
About Nesta

Nesta is the UK's innovation agency for social good. We have worked for over 20 years to design, test and scale new solutions to society's biggest problems, changing millions of lives for the better.

Background

In April 2021, the UK government amended the Climate Change Act (2008) to require the achievement of net-zero emissions by 2050. This ambition will require significant adoption of electric heat pumps across UK homes in all scenarios modelled by the Department for Business, Energy and Industrial Strategy (BEIS) and the Committee on Climate Change (CCC).

Nesta's research

Nesta has assessed data from 60,000 heat pump installations across the UK and used detailed modelling of running costs¹, the largest analysis of its kind to date.

Our research has found that while heat pumps are currently more expensive than gas boilers, it would take relatively modest changes to make heat pumps competitive on price. Three changes could bring the whole life cost of a typical heat pump to between **£230 and £270 per year more** than a gas boiler. These are:

1. switching environmental levies from electricity on to gas
2. increasing the efficiency of heat pump systems in homes
3. giving households with heat pumps access to a discounted heat pump tariff for the electricity

The most significant change would be achieved by shifting levies from electricity to gas.

If these reductions in running costs were combined with a £5,000 reduction in the upfront cost of a heat pump, equivalent to the subsidy offered by the UK government's Boiler Upgrade Scheme, then heat pumps would become **£60 to £110 per year cheaper** than a gas boiler over their lifetime.

Recommendations

Reducing running costs of heat pumps

1. Manufacturers should focus on increasing heat pump efficiency.
2. The UK government should adjust the cost of electricity and gas to make heat pumps more affordable to run.

Reducing installation costs of heat pumps

3. The heat pump market needs more high-quality suppliers.

¹ This analysis is based on data from the Microgeneration Certification Scheme (MCS) and the Energy Performance Certificate (EPC) dataset, together with information from the National Energy Efficiency Database (NEED) and an analysis by Renewable Energy Consumer Code (RECC).

4. The heat pump market needs to become more transparent.
5. Heat pumps need service innovation as much as product innovation.
6. Heat pumps should get much cheaper in smaller homes.
7. Government should remove VAT on home heating retrofits.

Making the upfront cost of heat pumps more affordable

8. Financial institutions should prioritise green finance products for heat pumps.

Key findings

The cost of heat pumps needs to fall

The median cost to install an air-to-water heat pump is £10,500. This ranges from around £9,000 in a flat to £13,000 or more in a large, detached house. This cost has been rising in recent years, increasing by over 15% since 2018. Although heat pumps turn energy into heat much more efficiently than boilers, their running costs also tend to be at least as high, because electricity currently costs more than gas.

The cost of a heat pump varies a lot in different homes

The cost of installing a heat pump varies depending on the home they are installed in. We found a wide range in the cost of installing a heat pump, with 16% of heat pump installations costing more than £15,000 and 18% costing less than £8,000. This cost uncertainty may affect consumer confidence in heat pumps and may slow development of the market.

Cost reductions will come from many sources, not just the heat pump itself

The biggest opportunities for reducing costs come not from the manufacture of heat pump units, but from running costs and installation costs (ie, the process of installing a heat pump in a home).

There is a lot of scope for making heat pumps cheaper

Although heat pumps are currently more expensive than gas boilers, it should be possible to close the gap with relatively few minor changes, especially to running costs. Air-to-water heat pumps are typically around four times more efficient than gas boilers – moves to reduce the price of electricity would have a particularly big impact on heat pump adoption. Other countries with much higher rates of heat pump adoption typically have much cheaper electricity.

The shape of the market for heat pumps matters

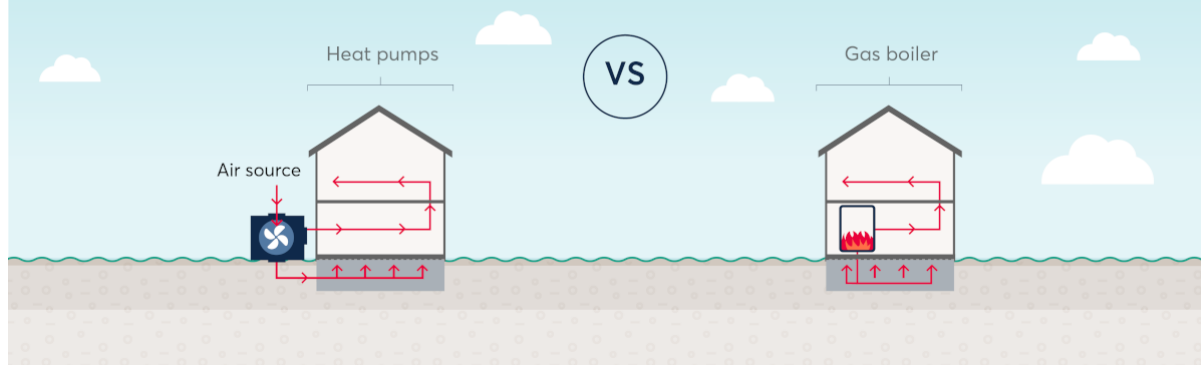
The heat pump market needs more suppliers and more competition. Productivity in the wider home maintenance sector – which includes boiler installers alongside plumbers, electricians and others – has not increased at all in the past 25 years. The heat pump market also needs significantly more skilled installers – it will be hard for prices to fall or to scale up heat pump adoption without significantly more skilled heat pump specialists.

For more information, please contact cara.sanquest@nesta.org.uk



The whole life costs of heat pumps compared to gas boilers

(estimates for different types of property)



Heat pumps will become more attractive with running cost savings likely from 2022 onwards

The median of costs for purchasing, installing and running a heat pump are currently higher than those for gas boilers across all property types. However, with policy changes and achievable improvements in installation quality, heat pumps could generate annual running costs savings sufficient to offset the difference in upfront costs within equipment lifetimes.

Today

Baseline costs

Current whole life cost per year for an air-to-water heat pump relative to a gas boiler

£670 more

£840 more

£1,190 more

Future policies or likely scenarios in 2022

Reducing running costs

- Increased heat pump efficiency
- Energy suppliers offer heat pump tariff
- Switch levies from electricity to gas

PLUS

£270 more

£230 more

£260 more

Reducing upfront costs

(Equivalent to the Boiler Upgrade Scheme)

Reduces upfront cost by £5,000

£60 less

£110 less

£70 less

Small

Medium

Large

100-150m²



Terrace / Converted Flat / Maisonette

50-100m²



Flats - medium

50-150m²



Post-1950s Bungalow



Semi-detached

150-200m²



Detached - large