Government's Approach to Decarbonising Heat

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Department for Business, Energy & Industrial Strategy

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What's the challenge we're trying to tackle?

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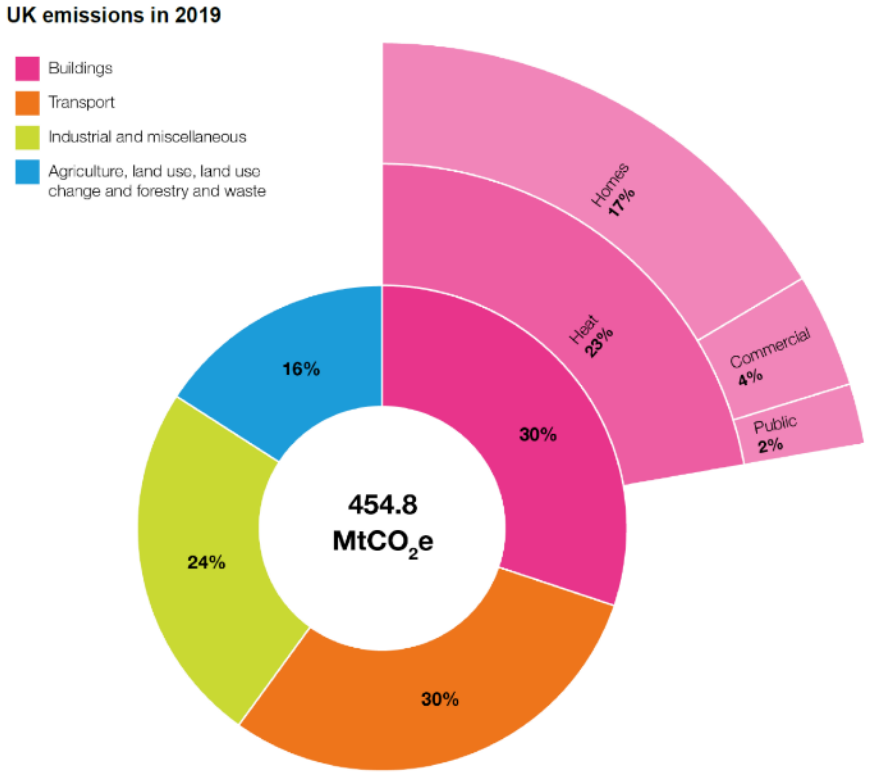
The heat decarbonisation challenge

- In 2019, the UK government set a legally binding-target to achieve **net-zero** greenhouse gas emissions from across the UK economy by 2050.
- Heating is responsible for **over a third of UK emissions**. Meeting our net-zero target will require virtually all heat in buildings to be decarbonised by 2050.
- With around half of our natural gas being used in heating, transitioning away from volatile global gas markets is also an **energy security priority**.
- Decarbonising heat is arguably the hardest challenge to overcome in reaching net zero. It's **consumer-facing**, it's **disruptive**, there are **multiple actors** involved and there is **no one size fits all solution**.



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Our strategy for decarbonising buildings

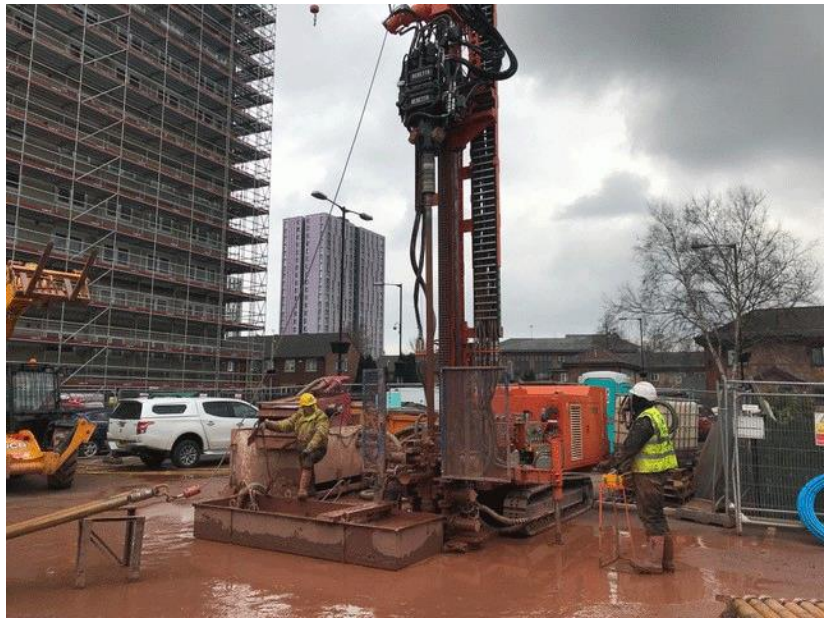
- Given the diversity of buildings and consumer preference, a variety of heating technologies are likely to be required to meet this challenge, including **solar thermal**, **biomass**, **direct electric heating**, **heat networks**, **hydrogen** for heat and **heat pumps**.
- However, our modelling suggests that even if strategic decisions find that hydrogen has a role in decarbonising heating, heat pumps will have a **major role** to play in all our future heating scenarios.
- We currently install around 55,000 heat pumps a year, but to meet our carbon commitments we need to install **600,000 heat pumps a year by 2028**.
- In October 2021, we published our **Heat and Buildings Strategy** where we set out our plan to ensure that the building sector stays on track to achieve net zero, including announcing policies to accelerate action on heat pumps.

Heat and Buildings Strategy – At a Glance:

- ✓ Providing **£3.9bn in public funding** to decarbonise our homes and businesses.
- ✓ Introducing a **Future Homes Standard** for new build in 2025 and consulting on banning new gas connections.
- ✓ Consulting on **ending the installation of new fossil fuel heating** for homes and non-domestic buildings **off the gas grid**, starting in the mid 2020s.
- ✓ **Aiming to phase out** the installation of new and replacement natural gas boilers by 2035 at the latest.
- ✓ Launching a **market-based mechanism** for heat pumps, expected to run from 2024.
- ✓ **Investing in R&D on hydrogen for heat**, including trials, enabling strategic decisions on future of gas grid by 2026.
- ✓ **Investing £60m in heat pump innovation** through the new “Heat Pump Ready” programme.

Stimulating demand through public investment

- Drilling down further into our policies…we are providing significant funding and subsidy for heat pump installations, including:
  - The **£450m Boiler Upgrade Scheme** in England and Wales, which will run for three years (2022-2025) and will provide upfront capital grants of **£5,000 for ASHPs** and biomass boilers, and **£6,000 for GSHPs.** Targeted at owner-occupiers.
  - As well as spending through schemes which support both heat decarbonisation and building fabric upgrades:
    - **£950m Home Upgrade Grant**,
    - **£800m Social Housing Decarbonisation Fund**, and
    - **£1.4bn for Public Sector Decarbonisation Scheme.**



…and through regulations

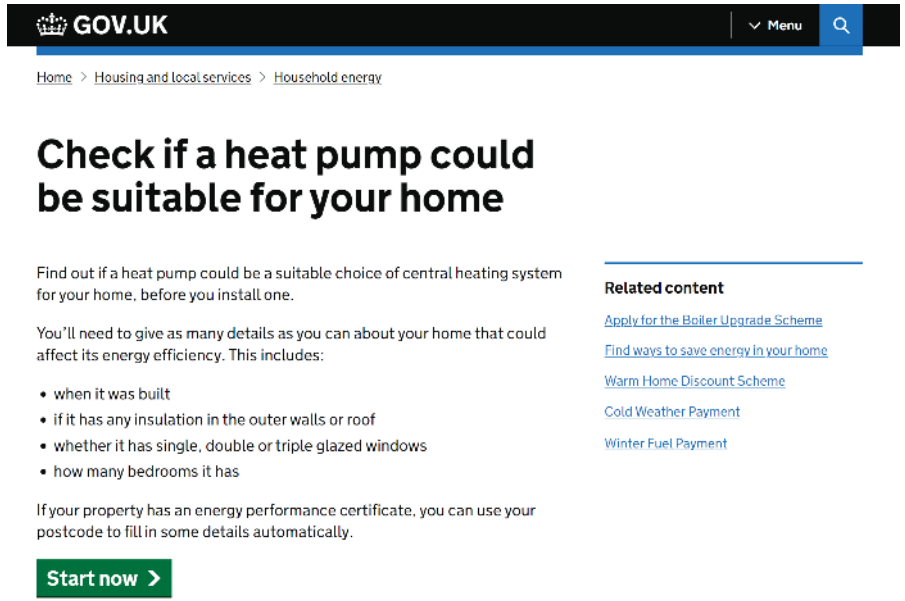
- In new buildings, the **Future Homes Standard** will ensure that from 2025, new homes are zero-carbon ready, requiring no further retrofit.
    - While the regulations do not mandate the use of specific technologies, the planned performance standard will ensure new homes will not be built with fossil fuel heating, but low carbon technologies such as **heat pumps** or clean **heat networks**.
- We have also consulted on **phasing out the installation or replacement of fossil fuel heating off the gas grid** (~1.5m homes)**:**
    - From **2024** for larger, non-domestic properties, and from **2026** for households, and smaller non-domestic buildings, we propose to introduce regulations that would mean no new installations of oil, coal or LPG heating systems.
    - We expect to adopt a **'heat pump first approach'** for replacements off the gas grid.
- The Heat and Buildings Strategy also set out an **ambition to end installations of new and replacement natural gas boilers for heating homes by 2035.**

Supporting investment through a market-based mechanism

- Given the key role of heating appliance manufacturers in the transition to clean heat, we plan to introduce a market-based mechanism for low-carbon heat **from 2024** until at least 2028, which will provide a policy framework to support investment in developing the UK consumer market for heat pumps.
- With a clear market-wide standard for low-carbon appliances as a proportion of sales, industry will have the **policy certainty and confidence** to invest in supply chains, partnerships and innovations to scale the consumer market.
- Tradable market mechanisms have a track record of supporting the development and transition of other sectors, such as low-emissions vehicles and renewable transport fuels.
- **Credit-trading** will ensure companies have a range of options for meeting the obligation, and create enhanced value through surplus credits for firms that bring forward the products and offerings that consumers value most.

Enabling heat pumps through policy

- We're investing in **public engagement** and **awareness raising**:
  - We have introduced a new Heat Pump Suitability Tool, along with publishing case studies, and we're in the process of developing a marketing campaign.
- We're supporting the development of a **skilled workforce**:
  - We're working with industry to standardise our approach to training.
  - We've introduced a new Low Carbon Heating Technician Apprenticeship and provided funding for existing fossil fuel boiler installers to re-train.
  - We have set new minimum installation requirements in building regulations to encourage best practice.
- We're also committed to **reducing the cost** of heat pumps:
  - We're encouraging cost reduction through our innovation programme, stimulating investment in new tech and financing models.
  - We have zero-rated VAT on heat pumps for five years.
  - We have taken powers to increase the minimum energy performance standards of heat pumps to improve their running costs.
  - We're consulting on mandating that all heat pumps are smart-enabled, starting in 2025, to enable them to flex.
  - We are committed to rebalancing electricity and gas costs.



www.gov.uk/check-heat-pump

How do trials inform policy making?

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The Importance of Trials for Policy Making

- Trials allow policy makers to test, scrutinise and demonstrate new technologies, tools or business models.
- In raising challenges, they identify areas for further innovation, and in demonstrating successes they build confidence and provide legitimacy for further, more ambitious policy action.
- For heat pumps, trials have been vital in informing policy:
  - ✓ Determining the **suitability of the housing stock** for heat pumps and the cost of retrofit has helped us model the cost optimal path to net zero and target funding through our public investment programmes.
  - ✓ Understanding the **technical barriers** to uptake has informed our innovation programmes, allowing us to fund the development and test new technologies, tools and services.
  - ✓ Measuring **in situ heat pump performance** has been used in our models to understand their carbon emissions, running costs and impacts on the electricity network.
  - ✓ Understanding **consumer awareness** and **barriers** has informed our public engagement campaigns and energy advice services.

A High Temperature Heat Pump being installed.

The History of Government-funded Trials

- The UK Government have funded a series of heat pump trials over the last decade.
- Early trials, like the **Renewable Heat Premium Payment Field Trials** explored the basic principles of heat pumps, i.e. do they work in a UK climate? Does installer accreditation work effectively in ensuring quality? Are consumers satisfied with their heat pumps?
- More recent trials, like the **Electrification of Heat Demonstration Project**, have built on this by further exploring the costs and performance of heat pumps across a range of housing archetypes. The Project has also provided behavioural insights and considered the consumer drivers and barriers to the uptake of heat pumps, as well as testing the solutions to some of the known practical and technical barriers to heat pump deployment, like space limitations.

EoH Demo Project Participants, Vanessa and Patryk, Fife

The Future of Trials

- Now we've proven they can work efficiently across a range of housing archetypes and we better understand the user experience, we are now considering how heat pump deployment can be scaled up.
- In the **Heat Pump Ready** innovation programme, we are exploring how coordinated deployment can be utilised to deploy heat pumps at high density and what this might mean for the electricity grid and future business models.
- The natural evolution of this is to explore further how we can manage heat pumps and the grid in a **smarter** way to optimise their performance on both a micro (in home) and macro (distribution and transmission network) scale.
- We also need to continually strive to improve the technology by making it **easier to install, cheaper** and **less disruptive for consumers**. This is where innovation and trials can help in providing evidence of the efficacy of any interventions.

Location	Project title	Lead organisation
Newcastle, Tyne and Wear	Heat Pump Ready Newcastle	E.ON
Sunderland, Tyne and Wear	Utilita Energy Heat Pump Ready Programme	Utilita Energy
Leeds, Yorkshire	Renewable Heat Infrastructure Network Operating System (RHINOS) Leeds	Leeds City Council
Oxford, Oxfordshire	Clean Heat Streets	Samsung
Greenwich, Greater London	Greenwich Thermal Infrastructure Motivating Electrification (Greenwich TIME)	Element Energy Limited
Bristol	Bristol Heat Pump Ready	Buro Happold
Teignbridge, Devon	Project Gaia	EDF
Fenland, Cambridgeshire	PACE Financing for Heat Pumps in Rural Cambridgeshire	City Science
Blairgowrie, Perth and Kinross	SAPPHIRE Solo	Power Circle Projects
Cherwell, Oxfordshire	Prosumer Model for Heat Pump Deployment in Cherwell	City Science
Bridgend	Heat Pump Ready - Bridgend	Buro Happold

Heat Pump Ready, Feasibility Pilots

Summary

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Summary

- We intend to take a strategic decision on the future of the gas grid in 2026, but irrespective of the role of hydrogen, heat pumps will have a major role to play.
- Heat pumps are a cost effective strategy for decarbonising heat and widely suitable across the housing stock.
- We are putting in place policies which will deliver 600k installations of heat pumps a year by 2028.
- Heat pumps have a key role to play, but there remain challenges to deployment. Costs need to fall and they need to be simpler to install.
- Innovation and trials have a critical role to play in informing policy and demonstrating the efficacy of new technologies or approaches.