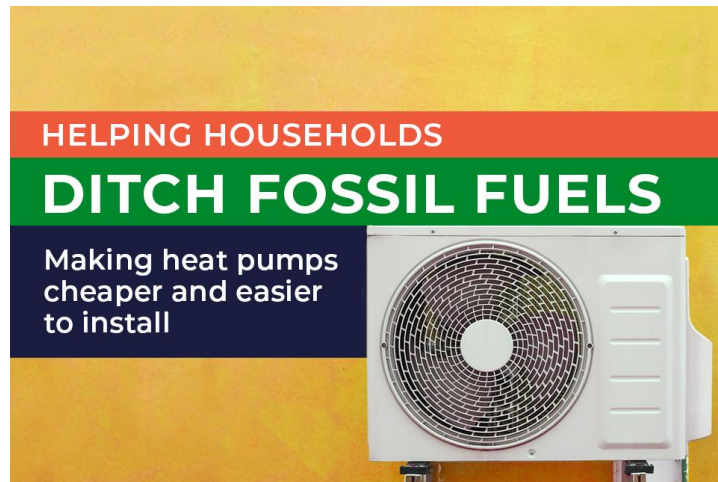


Heat Pump Ready Programme: Supporting innovation in the heat pump sector

Heat Pump Ready Conference – March 2023

Dr Nicola Lazenby

Energy Innovation Programme Lead – Heat Pump Ready



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Energy Security
& Net Zero

Why are we here?

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& Net Zero

Introductions – Heat Pump Ready Team



Sally Fenton & Tim Cook

Co-Heads - Built Innovation Team



Nicola Lazenby
Energy Innovation
Programme Lead
Heat Pump Ready –
Stream 1 & 3



Esme Sainsbury-Plaice
Energy Innovation
Delivery Manager
Supporting across the
Heat Pump Ready
Programme



Adam Stiles
Energy
Innovation
Research &
Evaluation Lead



Alex Hobley
Energy Innovation
Programme Lead
Heat Pump Ready –
Stream 2



Henry Riddle
Energy Innovation
Project Advisor
Supporting delivery
of Heat Pump
Ready Stream 2

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The Heat Pump Ready Team sit within the Science and Innovation for Climate and Energy (SICE) Directorate within the Department for Energy Security and Net Zero.

Introductions – Policy Team



Sarah Bailey

Senior Policy Advisor

Focused on overcoming barriers to the electrification of heat, including ensuring the electricity networks are an enabler, delivering smart heating, and supporting innovation.



Christopher Galpin

Head of Heat Pump Installer Policy
Working closely with the sector to ensure installers can access high quality training, and to strengthen the sector's reputation for high quality installations.



Ian Thel

Policy Adviser

Networks and Innovation

Supporting innovation and ensuring electricity networks can enable the route to 600k



Matthew Aylott

Senior Policy Advisor

Removing barriers to heat pump uptake, delivering policies to make heat pumps more affordable, improve consumer awareness, and update product and planning standards.

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The Heat Pump Ready Policy Team sit within the Clean Heat Directorate within the Department for Energy Security and Net Zero.

Aims of Heat Pump Ready

Heat Pump Ready is a **£60m innovation programme** which aims to:



Reduce lifetime costs of domestic heat pumps



Develop and strengthen partnerships between the many players involved in the domestic heat pump sector



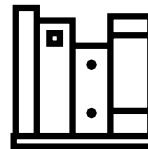
Improve lifetime consumer experience of heat pumps



Develop effective approaches and products to engage effectively on heat pump issues with homeowners and with the key players



Stimulate innovative research and solutions to address the impact of domestic heat pumps on the electricity system.



Establish an evidence base to enable effective design and development of future heat pump policy and regulation

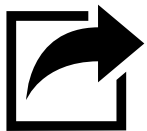
Objectives of Heat Pump Ready



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

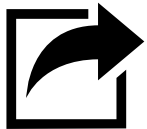
In this room we have....



Stream 1 – Phase 1 Project Teams
Stream 1 – Phase 2 Project Teams



24 Stream 2 Project Teams



Collaboration and Learning Managers from the Carbon Trust

Scale of the challenge

Heat pump deployment in numbers...

2028

2021

600,000 per year

55,000 per year

50,000 per month

4,583 per month

11,538 per week

1,058 per week

1,643 per day

151 per day

Collaboration is key...

Energy Innovation Basecamp - Problem

Statements

The networks shared some of the specific, technical challenges they are facing, both in the short-term and as we progress through the Energy System Transition. Here, you can learn more about network challenges which have been grouped under the following six strategy theme.

Pick strategy theme below to anchor to correct section of page:

- [Data and digitalisation](#)
- [Flexibility and market evolution](#)
- [Net Zero and the energy system transition](#)
- [Optimised assets and practices](#)
- [Supporting consumers in vulnerable situations](#)
- [Whole energy system](#)

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Further details: <https://smarter.energynetworks.org/>

Email: heatinnovation@beis.gov.uk if you have your own problem statement which could form part of a network challenge

Recap on objectives for today

1. Share learnings from Heat Pump Ready projects so far
2. Understand what changes are needed to achieve 600,000 high quality heat pump installations a year by 2028
3. Work together to shed light on how your innovations can transform the market for heat pumps

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Chatham House Rule

Participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.

Strong views welcome but please be respectful and professional.

Some people are less confident engaging in group discussions than others, so please be inclusive.

Upcoming Heat Pump Ready activities

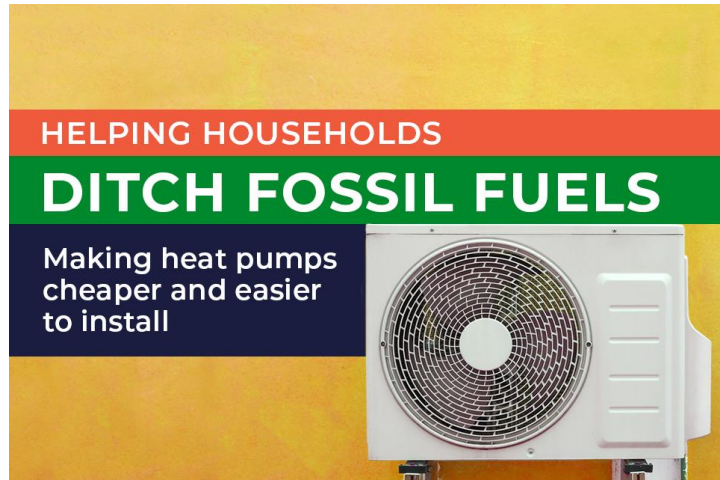
- Heat Pump Ready **website**
- Heat Pump Ready innovation zone at **Installer Show**
- Heat Pump Ready **podcasts** – Betatalk

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Heat Pump Ready Programme: Supporting innovation in the heat pump sector



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Part of the Net Zero Innovation Portfolio

Learning From Experience

An opportunity to hear learning and short insights from 5 project teams and to identify common experiences that we can build on as a community.

Stream 1

Bristol City Council

Samsung

City Science (Cambridge)

Stream 2

Build Test Solutions

MCS / Energy Saving Trust

Group Activity

Split into groups of 3 on your tables (one group will be x4) and take a colour card from the centre to represent your group. Have a think about the below questions and present back to the main group:

1. Having listened to the five stories, which experience could you most relate to? What really caught your attention? Why?
2. What did you learn from this that you will take back to your team/project to further strengthen practice?
3. What tip would you add to the 5 tips shared already?

Bristol Heat Pump Ready



Project overview

- Delivering a local supply chain focused and community backed approach to high performing heat pump installations based on targeted data insights and innovative holistic home survey approach

Project Partners: Bristol City Council, Buro Happold, Centre for Sustainable Energy, The Green Register, Veritherm, Build Test Solutions

Learnings

- **Technical Issue Faced:** Ensuring quality heat pump system systems
- **Solution:** Holistic approach to home survey including measured heat loss, thermal imaging, retrofit advice, air tightness
- **Key Learnings:** 1. Current survey approaches are inaccurate and potentially high risk for fuel poor 2. Customers want holistic survey 3. Homeowners are willing to pay for quality survey
- **Top Tip:** Accurately measure to inform retrofit

Clean Heat Streets

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www.cleanheatstreets.com

Project overview

- Installing 150 air-source heatpumps on two secondary substations in the Rose Hill area of Oxford. We will use Smart Tariffs combined with Smart Scheduling to demonstrate bill savings, and local economies-of-scale to offer installations from £2,600

Project Partners: Oxford City Council, University of Oxford, Oxford Brookes University, Oxfordshire County Council, Scottish and Southern Electricity Networks (SSEN), GenGame, Passiv UK, Alto Energy, Rose Hill and Iffley Low Carbon

Learnings

- **Technical Issue Faced:** Predictions for next winter's electricity/gas ratio are that heat pumps will cost relatively more to run than gas boilers
- **Solution:** Focus on how we can use Smart Tariffs with Smart Scheduling to demonstrate savings
- **Key Learnings:** *Has to be seen as cheaper than a gas boiler; Need to understand the local community and work with existing groups; Importance of social learning – and gradual recruitment approach; There are a lot of benefits from “Static” Heat Pump control.*
- **Top Tip:** Read the Heat Pump manual

PACE Financing for Heat Pumps in Rural Cambridgeshire

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Project overview

Improve the consumer journey through extensive user research
Overcome the high upfront cost of heat pumps with innovative lending options
Place-based engagement and GIS prioritisation of deployment location

Project Partners: Fenland District Council, Cambridgeshire County Council, Growth Guides, PECT, Lendology

Learnings

- **Technical Issue Faced:** Uncertainty on gas and electricity tariffs creates a range of financial possibilities to the lifetime cost of heat pumps
- **Solution:** Scenario modelling and sensitivity analysis to capture the range of possibilities
- **Key Learnings:**
 - The customer has to understand the range of uncertainty on tariffs and the impact it will make on the heat pump running costs
 - Electricity market reform to decouple the electricity price from gas is necessary to accelerate uptake of heat pumps
- **Top Tip:** Transparency with consumer. Complexity of possibilities must be communicated in an easy to understand way

MCS & Energy Savings Trust Consumer Journey

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Project overview

Guiding consumers from their first engagement through to receiving quotes for installation under the combination of the MCS & EST brands

Project Partners: MCs, Energy Savings Trust, Solstice Associates

Learnings

- **Technical Issue Faced:** Internal assessment of properties
- **Solution:** Partnership with Elmhurst to develop new assessment, based on up skilled PAS assessors and contractor input on data points. With assumption that future developments will reduce the amount of data gathered
- **Key Learnings:** There is no existing data set of internal details of homes. Hopefully the assessed data will be mappable to some of the measured data
- **Top Tip:** You have to have the data to build the insight

MEASURED

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Project overview

Using building performance measurement to improve HP specification & design

Project Partners: Veritherm, Elmhurst Energy

Learnings

- **Technical Issue Faced:** Accurately measuring the thermal performance of homes, and using this measurement to determine heat pump sizing
- **Solution:** Apply 2 existing thermal performance measurement methods, and demonstrate consistency in results across 50 houses. Design a 12831 heat loss calculator software that accepts thermal performance measurement as an input
- **Key Learnings:** It's really hard to predict the thermal performance of houses from a visual survey and measurement offers a practical, cost effective and accurate solution
- **Top Tip:** HTC measurement is a great tool to better tailor HP sizing

MEASURED

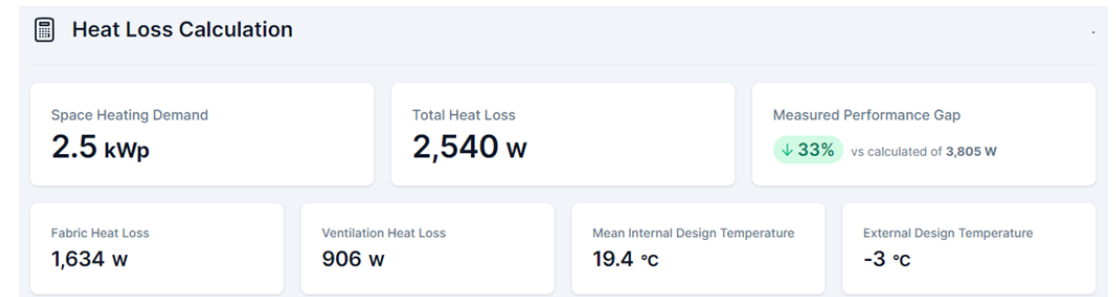
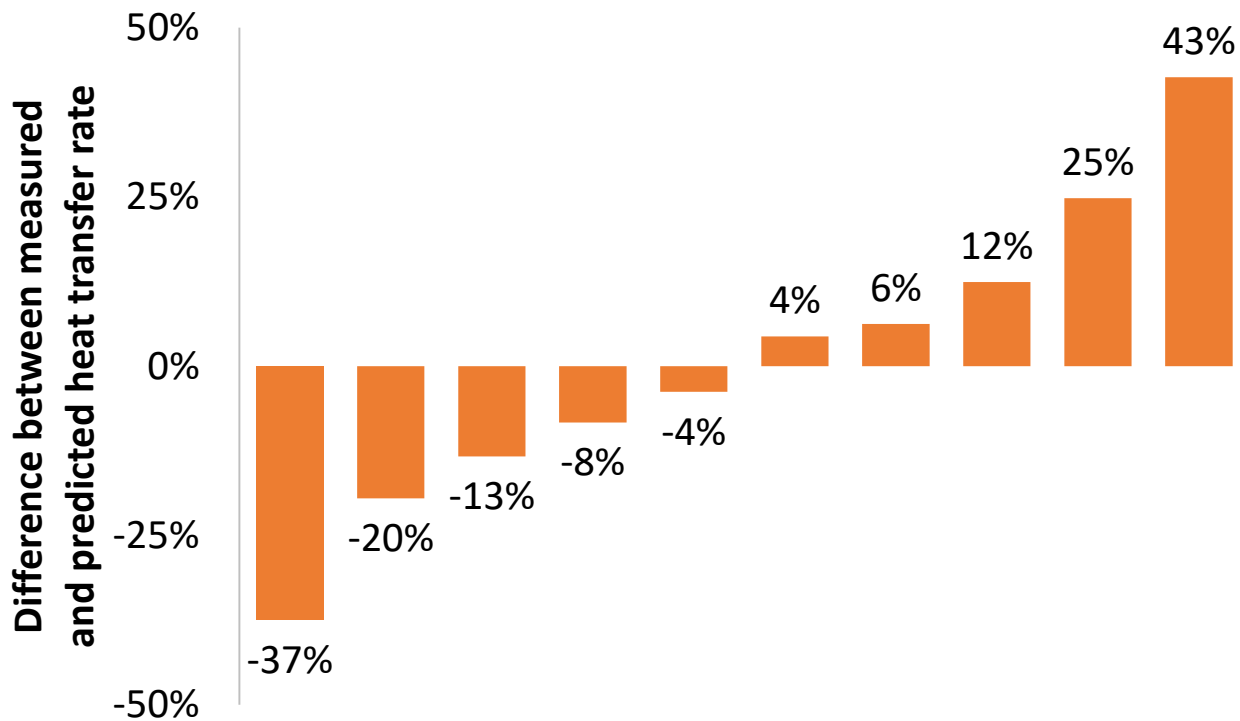
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Field trial in
50+ homes



Measurement
standardisation



Measured inputs to Heat Loss
Calculators

Group Activity

Split into groups of 3 on your tables (one group will be x4) and take a colour card from the centre to represent your group. Have a discussion about the below questions and present back to the main group:

1. Having listened to the five stories, which experience could you most relate to? What really caught your attention? Why?
2. What did you learn from this that you will take back to your team/project to further strengthen practice?
3. What tip would you add to the 5 tips shared already?

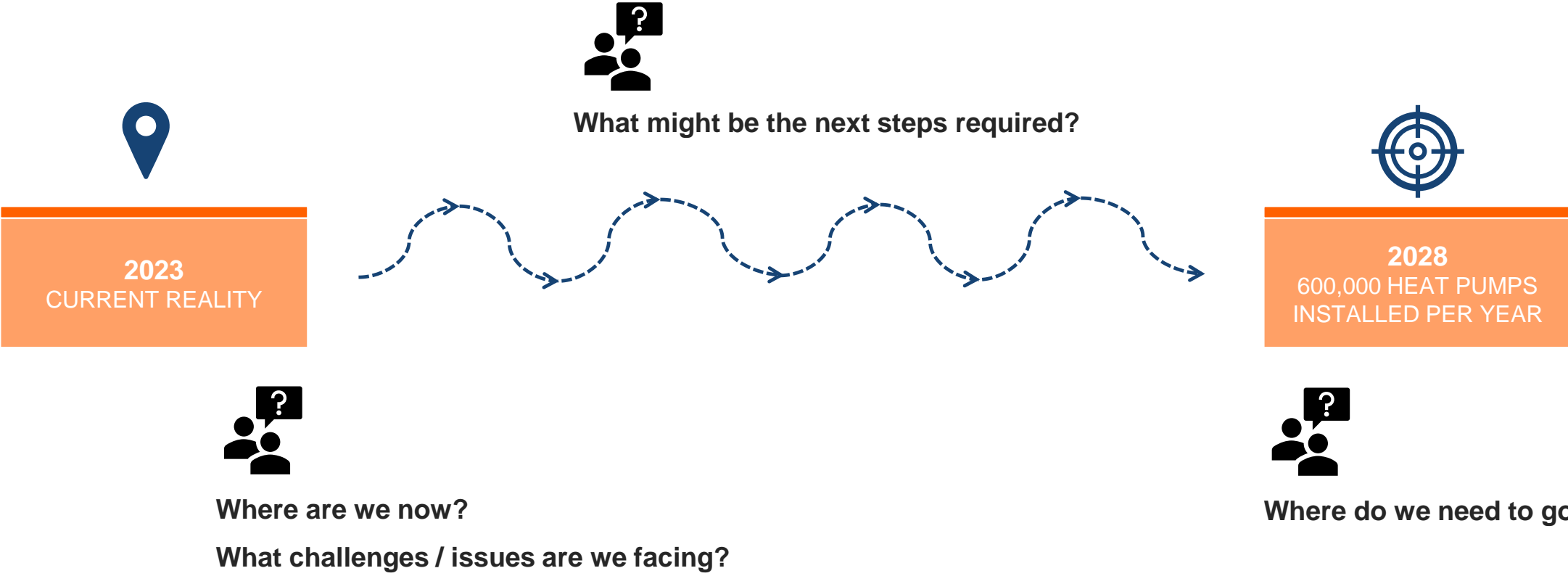
Selection Wheel

[Heat Pump Ready Conference \(wheelofnames.com\)](https://wheelofnames.com)

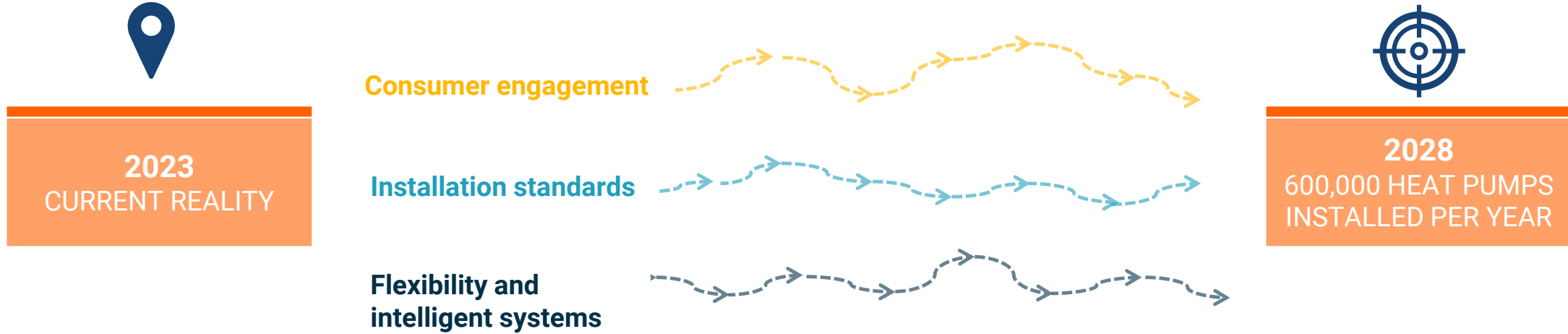
BREAK (15 mins)


#HeatPumpReady

What changes are required to achieve the 600,000 heat pump deployment target?



What changes are required to achieve the 600,000 heat pump deployment target?





How can we install 600,000 heat pumps a year that are fit for a future, intelligent energy system?

Alex Schoch, Octopus Energy

How can we successfully engage 600,000 customers a year?

Madeleine Gabriel, Nesta

How can we install 600,000 heat pumps a year that are all high quality, high efficiency, and reduce customer bills?

Brendon Uys, Ultimate Renewable Supplies

Why | Delivering on heat pump flexibility is critical to the grid

With heat pumps demanding up to 25 TWh per year by 2035, our flexibility technology will be **key to ensuring manageable loads and reducing infrastructure costs**



How | Heat pumps are inherently flexible

Annualised lifetime cost of heat pump vs gas boiler, medium home

Heat pumps offer **flexibility** in four dimensions that boilers—regardless of fuel—can't match

Annualised lifetime costs are still currently higher for heat pumps than boilers



Time of use flexibility

Heat pumps can preheat a home in low demand/price times and shut off to allow “thermal coasting” through high demand/price periods



Operational flexibility

Heat pumps can throttle temperature and flow speeds to maximise efficiency based on conditions

But small changes in electricity price make a big difference, e.g.

- Reduce price of electricity vs gas

- Remove standing charge



Thermal Storage

Heat pumps can “over-heat” cylinder water above reference temperature in low demand/price periods and circulate hot water hours later



Power source flexibility

As heat pumps are electric they can rely on renewable/zero-carbon energy sources and existing H₂ supplies

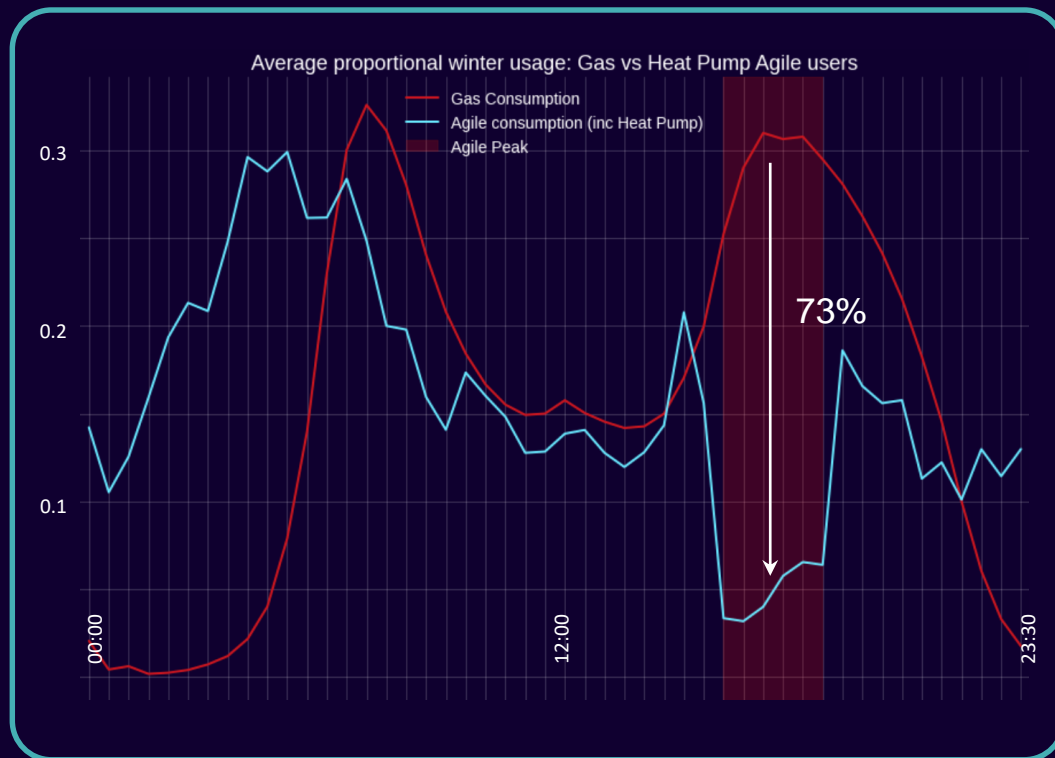
- Improve average performance

- Reduce upfront cost a bit

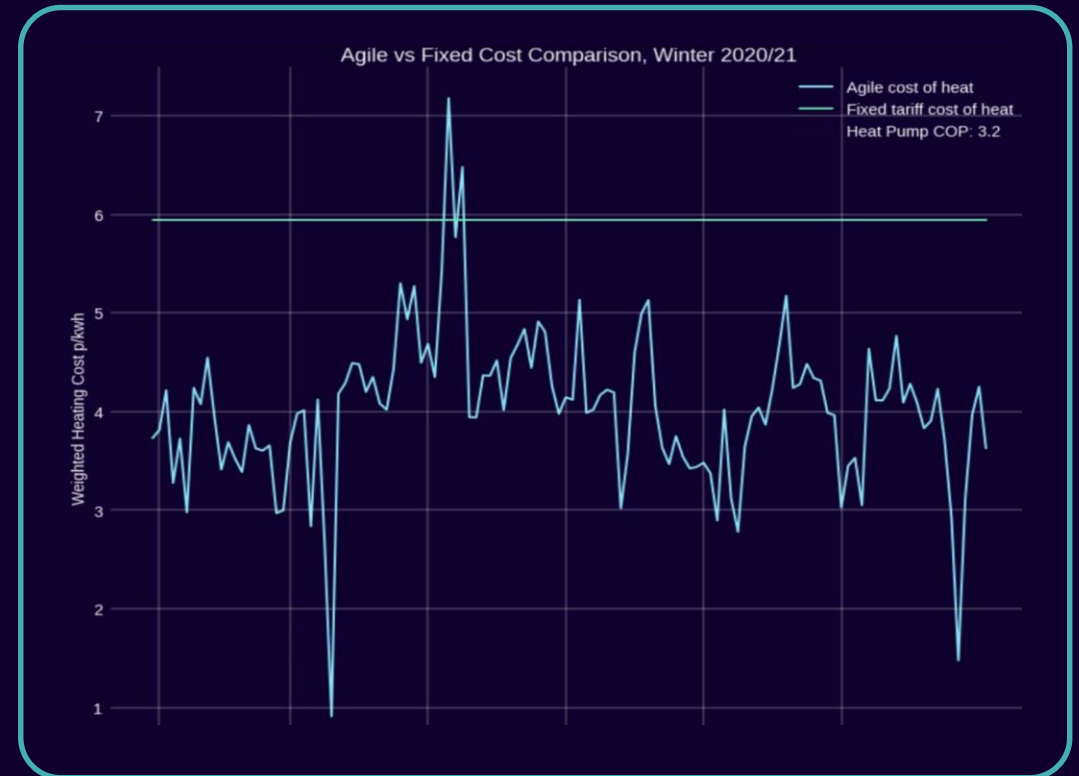
How | How flexible is a heat pump?

We've reviewed the data from **thousands of customers** using heat pumps on our smart tariffs & flexibility services and it's clear heat pumps have a **significant amount of flexibility**

Our **Agile Octopus** customers **reduced peak usage by 73%** ... **saving 20% on their elec bills** and reducing peak demand to negligible levels compared to gas...



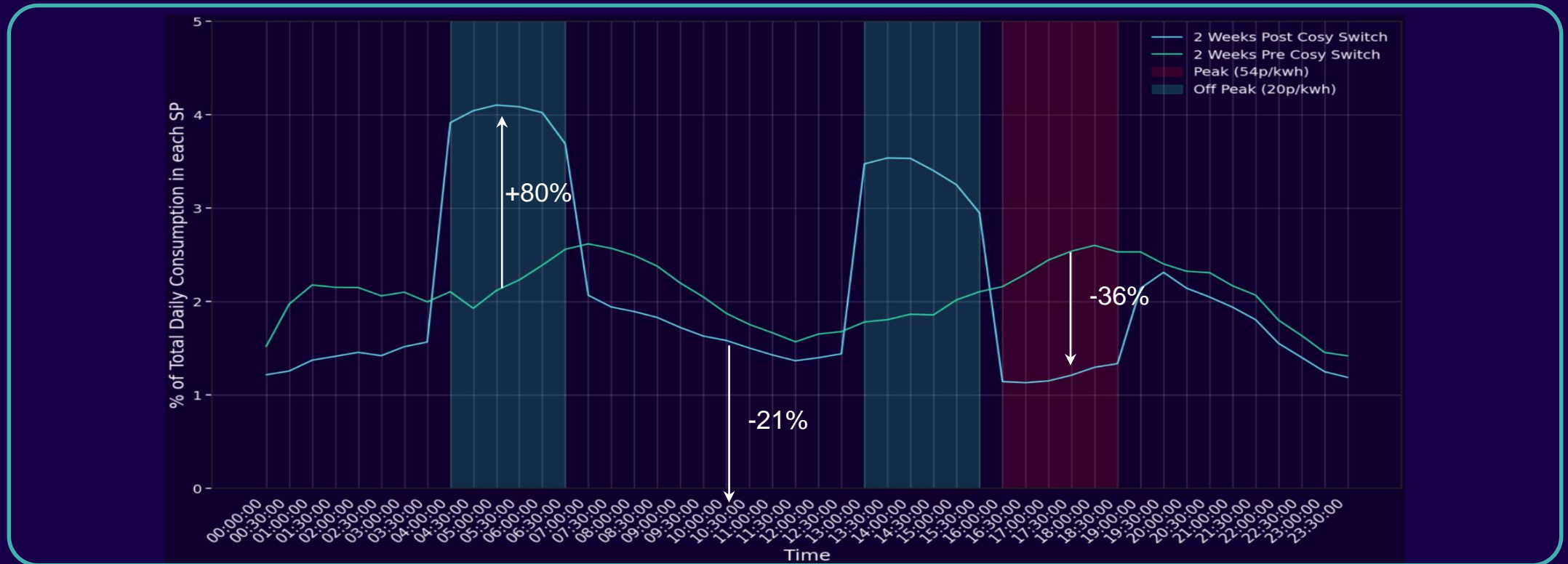
Based on analysis of 250 customers over the entire 2019/20 Winter



How | How flexible is a heat pump?

Already our **Cosy Octopus** customers are showing an **incredible ability to shift** consumption....

...**saving them £1.70 a day on average** since they signed up in Dec/Jan/Feb - one of the coldest periods of the year!

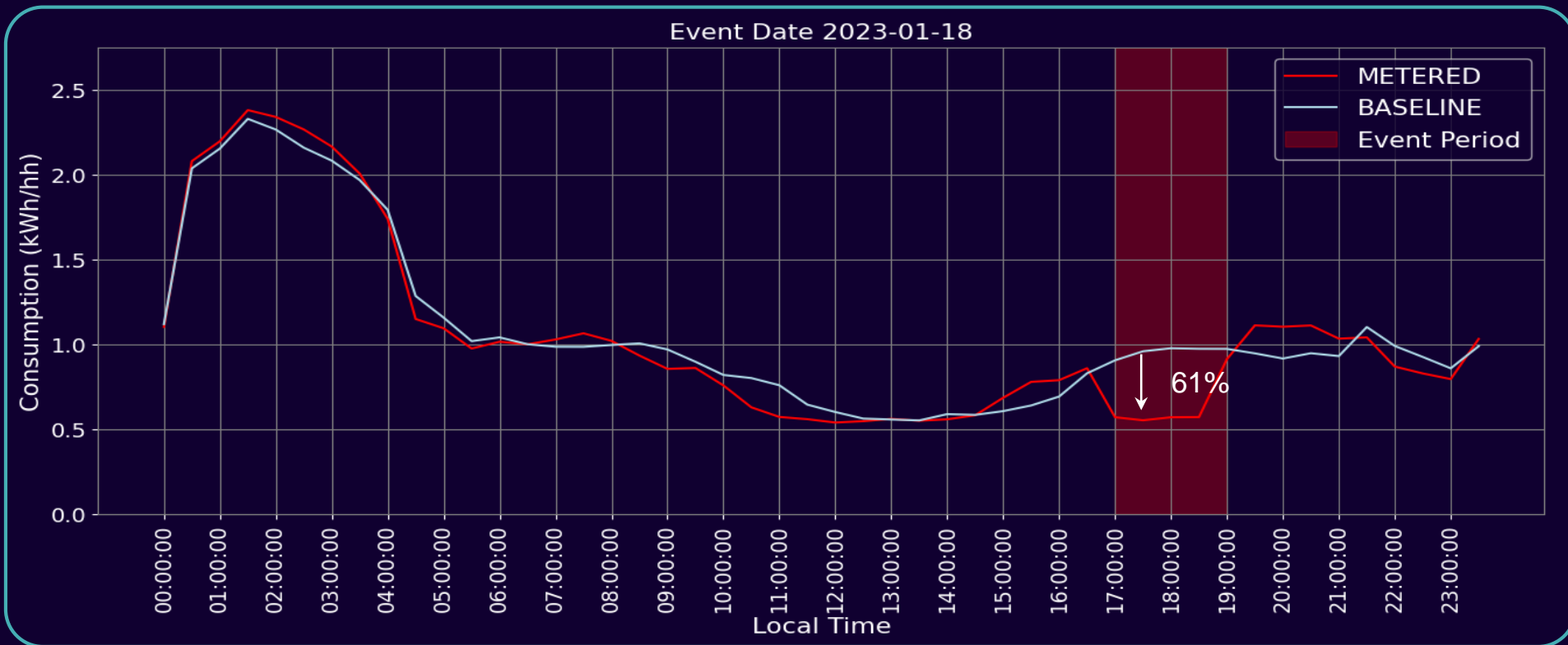


Based on analysis of 450 customers, comparing the two weeks before and after signing up to Cosy Octopus

How | How flexible is a heat pump?

Heat pump users on our **Equinox** trial are regularly reducing **peak electricity usage by 61%** ...

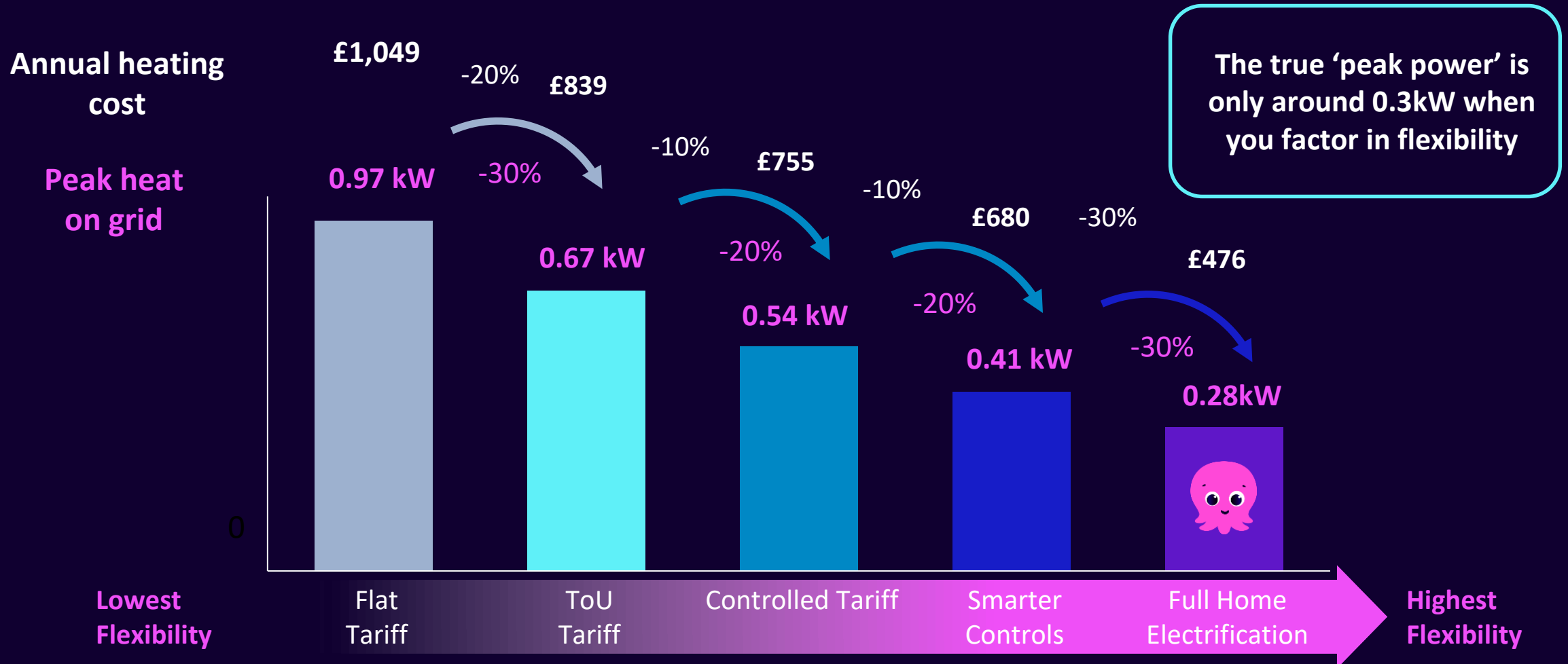
...and **92.5% of them say they feel no major difference in comfort**



Based on the results of 370 customers participating in an event on 18th January with an outside temperature of 1.5°C

Why | Peak heat pump power is less than you think

These savings are just the start, with **intelligent tariffs and technology**, we can further reduce the cost to run heat pumps and peak stress on the grid



600,000 heat pumps a year: How can we engage consumers?

Madeleine Gabriel

[nesta.org.uk](https://www.nesta.org.uk)

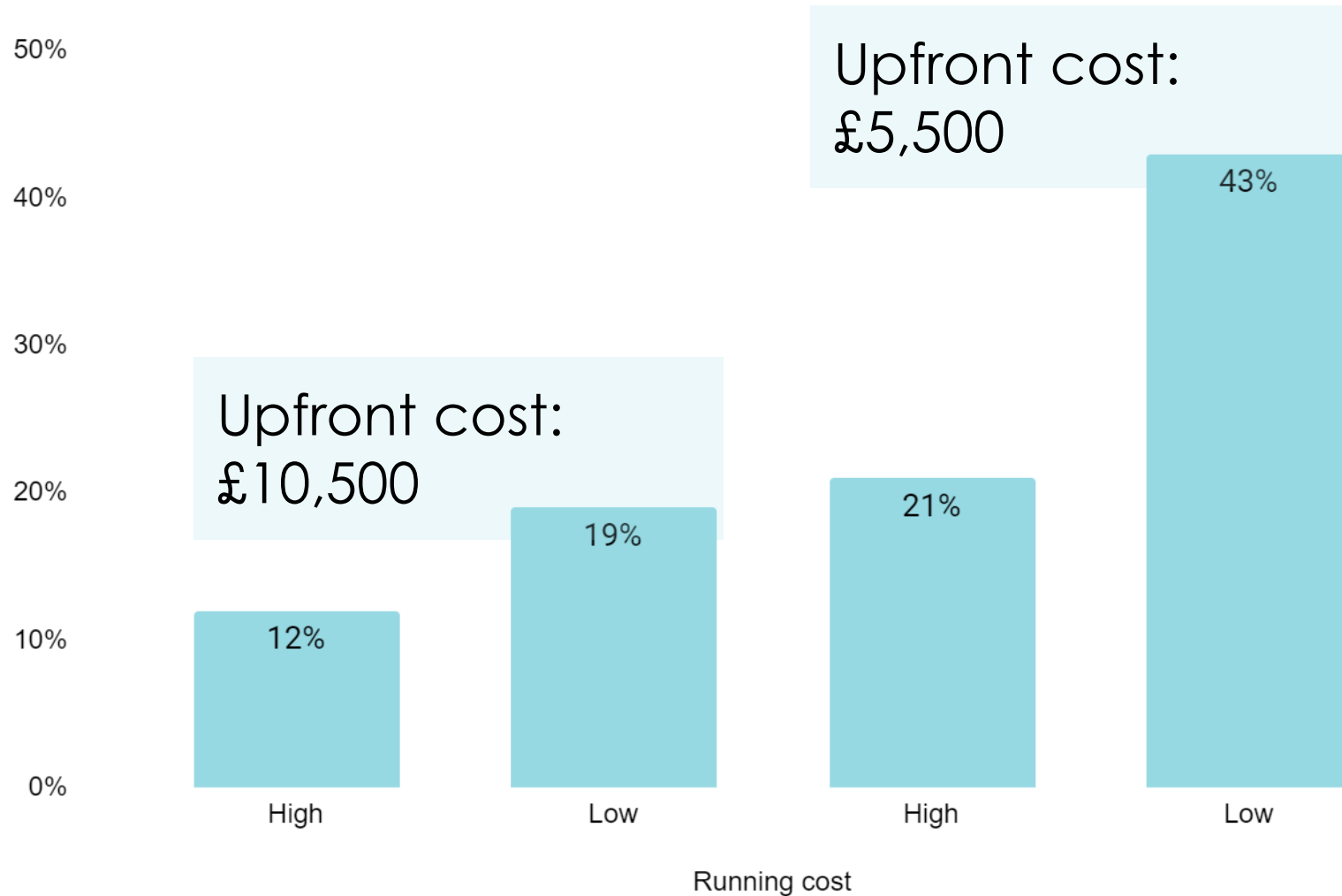


@mad_gabes



No-one wants a heat pump?

Proportion saying they'd pick a heat pump over a boiler



We told 8000 people they needed to replace their boiler

We showed them info on boilers and heat pumps

They were randomly assigned different information about costs

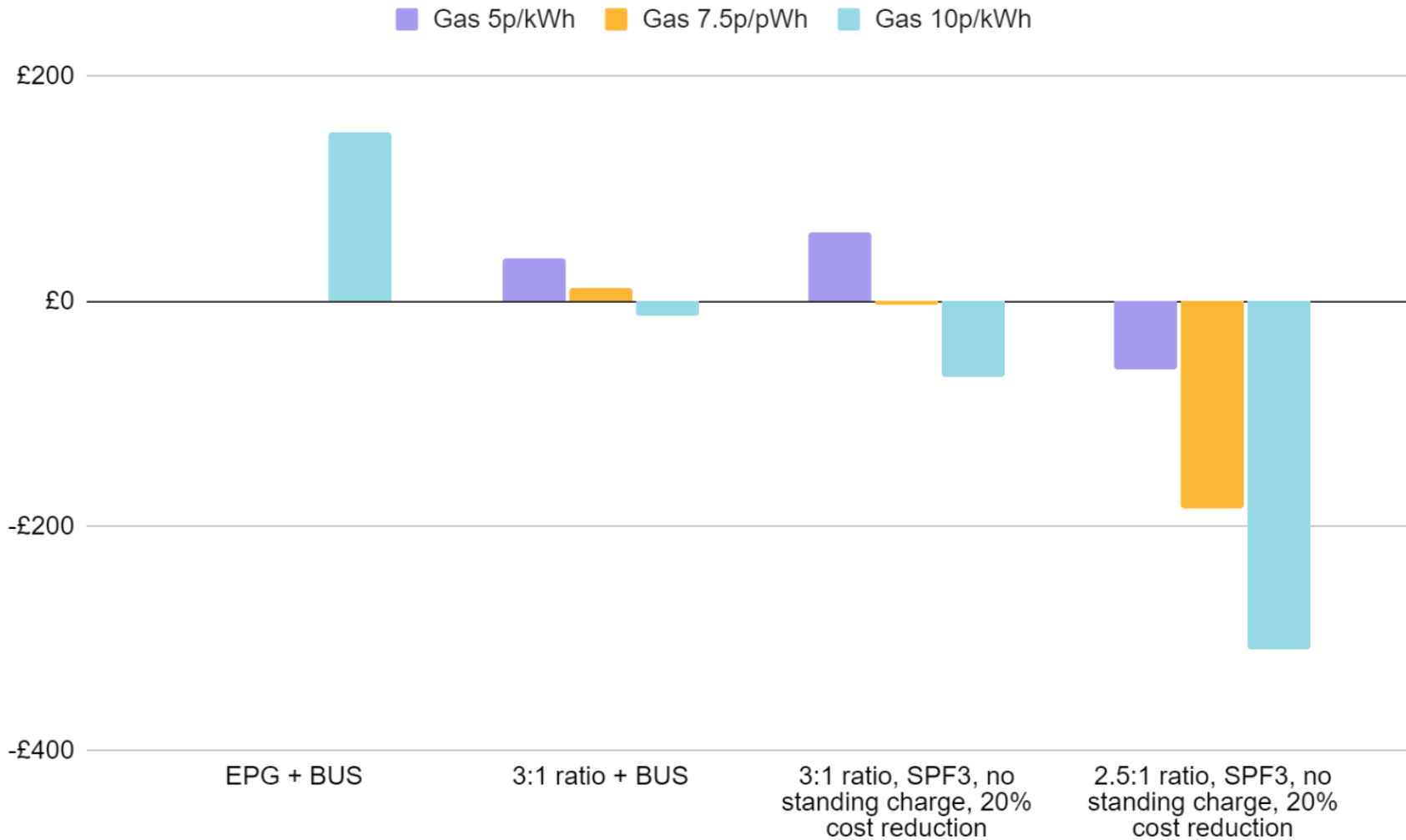
And were asked to then choose a heat pump or a boiler

12% preferred a heat pump, even with with no grant

With a £5k grant, 21% preferred a heat pump

But they're too expensive, aren't they?

Annualised lifetime cost of heat pump vs gas boiler, medium home

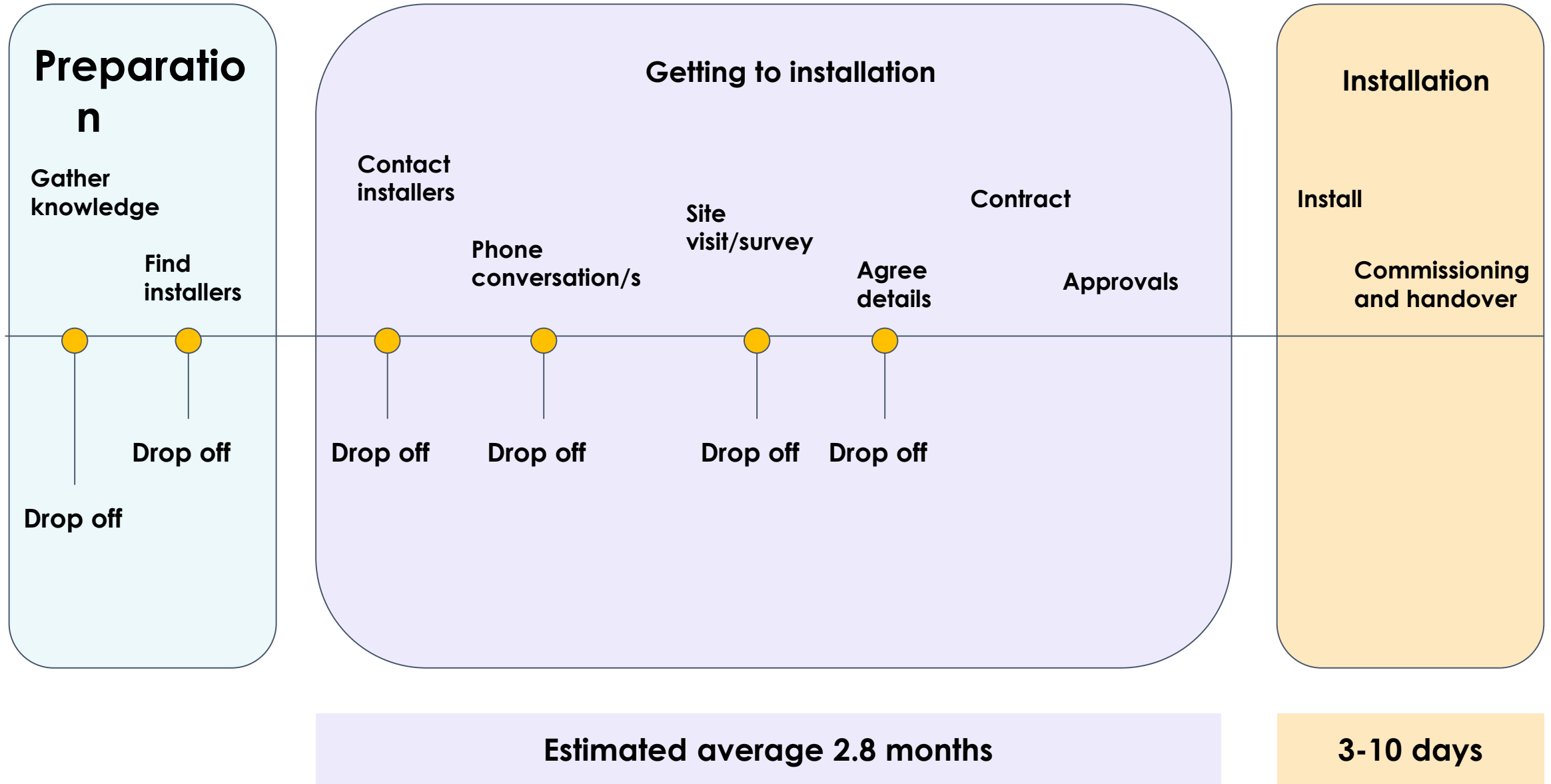


Annualised lifetime costs are still currently higher for heat pumps than boilers

But small changes could make a big difference, e.g.

- Reduce price of electricity vs gas
- Remove standing charge
- Improve average performance
- Reduce upfront cost a bit

It's pretty hard to get one though, isn't it?



So to sum up

- Consumers are interested
- We can unlock that demand by making heat pumps more affordable and easier to buy
- This may not need radical change - it could be achieved with relatively small improvements across a range of parameters
- Each customer interaction is important - what is the message we are giving?

Brendon Uys - Heacol

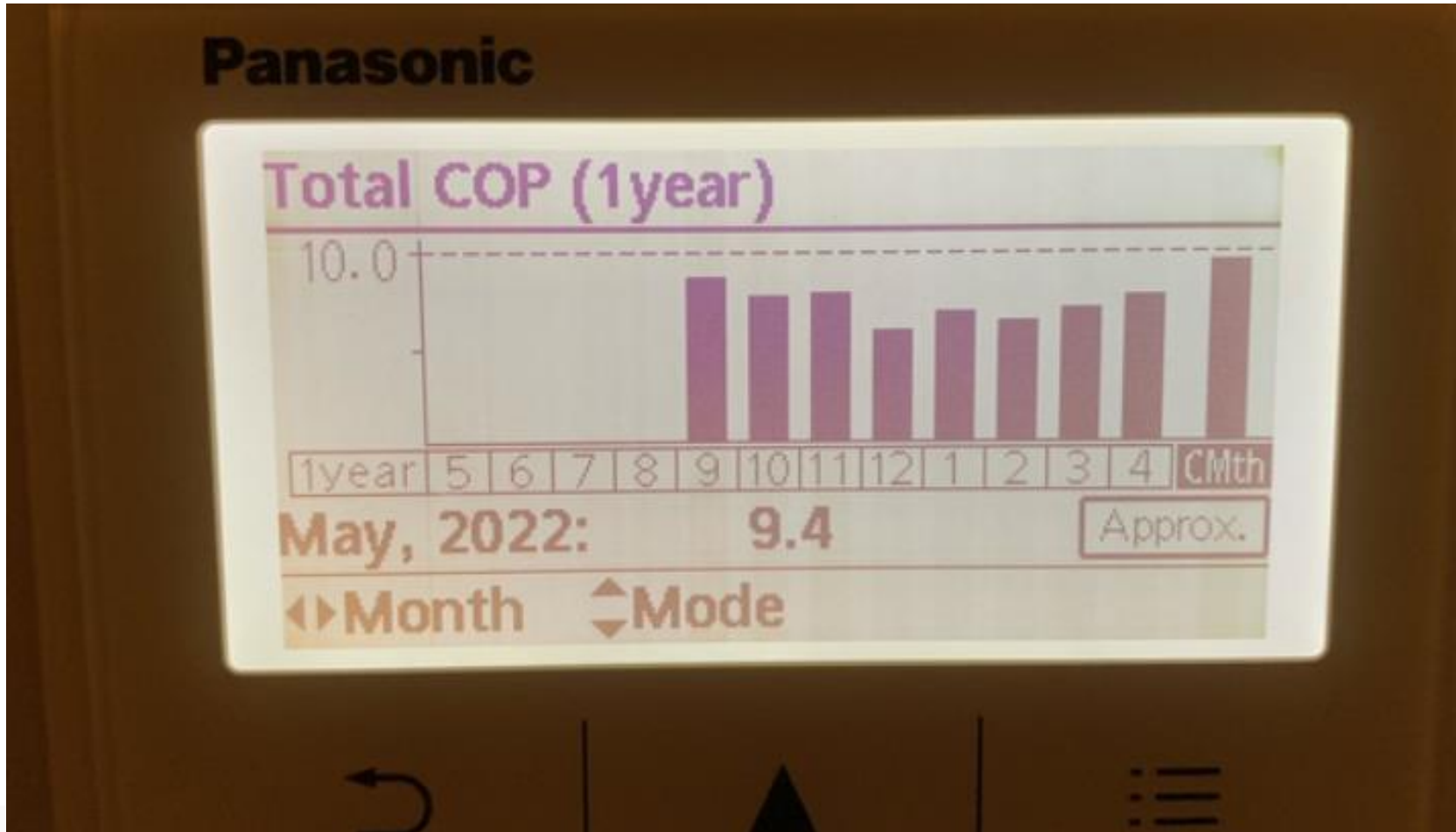
How do we achieve 600,000 high quality high installations a year by 2028?

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Brendon Uys - Heacol



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How can we successfully engage 600,000 customers a year?		How can we install 600,000 heat pumps a year that are all high quality, high efficiency, and reduce customer bills?	
Matthew Aylott	Nic Mason	Tim Bailey	Ren Kang
Sarah Bailey	Joe McQuillen	Madeleine Bailey-Hall	Nicola Lazenby
Matthew Boyes	Eimear Moloney	Richard Barwick	Jonathan Siviter
Maddy Clifford	Phil Proctor	Jackie Bolt	Mark Lufkin
Charlotte Flowerdew	Gareth Robertson	Adam Brann	Tom Moore
Christopher Galpin	Monique Sewell-Bennett	Redwan Choudhury	Georgina Orso
Rajat Gupta	Adam Stiles	Tim Cook	Dan Roberts
Mark Hewitt	Bethany Taylor	Simon Drake	Esme Sainsbury-Plaice
Craig Ilife	Ian Thel	Sally Fenton	Russell Smith
Cathryn Irwin	Wouter Thijssen	Laura Forster	Gruffydd Thomas
Philip Jackson	Joe Tresadern	Madeleine Gabriel	Anastasia Turpetko
Matthew Jones	Tricia Valentine	Nathan Gambling	Jon Warren
Michelle Leaper	Daniel White	Alex Hoble	Thomas Whiffen
Tom Lipinski	Jane Wilson	Richard Jack	Emily White

How can we successfully engage 600,000 customers a year?	How can we install 600,000 heat pumps a year that are all high quality, high efficiency, and reduce customer bills?	How can we install 600,000 heat pumps a year that are fit for a future, intelligent energy system?
Tim Bailey	Matthew Aylott	Sarah Bailey
Richard Barwick	Matthew Boyes	Madeleine Bailey-Hall
Jackie Bolt	Charlotte Flowerdew	Maddy Clifford
Adam Brann	Chrisopher Galpin	Laura Forster
Redwan Choudhury	Cathryn Irwin	Rajat Gupta
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Jon Warren	Tricia Valentine	Adam Stiles
Emily White	Daniel White	Anastasia Turpetko
		Thomas Whiffen
		Jane Wilson

Visualisation:

What changes are required to achieve the 600,000 heat pump deployment target?

<https://app.mural.co/invitation/mural/simonmural1728/1677072303720?sender=u400bb4109b7f57b5c0352097&key=9684a4fc-de52-448c-8d33-9be1d58131cc>

Discussion Questions

What is **the role of your project** in delivering the transformational steps required to achieve 600,000 heat pumps?

What are the **critical actions on the map** that will need to be addressed, by you or others, in order for your project to be successful in the long-term?

What is your **main takeaway from this afternoon session**, and does it impact how you are thinking about your project moving forward?

BREAK (15 mins)

#HeatPumpReady

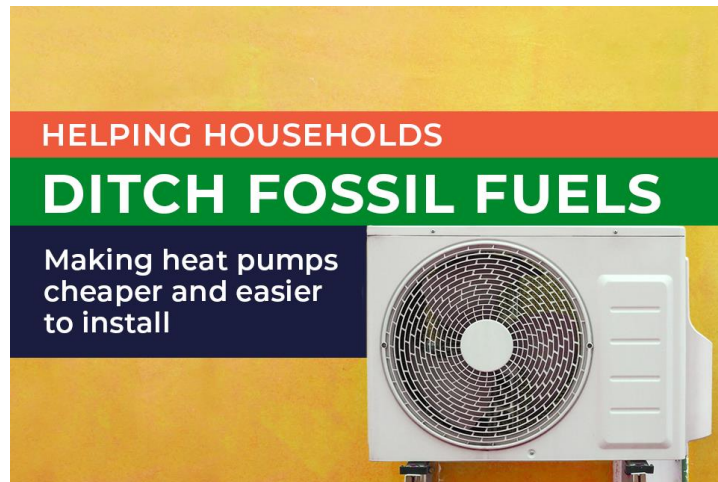
Fireside chat with the Department for Energy Security and Net Zero

Host: Nathan Gambling, Betatalk

Heat Pump Ready Programme: Supporting innovation in the heat pump sector

Department for Energy Security and Net Zero: heatinnovation@beis.gov.uk

Stream 3 (Collaboration, evaluation and dissemination): heatpumpready@carbontrust.com



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