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REPORT AUGUST 2023

SUPPORTING WARMER HOMES FOR RURAL COMMUNITIES

SOLUTIONS TO THE COST-OF-OIL CRISIS

ANNA PERAN, JULIET PHILLIPS

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About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

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SUMMARY

The cost of heating has long been a problem for families living off the gas grid in rural areas across the UK. The recent energy crisis has led heating bills to soar even further. The transition to efficient homes and clean heat could help alleviate some of the issues households face, as well as supporting climate and fuel poverty targets. To ensure a smooth, affordable and socially inclusive transition, policymakers must keep affordability and accessibility foremost in mind.

The majority of "off-grid" homes are heated using oil and liquefied petroleum gas (LPG) – some of the most expensive and carbon intensive fossil fuels. The challenge of keeping homes warm and healthy is compounded by issues including leakier properties which cost more to heat. In 2022, the fuel poverty gap – the reduction in fuel costs needed for a household to move out of fuel poverty – was £677 for rural households overall and £956 for households in rural villages, hamlets and isolated dwellings. By comparison, the gap in urban households was £265.

Measures to phase out fossil heating in off-grid homes can bring benefits, but must be implemented carefully. For the switch to clean heat to be simple and affordable, regulations should be complemented by fiscal support and non-financial measures.

Our research looks at the inequalities in access to affordable clean heating that rural, off-the-gas-grid communities in England face. We highlight solutions which can help level the playing field and reduce fuel poverty. Done correctly, accelerating the shift away from fossil heating can help lower bills, providing permanent solutions to the cost-of-oil crisis.

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Recommendations

> **Take a phased-in, "worst first" approach to phasing out fossil fuels**. The government has consulted on phasing out fossil heating systems in off-grid homes from 2026. We support starting with the most polluting fossil fuels, ensuring households have time to plan and invest in changes needed. Affordability should be ensured through cost caps, complemented by grants and attractive financial options. It will be essential to introduce complementary financial and non-financial support for off-grid households in parallel to ensure the transition is socially inclusive, attractive and fair.

> **Provide support with upfront and running costs**. To ensure low-income homes are positioned to benefit from clean and efficient heating, it is essential that the government moves forward with measures to lower the running costs of electricity. It should also expand the scope and scale of the Homes Upgrade Grant.

> **Implement a nationwide "rural uplift"** to the Boiler Upgrade Scheme and Great British Insulation Scheme, in recognition of the higher upfront costs for retrofitting larger, leakier, detached properties.

> **Provide additional non-financial support**, including independent advice services and awareness raising campaigns.

> **Change the planning system and enable upgrades to the electricity grid**, to ensure no areas are left behind.

INTRODUCTION

Volatile international fossil fuel markets have fuelled a cost-of-living crisis in the UK, with families struggling to keep warm as heating bills soar. The crisis has compounded pre-existing challenges faced by off-grid households, particularly those on middle to low incomes.

In the UK, around 4 million households live off the gas grid, which is approximately 15% of all households. Collectively these homes are responsible for 23% of carbon emissions from heating[1] the bulk of which arise from the 1.1 million off-grid households in England who use fossil fuels for heating. Of these, 78% use heating oil, 13% liquefied petroleum gas (LPG) and 9% coal (Figure 1). Other off-grid homes are located in urban areas, dependent on direct electric heating.[2]

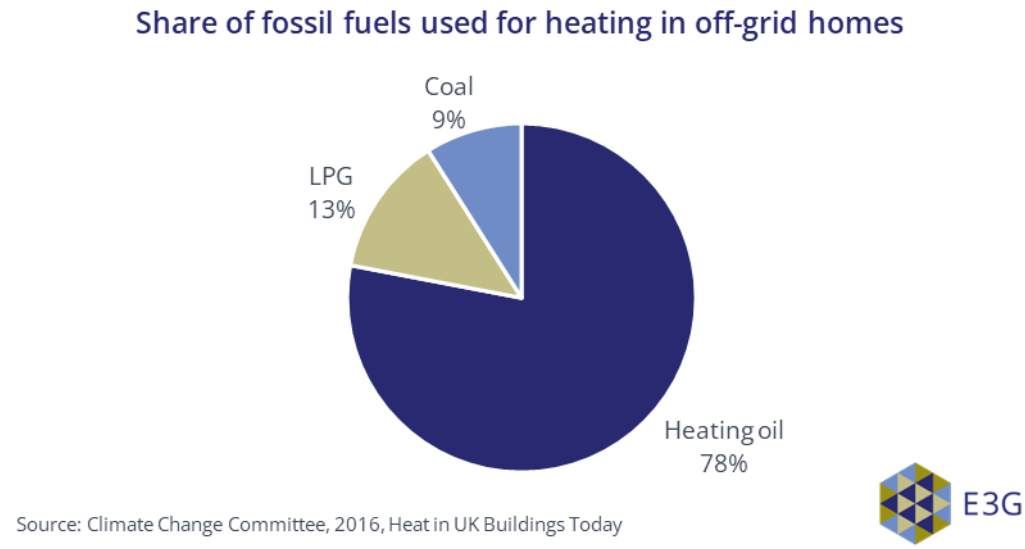

Figure 1: 1.1 million households in England live off the gas grid and rely on fossil fuels for heating. The majority of these households use heating oil.

The 2021 Heat and Buildings Strategy set out an intention to drive the clean heat transition in off-grid homes first – including energy efficiency measures and heat pump deployment – to help reduce bills and emissions.[3] But so far, access to

[1] Climate Change Committee, 2016, **Heat in UK Buildings Today**

[2] Office for National Statistics, 2023, **Census 2021: How homes are heated in your area**

[3] UK government, 2021, **Heat and Buildings Strategy**

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funding, support and installers varies from region to region, creating a heating postcode lottery for mid- to low-income households in rural areas. While some have been able to benefit from government subsidies, many living in rural fuel poverty lack sufficient access to funding and support.

A joined-up and holistic approach is essential to ensure plans to phase out fossil heating systems in off-grid homes are affordable, fair and practical. Understanding the particular issues faced by off-grid rural households, and the current barriers to the rollout of clean heat measures in these homes, provides the insight to develop a coherent package of policy measures for a successful clean heat transition.

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METHODOLOGY

The research process combined quantitative and qualitative methods. The report has been reviewed by industry and fuel poverty experts to road-test the findings and recommendations. We reviewed evidence from government, peer-reviewed and grey sources including:

> Mapping of rural areas' energy usage, heating, efficiency and fuel poverty profiles using spatial datasets – to understand the socio-economic context for off-grid homes and households in relation to heat decarbonisation.

> Policy analysis to understand the current policy framework for heating and energy efficiency in off-grid homes.

> Financial comparison of the running costs of oil/LPG versus clean heat – to identify the role of fiscal and financial incentives for supporting the heat transition.

Interviews were conducted to assess both the barriers and enablers of the heat transition and help test and further the findings of the desk-based research. Groups spoken to include fuel poverty, consumer and rural groups; the Department for Energy Security and Net Zero (DESNZ); and industry experts, including heating installers and energy companies – to better make sense of the supply chain and practical delivery aspect of the heating transition. We also drew on interviews with local authorities with experience of accessing and deploying the different government funding schemes from which off-grid homes can benefit.

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CHAPTER 1
UNDERSTANDING FUEL POVERTY AND THE BENEFITS OF CLEAN HEAT

Understanding fuel poverty

Fuel poverty is increasing and more prevalent in rural areas

Soaring energy costs are creating a fuel poverty emergency in the UK. The total number of households estimated to be classed as fuel poor reached 11 million in April 2023.[4]

Each nation in the UK has its own definition of fuel poverty. In England a household is considered fuel poor if:

1. They are living in a property with a fuel poverty energy efficiency rating of band D or below.
2. They are left with a residual income below the official poverty line when they spend the required amount to heat their home.[5]

Three factors determine whether a household is fuel poor: household income, household energy requirements and fuel prices.

Higher fossil fuel prices are affecting everyone, but not equally. Families living in rural off-grid areas are being hit particularly hard for several reasons including:

> more expensive fuel for heating

> inefficient homes which need more energy to keep warm

> a higher proportion of lower-income households.[6]

Figure 2 shows that the rate of fuel poverty has increased throughout England between 2020 and 2022 due to the energy and cost-of-living crises. However, though both urban and rural areas are affected, fuel poverty disproportionally

[4] End Fuel Poverty Coalition, October 2022, **Fuel poverty set to hit 11m households**

[5] UK government, 2023, **Fuel poverty statistics**

[6] Department for Environment, Food & Rural Affairs, 2022, **Government statistics: Fuel energy and fuel poverty in rural areas**

affects rural areas. In some rural constituencies, more than 50% of households are living in fuel poverty.[7]

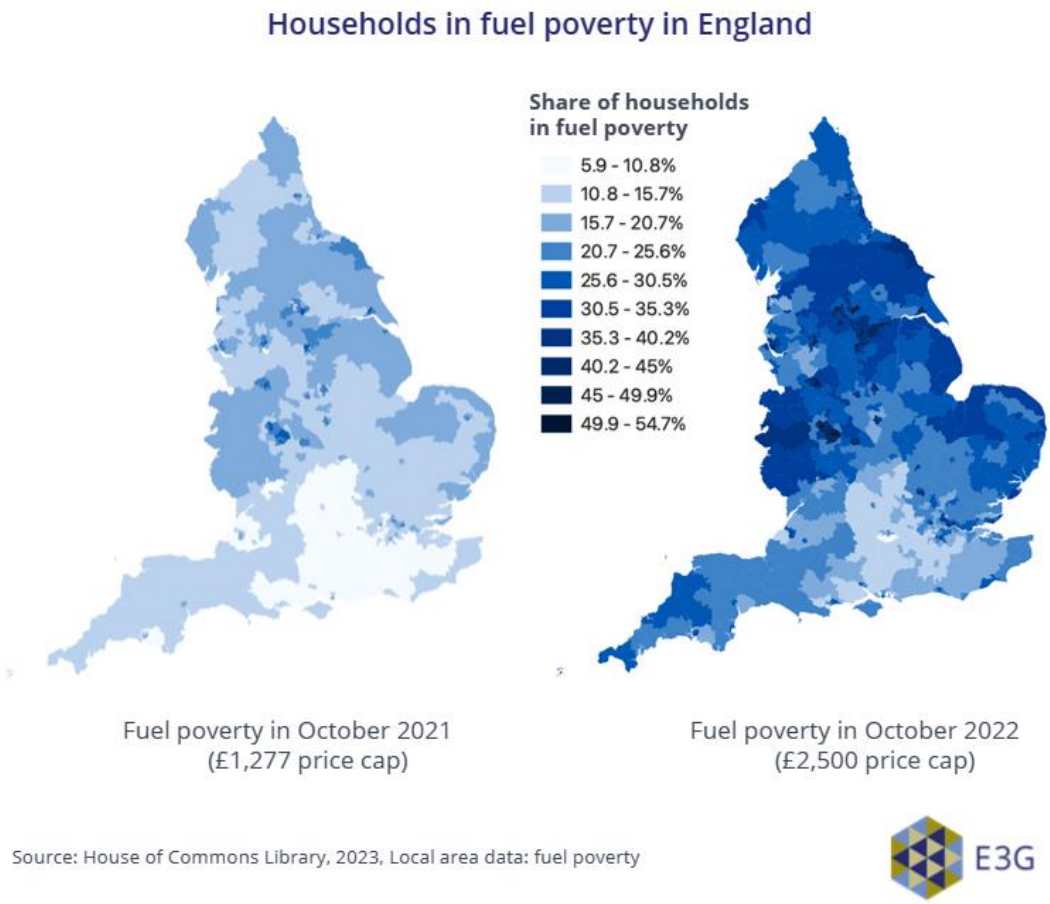

Figure 2: Fuel poverty in England increased markedly from 2021 to 2022.[8]

Rural households face a larger fuel poverty gap

Additionally, rural households on average experience a much larger fuel poverty gap, as Table 1 shows.[9] The fuel poverty gap broadly refers to the amount of money a household would need to no longer be classed as fuel poor. These figures have been worsened by the energy crisis and highlight the greater challenge rural households face to afford heating. The gap can be addressed by

[7] Department for Business, Energy & Industrial Strategy (now Department for Energy Security & Net Zero), 2022, **Annual fuel poverty statistics**

[8] House of Commons Library, 2023 **Local area data: fuel poverty**023

[9] Department for Environment, Food and Rural Affairs, 2023, **Statistical digest of rural England: Communities and Households**

increasing the efficiency of the property or reducing fuel costs sufficiently to bring the net household income above the official poverty line.

Table 1: The fuel poverty gap: comparing depth of fuel poverty in rural and urban households

	Rural Households	Urban Households
Fuel poverty gap (2022)	£677 £956 for fuel poor households in rural villages, hamlets & isolated dwellings	£265
Fuel poverty gap for EPC rating of F or G (2020)	£1,100	£970
Fuel poverty gap for EPC rating of F or G (2022)	£2,500	£1,400

Source: Department for Environment, Food & Rural Affairs, 2023, **Statistical digest of rural England: Communities and Households**

In 2022, the fuel poverty gap in rural households increased to £677 overall, and to £956 for fuel poor households in rural villages, hamlets and isolated dwellings. That makes the rural fuel poverty gap nearly triple the size of the urban, at £265. Such a stark difference depending on geography highlights the need for targeted support for off-grid homes specifically.

Table 1 shows that the energy crisis has had a particularly large impact on those living in the least energy efficient homes. The level of fuel poverty for households with an EPC of F or G was already higher for rural homes than urban homes prior to the energy crisis, but that difference has worsened since – going from £130 to £1,100, nearly nine times the original difference.

Households using oil for heating are exposed to oil price volatility

The cost of heating oil has undergone unprecedented fluctuations in recent years. As Figure 3 shows, the average price per 1,000 litres more than doubled from around £500 in September 2021 to around £1,100 in June 2022, before

slowly falling again.[10] The rise was driven by the all-time high in global oil prices in early 2022.[11]

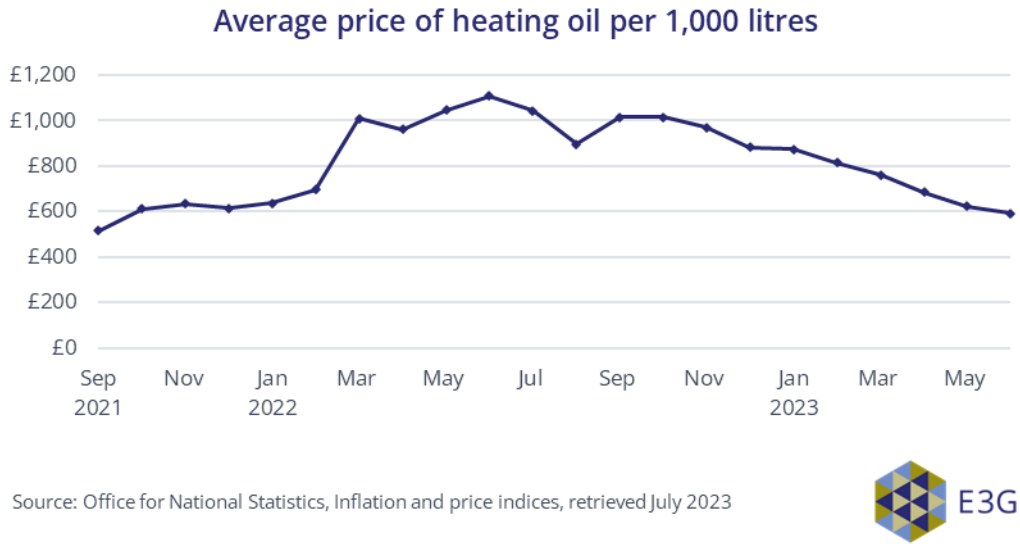

Figure 3: The average UK price of heating oil more than doubled between September 2021 and June 2022.

The price rise created enormous uncertainty and precarity for households, leaving some in debt, or unable to heat their homes altogether.[12] Households reliant on oil face substantial upfront payments as orders are delivered in bulk, becoming unaffordable for some. The bulk payments also deepen inequalities for off-grid homes, as they may have had to purchase oil at an all-time high, and therefore cannot benefit from falling prices at the time of use.

While the prices of oil and LPG have fallen since the height of the energy crisis, future price shocks cannot be ruled out. If next winter is cold in Europe, this could again stretch fossil fuel supplies and lead to a surge in energy bills. A shift to cleaner, efficient heat can help protect households against future price hikes.

Clean, efficient heat could benefit fuel poor rural households

Improving energy efficiency and supporting a switch to heat pumps would help answer some of the issues these households face today:

[10] Office for National Statistics, 2023, **Inflation and price indices**

[11] BBC News, 2023, **Oil prices**

[12] Information obtained through interviews with consumer groups and fuel poverty charities, April to June 2023

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> Improving energy efficiency would help drive heating bills down permanently, regardless of the energy source.

> Heat pumps are around four times as efficient as oil heating tanks, and have a longer lifespan: 20+ years compared to 10–15 years.

> Heat pumps are generally low-maintenance, and do not require fuel delivery unlike oil, LPG, gas bottles, or biomass.

Although the upfront cost of a heat pump installation remains significant, there are government schemes available today to help alleviate that cost and make the benefits of clean heat more easily accessible, helping homes be warmer for longer. Schemes include the Boiler Upgrade Scheme (BUS) for households in England and Wales, and the Home Upgrade Grant (HUG) for off-grid fuel poor households in England – as explored in a later section. In addition, industry is investing to lower the technology and installation costs.

Table 2: Comparing costs and benefits in the switch from oil heating to heat pumps

	Heat pump	Oil heating
Upfront cost	£7,000 to £13,000	£1,000 to £4,000
Grants available	BUS (up to £6000)[13] and HUG (up to full installation cost)[14]	None
Lifespan	20+ years	10–15 years
Typical annual running cost	£1,156	£1,104
Potential annual running cost with levy rebalancing	£1,009	£1,564
Efficiency	300–400%	80–90%

[13] UK government, 2023, **Apply for the Boiler Upgrade Scheme**

[14] Department for Business, Energy & Industrial Strategy (now Department for Energy Security & Net Zero), 2022, **Home Upgrade Grant: Phase 2, Guidance for local authorities**

Policy landscape

In the 2021 Heat and Buildings Strategy, the UK government set out the path to kickstart the transition to low-carbon heat. Off-grid homes were chosen as a starting point – beginning with phasing out new fossil fuel heating systems from 2026. It was noted that the 1.1 million off-grid homes in England could boost the heat pump market, and so help create green jobs in rural areas and throughout the UK.[15] The government consulted on the 2026 phase-out timeline but has not yet written this into law.

UK and devolved governments are already taking steps to help mid- to low-income households improve the energy efficiency of their homes, and switch to cleaner heating sources. The key schemes currently live are set out in Table 3.

Table 3: Government support for clean heat across the UK

Support scheme	Description
Home Upgrade Grant (HUG)	HUG provides **energy efficiency upgrades and low carbon heating** – primarily heat pumps – via local authorities, to households in **England that are low-income, off the gas grid, and have an EPC of D to G**. Up to £700 million will be made available to deliver HUG2 until March 2025.[16]
Energy Company Obligation (ECO)	Under the ECO, **obligated energy suppliers must provide measures to improve the ability of low-income, fuel poor and vulnerable households to heat their homes**. The scheme covers both on- and off-grid homes.[17]
Social Housing Decarbonisation Fund (SHDF)	SHDF supports **energy performance measures in social homes in England**. £778 million has been offered to 107 projects for the latest phase of the scheme in March 2023. Match funding from applicants provides an additional £1.1 billion. The scheme covers both on- and off-grid homes.[18]
Boiler Upgrade Scheme (BUS)	BUS provides **grants to support the installation of heat pumps and biomass boilers in England and Wales**. Acting on behalf of property owners, installers can apply for: £5000 off the cost and installation of an air source heat pump or a biomass boiler, and £6000 off a ground source heat pump. £450 million is available from 2022 to 2025. Following government announcements, the

[15] UK government, 2021, **Heat and Buildings Strategy**

[16] UK government, 2023, **Home Upgrade Grant: Phase 2, Successful local authorities**

[17] Ofgem, 2023, **Energy Company Obligation (ECO)**

[18] UK government, 2023, **Social Housing Decarbonisation Fund Wave 2.1: Successful bids**

Support scheme	Description
	scheme has been extended to 2028. This is not an off-grid specific scheme.[19]
Grant funding in Scotland	Homeowners in Scotland can apply for **grants for energy efficiency measures and heat pumps**. A rural uplift is available to households in Remote Rural and Island areas, as well as off-gas Accessible Rural areas, as defined by the Urban Rural Classification. Grant funding for heat pumps is up to £7,500, or £9,000 for households which qualify for the rural uplift. The remainder of funding requested can be taken up as an optional interest-free loan.[20]
The Nest Scheme in Wales	The Nest Scheme provides free, impartial advice on home heating and upkeep, and for those eligible, **a package of free home energy efficiency improvements** – such as a new boiler, central heating, insulation, solar panels or a heat pump. The scheme is targeted at low-income households and those living in deprived communities across Wales.[21]

Learnings from the Homes Upgrade Grant: England's scheme to address rural fuel poverty

The Homes Upgrade Grant (HUG) is England's flagship scheme dedicated to supporting low-income households off the gas grid. It provides energy efficiency upgrades and low-carbon heating installations to eligible households earning below £31,400. HUG is one of the most comprehensive schemes available, allowing for deep retrofits to maximise bill savings. In spring 2023, HUG entered its second phase (HUG2). The average cost of measures installed per household in phase 1 of HUG was £8,500.[22]

The current version of the scheme builds on the learnings from HUG1 to make the scheme more accessible and fairer to local authorities. The scheme now follows a challenge fund model – where funding can be released to any local authority, so long as they meet the minimum criteria – rather than a competition

[19] UK government, 2023, **Apply for the Boiler Upgrade Scheme**

[20] Home Energy Scotland, 2023, **Funding: grants and loans overview**

[21] Welsh Government, 2023, **Nest Scheme Wales**

[22] Department for Energy Security & Net Zero, May 2023, **Green Homes Grant Local Authority Delivery Scheme & Home Upgrade Grant - Statistics for England**

model, where there was a limited pot of funding which local authorities had to compete for. This change is welcome and helpful in several ways:

> **Local authorities do not have to bid against one another**. Projects are instead assessed against a set of minimum criteria – with feedback and opportunity to improve during the application process, helping to maximise their chances of being awarded. This encourages local authorities to be more realistic in their funding bids and focus on achievable deliverables. It also prevents direct rivalry.

> **Boosting local capacity to succeed through consortium funding**. Following HUG1, the Department for Energy Security and Net Zero (DESNZ) identified issues of capacity within and between local authorities – with some not having an energy officer in the first place. To promote cooperation and coordination, DESNZ put the local authorities concerned in touch with one another – where geographically possible and relevant – so they could combine their effort and apply as a consortium.

> **A rural uplift**. 60% of the funding is dedicated to rural local authorities to tackle the disproportionate fuel poverty households face in these areas.

Despite the positive steps taken to improve HUG, there remain limitations in access and delivery of the scheme, preventing some eligible households from being able to benefit from it.

Nationwide availability and access

Take up of HUG is low in some areas and there are geographical disparities. DESNZ expects over 25,000 homes to be upgraded by HUG2 by March 2025. This only represents a small proportion (around 5%) of the 1 million off-grid low-income households in England.

It is important that fuel poor households nationwide have easy, fair and equal access to HUG – which is not currently the case (Figure 4). Of the 2,611 installations made under HUG1, 773 (30%) were in the East of England, 532 (20%) in the North West, and 463 (18%) in the South East. The North East, although deeply affected by fuel poverty, lags behind on installations, despite the number of applications put forward in Phase 1. This is in part due to the bidding nature of HUG1, which will evolve with HUG2.

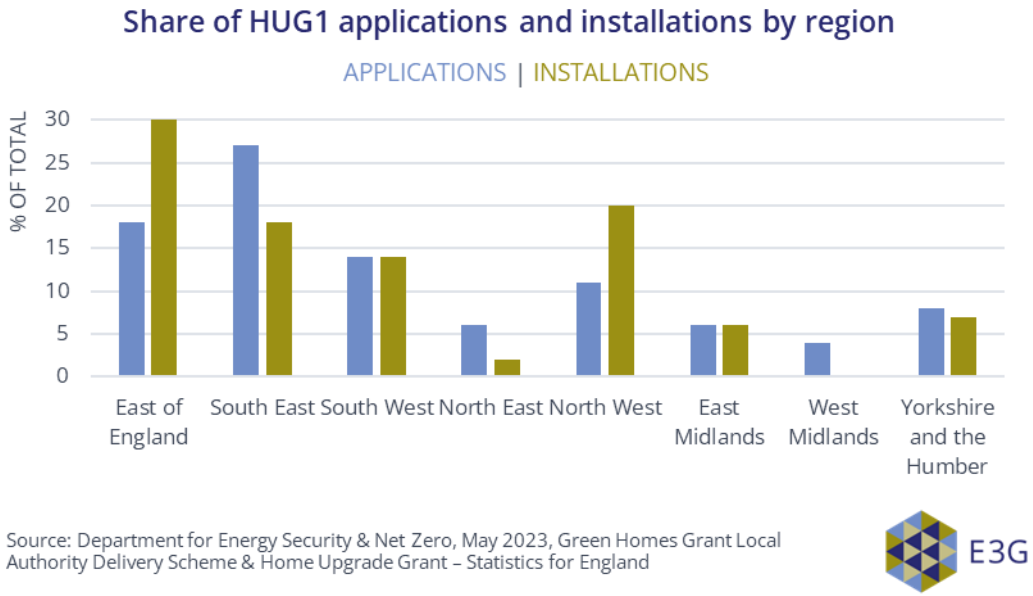

Figure 4: There are significant regional disparities in the number of applications to HUG1, and how these translated into installations[23]

In terms of access to the scheme, income thresholds remain the key means of measuring eligibility. The low-income household threshold has been updated to £31,000 to reflect changes to the median income in England. However, a four-person household earning £32,000 in the South East could be materially worse off than an single-person household earning £31,000 elsewhere in England.

However, the government has now built more flexibility into the scheme. HUG2 will accept alternative methodologies for demonstrating that a household should be able to benefit from the scheme, where the local authority provides evidence of the appropriateness of their methodology. For example, they may include households with total incomes above £31,000 in areas where high housing costs mean the household income after housing costs is below £20,000. Additionally, to allow area-based upgrades, DESNZ may accept the average income across a block of flats/houses/maisonettes, where most households have a combined income of no more than £31,000 per year.[24]

[23] Department for Energy Security & Net Zero, May 2023, **Green Homes Grant Local Authority Delivery Scheme & Home Upgrade Grant - Statistics for England**

[24] Department for Business, Energy & Industrial Strategy (now Department for Energy Security & Net Zero), 2022, **Home Upgrade Grant: Phase 2, Guidance for local authorities**

Supply chain delays and short funding windows led to under-delivery

Some local authorities who had successfully applied for HUG1 struggled to deliver the scheme due to issues in the supply chain. They found it hard to contract skilled installers and retrofit experts, demonstrating a need for enhanced support for local training and skills, which could potentially be rolled into future funding allocations.

The delivery challenge was exacerbated by the cost cap for measures in HUG1, as some contractors could no longer provide the required installations within the pre-established cost cap due to inflation.

Although DESNZ has granted some extensions for HUG1 to allow local authorities to deliver projects that had been delayed, they were only able to extend the project delivery funding until September 2023 due to financial year regulations enforced by HM Treasury. This meant some projects were unable to fully deliver the funding they were originally awarded. Going forward, it would be useful to adapt Treasury accounting rules to allow for longer term funding and spending flexibility over financial years – as seen in government departments such as the Ministry of Defence. This would help maximise outputs and benefits, building in more flexibility to ensure local authorities have sufficient turn-around time, and are able to adapt in the case of supply chain disruption.

Limited awareness and knowledge at a household level

Lack of household awareness regarding heat decarbonisation reduced HUG1's delivery of heat pumps. HUG takes a whole-house approach covering both energy efficiency and heat pumps. However, most households only opted for energy efficiency and solar PV.

To date, 2,611 measures have been installed in HUG Phase 1. Of these, 1256 (48%) were fabric insulation, 670 (26%) were solar PV, and just 263 (10%) were for air source heat pumps (Figure 5).[25] The appetite for solar PV is welcome and highlights a keen interest in electrification. Our interviews suggest that informing more households of the benefits of heat pumps would help increase uptake.

[25] Department for Energy Security & Net Zero, May 2023, **Green Homes Grant Local Authority Delivery Scheme & Home Upgrade Grant - Statistics for England**

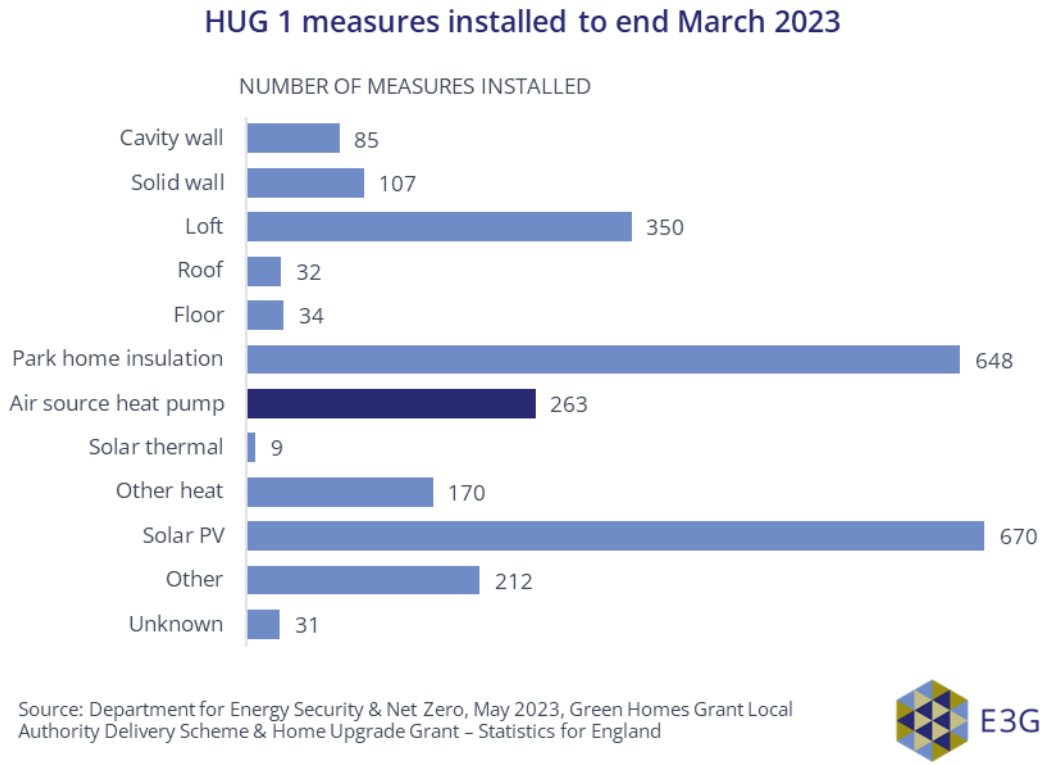

Figure 5: A total of 2,611 measures were installed in HUG phase 1. Only 10% of these were air source heat pumps.

Local authority capacity to apply and successfully deliver the scheme

Across the country, the capacity and competence of different local authorities to successfully apply for and deliver HUG varies greatly. While there are pockets of leadership, this is not universal.[26] The government has sought to boost local capacity (i.e., through the Technical Assistance Facility and Home Upgrade Hub[27]), but more will be needed to create a level playing field.

Solutions could include making a general pot of money available for authorities to hire and train retrofit teams, or to ensure staff and training support is built around specific projects. Other ways to maximise capacity include providing three-year blocks of funding, which reduces time spent annually on application processes, and allowing rolling application windows so authorities can plan an application timeline which suits them. National knowledge sharing and technical assistance can also be provided.

[26] E3G, 2023, **Enabling locally led retrofit: reforms to scale up effective delivery**

[27] Home Upgrade Hub, 2023, **Introducing the Home Upgrade Hub**

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CHAPTER 2
NAVIGATING OBSTACLES TO CLEAN HEAT DEPLOYMENT

There is growing consensus that the long-term solution to the energy crisis and costly fuel bills is through accelerating the transition away from fossil fuels and towards clean, efficient heating.[28] Getting on track to realise these benefits in off-grid homes will require navigating barriers, outlined in the table below.

Table 4: Barriers and solutions to the deployment of clean heat in off-grid homes

Barriers	Description	Solutions
Cost and finance	> Running costs of electricity, which are currently tied to gas prices and have added "levies" > Upfront costs associated with heat pumps and complementary efficiency measures	> Electricity price reform to lower running costs > Ensuring national access to the Homes Upgrade Grant (or equivalent) for mid- to low-income households > Boiler Upgrade Scheme rural uplift > Innovative financing to aggregate demand, including via UK Infrastructure Bank
Physical challenges in retrofitting rural homes	> Larger, detached rural homes can cost more to retrofit > Electricity grid upgrades needed to cope with increased energy demand > Planning regulations and Conservation Areas can act as a hurdle	> Complementary fabric efficiency measures; higher temperature heat pumps > Ensure networks are planning and investing ready for a transition to electric heat > Embedding a net zero mandate into planning regulations
Support for consumers	> Low awareness of clean heat options and benefits > Limited impartial advice	> Provide easily accessible and tailored advice and support following the example of Home Energy Scotland

[28] Electrify Heat, 2022, **Getting off gas: Learnings on how the UK can get ahead in the global race towards clean heat**

Barriers	Description	Solutions
	> Confusing consumer protection landscape	> Comprehensive, accessible consumer protection regime
Skills and supply chain	> Challenges in finding trained and trusted suppliers in rural areas (which can in turn increase costs)	> Dedicated local training to support a growing pool of experts who can install and maintain heat pumps

Cost and finance

Currently, running costs of electricity can be higher than direct heating with fossil fuels. Larger rural properties in particular could cost more to run. Households need to be confident that switching to clean heat will lead to long-term cost savings, and the government is already considering measures to lower the costs of electricity. We encourage the government to move ahead with reforms, while ensuring vulnerable and low-income households are protected through any changes (for example, via the introduction of a social tariff).

The upfront cost of getting a heat pump installed can act as a major barrier to rural families accessing clean, efficient heat. Air source heat pumps generally cost between £8,000 and £13,000, while ground source heat pump costs can range from £15,000 to £30,000. The cost depends on various factors including the size and nature of the property, size of the heat pump, and condition of the current heating system. Since rural properties are generally larger and detached, the costs of heat pump installation tend to be higher.

As previously noted, government subsidies are available to support households with the upfront costs – including the Boiler Upgrade Scheme, and the more comprehensive Homes Upgrade Grant available for low-income households. There is already some recognition of need for rural uplifts: Scotland provides an additional £1,500 on top of the £7,500 Home Energy Scotland Scheme to install heat pumps.[29] We consider how existing government schemes could be better targeted and tailored for rural and off-grid households in Chapter 3, taking the Homes Upgrade Grant as a springboard.

[29] Scottish Government, December 2022, **Enhanced support to make homes warmer and greener**

National Energy Action (NEA) notes several additional, often hidden, costs that households can face, including rewiring; servicing and maintenance; redecorating and paintwork; and "capping the gas supply".[30] There needs to be a holistic approach to ensure these ancillary costs can be accommodated within funding, to ensure that low-carbon heat is available for everyone.

Industry innovation and investment will be key for driving down the cost of installations over time. Several major energy companies are already seeking to make costs more attractive for homeowners.[31] Further innovation could be encouraged with a focus on off-grid areas, including through district heating technologies powered by ground source heat pumps.[32]

Several innovative financing solutions could additionally contribute to bringing down the cost of heat pump installations for rural communities. Proposed by the Green Finance Institute, demand aggregation finance can leverage economies of scale and connect households with attractive financial products that can bring down the upfront cost of energy efficiency and clean heat.[33] Typically sponsored by local authorities, schemes allow residents to register an interest in heat pumps to form a group with sufficient purchasing power to bulk order and mass install low-carbon technologies.

Physical challenges in retrofitting rural homes

Government research has shown at least 80% of fossil fuel heated off-grid homes in England have sufficient energy efficiency and internal fuse limit electrical connections to accommodate a low-temperature heat pump.[34] Nonetheless, EPC data suggests that homes in rural areas likely to be less efficient as more rural properties are older – and age is the factor that most impacts efficiency.[35] Additionally, properties in rural areas are often detached, so have four walls through which heat can be lost. They are also typically built with traditional solid walls and floors and are therefore more expensive and often need more

[30] National Energy Action, 2021, **Fuel Poverty Monitor 2021**

[31] Centrica, January 2023, **British Gas to drive demand for heat pumps with lowest price guarantee**

[32] For example see: Cambridgeshire County Council, 2023, **Swaffham Prior heat network**

[33] Green Finance Institute, 2023, **Demand Aggregation Finance**

[34] UK government, 2021, **Consultation: Phasing out fossil fuel heating in homes off the gas grid**

[35] Office of National Statistics, 2021, **Age of the property is the biggest single factor in energy efficiency of homes**

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expertise to retrofit. Overall, 60.53% of rural dwellings have an EPC of D or below, compared to the England average of 58.51%.[36]

New heat pumps with higher flow temperature can be used much more widely in houses that are either not well insulated or do not have surface heating such as underfloor heating.[37] Deployment of such heat pumps though increases the need for a parallel focus on lowering the running costs of electricity to ensure affordability in larger, leakier homes.

Planning regulations can prevent retrofit measures being installed in rural areas. This is the case in National Parks, Areas of Outstanding Natural Beauty, Conservation Areas and listed buildings. There are nearly 10,000 Conservation Areas in England covering over 10% of properties.[38] Changes to the National Planning Policy Framework can help steer local authorities to ensure planning systems are an enabler, rather than a hurdle.

Finally, connections to the electricity grid are not always able to support heat pumps. NEA notes occasions where the network has demanded that the household provides a financial contribution towards the cost of the upgrade before it takes place.[39] This has been a particular problem in rural villages, where infrastructure can be outdated and under-invested. More incentive is needed for energy distributors to plan and invest in rural grids without additional costs for fuel poor households.

Support for consumers

With energy prices rising and fuel poverty increasing, it has never been more important for people to be aware of the energy saving measures they can take, and the long-term solutions available to make their homes more efficient, cheaper and greener to run. However, research for the government found that levels of understanding among the public are low.[40] A national campaign is needed to increase awareness levels, paired with campaigns run by regional bodies, in order to address local needs and foster a climate of trust.

[36] Rural Services Network, 2022, **Rural cost of living**

[37] Fadvices, 3 October 2022, **New Bosch heat pumps solve two major problems at the same time**

[38] Historic England, 2017, **Designating and Managing a Conservation Area**

[39] National Energy Action, 2021, **Fuel Poverty Monitor 2021**

[40] Department for Business, Energy & Industrial Strategy (now Department for Energy Security & Net Zero), 2021, **Public Attitudes Tracker**

Consumers need to understand why they should make the change to clean heat and how to do so, so they can make informed decisions. In off-grid areas, geographical distance can create a social barrier, as can online connectivity issues. NEA notes that rural communities are more likely to struggle to access impartial information on technologies and funding options for decarbonising their homes – hence the need for regional and local bodies to ramp up communications.[41] Consumer advice must be presented in a way that considers people's individual needs, and notably takes different consumers' digital skills and internet access into account. Policy changes must be clearly communicated, and available funding opportunities should be easily accessible and understandable. This includes access to smart and digital services that can boost the affordability of heat pumps. For example, research has suggested that Time of Use tariffs – whereby consumers pay lower prices for the flexible use of electricity at times of high renewable generation or low network constraint – could offer substantial benefits to fuel poor households if designed in an accessible and inclusive way.[42]

There is additionally a lack of consistent and tailored information on maintenance and servicing after installation, especially for people in vulnerable circumstances. Simplifying and strengthening consumer protections will also be vital to give consumers confidence to engage in the energy transition[43] which in turn is needed to scale up a market that has until now remained "niche". Additionally, protections need to provide a safety net to early adopters. Currently the consumer protection landscape is confusing and complex – with multiple certification bodies and accreditation processes [44] – leaving consumers and installers confused on where to turn if issues arise.

When advice is done right, the benefits are clear. Home Energy Scotland helps more than 90,000 customers in Scotland every year.[45] 69% of total savings achieved by customers can be directly attributed to the advice provided. This means an average lifetime saving of 4.3 tonnes CO_2 (and £1,600) per customer.

[41] National Energy Action, 2021, **Fuel Poverty Monitor 2021**

[42] Powells, G. & Fell, M. J., 2019, **Flexibility capital and flexibility justice in smart energy systems**

[43] Citizens Advice, 2021, **The Net Zero protections puzzle: Helping piece together energy improvements**

[44] Competition and Market Authority, 2023, **Consumer protection in green heating and insulation**

[45] Energy Saving Trust, 2022, **Evidence for government**.

Skills and supply chains

Delivering heat pump targets will require upskilling and scaling up the supply chains. The Heat Pump Association estimates an additional 57,000 installers are needed over the next decade across the UK.[46] As noted in the case study on the Homes Upgrade Grant, a lack of access to skilled installers in certain regions can hold back local authorities from delivering retrofit programmes in off-grid areas. It can also increase the costs for households.

Respondents to a survey by NEA found that where there were few qualified installers in a particular area, businesses would often travel hundreds of miles to undertake an installation, severely limiting the amount of aftercare, advice, and customer service they can provide. One respondent reported instances of rural fuel poor households having a heat pump installed without being informed how to use it properly.[47]

Government research surveyed installers in off-grid areas and identified barriers that can hold back companies and individuals from investing in green skills:[48]

> The market is currently small and there is a lack of certainty to provide confidence of growth. Training can be expensive, and missing working hours can act as a disincentive. For SMEs (who represent a significant proportion of the market), there is an economic risk associated with taking time off for training, without guaranteed pay-back.

> There is an existing skills shortage for heating engineers, with an aging workforce.

The research identified positive opportunities for off-grid homes.

> The transition in skills from oil heating to heat pumps is more straightforward than from gas to heat pumps, due to overlapping skills required.

> Most heating installers were aware of the government's fossil heating phase-out plan and keen to transition and upskill, if provided with certainty and support and/or incentives from government and/or manufacturers.

[46] Heat Pump Association, 2023, **About heat pumps installers**

[47] National Energy Action, 2021, **Fuel Poverty Monitor 2021**

[48] Department for Business, Energy & Industrial Strategy (now Department for Energy Security & Net Zero), 2021, **Social research with heating installers in off-gas grid areas**

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> Among off-grid installers, the majority (73%) of heat pump installers reported being fully aware of government fossil fuel phase-out plans, compared to 49% of installers who currently don't install heat pumps. In addition, nearly all off-grid installers interviewed had at least basic awareness of government plans to phase out installation of fossil fuel heating systems.

The main recommendations from installers were to provide long-term policy and funding clarity, and incentives for training programmes. There is a parallel need for an upswell in consumer demand to act as an incentive, to ensure that investing in training will pay off.

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CHAPTER 3
RECOMMENDATIONS FOR OFF-GRID CLEAN HEAT

A well-managed shift to clean, efficient heat can offer benefits for rural communities. Circumstances have changed since the publication of the Heat and Buildings Strategy: the energy crisis makes the shift away from reliance on fossil fuels more important than ever, but the cost-of-living crisis creates new challenges. This section provides recommendations to navigate these challenges.

A national framework to guide local approaches

The government has consulted on phasing out fossil heating systems from off-grid homes from 2026. Deciding on a backstop date for the installation of new fossil heating systems can play an important role in providing long-term certainty for businesses to scale up skills and supply chains. However, complementary fiscal and planning measures should be introduced alongside regulations, to ensure a socially inclusive approach.

> **Take a phased-in, "worst first" approach to phasing out fuels**, ensuring households have time to plan and invest. Cost caps are needed to ensure affordability, complemented by grants and attractive financial options, and measures to reduce the cost of electricity.

  This could be supported by ensuring additional incentives and advice are made available at "**trigger points**" – moments when people are more likely to retrofit their home, such as buying and selling a property or replacing a heating system. This would help spread awareness and encourage take-up of available subsidies ahead of planned phase-out dates.

> **Update national and local planning regulations** to allow the retrofit of listed properties and those in conservation areas.

> **Provide platforms to share good practice and local success stories**, coordinated through national bodies, as has been put in place for the local authorities benefitting from the Home Upgrade Grant.

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Ensuring the transition is affordable, accessible, and attractive for rural areas

Greater financial and non-financial support is needed in rural areas, due to high levels of fuel poverty and greater investment needed for some properties. Without this, it will be hard to achieve society-wide consensus around the introduction of regulations.

> **Provide long-term and consistent funding** to local authorities and other delivery partners, allowing them to deliver home retrofit effectively. As explored in this report, the limitations of short spending timespans can prevent local authorities from fully delivering on the funding provided. More flexibility from the Treasury on accounting rules and the permitted spending timeline could ensure more efficient delivery to build a stable and sustainable market for the green economy.

> **Lower the running costs of heat pumps** by taking steps to reflect the lower costs of renewable energy in electricity prices. Other short-term measures could include "heat pump tariffs" to provide an incentive for early adopters, and a social tariff to ensure affordability for low-income households.

> **Expand the scope of the Homes Upgrade Grant**, which provides support to low-income, off-grid households. Build on the improvements following the learnings from phase 1 to support more homes to get heat pumps fitted**:**

1. **Consider widening delivery channels** for HUG in regions where local authorities are not delivering, considering the role of energy suppliers and other delivery partners to boost access to the scheme.
2. **Expand application and funding windows** for local authorities.
3. **Enhance retrofit capacity within local authorities** to build teams and officers with the knowledge and resources to deliver clean heat.

> **Provide a** "**rural uplift**" to the Boiler Upgrade Scheme and Great British Insulation Scheme in recognition of the higher upfront retrofit costs that come with larger, leakier, detached properties.

> **Provide a higher level of support for ground source heat pumps**, in recognition of the higher upfront costs.

> **Consider how the UK Infrastructure Bank can support rural communities**, for example through supporting demand aggregation schemes which help

build economies of scale. This could function in a similar way to community oil buying schemes, where buying in bulk brings down the costs for all.

Scaling skills and local supply chains

A lack of access to qualified heat pump installers and engineers in rural areas can increase the cost of installations, factoring in travel requirements. Investing in rural heating installers is a strategic way of scaling up the heat pump workforce.

> **Targeted rural support for local skills** could be provided through further education providers, apprenticeships, training and retraining opportunities.

> **Additional funding could be baked into subsidies** like the Boiler Upgrade Scheme and Homes Upgrade Grant to support with ancillary costs that installers and companies might face in boosting rural supply chains.

Trusted advice tailored to local needs

A lack of consistent and tailored information on clean heat represents a barrier, especially for people in vulnerable circumstances. Consumer advice must be offered in a way that considers people's individual requirements and include consideration of different households' digital skills and internet access.

> **A national campaign to increase awareness levels** among the public, paired with campaigns run by local and regional bodies.

> **Establish a consistent, independent and impartial advice service** to support households in making informed decisions. Local advice can be tailored to the needs of rural communities. This could resemble the Home Energy Scotland model, where consumers can access information in person, over the phone and online. Households can be connected with certified local installers.

> **Communicate policy changes clearly and make available funding opportunities easily accessible and understandable.** This includes access to smart and digital services that can help boost the affordability of heat pumps, including Time of Use tariffs.

> **Accelerate EPC reform** to better account for the carbon savings associated with heat pumps.

Electricity grid upgrades

The electricity grid requires investment to accommodate increasing electricity demand.[49] Rural villages are more commonly affected due to outdated and/or under-invested infrastructure. Reforms are needed to provide a mandate and incentive to ensure energy distributors are planning and investing in rural grids, without creating additional costs for fuel poor households.

[49] Regen, 2023, **Building a GB electricity network ready for Net Zero**

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CONCLUSION

For families living off the gas grid in rural areas, high heating prices have long been a problem. Improving energy efficiency and deploying heat pumps can help permanently lower bills, fuel poverty and carbon emissions. However, the current landscape presents a multitude of barriers, making the clean heat transition inaccessible for some.

The government therefore needs to take a joined-up and holistic approach, to ensure plans to phase out fossil heating systems in off-grid homes are affordable, fair and practical. A package of fiscal and planning measures is needed to ensure fuel poor rural households can have clean heat systems and energy efficiency measures installed and see tangible benefits from them.

But still, these plans can only deliver with rural support for net zero. Communities need to be aware of the benefits that net zero can offer for them and their local economies, and feel engaged and supported throughout the transition.