

The Future of Heat

We will start at 13.32 to allow participants to finish previous meetings and join the call

Slido.com
#GT11

Welcome and Opening

Thank you for joining us today

- The future of heat impacts us all.
- What will the future look like for heating? What are the options available and how does this fit in with getting us to Net Zero by 2050.
- As a gas transmission network we need to ensure we are ready for all of the different options in this space to help with a smooth energy transition.



Antony Green
Hydrogen Director

Who will be speaking?

Rosannah East
Market
Development Lead



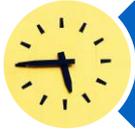
Malcolm Arthur
Policy Manager



Michelle Hocknull
Customer &
Stakeholder Lead



Logistics



Should last for approximately about 60 min



Questions and polling via slido.com #GT11



All callers will be placed on mute



We will circulate the slides and a recording of this webinar

Agenda

1. Future of Heat - Overview

2. Heat is a significant challenge to meeting net zero

3. It will require a mosaic of options – housing stock research

4. Our network will support the transition for all options

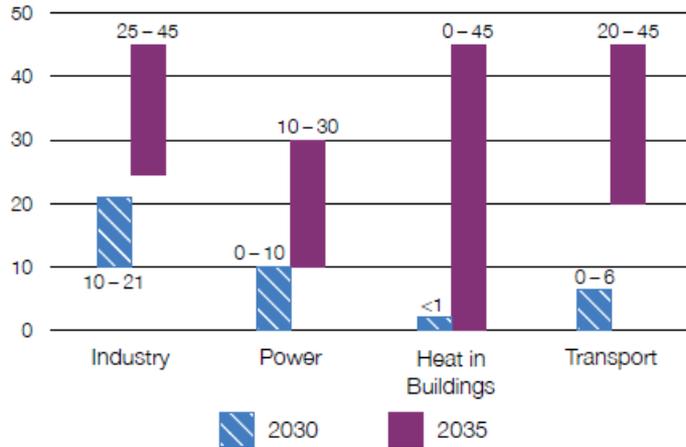
Overview



Role of hydrogen in 2030 and beyond

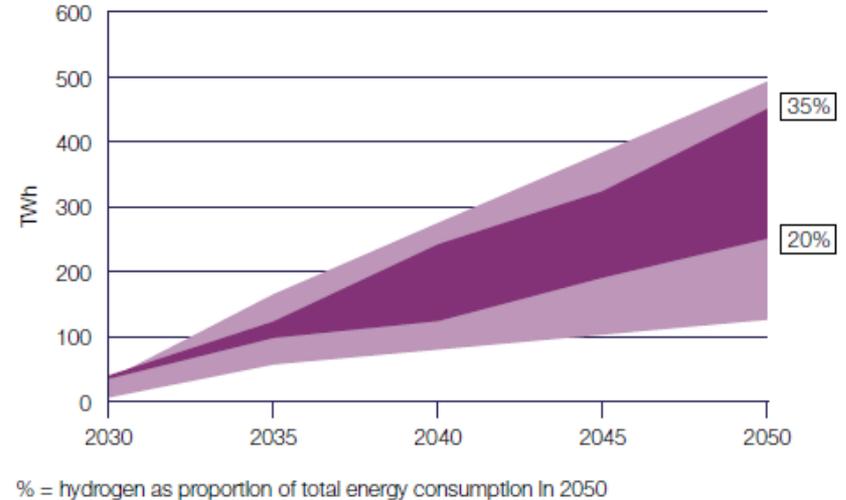
BEIS aim:to enable the low carbon hydrogen market to grow from fragmented initial stages to a highly integrated, competitive, transparent and liquid end state where hydrogen can compete against other technologies without support.

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.

Figure 1.2: Hydrogen demand and proportion of final energy consumption in 2050



% = hydrogen as proportion of total energy consumption in 2050

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.

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

There is consensus on the need to act

“The decarbonisation of heat is arguably the biggest challenge facing UK energy policy over the next few decades.”

Ofgem Future Insights, November 2016



**Heat is a
significant
challenge to
meeting net zero**



Heat Policy – Key Points



HM Government

Heat and Buildings Strategy

Presented to Parliament by the Secretary of State for Business, Energy and Industrial Strategy by Command of Her Majesty

October 2021

CP 388

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- 1. To meet Net Zero virtually all heat in buildings will need to be decarbonised**
- 2. The journey to Net Zero buildings starts with better energy performance**
- 3. Fairness and affordability are at the heart of our approach**
- 4. We will take major strategic decisions on the role of hydrogen for heat by 2026**
- 5. We need to take a co-ordinated system-wide approach to decarbonise cost-effectively.**

Interesting Facts

Recap on the heat decarbonisation challenge

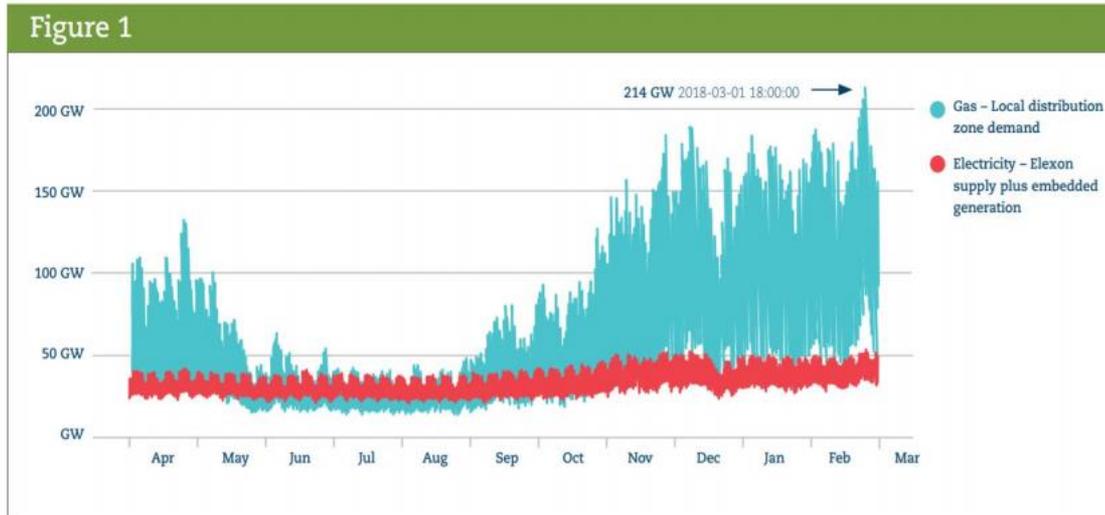


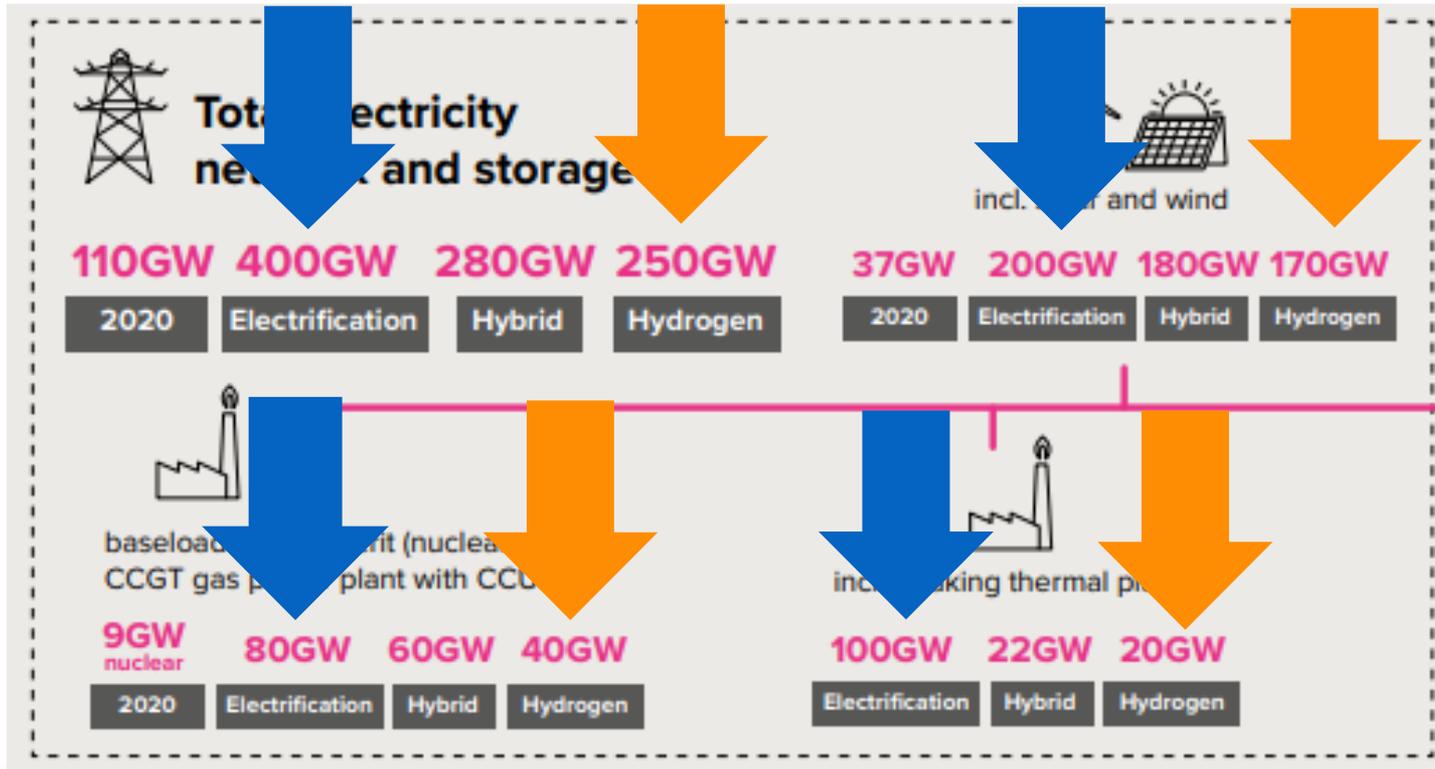
Figure 1: Britain's hourly local gas demand and electrical system supply, 2nd April 2017 - 6th March 2018.

Gas heat demand is 4 – 5 times electricity peak demand

Need to understand the implications on moving some (or all) this onto electricity networks

Delivering net zero heat

Mott McDonald Report – The Path to Zero Carbon Heat



Gas transmission

Existing housing stock is hugely varied making the challenge of decarbonisation hard

- There is wide variety in our existing housing stock with different types of homes e.g. detached, semi-detached, terraces, flats, bungalows potentially requiring a different low carbon heating solution
- The majority of buildings that exist today (around 80%) will still exist in 2050, which means a huge retrofitting challenge to make homes low carbon.



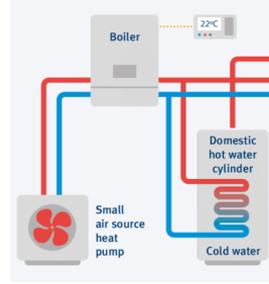
**It will require
a mosaic of
solutions**



There are a variety of options for decarbonising heat in homes and all will play a role in the transition



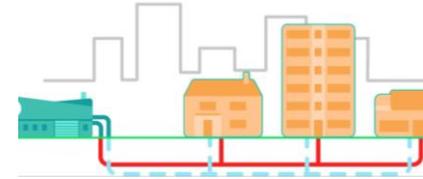
Heat pumps



Hybrid heat pump



Hydrogen boilers



District Heat



Electric resistive heating

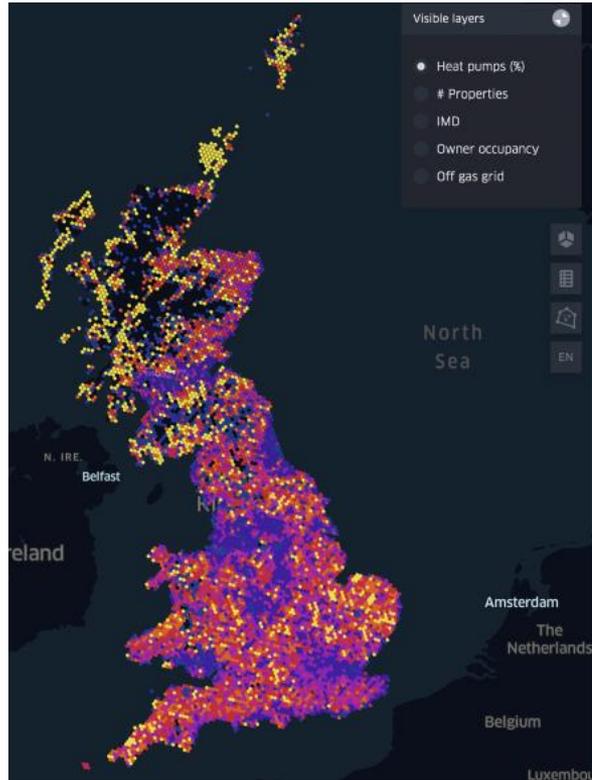


Biomass boiler



Biomethane boiler

It is interesting to look at where heat pumps have already been installed



Source: Nesta, 2022. Map to show where heat pumps are installed across GB



Source: Nesta, 2022. Map to show population density across GB.

There are conflicting views on the suitability of heat pumps to different housing types



Case Study

Electrification of Heat – 1920s detached house heat pump



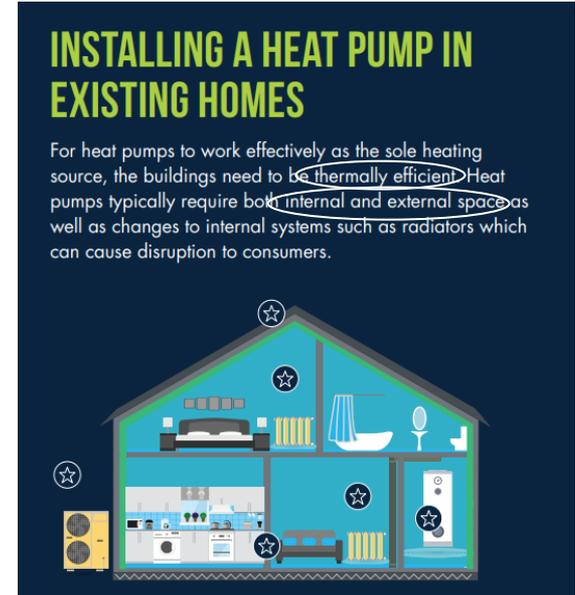
Case Study

Electrification of Heat – 2000s flat heat pump and heat battery

[Click here for more](#) →

‘There is no property type or architectural era that is unsuitable for a heat pump’

Source: [Energy Systems Catapult: Electrification of Heat UK Demonstration Project \(2021\)](#)



‘Our analysis shows that it is likely to be impractical to heat many GB homes with heat pumps only.’

Source: [EUA: Decarbonising Heat in Buildings: Putting Consumers First \(2021\)](#)

The prevalence of terraces and flats in these 7 Local Distribution Zones require a different solution

North West LDZ:
1.7 million terraces and flats
57% of building stock in LDZ

West Midlands LDZ:
1.2 million terraces and flats
54% of building stock in LDZ

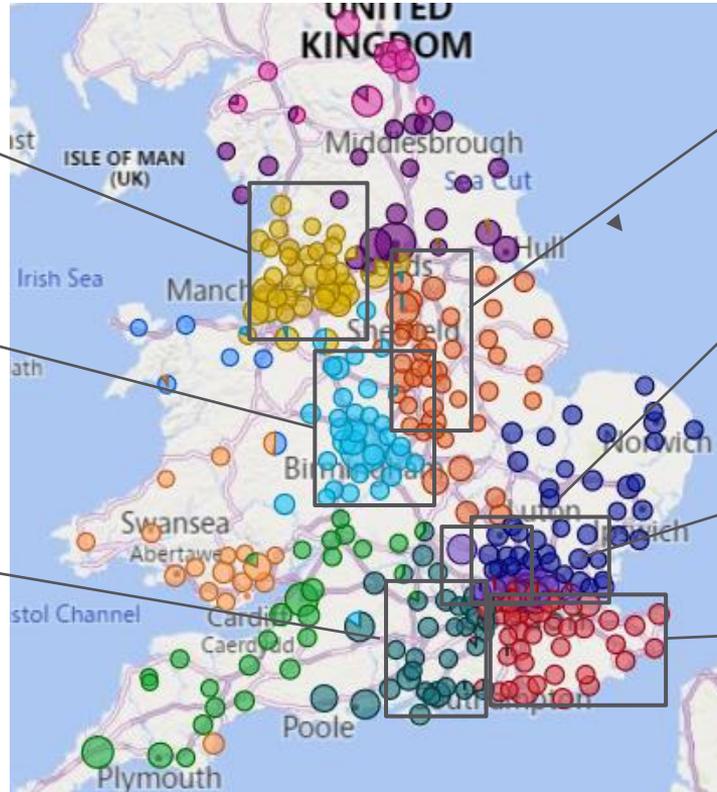
Southern LDZ:
1.1 million terraces and flats
66% of building stock in LDZ

East Midlands LDZ:
1.4 million terraces and flats
51% of building stock in LDZ

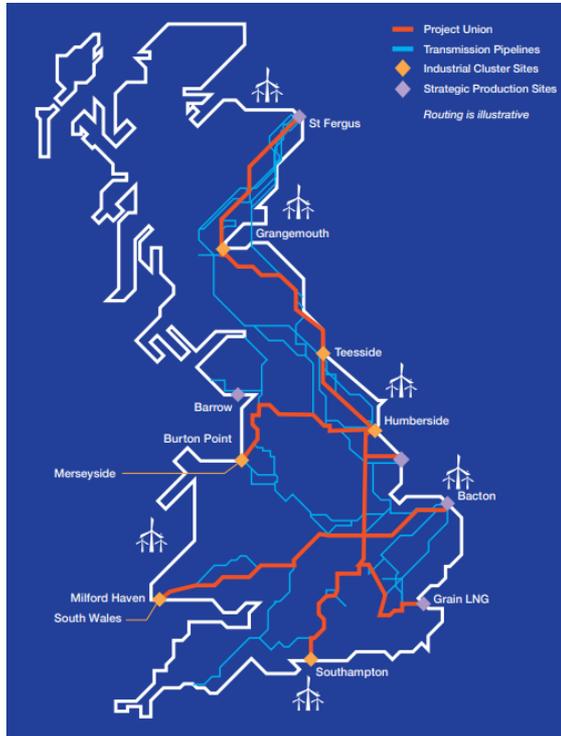
Eastern LDZ:
1.1 million terraces and flats
54% of building stock in LDZ

Northern Thames LDZ:
1.9 million terraces and flats
69% of building stock in LDZ

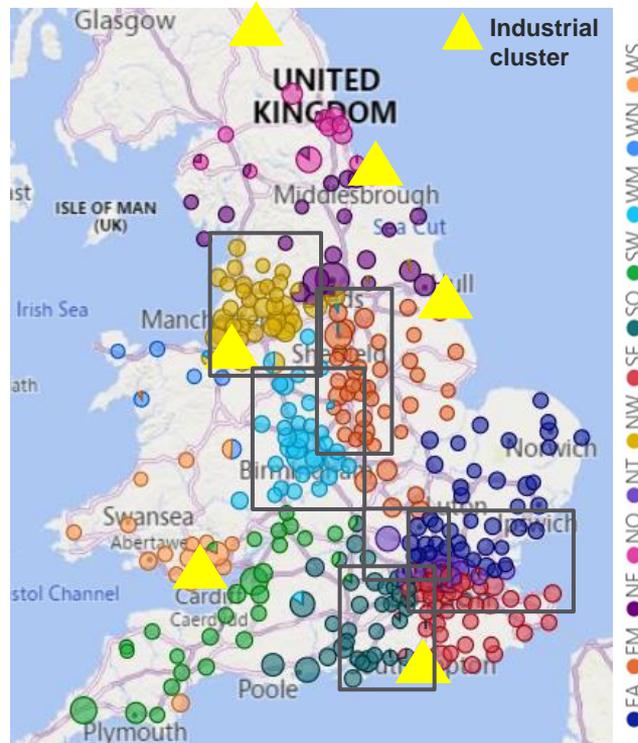
South East LDZ:
1.9 million terraces and flats
62% of building stock in LDZ



Project Union will connect industrial clusters, moving hydrogen supply to meet heat demand



Routing is illustrative – potential pipeline routes will be identified in the feasibility phase (2023-2025)



Density of terraces and flats across England and Wales by LDZ with industrial cluster locations marked

**Our network
will support
the transition**

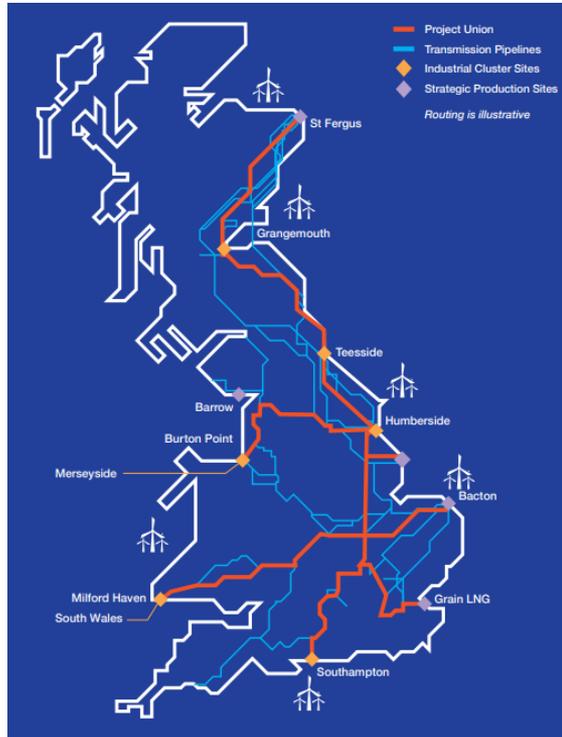


The decision on hydrogen for heat is critical to understanding the size of the future hydrogen market

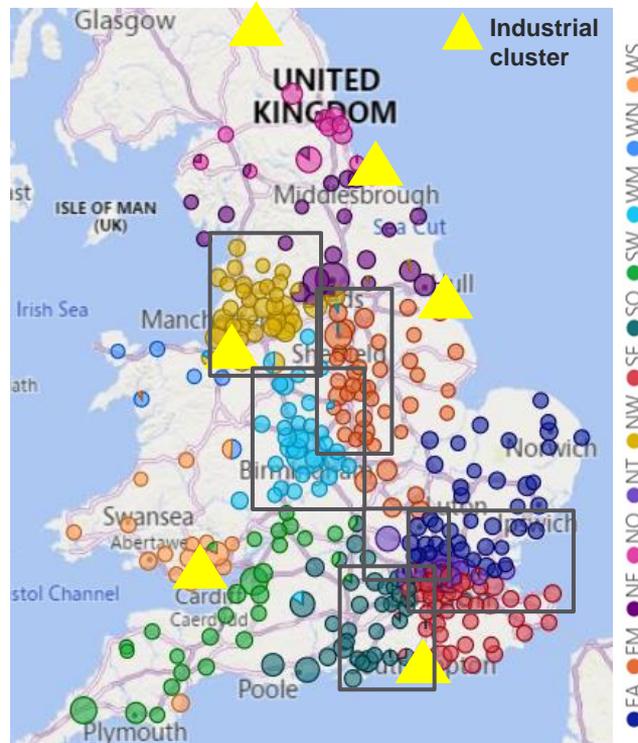
In 2020, residential gas demand was around 30 bcm for the year, which was 42% of total gas demand. If hydrogen were to supply the significant proportion of homes in Great Britain, that creates a large source of demand for hydrogen. We will need to understand the implications for the development of hydrogen production and also the hydrogen transmission system



Project Union will initially connect industrial clusters, providing producers access to large heat market



Routing is illustrative – potential pipeline routes will be identified in the feasibility phase (2023-2025)



Density of terraces and flats across England and Wales by LDZ with industrial cluster locations marked

Connecting hydrogen production sites via a transmission system helps to:

- ✓ Provide producers access to larger markets, enabling faster scale up of low carbon hydrogen
- ✓ Enable competition and create a liquid market
- ✓ Drive down costs for consumers, and
- ✓ Improve security and certainty of supply.

Next steps: creating a clearer picture of low carbon heat across England and Wales

- **Heat network zones:** Overlay map with where heat network zones are planned to be – indicating where heat networks are thought to be the most cost effective option for consumers
- **Costs associated** with moving the country to low carbon heat, including:
 - Likely cost of hydrogen production
 - Cost of repurposing gas networks for hydrogen
 - Likely cost of insulating all homes up to a minimum standard
 - Cost of reinforcing the electricity network for varying numbers of consumers using heat pumps to heat homes

Questions



Webinar Programme

<https://ngrid.com/3ESgN1t>



Event Name	Date / Time	Presenters
Facilitating Commercial & Regulatory Change	Tuesday 29th November @ 09:30	Ian Radley, System Operations Director
Sustainable Construction	Wednesday 30th November @ 09:00	Mark Lissimore, Construction Director
Accessing Energy Data	Thursday 1st December @ 11:00	Mark Lissimore, Construction Director
Operating the Network	Friday 2nd December @ 13:00	Ian Radley, System Operations Director
Blending	Monday 5th December @ 10:00	Tony Green, Hydrogen Director
Transitioning to 100%	Tuesday 6th December @ 11:00	Martin Cook, Commercial Director
Hydrogen Regulatory Framework	Wednesday 7th December @ 12:00	Tony Nixon, Regulation Director
Monitoring and Mitigating Methane Emissions	Thursday 8th December @ 13:00	Steven Vallender, Asset Director
Future of Heat	Friday 9th December @ 13:30	Tony Green, Hydrogen Director
FutureGrid - Progress Report	Monday 12th December @ 14:00	Tony Green, Hydrogen Director
Innovation	Tuesday 13th December @ 13:00	Tony Green, Hydrogen Director
Driving a Positive Environmental & Community Impact	Wednesday 14th December @ 10:00	Jake Tudge, Corporate Affairs Director

What next?



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



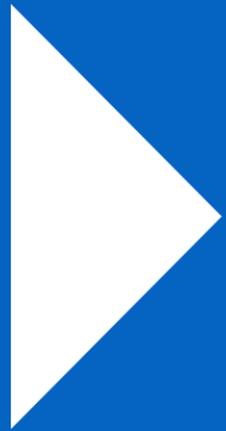
If you have any further questions or would like to discuss anything specific please get in touch with michelle.hocknull@nationalgrid.com



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 for joining us





Gas

Transmission