











How to increase the demand for heat pumps

June 2022

Summary

1. BIT used Predictiv, its in-house policy testing lab, to run an online experiment with a sample of 8,016 UK homeowners collected between 11 March – 5 April 2022 to test how different incentives would affect the uptake of heat pumps. The incentives were reducing the installation cost, a delayed payment scheme, cheaper running costs and quicker installation time.
2. **Heat pump uptake significantly increases when reducing installation costs (+10 pp (percentage point)), introducing payment schemes (+9 pp) and reducing running costs (+7 pp).** Reducing installation time by one week did not impact uptake in this hypothetical experimental setting.
3. **Heat pump uptake increases further when combining incentives.** Reducing both installation cost and running costs together increases uptake by 30 pp compared to no incentives, the largest effect we found. Both reducing running costs and introducing a payment scheme increases uptake by 24 pp. By making all characteristics more favourable, heat pump uptake is extrapolated to increase by 44 pp.
4. We also tested five messages encouraging heat pump uptake. 'Heating that works' and 'energy security' messages were the most effective messages, increasing intent to buy a heat pump in the next five years by 5 pp. A message highlighting property value had a smaller impact while messages highlighting emissions and the boiler phase out had no impact.

Main effects		Reducing installation cost from £10,500 to £5,500	+10 pp**
		Interest-free loan instead of an upfront payment	+9 pp**
		Making heat pump running costs cheaper than gas boiler	+7 pp**
		Reducing installation time from ten days to three days	+0 pp
Combined effects (Interaction effects)	 	Low installation cost + Low running cost	+30 pp (+13 pp**)
	 	Interest-free loan + Low running cost	+24 pp (+8 pp**)
	 	Low installation cost + Interest-free loan	+16 pp (-3 pp)

Effects of incentives on heat pump uptake (Baseline uptake = 12%)

N = 8,016; Choices = 24,048. ** p < 0.01, * p < 0.05, + p < 0.1.

Corrected for multiple comparisons. Multivariate logistic regression including covariates.

Data collected by BIT on 11 March – 5 April 2022.

Policy recommendations

Reducing the upfront cost is still the most impactful thing policymakers can do to promote heat pump adoption. However, reduced running costs and delayed payment also have the potential to significantly increase uptake.

Around one in eight would choose a heat pump under current conditions. Taken together, halving installation cost, reducing running costs and providing financing options could increase overall uptake of heat pumps by around 44 pp.



Provide financing options

Our results suggest that providing an interest-free loan over six or 12 years is comparable to a £5,000 subsidy in driving uptake. It is cheaper to service an interest-free loan than provide subsidies, so policymakers should consider financing options. Provision of a loan is particularly valuable when running costs are reduced (increasing uptake by a further 8 pp, in addition to the main effects). This is perhaps intuitive, since taking on debt for a sizeable investment is more appealing when that investment pays for itself over time.



Reduce running costs

In consumers' eyes, reducing running costs is comparable to halving the upfront costs or spreading it over time. This implies that switching the environmental levies currently imposed on electricity to gas tariffs can complement the current boiler upgrade scheme.

Communications recommendations



Highlight personal benefits of heat pumps: effective heating and boost to property value

These types of messages increased future intentions to buy a heat pump by 4-5 pp, reassuring potential customers about common performance concerns, and that the high investment is not wasted. These messages outperformed messages about lower emissions, suggesting that these important drivers of uptake may now be less novel and so less valuable to further promote uptake.



Link electrification of heat to the wider energy-security narrative

The energy security message also increased intent to adopt by 5 pp. The coalescence of energy security concerns, high prices and climate concern provides an opportunity to ensure consumers are aware of the role that heat pumps play in all three: cleaner, cheaper in the long run and the best way to use domestic energy.

Overview

Home heating accounts for 13-14% of total UK carbon emissions. BEIS are strongly encouraging the adoption of heat pumps as a key strategy to decarbonise heating. However, adopting a heat pump is more difficult and more expensive than fossil fuel alternatives. In our previous trial, **we identified that cost is a major factor for uptake of heat pumps**. High level of disruption and running costs are also major barriers to uptake.

In this study, we aimed to estimate the relative weights of different factors that encourage homeowners to say they would adopt heat pumps.

Key research questions

- > Do **different financing/payment options** for a heat pump encourage its uptake?
- > Does **reducing running costs** encourage heat pump uptake?
- > Does **reducing installation hassle** encourage heat pump uptake?
- > Can **implementing multiple incentives together** (eg, providing finance option AND reducing running cost) encourage heat pump uptake beyond their main effects (interaction effects)?
- > Can **different framing and messages** of heat pumps encourage its uptake?

To investigate these questions, we conducted an online experiment where we randomly varied these attributes to participants. We conducted a choice-based conjoint analysis to estimate the relative weights of these barriers.

All participants in the experiment were UK homeowners with a gas boiler.

Methodology

We recruited a sample of 8,016 homeowners with gas boilers in the UK.

BIT worked with Nesta to understand the main barriers affecting heat pump uptake and to test messages encouraging heat pump uptake.

We examined this using Predictiv, BIT's in-house policy testing lab. We recruited an online representative sample of 8,016 UK homeowners¹ on 11 March – 5 April 2022.

Gender		Region		Ethnicity	
Women	48%	South and East	30%	White	90%
Age		North	28%	Asian	6%
25-34	15%	Midlands	19%	Black	2%
35-54	44%	Scot/NI/Wales	14%	Mixed/other	2%
55+	40%	London	9%		

Note on interpreting results

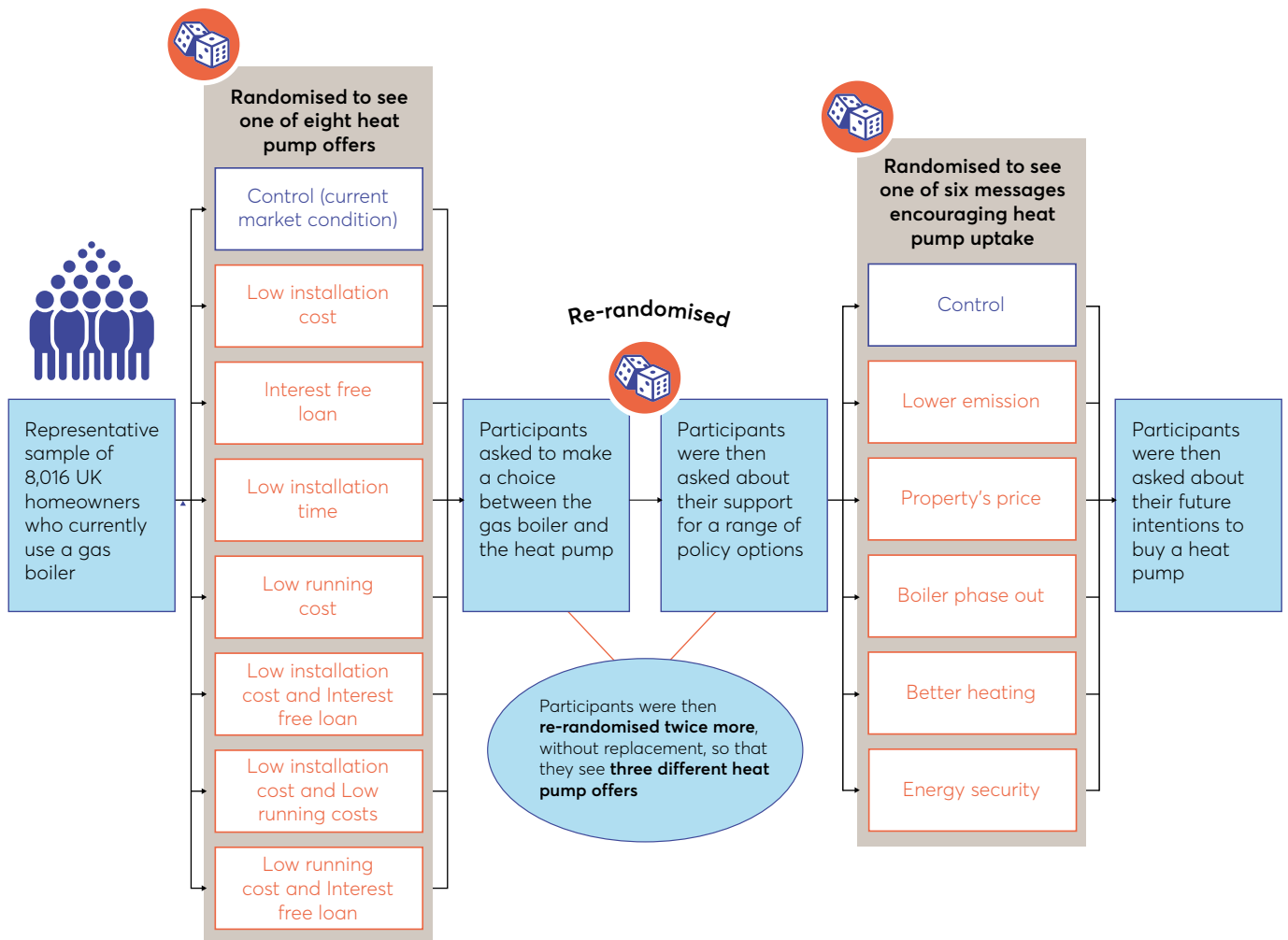
1. The sample doesn't capture the digitally excluded, or people not inclined to complete online surveys.
2. Just because people say they would do something in an online experiment, this doesn't mean they always will in real life. We therefore interpret stated intent as a likely upper bound of real behaviour.
3. When we examine differences by subgroups (eg, gender, ethnicity), we only do so when the sample size remains large enough to draw robust inferences from.

Median time spent completing survey: eight minutes, one second.

Also collected data for all respondents for education, income, employment status, climate concern, willingness to act (for climate change), number of bedrooms, year home built, caring responsibilities and number of people living in home.

1. Demographic characteristics of UK Homeowners compiled from [ONS Income](#) and the [English Housing Survey](#).

Participants were shown three (of eight) heat pump offers with different characteristics and asked to choose between a heat pump and gas boiler. They were then re-randomised into one of six arms in which they either saw a message encouraging heat pump uptake or no message.



How heat pump uptake varies depending on its characteristics

Methodology

Participants were randomised to sequentially see three of eight heat pump variations, specifically selected to test combinations of interest. They were then asked to choose between the gas boiler and the heat pump.

Participants were presented with a choice between a gas boiler and heat pump. They were presented with the choice three times, each with a different heat pump variation. The installation cost, payment method, installation time and running cost each had two variations. The control condition is based on the current market condition.

	Gas boiler	Heat pump
Installation cost	£2,000	£10,500
Payment method	The full price must be paid upfront	The full price must be paid upfront
Carbon emissions	High	Low
Installation time	About half a day	About three days
Running cost (for mid-sized property)	~£75 per month on average	~£100 per month on average

Heat pump characteristic variations (Control is based on the current market conditions)

Installation cost

Control: '£10,500'

Treatment: 'You pay £5,500, the government will pay £5,000. (The price is £10,500)'

Payment method

Control: 'The full price must be paid upfront.'

Treatment: If price is £10,500 – 'Can be paid over 12 years interest free. (~£75 per month)'

or

If price is £5,500 – 'Can be paid over six years interest free. (~£75 per month)'

Installation time

Control: 'About ten days'

Treatment: 'Three days'

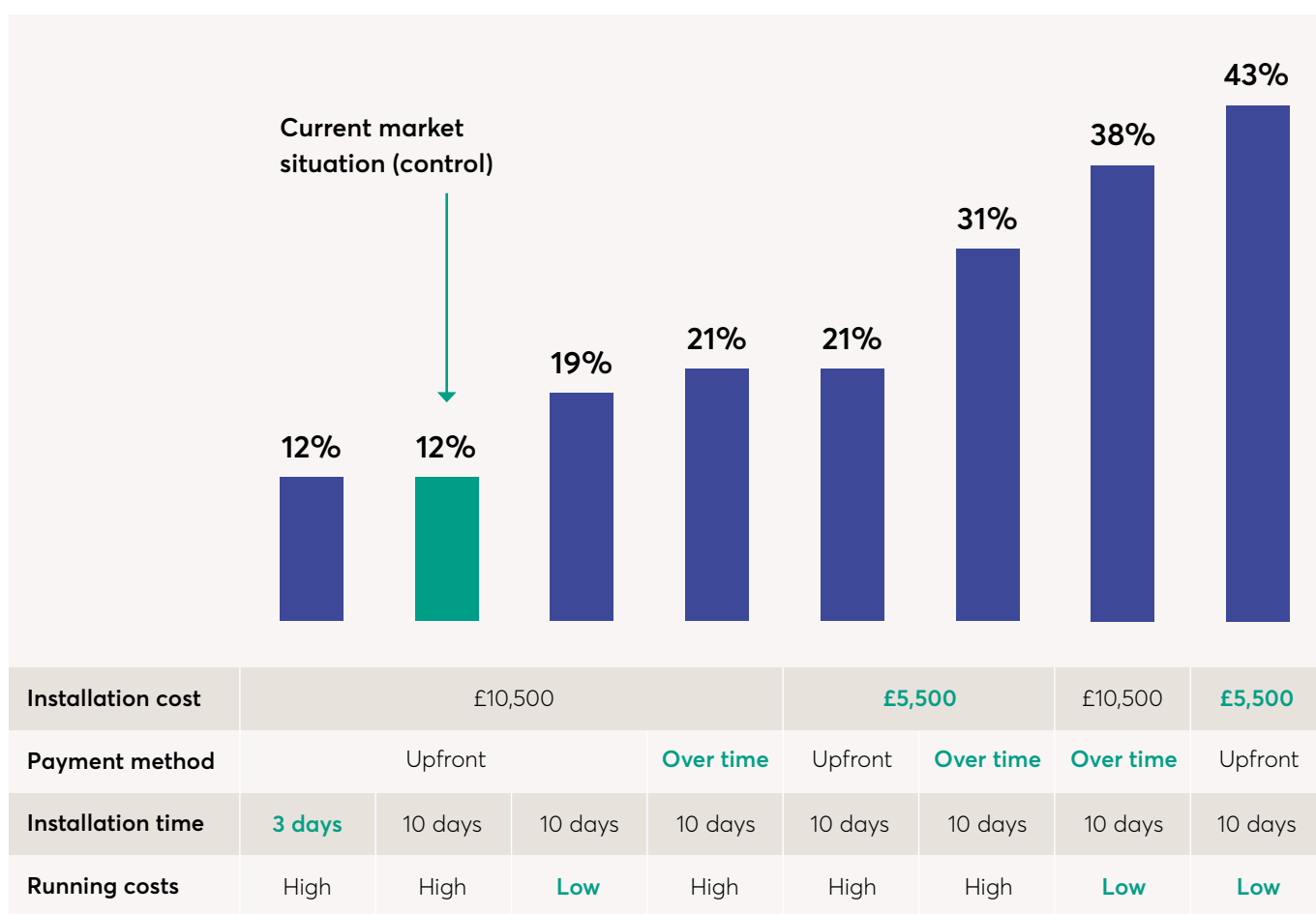
Running cost (Changed for both gas boiler and heat pump)

Control: £75 vs £100 per month on average

Treatment: £80 vs £60 per month on average

Descriptive statistics

~One in eight chose the heat pump in the current market conditions (control). The proportion of people choosing the heat pump varied from 12% to 43% depending on heat pump characteristics.



N = 8,016; Choices = 24,048.

Descriptive statistics, no significance testing.

Data collected by BIT on 11 March – 5 April 2022.





Green cells highlights how the heat pump variation differs from the current market situation (control).

Key findings

Heat pump uptake significantly increases when reducing installation cost (+10 pp), providing an interest-free loan (+9 pp), and reducing running costs (+7 pp).

Effects on likelihood of choosing the heat pump

Main effects

<p>+ 10 pp**</p> <p>Lower installation cost</p>  <p>£10,500 vs £5,500</p>	<p>+ 9 pp**</p> <p>Payment plan</p>  <p>Upfront vs Paid over 12/6 years</p>	<p>+ 7 pp**</p> <p>Lower running cost</p>  <p>£25 more vs £20 less than a gas boiler per month</p>	<p>+ 0 pp</p> <p>Quicker installation time</p>  <p>Ten days vs three days</p>
---	---	---	---

Online participants may not have recognised installation time to be a strong indicator of the hassle involved in installing a heat pump.

Baseline uptake = 12%.

N = 8,016; Choices = 24,048. ** p < 0.01, * p < 0.05, + p < 0.1.

Corrected for multiple comparisons using the Hochberg procedure.

Multivariate logistic regression including covariates.

Data collected by BIT on 11 March – 5 April 2022.

Reducing both installation costs and running costs together could increase heat pump uptake by a further 13 pp, in addition to the main effects, creating an overall effect of 30 pp compared to no incentives. This was the strongest incentive interaction we tested.

Effects on likelihood of choosing the heat pump:
installation cost x running cost

Interaction effects

+ 13 pp**

Overall effect
 10 pp + 7 pp + 13 pp = 30 pp

Main effects

<p>+ 10 pp**</p> <p>Lower installation cost</p>  <p>£10,500 vs £5,500</p>	<p>+ 9 pp**</p> <p>Payment plan</p>  <p>Upfront vs Paid over 12/6 years</p>	<p>+ 7 pp**</p> <p>Lower running cost</p>  <p>£25 more vs £20 less than a gas boiler per month</p>	<p>+ 0 pp</p> <p>Quicker installation time</p>  <p>Ten days vs three days</p>
---	---	---	---

Baseline uptake = 12%.
 N = 8,016; Choices = 24,048. ** p < 0.01, * p < 0.05, + p < 0.1.
 Corrected for multiple comparisons using the Hochberg procedure.
 Multivariate logistic regression including covariates.
 Data collected by BIT on 11 March – 5 April 2022.

Both reducing running costs and allowing installation costs to be paid over time increased uptake by a further 8 pp, in addition to the main effects, creating an overall effect of 24 pp.





Effects on likelihood of choosing the heat pump:
 payment method x running cost

Interaction effects



Overall effect
 9 pp + 7 pp + 8 pp = 24 pp

Main effects

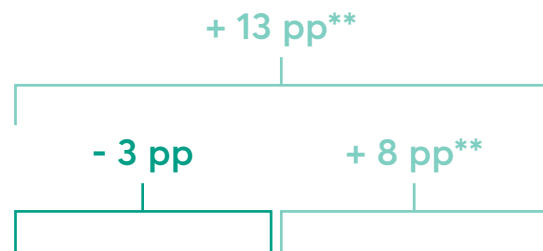
<p>+ 10 pp**</p> <p>Lower installation cost</p>  <p>£10,500 vs £5,500</p>	<p>+ 9 pp**</p> <p>Payment plan</p>  <p>Upfront vs Paid over 12/6 years</p>	<p>+ 7 pp**</p> <p>Lower running cost</p>  <p>£25 more vs £20 less than a gas boiler per month</p>	<p>+ 0 pp</p> <p>Quicker installation time</p>  <p>Ten days vs three days</p>
---	---	---	---

Baseline uptake = 12%.
 N = 8,016; Choices = 24,048. ** p < 0.01, * p < 0.05, + p < 0.1.
 Corrected for multiple comparisons using the Hochberg procedure.
 Multivariate logistic regression including covariates.
 Data collected by BIT on 11 March – 5 April 2022.

Both reducing the installation cost and allowing this to be paid over time did not significantly change uptake beyond the main effects. The overall effect of implementing both of these is 16 pp.





Effects on likelihood of choosing the heat pump:
installation cost x payment method

Interaction effects



Overall effect
 $10 \text{ pp} + 9 \text{ pp} - 3 \text{ pp} = 16 \text{ pp}$

Main effects

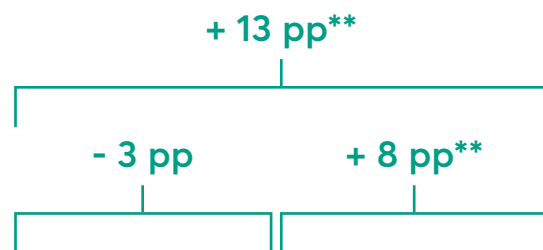
<p>+ 10 pp**</p> <p>Lower installation cost</p>  <p>£10,500 vs £5,500</p>	<p>+ 9 pp**</p> <p>Payment plan</p>  <p>Upfront vs Paid over 12/6 years</p>	<p>+ 7 pp**</p> <p>Lower running cost</p>  <p>£25 more vs £20 less than a gas boiler per month</p>	<p>+ 0 pp</p> <p>Quicker installation time</p>  <p>Ten days vs three days</p>
---	---	---	---

Baseline uptake = 12%.
 N = 8,016; Choices = 24,048. ** p < 0.01, * p < 0.05, + p < 0.1.
 Corrected for multiple comparisons using the Hochberg procedure.
 Multivariate logistic regression including covariates.
 Data collected by BIT on 11 March – 5 April 2022.

By reducing the installation costs, introducing a payment plan and reducing running costs together, the heat pump uptake is expected to increase by 44 pp. This assumes there are no additional benefits or costs from implementing all three changes together.





Effects on likelihood of choosing the heat pump:

Interaction effects



Estimated total effect of making all characteristics more favourable
(assuming no three way interaction)
 $10 \text{ pp} + 9 \text{ pp} + 7 \text{ pp} + 13 \text{ pp} + 8 \text{ pp} - 3 \text{ pp} = 44 \text{ pp}$

Main effects

<p>+ 10 pp**</p> <p>Lower installation cost</p>  <p>£10,500 vs £5,500</p>	<p>+ 9 pp**</p> <p>Payment plan</p>  <p>Upfront vs Paid over 12/6 years</p>	<p>+ 7 pp**</p> <p>Lower running cost</p>  <p>£25 more vs £20 less than a gas boiler per month</p>	<p>+ 0 pp</p> <p>Quicker installation time</p>  <p>Ten days vs three days</p>
---	---	---	---

Baseline uptake = 12%.
 N = 8,016; Choices = 24,048. ** p < 0.01, * p < 0.05, + p < 0.1.
 Corrected for multiple comparisons using the Hochberg procedure.
 Multivariate logistic regression including covariates.
 Data collected by BIT on 11 March – 5 April 2022.

Summary



12% of participants chose the heat pump over a gas boiler in the current market situation (control). Heat pump uptake significantly increases when reducing installation costs (+10 pp), introducing payment schemes (+9 pp) and reducing running costs (+7 pp).



Reducing installation time by one week did not impact uptake. This seems inconsistent with our finding from Trial 1² (six out of ten would choose a heat pump if it were easier to install in their home). This may be because the number of days it takes to install a heat pump is a poor proxy of installation hassle, or the details lacked specificity, eg, hot water turned off, rooms to be vacated, paper work etc. We know from wider research that hassle matters, particularly when needing to replace a boiler at short notice. We advise that reducing installation hassle and time should remain a major focus of innovation and policy.



There were substantial interaction effects (increasing uptake beyond the sum of the main effects):

- > Reducing both installation cost by £5,000 and running costs together increased heat pump uptake by a further 13 pp.
 - > Both reducing running costs and allowing installation costs to be paid over time increased heat pump uptake by a further 8 pp.
 - > Heat pump uptake does not further increase by lowering installation cost and providing a payment plan together.
-



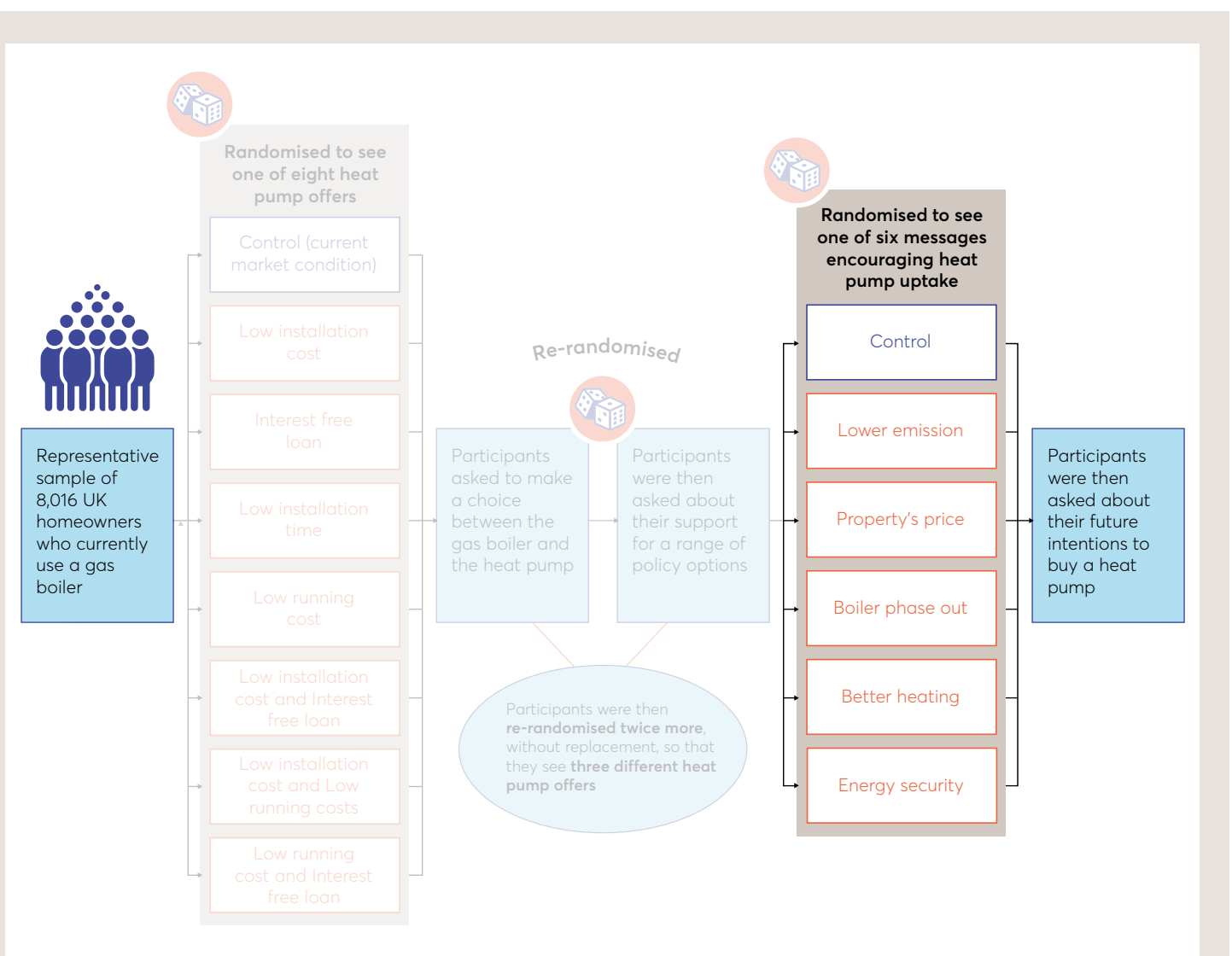
By (1) reducing the installation costs, (2) allowing the cost to be paid over time, and (3) reducing running costs together, the heat pump uptake is expected to increase by 44 pp. This assumes there are no additional benefits or costs from implementing all three changes together.

2. Results from Trial 1: <https://www.bi.team/blogs/how-much-are-we-willing-to-pay-to-make-home-heating-greener>

Messages encouraging heat pump uptake

Methodology

Participants were then re-randomised into one of six arms in which they either saw a message encouraging heat pump uptake or no message.



Participants were then randomised to see either one of five messages encouraging heat pump uptake or no message at all.

No message



Participants did not see a message

(n = 1,354)

Heating that works

Have you thought about upgrading your heating?

"We have an old house which was pretty cold, so I wasn't sure a heat pump would work for me..."

But the new heat pump system has actually made our home **so much more comfortable**. The heating is on at a low level continuously, so (even though it's super efficient) it's warm all the time now."



Upgrade your heating, get a heat pump!

(n = 1,309, median viewing time = 20 seconds)

Lower emissions

Have you thought about greener heating?

"I've always been concerned about climate change, so I got a heat pump. Heat pumps **reduce my carbon emissions from my heating by 75% right away**, and are set to reduce emissions to 0% by 2035..."

This will make a huge difference to my carbon footprint because the majority of household emissions comes from heating."



Green your heating, get a heat pump!

(n = 1,369, median viewing time = 18 seconds)

Data collected by BIT on 11 March – 5 April 2022.

Boiler phase out

Are you ready for the gas boiler phase out?



"I've heard that the Government are going to ban the sale of new gas boilers soon. So I installed a heat pump to future proof my home...
I just didn't want to have to deal with it at the last moment, or get stuck with the old inefficient technology."

Get ready, get a heat pump!

(n = 1,298, median viewing time = 19 seconds)

Property value

Have you heard that new heating boosts your home's value?

"We upgraded our property's heating system by getting a heat pump – and it has already increased the value of our home..."

The market really rewards market efficiency – for instance, I heard that sellers who upgrade their EPC to C, can get as much as an extra 16%.
Don't miss out on extra cash from your house sale!"



Upgrade your home, get a heat pump!

(n = 1,397, median viewing time = 20 seconds)

Energy security

Have you considered our country's energy security?



"It's important we create our energy in the UK, so we're not dependent on imports and gas prices set by volatile parts of the world.

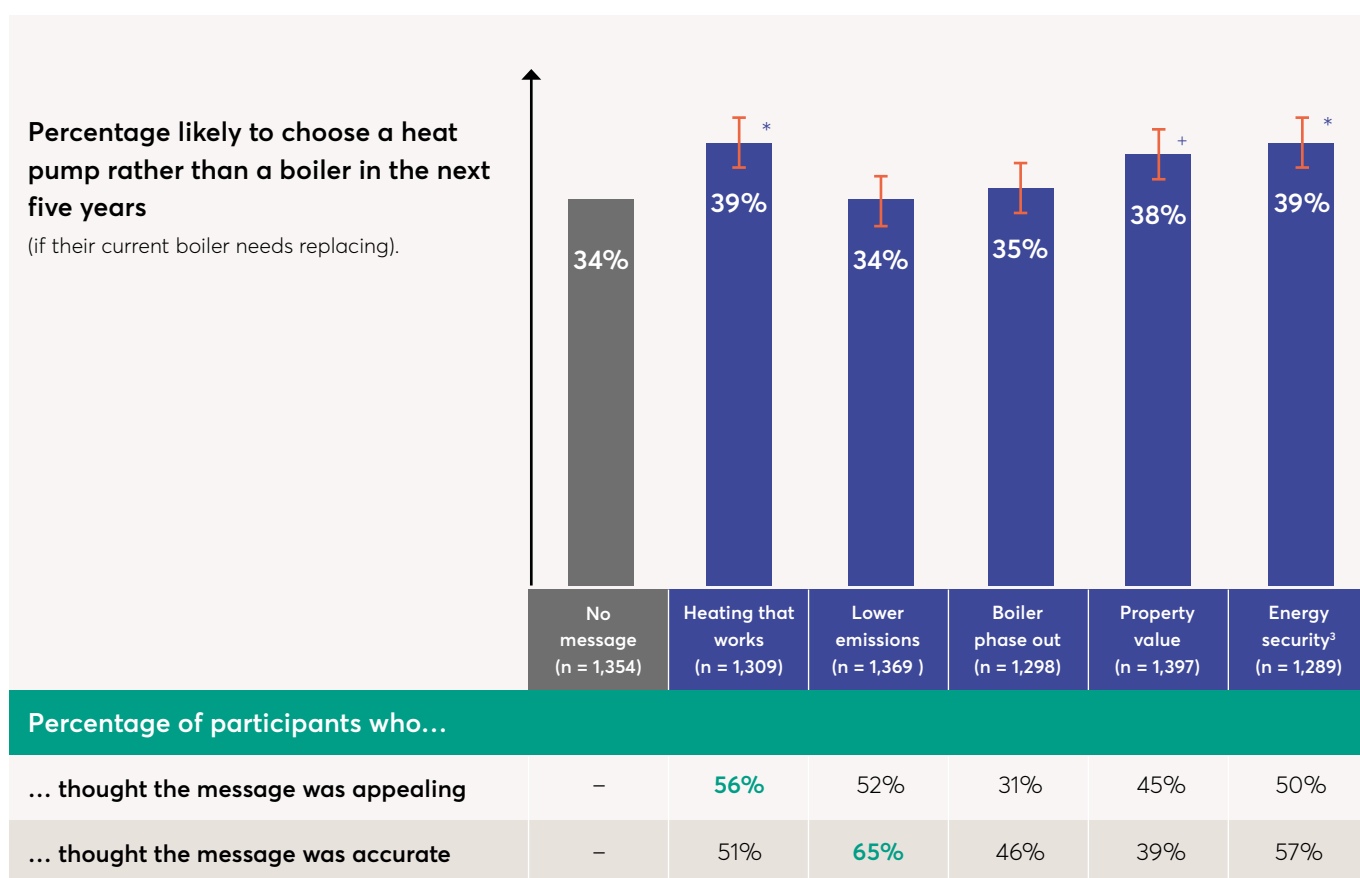
For households, that means we must move away from gas boilers, so I chose an electric heat pump instead."

Help UK energy to be independent, get a heat pump!

(n = 1,289, median viewing time = 17 seconds)

Future intentions to buy a heat pump

The 'heating that works', 'energy security' and 'property value' increased the intentions to buy a heat pump in the next five years. People thought that the 'heating that works' message was the most appealing.



N = 8,016. ** p < 0.01, * p < 0.05, + p < 0.1.

Corrected for multiple comparisons using the Hochberg procedure.

Logistic regression including covariates.

Data collected by BIT on 11 March – 5 April 2022.

Green text identifies statistically significantly highest value in row.

3. Data collection took place during the Ukraine War (starting 22 February 2022) which sparked worries about reliance on Russia for gas supply in the UK. <https://www.gov.scot/publications/energy-security-plans-letter-to-uk-government>

About Nesta

We are Nesta, the UK's innovation agency for social good. We design, test and scale solutions to society's biggest problems. Our three missions are to give every child a fair start, help people live healthy lives, and create a sustainable future where the economy works for both people and the planet.

For over 20 years, we have worked to support, encourage and inspire innovation. We work in three roles: as an innovation partner working with frontline organisations to design and test new solutions, as a venture builder supporting new and early stage businesses, and as a system shaper creating the conditions for innovation.

Harnessing the rigour of science and the creativity of design, we work relentlessly to change millions of lives for the better.

Find out more at [nesta.org.uk](https://www.nesta.org.uk)

If you'd like this publication in an alternative format such as Braille or large print please contact us at information@nesta.org.uk

Layout: Green-Doe Graphic Design Ltd.

Get in touch

Kristina Londakova
Senior Advisor
kristina.londakova@bi.team



Toby Park
Principal Policy Advisor
toby.park@bi.team

Dr. Edwin Chan
Research Advisor
edwin.chan@bi.team

Jordan Whitwell-Mak
Associate Research Advisor

Dr. Abigail Mottershaw
Principal Research Advisor

Dr. Bobby Stuijzand
Senior Research Advisor

58 Victoria Embankment, London EC4Y 0DS
+44 (0)20 7438 2500 • information@nesta.org.uk
 @nesta_uk  [nesta.uk](https://www.facebook.com/nesta) • www.nesta.org.uk