

The UK approach to residential heat transition



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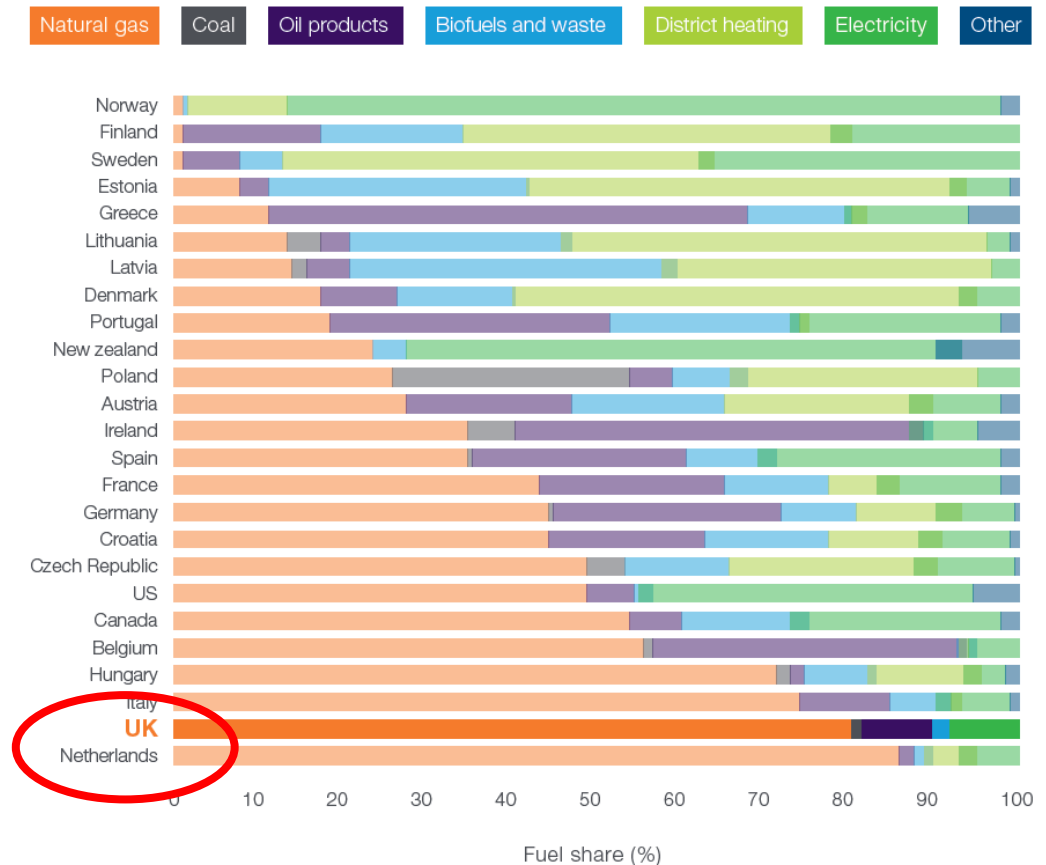
Overview

1. Going Dutch? project
2. The context for UK residential heat decarbonisation
3. Heat and Buildings Strategy 2021 (and Scottish Heat in Buildings Strategy 2021)
4. Some comparisons with the Netherlands

Going Dutch? project

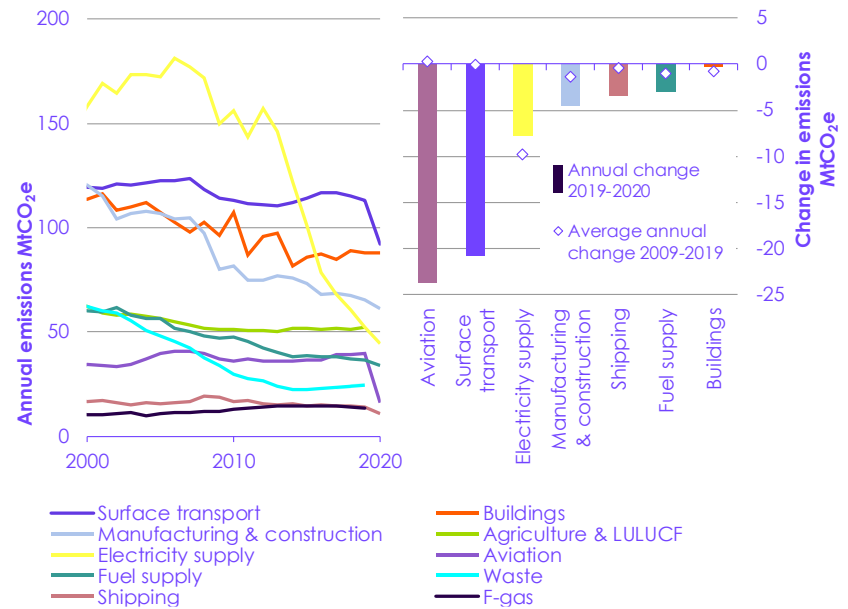
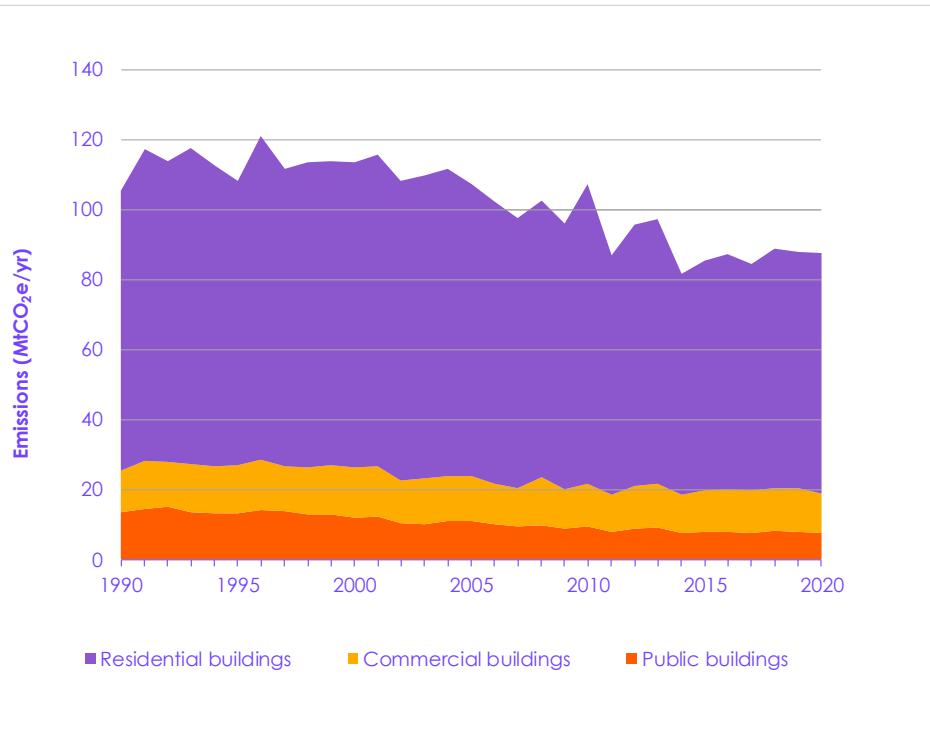
- 18-month research project, led from the University of Sussex, funded by the UK Energy Research Centre
- Comparing governance arrangements for heat decarbonisation and natural gas phase-out in the UK and the Netherlands
- Investigating how these arrangements have been shaped by different political and institutional contexts
- Looking at possibilities of lesson-learning
- More at <https://www.going-dutch.org/>

Fuel share for heating demand
(residential and commercial)



Source: BEIS 2018

Challenge



Source: [Climate Change Committee 2021](#)

Context

- **Legislation**

- 2008 Climate Change Act; 2009 Climate Change (Scotland) Act; CCA amended 2020, followed by Net Zero Strategy (net zero emissions by 2050 (Scotland 2045))

- **Strategies**

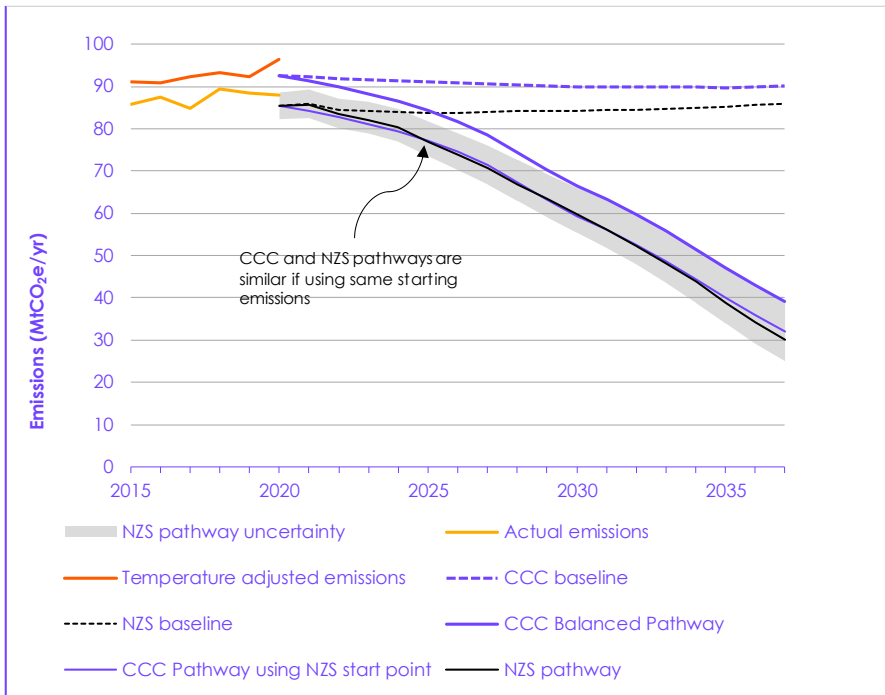
- 2012: The future of heating: a strategic framework for low carbon heat
- 2016: Next steps for UK heat policy (Committee on Climate Change)
- 2021: Heat and buildings strategy (UK), Heat in buildings strategy (Scotland)

- **Costs crisis:**

- Cap on average bills increased by 54% in April 2022, with another 32% increase expected in October



Targets



Source: [CCC](#)

- **Scotland**

- 2024 zero emission heat standard for new buildings
- 35% of heat in domestic buildings to be supplied using low-carbon technologies by 2032
- move 1 million homes currently using mains gas, and the vast majority of off-gas homes to zero-emission heating by 2030

- **CCC**

- Reduce emissions from buildings from ~90 MtCO₂e to ~30MtCO₂e by 2037

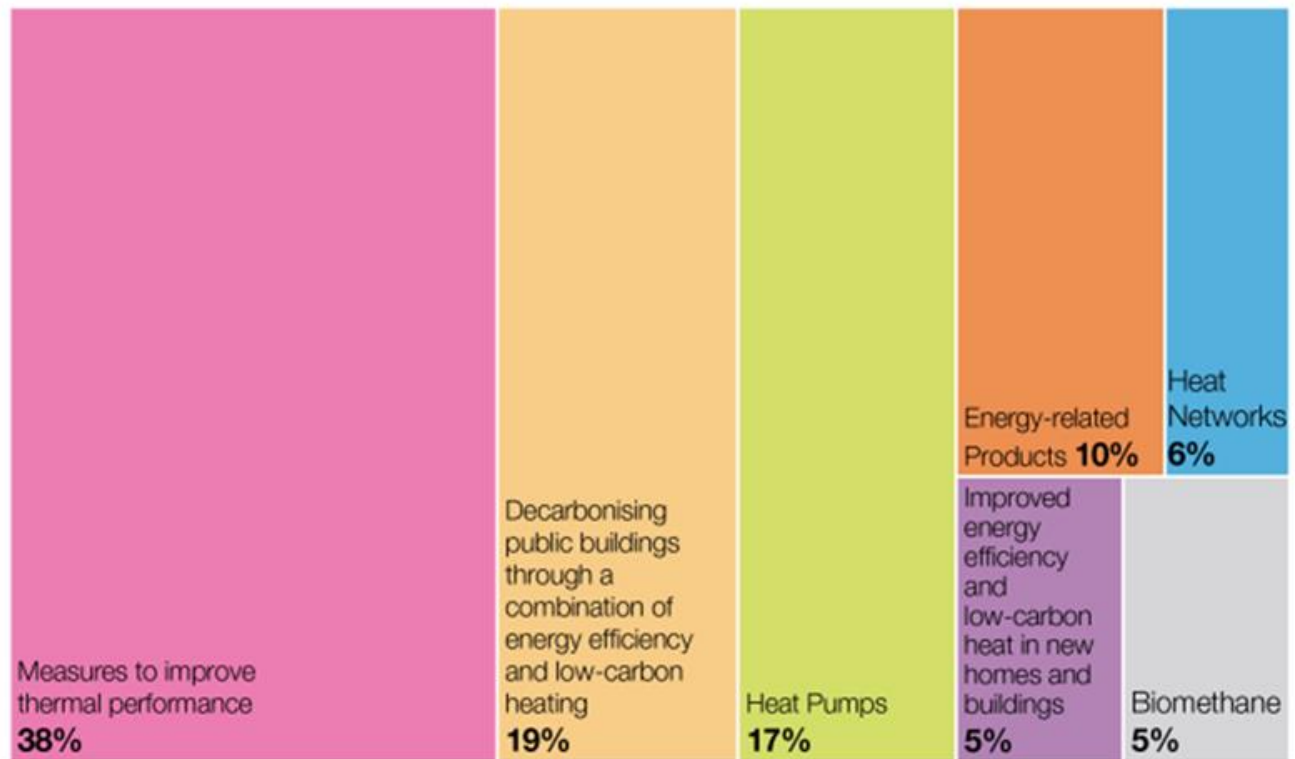
- **UK**

- No gas boilers in new build housing from 2025
- 'ambition of phasing out the installation of new natural gas boilers from 2035'

Heat and Buildings Strategy overview

5 key approaches:

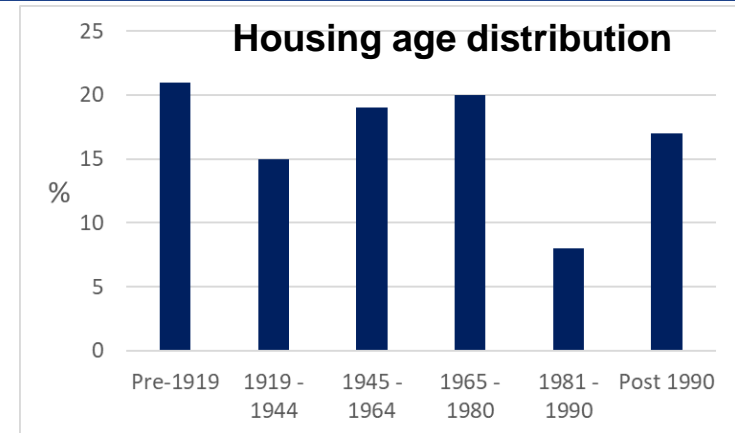
- Energy efficiency
- Heat pumps
- Hydrogen
- Heat networks
- Bioenergy



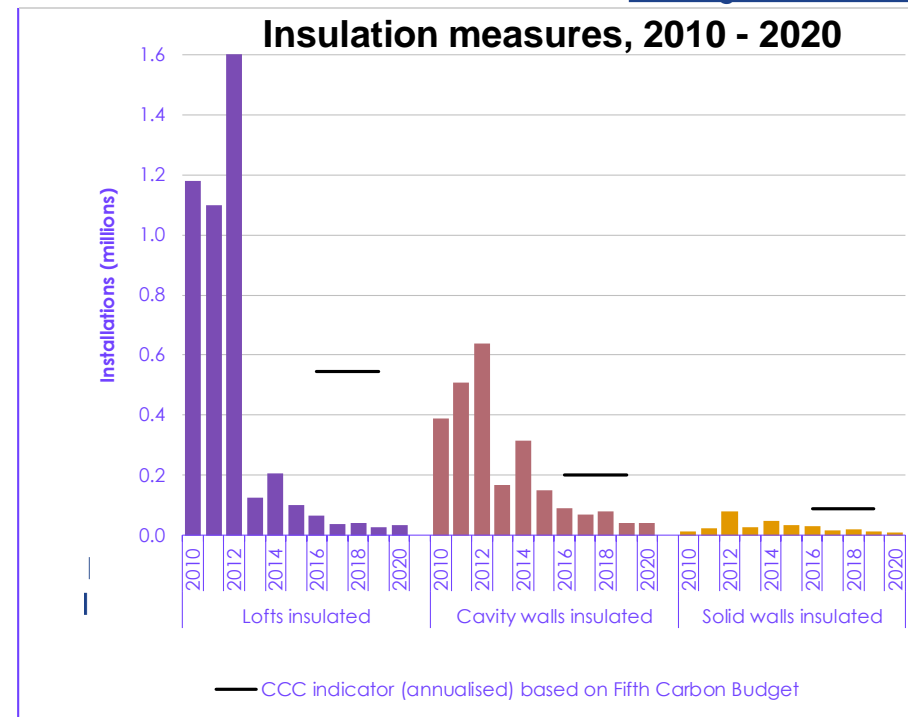
Building performance and energy efficiency

- Collapse in policy effort post-2012, but estimates that 25% of household energy could still be saved cost-effectively
- Main instrument = Energy Company Obligation (ECO)
- Two poorly designed and implemented schemes (Green Deal 2013-15 and Green Homes Grant 2020-21) cancelled
- HBS approach
 - £8.2 billion targeted public support to 2026 for low income households through ECO and tax-funded schemes
 - Minimum energy performance standards (but no concrete proposal for owner-occupiers yet, except voluntary min C EPC target for mortgagees)
 - Encourage mortgage lenders and other financial institutions to offer finance for energy efficiency measures

Source: [CCC](#)

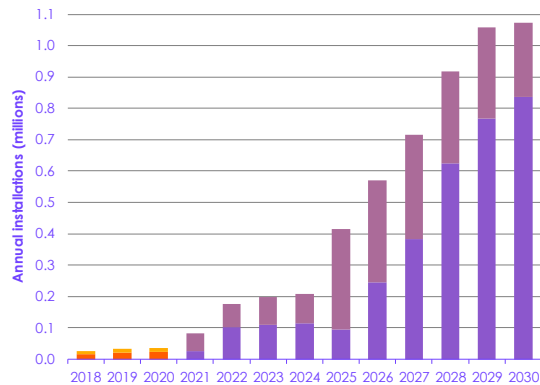


Source: [Piddington et al 2020](#)



Heat pumps

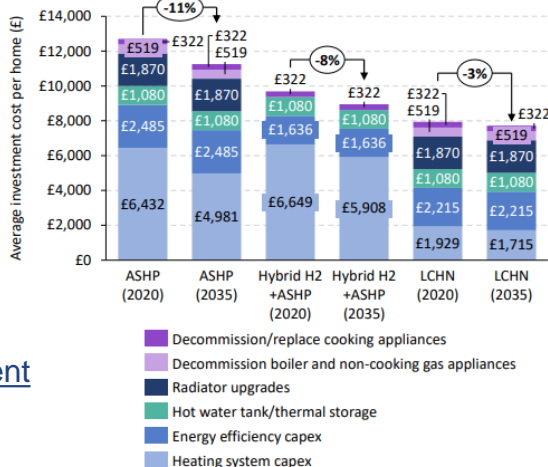
Heat pump installation rates in Climate Change Committee's net-zero "balanced pathway".



Source: CCC
 ■ CCC trajectory - new homes
 ■ CCC trajectory - existing homes
 ■ Actual installations - new homes
 ■ Actual installations - existing homes

- Just under 90,000 heat pumps installed by Q1 2022
- CCC estimates huge scale-up required for net zero pathway (>500,000/yr by 2026)
- Support policy up to April 2022 was Renewable Heat Incentive (= feed-in tariff)
- Now changed to grant of £5,000-£6,000 (~40% of upfront cost)
- Criticised as insufficient (£450m funding = 90,000 HPs over 3 years), with unclear additionality or cost-reduction effects
- Obligation (subject to consultation) requiring boiler or heat pump manufacturers to deliver a certain number of heat pump installations each year, between 2024 and 2028, but details not yet clear
- Proposal to shift low-carbon policy costs from electricity to gas over 2020s

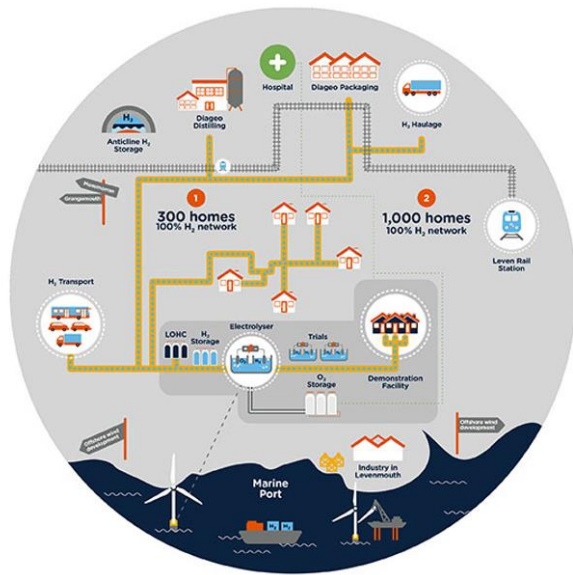
Average required capital expenditure^[1] in Balanced Pathway for a home getting an air source heat pump (ASHP)^[2], Hybrid ASHP and H₂ boiler, and a home connecting to a low carbon heat network (LCHN)^[3] in 2020 and 2035



Modelled low carbon heat technology costs

Source: [Element Energy 2020](#)

Hydrogen

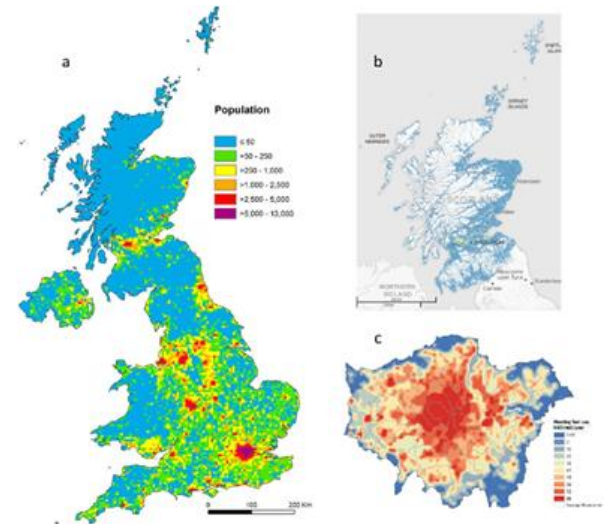


H100 in Fife

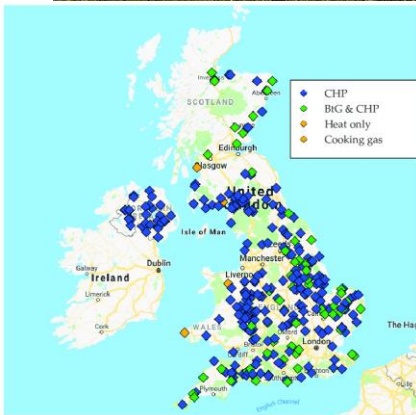
- Hydrogen Strategy 2021 commits to scaling up of production of both blue and green hydrogen
- Commitment to support blending of hydrogen in gas grid up to 20%
- Decision on role of hydrogen in residential heating due by 2026
- Government working on trials and R&D to “assess the feasibility, costs and benefits of widespread use of hydrogen in heat and buildings”
- 100% hydrogen village trial of 2,000 homes to be set up by 2025; other trials (e.g. H100) also starting soon
- Active lobbies for blue hydrogen (oil and gas majors) and hydrogen in heat (gas network companies)

Heat networks

- Heat networks currently provide about 2% of the overall UK heat demand; most schemes have been [local authority led](#)/public-private partnerships
- Historically unlicensed, but now [proposed](#) that operators should be licensed and regulated by gas and electricity regulator Ofgem
- Heat Network Development Unit established 2013 to help local government develop projects; [Heat Networks Investment Project](#) provides some capital funding
- 2020 [Energy White Paper](#) committed to bringing in heat network zoning in England by 2025; policy stronger in Scotland - see slide below
- New [proposals](#) for national heat network planning process, with powers for local government to require *non*-domestic building owners to connect
- Local HN planning to use standardised methodologies and a national dataset
- Impact of policies likely to depend on capacity and interest in local governments, which [ranges widely](#)



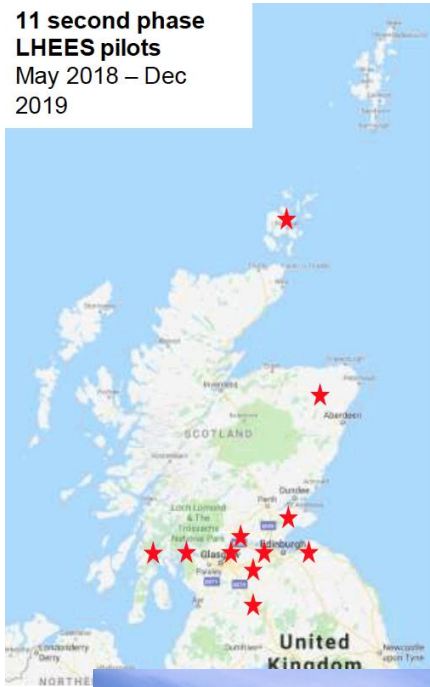
Bio-energy



- Expected to play minor but significant role in strategy
- Backlash against solid biomass (wood-burning stoves) in cities, due to particulates
- Key policy = injection of bio-methane from anaerobic digestion into gas grid
- Historically supported through the Renewable Heat Incentive
 - 95 registered producers of bio-methane by 2020
 - Over 2011 – 2020, on average annual biomethane produced equivalent to under 0.5% of total heat demand
- 2021 Green Gas Support Scheme funded by Green Gas Levy on suppliers, passed through to customers

Scotland

11 second phase
LHEES pilots
May 2018 – Dec
2019

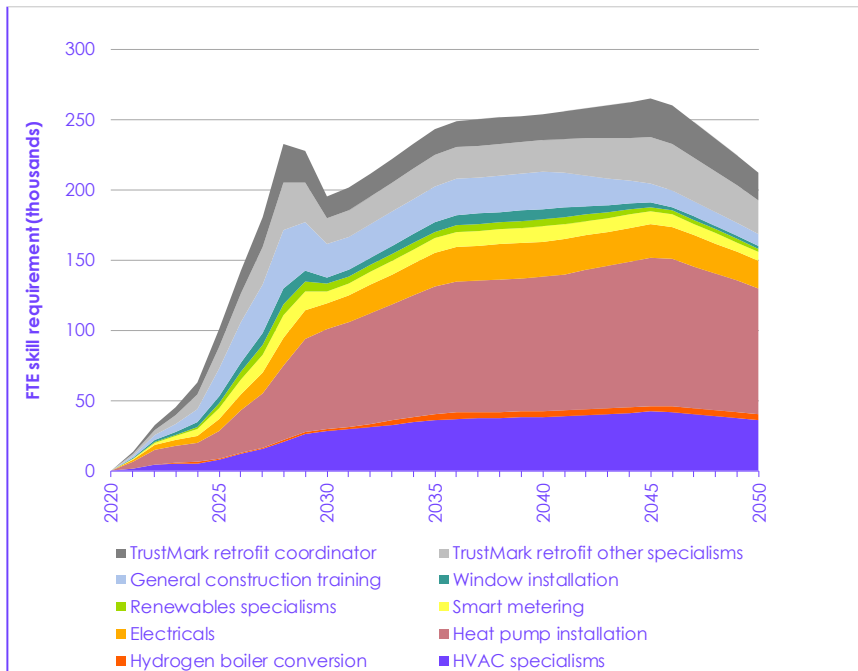


- Certain powers for buildings decarbonisation are devolved to Scottish Government
- Climate Change Plan proposed Local Heat and Energy Efficiency Strategies (LHEES) - to focus on 'no and low regrets areas' and strategic technologies e.g. heat networks, heat pumps and energy efficiency
- Pilot scheme 2017-2021, with evaluation in 2020 and final methodology under review
- Capacity to conduct LHEES varies significantly across local authorities
- 2021 Heat in Buildings Strategy gives central place to LHEES, with proposal that they be made mandatory for all local authorities by end of 2023, and lead to LHEES Delivery Plans
- Heat Networks (Scotland) Act 2021 has mandate requiring local authorities to identify areas for heat network and targets for heat delivered through networks

Skills



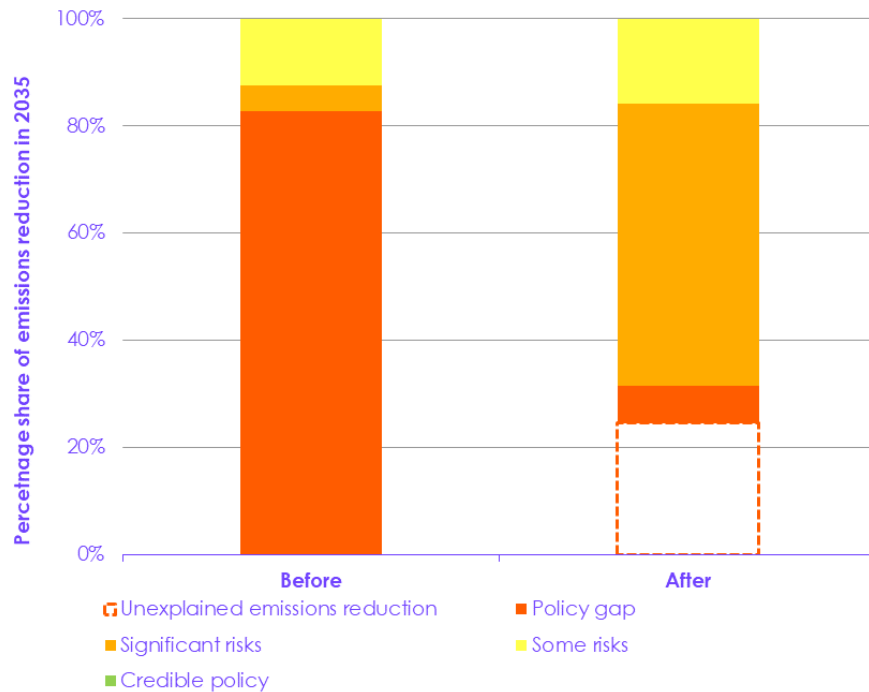
- Awareness that skills will be a key factor for delivery
- 140,000 plumbers and heating engineers trained for gas boilers, but shortage of skills for heat pumps and heat networks
- UK historically weak on vocational skills relative to Europe
- National framework = National Skills Fund (£2.5 billion) including Construction Skills Fund, delivered through further education colleges and 'skills bootcamp' short courses
- 2020 Green Jobs Taskforce, with expected action plan for net zero skills this year(?)



Source: [CCC](#)

Evaluating the approach

Policy gaps and risks for emissions reductions from residential buildings policies in the Heat and Buildings Strategy



Source: [CCC](#)

- Step forward after some years of inertia – ‘a foundation to build on’ ([CCC 2022](#))
- Gaps in some areas (e.g. energy efficiency for owner-occupiers; gas boiler phase out date too late)
- Reliance on markets over publicly funded programmes, but will require support on skills, finance, planning to make this work
- Some areas still vague (e.g. rebalancing gas and electricity prices)
- ‘Wait-and-see’ approach, e.g. on costs, hydrogen, emphasis on innovation through trials and piloting rather than learning-by-doing at scale

Governance contrasts UK vs NL

- UK climate policy framework more technocratic
 - CCA and Climate Change Committee framework vs Climate Agreement process
 - Citizens Climate Assemblies are a response, but have limited impacts
- UK heat decarbonisation strategy more centralised
 - Strategy led from the centre; as yet no overall framework at the UK government level for the role of local authorities in achieving net zero (CCC 2020b, NAO 2021)
 - Local authorities as delivery agent for energy efficiency programmes, and can help plan heat networks within national and regional framework
 - Only Scotland has something similar to municipal visions and plans in LHEES

