

Briefing| How heat pumps help tackle the energy crisis

This briefing note summarises recent research from Nesta on [heat pumps and the energy crisis](#). It also provides recommendations for accelerating the roll out of heat based on Electrify Heat and Nesta's work.

Heat pumps massively reduce gas use

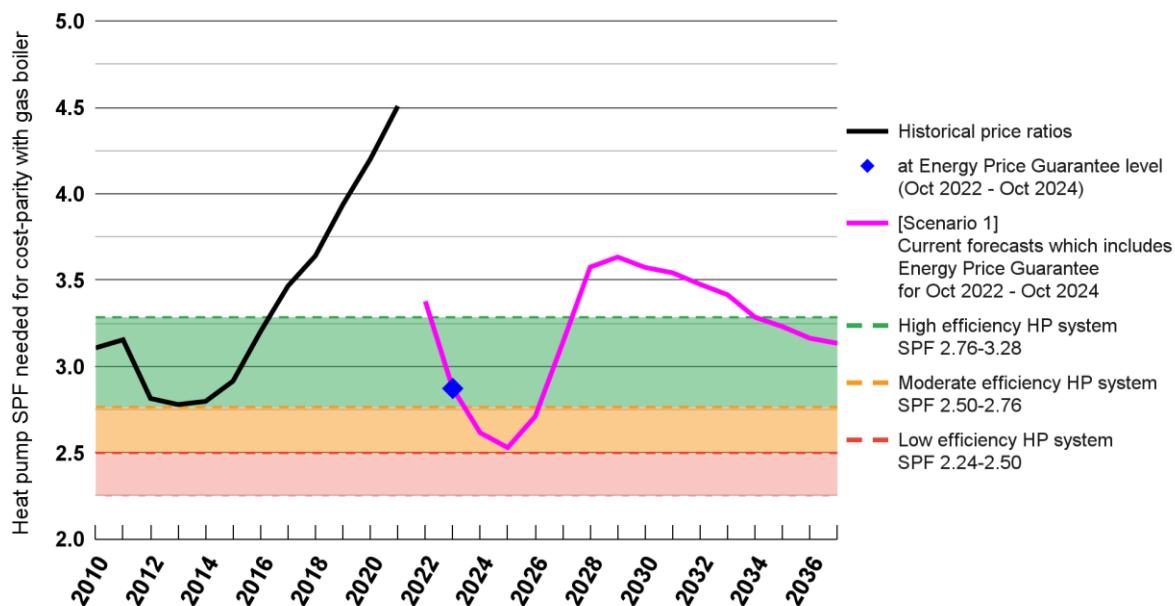
- Home heating is the single biggest use of gas in the UK, accounting for around 37% of use in 2021. Replacing gas boilers with electric heat pumps is one of the most effective ways to reduce gas use.
- For every unit of gas it takes to heat a home with a boiler, heat pumps use three to four times less energy.
- Replacing a gas boiler with a hydronic heat pump reduces a home's gas use by over 70%, assuming the makeup of the electricity grid remains constant.
- For every heat pump installed, the UK can save around £1,100 in wholesale gas costs at current prices.
- The UK imports 60% of its gas. If all 23 million homes with gas boilers switched to a heat pump without any change in the share of gas in the electricity grid, the savings in wholesale gas costs would be equivalent to around 1.2% of GDP.

The energy crisis has made gas boilers more expensive to run than heat pumps

- A well-installed heat pump is likely to have lower running costs than a gas boiler over the coming years, while even heat pumps with below average efficiency should have similar or lower running costs to a gas boiler (see chart below)
- This is driven by the ratio of electricity to gas prices. This ratio is currently 3.3 (under the Energy Price Guarantee), having fallen from around 5 since the energy crisis began.
- These lower running costs come despite the fact that the UK has among the most expensive electricity relative to gas prices in Europe. Addressing this discrepancy would further improve the economic case for heat pumps.

Although first time heat pump installations have a higher upfront cost than gas boiler replacements, they typically have longer lives and can be significantly cheaper to run. With the right mix of policy measures – including removing levies, a £5,000 subsidy, high heat pump efficiencies – combined with a decoupled electricity market, heat pumps are £120-£160 per year cheaper over their lifetime than gas boilers.

Chart 1: How efficient will a heat pump need to be to match a gas boiler on running costs?



Policy recommendations to get on track

- **Reduce the cost of electricity relative to gas:** The UK government should seek to decouple the price of gas-fired electricity from renewable electricity as far as possible, while preserving the right investment signals to ensure the grid is decarbonised by 2035. The Review of Electricity Market Arrangements and the forthcoming Energy Security Bill present opportunities to take this forward.
- **Encourage private investment with long-term policy stability:** We encourage continued commitment to the Boiler Upgrade Scheme, alongside confirmation of long-term regulations and mechanisms set out in the Heat & Buildings Strategy – including the market-based mechanism for low carbon heat and timelines for phasing out fossil fuel heating - for new (2025) and existing properties (2026 for those off the gas grid; 2035 for new gas boilers).
 - ◆ The government might look to expand support available for fuel poor households to cover the full cost of installation, and for ground source heat pumps, due to higher upfront costs.
- **Ensure all customers have access to highest quality heating systems:** The government should adopt efficiency standards for heat pumps, as well as for boilers and other heating devices, in the energy related product framework. This will ensure all customers can benefit from cheaper running costs heat pumps currently enjoy

relative to boilers. Regular monitoring of the efficiency of all heat sources - including gas boilers and heat pumps - as they operate in homes should also be a priority which should be mandated or encouraged. Making operating performance data widely available to customers will mean higher quality installations and greater cost savings across all heating technologies.

- **Encourage flexible electricity use.** Governments in the UK should promote the use of electric batteries and smart thermal storage more widely alongside low carbon heating. The UK government is right to propose a requirement on all electric heating systems to operate smartly, as this will reduce costs for consumers and for the wider energy system. The UK government and Ofgem should also push for more widespread reintroduction of flexible time-of-use tariffs, either by paying customers to flex their electricity use or encouraging lower tariffs at times where electricity is more abundant.
- **Boost skills and supply chains** to support an army of heat pump installers, supporting and incentivising high-quality training, apprenticeships, and retraining opportunities.
- **Roll-out an independently run, nationwide green homes awareness and information campaign,** providing tailored advice across the country on low carbon home heating and energy saving measures - as well as available financial support for heat pumps (such as the Boiler Upgrade Scheme).

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