HEAT PUMPS – NO ONE SIZE FITS ALL?

BIEE WEBINAR

GUY NEWEY

DIRECTOR OF STRATEGY

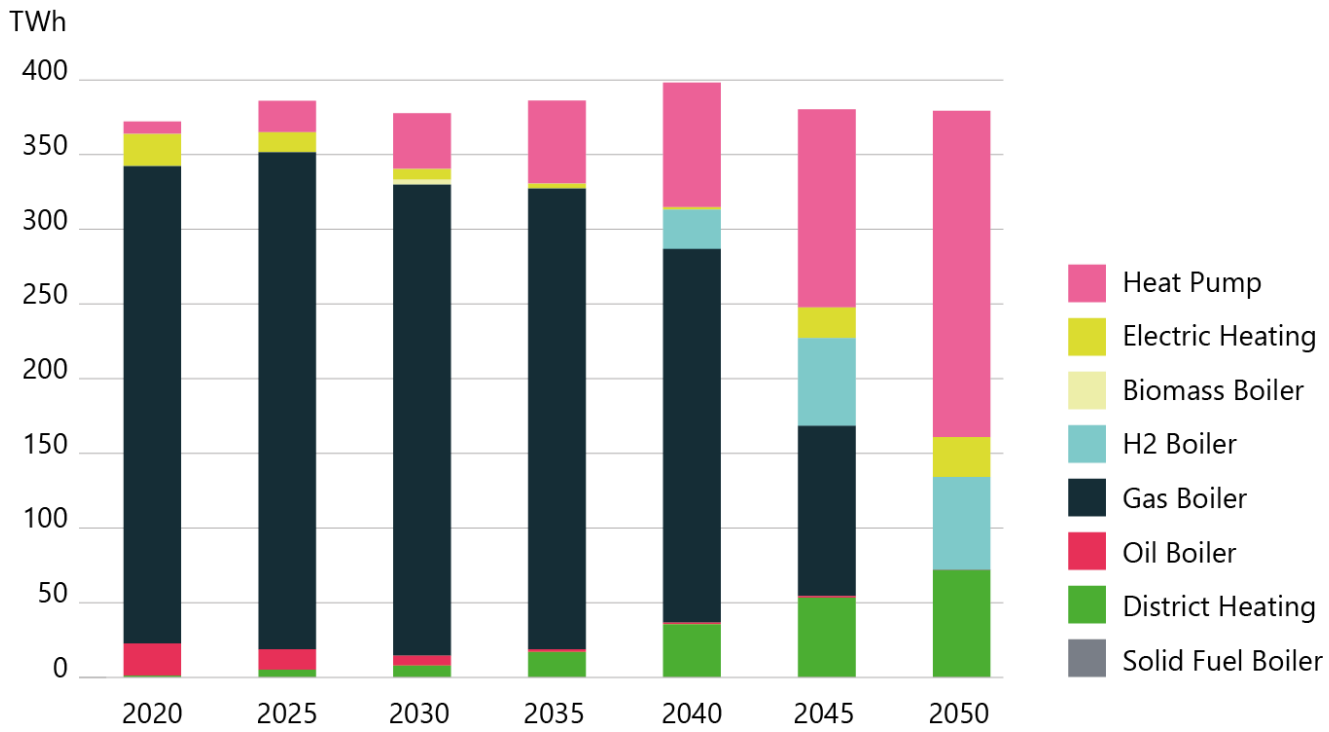
MAY 2022

HOW DO WE MAKE THE SHIFT TO LOW CARBON HEATING AS EASY AS POSSIBLE?

BUILDINGS AND HEAT: the critical UK challenge?

Clockwork

Space Heat Output



2050

Capacity

Innovation priorities:

Whole house retrofit packages innovation to reduce cost, improve performance.

Smart multi-zone controls can reduce energy use while maintaining levels of comfort.

Hybrid heat pump and boiler demonstration of integrated solutions.

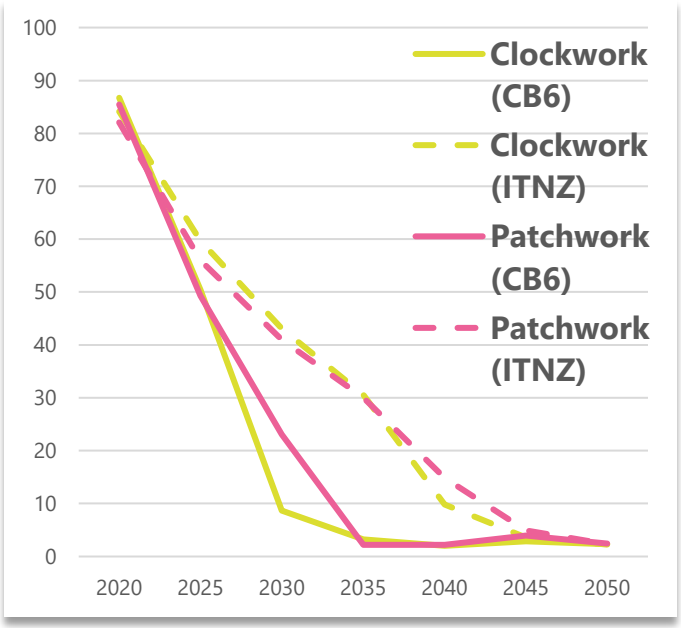
Heat storage with potential to substitute for gas boilers as back up for heat pumps.

100% hydrogen networks early demonstration essential to maintain this as an option.

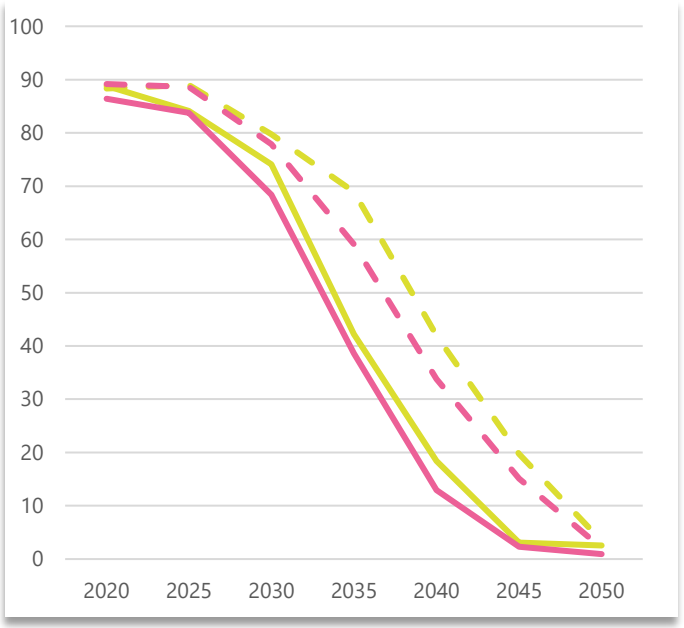
OUR UPDATED MODELLING OF 'CARBON BUDGET 6' SHOWS MORE RAPID ACTION IS REQUIRED (and that is before new targets in Energy Security Strategy)

- Our updated modelling for the CCC's 'Carbon budget 6' (CB6) shows even more is required from the electricity, transport and domestic space heating sectors.

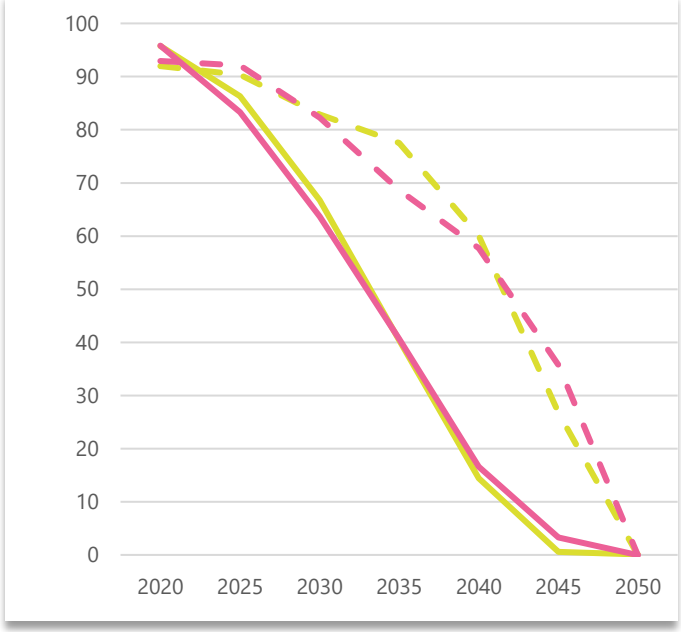
Emissions from Power Sector ($mtCO_2e$, gross)



Emissions from Cars and Vans ($mtCO_2e$)

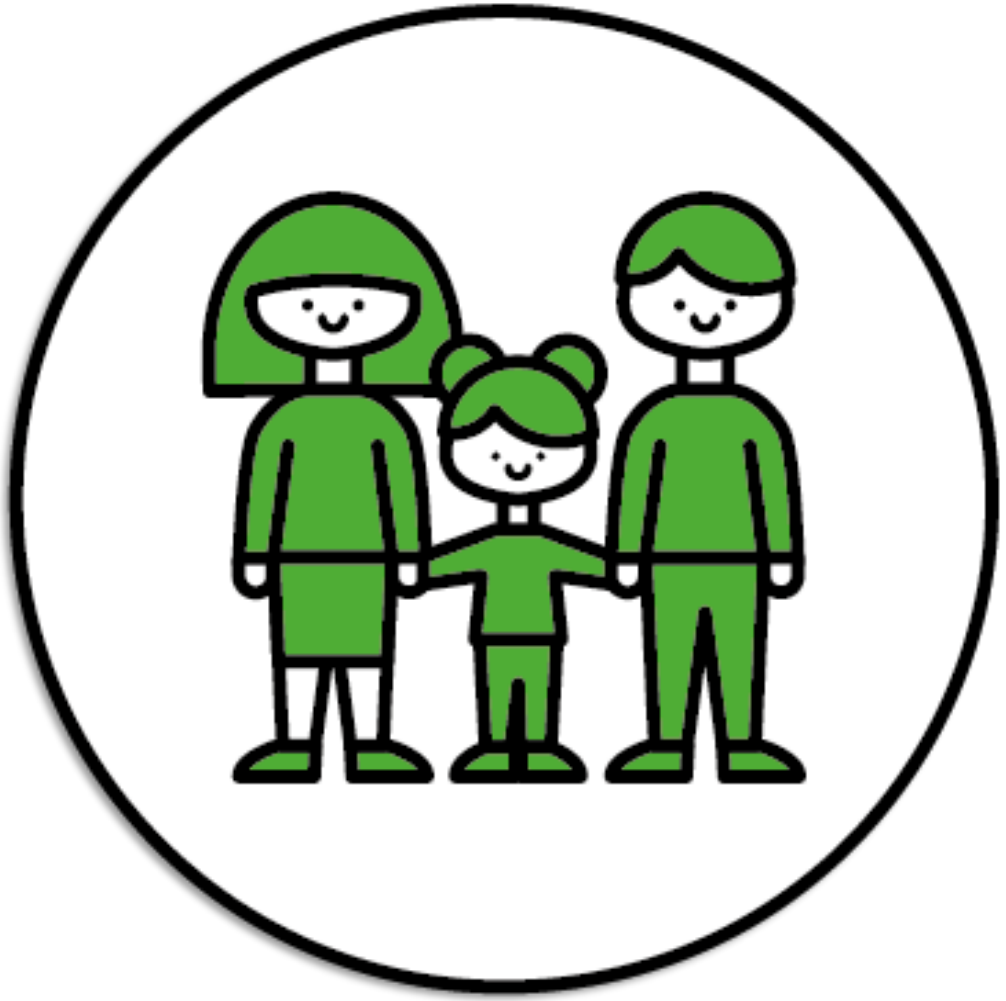


Emissions from Residential Space Heating ($mtCO_2e$)



Source: ESC ESME model, updated for 6th Carbon Budget.
Note: Model reflects targets from the CCC's 6th Carbon Budget and 2030 ban on new ICE vehicles.

Start with the consumer, not the technology



There is an opportunity for low carbon to solve common heating problems

Poor control

Draughts

Damp

Overheating

REASON TO ACT

CATAPULT Energy Systems

CONSUMERS

High carbon heat
e.g. gas boiler

WILLING

ABLE

Low-carbon ready
e.g. insulated

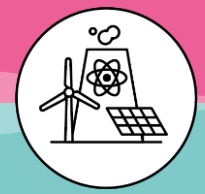
WILLING

ABLE

Low carbon installed
e.g. heat pump

WILLING

ABLE



Low carbon energy
(flexibility key)

SUPPLY CHAIN

REASON TO ACT

WHAT HAVE WE LEARNED SO FAR ON ELECTRIFICATION OF HEAT PROJECT?

TARGETED INSTALLS vs ACTUAL INSTALLS

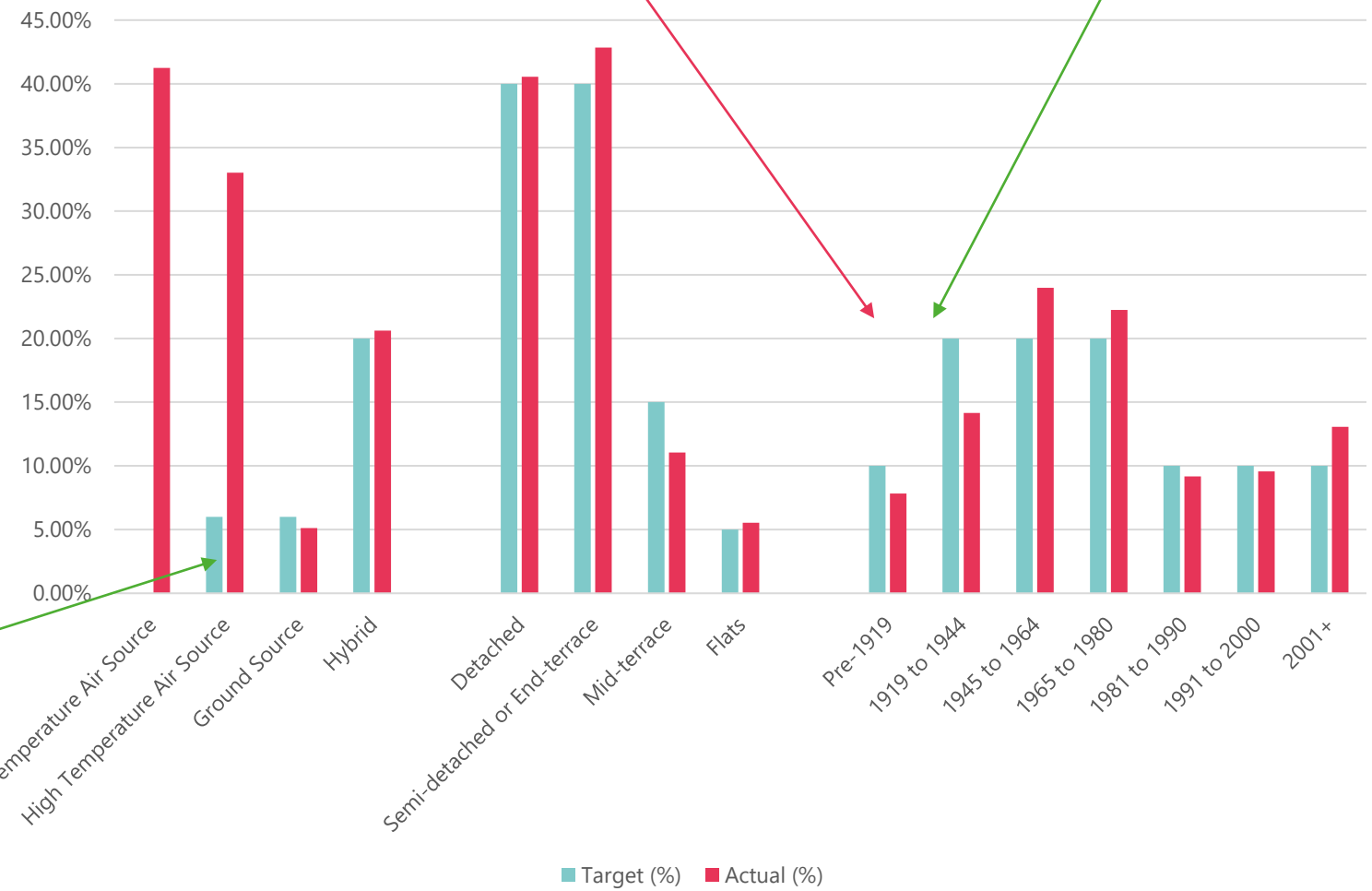
Department for Business, Energy & Industrial Strategy

CATAPULT Energy Systems

Successfully installed full range of heat pumps in the full range of targeted property types and ages

Shortfall of pre-1945 houses indicative of challenge to install within the project constraints

163 successful installs shows challenge was surmountable

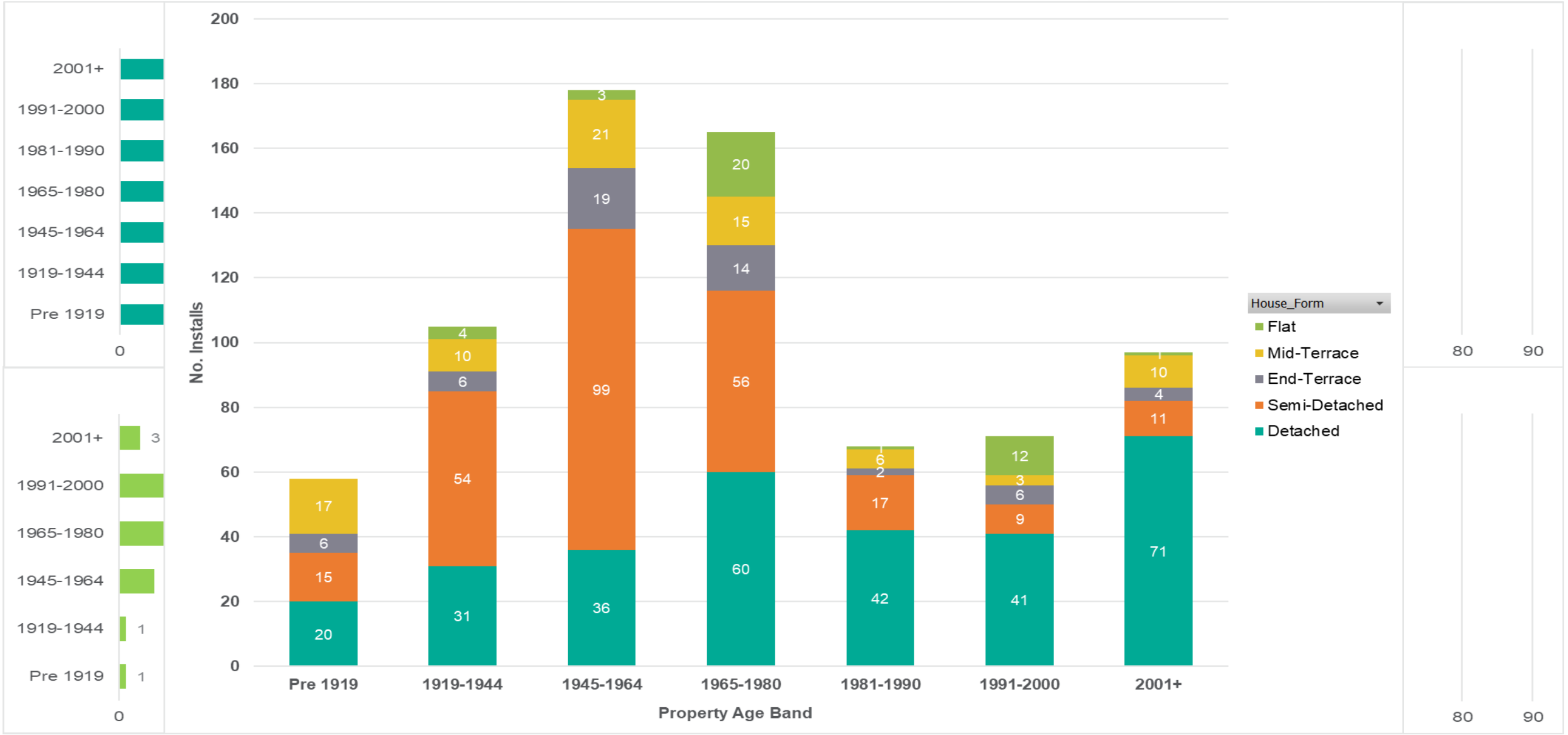


Higher number of High Temp units due to Advanced Technology vs pre-project definition

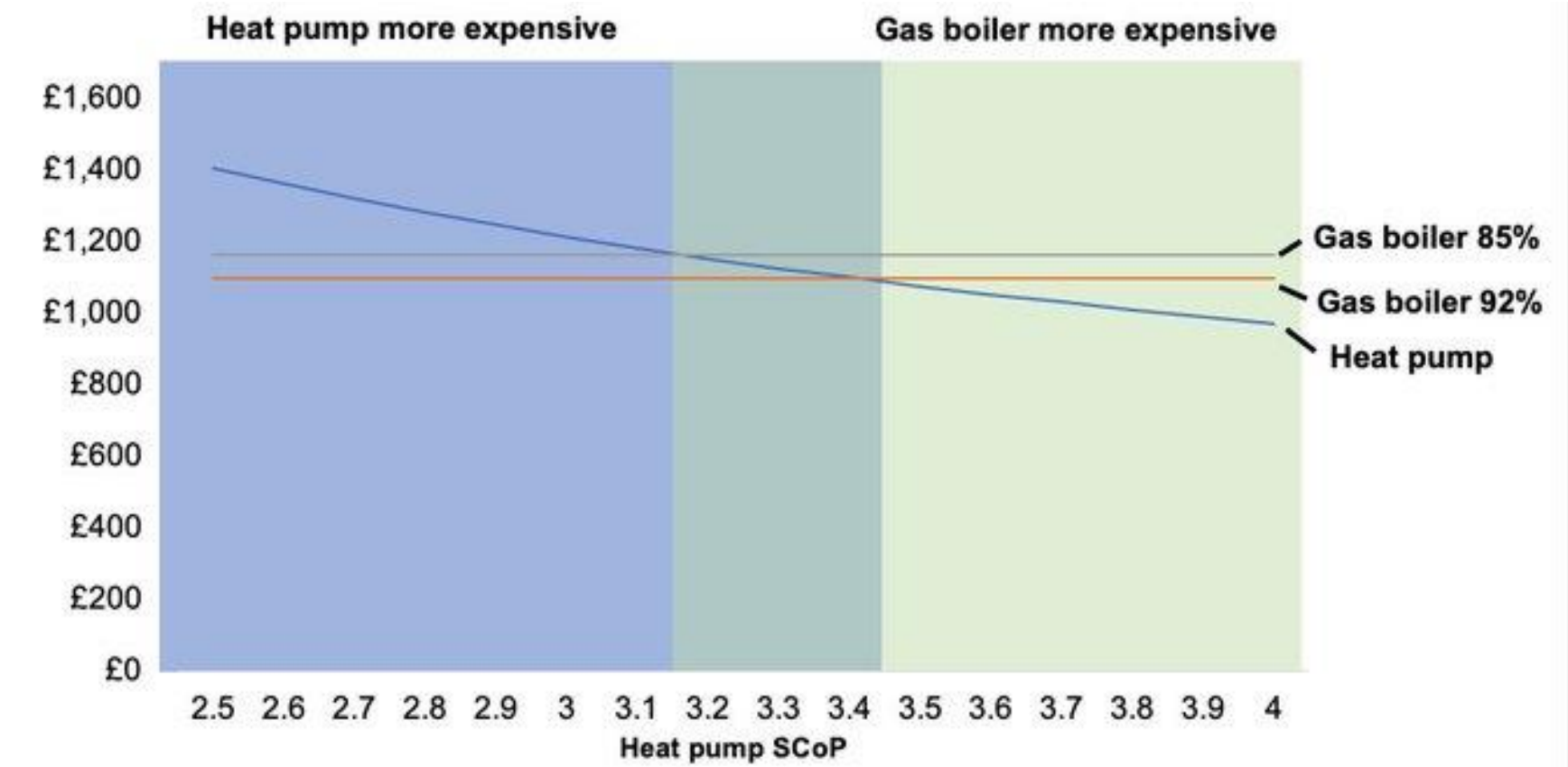
Target Total = 750
Actual Total = 742

80% previously mains gas heating

MORE INSTALLATION STATISTICS



NEW MARKET PRICES AND POLICY CHANGES ARE ALREADY SHIFTING THE BALANCE BETWEEN HEAT PUMP AND BOILER ECONOMICS



Assumptions: Heat demand: 10,204 kWh; Cost gas: 7.37p/kWh; Cost electricity: 28.34p/kWh; Gas standing charge: £0.27/day; CAPEX heat pump: £10.5k, incl. VAT, £10k, with BUS grant £5k; CAPEX gas boiler: £2.7k; Lifetime heat pump: 20 years; Lifetime gas boiler: 15 years

Significant implications for innovators

Increasing potential of concepts like heat as a service, improving retrofit skills, new energy efficiency technologies and scaling-up of low carbon heating options

Analysis by Regulatory Assistance Project (Jan Rosenow)

WHAT'S TO COME?

- Recruitment, Survey, Design and Install Dataset including:
  - Dates,
  - Participant Details and Reasons,
  - Further Property Details,
  - Design Details,
  - Suitability Decision and Reasons,
  - Home Upgrades,
  - Costs (incl. Capital and Estimated Running).

- Monitoring Dataset and Insights including:
  - Seasonal Performance Factor,
  - Heat Pump Energy Consumption,
  - Heat Pump Energy Output,
  - Further Heat Pump Statistics,
  - Further System Statistics.

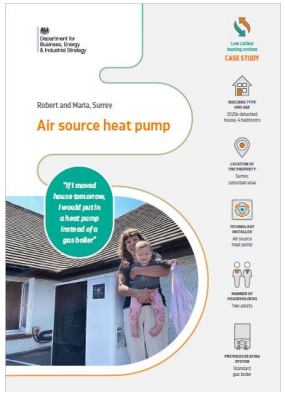
FIND OUT MORE

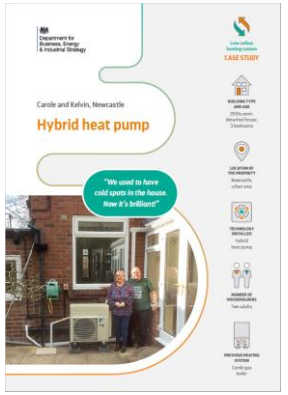
- **Heat Pump Installation Statistics Report**

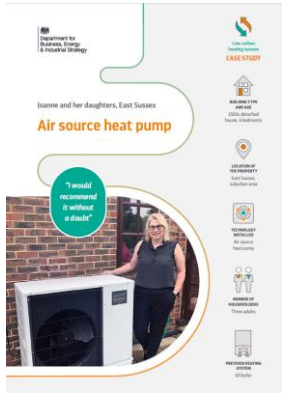
https://es.catapult.org.uk/report/electrification-of-heat-installation-statistics/

- **Case Studies**
- ASHP in 2000s flat, 1930s detached and 1920s detached
- Hybrid Heat Pump in 1930s semi-detached

Use report link as above and scroll down the page.







- **Dataset**
- *Use report link as above and scroll down the page or go to:*

https://usmart.io/org/esc/

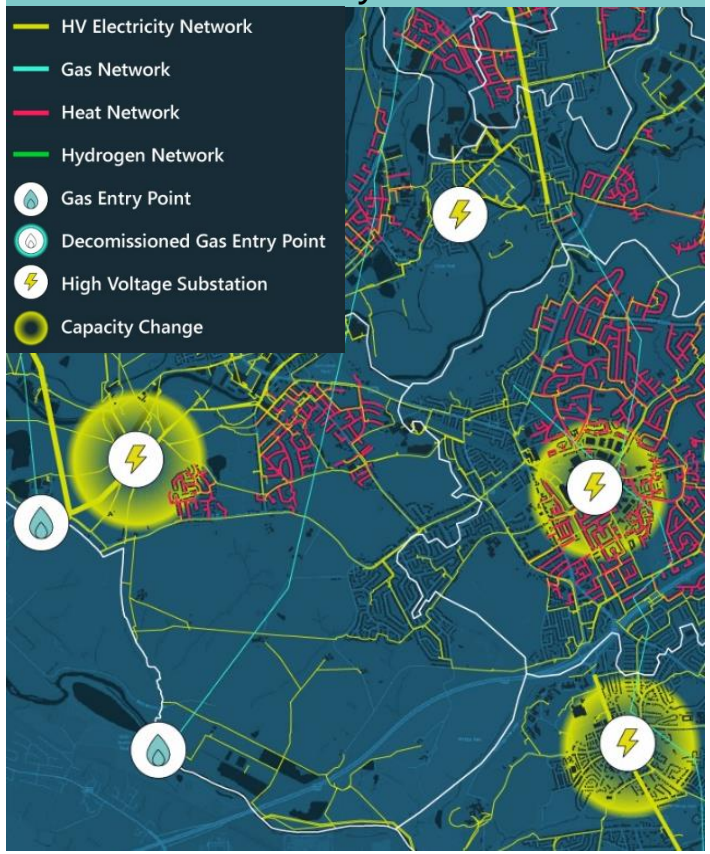
Search: BEIS Electrification of Heat Project - Heat Pump Installation Statistics

To discuss this or other ESC activity come and us on Stand C34 in the Energy Zone

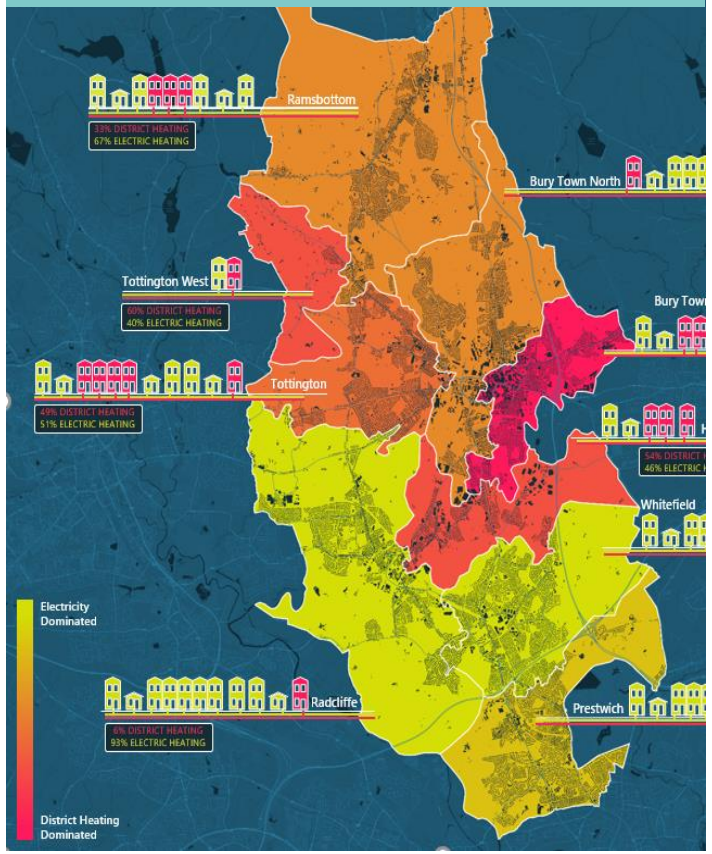
AND ANY LOW CARBON HEATING SOLUTION WITH HAVE TO BE MINDFUL OF LOCAL CONDITIONS

IMPORTANCE OF LOCAL AREA ENERGY PLANS

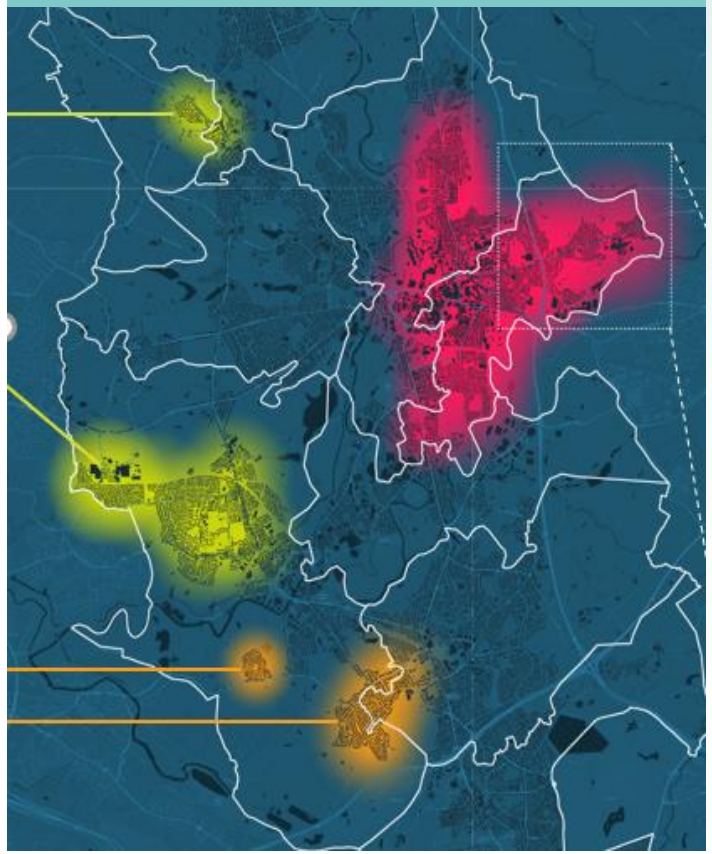
Understand **local options and choices for Net Zero** and other parts of the energy system, based on robust system data



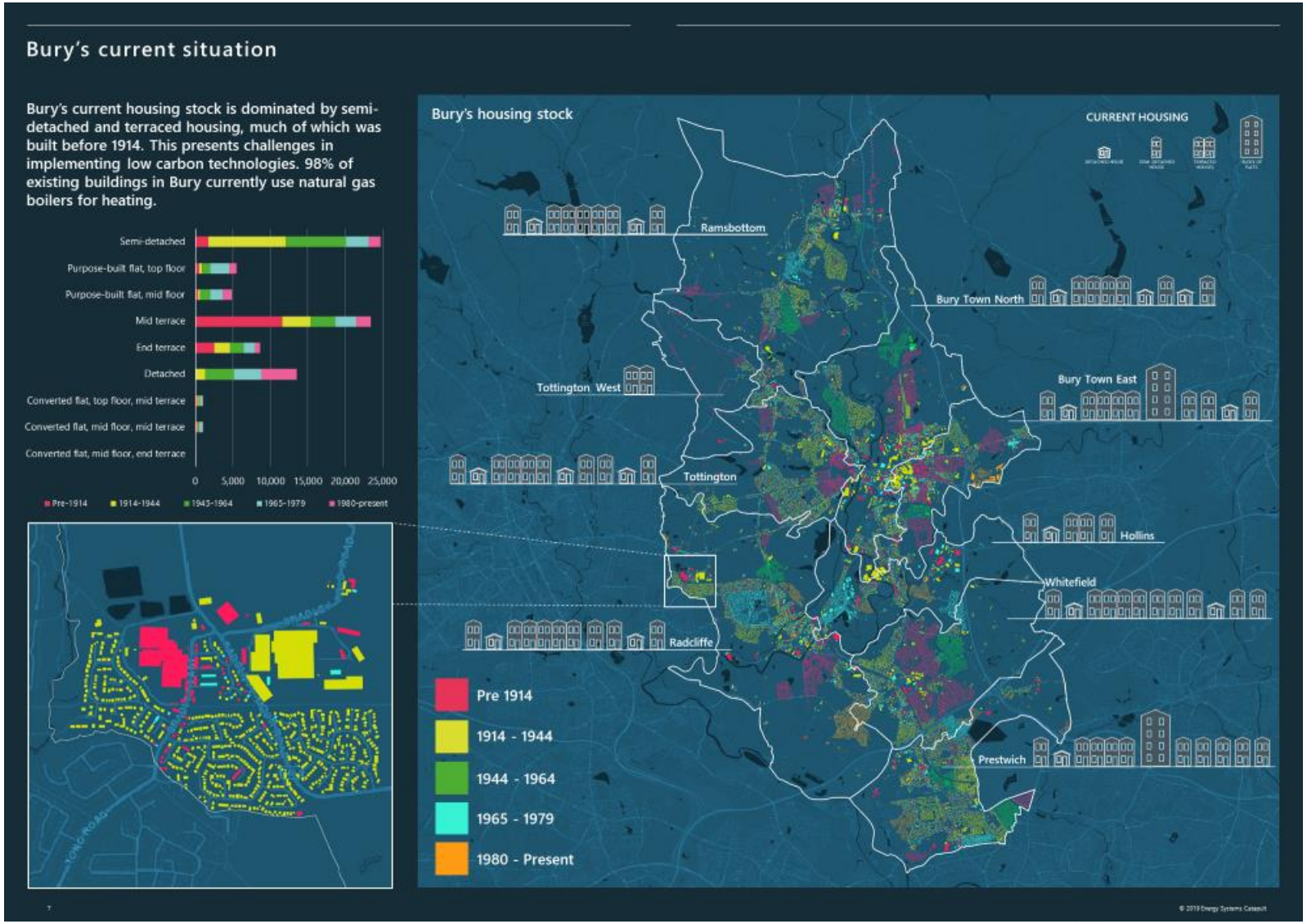
Collaboratively develop a **long term evidence based plan** to decarbonise, using modelling and local consultation



Resulting in data and insight to **target innovation and deployment** projects



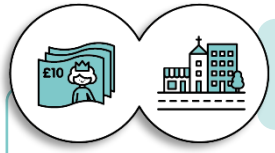
Robust plans consider current energy system in granular detail: including factors like the age of housing stock, to help plan future transition



What might a long-term policy package look like? Six steps to decarbonising buildings

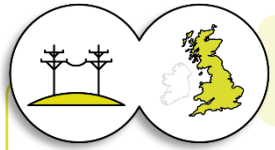
CATAPULT Energy Systems

1 Fund place-based low carbon 'Pathfinders', to build supply chains and skills



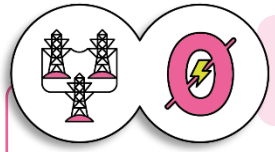
To drive early deployment of low carbon solutions in building stock and develop supply chains in a 'place-based' framework.

2 Roll out local area energy planning (LAEP)



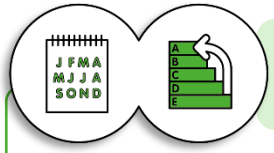
To develop a national framework for local energy transition planning and co-ordination spanning buildings and all energy vectors and networks.

3 Make energy networks invest for Net Zero (by adapting the RIIO2)



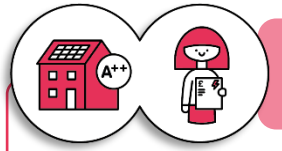
To make energy networks' long-term investment plans supportive of local 'whole system' decarbonisation plans.

4 Phase in minimum carbon performance requirements for all building owners



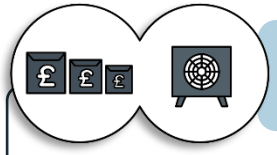
To improve understanding of carbon performance and drive long-term demand for innovative building upgrade solutions. Give homeowners long lead times to get ready.

5 Reward low carbon choices through energy bills



To create rewards and revenue for consumers who adopt and innovators who create zero carbon energy solutions, through a new building carbon credit scheme.

6 Develop low cost green finance for zero carbon solutions



To create new affordable green finance options for consumers and reduce default risks for finance providers.

OUR MISSION

TO UNLEASH INNOVATION AND OPEN NEW MARKETS TO CAPTURE THE CLEAN GROWTH OPPORTUNITY.

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