

# Shaping the Gas Transmission System of the Future

## Supporting regional hydrogen transitions

We will start at 09.02 to allow participants to finish previous meetings and join the call

**nationalgrid**



While you are waiting, please access Sli.do which we will be using for Q&A

Event Code:

# #GTX7

### Sli.do Instructions:

You can access Sli.do at [www.sli.do](http://www.sli.do) or by downloading the Sli.do app.

Once you've logged on, enter the code above when prompted.



# Who will be speaking today?

**Danielle Stewart**  
Hydrogen Programme Manager



**Alastair Grundy**  
Hydrogen Development Engineer



**Sally Brewis**  
Head of Regional Development (East and London)  
Cadent



**Jane Herbert**  
Energy Futures Communications Manager



**Malcolm Arthur**  
Net Zero Policy Manager



**Jennifer Pemberton**  
Stakeholder Manager



# Logistics



Should last for approximately about 60 min



Questions and polling via slido.com #GTX7



All callers will be placed on mute



We will circulate the slides and a recording of this webinar

# Agenda

**UK Hydrogen Projects**

**Alignment on all scales**

**Regional transition projects**

**Decarbonising Heat**

**Questions**

# Hydrogen roadmap to 2050

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**BUILDING THE EVIDENCE BASE**

**2020**

- 01 Programme of work for hydrogen informed
- 02 Government Ten Point Plan and Energy White Paper

**2021**

- 03 Key Government strategies published
- 04 Policy influencing development
- 05 FutureGrid programme begins

**2022**

- 06 Hydrogen and CCUS business models finalised
- 07 Continued strategic stakeholder engagement

**ENABLING THE TRANSITION**

**2024**

- 12 Trials prove ability to deblend
- 13 Upskilling the workforce

**2023**

- 08 Increased hydrogen production
- 09 Hydrogen neighbourhood trials
- 10 20% blend testing complete
- 11 Online transmission trials begin

**2025**

- 14 1GW of hydrogen production capacity
- 15 GS(M)R updated and Hydrogen blends injected into NTS
- 16 First hydrogen village established
- 17 Hydrogen-ready boilers mandated

**2026**

- 18 Two low-carbon clusters are operational with CCUS
- 19 NTS Conversion Plan finalised

**2027**

- 20 Project Union hydrogen transmission backbone begins

**2029**

- 21 Third cluster operational

**GROWING THE HYDROGEN NETWORK**

**2038**

- 33 Distribution networks move towards national coverage
- 34 NTS moves towards national coverage

**2035**

- 32 NTS able to support imports and exports of hydrogen at interconnectors

**2032**

- 30 Green hydrogen becomes cost competitive with blue hydrogen
- 31 5th low-carbon cluster operational and joins backbone

**2031**

- 27 Hydrogen power generation
- 28 4th cluster joins the backbone
- 29 Distribution networks continue conversion to hydrogen

**2030**

- 22 40GW of offshore wind
- 23 5GW hydrogen production capacity
- 24 Scotland GHG emissions reduced by 75%
- 26 First hydrogen town  
Four low-carbon clusters operational

**REACHING NET ZERO**

**2040**

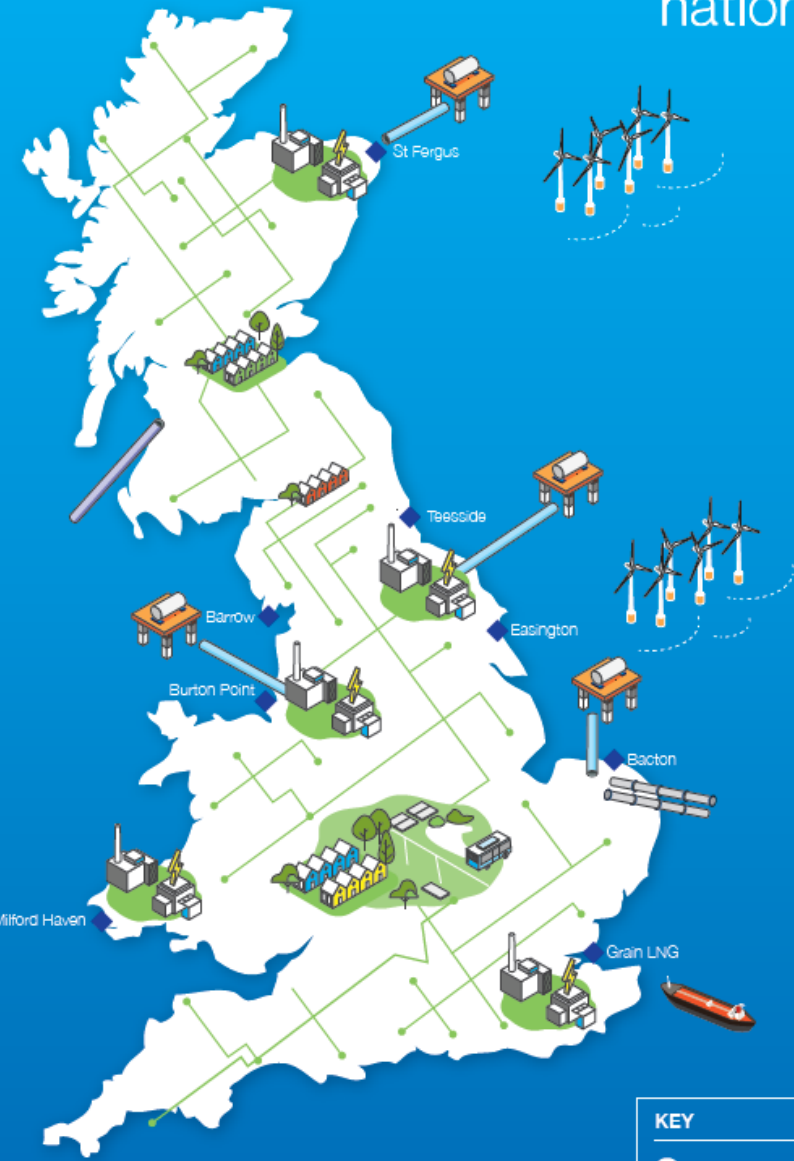
- 35 Scotland GHG emissions reduced by 90%

**2045**

- 36 Scotland achieves Net Zero
- 37 National Hydrogen Transmission Network

**2050**

- 38 UK achieves Net Zero



**KEY**

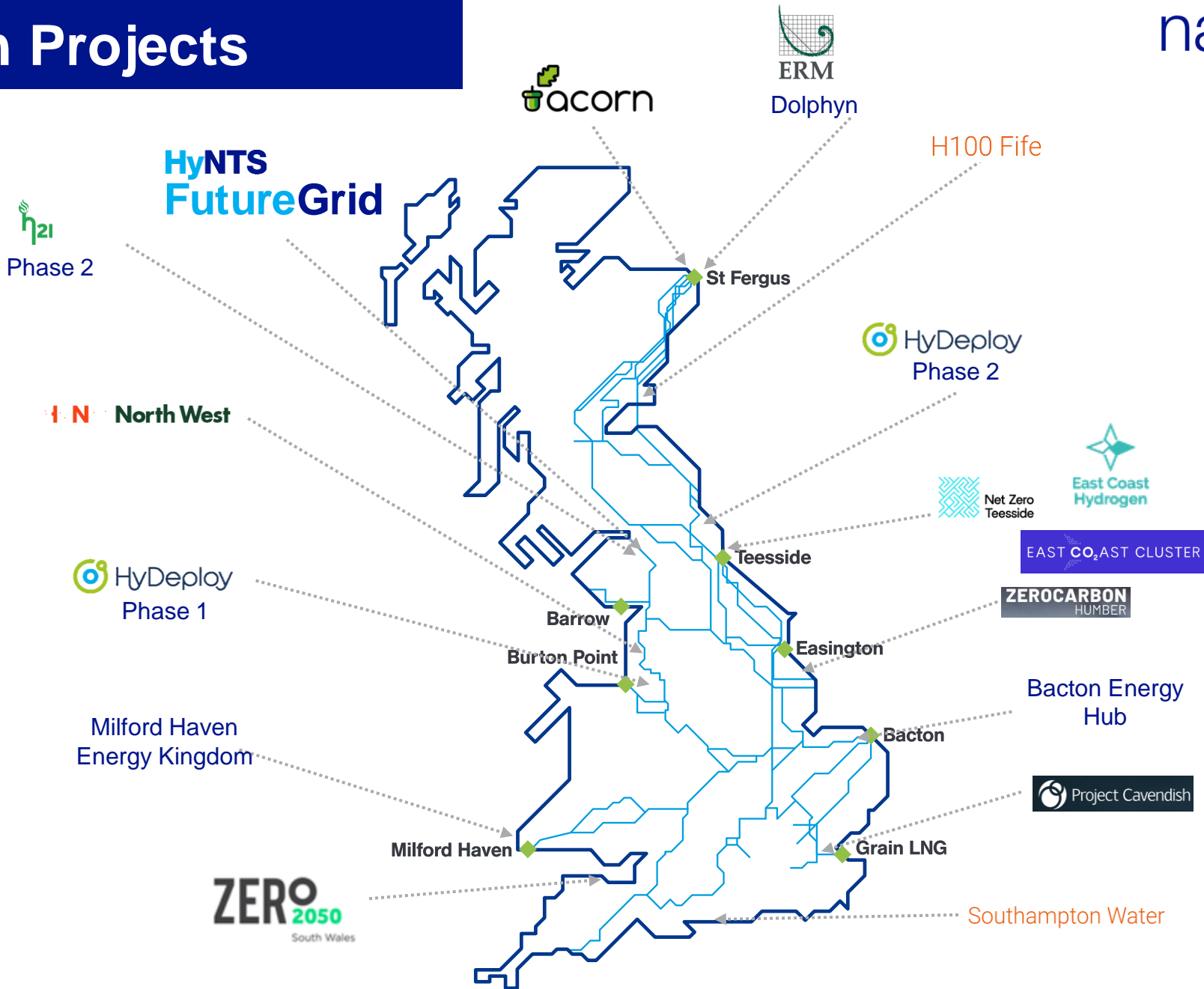
- Government milestones
- ◆ Industry milestones

Dates are estimated and subject to change.  
Illustrations shown on map are not indicative of actual geographical location.

**Net Zero**

# UK Hydrogen Projects

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Hy4Heat

ProjectUnion

# Quick poll

**How should we prioritise our engagement?**

**International**

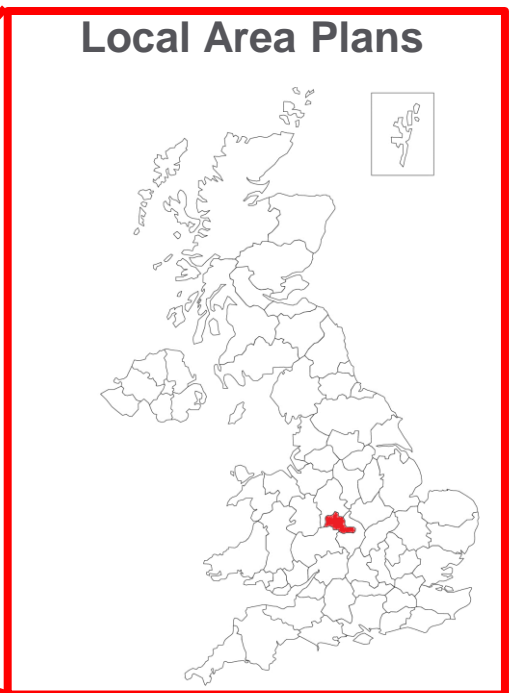
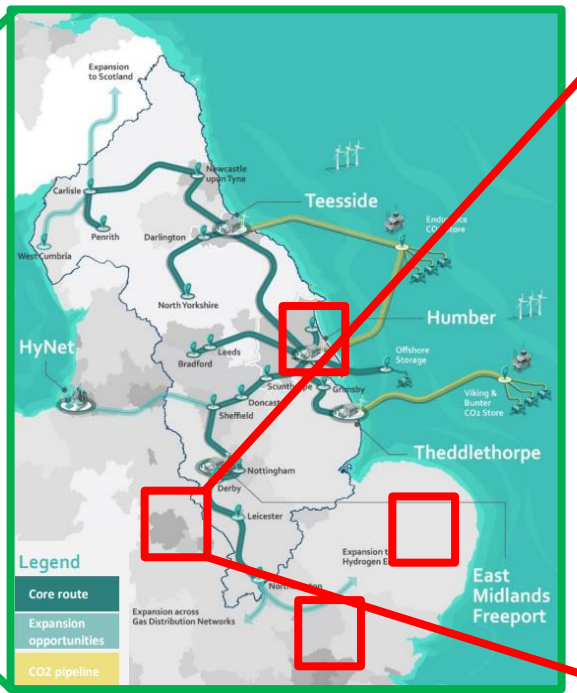
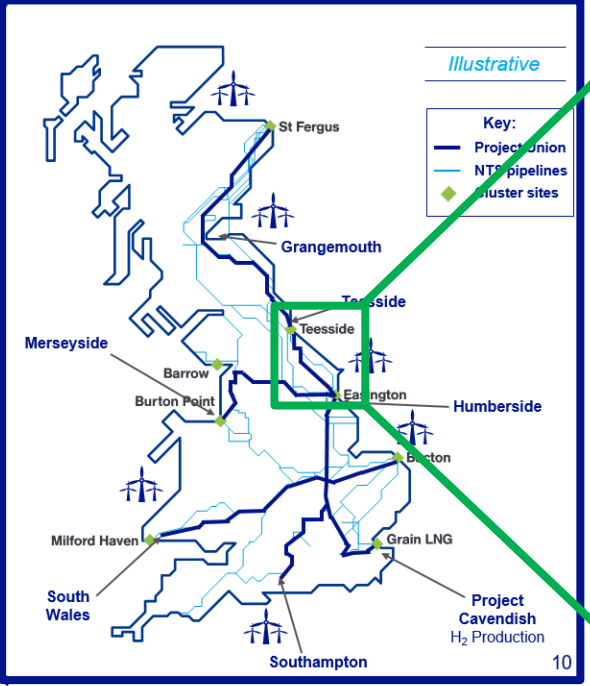
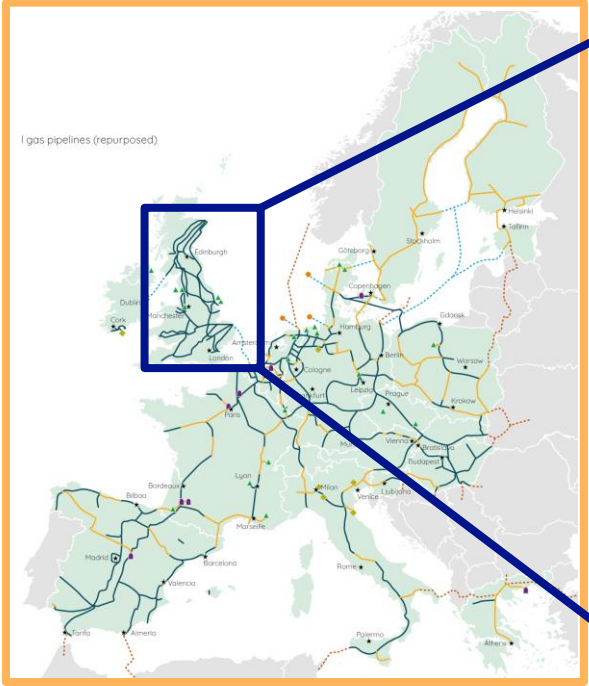
**National**

**Regional**

**Local**

**Please explain**

# Alignment on all scales





# Project Union



Development of a UK hydrogen “backbone” by repurposing ~2,000 km of existing assets (~25% of NTS today)



Integral to delivering the UK’s hydrogen strategy



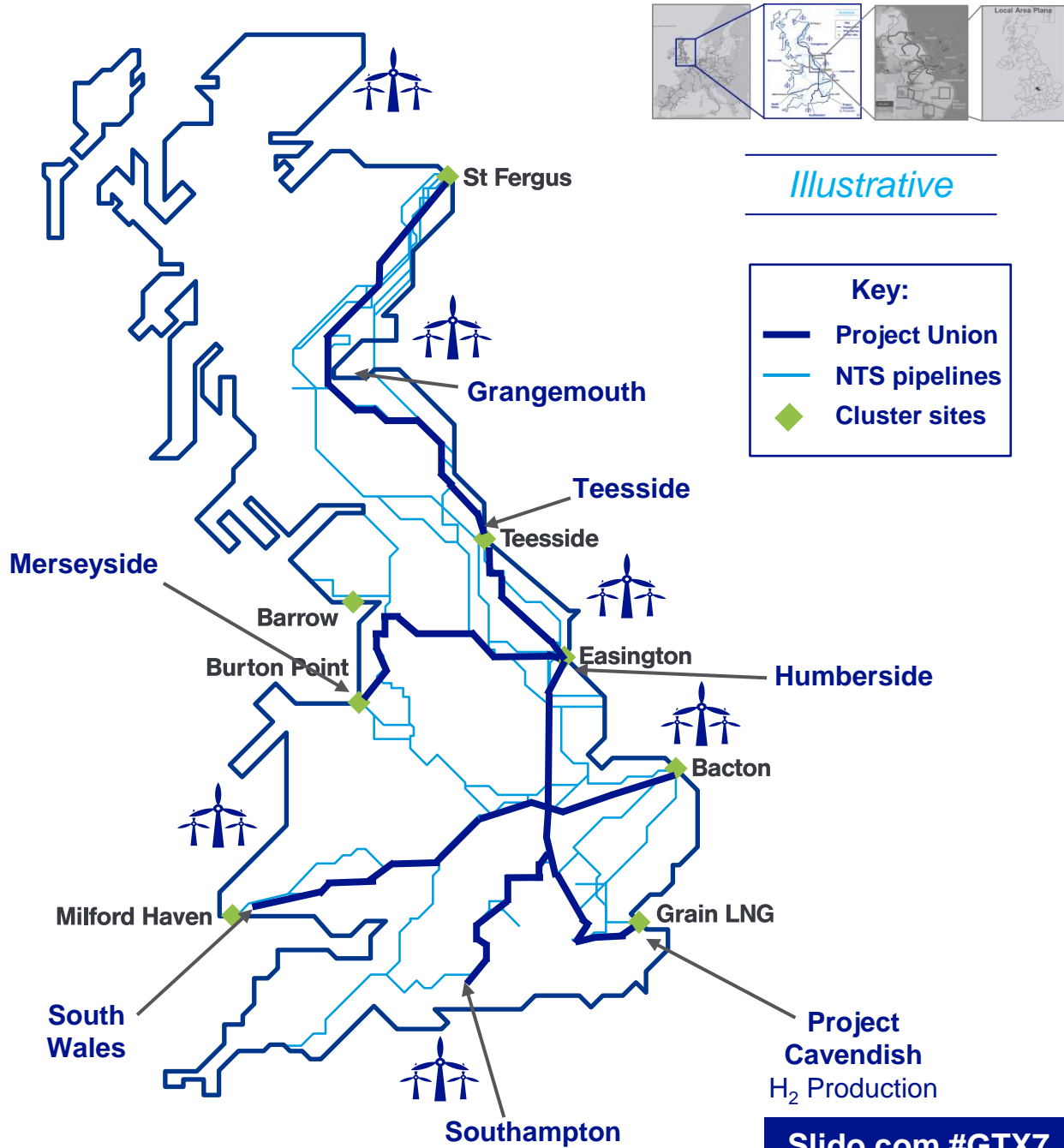
Aligned to green and blue hydrogen developments and CCUS clusters



Decarbonise heavy industry (e.g. steel, concrete, and glass manufacturers)



Connect hydrogen production, demand, storage, and export centres





East Coast  
Hydrogen

# East Coast Hydrogen

*Bringing Hydrogen to You*

2<sup>nd</sup> December 2021



Northern  
Gas Networks 

**Cadent**  
Your Gas Network

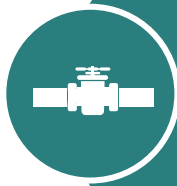
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# 1. East Coast Hydrogen Overview

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**Connect hydrogen supply with hydrogen demand** across multiple end use cases commencing with industrials fuel switching to hydrogen



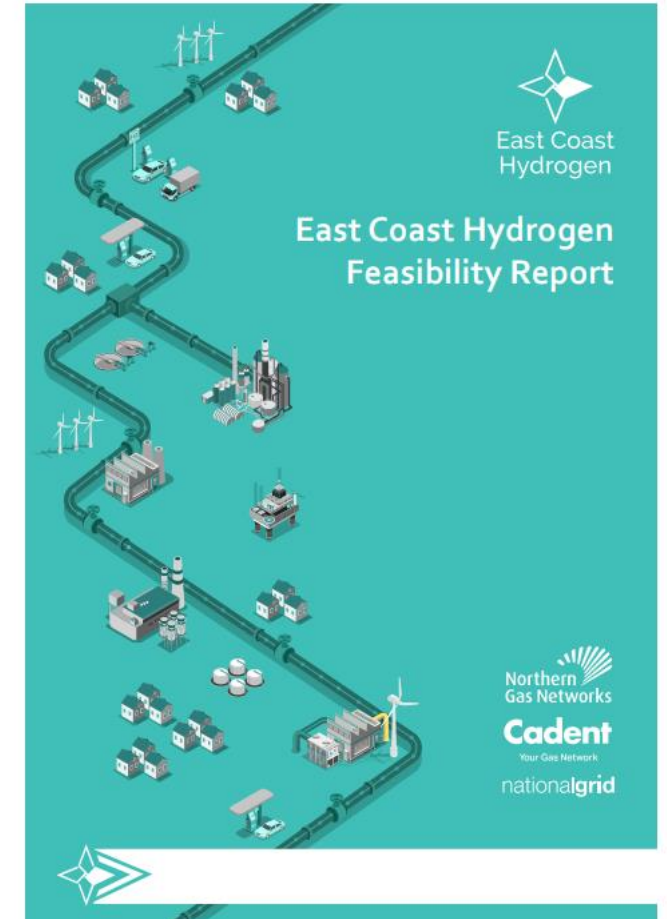
**Transport hydrogen** through repurposed and new build pipelines to industrial users first with further potential to supply domestic users



**Build resilience** with the interconnectivity of the Humber and Teesside industrial clusters and storage facilities across the East Coast Hydrogen region

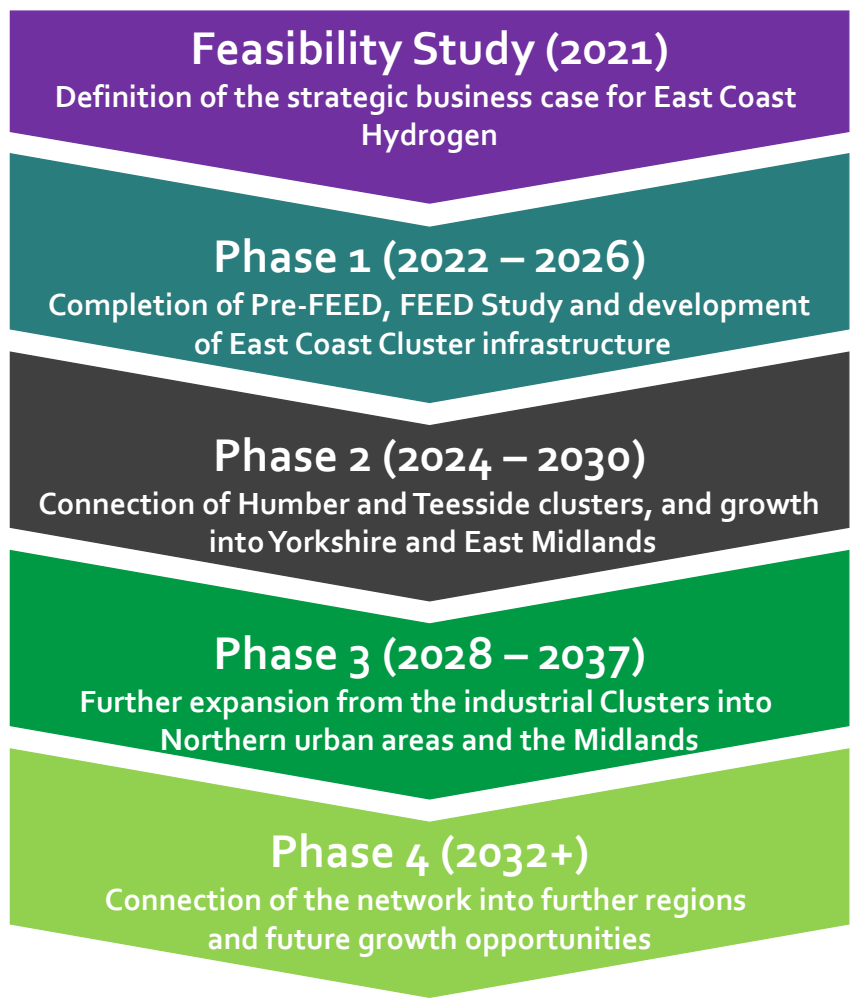


**Support efficient market growth** by balancing supply and demand and enabling connections across the East Coast Hydrogen region

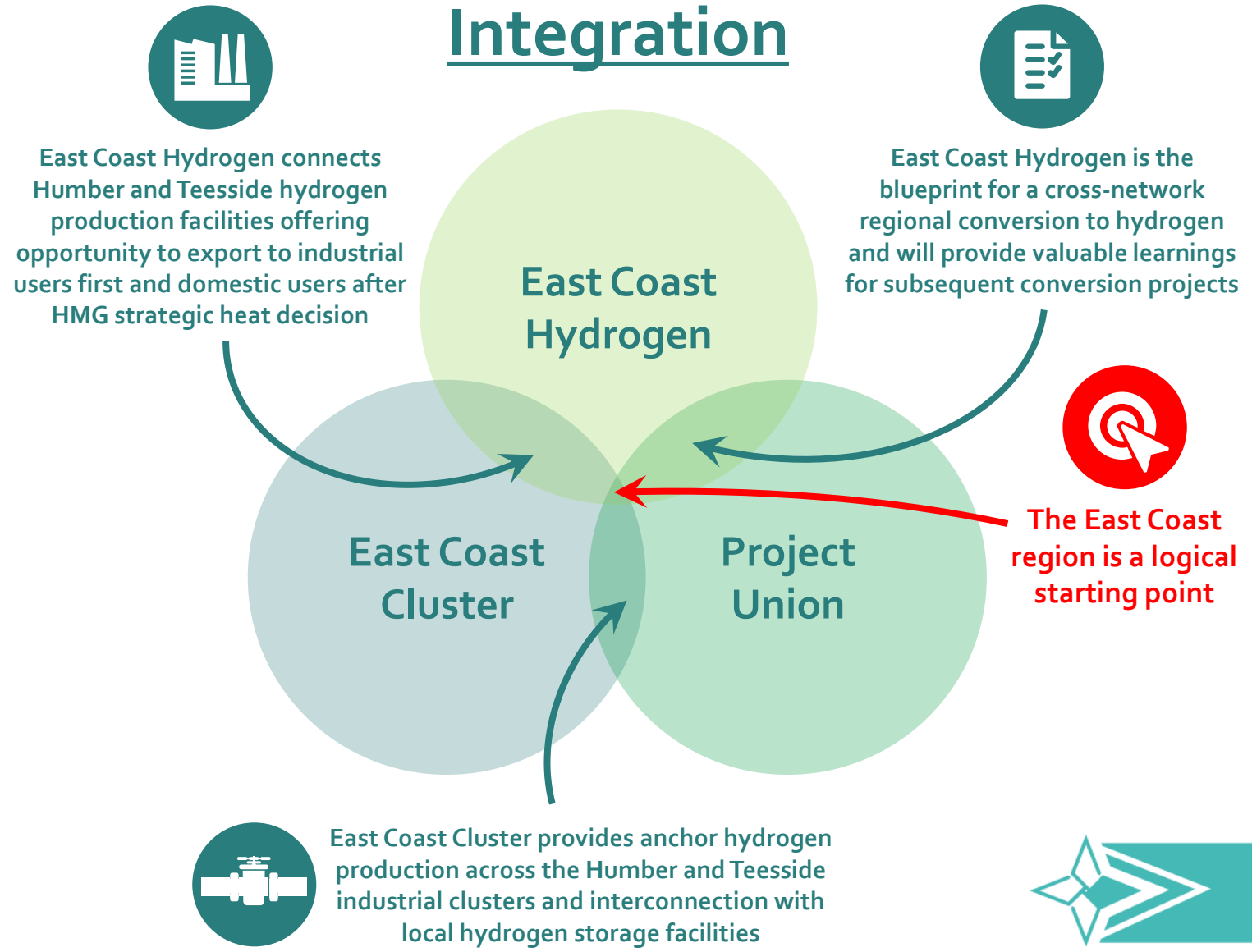


# 2. East Coast Hydrogen Strategy

## Phases



## Integration



# Initial Feasibility Study results

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## 1. Industrial decarbonisation



**Up to 39,000**

Commercial and industrial sites supplied with low carbon heating and process fuel



**~60TWh**

Annual industrial and commercial gas demand decarbonised by East Coast Hydrogen



**Up to 11.5MtCO<sub>2</sub>**

Annual avoided industrial emissions by fuel switching from gas to hydrogen



## 2. Domestic decarbonisation



**Up to 4.4 million**

Domestic properties switched to a low carbon heating solution



**~50TWh**

Annual gas demand decarbonised by East Coast Hydrogen



**Up to 9MtCO<sub>2</sub>**

Annual avoided domestic emissions from switching to a hydrogen gas supply



## 3. Interconnectivity



**Up to 7GW**

Current planned hydrogen production in the East Coast Hydrogen area



**~800km**

Repurposed and dedicated new-build hydrogen pipelines



**~12TWh**

Planned hydrogen storage capacity in the East Coast Hydrogen area





# Hydrogen Village Trials

# Hydrogen Village Trial



Department  
of Energy &  
Climate Change

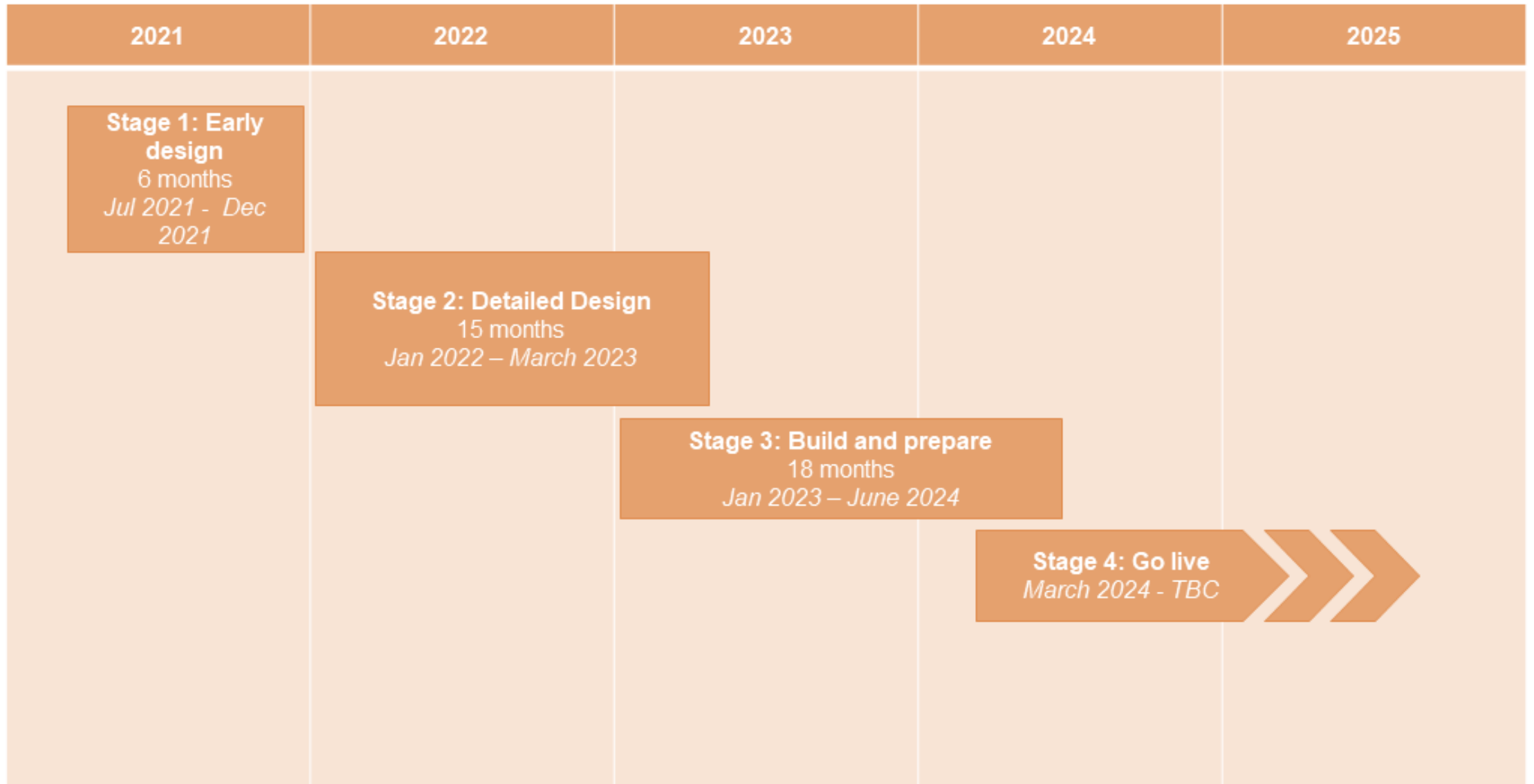
- Invited by BEIS to put forward a proposal to deliver a 100% hydrogen village trial
- Includes new 100% hydrogen appliances
- 1000 – 2000 properties including domestic, commercial and industrial
- Residential homes, leisure centre, Council offices, shops and a college
- Live for a minimum of 1 year



we are  
the network

Slido.com #GTX7

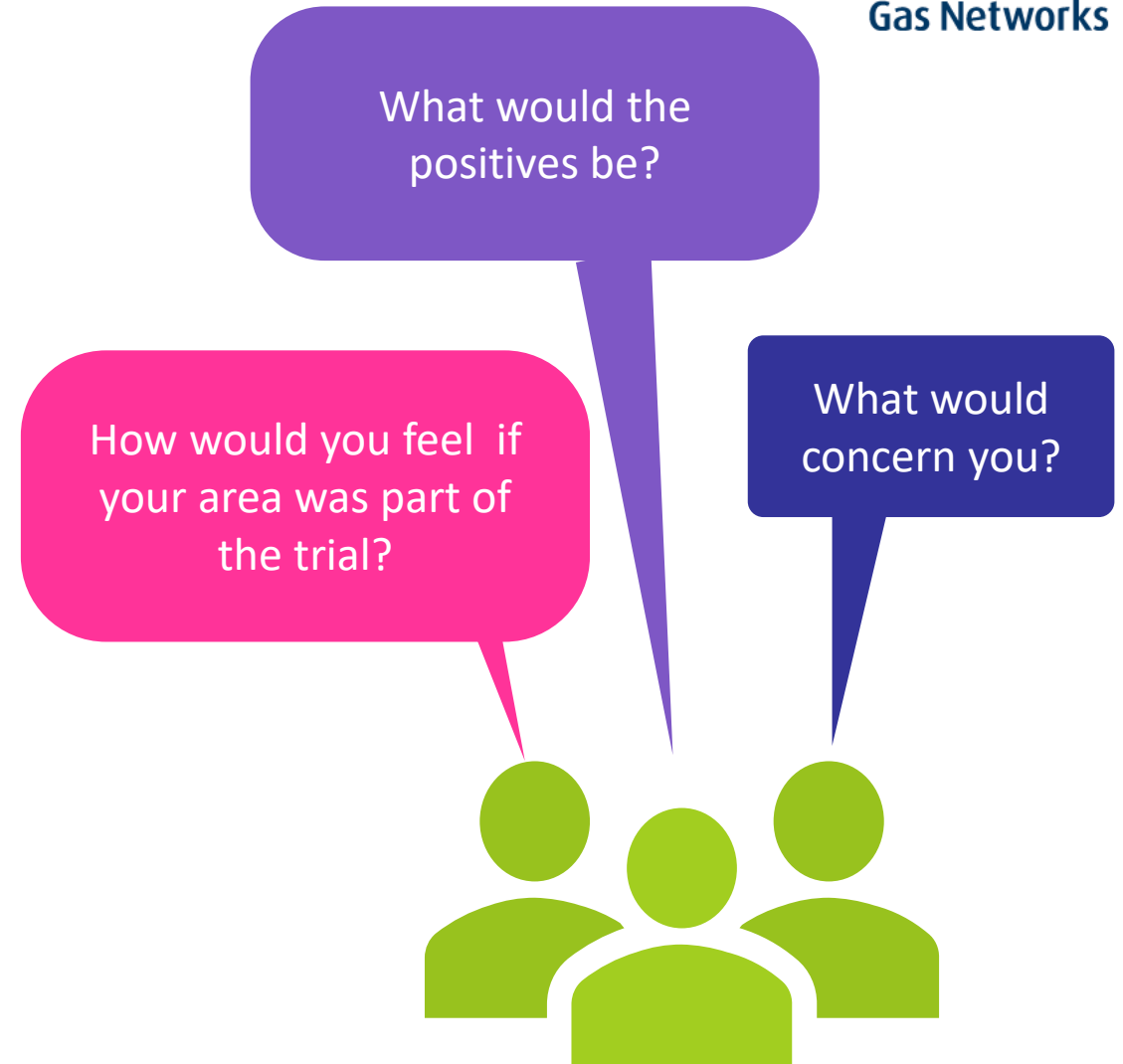
# Village Trials – BEIS Stages





# Hydrogen Village Trial

- Important to note that the trial is being designed to reflect the home heating choices that may be available in 2050 e.g. no Natural Gas with a focus on trialing alternative heating options
- Option to **choose between hydrogen or all electric solution** e.g. heat pumps, electric heaters etc
- BEIS clear that **no one should be financially disadvantaged from the trial**, therefore energy bills during the trial will not increase as a result
- Undertaking extensive consumer research to ensure that the trial is a fair and just one for all customers



# Quick poll - results

**How should we prioritise our engagement?**

**International**

**National**

**Regional**

**Local**

**Please explain**

Gas  
Transmission

# Decarbonising Heat

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# Quick poll

**Will decarbonisation of heat be decided at a local / regional / national level?**

**Local**

**Regional**

**National**

**Please explain**

# Decarbonising Heat

## Why does heat matter?

How we heat our homes matters to **everyone in the UK** – it is an essential source of wellbeing in society

**85% of homes** in the UK are heated by natural gas

**1.7 million** gas boilers are installed each year

Need to upgrade **20,000 homes per week** from now to 2050 to deliver net zero heat

The future of heat needs to be **clean, affordable and convenient** for consumers



# Decarbonising Heat

**There are a range of potential technologies to decarbonise heat**

**Heat  
networks**

**Heat pumps**

**Hydrogen**

**Biogas &  
biomass**

**Hybrid  
solutions**

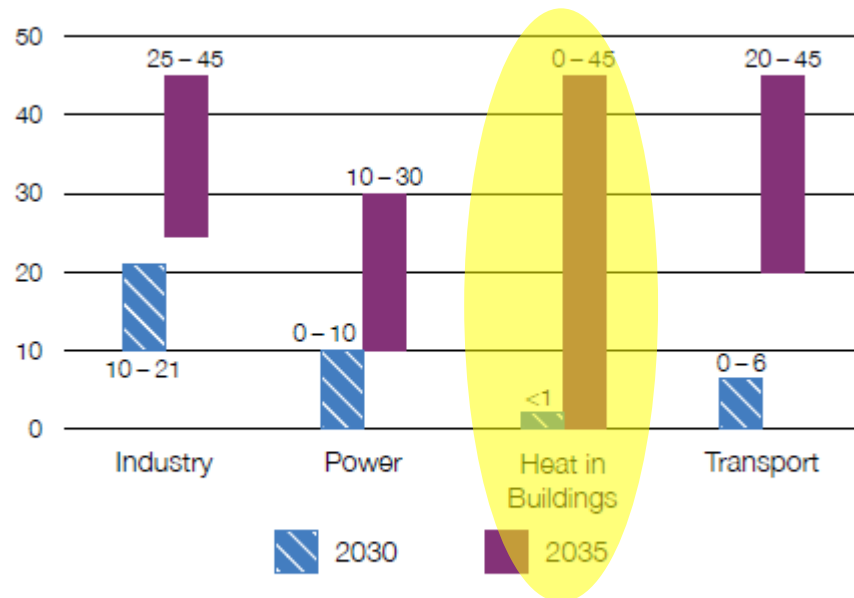
**Improved  
energy  
efficiency**

**Smart  
measures**

# Decarbonising Heat

Extract from the Hydrogen Strategy

Figure 2.4: Illustrative hydrogen demand in 2030 and 2035



Source: BEIS analysis (see analytical annex). Note: figures do not include blending into the gas grid.

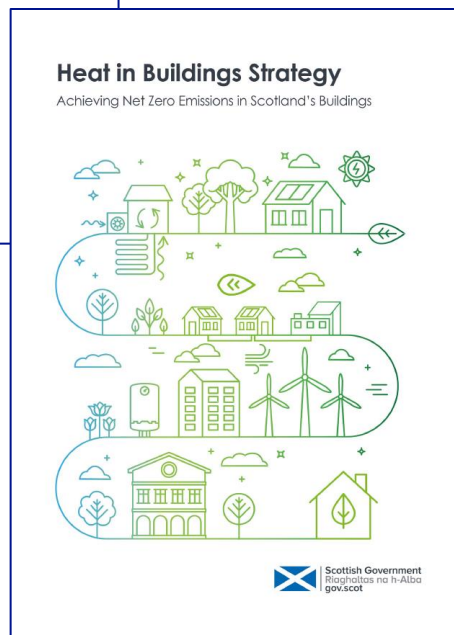
- Uncertainty about the extent that hydrogen will be used to heat homes
- Work being progressed that indicates a potential role for hydrogen

# Decarbonising Heat

## Recent Heat and Buildings Strategies



- A decision about the role of hydrogen in heat will be met in 2026
- Aim is to install 600k HP's by 2028
- Ambition that by 2035, no new gas boilers will be sold



- Aim to reduce emissions from buildings by 68% by 2030
- Will establish a National Public Energy Agency to accelerate the transformational change in how we heat and use energy in homes and buildings



# Quick poll - results

**Will decarbonisation of heat be decided at a local / regional / national level?**

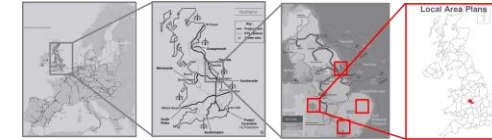
**Local**

**Regional**

**National**

**Please explain**

# Regional steering groups



## Regional Steering Groups

Regular **steering group** sessions to coordinate and move regions / projects forward

- Bring together the **Whole Energy System** to align projects to progress the regional solutions needed to transition
- Identify key projects in relevant areas
- Chair role to be agreed

### What it is:

Tactical forum to align projects (timings, interactions and outcomes)

A place to:

- Create visibility across the whole energy system of net zero projects
- Align delivery of projects with the local authority at least cost and disruption to consumers

### What it is NOT:

- A talking shop
- A forum for strategic discussions
- A route to gain or manage funding for projects
- A forum to inform decision makers

## Proposed regional groups

- Scotland
- North east
- North west
- Wales
- Ireland
- Centre
- South east
- South west



# Quick poll

Does this proposal work for you?

Yes

Somewhat

No

Please explain

# Q&A



# Thank you for joining us today

Keynote speech	Complete	<a href="#">Watch again</a>
Future of Gas	Complete	<a href="#">Watch again</a>
Innovation – broadening the horizon	Complete	<a href="#">Watch again</a>
Gas Market Plan	Complete	<a href="#">Watch again</a>
Transitioning to a hydrogen backbone	Thu 02 <sup>nd</sup> Dec 10.00 – 11.00	<a href="#">Watch again</a>
Managing methane emissions	Thu 02 <sup>nd</sup> Dec 13.00 – 14.00	<a href="#">Watch again</a>
Supporting regional hydrogen transitions	Fri 02 <sup>nd</sup> Dec 09.00 – 10.00	
Understanding the skills needed for a net zero world	Mon 06 <sup>th</sup> Dec 13.00 – 14.00	<a href="#">Register here</a>
Digital Strategy and Information Provision	Tue 07 <sup>th</sup> Dec 13.30 – 14.30	<a href="#">Register here</a>
Operating the network	Wed 08 <sup>th</sup> Dec 09.00 – 10.00	<a href="#">Register here</a>
FutureGrid 2021 Progress report	Tue 14 <sup>th</sup> Dec 10.00 – 11.00	<a href="#">Register here</a>
Annual Network Capability Assessment Report	Wed 15 <sup>nd</sup> Dec 10.00 – 11.00	<a href="#">Register here</a>

# What next?



You will receive the recording and material from today's session

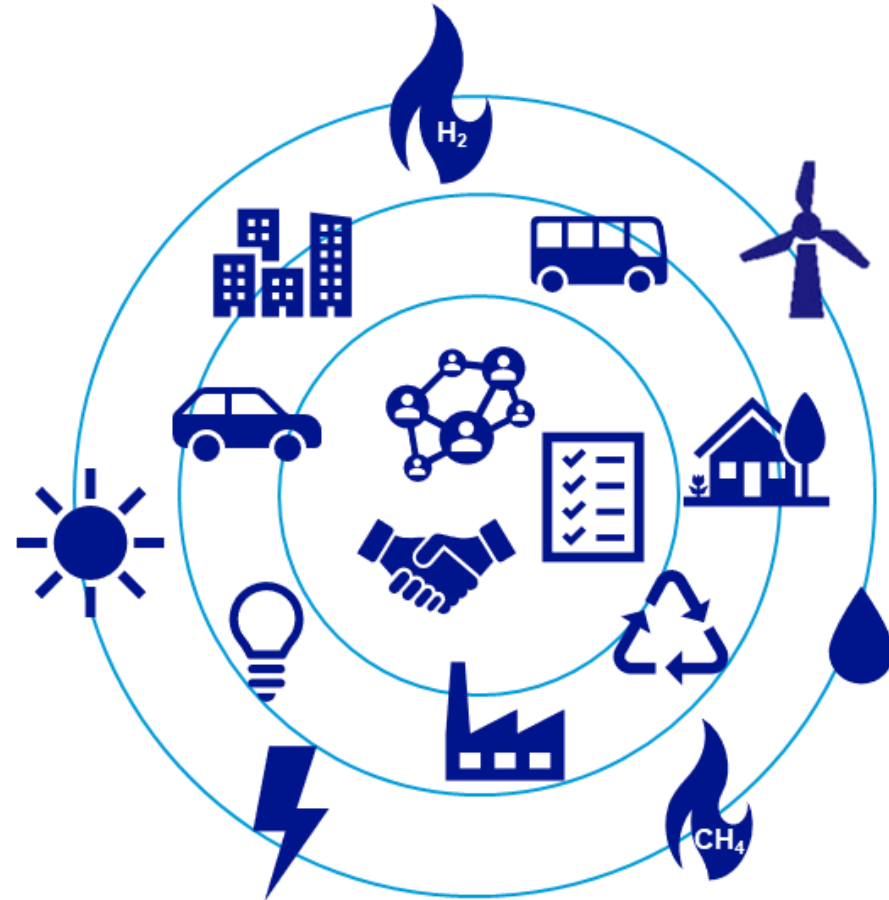


If you have any further questions or would like to discuss anything specific please get in touch with [Jennifer.Pemberton@nationalgrid.com](mailto:Jennifer.Pemberton@nationalgrid.com)



Feedback is important to us, therefore if you have not already taken part, we would like to put you forward for a survey

# Thank you



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