



AFFORDABLE WARMTH: NEXT STEPS FOR CLEAN HEAT IN SCOTLAND

SUMMARY BRIEFING

CLEAN HEAT CAN LOWER HOUSEHOLD ENERGY BILLS, CUT CARBON AND HELP TACKLE THE COST OF LIVING AND CLIMATE CRISIS TOGETHER.

Our reliance on oil and gas boilers is driving up energy bills and adding to climate change. Fortunately, low-carbon solutions like energy efficiency, electric heat pumps and heat networks can drastically cut homes' carbon emissions, lower energy bills and protect households from unstable fossil fuel prices.

Unfortunately, the retrofit of these to homes is far too slow – just 11% have low-carbon heating and half are below recommended levels of energy efficiency, leaving too many struggling to heat cold and draughty homes.

WWF Scotland commissioned new research to understand the practicalities and costs of decarbonising homes. Read on to see what we found, and our recommendations to Scottish Government.



SCAN FOR FULL
REPORT

HOW RADICAL IS CLEAN HEAT?

Scotland isn't alone in moving away from fossil fuel heating and is following the lead of many other European countries. **France** now has over 8.5 million heat pumps and across the EU, annual installations are up 35%. In chilly **Finland**, one in three homes now has a heat pump – they work in all climates!

HEATING SOLUTIONS EXPLAINED



ENERGY EFFICIENCY

Insulation can reduce the heat lost through the external surfaces of a home. It can be laid in lofts, injected into cavity walls or fixed to the inside or outside of solid walls in older properties. Double or secondary glazing reduces heat lost through windows, and sealing gaps around doors, windows and service pipes with draught proofing is very effective at reducing heat loss.



ELECTRIC HEAT PUMPS

Heat is drawn from the air or ground outside and compressed using electricity to heat up a building. An 'air-source' heat pump requires an external unit (about the size of a washing machine) which sends heat to radiators and a hot water tank. A correctly installed system will be at least 300% efficient, producing three units of heat for every unit of electricity consumed (compared to fossil boilers which are only around 85% efficient).



HEAT NETWORKS & COMMUNAL HEATING SYSTEMS

Hot water is piped from a large heat source to several units/homes within a building (known as a 'communal' system) or to multiple buildings ('district heating'). They are particularly suited for large buildings and flats in town and city centres where it may be difficult to fit individual units. They can use heat from almost any kind of source: systems are already heating buildings in Scotland using heat extracted from the River Clyde and from waste water treatment plants using large heat pumps. In the home, boilers are replaced by a similar sized box that takes heat from the network and supplies it to radiators and taps, sometimes without the need for a hot water tank.



DIRECT ELECTRIC & STORAGE HEATERS

Traditional 'panel' or storage heaters use electricity passing through wires to create heat. They are only 100% efficient, although storage heaters which charge overnight can make use of cheaper overnight electricity. Our research found that heat pumps are cheaper to run and emit less carbon.



BIOENERGY

Biomass (wood logs, pellets) and biogases made from virgin and waste organic material are sometimes used for home heating. Neither is recommended as a mass solution however, given the importance of bioenergy and the resources used to make it for more valuable uses in industry and transport which are harder to decarbonise. Bioenergy production must be carefully managed to ensure it delivers genuine emissions reductions and does not displace food production.



WHAT ABOUT HYDROGEN?

In future it may technically be possible to use boilers to burn low carbon hydrogen delivered through existing gas networks (with modification or replacement to make them suitable). Gas network companies and boiler manufacturers heavily promote hydrogen as an alternative to the mass-roll out of heat pumps as a way of capitalising on gas infrastructure already in place.

Hydrogen heating has yet to be fully demonstrated or commercialised, and therefore the evidence on its feasibility and costs remains limited. We commissioned analysis by external experts CAG on its potential in Scotland and they found that if available at all, it's unlikely to be ready until the mid-2030s and is likely to be much more expensive to run than current gas boilers (you can read a full summary here). Using hydrogen to heat homes also risks diverting it from more valuable uses in heavy industry, heavy transport and electricity generation.



RESEARCH: FINDING THE BEST SOLUTIONS FOR CLEAN HEAT

WWF Scotland commissioned experts from Cambridge Architectural Research (CAR) to explore the practicalities, costs and benefits of low-carbon heat in Scottish homes.

CAR ran detailed energy modelling of 'typical' homes designed and scaled to represent the Scottish housing stock. The performance and costs of different combinations of solution in the homes was assessed at hourly intervals across a year, using Scottish climate data. The full research can be accessed online [here](#). The key findings are:

1. ELECTRIC HEAT PUMPS ARE THE BEST SOLUTION FOR MOST HOMES:

they can cut carbon emissions by 90% and are particularly suitable for houses. Communal systems like heat networks may be more suitable in flats and tenements, which can install individual heat pumps but face extra challenges and costs.

2. MANY HOMES CAN ENJOY LOWER ENERGY BILLS WITH A HEAT PUMP:

many houses can already reduce their bills today with a heat pump, and this could reach 70% of all houses once the UK Government removes costs that are currently added to electricity bills.

3. ENERGY EFFICIENCY HELPS MAKE HEAT PUMPS CHEAPER:

insulation pays back quickly and lowers heat pump costs as well as reducing risks of fuel poverty. Around 50% of homes should improve insulation with moderate cost measures like loft and cavity wall insulation and draught proofing, with average costs of £1,800.

4. UPFRONT HEAT PUMP COSTS START AT £4,500 WITH GOVERNMENT GRANT SUPPORT.

Some of these costs are a one off due to the change of heating system and costs are likely to fall as supply chains expand and mature. Scottish Government currently provides grants of up to £7,500 per household, and £9,000 for rural homes. These grants, including those for insulation and fuel poor homes, should continue alongside regulation until costs reduce.



POLICY

RECOMMENDATIONS

Decarbonising homes will help tackle climate change and the cost-of-living crisis. Regulation, alongside grants and advice, is vital to give industry the confidence to invest and retrain

The Scottish Government consulted, in November 2023, on policies to be part of a proposed **Heat in Buildings Bill**. In response, WWF Scotland calls for the Government to:

- **Introduce a strong Heat in Buildings Bill to the Scottish Parliament this year with no more delays**
- **Design grant schemes to dovetail with the new regulatory requirements**
- **Work with the UK Government on key reforms: removing levies from electricity bills and completing wider electricity market reforms**

The **Scottish Government** has proposed regulations that would require action by homeowners and landlords to fit insulation and clean heating at five potential points. Privately rented homes would need to meet a **minimum standard of energy efficiency** by 2028, and owner-occupied homes by 2033. The minimum energy standard would require homes to fit moderate cost measures like loft and cavity wall insulation but would not require more expensive measures like solid wall insulation.

By 2045, it is proposed that all building owners would need to have **ended their use of polluting heating**. To spur activity before this, some households would also be required to fit clean heating after completing the **purchase of a property**. This could take effect from 2028, although the timings have yet to be confirmed. Homes within designated '**heat network zones**' would need to meet a different requirement, with notification to fit clean heating issued by the local authority, once a heat network is able to offer a connection.

ABOUT WWF SCOTLAND

WWF is an independent conservation organisation, with over 30 million followers and a global network active in nearly 100 countries. Our mission is to stop the degradation of the planet's natural environment and to build a future in which people live in harmony with nature. In Scotland, we've long campaigned to reduce climate emissions, with a particular focus on energy and agriculture.