HEALTH ACTION RESEARCH GROUP

because prevention is better than cure

Good for Health, Good for Business

How and why we need to reduce energy costs

Tamsin Grosvenor

CONTENTS

Energy is rarely discussed as a health issue, but it should be

INTRODUCTION

Energy is rarely discussed as a health issue, but it should be. Nearly 3 million households in England are experiencing fuel poverty, concentrated among already disadvantaged groups. This has significant health implications. For example, around 20,000 excess winter deaths are directly attributable to cold homes and fuel poverty, which also increases mental health risks.

It is the poorest who suffer most when energy supplies are disrupted and prices spike, as we saw when Russia invaded Ukraine and again when America and Israel attacked Iran.

With basics like energy costs and housing higher in the UK than in most other European countries, this leaves people on low incomes struggling to make ends meet. It also leaves them particularly vulnerable to further energy price rises.

This has clear implications for both mental and physical health. For example, more than twice as many women take antidepressants in the poorest areas in England compared with women in the richest areas. While women in affluent Richmond upon Thames enjoy 18 years more good health on average than their poorer counterparts in Tower Hamlets.

These are examples of the pervasive health inequalities in the UK. More than twice as many working age adults died from Covid-19 in the poorest areas of England compared with people living in the richest areas.

Tackling health inequalities requires investment, to address the underlying structural causes. However, this is a challenge for the government. Minimal economic growth limits tax income, at a time when the government face increasing demands, including for areas as diverse as defence spending, resident doctors' salaries, and welfare expenditure.

In this report we therefore recommend that, given these financial challenges, the government prioritise long-term structural changes to reduce energy costs. Our assessment is that this produces the best return on investment, for health, business and the government. It will:

- Help lift some 3 million households out of fuel poverty, as well as helping millions more struggling to make ends meet.
- Increase the competitiveness of UK businesses and industrial users, whose electricity prices are around 50% higher than those of France and Germany. In turn this should generate economic growth, boost employment and increase tax income.
- Reduce energy costs across the public and voluntary sectors – including for hospitals, schools and the many charities supporting the most vulnerable in society.

In this report Tamsin Grosvenor therefore sets out the costs, feasibility, and benefits of reforms that can mitigate fuel poverty while delivering wider economic gains.

Michael Baber
Director
Health Action Research Group

EXECUTIVE SUMMARY

THE PROBLEM

2.73 million UK households live in fuel poverty, spending more on energy than they can afford while living in homes that fail minimum energy efficiency standards. This is due to structural failures in the energy and housing systems. Cold and damp homes cost the NHS at least £2.5bn per year in preventable ill-health. Further, UK businesses pay 50% more for electricity than in France and Germany, as well as higher energy costs for public services and charities.

WHY EXISTING MEASURES FALL SHORT

Short-term subsidies like the Warm Home Discount address symptoms rather than causes. Retrofit programmes collapsed after 2013 when stop-start funding weakened installer supply chains. Meanwhile, structural features of the energy system such as gas price dominance, grid constraints, and lack of electricity storage, lock in unaffordable energy costs regardless of what households do.

THE STRUCTURAL REFORMS NEEDED

- Immediate: Extend the Warm Home Discount and complete the shift of decarbonisation levies from electricity bills to general taxation; launch a national retrofit one-stop-shop with stable funding and quality standards.
- Medium-term: Deliver the Strategic Spatial Energy Plan (SSEP – national map of optimal locations for generation, storage, and infrastructure) by end-2026, and reform transmission network charges (TNUoS) to halve grid constraint costs by 2030.
- Long-term: Scale Contracts for Difference (CfDs) and expand Ofgem's Long-Duration Energy Storage scheme to structurally decouple household bills from gas price volatility.

IN THE CASE FOR ACTION

Households: retrofit saves £630–730/yr per property on energy bills; grid reform reduces bills by an estimated £50/yr by 2031; and scaled CfDs projected to save £24bn in electricity system costs by 2050.

Business: energy-intensive industries are projected to see 10–15% cost reductions from grid reform, helping to reverse the ~33% fall in manufacturing output from 2021–2024.

Public sector: the NHS saves £2.5bn/yr from warmer homes; public sector energy savings are estimated at £650m/yr to 2037.

Employment: a national retrofit programme could support up to 45,000 jobs annually; as well as 135,000–725,000 net new jobs across the clean energy transition.

Health: 6,000 avoidable deaths prevented annually at full retrofit scale; £56bn long-term health benefits; delay carries a cost measured in lives, hospital admissions, and developmental harm to children.

All three reforms align with the government's Clean Power 2030 agenda and energy security objectives, strengthening the political case for investment. Full cost-benefit analysis with sources is available in the supplementary annexe.

HOW AND WHY WE NEED TO REDUCE ENERGY COSTS IN THE UK

Energy is rarely discussed as a health issue, but it should be. The temperature of homes shapes respiratory health, mental wellbeing, and the developmental prospects of the next generation, among many other effects. Fuel poverty is not a peripheral concern for energy policy but a central public health challenge that requires structural solutions.

ENERGY AFFORDABILITY AS A SOCIAL DETERMINANT OF HEALTH

In England, an estimated 2.73 million households (11%) are experiencing fuel poverty[i]. This means that if these households were to spend the required amount on fuel costs they would be left with an income below the official poverty line ***and*** that they are living in a home which does not meet the minimum energy efficiency standards for rental properties (Figure 1).

Figure 1: DESNZ (2025) Annual Fuel Poverty Statistics in England, 2025 (2024 data).

Fuel poverty is not evenly distributed across society. Firstly, geographical inequality is a significant factor, with the West Midlands having the highest rate of fuel poverty (16.4%) and the East having the lowest (9.0%)[ii] (Figure 2). Then, fuel poverty is further concentrated among those already facing structural disadvantage, such as low-income, minority ethnic (double the rate of white households), private-renting (25% versus under 10% owner-occupied) or lone parent households (26.5% fuel poverty rate) and households home to dependent children and people living with disabilities[iii].

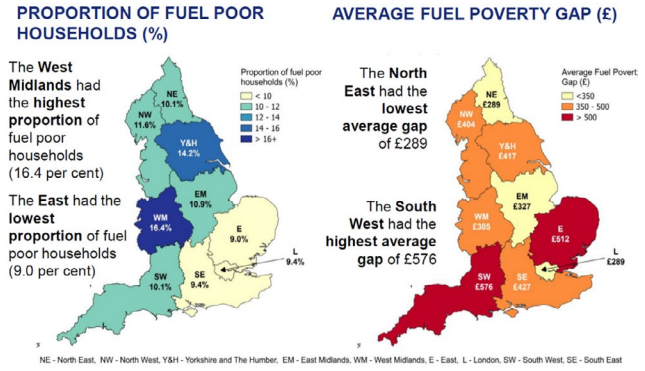

Figure 2: DESNZ (2025) Fuel poverty factsheet 2025

The impact of fuel poverty is extensive. 63,000 excess winter deaths occurred in England in 2020-2021, 21% of these were directly attributable to cold homes, and 10% to fuel poverty[iv]. In fact, England's excess winter death index is higher than the Northern European average, despite having a relatively mild climate – this is a consequence of housing and policy failure. Cold and damp homes hugely affect public health, causing respiratory and cardiovascular illnesses (two of the leading causes of excess winter deaths in England) and potentially exacerbating certain ulcers, musculoskeletal conditions, and diabetes[v] (where diabetes complications cost the NHS an estimated £6.2 billion a year[vi]).

Fuel poverty also has a significant impact on the population's mental health, with 28% of young people in cold homes having four or more negative mental health symptoms versus 4% in warm homes, and mothers of young children in fuel-poor households are up to 64% more likely to experience depression[vii]. The NHS spends at least £2.5 billion every year treating illnesses directly linked to cold and damp homes[viii], a cost which is entirely preventable.

High fuel costs also reduce a household's ability to afford other wider determinants of health by affecting ability to access healthy foods, restricting their use of transport and so access to essential services, school, or socialising, or forcing them to choose between heating and online access, potentially affecting work and/or education[ix].

Further, the effects of childhood fuel poverty may persist across generations for vulnerable households. Epigenetics is the study of how environmental conditions can alter the way genes are expressed and then be passed onto future generations. Through epigenetic changes, it is suggested that up to 10% of a person's DNA may be affected by childhood living conditions, e.g., consequences of cold housing such as mould or disrupted sleep[x]. These consequences may then be carried into their adult life and passed on to their children. Addressing fuel poverty therefore delivers multiplier benefits across health, education, employment, and housing simultaneously.

The average fuel gap for England (reduction in fuel costs needed so a household is no longer in fuel poverty) is estimated to be £407[xi] per household – an aggregate gap of £1.11 billion. People deserve to be able to afford to heat their homes and keep healthy. Energy discounts and grants can help in the short-term. However, they are unsustainable at the scale required. Instead, structural energy reform is necessary to significantly reduce the level of fuel poverty in the country and thus prevent the avoidable health inequalities it produces.

The health impact of high energy costs reaches beyond individual households. NHS trusts, GP surgeries, care homes, and local authority services all face significantly higher operational costs when energy prices rise, compressing the budgets available for frontline care at the moment when demand from cold-related illness is highest. Reduced access to good-quality healthcare, social care, and community support worsens physical and mental health outcomes and deepens existing inequalities. People experiencing fuel poverty therefore feel the cost of high energy prices twice: once through their own bills, and again through the degradation of the services they depend on most.

STRUCTURAL BARRIERS TO AFFORDABLE ENERGY

Three key interlocking structural features of the energy system make it difficult for affordable energy to reach households: gas price dominance, grid constraints, and the lack of large-scale electricity storage. These structural barriers also leave UK households, businesses and the public sector vulnerable to international price shocks caused by geopolitical tensions and conflicts, such as the increase in prices following Russia's invasion of Ukraine in 2022 and the 2026 war in the Middle East.

> *...As long as the system remains tied to volatile global gas markets, households will continue to feel the impact of every international shock.*
>
> **Simon Francis, Coordinator of the End Fuel Powerty Coalition, 2026**

Gas Price Dominance

Renewable energy now contributes about 55% of UK electricity with wind making up the highest proportion, while fossil fuel generation accounts for about 30%[xii]. While wind energy is one of the cheapest sources of renewable electricity, household energy bills (even those using renewable energy) are largely driven by the price of gas, which remains three times higher than pre-energy crisis levels[xiii]. This is because we use a pricing system called marginal pricing, in which the most expensive generator needed (almost always gas) sets the price for all electricity produced during any set time.

Marginal pricing has been the basis of the UK electricity market since liberalisation in the early 1990s. While it does deliver benefits in efficient dispatch, transparent price signals, and incentives for low-cost generation, sustained high gas prices demonstrate that these incentives have not been sufficient to protect consumers from prolonged wholesale volatility. Despite this, economic evidence suggests that the UK should retain marginal pricing in the short-term electricity market, because it ensures the cheapest available power is dispatched first and keeps system operation efficient[xiv]. The policy challenge is therefore to reform the wider system through strengthening long-term contracts, capacity mechanisms, and low-carbon generation so that households are less exposed to future gas shocks.

The structural danger of this gas price dependency is compounded by the volatility of global energy markets which remain vulnerable to geopolitical disruptions. When Russia invaded Ukraine in February 2022, European gas prices rose by 180% in the first two weeks alone[xv] amid fears of supply disruption from a continent heavily dependent on Russian gas. More recently, US and Israeli military attacks on Iran and retaliatory Iranian attacks on the Gulf state infrastructure have prompted forecasts of a 10% rise in UK household energy bills from July 2026, as damage to QatarEnergy production sites and Iranian threats to close the Strait of Hormuz (a shipping route which 20% of global oil and gas passes through) are intensifying competition in international gas markets[xvi].

While the UK benefits from a relatively diverse gas supply compared to some European neighbours, these episodes demonstrate that no degree of supply diversification fully insulates a gas-dependent pricing system from international shocks (in 2026, gas prices remained three times higher than they were before the 2022 energy crisis[xvii]). For households already in fuel poverty, with no financial buffer to absorb sudden price rises, this volatility is a direct health risk. The structural reforms outlined here are therefore not only affordability interventions but energy security interventions, reducing the UK's exposure to a global gas market that shows no signs of becoming more stable.

> *If we actually paid the price of what our electricity now costs to produce, our bills would be substantially cheaper.*
>
> **Michael Grubb, UCL, 2025**

Using domestic gas reserves fails to resolve the problem effectively or sustainably. UK oil and gas reserves are both declining and sold at global market prices, meaning that even energy extracted from British soil is priced against the same volatile international market and would be subject to the same shocks triggered by the Ukraine war and Middle East conflict . Expensive and volatile household bills are not caused by where our energy comes from, but how it is priced.

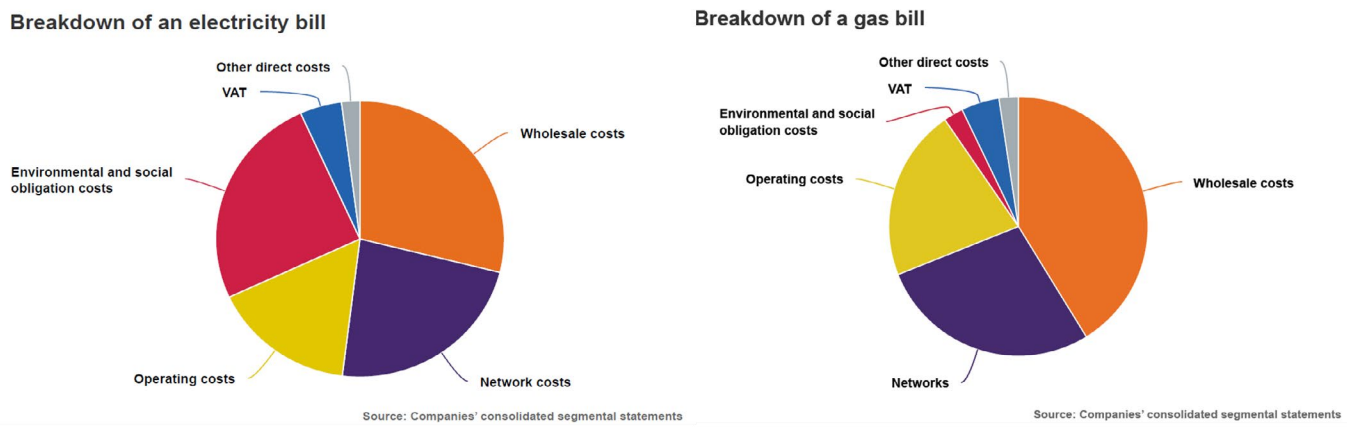

Figure 3: Ofgem, 2021

Compounding this slightly is the costs from decarbonisation policies ('Environmental and social obligation costs' in Figure 3) which are disproportionately recovered through electricity bills, making electricity artificially more expensive and discouraging the switch to electric heating which could reduce gas dependence[xix]. These levies add about £140 to a typical household's electricity bill (comprising about 16%) and £50 to their gas bill[xx]. Alternatives exist, including recovering these costs through general taxation, which would remove this regressive burden from bills and reduce the disincentive to electrification.

France uses the same marginal pricing system, yet households there were largely protected from the 2022 gas price spike. While gas makes up a much smaller share of electricity generation in France than in the UK, the pass-through of gas-driven wholesale spikes is significantly reduced through long-term, cost-based nuclear contracts which are insulated from wholesale gas markets, which therefore made them more resilient to the 2022 Ukraine gas shock[xxi].

In the UK the equivalent would be Contracts for Difference (CfDs) – agreements under which generators sell electricity at fixed prices and are therefore not vulnerable to gas price volatility. CfDs have been confirmed by the government's 2025 Review of Electricity Market Arrangements (REMA) as central to the reformed pricing framework[xxii]. Scaling CfDs in the UK would provide the same structural insulation, meaning that future geopolitical shocks no longer automatically translate into household bill increases and the health consequences that follow.

Current Policy Response

CfDs are already government policy (confirmed in REMA 2025) but scaling them sufficiently to insulate bills from gas volatility requires sustained political will. Combined with Long-Duration Energy Storage (LDES) investment, which is projected to save £24bn in system costs by 2050, decoupling bills from gas prices is achievable within this decade, but only if the storage pipeline moves faster than current project timelines suggest. The business case for action is also significant: UK industrial electricity prices sit at the highest of any IEA country, with energy-intensive manufacturing output having fallen 33% between 2021 and 2024 as a result of the high prices.

Grid Constraints

Limitations within the UK energy network capacity contribute to higher system costs as curtailment and balancing charges are routine. Curtailment charges occur when renewable generators are asked to switch off (e.g., wind farms) because the grid cannot transport electricity from where it is generated to where it is needed because there is too much supply relative to demand at that moment. So, the switched off generators must then be compensated. The grid is sometimes unable to transport electricity due to a history of underinvestment which has left it struggling to support the current UK energy demand. Balancing refers to how the supply and demand of electricity is made to match in real time: if demand suddenly rises then additional power stations (often gas) must fill the gap. This is costly as last-minute adjustments are more expensive than electricity bought in advance and because gas plants are often the flexible backup source. These charges are then ultimately reflected in household energy bills[xxiii].

The government has made positive commitments on this front, with the review of electricity market arrangements 2025 (REMA) establishing a Strategic Spatial Energy Plan (SSEP) set to be published by the end of 2026 which will set out optimal locations for generation, storage, and transmission for energy infrastructure[xxiv].

> *If we can't expand the grid fast enough, it'll... deprive households of secure, domestic, cheap electricity.*
>
> **Nick Winser, Electricity Networks Commissioner**

The review also highlights that accelerated grid build-out could cut constraint costs by at least half by 2030. Additionally, Transmission Network Use of System (TNUoS) charging reform, which redistributes the fees paid by generators and consumers, has been committed to within this government term.

Accelerating grid build-out is also an energy security intervention. A grid capable of transmitting renewable electricity from where it is generated to where it is needed reduces the

volume of gas generation required to fill supply gaps. In this case, when gas markets are disrupted, the UK system would have greater capacity to draw on domestic renewables rather than expensive imported gas.

Current Policy Response

Ofgem's RIIO-T3 settlement (the third price control review for transmission network operators, covering 2026-2031) commits £77.4bn to grid expansion 2026-2031, with household bills projected to fall by £50/yr by 2031 as a result[xxv]. For energy-intensive industries, which are currently paying the highest electricity prices of any IEA country, grid reform could reduce costs by 10-15%, with significant implications for manufacturing, employment and the tax base. The cost of inaction is itself substantial: without accelerated build-out, annual grid constraint costs are forecast to peak at £4-8bn by 2030.

Electricity Storage

In theory, balancing costs could be mitigated through filling energy demand gaps with stored energy (and thus less use of expensive gas/lower balancing costs). However, the UK has had no major investment in large-scale electricity storage for 40 years[xxvi] and thus has very little capacity to store renewable energy sufficient for today's demands.

Long-duration storage directly reduces the UK's exposure to gas price volatility events. Balancing costs currently come from calling on gas peaker plants to fill supply gaps and continue to operate when gas prices are at their most volatile. Sufficient storage capacity means the grid has an alternative to gas at those critical moments, reducing both system costs and the pass-through of international price shocks to households bills.

Improving storage capacity has strong political alignment, supporting both energy security and decarbonisation simultaneously, and Ofgem's Long Duration Energy Storage (LDES) cap-and-floor scheme is funding projects across multiple technologies, with successful projects to be confirmed this summer[xxvii].

> *...To deliver the very best results for business across the country, we must also prioritise electrification across the economy.*
>
> **DharaVyas, Chief Executive of Energy UK, 2026**

Current Policy Response

The scheme is live and first projects have been confirmed. The main risk is pace: NESO (the National Energy System Operator, which provides technical advice on energy system planning) modelling suggests significantly more storage capacity is needed by 2030 than is currently in confirmed development, and the specialist workforce in pumped hydro, battery chemistry, and grid systems engineering faces significant competition from across the clean energy sector. The employment opportunity is significant: energy transition could support 135,000-725,000 new jobs across the UK[xxviii].

CURRENT GOVERNMENT PLANS

The government has introduced a range of measures to address energy affordability in both the short and longer term, and these represent meaningful steps in the right direction.

From April 2026, the government is taking two steps to reduce the cost of the Renewables Obligation (one specific legacy renewable energy support scheme) to consumers. First, it has switched the Renewables Obligation scheme indexation from RPI to CPI – meaning the buy-out price paid by suppliers will grow more slowly over time, gradually reducing the scheme's cost burden on bills, with projected consumer savings of up to £270 million per year by 2030[xxix]. Second, the November 2025 Budget announced that 75% of the domestic share of Renewables Obligation costs will be paid through general taxation rather than passed through electricity bills, with expected savings passed on to consumers from April 2026. Ofgem suggests these measures should deliver average savings of £150 per household from April[xxx]. However, the realised reduction in the April 2026 price cap is £117 (less than expected) because network costs have increased by £66 per year due to investments in upgrading energy infrastructure. This illustrates the tension at the heart of affordable energy: the investment required to build infrastructure that will ultimately reduce bills is itself adding upward pressures to bills in the short term.

The Warm Homes Discount of £150 is now continuing until 2030/31[xxxi], alongside Cold Weather Payments and Winter Fuel Payments for eligible households.

Looking further ahead, the government has set a legally binding Clean Power 2030 target to decarbonise the electricity system through investment in renewables and nuclear, reducing long-term dependence on volatile gas markets. To accelerate this, a new publicly owned clean energy company Great British Energy has been created and backed with up to £8.3 billion during this parliament to co-invest in and develop clean energy projects across the UK[xxxii].

> *With this investment [Warm Homes Plan], we embark on a national project to turn the tide – waging war on fuel poverty and taking another step forward in tackling the affordability crisis for families throughout Britain.*
>
> **Ed Miliband, Energy Secretary, 2026**

On grid infrastructure, the government is accelerating connections for projects that are ready and has brought onshore wind back into the national infrastructure planning regime[xxxiii]. On longer-term supply diversification, the government is investing in hydrogen production and accelerating nuclear projects including Sizewell C and Small Modular Reactors as part of its energy security strategy[xxxiv]. For energy-intensive industries, the British Industry Supercharger scheme increases network charging compensation to 90% from April 2026, saving around 500 businesses up to £420 million per year and directly addressing the industrial competitiveness challenge this brief describes[xxxv] . Finally, the Future Homes Standard (new building regulations being published in 2026), will mandate higher energy efficiency and solar panels on new-build homes, ensuring that new housing stock does not compound the insulation problems this brief describes[xxxvi].

These commitments are welcome and represent genuine political momentum toward the structural changes this brief recommends. However, as the section above set out, the pace of delivery, the unresolved electricity-to-gas disparity, and the scale of the workforce and infrastructure challenge mean that structural barriers to affordable energy remain and that the 2.73 million households currently in fuel poverty face another winter before the benefits of long-term programmes reach them.

WHY HAVEN'T PREVIOUS MEASURES DELIVERED BILL REDUCTIONS?

The Warm Home Discount (WHD) has recently been extended to 2030 – a welcome step, but compensatory rather than structural and insufficient at the scale of the £1.11 billion aggregate fuel gap. The Energy Company Obligation (ECO), the main government scheme designed to lift homes out of fuel poverty through insulation and heating upgrades, was ended at the 2025 Budget and replaced by the Warm Homes Plan – an acknowledgment that the previous delivery model had failed to achieve its goals at the scale required. This included a collapse in effective, large-scale retrofit delivery.

Retrofitting installations to extend home insulation and reduce energy demand (and improve health and reduce winter hospital visits) were being implemented extensively at the beginning of the 2010s, with installations in 2.3 million households in 2012, but then dropped by approximately 90% in the years following[xxxvii]. This collapse has been largely attributed to stop-start funding which has weakened installer confidence and supply chains, meaning the industry capacity to deliver these programmes has been significantly reduced. Further, many of the homes retrofitted under insulation schemes were fitted with incomplete cladding and need repairs, leaving them once again at risk of damp and mould[xxxviii]. Finally, householders significantly undervalue future bill savings from such renovations[xxxix] – widespread awareness simply isn't there.

REDUCING DEMAND: A FASTER ROUTE TO LOWER BILLS AND A HEALTHIER POPULATION

Rising demand from data centres, EVs, and electrification is outpacing grid capacity and stressing infrastructure, threatening affordability and reliability further[xlxli]. Reducing energy demand could help to counteract this deficit (as well as reducing household bills and NHS pressures) while we wait for structural reform to take effect.

Home energy efficiency improvements could reduce these demand pressures while simultaneously preventing poor health from damp/cold homes and minimising NHS pressures and costs. Retrofitting programmes should be understood as energy, health, fiscal, and employment interventions simultaneously.

Demand reduction also builds household-level resilience to the kind of international price volatility described above. A household whose energy demand has been reduced through insulation and efficiency improvements is less exposed to a sudden 10% bill increase than one trying to heat an inefficient home. For households in fuel poverty, this resilience dimension of retrofitting is as important as the long-term bill savings. The most vulnerable households are simultaneously the most exposed to price volatility and the least able to cope with it – targeted retrofitting could ameliorate this.

Comparative insulation-improving programmes have been successful in other European countries: the KfW (Germany's state development bank) Efficiency House standard in Germany has improved awareness of the benefits of energy efficiency, saved €3.3 billion for homeowners in 2011 alone, and created and safeguarded around 300,000 jobs[xlii]. In Sweden, heat pump sales per 1,000 households reached 29 in 2021, compared to 1.5 in the UK[xliii]. The Dutch Energiesprong model, which achieves net-zero retrofits through prefabricated components, has already been piloted in the UK, demonstrating that international approaches to retrofitting can be adapted to UK conditions[xliv].A national retrofit programme at scale could support up to 45,000 jobs a year in the UK and prevent 6,000 avoidable deaths per year[xlvi].

> *To get this [Retrofit Project at Scale] to work, it is really quite a significant culture change within the supply chains to deliver an integrated, customer-friendly retrofit business model... there is not quick fix.*
>
> **Joanne Wade, The Association for Decentralised Energy, 202**

Closer to home, both Scotland and Ireland have established national retrofit one-stop-shops, which provide coordinated services to give households personalised energy advice, access to funding, and end-to-end support. Home Energy Scotland gave free energy advice to around 100,000 people between April 2024 and March 2025 and generated an estimated £3.8 million lifetime savings on energy bills for low-income households[xlvii]. Ireland has developed a network of one-stop-shops which helped produce the awareness and information necessary for nearly 54,000 homes to be retrofitted in 2024, supporting an estimated 12,560 direct and indirect jobs that year[xlviii]. Both models demonstrate that centralised coordination, consistent funding, and quality standards are achievable within the UK policy environment.

Heat pumps are an important technology within the retrofit toolkit and central to the Warm Homes Plan's delivery. They typically achieve a coefficient of performance of around 3, meaning they deliver approximately three units of heat for every unit of electricity consumed, which is significantly more than a modern gas boiler[xlix].

However, their higher upfront installation costs – typically £7,000-£13,000 before the £7,500 Boiler Upgrade Scheme grant – and the insulation investment often required to optimise their performance mean total costs remain prohibitive for many fuel-poor households without full grant coverage[l]. Critically, under the current pricing system where the April 2026 price cap sets electricity at 24.67p/kWh against gas at 5.74p/kWh, the efficiency advantage of heat pumps is substantially narrowed in practice, and a household replacing a gas boiler with a heat pump may see only modest bill savings compared with a modern efficient gas boiler . Heat pumps significantly reduce carbon emissions and provide long-term resilience against gas price volatility, but to deliver visible affordability benefits their large-scale installation must be coupled with the pricing reforms described in this brief. Heat pumps become a genuinely affordable and bill-reducing technology when the electricity-to-gas price disparity is addressed. The cost-saving potential of heat pumps at scale therefore depends on the pricing reforms this brief recommends.

Overall, the consistent lessons learned from past failures and international successes are: personalised benefits of energy efficiency need to be accessible to households; long-term funding needs to be certain and consistent; there needs to be a sufficient industrial workforce developed in parallel; and the work force needs to be subject to rigorous quality standards.

AI Companies and On-Site Energy Generation – Is the UK Following Suit?

Rising demand from data centres is one of the most significant new pressures on UK grid capacity, with data centre electricity demand projected to grow from 1.6GW today to between 3.3 and 6.3 GW by 2030[lii].

One solution, prominently discussed in energy and technology policy circles, is that AI companies could generate power directly on-site at their data centres rather than drawing from the national grid, thus bypassing the shared transmission network. This has two significant advantages: it reduces exposure to grid connection delays (currently up to ten years in parts of the UK) and can be designed around low-carbon sources[liii].

In the United States this is already happening at scale: Microsoft has contracted the restart of a major nuclear plant in Pennsylvania; Google has signed agreements for Small Modular Reactor capacity[liv]; and Amazon has invested heavily in a nuclear-adjacent AI campus[lv].

In the UK, the conditions for this model are actively being created. The government has designated AI Growth Zones, fast-tracked planning areas for data centre development, which will benefit from streamlined planning processes and enhanced access to significant power supply connections[lvi]. From April 2027, data centres in AI Growth Zones will receive electricity cost reductions of up to £24/MWh by being exempted from a portion of transmission charges, incentivising them to locate in areas with abundant renewable energy[lvii].

If data centres generate their own power rather than competing for grid connections, they reduce one of the main pressures on grid congestion costs, which are ultimately passed down to household energy bills. Additionally, some on-site generation models capture waste heat for redistribution: as planned in North Lincolnshire, where a 49.9 MW on-site energy centre is designed to feed a local district heating network, directly reducing heating costs for nearby homes[lviii].

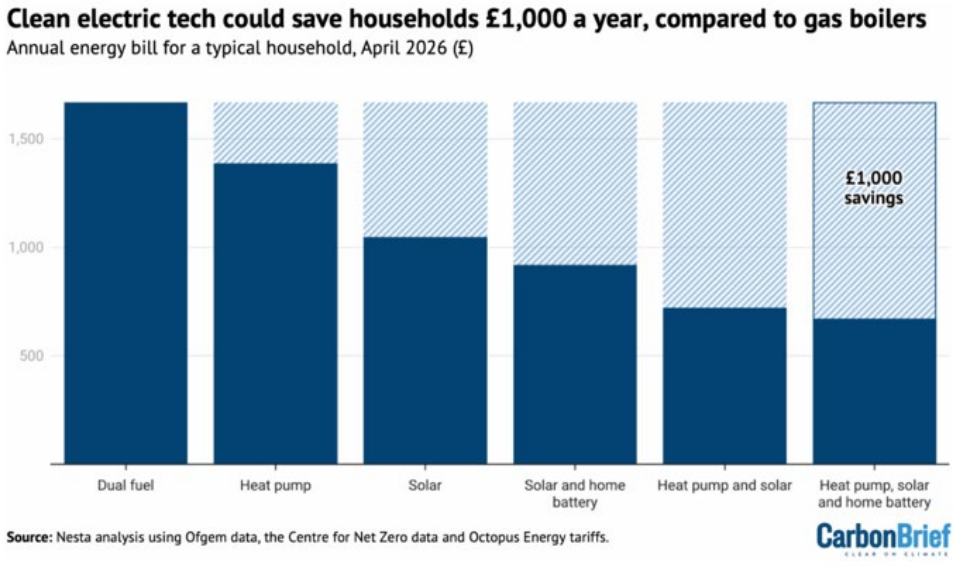

Figure 4: CarbonBrief, available at: Q&A: What UK's 'warm homes plan' means for climate change and energy bills – Carbon Brief (accessed 12/03/2026)

COST-BENEFIT OVERVIEW: STRUCTURAL REFORM AT A GLANCE

The table below summarises the estimated costs, benefits, feasibility, and timelines for the three structural reforms identified in this brief. A full breakdown with sources is provided in the supplementary cost-benefit annexe.

Reform	Estimated Cost	Estimated Benefits	Feasibility & Political Alignment	Timeline & Expertise
Long-Duration Energy Storage (LDES) Ofgem Cap-and-Floor Scheme	**CAPITAL COST** ~£580,000/MW for battery storage (Modo Energy, Nov 2024) Pumped hydro & flow batteries: higher upfront, longer operational life 20GW LDES target to 2050 = multi-billion investment across technologies **FUNDING MODEL** Funded via private investment under Ofgem's cap-and-floor mechanism – government provides revenue floor, not direct grant funding	**HOUSEHOLD** Reduces bills by cutting reliance on expensive gas peaking plants Contributes to £50/yr household bill saving by 2031 (Ofgem) **BUSINESS** Reduces system balancing costs passed through to industrial and commercial users Supports UK competitiveness vs EU peers (currently paying ~50% more for electricity than in the EU) **PUBLIC SECTOR** £24bn electricity system savings 2030-2050 (DESNZ/NESO modelling) – benefits flow through to NHS, schools, local authorities etc., via lower energy bills **EMPLOYMENT** 135,000–725,000 net new jobs across clean energy transition (CCC estimate) Specialisms: pumped hydro, battery chemistry, power electronics, grid systems engineering **HEALTH** Indirect: lower household bills reduce fuel poverty; warmer homes = fewer cold-related illnesses and hospitalisations	**FEASIBILITY: HIGH** Ofgem cap-and-floor scheme launched April 2025 – first-round projects confirmed for 2025 Strong political alignment: simultaneously serves energy security and decarbonisation – two core government priorities **KEY RISK** Delivery gap: 4-6GW of long duration energy storage needed by 2030 23-27GW of battery capacity needed by 2030 More capacity needed for clean energy transition than current timelines and projects can match. Skills England identifies significant workforce competition in required specialisms	**EARLIEST BILL IMPACT** 2028–2030 **FULL DELIVERY** 2030–2050 (20GW target) **POLICY STATUS** • Scheme live • First projects confirmed 2025 • Pace of delivery uncertain

Reform	Estimated Cost	Estimated Benefits	Feasibility & Political Alignment	Timeline & Expertise
Grid Reinforcement & TNUoS Reform SSEP 2026 + Accelerated Build-Out	**CAPITAL COST** Up to £70bn total electricity transmission investment may be required over RIIO-2 period (2026-2031) (Ofgem) £77.4bn committed across transmission operators 2026-2031 (Ofgem) **CONSTRAINT COSTS (INACTION)** Grid constraint costs forecast to peak at £4-8bn in 2030 Transmission costs forecast to treble to £11.75bn by 2030/31 without reform **FUNDING MODEL** Funded via private investment under Ofgem's cap-and-floor mechanism – government provides revenue floor, not direct grant funding	**HOUSEHOLD** Electricity bills reduce by £50/yr by 2031 (Ofgem) Accelerated build-out cuts grid constraint costs by ≥50% by 2030 (REMA 2025) **BUSINESS** Reduced curtailment and balancing charges lower industrial electricity costs Energy-intensive industries projected 10-15% bill reduction from grid reform by 2031 (Ofgem, REMA analysis) ~33% fall in energy-intensive manufacturing output 2021-2024 due to the energy-price crisis - these changes would support reversal of this reduction (ONS) British Industry Supercharger: 90% network charging compensation from April 2026, saving ~500 businesses up to £420m/year (DESNZ) **PUBLIC SECTOR** £650m/yr average public sector energy savings to 2037 from decarbonisation (DESNZ 2023) Lower constraint costs reduce NHS, schools, and local authority energy bills **EMPLOYMENT** 400,000 new recruits needed in energy sector to deliver net zero by 2050 (National Grid, 2020) ~20,000 jobs specifically for grid reinforcement by 2035 (government estimate) **HEALTH** Lower household bills reduce fuel poverty; indirect health benefits from warmer homes £2.5bn/yr NHS cost from cold homes partially addressable via reduced bills to fuel-poor households	**FEASIBILITY: MEDIUM-HIGH** REMA 2025 commits to SSEP by end-2026 and TNUoS reform within this Parliament Strong political endorsement: grid reform central to Clean Power 2030 and energy security agenda Ofgem (£77.4bn) already approved and underway **KEY RISK** Historical build times 12-14 years; Transmission Acceleration Action Plan targets 50% reduction but timeline uncertain Fuel-poor communities unlikely to see bill reductions before mid-2030s without complementary short-term measures Critical skills bottleneck: 550 vacancies per apprentice completion in engineering maintenance (ECA 2026) Straining international supply chains: delays in sourcing electrical components; cabling, transformers, and switchgear threaten to extend estimated timelines (NESO)	**EARLIEST BILL IMPACT** Early 2030s **FULL DELIVERY** 2035+ **POLICY STATUS** • RIIO-T3 investment committed • SSEP committed by end-2026 • TNUoS reform this Parliament • Decade-scale delivery risk

Reform	Estimated Cost	Estimated Benefits	Feasibility & Political Alignment	Timeline & Expertise
National Retrofit Programme Home Insulation, Heat Pumps & Warm Homes Plan	**PER PROPERTY COST** Comprehensive insulation: £12,000-£18,000. Full whole-house retrofit: up to £50,000 Government grants (Warm Homes Plan): up to £15,000 energy performance + £15,000 low-carbon heating. **PROGRAMME COST** £15bn committed via Warm Homes Plan 2025-2030 Full delivery across 2.73m fuel-poor households = £33-49bn aggregate (phased 10-15 years) **FUNDING MODEL** Mix of government grants, local authority delivery, social housing funding, and private finance	**HOUSEHOLD** £630-£730/yr energy bill saving per household (comprehensive insulation) For 2.73m fuel-poor households with average fuel gap of £407, even partial retrofit brings households out of fuel poverty German KfW equivalent: €3.3bn saved for homeowners in 2011 alone **BUSINESS** Reduced energy demand lowers system-wide costs, improving grid stability £27-36bn annual economic boost from full national programme (NEF modelling, 2020) **PUBLIC SECTOR** NHS saves £2.5bn/yr treating cold-home illnesses – preventable with adequate retrofit GB Energy solar programme: £400m lifetime savings from 400 schools and NHS sites. Reduced hospital admissions and social care pressure **EMPLOYMENT** Up to 580,000 jobs supported annually at full scale (PwC Green Jobs Barometer) 94,600 direct trade jobs (PwC) **HEALTH** 6,000 avoidable deaths prevented annually at full retrofit scale (UKGBC) £56bn potential health benefits from national retrofit strategy (UKGBC) 28% of young people in cold homes have negative mental health symptoms vs 4% in warm homes Mothers in fuel-poor households up to 64% more likely to experience depression	**FEASIBILITY: MEDIUM** Policy case is overwhelming. The barrier is delivery infrastructure, not evidence. Warm Homes Plan (£15bn, 2025-2030) provides more continuity than previous programmes. Government committed to long-term funding; international comparators (Germany, Netherlands) demonstrate delivery is achievable **KEY RISK** Previous programmes failed due to stop-start funding weakening installer supply chains – continuity is essential. 250,000 additional workers needed by 2028 (NHDG Retrofit Workforce Roadmap) – currently behind trajectory. Young people show low interest in entering the retrofitting sector; recruitment rates must triple (Reed Environment) Many homes retrofitted under previous schemes need repairs before re-retrofitting (Guardian, 2025)	**EARLIEST BILL IMPACT** Immediate / 1-2 years **FULL DELIVERY** 10-15 years **POLICY STATUS** • £15bn Warm Homes Plan committed • Workforce pipeline behind schedule • Previous scheme repairs needed • Full funding gap unresolved Overall, retrofit produces the largest direct fuel poverty reduction per household and the fastest fiscal return

PRIORITIES FOR REFORM

Each of the following reforms addresses affordability directly but also aims to reduce the UK's structural dependence on volatile global gas markets, building resilience against the kind of international price shocks that can translate into health consequences for the most vulnerable, while also protecting businesses and employment and limiting costs for hospitals and schools.

Immediate

1. Extend and expand the Warm Home Discount (WHD) and social tariff: a public health intervention which can reduce the annual £2.5 billion cost to the NHS while directly reducing health inequalities.

2. Complete the shift of decarbonisation levies from electricity bills to general taxation: the government has moved 75% of Renewables Obligation costs, however broader rebalancing of all policy costs across electricity and gas bills was considered but not implemented in the Warm Homes Plan. Full rebalancing would remove the remaining regressive burden on low-income households, reduce the disincentive to electrification, and allow heat pumps to deliver their full bill-saving potential.

3. Launch a national retrofit one-stop-shop in England: modelled on Scotland and Ireland's equivalents along with mandatory installer licensing and quality standards to avoid previous failures.

Medium-term

1. Deliver the Strategic Spatial Energy Plan (SSEP) by end 2026 and Transmission Network Use of System (TNUoS) reform by 2029 as committed in the Review of Electricity Market Arrangements (REMA): improving grid capacity so that households can see more benefit from renewables.

2. Deliver and expand Ofgem's Long Duration Energy Storage Scheme (LDES): essential infrastructure in reducing gas price dominance and reducing fuel poverty.

Long-term

1. Scale Contracts for Difference (CfDs) to expand generation outside of spot market pricing: the structural equivalent of France's long-term generation contracts, achievable through existing UK institutional tools and decoupling bills from gas price volatility.

DELAY CARRIES A HEALTH COST

Cost of inaction (annual)	Benefits of action (at scale)	Political alignment summary	
£2.5bn NHS treating cold-home illness 20,000 excess winter deaths directly attributable to cold homes and fuel poverty (2020-21) UK industrial electricity 25.85p/kWh – highest of 28 IEA countries; ~4× US prices Energy-intensive manufacturing output fell ~33%, 2021-2024 (ONS) Lost productivity, multigenerational developmental harm to children	**Household:** £630-730/yr bill savings per retrofit household; £50/yr from grid reform by 2031 **Business:** 10-15% industrial energy cost reduction; £27-36bn annual economic boost (NEF) **Public Sector:** £2.5bn/yr NHS savings; £650m/yr public sector energy savings to 2037; £24bn system savings (LDES) **Employment:** Up to 45,000 retrofit jobs p.a.; and 135,000-725,000 clean energy jobs (CCC) **Health:** £56bn long-term health benefits (UKGBC)	LDES: High – scheme live, cross-party energy security rationale Grid: High – REMA 2025 committed, RIIO-T3 underway Retrofit: Medium – Warm Homes Plan committed but delivery uncertain All three reforms align with government's Clean Power 2030, energy security, and growth agenda – positioning this as a fiscal and economic intervention, not only a health one.	• **Fastest to impact** Retrofit: immediate • **Largest system saving** LDES: £24bn to 2050 • **Broadest economic benefit** Retrofit: £27-36bn/yr

The framework for reform is already underway, and we can be optimistic about the prospect of improving grid infrastructure so that we may benefit more from renewables in the future. However, in the meantime, the 2.73 million households in fuel poverty need support. Every winter without action carries the cost of excess deaths, hospital admissions, mental health deterioration, and developmental harm to children that will follow them into adult life. The case for reform extends beyond household fuel poverty - UK businesses and industrial users face electricity prices around 50% higher than in France and Germany[lix], compounding the cost pressures on public services, charities, and employers who support vulnerable communities. When the cost of delay includes £2.5bn annually to the NHS, 20,000 excess winter deaths directly attributable to cold homes and fuel poverty, and a 33% fall in energy-intensive manufacturing output, the investment case for structural reform is not just defensible but compelling. The geopolitical context reinforces this urgency. The two most significant energy price shocks of the past three years both originated in events outside UK control. A system structurally decoupled from global gas markets through CfDs, storage, and grid investment is not only cheaper in the long run but also more resilient to the kind of international instability that now appears to be a permanent feature of the global landscape.

Structural energy reform costs money, but so does delay.

GLOSSARY

Boiler Upgrade Scheme (BUS)	A government grant scheme offering households £7,500 towards the cost of replacing a gas or oil boiler with a heat pump. Extended to 2029/30 under the Warm Homes Plan, with annual funding increasing gradually to £709 million by 2029/30.
Clean Power 2030	A government action plan which sets out a pathway to a clean power system by 2030 which aims to: maintain secure and affordable energy, create new investments around the country, and protect the environment from the effects of climate change. The target is legally binding under the Climate Change Act framework.
Contracts for Difference (CfDs)	Long-term government contracts with low-carbon electricity generators that fix the price they receive for the electricity they produce. When wholesale market prices fall below the agreed price, the government tops up the difference; when market prices rise above it, the generator pays back the surplus. This insulates both generators and consumers from wholesale price volatility. CfDs have been confirmed as central to the UK's reformed electricity market under REMA 2025.
Energy Company Obligation (ECO)	A government scheme that required large energy suppliers to fund energy efficiency improvements – primarily insulation and heating upgrades – in low-income and vulnerable households. It was the main delivery mechanism for lifting homes out of fuel poverty for over a decade but was ended at the 2025 Budget following criticism of low standards, incomplete installations, and insufficient scale. It has been replaced by the Warm Homes Plan.
Energy Price Cap	A limit set by Ofgem every three months on the maximum amount energy suppliers can charge domestic customers per unit of energy and per day in standing charges, for those on default or standard variable tariffs. From April 2026 the cap is set at £1,641 per year for a typical dual-fuel household paying by direct debit, with electricity at 24.67p/kWh and gas at 5.74p/kWh.
Future Homes Standard	New building regulations being published in 2026 that will require all new-build homes to meet higher energy efficiency standards and have low-carbon heating systems installed by default along with solar panels.
Great British Energy	A publicly owned clean energy company established by the Great British Energy Act 2025, backed with up to £8.3 billion during this Parliament. Its purpose is to co-invest in and accelerate the development of clean energy projects across the UK, including renewable generation, storage, and local energy schemes.
KfW (Kreditanstalt für Wiederaufbau)	KfW (Kreditanstalt für Wiederaufbau): Germany's state development bank.
LDES (Long Duration Energy Storage)	Technologies that store the excess electricity generated by renewable sources when demand is low. This electricity can then be available for consumers to use when demand necessitates it.
Marginal Pricing	The method used to set electricity prices in the UK wholesale market, in which the most expensive generator needed to meet demand at any given moment sets the price paid to all generators producing electricity at that time.
NESO (National Energy System Operator)	A body which provides independent technical advice on energy system planning.

REMA 2025 (review of electricity market arrangements)	Review set up in 2022 to consider the best ways to deliver an affordable and reliable power system.
Renewables Obligation (RO)	A government scheme introduced in 2002 that requires electricity suppliers to source a proportion of their power from eligible renewable generators. Costs of this scheme are ultimately passed through to consumers via electricity bills. The scheme closed to new applicants in 2017 but continues to make payments to existing generators until they come off the scheme between 2027 and 2037.
RIIO-T3	The third price control review by Ofgem for transmission network operators, covering 2026-2031 and committing £77.4bn to grid expansion.
Small Modular Reactors (SMRs)	A new generation of nuclear power plants, smaller and faster to build than conventional nuclear stations, designed to be manufactured in standardised modules and assembled on site.
SSEP (Strategic Spatial Energy Plan)	A new national plan, committed in REMA (2025) and due by end-2026, that will map out the optimal locations across the country for energy generation, storage, and transmission infrastructure. The SSEP is intended to coordinate these decisions so the grid gets built in the right places in the right order, reducing waste and constraint costs.
TNUoS (Transmission Network Use of System charges)	The fees paid by generators and large consumers for using the high-voltage transmission network. Currently structured in a way that places disproportionate costs on certain types of generators and regions, making the overall system less efficient and pushing costs onto bills. Reform would redistribute these charges more fairly and reduce the cost passed to consumers.
Transmission Acceleration Action Plan	A government plan to reduce the time taken to build new electricity transmission infrastructure, targeting a 50% reduction in historical build times of 12–14 years.
Warm Homes Plan	Government initiative to make homes warmer, reduce household energy bills, create good jobs across the country, and lift households out of fuel poverty. The plan aims to upgrade up to 5 million homes by 2030, upgrading their efficiency by fitting technology like solar panels, insulation, batteries, and heat pumps. The plan is backed by £15 billion in grants and loans over the 2025-2030 parliamentary period.

REFERENCES

i. Department for Energy Security & Net Zero (2025) 'Annual Fuel Poverty Statistics in England, 2025 (2024 data)', Annual fuel poverty statistics report: 2025 - GOV.UK (accessed 16/02/2026).

ii. Department for Energy Security & Net Zero, 'Annual Fuel Poverty Statistics', 34.

iii. Lee, Alice, Sinha, Ian, Boyce, Tammy, Allen, Jessica, and Goldblatt, Peter (2022) 'Fuel Poverty, Cold Homes, and Health Inequalities in the UK', *Institute of Health Equity*, Fuel Poverty, Cold Homes and Health Inequalities in the UK - IHE (accessed 16/02/2026).

iv. Lee et al., 'Fuel Poverty', 4.

v. Lee et al., 'Fuel Poverty', 4.

vi. Diabetes UK (2024) 'Cost of Devastating Complications Highlights Urgent Need to Transform Diabetes Care in the UK', Cost of devastating complications highlights urgent need to transform diabetes care in the UK | Diabetes UK (accessed 09/03/2026).

vii. Lee et al., 'Fuel Poverty', 17.

viii. Lee et al., 'Fuel Poverty', 4.

ix. Lee et al., 'Fuel Poverty', 20.

x. Lee et al., 'Fuel Poverty', 20.

xi. Department for Energy Security & Net Zero, 'Annual Fuel Poverty Statistics', 1.

xii. Department for Energy Security and Net Zero (2025) 'Energy Trends December 2025, Energy Trends December 2025 (accessed 16/02/2026).

xiii. Carbon Brief (2025) 'Factcheck: Why expensive gas – not net-zero – is keeping UK electricity prices so high', Factcheck: Why expensive gas – not net-zero – is keeping UK electricity prices so high - Carbon Brief (accessed 16/02/2026).

xiv. Abada, Ibrahim, Ehrenmann, Andreas, and Smeers, Yves (2024) 'Marginal pricing and the energy crisis: Where should we go?', *University of Cambridge Energy Policy Research Group*, Marginal Pricing and the Energy Crisis: Where Should We Go? | Faculty of Economics (accessed 25/02/2026).

xv. Adolfsen, Jakob Feveile, Kuik, Friderike, Lis, Eliza Magdalena, and Schuler, Tobias (2022) 'The impact of the war in Ukraine on euro area energy markets', *European Central Bank*, The impact of the war in Ukraine on euro area energy markets (accessed 05/03/2026).

xvi. Clarke, Josie (2026) 'Energy bills forecast to rise 10% from July as Middle East war drives up prices', *Independent*, Energy bills forecast to rise 10% from July as Middle East war drives up prices | The Independent (accessed 05/03/2026).

xvii. Carbon Brief, 'Factcheck'.

xviii. Price, James, Pye, Stephen, Broad, Oliver (2023) 'UK Energy Independence: Mapping out potential pathways to a more energy independent UK', UK Energy Independence: Mapping out potential pathways to a more energy independent UK - UCL Discovery (accessed 17/02/2026).

xix. Turner, Karen, and Katris, Antonios (2025) 'Paying for net zero: can we find a way that is more equitable and less costly to the economy than placing the burden on electricity bills?', *University of Strathclyde Centre for Energy Policy*, Paying for Net Zero : Can we Find a Way that is More Equitable and Less Costly to the Economy than Placing the Burden on Electricity Bills? - Strathprints (accessed 16/02/2026).

xx. Kavan, Martina (no date) 'Household energy bills include green levies. What are they and why do we need to pay them?', *Nesta*, Household energy bills include green levies. What are they and why do we need to pay them? | Nesta (accessed 25/02/2023).

xxi. Zane Lilley, 'Graph: How do French electricity prices compare with other EU countries and UK', *The Connexion*, French Electricity Prices vs UK and EU: Trends and Future Changes (accessed 16/02/2026).

xxii. Department for Energy Security & Net Zero (2025) 'Review of electricity market arrangements (REMA): Summer update, 2025 (accessible webpage)', Review of electricity market arrangements (REMA): Summer update, 2025 (accessible webpage) - GOV.UK (accessed 17/02/2026).

xxiii. Carbon Brief, 'Factcheck'.

xxiv. Department for Energy Security & Net Zero, 'Review'.

xxv. Ofgem (2025) 'RIIO-3 Final Determinations for the Electricity Transmission, Gas Distribution and Gas Transmission sectors', RIIO-3 Final Determinations for the Electricity Transmission, Gas Distribution and Gas Transmission sectors | Ofgem (accessed 23/02/2026).

xxvi. Ofgem (2025) 'Super battery projects that maximise renewable-generated power enter next phase of Ofgem's green power storage scheme', Super battery projects that maximise renewable-generated power enter next phase of Ofgem's green power storage scheme | Ofgem (accessed 16/02/2026).

xxvii. Ofgem (2025) 'Super battery projects that maximise renewable-generated power enter next phase of Ofgem's green power storage scheme', Super battery projects that maximise renewable-generated power enter next phase of Ofgem's green power storage scheme | Ofgem (accessed 17/02/2026).

xxviii. Climate Change Committee (2023) 'A Net Zero workforce', A Net Zero workforce (accessed 19/02/2026). Department for Energy Security and Net Zero, and Ofgem (2024) 'New scheme to attract investment in renewable energy storage', New scheme to attract investment in renewable energy storage - GOV.UK (accessed 19/02/2026).

xxix. Department for Energy Security & Net Zero (2026) 'Renewables Obligation (RO) scheme indexation changes: government response (accessible webpage), *GOV.UK*, Renewables Obligation (RO) scheme indexation changes: government response (accessible webpage) - GOV.UK (accessed 12/03/2026).

xxx. Ofgem (2026) 'Changes to energy price cap between 1 April and 30 June 2026', Changes to energy price cap between 1 April and 30 June 2026 | Ofgem (accessed 12/03/2026).

xxxi. Department for Energy Security and Net Zero (2026) 'Families to save in biggest home upgrade plan in British history', *GOV.UK*, Families to save in biggest home upgrade plan in British history - GOV.UK (accessed 12/03/2026).

xxxii. Department for Energy Security and Net Zero (2025) 'Great British Energy Act 2025: factsheet', *GOV.UK*, Great British Energy Act 2025: factsheet - GOV.UK (accessed 12/03/2026).

xxxiii. UK Government (2024) 'Clean Power 2030 Action Plan: A new era of clean electricity', Clean Power 2030: Action Plan: A new era of clean electricity (accessed 12/03/2026).

xxxiv. UK Government, Clean Power 2030.

xxxv. Department for Business and Trade (2025) 'British Businesses to Save over £400m a Year as Government Slashes Electricity Costs', British Businesses to Save over £400m a Year as Government Slashes Electricity Costs - GOV.UK (accessed 12/03/2026).

xxxvi. UK Government, Clean Power 2030, 78.

xxxvii. UK Energy Research Centre (2025) 'Accelerating Energy Efficiency Retrofits in Owner-occupied Homes: An International Review of Good Practice Policies', Accelerating Energy Efficiency Retrofits in Owner-occupied Homes | UKERC | The UK Energy Research Centre (accessed 17/02/2026).

xxxviii. Gayle, Damien (2025) 'Almost all external insulation fitted under Tory scheme needs repair or replacing, report finds', The Guardian, Almost all external insulation fitted under Tory scheme needs repair or replacing, report finds | Energy efficiency | The Guardian (accessed 17/02/2026).

xxxix. UK Energy Research Centre, 'Accelerating Energy Efficiency', 15.

xl. Craske, Ben (2025) 'IEA Warns Data Centre Demand Intensifies Efficiency Gap', *Data Centre Magazine*, IEA Warns Data Centre Demand Intensifies Efficiency Gap | Data Centre Magazine (accessed 17/02/2026).

xli. Craske, Ben (2026) 'IEA Warns Grid Must Scale for Data Centre Surge', *Data Centre Magazine*, IEA Warns Grids Must Scale for Data Centre Surge | Data Centre Magazine (accessed 17/02/2026).

xlii. Imperial College London (2022) 'UK trails behind as European countries upgrade homes to reduce energy bills and tackle climate crisis', *Tech Xplore*, UK trails behind as European countries upgrade homes to reduce energy bills and tackle climate crisis (accessed 17/02/2026).

xliii. Imperial College London, 'UK trails behind'.

xliv. TrustMark (2024) 'What can we learn from European countries and their home retrofitting practices & frameworks?', What can we learn from European countries and their home retrofitting practices & frameworks? • TrustMark (accessed 17/02/2026).

xlv. PwC (2022) 'Green skills as an enabler of UK retrofit', Green skills as an enabler of UK retrofit (accessed 25/02/2026).

xlvi. UK Green Building Council (no date) 'Home Retrofit', Home Retrofit | UKGBC (accessed 19/02/2026).

xlvii. Home Energy Scotland (2025) 'How we help people in fuel poverty', How we help people in fuel poverty | Home Energy Scotland (accessed 02/03/2026).

xlviii. Sustainable Energy Authority of Ireland, SEAI (2025) 'SEAI Programme Impact Report 2024: Measuring our impacts on the Irish energy transition', Publications Search | SEAI (accessed 02/03/2026).

xlix. Simon Evans (2026) 'Factcheck: What it really costs to heat a home in the UK with a heat pump', *CarbonBrief*, Factcheck: What it really costs to heat a home in the UK with a heat pump - Carbon Brief (accessed 12/03/2026).

l. UK Government (2026) 'Warm Homes Plan' Warm Homes Plan (accessed 12/03/2026).

li. Ofgem, 'price cap'.

lii. Clark, Adam, Burnett, Nuala, Stewart, Iona, and Woodhouse, John (2025) 'Data centres: planning policy, sustainability, and resilience', *House of Commons Library*, Data centres: planning policy, sustainability, and resilience - House of Commons Library (accessed 03/03/2026).

liii. Hahn, Clarissa (2026) 'The rising challenge of powering data centres', *Oxford Economics*, The rising challenge of powering data centres | Oxford Economics (accessed 03/03/2026).

liv. World Nuclear News (2024) 'Google and Kairos Power team up for SMR deployments', Google and Kairos Power team up for SMR deployments - World Nuclear News (accessed 03/03/2026).

lv. Rapier, Robert (2026) 'Why Microsoft And Amazon Are Turning to Nuclear Power For AI', *Forbes*, Why Microsoft And Amazon Are Turning To Nuclear Power For AI (accessed 03/03/2026).

lvi. National Grid DSO (2025) 'Data Centre Impact Study: An analysis of the growth and impact of data centres in National Grid Electricity Distribution's licence areas' (accessed 03/03/2026).

lvii. Department for Science, Innovation & Technology (2025) 'Delivering AI Growth Zones', Delivering AI Growth Zones - GOV.UK (accessed 03/03/2026).

lviii. Gooding, Matthew (2025) 'Plans submitted for 1GW data center in North Lincolnshire, UK', DCD, Plans submitted for 1GW data center in North Lincolnshire, UK - DCD (accessed 03/03/2026).

lix. Office for National Statistics (2025) 'The impact of higher energy costs on UK business: 2021 to 2024', The impact of higher energy costs on UK businesses - Office for National Statistics (accessed 17/02/2026).

CONTACT

Health Action Research Group
Dalton House
60 Windsor Avenue
London
SW19 2RR

www.healthactionresearch.org.uk

info@healthactionresearch.org.uk

Design by Ilona Szczepanczyk
www.ilonaszczepanczyk.com

HEALTH ACTION RESEARCH GROUP

because prevention is better than cure