Innovative methodologies for high-density domestic heat pump deployment in the UK

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UK heat pump landscape

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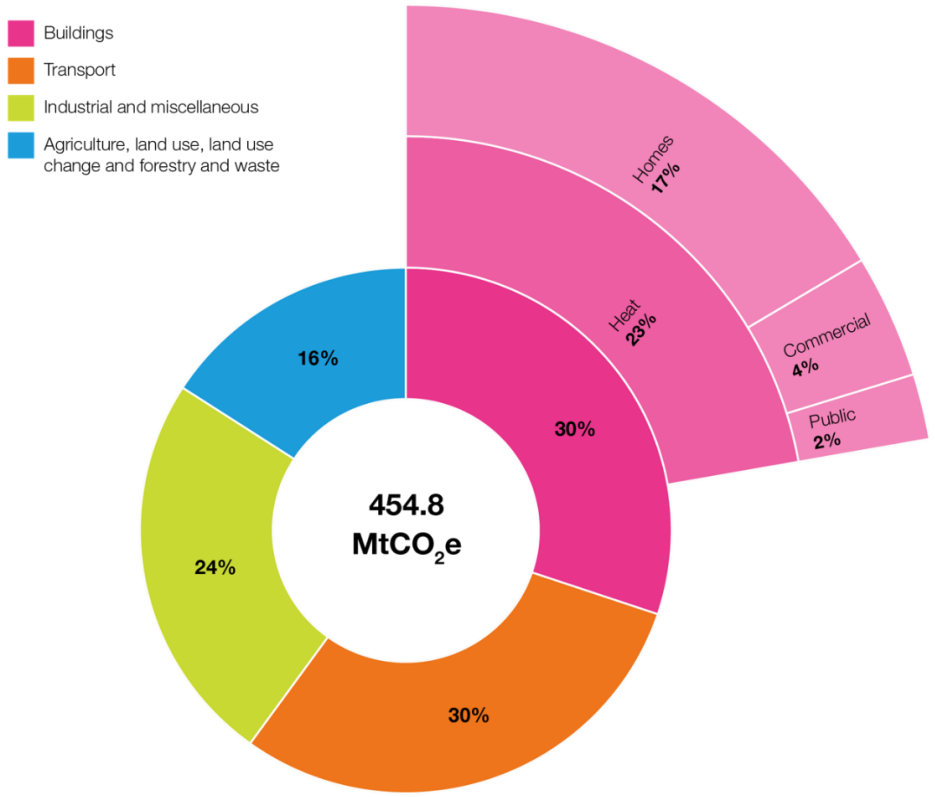
- The UK government has a legally binding-target to achieve **net-zero** greenhouse gas emissions by 2050.
- Heating buildings accounts for around **23 per cent** of all UK greenhouse gas emissions.
- To meet Net Zero, we need to decarbonise virtually **all of our building stock**
- This means converting around **30 million buildings** to low carbon heating by 2050



UK Policy Context for Heat Pumps

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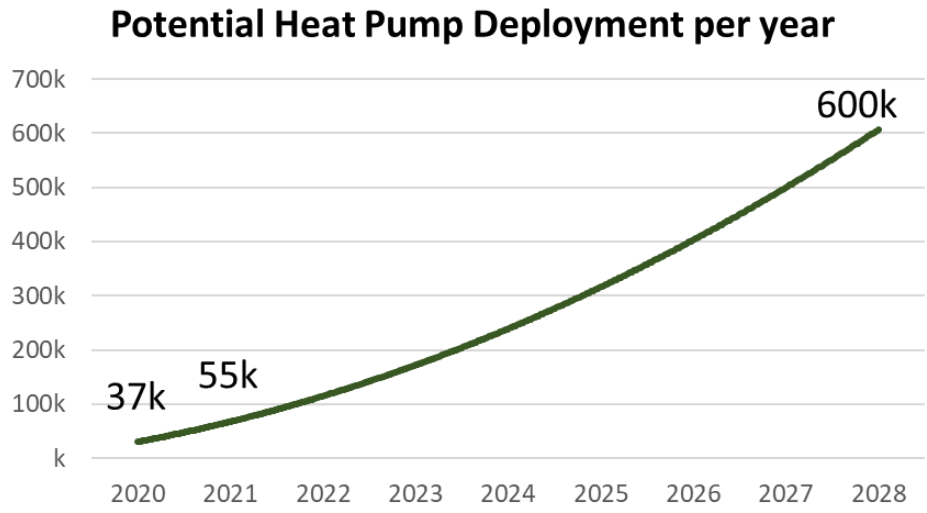
- Heat pumps have a major role in **all pathways to net zero**.
- **To stay on track to meet net zero,** we need to ensure deployment of heat pumps reaches **at least 600,000 installations per year by 2028**.
- If limited low-carbon hydrogen is used for heating, we would need to further grow the heat pump market to install **at least 1.5 million heat pumps per year by the mid-2030s.**
- In a high hydrogen scenario, heat pump deployment will continue at 600k p.a. post 2028.



Heat Pump Ready Programme

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The Heat Pump Ready programme (HPR) forms part of the UK Governments £1bn Net Zero Innovation Portfolio (NZIP) under the Built Innovation theme.

Heat Pump Ready provides up to £60m of funding to projects supporting the aims of:

Heat Pump Ready Development

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- Rapid Evidence Assessment (REA)

1. **Financial Innovations:** What are the necessary financial innovations required to deliver a large-scale roll-out of heat pumps in the United Kingdom (UK)?
2. **Low Voltage Grid Issues:** What are the Low Voltage (LV) grid issues associated with a concentrated deployment of heat pumps and how can we mitigate these? What is the necessary size of a heat pump cluster to achieve appropriate grid impact learnings?
3. **Roll-out Facilitation:** What are the necessary innovations or learnings required to facilitate the large-scale roll-out of heat pumps? What tools or established processes of stakeholder coordination exist that could support the effective roll-out of heat pumps and are there examples of coordinated deployment?
4. **Performance and Deployment:** What are the technological improvements to the heat pump system and tools that could be developed to support any of the above aims - i.e. the large-scale deployment of heat pumps in the UK?

REA Findings

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1. Research on business models needed to stimulate update of domestic heat pumps.
2. Network issues can be expected at low voltage levels due to increase in heat pump deployment
3. Evidence that there is a benefit to effective coordination between stakeholder groups and a understanding that a consumer-focused framework may lead to increased take up of heat pumps.
4. Understanding that innovation is required to bring actual performance of heat pumps closer to project performance

1. Trailing of business models in-situ and at scale to increase consumer understanding and motivations.
2. Limited amount of field data, at large scale, with electricity grid impact learnings expected at ~20% penetration of heat pumps in dwellings.
3. Understanding of the role of effective and accurate energy modelling and consumer satisfaction.
4. Develop innovation to support design improvements, manufacturing, installation and monitoring, maintenance and operation of heat pumps.

Heat Pump Ready Objectives

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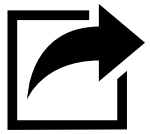
1) Develop innovative coordinated methodologies to achieve high-density heat pump deployment

2) Support innovative tools and technologies which overcome barriers to heat pump deployment



3) Foster collaboration and learning across the Heat Pump Ready programme and wide heat pump and associated sectors

Innovative coordinated methodologies to achieve high-density heat pump deployment

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The **Solutions for High-Density Heat Pump Deployment Projects (Stream 1)** aim to support the design and trial of innovative, optimised solutions which deliver more cost-effective and high-density domestic heat pump roll out – reaching 1 in 4 homes within a specific location.

This stream focuses on:

- **Developing and trialling solutions** which take a 'joined up' approach to heat pump deployment, working across the heat pump landscape.
- **Developing an enhanced 'consumer journey'** as part of the solution – i.e. using the cluster projects to develop effective consumer engagement for all stages of roll out.
- **Understanding the network impacts of high-density heat pump deployment:** through the engagement with Distribution Network Operators (DNOs) in parallel to the high-density deployment provides the opportunity to understand the role of flexibility with multiple heat pump installations in their project location.

Phase 1 project locations

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Phase 1: Feasibility Study Locations

Urban	Rural	Urban with Rural
Newcastle	Teignbridge	Perth & Kinross
Sunderland	Fenland	Cherwell
Leeds		Bridgend
Oxford		
Greenwich		
Bristol		

Projects led by:

Power Circle Delivering Local Energy

Leeds City Council

e·on

EDF

City Science endless possibilities

BURO HAPPOLD

utilita

SAMSUNG

elementenergy

Phase 2 project locations

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Phase 2: Feasibility Study Locations

Urban	Rural	Urban with Rural
Oxford	Fenland	Cherwell
Bristol		

SAMSUNG

CITY SCIENCE
endless possibilities

BRISTOL CITY COUNCIL

Learning #1: collaboration

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Management entity

Place based entity

Engagement coordinator

Local energy / community group

Housing stock modeller

Distribution Network Operator (DNO)

Technology provider

Energy suppler

Contracted services

Financial partner

Installers / Installer training providers

Learning #2: the role of data

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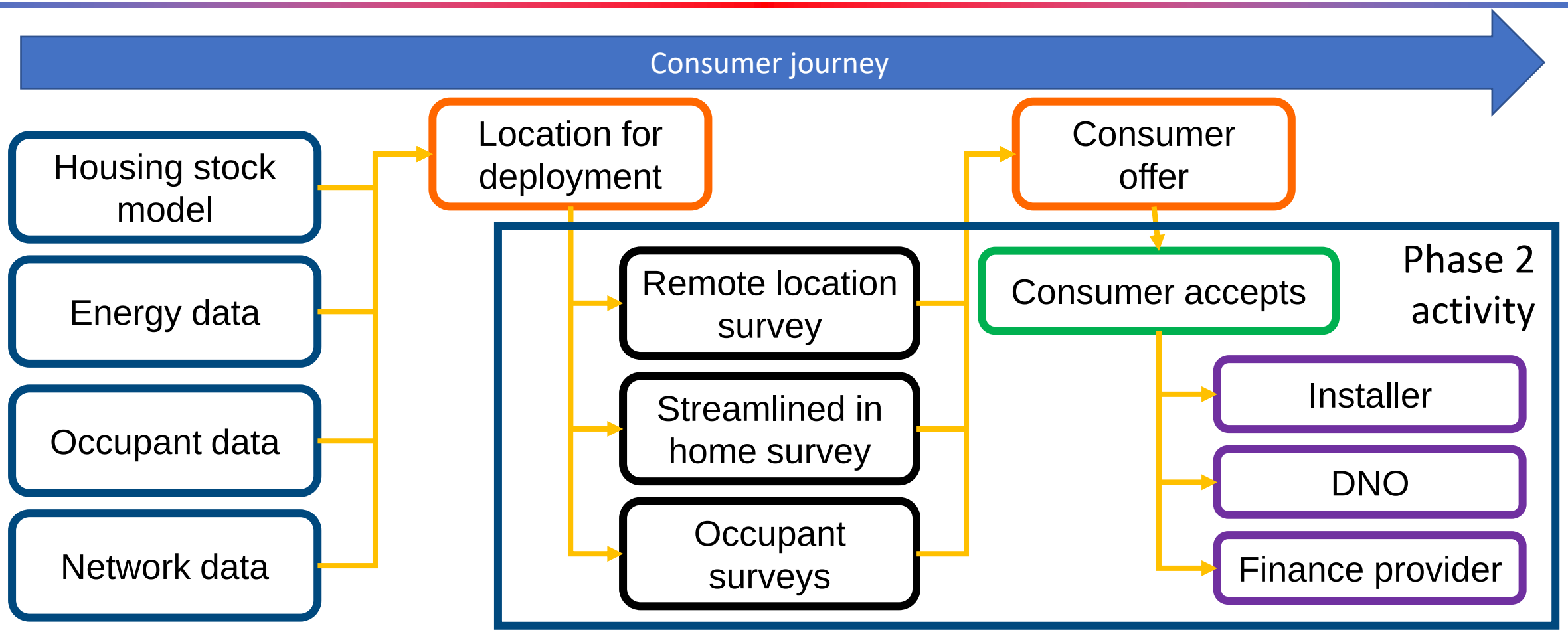

Questions?

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All Phase 1 project feasibility studies available here:
https://www.heatpumpready.org.uk/knowledge-sharing/

Email: heatinnovation@beis.gov.uk

Website: www.heatpumpready.org.uk