UK Member Country Report

Oliver Sutton, Department for Business Energy and Industrial Strategy (BEIS)




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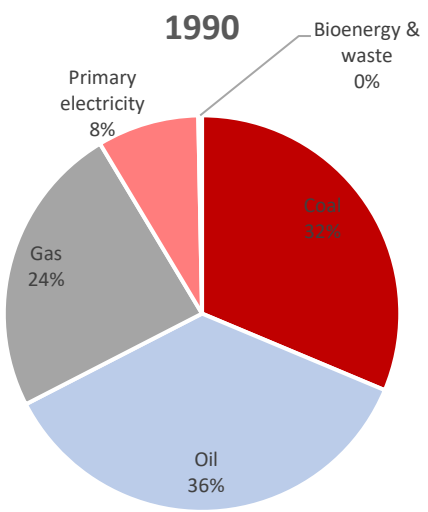
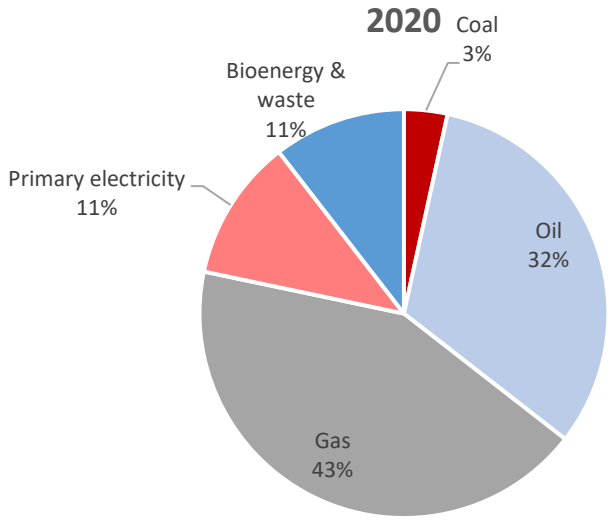
Introduction

- Context
- Market Summary
- Policy
- Innovation
- Research and Development

Context – UK Primary Energy Consumption

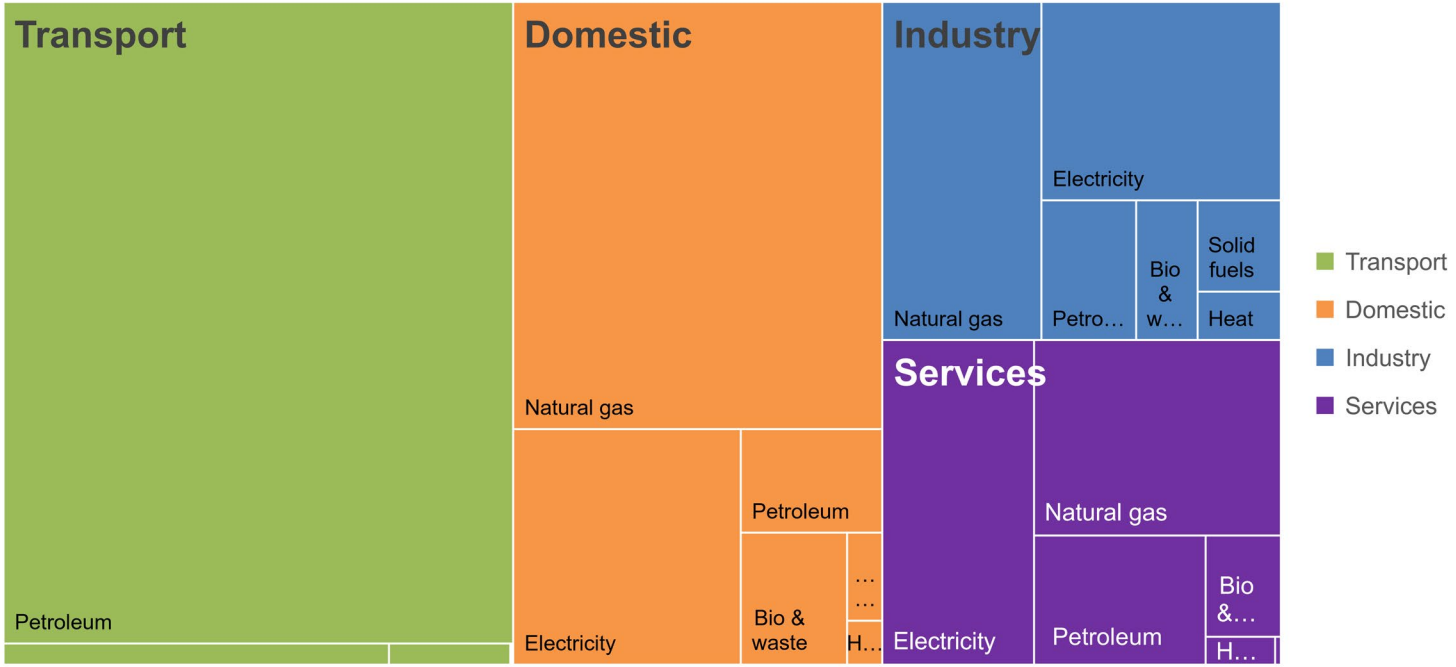




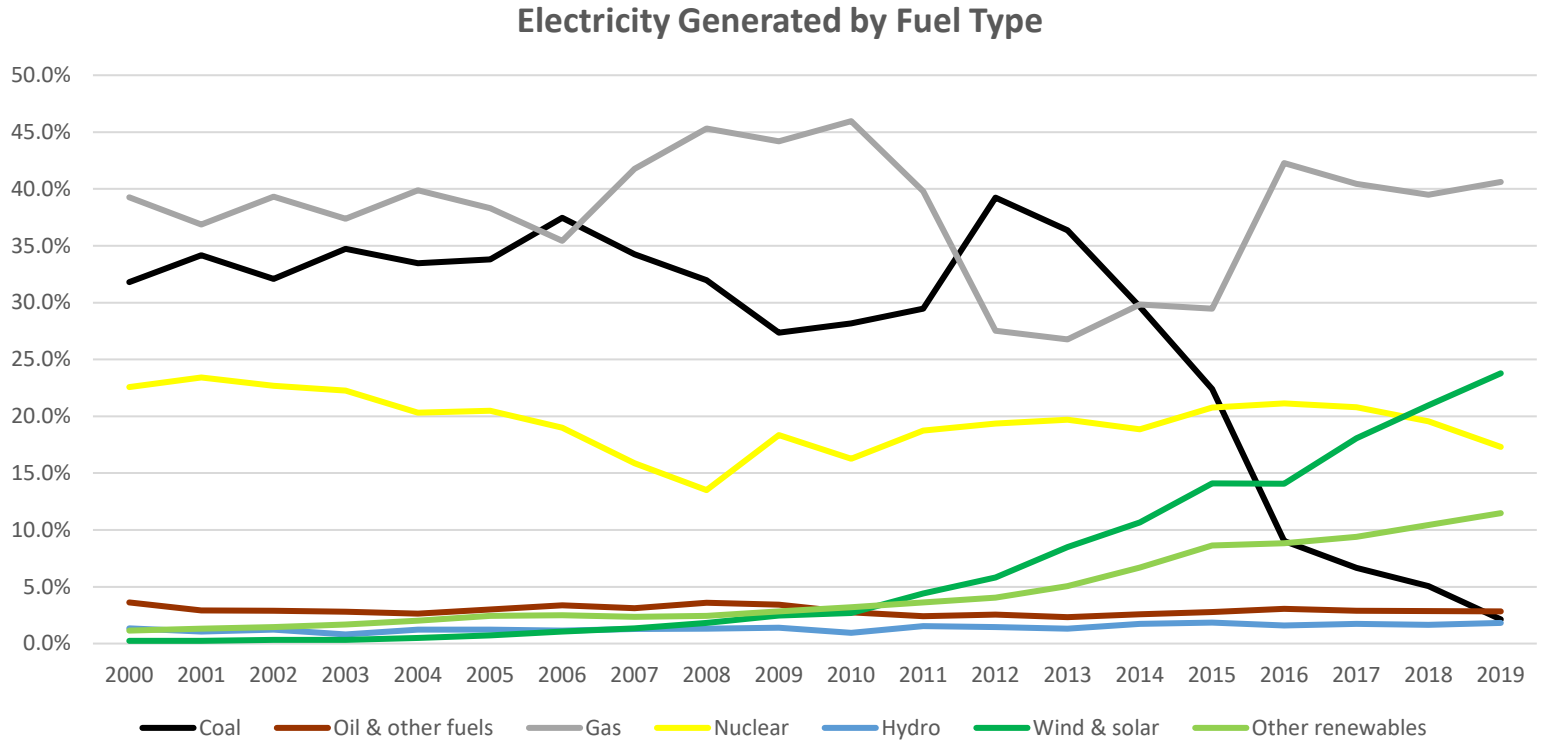
https://www.gov.uk/government/statistics/uk-energy-in-brief-2022

Context – UK Sector Energy Consumption

2018 Consumption by Sector



Context – UK Electricity Generation



https://www.gov.uk/government/statistics/uk-energy-in-brief-2022

Context – Heating Systems

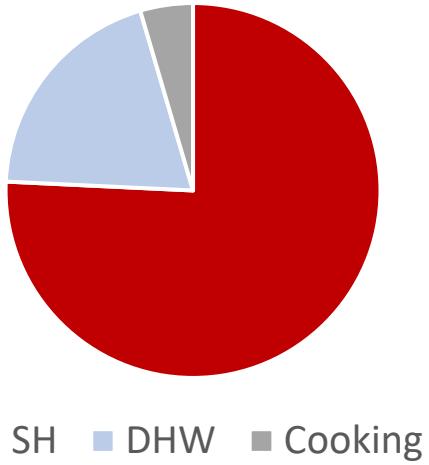
Fuel Type	Number of Households
Mains gas	22 million
Electricity	2.2 million
Heating oil	1.1 million
District heating	420 thousand
Solid fuel	200 thousand
LPG	193 thousand
Other	4 thousand
Total Households	**26.2 million**

~4 million GB homes are off the gas grid

~1.3 million GB homes use oil/LPG for heating

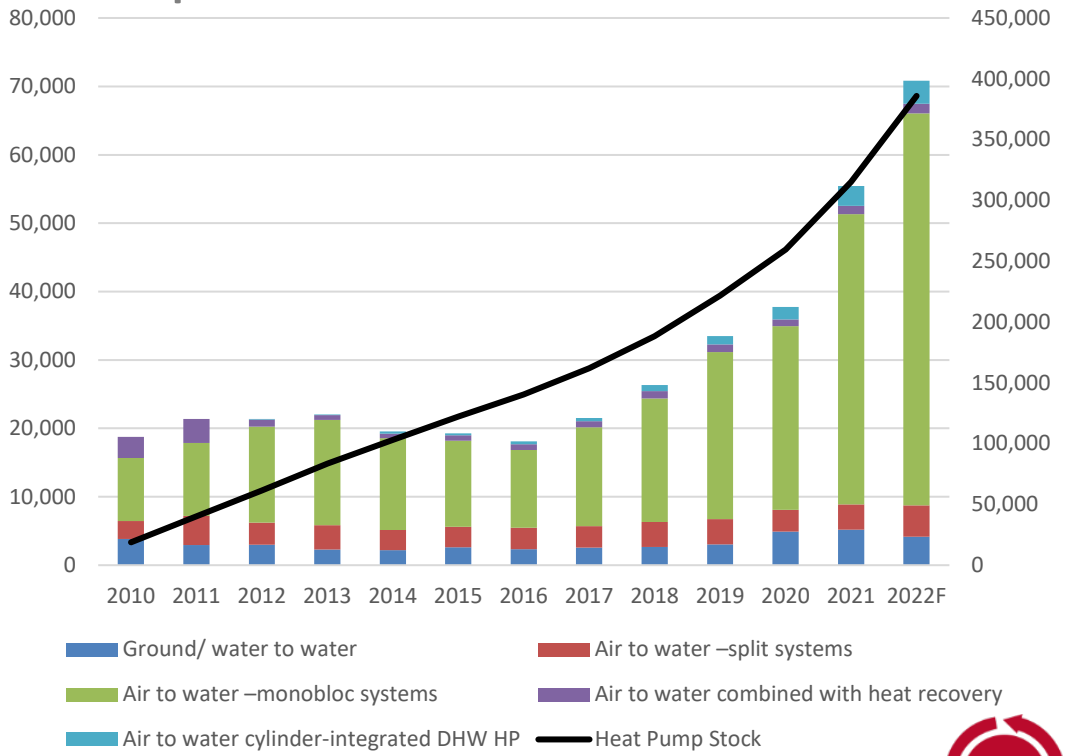
Typical house gas consumption

13,000 kWh/y

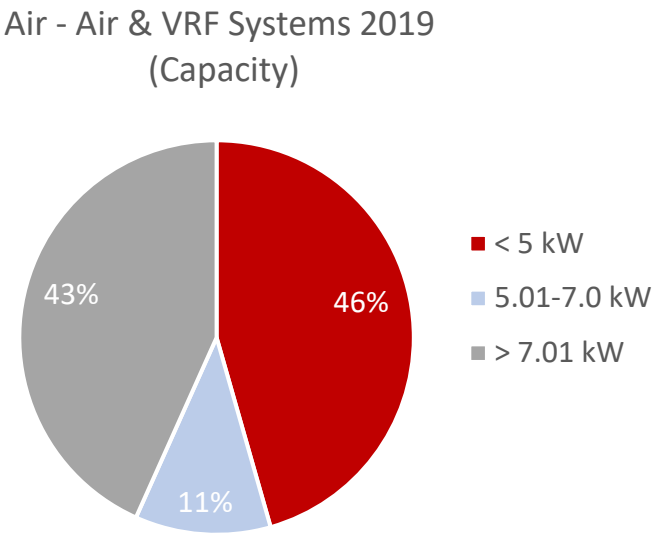


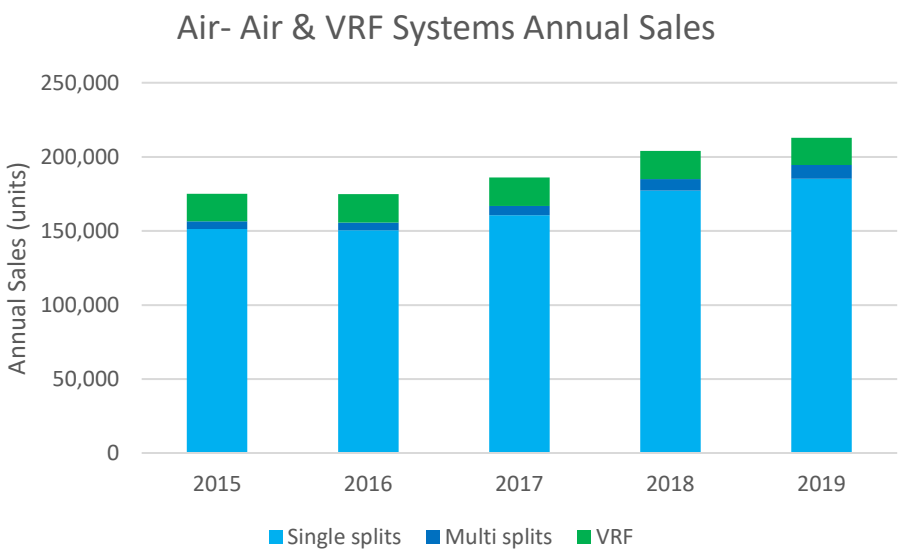
Market – Domestic Heat Pumps

- Domestic heat pump sales remained relatively constant despite the introduction of the Renewable Heat Incentive in 2014.
- Sales have begun to increase as new policy certainty emerges and consumer awareness increases.
- The majority of growth is in air-water monobloc units which offer lower upfront cost and lower barriers for installation.
- Approximately 400k heat pumps are installed in homes today.
- Gas boiler sales are ~1.6 million units per year.



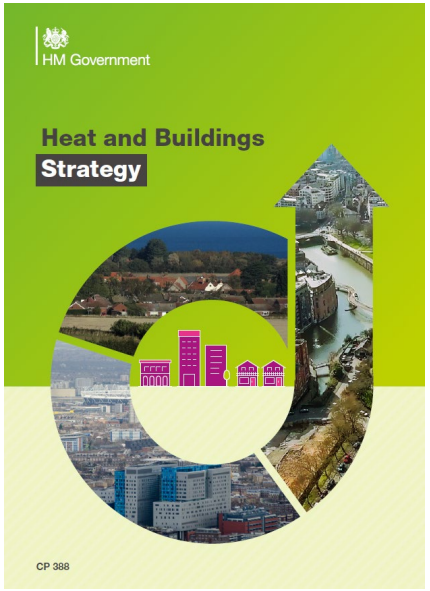
Market – Non-domestic





Many large systems not captured in market data

Policy - Strategy



Heat and Buildings Strategy 2021

- To meet Net Zero virtually all heat in buildings will need to be decarbonised.
- No new fossil fuel heating in new homes by 2025.
- Phase out fossil fuel heating in off-gas grid buildings by 2026.
- Ambition to phase out the installation of new natural gas boilers from 2035.
- Take major strategic decisions on the role of hydrogen for heat by 2026.
- Aim to grow the heat pump market to deploy 600,000 heat pumps per year by 2028.
- Boiler Upgrade Scheme – Heat pump grants for homes (£5,000 for ASHPs, £6,000 for GSHPs)
- Introduce a market-based mechanism to grow the heat pump market and supply chain.
- Rebalance costs of electricity and gas

https://www.gov.uk/government/publications/heat-and-buildings-strategy

Figure 1: Our policy approach

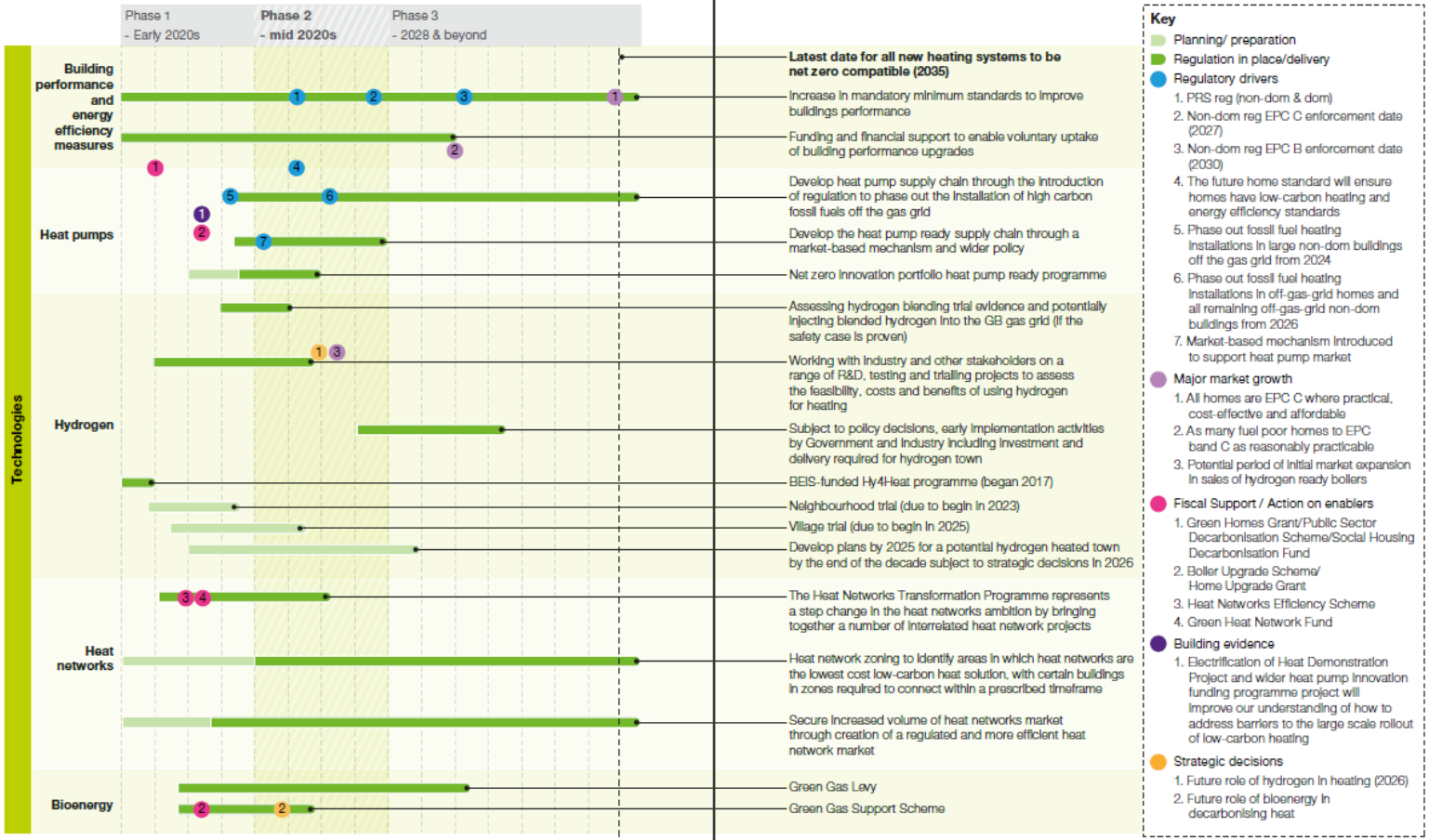


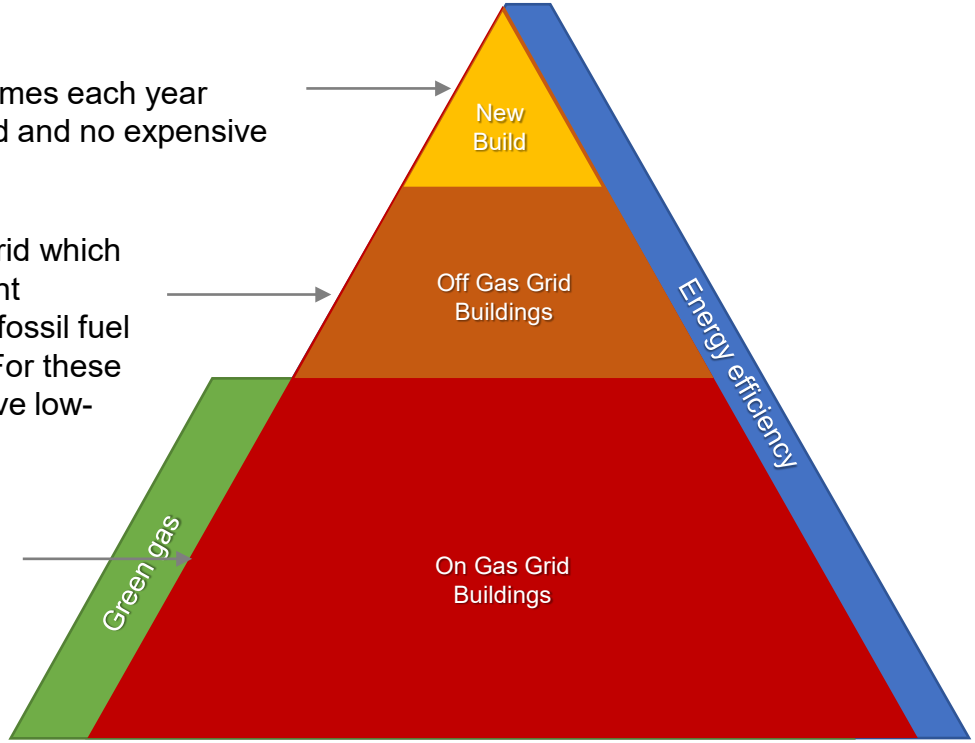
Figure 1 provides an illustrative diagram of the breadth of activities planned to be undertaken over the next decade according to BEIS' current thinking.

Policy - Strategy

Government is committed to delivering **300,000** new homes each year from the mid-2020s. New homes have low heat demand and no expensive retrofit costs, so are well suited for heat pumps.

There are over **5m** homes and businesses off the gas grid which use oil, LPG or resistive electric heating. UK Government has already announced plans to phase out high carbon fossil fuel heating in **1.3m** buildings off the gas grid in the 2020s. For these buildings, heat pumps are typically the most cost effective low-carbon heating solution.

The optimal solution for the **24.5m** homes and businesses on the gas grid is uncertain and may vary locally. Options include heat networks, efficient electric heating solutions, like heat pumps, or replacing gas with low-carbon alternatives: hydrogen or biogas.

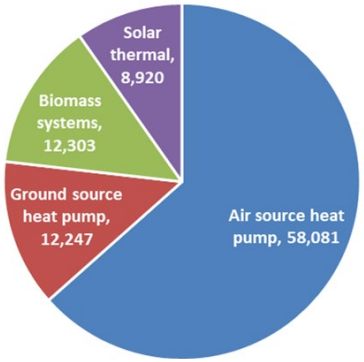


https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

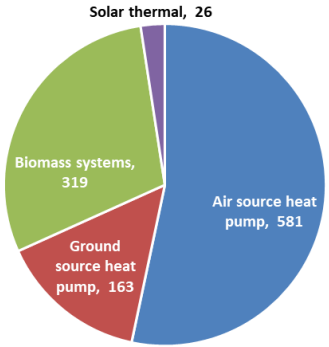
Policy – Heating Systems

- Renewable Heat Incentive (RHI)
  - Introduced for non-domestic in 2011 and domestic 2014
  - The first “feed-in tariff” for renewable heat.
  - Receive a price/kwh of renewable heat produced and paid over the lifetime of the installation
  - For heat pumps, biomass boilers, solar thermal, biomethane/biogas, deep geothermal.
  - Closed in March 2022
- Boiler Upgrade Scheme
  - Provide upfront grants for heat pumps and biomass boilers
  - £5,000 for ASHP or biomass boiler, £6,000 for GSHPs

Domestic RHI installations (units)



Domestic RHI installations (Capacity in MW)



Innovation

BEIS Energy Innovation Programme (£505m 2015 – 2021)

~£90m for project on the built environment

- Electrification of Heat Demonstrator – installing 750 heat pumps in homes, monitoring their use and aiming to demonstrate cost reductions
- Challenge funds for low carbon heating – to support a variety of innovative projects

https://www.gov.uk/guidance/energy-innovation

BEIS Net Zero Innovation Portfolio (£1bn 2021 – 2025)

10 Priority Areas

- future offshore wind
- nuclear advanced modular reactors
- **energy storage and flexibility**
- bioenergy
- hydrogen
- **homes**
- direct air capture and greenhouse gas removal (GGR)
- advanced carbon capture, usage and storage (CCUS)
- industrial fuel switching
- **disruptive technologies**

Innovation

BEIS Heat Pump Ready Programme (£60m 2022 - 2025)

- Stream 1: solutions for high-density heat pump deployment. Challenge funds for low carbon heating – to support a variety of innovative projects.
- Stream 2: developing tools and technology. Up to £25 million of grant funding for projects to overcome barriers to heat pump deployment.
- Stream 3: trial support and learning. Up to £5 million contract from spring 2022.

https://www.gov.uk/guidance/energy-innovation

Research

- Large thematic area of end-use energy demand
- Research tends to focus on heat pumps in systems rather than component level
- Specific expertise on gas sorption heat pumps, energy storage, whole energy system modelling, building simulation modelling

UKRI Engineering and Physical Sciences Research Council

Department for Business, Energy & Industrial Strategy

https://www.gov.uk/government/collections/heat-pump-research

Summary

- Heat pumps in the UK are currently a niche market in homes but widely used in commercial buildings.
- The market is growing steadily but new policy developments are expected to increase this in specific areas e.g. new build, off-grid buildings.
- Ambition for high levels of heat pump deployment with key decisions around the role for hydrogen in heating needed in the next decade.
- Significant barriers remain around suitability of the building stock, consumer awareness, gas/electricity price ratio and upfront cost of systems.
- Current energy price crisis raising the profile of heat pumps as an option.