

BETTER HOMES, LOWER BILLS: LOCKING IN SAVINGS FOR FUEL POOR HOUSEHOLDS

A report for WWF-UK and ScottishPower

OCTOBER 2026

Contents

1	Executive Summary	3
2	Introduction	7
3	The scale of fuel poverty	10
4	The scale of bill and emission savings that can be achieved	12
5	The number of fuel poor homes supported with £1.5bn of additional Government funding per year	20
6	Conclusion	24
	Annex A - Methodology and assumptions	25
	Annex B – Detailed bill and emission savings	45
	Annex C – Additional bill savings in a price spike scenario	52

1 Executive Summary

Fuel poverty affects nearly three million households across Great Britain, roughly 10% of all households.¹ Those in fuel poverty can face significant health and wellbeing issues because of inadequately heated homes, as well as higher risks of falling into debt. Improving home energy performance delivers energy bill savings and reduces fuel poverty, providing significant social benefits, while also reducing greenhouse gas emissions.

Frontier Economics has been commissioned by WWF-UK and ScottishPower to develop a modelling tool to assess the bill and emission savings that could be delivered by further roll out of energy efficiency and low carbon technologies to fuel poor households across Great Britain. This analysis builds on our previous work for WWF-UK and ScottishPower, published in 2024.²

As well as estimating the bill impacts of home energy upgrades, we estimate the number of fuel poor households across Great Britain who could receive home energy upgrades, if Government increased its public spending in this area by £1.5bn annually. This additional funding would, in effect, fill the funding gap left by the closure of the Energy Company Obligation (ECO) scheme and the Great British Insulation Scheme in 2026.

Significant bill and emission savings can be achieved by installing energy efficiency and low carbon technologies in fuel poor homes

Our analysis finds that significant bill savings can be achieved by upgrading the homes of those in or at risk of fuel poverty.

Figure 1 shows the estimated annual bill and emission savings for fuel poor households with a band D rated terraced household with a **gas boiler**, the most common property archetype among fuel poor households in Great Britain.

- The annual **bill savings** from home upgrades can exceed £900 with the most comprehensive package modelled.³ Annual bill savings from an insulation upgrade⁴ plus heat pump are around £200 per household, while savings from solar PV ('solar') plus a

¹ For the purpose of this analysis, we use the English definition of fuel poverty, which is based on the Low Income Low Energy Efficiency ('LILEE') metric. We use this definition since it is the metric used for the statutory target of the UK Government in England and it covers the majority of homes in Great Britain.

² Frontier Economics (2024). [Warm Homes Mission: Addressing fuel poverty with energy efficiency](#)

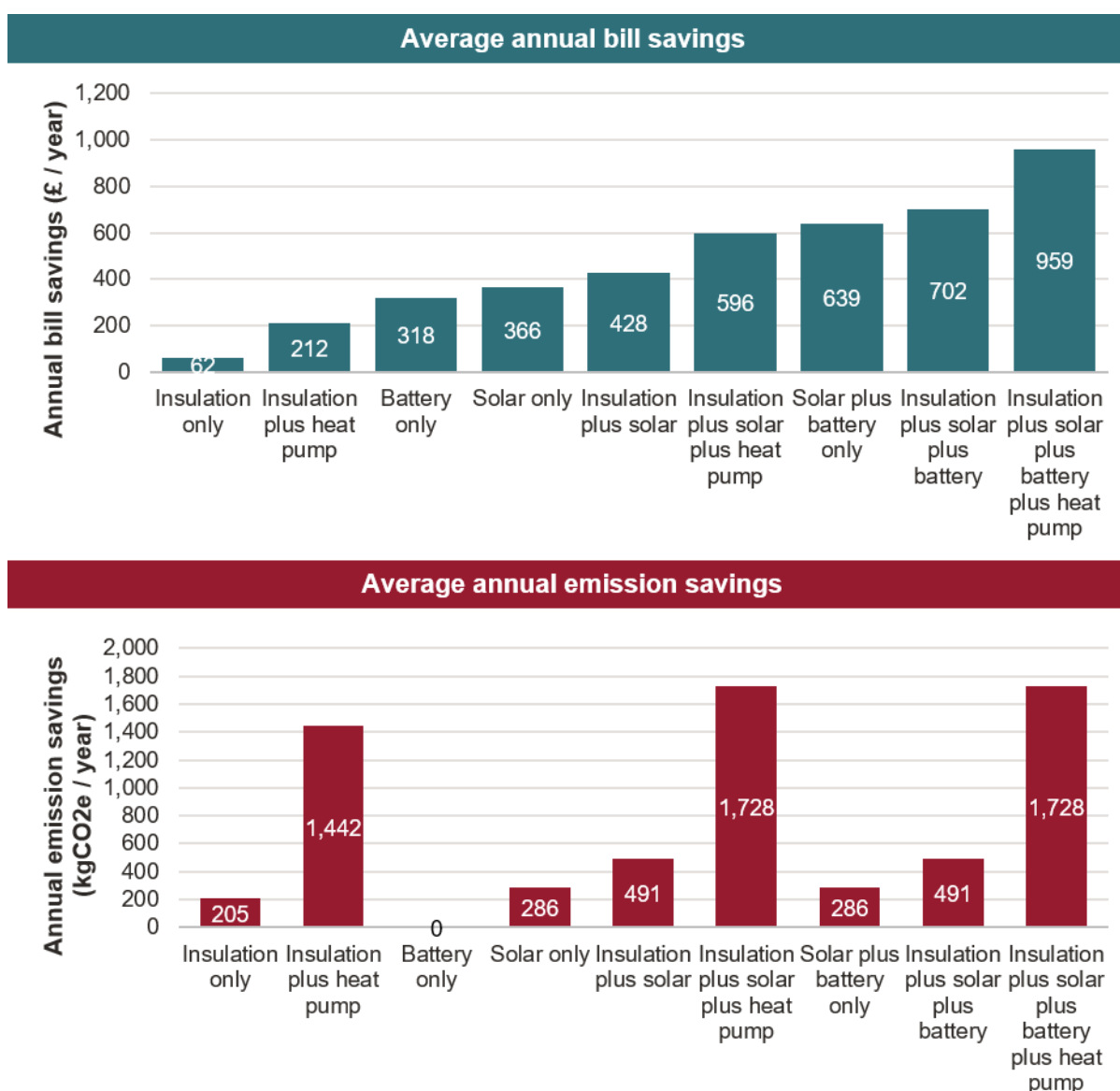
³ Annual bill savings are calculated based on central price projections (see A.2 for alternative price scenarios). The upfront costs of the measures are not included in these figures.

⁴ We model an insulation upgrade as bringing the home up to Band C. We estimate the resulting reduction in energy consumption using differences in average consumption, between EPC C homes and homes in the starting EPC band, based on NEED data, allowing for a 15% comfort-taking effect. Upfront costs are based on English Housing Survey costs to reach EER C, adjusted for property type and starting EPC band, and uplifted to 2026 prices. See Annex A.5 for further detail.

battery are £600. Solar by itself, a relatively lower cost measure, generates annual bill savings of over £300.

- Heat pump packages generate the largest **emission savings**, as they enable households to switch away from gas. An insulation upgrade plus heat pump reduces annual emissions by around 1.4 tonnes CO₂e per year. Insulation upgrades alone and solar alone reduce annual emissions by around 0.2 tonnes CO₂e and 0.3 tonnes CO₂e, respectively.

Figure 1 Bill and emission savings for a fuel poor band D rated terraced household with a gas boiler



Source: Frontier Economics

Note: Bill savings do not include upfront costs associated with installing the measures. 'Insulation' means an insulation upgrade to bring the household up to band C. Prices assume no further rebalancing action by Government and are based on high-level forecasts which are subject to uncertainty and simplifying assumptions.

The pattern of bill and emission savings is similar across all gas household types. Households with an oil boiler also see similarly sized savings and the same pattern across upgrade types. For households with direct electric heating, savings are typically greater (up to £2,300 for a terraced home) because of high electricity prices and high electricity use with this heating type.⁵

Home energy upgrades also provide some resilience against potential future price spikes, such as those experienced in 2022 and 2026. For example, in the year of a price spike of the same magnitude as that experienced in 2021/2022, annual bill savings for a gas terraced band D household from an insulation upgrade plus heat pump would be 48% higher than under the central price scenario.

Further Government action to move policy costs from electricity bills and on to Government spending ('rebalancing'), building on the Autumn 2025 budget announcement around the Renewables Obligation, would increase bill savings from heat pumps.⁶ We find that bill savings under a moderate rebalancing scenario could be up to 37% higher for a gas terraced band D household compared to the saving with no further action on rebalancing. Solar continues to deliver significant bill savings of above £300 per household per year in a rebalanced scenario.

With an additional £1.5bn of annual Government support, almost two thirds of fuel poor households can receive an upgrade

We assess the impact of providing an additional £1.5 billion per year of public funding for energy efficiency and low carbon technologies targeted at improving fuel poor homes. This level of increased public funding would, in effect, fill the gap left by the closure of the Energy Company Obligation (ECO) scheme and the Great British Insulation Scheme in 2026. We model the impact of this when combined with current UK Government funding commitments for low-income households in the Warm Homes Plan and plans to strengthen the regulations around energy efficiency standards in private rented accommodation.^{7 8}

We allocate the Warm Homes Plan funding included in our modelling and the additional £1.5 billion per year to packages of measures that deliver at least £200 of annual bill savings and £100 of monetised annual emission savings per household.

⁵ By 'direct electric homes', we refer specifically to households without storage heaters who consume electricity at the same time they demand it from the grid. Storage-heater households are not modelled separately and would be expected to see lower savings because they can already shift some electricity consumption to lower-cost off-peak periods.

⁶ DESNZ (2026), [Domestic energy tariff reductions 2026: ministerial direction](#)

⁷ The Warm Homes Plan funding for low-income households begins before our modelling period. Our analysis covers 2027 to 2031 and therefore includes only the funding falling within this period. For years beyond the published Warm Homes Plan funding period, we assume funding continues at the average annual level over 2025/26 to 2029/30. DESNZ (2026). [Warm Homes Plan - GOV.UK](#)

⁸ DESNZ (2026). [Improving the energy performance of privately rented homes: impact assessment](#). The Government intends for private landlords to be required to comply with the higher standard from October 2030

With existing Warm Homes Plan funding and the planned private rented sector minimum standards, around **1 million** fuel poor households would receive home energy upgrades by 2031. Adding £1.5 billion of public funding per year increases this to **1.8 million** households, meaning the additional funding supports around **800,000** more fuel poor households. Further accounting for planned improvements in the social rented sector regulatory regime could bring this overall figure up to **at least 2.1 million** (around three quarters of the fuel poor population).⁹

The estimated bill savings for treated households are substantial. On average, we estimate that households receiving home energy upgrades gain an **annual bill saving of roughly £475** and that an annual emission saving of nearly £200 is delivered per household.¹⁰

⁹ DESNZ (2026). [Improving the energy performance of socially rented homes - final stage IA](#)

¹⁰ Our modelling covers homes upgraded via public funding only. Therefore, these estimates relate to these homes, rather than homes in the private rented or public rented sector.

2 Introduction

WWF-UK and ScottishPower have commissioned Frontier Economics to assess:

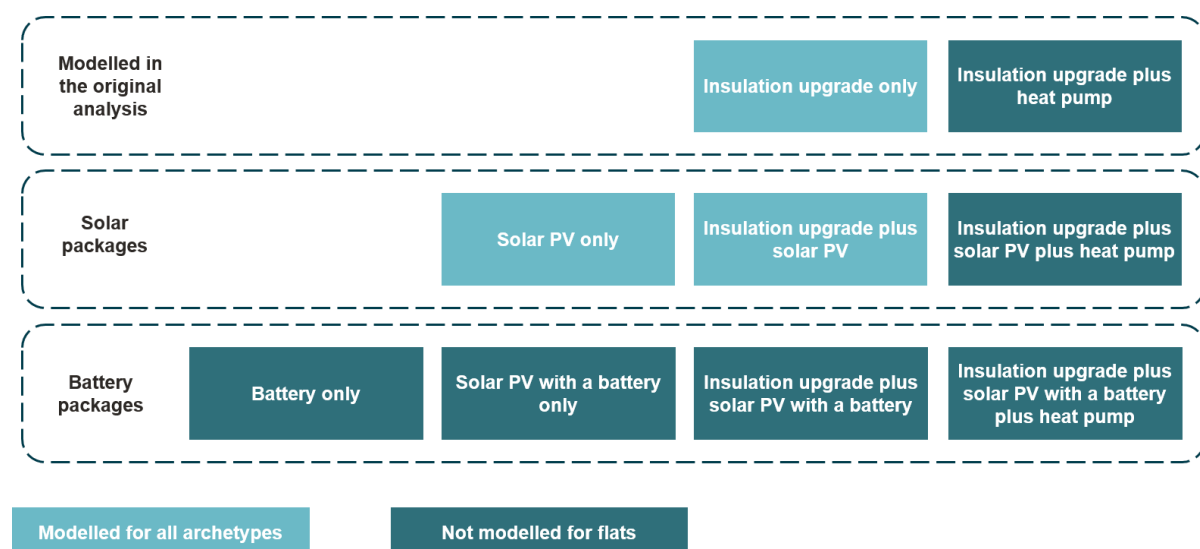
- The annual bill and emission savings that can be achieved by home energy upgrades for fuel poor households in a range of archetypal properties across Great Britain.
- The number of fuel poor households across Great Britain who could receive upgrades over the next five years¹¹, based on an additional £1.5 billion of annual Government spending added to its current Warm Homes Plan.¹²

Our analysis builds on previous work commissioned by WWF-UK and ScottishPower and published in 2024.¹³

2.1 Scope of work

In this report, we assess nine home energy upgrade packages, incorporating insulation upgrades, heat pumps, solar panels and batteries (see Figure 2). We estimate the bill and emission savings from each package, including the benefits of time-of-use tariffs for households with heat pumps and batteries. When allocating public funding, we select packages that deliver at least £200 of annual bill savings and £100 of monetised annual emission savings per household. Our allocation additionally ensures that heat pump packages are allocated such that 5% of fuel poor households have a heat pump by 2031.

Figure 2 Upgrade packages modelled



¹¹ Running from January 2027.

¹² DESNZ (2026). [Warm Homes Plan - GOV.UK](#)

¹³ Frontier Economics (2024). [Warm Homes Mission: Addressing fuel poverty with energy efficiency](#)

Source: Frontier Economics

Note: Insulation upgrade refers to insulation measures that take the house up to FPEER C. Further detail on the individual technologies is set out in Annex A

We do not model heat pumps or batteries for flats because of the practical constraints of installing these technologies in some flats.¹⁴ These constraints could include space limitations and building regulations.

We also consider uncertainty in future retail energy prices and the impact of potential policy changes, including:

- three illustrative retail price scenarios developed specifically for this project;
- the potential impact of a globally driven price spike, similar to those experienced in 2021/2022; and
- further ‘rebalancing’ action by the Government, building on steps already taken at the Autumn Budget 2025. For the purpose of this report, by rebalancing, we mean transferring some policy costs which are currently disproportionately borne by electricity consumers rather than gas consumers to Government spending.¹⁵

We model the impact over a five-year period (2027-2031) and report the average annual bill savings and monetised average annual emission savings across this period.

Our model considers 135 home archetypes, across the following categories:

- housing types: converted flat, purpose-built flat, terraced, semi-detached and detached;
- Fuel Poverty Energy Efficiency Rating (FPEER) bands: FPEER D, FPEER E, and FPEER F/G;¹⁶
- heating types: gas, electric, and other;¹⁷ and
- GB nations: England, Scotland and Wales.

¹⁴ Options such as shared ground-loop arrays may be available for some blocks of flats, but these are outside the scope of our modelling.

¹⁵ DESNZ (2026), [Domestic energy tariff reductions 2026: ministerial direction](#)

¹⁶ We focus on FPEER bands in this report. FPEER bands are an adjusted version of the standard energy efficiency rating, accounting for the impact of policies which discount households’ energy bills such as the Warm Home Discount. Some data (for example, the costs to upgrade homes to an EER Band C level from the English Housing Survey) are reported by EER/EPC band. In this report we treat data reported by EER C band as broadly equivalent to data reported by FPEER band C. For example, given that the main difference between the two definitions is the inclusion of the Warm Home Discount in the FPEER band definition, we think it is reasonable that the costs to upgrade to FPEER C should be broadly similar to the costs to upgrade a home to EPC C.

¹⁷ DESNZ’s fuel poverty statistics categorise homes by main fuel type as gas, electricity or ‘other’. The ‘other’ category includes heating oil, solid fuels, LPG/propane and community heating, although [DESNZ notes that it consists predominantly of oil and LPG](#). For simplicity, we assume all ‘other’ households consume oil. The ‘electric’ category covers direct electric heating, storage heaters, electric boilers and underfloor heating. For simplicity, we do not model storage heaters as a separate archetype in this work. Bill and emissions savings for households with electric heating therefore relate to electric households without storage heaters.

We use data for England, Scotland and Wales.

2.2 Structure of this report

The report is structured as follows.

- In Section 3, we summarise the scale of the challenge in terms of the number of fuel poor households across GB.
- In Section 4, we estimate the bill and emission savings that could be achieved by the nine upgrade packages set out in Figure 2 above.
- In Section 5, we assess the number of fuel poor homes that could be supported by an additional £1.5 billion of Government funding annually (on top of existing Warm Homes Plan policies and private rented sector regulations).
- Section 6 summarises our conclusions.

Further detail on the results, methodology and assumptions is provided in the annexes.

3 The scale of fuel poverty

We first set out the scale of the challenge, updating our previous 2024 analysis on the scale of fuel poverty in GB.

We use the English definition of fuel poverty since it is the metric used for the statutory target of the UK Government in England as noted in the Government's updated Fuel Poverty Strategy and it covers the majority of homes in GB.¹⁸ Under this definition, a household is fuel poor if it has an FPEER of band D or below and, after spending the required amount to heat its home, has a residual income below the official poverty line.

We estimate that there are currently around **2.8 million homes in fuel poverty across GB**. This includes 2.4m homes in England, 270,000 homes in Scotland and 120,000 homes in Wales. Analysis by both DESNZ¹⁹ and the Committee on Fuel Poverty²⁰ indicates that there has been a significant fall in fuel poverty over the last few years, predominantly due to increased home energy efficiency improvements to the housing stock.²¹ In England alone, the fuel poverty rate fell by 17.5% from 2023 to 2025.²²

Fuel poverty can be found in all home and fuel archetypes that we consider, but some home energy characteristics are particularly prevalent in the fuel poor population (see, Figure 3).

- Most fuel poor households live in FPEER band D homes. There are 2.2m homes (80% of all fuel poor homes) in FPEER band D, while 600,000 homes (20% of all fuel poor homes) are in FPEER band E/F/G.
- Most fuel poor households have gas boilers (2m homes or 72% of all fuel poor homes). There are also a significant number of homes with electric heating (510,000 homes or 19% of all fuel poor homes) and 'other' heating (270,000 homes or 10% of all fuel poor homes).^{23 24}
- Most fuel poor households live in terraced or semi-detached houses (1.7m homes or 60% of all fuel poor homes, of which 0.7m are in semi-detached houses and 0.9m in terraced).

¹⁸ DESNZ (2026). [Fuel Poverty Strategy for England - GOV.UK](#)

¹⁹ DESNZ (2026). [Annual fuel poverty statistics report: 2026 \(2024 and 2025 data\)](#)

²⁰ Committee on Fuel Poverty (2026). [Warm Affordable Fair CFP Annual Report 2026](#)

²¹ Our 2024 analysis found there were 3.7 million homes in fuel poverty across GB. This was based on 2024 estimates of fuel poor in 2023 in England, which were revised down in later data estimates. See DESNZ (2024) [Annual fuel poverty statistics in England, 2024 \(2023 data\)](#) and DESNZ (2025) [Annual Fuel Poverty Statistics report 2025](#). Whilst fuel poverty has fallen, the fall has not been as significant as indicated by a comparison between this report and the previous report.

²² DESNZ (2026). [Performance report](#)

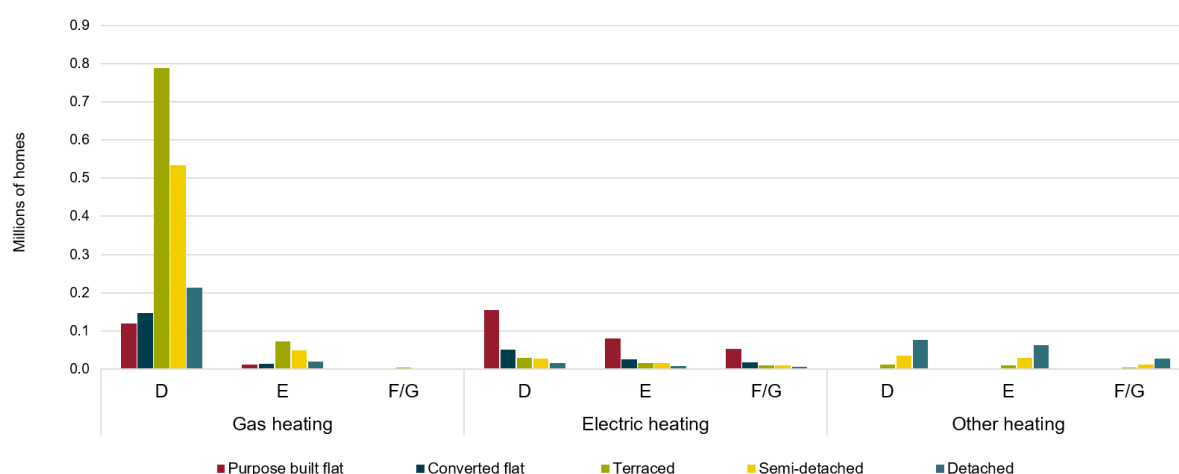
²³ Figures sum to more than 100% due to rounding.

²⁴ The 'other' category includes heating oil, solid fuels, LPG/propane and community heating, and consists predominantly of oil and LPG. For modelling purposes, we use oil as the representative fuel type, as it is the most common heating type within this category.

The remainder live in detached houses (400,000 homes or 15% of total), purpose-built flats (400,000 or 15%) or converted flats (300,000 or 9%).

- Households with gas boilers in terraced/semi-detached homes in FPEER band D make up around half of all fuel poor homes. The most common archetype is an FPEER D terraced home with a gas boiler. We therefore use this archetype as the primary example throughout the report, with results for a broader range of archetypes presented in Annex B.

Figure 3 Number of fuel poor homes in GB by FPEER band and main heating type



Source: Frontier Economics

Note: 'Electric heating' consists mainly of direct electric heating (including storage heaters, electric boilers or underfloor heating). A small number of heat pumps could fall into this definition, but we treat this as negligible, given the upgrades to homes associated with heat pump installation will generally increase the EPC level above D. The 'Other' category includes heating oil, anthracite nuts, house coal, smokeless fuel, wood, propane, bulk LPG, community heating from boilers/CHP/waste heat. Data is not available to split out F/G homes.

4 The scale of bill and emission savings that can be achieved

We now set out the energy bill savings and associated emission savings that can be achieved under nine home energy upgrade packages.²⁵

We present the results for an FPEER D terraced household with a gas boiler. This is the largest group of fuel poor households, making up 29% of all fuel poor households. Results for other archetypes are presented in Annex B

4.1 Significant bill savings can be achieved

Figure 4 shows the average annual bill savings generated over a five-year period (running from January 2027 to December 2031) for fuel poor households that receive each of the upgrade packages, for an FPEER D terraced household with a gas boiler.

We find significant energy bill savings from a range of upgrade packages for low-income households, ranging from £62 (insulation upgrade only) to £959 (insulation upgrade, plus solar, a battery and a heat pump) per year.

- Bill savings are smallest for the insulation only package. However, the benefits of this package are greater than just the bill or emissions savings. We explicitly account for positive comfort taking effects for these fuel poor households, to reflect the fact that households will likely heat their homes to a warmer standard. This will likely generate health and wellbeing benefits not included in our modelling. By contrast, solar can deliver substantial bill savings but does not improve the thermal performance or warmth of the home itself.²⁶
- Savings are largest for the combined measure packages, with the package including all measures seeing the highest potential savings. However, these packages come with much larger upfront costs: over £30,000 for the most comprehensive package compared to just £5,000 for solar by itself.^{27 28}
- The bill savings associated with batteries are driven by their use in conjunction with time-of-use tariffs. For an FPEER D terraced household with a gas boiler, a battery alone

²⁵ Our approach to estimating bill and emission savings is set out in Annex A.3 (with Annex A.2 explaining our approach to estimating prices).

²⁶ See Section 5.2 of our previous report for more details: Frontier Economics (2024). [Warm Homes Mission: Addressing fuel poverty with energy efficiency](#)

²⁷ Upfront costs are set out in Annex A.5.

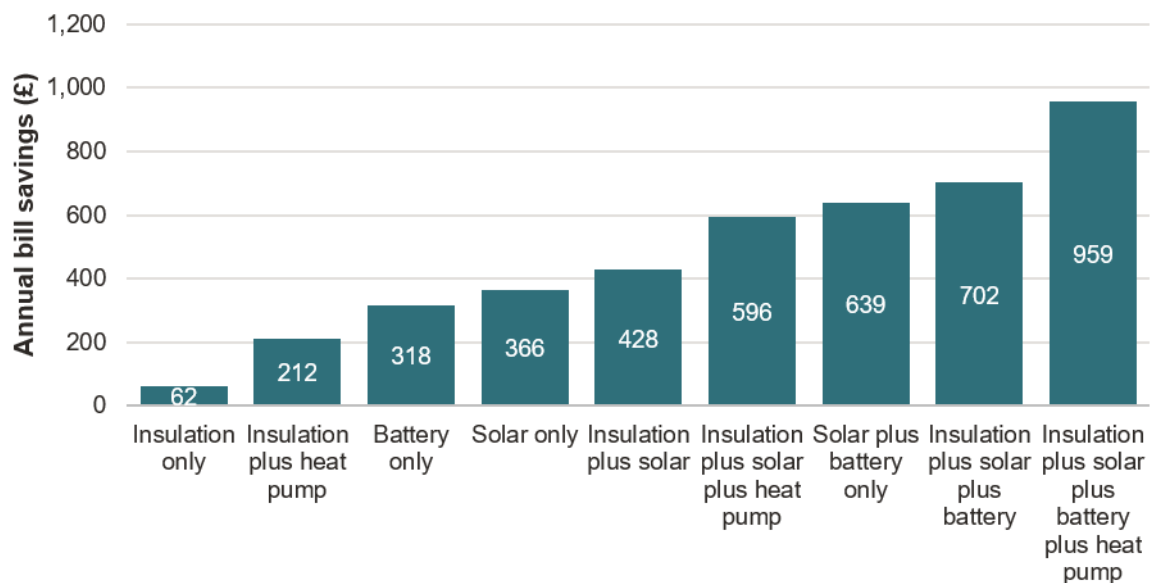
²⁸ We note that some of the savings associated with solar installation represent avoided policy costs that will need to be borne by other electricity consumers or taxpayers. However, in Section 4.1.2 below we note that even where these policy costs are removed from electricity unit costs, the savings from solar are still significant.

generates around £300 of annual bill savings by charging from the grid in lower cost periods and discharging to meet demand in higher cost periods. Adding solar increases total annual savings to £639, as the household can either use solar generation directly or store it for later use, reducing the amount of electricity purchased from the grid.²⁹

The results shown are based on a central retail price scenario developed for this project. Given the volatility and uncertainty of future prices, we also consider low and high price scenarios based on DESNZ wholesale gas and electricity price forecasts. Estimated bill savings are sensitive to these assumptions, particularly for measures that reduce gas consumption. For example, savings from an insulation upgrade plus heat pump are 70% higher under our high price scenario and 35% lower under our low price scenario compared to the central scenario. While these scenarios partially account for uncertainty in future prices, significant uncertainty remains and our results should not be interpreted as precise projections. Our detailed price methodology is set out in Annex A.2.

²⁹ These savings assume that households have an appropriate smart meter, time-of-use tariff and battery configuration that enables charging and discharging to respond to different tariff periods. The extent to which these savings can be realised in practice will depend on households being able to access and use these arrangements. Our modelling of time-of-use tariffs aligns with the Climate Change Committee's approach. See Climate Change Committee (2026), [Progress in reducing emissions: 2026 report to Parliament](#), Section 5.2.4.

Figure 4 Average annual bill savings for each upgrade package for an FPEER D terraced household with a gas boiler



Source: Frontier Economics

Note: Savings do not include the upfront costs associated with installing the measures. Funding arrangements are considered separately in Section 5. Savings from solar vary slightly across the three GB nations.³⁰ 'Insulation' means an insulation upgrade to bring the household up to band C.

The pattern of savings across upgrades is similar across property archetypes, with larger housing types receiving larger savings due to their higher energy consumption.³¹

Bill savings are similar for households using oil but significantly higher for households using direct electric heating.

- Estimated annual bill savings for an **oil household** are similar to the estimated savings for a gas household. Savings which involve reduced oil consumption (those with insulation upgrades and heat pumps) are slightly lower than savings for the same package for gas households, because oil prices are slightly lower than gas prices over the modelled period. In addition, oil households do not benefit from savings related to the removal of the gas standing charge from their bill when they switch to a heat pump.³²
- Savings for **direct electric homes** are much larger than savings for households using gas or oil because the direct electric heating technologies in use are less efficient than

³⁰ For the FPEER D terraced household with a gas boiler shown here, estimated annual savings from solar alone are approximately £366 in England, £361 in Scotland and £361 in Wales. Differences reflect variation in assumed solar generation across the three nations.

³¹ See Annex B for further details on results by housing archetype.

³² Our modelling assumes that a household switching from a gas boiler to a heat pump no longer pays the gas standing charge. This often requires the customer to action this with their supplier. See Annex A.3 for further detail.

heat pumps, and electricity has a relatively high unit price.³³ For example, an FPEER D purpose-built flat (the most common direct electric home) will save £240 each year from an insulation upgrade only. This compares with just £65 for the same household with a gas boiler. Their higher electricity consumption also increases the potential savings from solar and time-of-use tariffs.

Further details on these results are presented in Annex B.

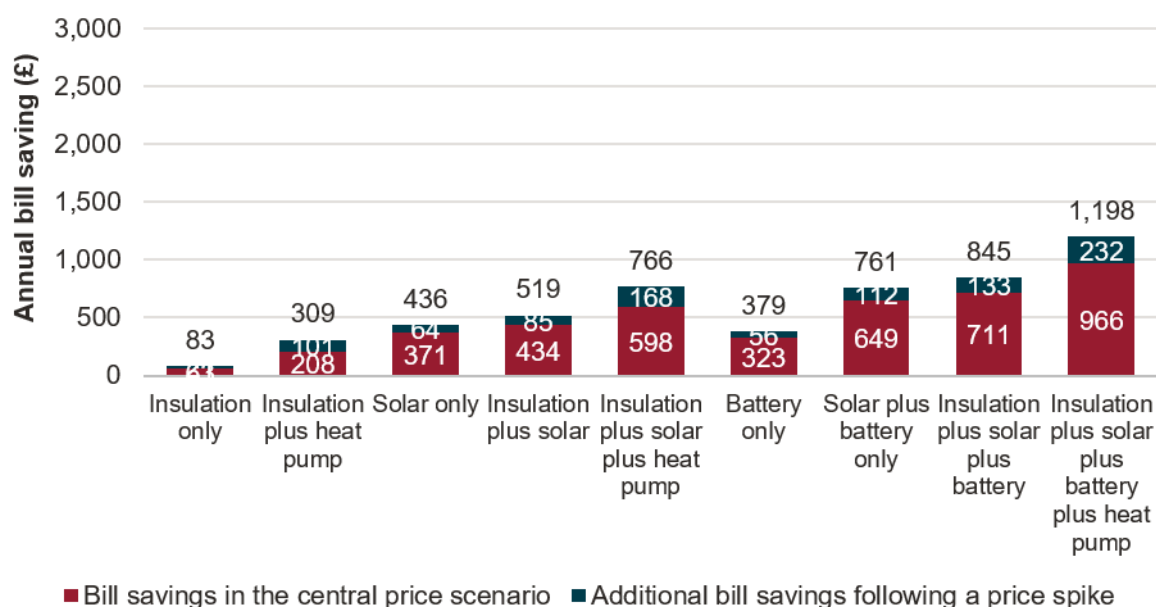
4.1.1 A price spike would increase the potential for savings when switching away from gas and oil heating

The savings presented above are based on our central price scenario. As well as modelling high and low price scenarios we model a sensitivity in which there is a temporary spike in wholesale energy prices in 2029 (see further detail in Annex A.2). We align the scale of this shock with the approach used by the Climate Change Committee (CCC) in its Seventh Carbon Budget analysis: we assume an increase in wholesale prices in line with that observed between 2021 and 2022 following Russia's invasion of Ukraine. This allows us to test how the benefits of housing upgrades that reduce households' exposure to fossil fuel prices change during a period of unusually high energy prices.

While bill savings are higher in all packages under the price spike scenario, the increase is greatest for packages that reduce gas and oil demand (i.e. those that include insulation upgrades and heat pumps). For an FPEER D terraced household with a gas boiler, annual bill savings from an insulation upgrade plus heat pump are 48% higher in the year of the price spike than under the central scenario, while savings from an insulation upgrade only are 33% higher. For packages that only affect electricity use (solar, battery or solar with battery), bill savings are 17% higher. Figure 5 illustrates these results.

³³ By 'direct electric homes', we refer specifically to households without storage heaters who consume electricity at the same time they demand it from the grid. Storage-heater households are not modelled separately and would be expected to see lower savings because they can already shift some electricity consumption to lower-cost off-peak periods.

Figure 5 Bill savings for FPEER D terraced households with a gas boiler, in the central scenario vs the price spike scenario, in the year of a price spike



Source: Frontier Economics

Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C.

This shows the resilience benefit of reducing fossil fuel demand: households with these upgrade measures are less exposed to increases in gas and oil prices than they would have been without the upgrade. The effect is even larger for oil-heated homes. For an FPEER D rated terraced household currently using an oil boiler, annual bill savings from an insulation upgrade plus heat pump are around three times as high in the price spike scenario than under the central scenario.

Annex C presents the modelled price path under the price spike scenario and equivalent results for oil and direct electric households. Further detail on our methodology is set out in A.2.

4.1.2 Rebalancing policy costs makes heat pumps more attractive

The Warm Homes Plan recognises that the unequal distribution of some policy costs on energy bills across electricity and gas reduces the incentive to switch to heat pumps.³⁴ We model the impact of removing certain policy costs from electricity bills and funding them instead through general government spending. We refer to this as 'rebalancing' as it

³⁴ DESNZ (2026). [Warm Homes Plan - GOV.UK](https://www.gov.uk/government/consultations/warm-homes-plan)

contributes towards addressing the fact that policy costs fall more heavily on the electricity bill than the gas bill. By policy costs, we mean the costs of current and past schemes to support low carbon generation (e.g. the Renewables Obligation, small scale Feed-in-Tariff scheme) and to provide social support (e.g. the Warm Home Discount scheme). We do not model a case where these policy costs are transferred to gas bills (taking into account the fact that gas prices remain at historically high levels).

The Government has already taken some action on rebalancing. At the Autumn Budget 2025, it announced that three quarters of the domestic legacy Renewables Obligation costs would be moved off electricity bills and funded via general government spending running from 1 April 2026 to 31 March 2029.³⁵ In addition, the Government announced the removal of VAT from electricity bills for the final six months of this financial year.³⁶

The results presented above assume no further rebalancing of policy costs in the period up to 2031. This means that the levies supporting low carbon generation (such as the small scale Feed-in-Tariff scheme) and social schemes (like the Warm Home Discount) continue to fall disproportionately on electricity rather than gas bills.

However, we also assess the impact of further rebalancing action on the bill savings achieved by our upgrade packages. We consider two scenarios.

- **Scenario 1** removes VAT and all of the Renewables Obligation as well as Feed-in-Tariffs from domestic electricity bills across the entire period (2027-2031). This builds on the recent Government announcements set out above.³⁷
- **Scenario 2** *additionally* removes:
 - the Warm Home Discount from domestic electricity bills (but not gas bills); and
 - legacy Contracts for Difference costs from electricity bills, where ‘legacy’ refers to Contracts for Difference contracts signed bilaterally prior to the first competitive allocation round in 2014.

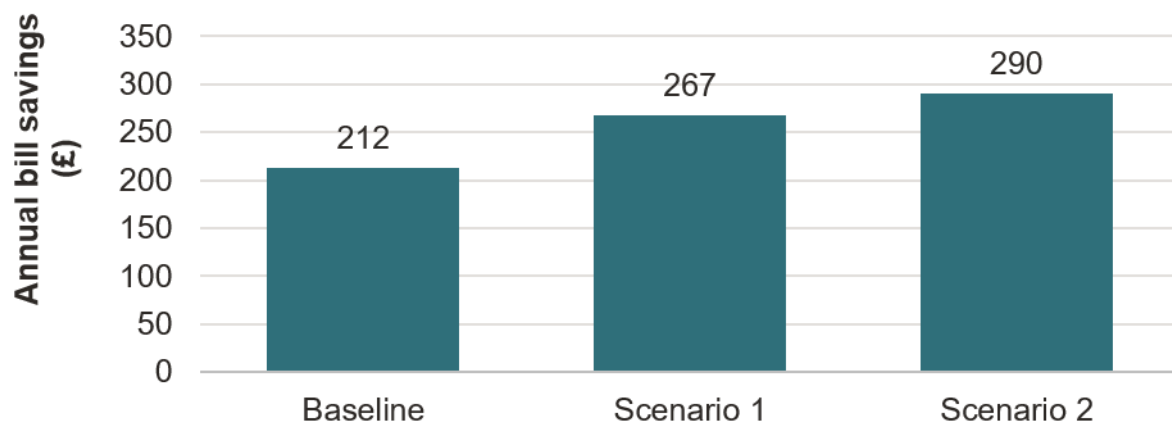
We find that such **rebalancing makes heat pumps significantly more attractive** and therefore strengthens the benefits from the transition to low carbon heating. Switching from gas or oil to a heat pump results in a more sizeable bill saving with rebalancing, because of lower electricity prices. For a gas terraced FPEER D household, the bill savings are 26% higher under Scenario 1 and 37% higher under Scenario 2 than the central case – corresponding to an additional saving of £80 in Scenario 2 (Figure 6).

³⁵ DESNZ (2026), [Domestic energy tariff reductions 2026: ministerial direction](#)

³⁶ HM Treasury and DESNZ (2026), [New PM cuts tax on household electricity bills to give breathing space on cost of living](#).

³⁷ See DESNZ (2026), [Domestic energy tariff reductions 2026: ministerial direction](#); and Prime Minister's Office, HM Treasury and DESNZ (2026), [New PM cuts tax on household electricity bills to give breathing space on cost of living](#).

Figure 6 Bill savings for an FPEER D terraced household with a gas boiler getting an insulation upgrade plus heat pump under various rebalancing scenarios



Source: Frontier Economics

Note: Savings do not include the upfront costs associated with installing the measures.

The fact that policy costs fall disproportionately on electricity bills partly drives the sizeable bill savings from solar packages previously shown.³⁸ However, bill savings from these packages remain substantial under the two rebalancing scenarios. For example, for a gas terraced FPEER D household in Scenario 2, solar still generates £329 of bill savings annually.

4.2 Emission savings

Figure 7 presents the monetised average annual emission savings, generated between 2027 and 2031 for households that receive each of the upgrade packages, for an FPEER D terraced household with a gas boiler.

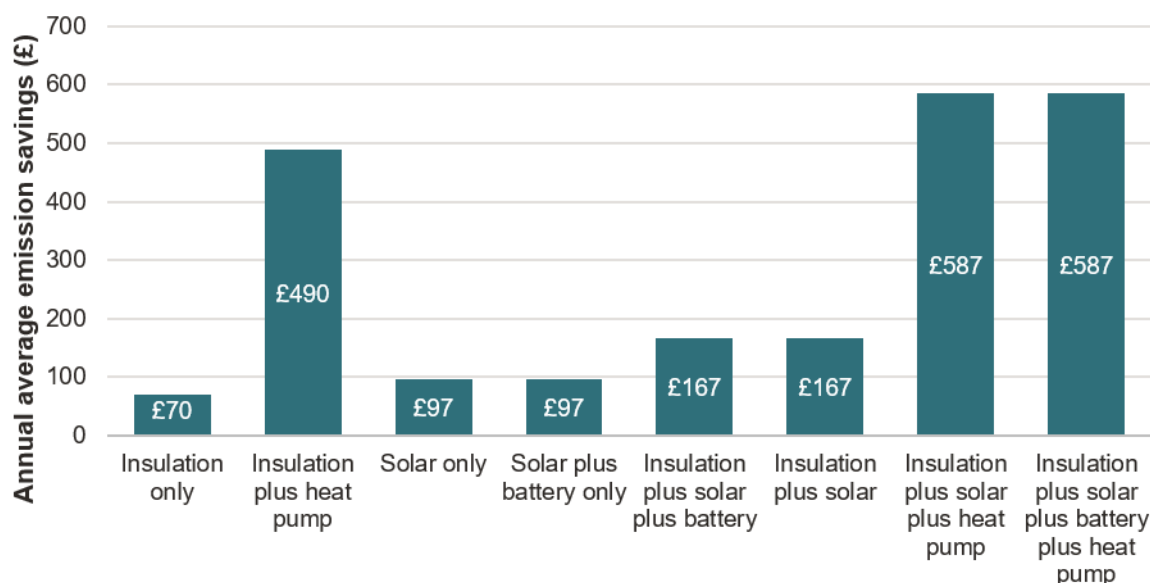
- Emission savings are greatest for packages which include heat pumps. For an FPEER D terraced household with a gas boiler, an insulation upgrade plus heat pump reduces annual emissions by around 1,440 kgCO₂e. This generates around £490 of monetised emission savings annually.³⁹

³⁸ Adoption of solar packages would result in distributional impacts, with the policy costs avoided needing to be covered by other consumers. Rebalancing reduces these impacts.

³⁹ Monetised emission savings convert the change in carbon emissions per home to a monetary figure, using DESNZ's appraisal carbon values. See DESNZ (2023), [Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal](#). See Annex A.3 for further detail.

- Solar alone reduces annual emissions by around 286 kgCO₂e, and an insulation upgrade reduces annual emissions by around 205 kgCO₂e. This corresponds to monetised emission savings of around £97 and £70 respectively.

Figure 7 Average annual emission savings for each upgrade package for an FPEER D terraced household with a gas boiler



Source: Frontier Economics

Note: We do not model emission savings from batteries, though we note there may be small emission savings from shifting demand from peak to off-peak hours. Savings from solar vary slightly across the three GB nations. 'Insulation' means an insulation upgrade to bring the household up to EPC band C

We have also modelled the impact for oil and direct electric households.

- Emissions savings for an **oil household** are similar to savings for a gas household. Savings which involve reduced oil consumption (those with upgrades and heat pumps) are slightly higher than savings for the same package for gas households, because oil emissions are greater than gas emissions. For example, for an FPEER D terraced household with an oil boiler, an insulation upgrade plus heat pump generates around £670 of monetised emission savings annually.
- Emission savings for **direct electric homes** are smaller than savings for gas or oil households, because of lower emission intensity for grid electricity.

Annex B presents these results in more detail.

5 The number of fuel poor homes supported with £1.5bn of additional Government funding per year

This section presents our analysis of the number of fuel poor homes that could be upgraded through energy efficiency and low carbon technologies, if Government added £1.5 billion per year of funding into its Warm Homes Plan.

5.1 Approach to allocating funding and existing Government policies

We model the effect of allocating an additional £1.5 billion a year of public funding to the Warm Homes Plan. This is broadly equivalent to the annual funding lost following the closure of the Energy Company Obligation ('ECO') and the Great British Insulation Scheme in 2026.

Taking account of the existing public funding in the Warm Homes Plan that is specifically dedicated to low-income households, this results in a total of £12.6 billion of public spending being allocated across the fuel poor archetypes in our model across 2027 to 2031.⁴⁰

We allocate this funding across the fuel poor group in proportion to their prevalence across the archetypes. For example, terraced FPEER D gas households make up 29% of fuel poor households and therefore receive 29% of funding.

For each archetype, we allocate the package with the lowest upfront cost subject to achieving the following targets:

- a minimum £200 annual bill saving, to ensure that public funding is directed towards measures that deliver a material affordability benefit for fuel poor households; and
- a minimum £100 monetised annual emission saving, so that the allocation of funding supports the wider transition to lower-carbon homes.

In addition, we allocate heat pump packages such that 5% of fuel poor households have a heat pump by the end of the modelling period (2031), given that heat pumps are important for the longer-term transition away from fossil fuel heating.⁴¹ Heat pump packages must also meet the minimum bill and emission savings criteria we have set as thresholds. If a heat pump and

⁴⁰ DESNZ (2026). [Warm Homes Plan - GOV.UK](#). The Warm Homes Plan ends in 2029/30 and so we assume funding in 2030/31 and 2031/32 is equal to average annual funding over 2025/26 to 2029/30. We do not include the Boiler Upgrade Scheme, nor the CDEL financial transactions funding (£600 million of loan financing for low-income households).

⁴¹ We retain the 5% assumption used in our 2024 analysis. This was selected as the mid-point between the Climate Change Committee's recommendation that, by 2030, approximately 10% of existing homes should be heated using a heat pump, and the Committee on Fuel Poverty's recommendation that a 'fabric first' approach should be prioritised for the fuel poor population. See Climate Change Committee (2024), [Progress in reducing emissions: 2024 Report to Parliament](#), p. 9, and Committee on Fuel Poverty (2024), [Can fuel poverty be ended?](#) The Committee on Fuel Poverty Annual Report 2024.

insulation upgrade alone will not achieve a £200 bill saving, we implement this alongside other technologies including batteries and solar.

We also consider homes upgraded because of the introduction of new minimum energy efficiency standards in the private rented sector for a more complete picture of the number of fuel poor households who could receive measures as a result of Warm Homes Plan policies. The new minimum energy efficiency standards will require private landlords to upgrade their properties to meet EPC or EER Band C (subject to a cost cap) by October 2030. We estimate roughly 600,000 fuel poor households in the private rented sector receive upgrades by 2031 under these regulations.⁴²

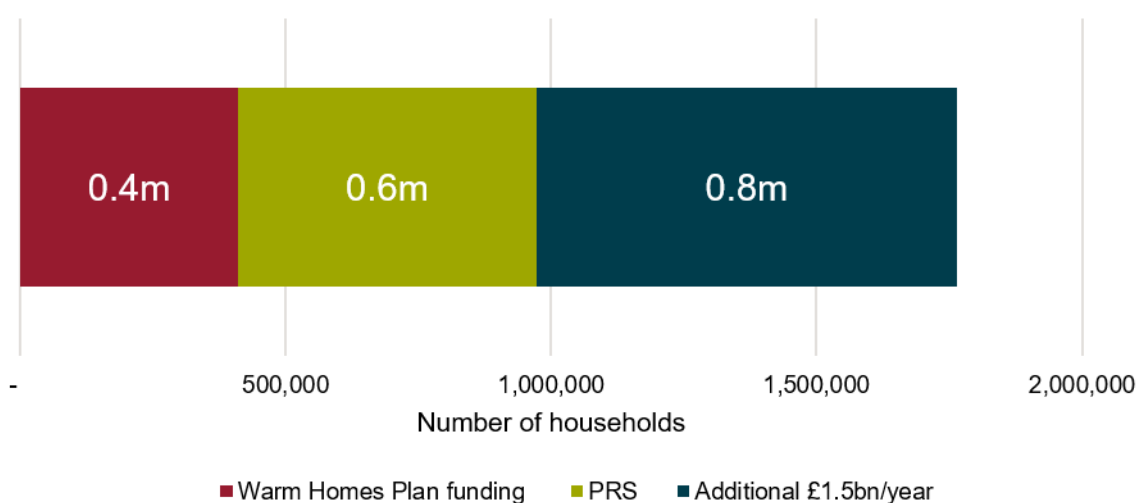
More detail on the approach is set out in Annexes A.4 and A.5.

5.2 2.1 million fuel poor households would receive measures

Combining measures delivered through upfront grant funding (from the Warm Homes Plan schemes and the additional £1.5 billion per year) and through the introduction of new Private Rented Sector (PRS) minimum standards, we find that **1.8 million** fuel poor households could receive energy efficiency upgrades or low carbon technologies by 2031, as seen in Figure 8. This corresponds to **64%** of the current fuel poor population.

Without the additional £1.5 billion of annual funding, only 1 million fuel poor households would receive measures. The additional funding therefore supports an extra 800,000 fuel poor households.

Figure 8 Number of fuel poor households receiving measures through Warm Homes Plan funding, additional public funding and PRS regulations



⁴² DESNZ (2026). [Improving the energy performance of privately rented homes: impact assessment](#). We do not model the bill or emission savings associated with these PRS upgrades.

Source: Frontier Economics

Our modelling does not account for additional homes upgraded through the new minimum energy efficiency standards in the social rented sector (SRS). New regulation will require social landlords to meet one of 'three' metrics by April 2030: fabric performance, smart readiness, and heating systems. DESNZ estimates that the regime will lift 323,000 households out of fuel poverty by 2030, with additional fuel poor households receiving upgrades without being lifted out of fuel poverty.⁴³ Combining the 1.8 million households identified through our modelling with the 323,000 households expected to be lifted out of fuel poverty through the SRS regime gives a total of around **2.1 million fuel poor** households receiving measures by 2031.

The households receiving upgrades through public funding would generate an average annual bill saving of £475 and emission saving of £195. We do not model the bill and emission savings for those supported via strengthened PRS or SRS regulatory regimes.

Figure 9 shows the upgrade packages allocated to fuel poor households supported by the improved public funding approach set out above.

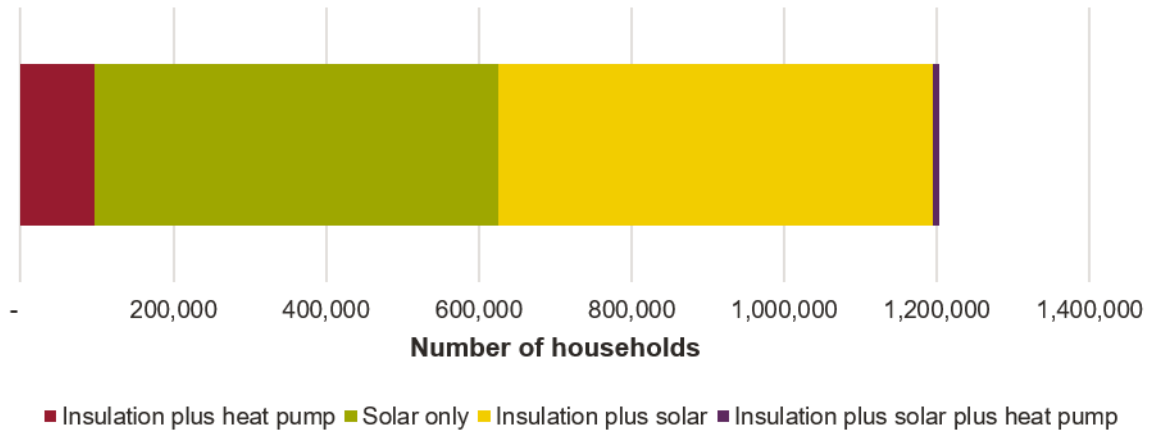
- The solar only, insulation plus solar, upgrade plus heat pump and insulation plus solar plus heat pump packages are the only packages allocated.⁴⁴
- Roughly 92% of treated homes would receive a package which includes solar – predominantly solar only or insulation plus solar only. These packages are the most common since they deliver relatively high bill savings and meet the minimum required emission savings, for relatively low cost.
- Roughly 9% of homes upgraded using grant funding will receive a package which includes a heat pump.⁴⁵

⁴³ DESNZ (2026). [Improving the energy performance of socially rented homes - final stage IA](#)

⁴⁴ Packages including batteries are assumed to deliver no additional emissions savings while increasing the upfront cost of the package, and are therefore not selected under the allocation rules.

⁴⁵ The 5% heat pump target applies across the entire fuel poor population, whereas this figure relates only to homes receiving grant funding. Heat pumps delivered through PRS regulations also contribute towards the overall 5% target (calculated based on DESNZ (2026). [Improving the energy performance of privately rented homes: impact assessment](#)). Figures do not add due to rounding.

Figure 9 **Number of households upgraded by technology type with additional public funding approach**



Source: Frontier Economics

Note: We do not model upgrade types for PRS and SRS upgrades. 'Insulation' means an insulation upgrade to bring the household up to band C

6 Conclusion

Our analysis demonstrates the potential for energy efficiency and low carbon technologies to make a major contribution to reducing energy bills for fuel poor households, while delivering significant emissions savings. Our model provides a framework for assessing how those benefits vary across different households, technology packages, energy price scenarios and funding choices.

Our key findings are as follows.

- Significant energy bill savings for fuel poor households can be achieved through home energy upgrades. These upgrades also deliver sizeable emissions savings.
- Annual bill savings can exceed £900 with the most comprehensive package.⁴⁶ Annual savings from an insulation upgrade plus heat pump are £200, while savings from solar alone are more than £300.
- Savings from heat pump packages would increase substantially if the Government were to take additional action to rebalance policy costs by moving additional policy costs off electricity bills and into Government spending. While insulation upgrades alone deliver more limited bill savings, they can also generate health and wellbeing benefits improving the warmth of homes.
- On top of these bill savings, home energy upgrades provide significant resilience benefits against volatile fossil fuel prices and can improve overall energy resilience. This is demonstrated by our price spike analysis.
- Adding £1.5 billion of Government funding into the current Warm Homes Plan to fill the gap left by the ending of the Energy Company Obligation and Great British Insulation Scheme (combined with the existing plan to strengthen the Private Rented Sector and Social Rented Sector minimum standards regulations), could result in energy efficiency and low carbon technology upgrades being delivered to 2.1 million fuel poor households by 2031. As well as generating significant bill savings, these measures would help to facilitate the wider low carbon transition with significant emission savings.
- On average, the upgrades we model generate an average annual bill saving of £475 and emission saving of £195 across the 1.2 million households receiving fully funded measures. Households typically receive an upgrade package that includes solar, given the significant savings it generates for a relatively low cost.

⁴⁶ Annual bill savings are calculated based on central price projections (see A.2 for alternative price scenarios). The upfront costs of the measures are not included in these figures.

Annex A - Methodology and assumptions

Our approach can be summarised in five stages:

1. we estimate the number of fuel poor households across Great Britain (GB) and split them into archetypes;
2. we forecast high-level price scenarios;
3. we estimate the benefits in terms of bill and carbon emission savings;
4. we estimate the number of households supported with upgrades because of strengthened private rented sector regulations; and
5. we allocate the funding across households, to calculate the total numbers supported with upgrades.

A.1 Number of fuel poor households

The first step is to summarise the number of fuel poor households across GB.

Fuel poverty is defined in different ways across England, Scotland and Wales.

- **England.** Fuel poverty in England is measured using the Low Income Low Energy Efficiency ('LILEE') metric. Under this metric, a household is considered to be fuel poor if i) they are living in a property with a fuel poverty energy efficiency rating ('FPEER')⁴⁷ of band D or below; and ii) when they spend the required amount to heat their home, they are left with a residual income below the official poverty line.⁴⁸
- **Scotland.** In Scotland, a household is defined as fuel poor if more than 10% of their net income is required to pay for their reasonable fuel needs after housing costs have been deducted; and the remaining household income is not enough to maintain an acceptable standard of living, defined as at least 90% of the UK Minimum Income Standard (MIS) once childcare costs and disability or care benefits are deducted.⁴⁹

⁴⁷ Energy efficiency is typically based on the Government's Standard Assessment Procedure ('SAP'), which allocates an energy efficiency rating ('EER') to a house of 1 (very inefficient) and 100 (highly efficient) based on the modelled fuel costs of the home. These ratings are then converted into EER bands A (very efficient) to G (very inefficient). The FPEER is an adjusted version of the standard EER rating produced by DESNZ for the purposes of producing fuel poverty estimates. The FPEER accounts for policies that affect the cost of energy, namely the Warm Home Discount. The FPEER deducts the Warm Homes Discount from the modelled fuel costs to get an adjusted energy efficiency rating, which is then converted into fuel poverty energy efficiency bands ranging from FPEER A-G. See DESNZ (2014), [Fuel Poverty Energy Efficiency Rating Methodology](#).

⁴⁸ Department for Energy Security & Net Zero (2024), [Fuel Poverty Methodology Handbook](#), pages 1,2.

⁴⁹ Scottish Government (2021), [Home Energy and Fuel Poverty](#)

- **Wales.** A household is defined as being fuel poor if they would have to spend more than 10% of their income to maintain a satisfactory heating regime.⁵⁰

For this analysis, we use the English definition of fuel poverty, which is based on the Low Income Low Energy Efficiency ('LILEE') metric. We use this definition since it is the metric used for the statutory target of the UK Government in England and it covers the majority of homes in GB.⁵¹ In addition, the intention of the LILEE measure when it was adopted in England in 2021 was to better capture the households who would benefit from energy efficiency measures. In this regard, the Committee on Fuel Poverty has recognised that this measure serves to prioritise the upgrading of homes on low incomes (while recognising the scope for reviewing it over time).⁵²

We focus on modelling a set of key house archetypes where each archetype refers to a combination of heating technology, FPEER band, building style, and the number of homes in England, Scotland and Wales.

- **FPEER band:** We consider three different energy efficiency levels: homes that are classified as FPEER band D; homes that are classified as FPEER band E; and homes that are classified as F or G.
- **Building style:** We consider five different classes of building type (i.e. detached, semi-detached, terraced, converted flats and purpose-built flats).
- **Main heating type:** We consider the three main existing heating technologies captured in DESNZ's fuel poverty data which are gas boilers, electric heating⁵³ and 'other' heating. Electric heating consists mainly of direct electric heating (including storage heaters, electric boilers or underfloor heating). DESNZ notes that a "*small number of electrically powered heat pumps are included in electric heating*" so we treat this as negligible, noting that heat pump installation will generally be accompanied by an increase in home efficiency already.⁵⁴ DESNZ defines 'other' heating types to include heating oil, anthracite nuts, house coal, smokeless fuel, wood, propane, bulk LPG, community heating from boilers/CHP/waste heat.⁵⁵ When modelling bill impacts for the households with 'other' heating, we use an oil boiler as a representative fuel type as it is the most common heating type in the 'other' category.
- **GB nations:** We estimate the number of homes across England, Scotland, and Wales.

⁵⁰ Welsh Government (2023), [New Warm Homes Programme: policy statement](#)

⁵¹ See DESNZ (2021), [Sustainable Warmth: Protecting Vulnerable Households in England](#).

⁵² See DESNZ (2021), [Sustainable Warmth: Protecting Vulnerable Households in England](#).

⁵³ See DESNZ (2026), [Fuel poverty detailed tables 2025 \(2023 data\)](#), Table 12.

⁵⁴ DESNZ (2026), [Annual fuel poverty statistics report: 2026 \(2024 and 2025 data\)](#), footnote 38.

⁵⁵ See DESNZ (2026), [Fuel poverty detailed tables 2026 \(2025 data\) - GOV.UK](#) Table 12.

We estimate the number of homes across GB using the LILEE in the following way.

- Our starting point is the number of fuel poor homes in England which provides the split by **FPEER band** and **heating technology** reported by DESNZ.⁵⁶
- We then break down these estimates further by **property type**. We do this by multiplying the total number of homes in each FPEER band and heating technology by the share of homes in each type of property. This allows us to obtain the distribution of fuel poor homes by property type, within each FPEER band and heating technology. The share of homes in each type of property is based on their prevalence in the English housing stock with the same heating type based on Census data for England.⁵⁷ The output of this step is the number of fuel poor homes in England, split by property type, main heating technology and FPEER band.
- We then extrapolate the number of fuel poor homes in England to Scotland and Wales by scaling down the English fuel poor homes by the relative size of the housing stock in Scotland and Wales (compared to England) for each building type. Specifically, we multiply the number of homes by the ratio of the housing stock in Scotland/Wales vs England.⁵⁸

This step allows us to account for differences both in the scale and mix of property types within the housing stock across Scotland and Wales. For example, Scotland has a higher share of flats compared to England (due to a large number of tenement flats) and a lower share of terraced/semi-detached homes, while Wales has a lower share of flats compared to England and a higher share of detached and semi-detached homes.⁵⁹

The output of this step is an estimate of the number of fuel poor homes in GB, split by property type, FPEER band, main heating technology and country.

Lastly, we do not make any adjustments to control for differences in the share of homes below the poverty line since the proportion of individuals below the poverty line is roughly similar

⁵⁶ See DESNZ (2026), [Fuel poverty detailed tables 2026 \(2025 data\) - GOV.UK](#) Table 12.

⁵⁷ See ONS (2025), [Main fuel type or method of heating used in central heating, England and Wales, March 2025 edition](#), Table 1c.

⁵⁸ Data on the size of the housing stock by house type is obtained from DESNZ (2026), [Fuel poverty detailed tables 2026 \(2025 data\)](#), Table 7, for England; Scottish Government (2026), [Scottish House Condition Survey: 2024 Key Findings](#), tables KA1b and KA8b, for Scotland; and ONS (2023), [Housing, England and Wales: Census 2021](#), Figure 1 for Wales. We note that the data for Scotland and Wales does not distinguish between purpose-built flats in Scotland and Wales. For Scotland, we estimate the proportion of flats that are converted based on the number of flats classified as tenement flats or houses converted to flats. For Wales we apply the proportion of flats that are converted in England.

⁵⁹ Since data on the number of homes by EER / FPEER band, property type and heating type (i.e. the cross-section of these characteristics) is not available for Scotland and Wales, our extrapolation requires us to make a simplifying assumption. Our approach assumes that the distribution of the fuel poor population in England across heating technology and FPEER band applies to Scotland and Wales but makes an adjustment for the differences in distribution across property type in England vs Scotland and Wales. We think this is a reasonable approach, given the available data.

across England, Scotland and Wales (i.e. c. 16% in England, 15% in Scotland and 19% in Wales).⁶⁰

A.2 Price scenarios

We construct high-level, illustrative energy price scenarios for the purposes of this project. These are not intended to be predictions. We do not forecast every line of the bill and instead aim to consider those bill items which may significantly change over the period and where robust evidence is available to make the forecast. In some areas, we have made simplifications for pragmatic reasons. These prices are an average GB cost, and do not factor in how network charges vary across GB.

We construct three scenarios: low, central and high. We present the central scenario throughout this report, except where otherwise stated.

Wholesale prices

Direct fuel costs

Direct fuel costs are charged on the unit rate.

The low, central and high price scenarios are driven wholly by the wholesale prices: all other components of the retail price follow a common forecast across the three scenarios. We use the following approaches.

- **Gas:** We use DESNZ's fossil fuel price assumptions.⁶¹ DESNZ produce low, central and high forecasts.
- **Electricity:** We use DESNZ's electricity price assumptions from the Energy and Emissions Projection.⁶² Our low scenario aligns with the 'Low Fossil Fuel Price' scenario and our high scenario with the 'High Fossil Fuel Price' scenario. We calculate our central scenario as a mid-point of the two. We use the 'volume weighted' value.

Contracts for Difference and Capacity Market

Contracts for Difference ('CfD') and Capacity Market ('CM') costs are only charged on electricity bills, both on the unit rate. For both, we apply the following approach.

- We take as a starting point the cost in the retail bill from Ofgem's price cap over 2026 to date.

⁶⁰ See House of Commons (2026), [Poverty in the UK: Statistics](#), page 58, which is based on data published by the Department for Work and Pensions (DWP) as part of the '[Households below average income](#)' (HBAI) statistics.

⁶¹ DESNZ (2026), [Fossil Fuel Price Assumptions 2025 publication.xlsx](#)

⁶² DESNZ (2026). [EEP Annex M](#)

- We uplift the 2026 cost based on the increase in CM and CfD costs forecasted by the Office for Budget Responsibility (OBR).⁶³ Our uplift accounts for the overall forecasted growth in electricity demand.⁶⁴ For example, if costs are forecasted to rise by 10% but electricity demand also rises by 10%, there would be no uplift in the unit rate in the retail bill.

Our rebalancing scenarios require an estimate of 'legacy CfD costs': those CfDs signed before competitive auctions. We take a high-level estimate of these costs by estimating the total cost of legacy CfDs (based on historic capacities and strike prices) and dividing this by total electricity demand from NESO in each year.⁶⁵

Network costs

- For **gas network charges, electricity transmission and electricity balancing charges**, we use Ofgem's RIIO-3 impact assessment to estimate costs in 2031.⁶⁶ We assume charges grow linearly between the current price cap costs to 2031.
 - Gas network charges are treated as predominantly unit rate costs, so the annual cost for a typical customer is converted into p/kWh using assumed typical gas demand.
 - Electricity balancing charges are also treated as unit rate costs. We uplift the current balancing charge in Ofgem's price cap in line with its expected growth by 2030/31.
 - Electricity transmission is treated as predominantly a standing charge cost and so the entire charge is placed on the standing charge.
- For **electricity distribution**, our estimates are uncertain as RIIO-ED3 has not yet been finalised. We use the forecasted index costs estimated by CEPA for Ofgem.⁶⁷
 - We calculate the unit rate by assuming the 2026 price cap unit rate grows in line with the index of unit costs estimated.
 - We back out the increase in the standing charge by combining the index of growth in the unit rate and total cost per MPAN, with NESO data on total electricity demand. We assume a constant number of MPANs, in line with the approach in the raw data.

⁶³ OBR (2026). [Economic and fiscal outlook – March 2026 - Office for Budget Responsibility](#). We note that the OBR CfD forecast does not include AR8 and therefore underestimates CfD policy costs, particularly for later years of our modelling.

⁶⁴ Based on NESO (2025) [Future Energy Scenarios](#). Holistic Transition.

⁶⁵ This is a high-level estimate which does not account for the fact that wholesale prices may change over time, nor the timing of the Drax subsidy.

⁶⁶ Ofgem (2025). [RIIO-3 Final Determinations – Impact Assessment](#). Ofgem's figures refer to the 'average dual fuel' consumption, which we assume to mean a dual fuel customer at the TDCV.

⁶⁷ CEPA (2026). [Ofgem ED3 Depreciation](#)

Policy costs

Our central forecast models policy costs based on current Government policy. We additionally consider how policy costs may change with our rebalancing scenarios.

For policy costs, we take the current price cap value (July 2026 to September 2026) as a starting point. The approach to policy costs has recently changed and so it is not suitable to use the average over 2026 to date as the starting point.

We use the following approach for each policy cost.

Electricity policy costs

All electricity policy costs are charged on the unit rate.

- We replicate the approach for Capacity Markets and CfDs for the **Renewables Obligation and Sizewell C RAB** i.e. we apply the OBR's forecast, accounting for the change in electricity demand over time from NESO's FES to calculate the unit rate. We account for the increase in the Renewables Obligation after the Government's commitment to fund 75% of it through general government spending comes to an end in March 2029.⁶⁸
- We apply a similar approach for **Warm Home Discount**, but instead account for only household electricity demand since WHD is only charged to households.
- We assume the **Feed-in-Tariff** unit rate falls with total electricity demand up to and including 2029 (but that the total cost remains constant). The total cost then falls linearly from 2030 such that it is zero by 2042 (the 'early 2040s'). This aligns with DESNZ's approach.⁶⁹
- We hold the **Network Charging Compensation** scheme constant. This is a simplification because the impact is small.
- We do not model the **Assistance for Areas with High Electricity Distribution Costs**, as this will 'average out' for the average customer.

Gas policy costs

The Green Gas Levy is charged on the standing charge. All other costs are on the unit rate.

- We apply the same approach to the **Warm Home Discount** for gas as for electricity.

⁶⁸ DESNZ (2026), [Domestic energy tariff reductions 2026: ministerial direction](#)

⁶⁹ [Feed-In Tariffs \(FiT\) scheme: Final consultation analytical annex - impact of indexation options \(accessible webpage\) - GOV.UK](#)

- DESNZ forecast that the **Gas shipper's levy** will increase the gas unit rate by between 20p-30p/MWh in 2028-2032 (2023 prices).⁷⁰ We assume the impact in 2028 is 20p and the impact in 2032 is 30p, and assume that the impact grows linearly.
- For the **Green Gas Levy**, we use the same approach as the Renewables Obligation and Sizewell C RAB (adjusting the OBR forecast based on FES gas demand).

Rebalancing

We consider rebalancing of electricity policy costs, off electricity bills and onto general government spending. We model two scenarios.

- **Scenario 1** removes VAT and all of the Renewables Obligation as well as Feed-in-Tariffs from domestic electricity bills across the entire period (2027-2031). This builds on recent Government announcements.⁷¹
- **Scenario 2** *additionally* removes:
 - the Warm Home Discount from domestic electricity bills (but not gas bills); and
 - legacy Contracts for Difference costs from electricity bills, where 'legacy' refers to Contracts for Difference contracts signed bilaterally prior to the first competitive allocation round in 2014.

Other costs

We hold most other price cap components constant in real terms at their 2026 level (based on the current price cap). This includes the following elements: adjustment allowance, smart metering net cost change, industry charges, core operating costs, debt-related costs, and levelisation.

We use this simplifying assumption as our modelled prices are intended to capture bill components which may change significantly over the period and where there is robust evidence on how they may move. Our model does not forecast every individual price cap line.

We model the following costs more explicitly.

- We apply the average **EBIT** margin in 2026 to all eligible EBIT costs.⁷²

⁷⁰ DESNZ (2025) [Funding mechanism for the Hydrogen Production Business Model: proposed design of the Gas Shipper Obligation – analytical annex \(HTML\) - GOV.UK](#)

⁷¹ See DESNZ (2026), [Domestic energy tariff reductions 2026: ministerial direction](#); and Prime Minister's Office, HM Treasury and DESNZ (2026), [New PM cuts tax on household electricity bills to give breathing space on cost of living](#).

⁷² Eligible EBIT costs are: direct fuel, capacity market, adjustment allowance, policy costs, network costs, smart metering net cost change, industry charges, payment method adjustment charges, core operating costs and debt-related costs.

- We calculate the **headroom allowance percentage** (HAP) as a percentage of all eligible HAP costs.⁷³
- We typically apply **VAT** of 5% to the total of all other line items. We assume 0% VAT for electricity from October 2026 to March 2027 in our baseline scenario, in line with recent policy announcements.

All costs are charged on the unit rate or standing charge in line with the approach in the price cap.

Oil costs

Since price projections are not available for heating oil, we use the following approach.

- We use the pre-Iran kerosene wholesale price from the 2026 CMA market study.⁷⁴ We assume that this moves annually with the DESNZ oil wholesale price forecasts, using the low, central and high forecasts to create our scenarios.⁷⁵
- We additionally use the CMA study to estimate the distributor gross margin applied to the wholesale price, to estimate the retail price. We assume the margin stays constant in real terms.
- We apply 5% VAT to our forecasted prices.

Price spike scenario

We model a sensitivity in which there is a temporary spike in wholesale energy prices in 2029. This allows us to test how the bill savings from different energy efficiency and low carbon technology packages might change during a period of unusually high energy prices.

We align our approach with the Climate Change Committee's approach as part of its Seventh Carbon Budget advice and assume the price spike is in line with the observed increase in wholesale prices between 2021 and 2022 (as a result of the Russia/Ukraine war).⁷⁶

⁷³ Eligible HAP costs are all eligible EBIT costs except network costs, plus EBIT itself.

⁷⁴ Competition Markets Authority (2026). [Heating oil market study - GOV.UK](#)

⁷⁵ DESNZ (2026), [Fossil Fuel Price Assumptions 2025 publication.xlsx](#)

⁷⁶ CCC (2026). Cost of Net Zero by 2050 less than a single fossil fuel price shock

A.3 Bill and emission savings

Change in energy consumption

As in our ‘Warm Homes Mission’ report, we begin by calculating starting energy consumption of each fuel poor household building archetype, prior to any upgrades.⁷⁷ We obtain data on actual energy consumption from the National Energy Efficiency Data Framework (NEED) published by DESNZ and calculate the average consumption for each property type and FPEER band.⁷⁸ These averages are adjusted downward to reflect lower consumption of the fuel poor population compared to the general population.⁷⁹

We use the following approach to calculate the impact on energy consumption of the chosen upgrade package. Batteries do not impact total energy consumption.

Insulation upgrades

We use the difference in average consumption between EPC C and EPC D, EPC E or EPC F/G homes in the NEED data (we used EPC band as a proxy for FPEER band). We assume that 15% of the energy savings are offset by comfort taking (‘rebound effect’).⁸⁰

Heat pumps

We use average efficiency of an air source heat pump in line with the Warm Homes Plan.⁸¹ We assume no rebound effect – in line with other studies such as the Boiler Upgrade Scheme Impact Assessment.⁸²

Solar PV

We use evidence from the ‘Better Homes, Cooler Planet’ report⁸³ (commissioned by WWF-UK and ScottishPower in 2022) on the size of the solar installation that might be installed to each type of home: 2.5kWp for terraced, 4kWp for semi-detached and 5kWp for detached.⁸⁴ In

⁷⁷ Frontier Economics (2024). [Warm Homes Mission: Addressing fuel poverty with energy efficiency](#)

⁷⁸ The NEED data includes a property level dataset with gas and electricity consumption for an anonymised sample of 4 million households from 2005 to 2022. DESNZ (2024), [National Energy Efficiency Data-Framework \(NEED\): anonymised data 2024](#).

⁷⁹ The NEED data includes a property level dataset with gas and electricity consumption for an anonymised sample of 4 million households from 2005 to 2022. DESNZ (2024), [National Energy Efficiency Data-Framework \(NEED\): anonymised data 2024](#).

⁸⁰ See DESNZ (2022), [Final Stage Impact Assessment ECO4](#), footnote 4. We did not identify more recent evidence on comfort taking.

⁸¹ DESNZ (2026). [Warm Homes Plan: Technical annex](#)

⁸² BEIS (2022), [Boiler Upgrade Scheme: Impact Assessment](#)

⁸³ Think Three (2022), [Better Homes Cooler Planet: The Value of Low Carbon Homes. Technical Report](#)

⁸⁴ kWp refers to a kilowatt peak, a unit of measurement used to describe the maximum power output of a solar panel system under standard test conditions.

addition, we assume 1kWp for a flat.⁸⁵ We then apply a load factor for each nation based on DESNZ load factors by region to estimate the energy generated per home per year.⁸⁶

We assume that all homes that have a battery have a 5.5kWh battery, based on input from ScottishPower.

Bill savings

Time-of-use tariffs

Our bill savings include savings from households utilising time-of-use tariffs alongside a heat pump or with a battery only. We do not include time-of-use tariffs for other technologies. Heat pumps and batteries provide meaningful scope to shift electricity demand away from peak periods. Evidence from DESNZ and Ofgem suggests that relying on households to manually change the timing of everyday electricity use is unlikely to deliver material savings.⁸⁷ Storage and more flexible loads, such as hot water heating from a heat pump, can make time-of-use tariffs more worthwhile.

We align with the CCC's approach in the 2026 Progress Report.⁸⁸ We assume three tariff periods: off-peak, standard and peak. Prices in the peak period are 50% higher than standard and prices in the off-peak period are 50% lower than standard.

Insulation upgrades

We apply our forecast energy prices to the change in consumption estimated above.

Heat pumps

Bill savings come from three elements.

- We apply our forecasted energy prices to the change in consumption.
- Where a household switches from a gas boiler to a heat pump, we assume they no longer pay the gas standing charge.
- We calculate the reduction in the average price because of time-of-use tariffs. We assume a household utilising time-of-use tariffs with a heat pump will consume 5% of their demand

⁸⁵ There are no sources which estimate the size of solar for flats. We base our 1kWp assumption on typical flat size and storeys and the following two sources: HM Government (2026), [The Building Regulations 2010](#) and MHCLG (2019). [Energy Performance of Buildings Directive: Second Cost Optimal Assessment for the United Kingdom](#).

⁸⁶ DESNZ (2025). [Standard load factors by region](#)

⁸⁷ Ofgem (2020). [Energy consumers' experience and perceptions of smart 'Time of Use' tariffs](#)

⁸⁸ CCC (2026). [Progress in reducing emissions 2026 report to Parliament](#).

during peak, 39% during standard and 56% during off-peak.⁸⁹ As a result, they save 25% on their electricity bills.

Solar (with and without a battery):

We calculate each home's energy bill savings as the sum of the following elements.

Bill savings from avoided electricity consumption.

We assume a proportion of solar is consumed within the home (the 'self-consumption rate'). This percentage differs across energy sources (direct electric, heat pump or gas/oil) and depending on whether a household installs a battery.

We use the following approach.

- For gas and oil households, we use the MCS self-consumption lookup tables directly, based on annual household electricity consumption, solar generation and battery size where relevant.⁹⁰ We make the following assumptions:
 - MCS provides solar self-consumption rates for three household occupancy profiles: "Home all day", "In half the day", "Out during the day". We assume all households are "in half the day" as a central case.
 - Electricity consumption figures for non-heating use come from National Energy Efficiency Data Framework (NEED) for each house type (flat, terrace etc.).
- We retain the MCS estimate for underlying (non-heating) household electricity demand. We add an adjustment for the portion of heating electricity demand that is assumed to coincide with solar generation. This additional coincident demand is treated as directly self-consumed solar, assuming that it does not result in solar consumption exceeding solar generation. We assume that using electricity for heating does not increase battery utilisation beyond the level already captured in the MCS battery self-consumption rate. This reflects the assumption that the battery is already being operated to maximise self-consumption of available solar. We make the following additional assumptions:
 - **Solar season:** The "solar season" covers April to September (spring and summer). Solar generating hours are assumed to be between 10am to 4pm. This does not mean that solar is not generated during other periods, but instead that the limited solar generated is already used for non-heating electricity demand.
 - **Heat pump demand during solar season:** We estimate the proportion of annual heating electricity demand that falls within both the solar season and these solar-

⁸⁹ In line with the CCC's approach in the [Progress in reducing emissions 2026 report to Parliament](#).

⁹⁰ MCS. [Look Up Tables](#)

generating hours. This proportion is applied to total annual heating electricity demand to estimate additional demand that can be met directly by solar.

- This estimation is based on the heat pump demand profile estimated by [Agrawal and Wallom](#) (2026). We subtract electricity demand for a non-heat pump home (gas boiler) from electricity demand for a heat pump to calculate the demand profile for heating electricity only in a heat pump home.
 - We assume that the heating demand profile for heat pump and direct electric heating is the same, absent better evidence for direct electric heating. However, actual consumption (kWh) varies across these groups and this results in different self-consumption rates for the two groups.
- We cap self-consumption at 95%.

These assumptions allow us to estimate avoided household electricity consumption due to the solar/battery installations. We then apply our forecasted energy prices.

Income from the export of electricity to the grid.

We assume the remaining electricity not consumed within the home is exported to the grid and that the home receives a payment based on an assumed smart export guarantee (SEG) tariff. We use a SEG value for 2027 based on the average tariff rates published by Ofgem in 2024-2025, uplifted to 2026 prices for consistency with the rest of our analysis.⁹¹ We adjust the 2025 figure for each year in our analysis based on the change in electricity retail prices calculated in our price scenarios.

Battery

We assume all households taking up a battery install a 5.5kWh battery. We assume that batteries are not installed in flats, given there are more likely to be space constraints.

We conduct high-level modelling to estimate the bill savings from installing a battery where it allows households to utilise time-of-use tariffs, and shift electricity consumption away from higher priced periods and into lower-priced periods under a time-of-use tariff.

Our modelling uses the following approach.

- For each archetype, we split annual electricity demand (following any upgrades, estimated above) into peak, standard and off-peak periods.
- We assume that batteries are operated to minimise electricity costs. Where a household also has solar, solar generation is allocated in the following order:

⁹¹ Ofgem (2025), [Smart Export Guarantee. Annual Report. SEG Year 5](#)

1. solar electricity is stored in the battery to meet demand during peak hours;
 2. solar is used directly during standard periods, subject to a cap of 50% of the solar electricity generated (as we assume that only half of the solar generating hours fall within standard hours);
 3. any remaining solar is stored for use during standard periods, where battery capacity is available;
 4. remaining solar is used during off-peak periods; and
 5. any spare battery capacity is charged from the grid during off-peak periods and subsequently discharged to meet any remaining peak demand, followed by standard-period demand. This is also the case for a battery-only installation.
- We make the following assumptions about battery capacity and efficiency: 90% of nominal battery capacity is usable and discharge efficiency of 93.5%.^{92, 93} As a result, more electricity must be purchased to charge the battery than is subsequently available to meet household demand.
 - We calculate the reduction in the average electricity price paid by utilising time-of-use tariffs.

Our bill savings do not include price arbitrage by charging from the grid for subsequent export.

Optimal use of the battery, following the dispatch order set out above, requires households to have an appropriate smart meter, time-of-use tariff and battery configuration that enables automated charging and discharging. Without these, the battery will not be used optimally, limiting potential bill savings.

Emissions savings

To calculate emission reductions, we apply marginal grid emissions factors from the Government's Green Book to the change in consumption to calculate a reduction in carbon emissions per home (kgCO₂e).⁹⁴ For solar, we assume that all generated solar power displaces grid electricity. We assume no emissions impact from utilising time-of-use tariffs.

⁹² Based on the midpoint of efficiency estimates from various sources, including BEIS (2018) [Storage cost technical assumptions](#) and existing batteries on the market such as [GivEnergy](#).

⁹³ Based on: Fett et al. (2023) [Life cycle greenhouse gas emissions of residential battery storage systems: A German case study](#)

⁹⁴ DESNZ (2023), [Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal](#).

We monetise this using DESNZ's appraisal carbon values.⁹⁵

A.4 Implications of private rented sector regulations

Private rented sector (PRS) regulations require landlords to improve the energy efficiency of rented homes to meet minimum standards, subject to exemptions and cost limits. We model these in addition to the homes upgraded by Government funding. This is also an important element of the modelling to understand total heat pump uptake.

This involves two steps:

1. estimate the number of PRS households across England, Scotland and Wales; and
2. estimate the number of PRS households supported across England, Scotland and Wales.

We explain the approach in more detail below.

Number of fuel poor households in the private rented sector

First, we take the number of fuel poor English households in the PRS directly from DESNZ fuel poverty statistics (34% of households). Since we use the English definition of fuel poverty, we do not take figures on fuel poverty by tenure directly from Scotland and Wales. Instead, we adjust the English percentage based on the proportion of private rented homes across all households in Scotland and Wales.⁹⁶ This results in the assumption that 22% of fuel poor households in Scotland and Wales are in the PRS.

Number of fuel poor PRS households supported with upgrades

England and Wales

Landlords in England and Wales will be required to comply with minimum energy efficiency standards for privately rented homes by 1st October 2030. Subject to exemptions, they are required to meet fabric performance requirements and either a smart readiness or heating system requirement.

DESNZ's PRS Impact Assessment finds that by 2030, 63% of fuel poor PRS households have been upgraded.⁹⁷ This aligns with DESNZ's assumptions on non-consent and tenant turnover. We calculate that this figure is 64% by 2031.

⁹⁵ DESNZ (2023), [Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal](#). We use the central values.

⁹⁶ Scottish Government (2026). [Scottish Household Survey](#); Welsh Government (2026) [Dwelling stock estimates](#)

⁹⁷ DESNZ (2026). [Improving the energy performance of privately rented homes: impact assessment](#)

Scotland

Landlords in Scotland are expected to install insulation such that homes reach EPC Band C. Unlike England and Wales, there is no secondary requirement to install heat pumps or solar. The standards apply to new tenancies from 2028, with all remaining PRS properties brought into scope by 2033.

Since no data or impact assessment has been released, we make the following assumptions.

- First, we calculate the number of eligible tenancies in a given year based on the proportion of tenancies which are 'new' each year.⁹⁸
- Then, we assume that 63% of these (in line with uptake in England and Wales by the end of the deadline) receive upgrades.

As a result, we assume that 49% of fuel poor PRS households have been upgraded by 2031. This corresponds to 29,000 homes.

A.5 Number of fuel poor households upgraded with Government funding

This is undertaken in five steps:

1. calculate total funding;
2. calculate costs of each upgrade, for each archetype;
3. account for PRS upgrades, including heat pumps;
4. identify the upgrade packages for each archetype; and
5. allocate funding across archetypes.

We explain each step in turn below.

Calculate total funding

We first estimate the public funding already expected to reach fuel poor households over the modelling period. We include the following Government spending committed in the Warm Homes Plan.⁹⁹

- **Low-income home grants in England.** This totals £4.4 billion from 2025/26 to 2029/30. In the absence of better evidence, we assume that funding in 2030/31 and 2031/32 is equal to average funding over the period of the Warm Homes Plan. As a result, we model £4.8bn of funding from 2027 to 2031 (calendar years).

⁹⁸ Scottish Government (2024). [Key Findings - Tenants - Capping of rent increases on referral or appeal: equality impact assessment results - gov.scot](#)

⁹⁹ DESNZ (2026). [Warm Homes Plan \(HTML\) - GOV.UK](#)

- We exclude the £600m financial transactions for low-income households, as our model focuses on grants. Moreover, the mechanism through which the £600m of loan financing is to be allocated to low-income households has not yet been determined. Including it within our grant-funded cost envelope would therefore require assumptions about the structure, take-up and leverage of this finance that are not currently supported by government policy.
- **Barnett consequentials for Scotland and Wales**, to reflect the GB-wide scope of the analysis. We assume that Barnett consequentials total £1bn.¹⁰⁰ Roughly one-third of the total England funding goes to fuel poor households, and we therefore assume the same is true in the devolved administrations. Therefore, we model an additional £330m of funding. Since the split of this funding across the period is not clear (nor is the total pot of funding), we make the simplifying assumption that the £330m is spent over the five years of our modelling (2027 to 2031).

On top of this, we assume an additional £1.5 billion of annual funding – in effect, replacing the funding related to the end of ECO and GBIS.

We do not include the remaining funding from the Warm Homes Plan, as it is not directly targeted at fuel poor households.

Calculate capex costs

We first calculate the costs to upgrade each type of household, across our upgrade packages. We discuss each type of upgrade in turn below.

Costs of insulation to upgrade homes to an EER Band C level

The English Housing Survey provides data on the average cost to upgrade homes to EER C by property type, and separately by EER band (but not the cross-section i.e. by property type and EER band). We therefore need to make some assumptions to estimate the costs to upgrade homes to EER C for the cross-section of property type and EER band.

- We obtain data on the average cost to upgrade homes to EER C for a home that is in band D, E or F/G as reported by the English Housing Survey (step A).^{101,102}
- We obtain data on the cost to upgrade properties of different types (detached, semi-detached etc.) for a home that is in band D, E or F/G (again, as reported by the English

¹⁰⁰ A total of £1.5 billion is allocated to 'other Warm Homes Plan Programmes and Devolved Administrations', of which £428 million goes to other programmes. We therefore assume devolved administration funding is roughly £1 billion over the period.

¹⁰¹ Data is not available to split out homes between F/G bands.

¹⁰² See Ministry of Housing, Communities and Local Government (2026), [English Housing Survey 2024 to 2025](#): headline findings on housing quality and energy efficiency, Chapter 2: Energy efficiency, Annex Table 2.14.

Housing Survey) and calculate the ratio of the cost for each property type relative to the national average cost (step B).

- We multiply the cost to upgrade a home (step A) by the ratio of the cost for the house type compared to the national average (step B). The output of this step is a set of insulation costs for different combinations of property type and EER band.
- Lastly, since the English Housing Survey data is based on 2024 prices we uplift the insulation costs to 2026 prices.

Taking this approach means that we are assuming that the driver of variation in upgrade cost across properties is the property type and the starting EER rating, rather than the starting fuel type. We believe this is a reasonable assumption, as the type of insulation to be applied will not vary by fuel type. We also assume that these costs (based on the English Housing Survey) also apply to Scotland and Wales per property type (as noted in section 3 above, we are adjusting for the different mix of property types across the devolved nations).¹⁰³

Costs to switch to a heat pump

We estimate the costs to install a heat pump for these house types based on data underpinning the CCC's Sixth Carbon Budget,¹⁰⁴ updated to reflect the more recent estimates in the Seventh Carbon Budget.¹⁰⁵ The Sixth Carbon Budget data provide the disaggregated fixed, marginal and installation cost assumptions required for our modelling, including different additional installation costs depending on existing heating technology and property type.

We update the fixed and marginal technology cost using the CCC's more recent estimate of the capital cost of a first-time 12kW air source heat pump installation. The CCC estimates this cost at £10,900 in 2025 and £10,300 in 2030, in 2023 prices. We linearly interpolate between these values and take the average over 2025 to 2029. After adjusting this average to 2026 prices, this implies a 15% uplift to the fixed and marginal capex assumptions from the Sixth Carbon Budget.

Our modelling focusses on allocating air source heat pumps only, given the higher cost of ground source heat pumps. We note that ground source heat pumps will also have an important role in communal heating (which is outside the scope of this analysis).

There are three types of upfront capital costs.

¹⁰³ These are modelling assumptions. The underlying upgrade costs are taken from Ministry of Housing, Communities and Local Government (2026), [English Housing Survey 2024 to 2025: headline findings on housing quality and energy efficiency](#), Chapter 2: Energy efficiency, Annex Table 2.14.

¹⁰⁴ CCC (2020), [Sixth Carbon Budget](#).

¹⁰⁵ CCC (2025), [The Seventh Carbon Budget](#), Table 7.2.1.

1. **Fixed capex (£/asset):** We use the average over 2025 to 2029 of the CCC's fixed capex cost for an air source heat pump from the Balanced Pathway scenario, uplifted by 15% to align with the Seventh Carbon Budget cost estimate described above.
2. **Marginal capex (£/asset):** Heat pumps have a 'marginal capex' cost that varies according to the installed capacity of the technology. We use the average over 2025 to 2029 of the CCC's marginal capex cost for an air source heat pump from the Balanced Pathway scenario, uplifted by 15% to align with the Seventh Carbon Budget cost estimate described above. We estimate the installed capacity required based on the home's heating requirements after the insulation upgrade (and accounting for the rebound effect, which we apply when insulation is installed, see discussion further below).
3. **Installation costs (£/asset):** There are additional costs associated with switching from an existing heating technology to a new technology. For example, for homes with electric heating switching to a heat pump, this includes the installation of a wet distribution system.

We add the three capex components above to derive total heat pump costs for each house type. We adjust the capex costs for inflation where required. We assume the same heat pump costs apply in England, Wales and Scotland.

Solar and battery costs

We estimate the upfront cost of installing solar using the latest DESNZ solar PV cost data, which is based on installations recorded through the Microgeneration Certification Scheme (MCS).¹⁰⁶ We apply the relevant average installation cost per kW to each assumed system size to estimate the total solar installation cost.

Solar costs therefore vary by property type, reflecting differences in assumed system size, but do not vary by heating technology or starting FPEER band.

Battery cost

Similarly, we estimate the upfront cost of installing batteries using the latest DESNZ data on MCS-certified domestic battery installations.¹⁰⁷ We apply the relevant average cost per kWh to the assumed battery capacity for each household archetype (5.5kWh in all cases).

¹⁰⁶ DESNZ (2026). [Solar photovoltaic \(PV\) cost data - GOV.UK](#)

¹⁰⁷ DESNZ (2026). [MCS certified domestic battery installation statistics - GOV.UK](#)

Search costs

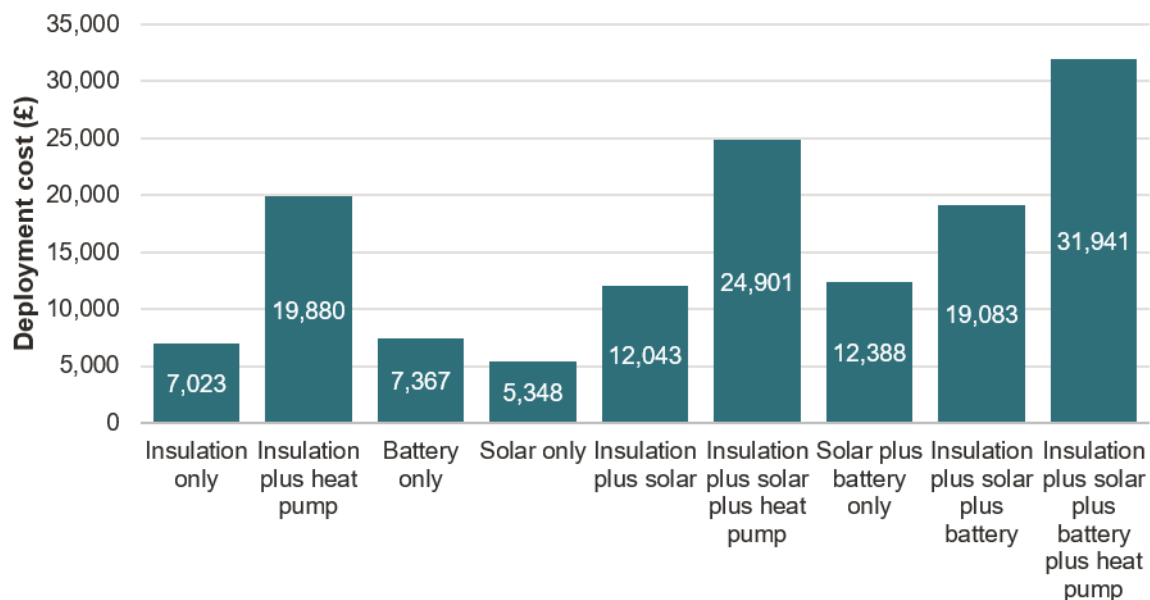
We also assume that there is a fixed search cost per home of £327 for homes on the gas grid and £544 for homes off the gas grid, based on the search costs assumed in the UK Government ECO4 Impact Assessment.¹⁰⁸

Cost of a given package

Each package is the sum of all technologies included in the package, plus a search cost.

The resulting capex costs vary across archetypes, although the pattern of costs is similar. Costs for an FPEER D terraced household with a gas boiler are set out in Figure 10.

Figure 10 Capex costs for an FPEER D terraced home with a gas boiler



Source: Frontier Economics

Upgrade package for each archetype

Every upgraded household in each archetype will receive one of two upgrade packages, selected from all nine upgrade packages modelled.

¹⁰⁸ See BEIS (2022), [ECO4 Final Stage Impact Assessment](#), Table 30. The ECO4 Impact Assessment presents search costs for different insulation measures. We calculate the average search cost across key insulation measures relevant for this work (i.e. wall insulation, floor insulation, loft insulation and heat pumps), and make an adjustment to uplift the 2021 costs to 2026 prices.

First, we allocate the package with the lowest upfront cost subject to achieving the following targets:

- a minimum £200 bill saving, to ensure that public funding is directed towards measures that deliver a material affordability benefit for fuel poor households; and
- a minimum £100 monetised emission saving, so that the allocation of funding supports the wider transition to lower-carbon homes.

In addition, we allocate heat pump packages such that 5%¹⁰⁹ of fuel poor households have a heat pump by the end of the modelling period (2031).¹¹⁰ This reflects the fact that a purely cost-minimising allocation would tend to favour cheaper technologies, particularly solar. Heat pumps are important for the longer-term transition away from fossil fuel heating. Heat pump packages must also meet the minimum bill and emission savings criteria: where a heat pump alone will not achieve £200 bill saving, it will be implemented alongside other technologies including batteries and solar.

Funding across archetypes

We allocate the available funding across archetypes in proportion to their prevalence in the fuel poor housing stock. For example, if 20% of all fuel poor households are in a given archetype, that archetype will receive 20% of the funding.

Some funding is left unallocated after this process, because in some archetypes there is a limit on the technical potential to upgrade homes and meet the bill and emission targets we have set. Where this is the case, we reallocate the funding to all remaining archetypes where there is still capacity for funding.

¹⁰⁹ As noted in Section 5.1, the 5% heat pump assumption is retained from our 2024 analysis and reflects a balance between heat pump deployment and a 'fabric first' approach for fuel poor households.

¹¹⁰ Based on DESNZ's PRS impact assessment, we assume that 6% of those upgraded via PRS in England and Wales receive a heat pump. We assume no heat pumps are allocated from PRS in Scotland as this is not a requirement of the legislation. We do not account for heat pumps allocated to fuel poor households through any other means, including SRS regulations or self-funded.

Annex B – Detailed bill and emission savings

This Annex builds on Section 4. We present the following.

- Bill savings for FPEER D terraced gas households (the most common archetype), under our high and low price scenarios. This is to provide an indication of how much bill savings could vary across scenarios.
- Bill and emission savings for FPEER D households, for each house type, split by the three heating fuels (gas, oil and direct electric). We focus on FPEER D households as they make up 80% of all fuel poor households. We provide additional insight into the equivalent savings for FPEER E and FPEER F/G households.

B.1 Gas households

Bill savings

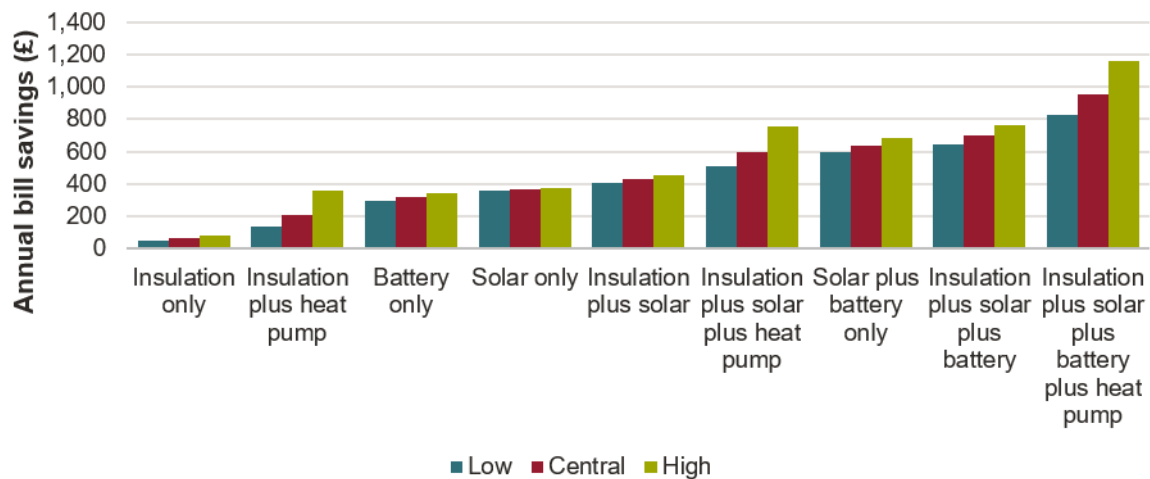
Impact of price scenarios

Given the uncertainty in future prices, we calculate three price scenarios: low, central, and high. These create three ‘potential states’ of the world.

Higher gas and electricity prices see increased bill savings across packages in contrast to lower gas and electricity prices. Since gas prices vary more than electricity prices across these scenarios, the greatest difference occurs in packages which reduce gas use.

- With an upgrade plus heat pump, bill savings are 35% lower in the low scenario and 70% higher in the high scenario (compared to the central scenario).
- With solar battery only, bill savings are 7% lower in the low scenario and 7% higher in the high scenario (compared to the central scenario).

Figure 11 Annual bill savings for an FPEER D terraced household with a gas boiler across price scenarios



Source: Frontier Economics

Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C

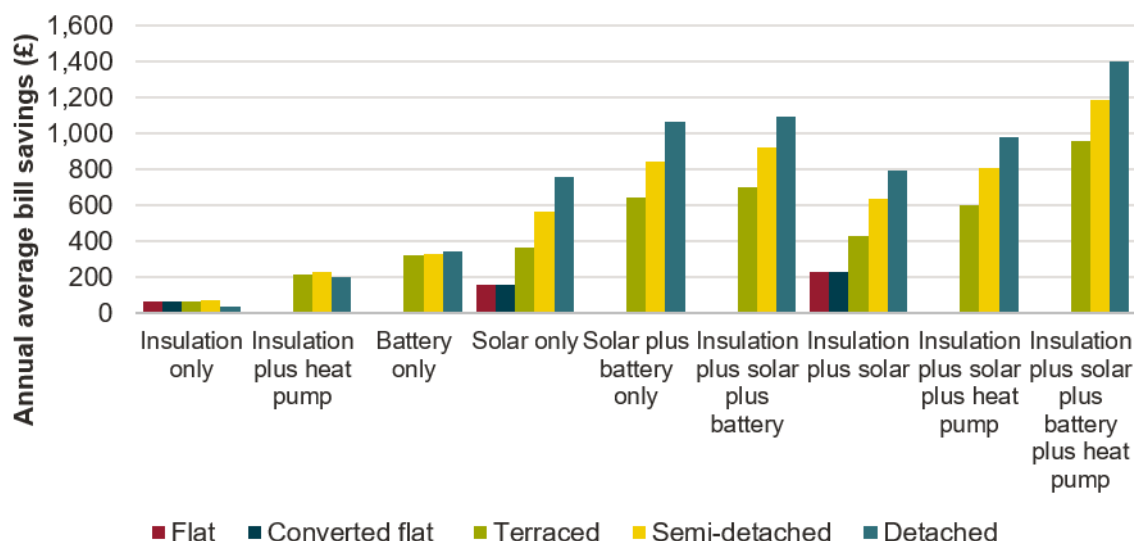
Various household types

Figure 12 presents the bill savings for all FPEER D households with a gas boiler.

We find that the pattern of bill savings is consistent across housing types, and findings align with the findings for terraced households presented in the main body.

The pattern is also similar for FPEER E and FPEER F/G households, but bill savings are slightly higher due to higher energy consumption. For example, an FPEER E terraced household sees savings of £122 - £1,022 (compared to £62 - £959 for the same FPEER D household).

Figure 12 Bill savings for FPEER D households with a gas boiler



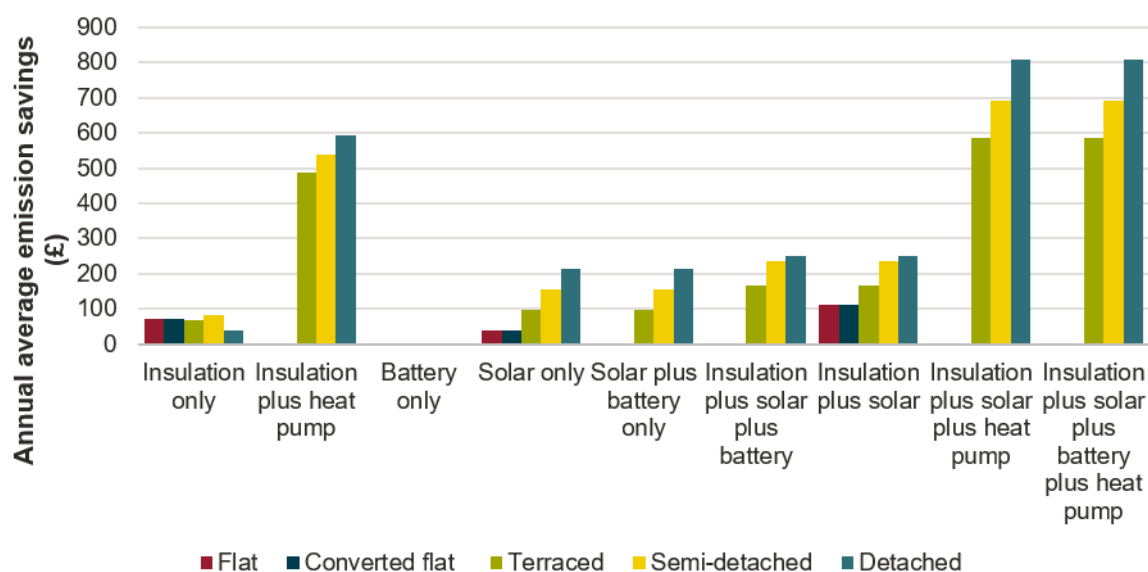
Source: Frontier Economics

Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C

Emission savings

Figure 13 presents the emission savings for all FPEER D households with a gas boiler. Like bill savings, the findings align with the findings for terraced households presented in the main body.

Figure 13 Emission savings for FPEER D households with a gas boiler



Source: Frontier Economics

Note: Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C.

B.2 Oil households

The most common archetype for oil households is FPEER D detached houses (31% of all oil households). Nearly two thirds of all oil households are in detached houses.

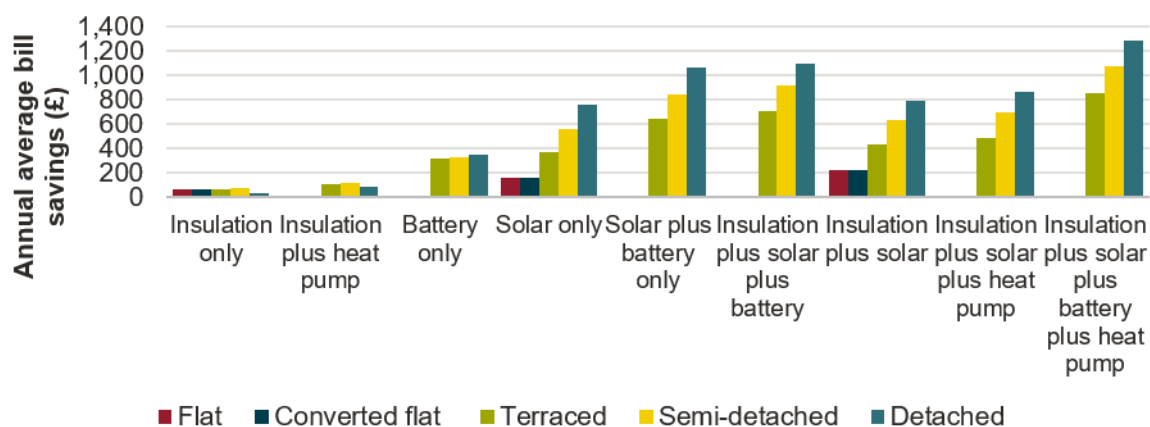
Bill savings

Figure 14 presents the bill savings for FPEER D households with an oil boiler.

We find that the pattern of savings is similar to gas households. Savings are slightly lower because oil prices are slightly below gas unit rates. Compared to gas households, savings are particularly low for an upgrade plus heat pump, because oil households do not save via the end of the gas standing charge.

Focusing on the most common housing type (detached houses), annual bill savings range from £33 to £1,282.

Figure 14 Bill savings for FPEER D households with an oil boiler



Source: Frontier Economics

Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C.

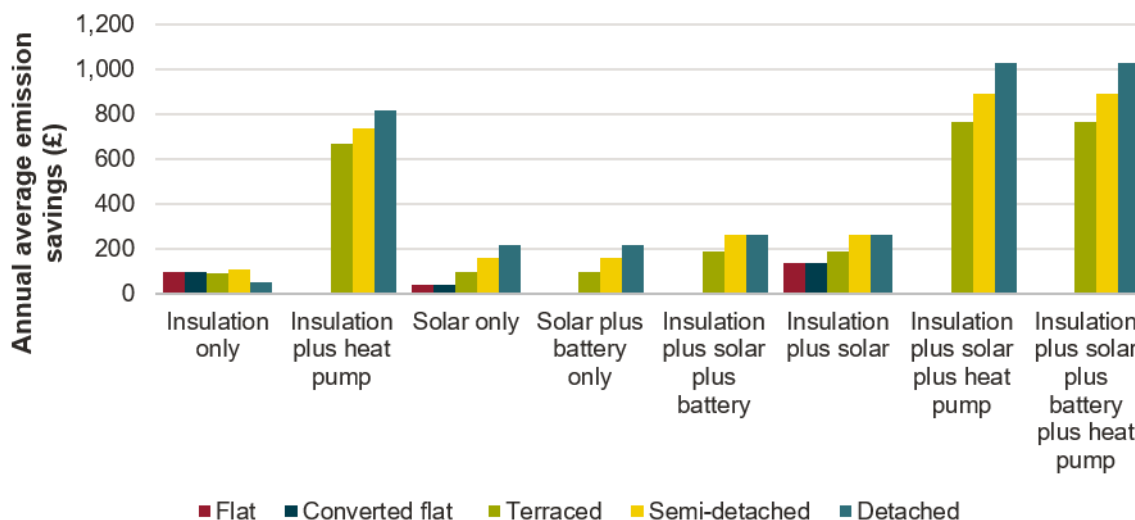
Emission savings

Figure 15 presents the emission savings for FPEER D households with an oil boiler.

For packages which reduce oil (upgrade and heat pumps), emission savings are slightly higher for oil households than gas households because oil has a higher emissions factor.

Focusing on detached households, an upgrade plus heat pump delivers £814 of monetised emission savings (compared to £595 for the same gas household). An insulation upgrade delivers £50 of monetised savings, and solar £213.

Figure 15 Emission savings for FPEER D households with an oil boiler



Source: Frontier Economics

Note: Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C.

B.3 Direct electric households

Roughly one-third of direct electric households are in FPEER D purpose-built flats. All types of flats make up three quarters of all direct electric households.

Bill savings

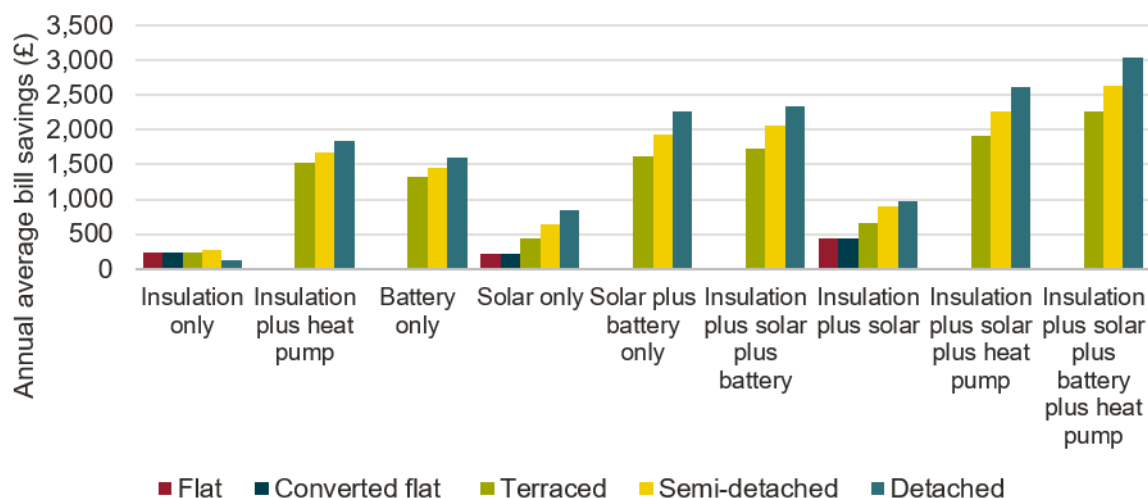
Figure 16 presents the annual bill savings for FPEER D households with direct electric heating.

High electricity prices coupled with high electricity use mean that direct electric households can see significant bill savings from upgrades.

Focussing on purpose-built flats, savings range from £215 to £444 (for a small subset of packages: insulation upgrade only, upgrade plus solar and solar only). Considering a terraced household (that has access to all packages), savings are as large as £2,271 under the complete packages.

Time-of-use tariffs make up a significant proportion of the savings for all battery packages, as these households can realise large benefits from shifting their sizeable electricity demand to off-peak hours.

Figure 16 Bill savings for FPEER D households with direct electric heating



Source: Frontier Economics

Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C.

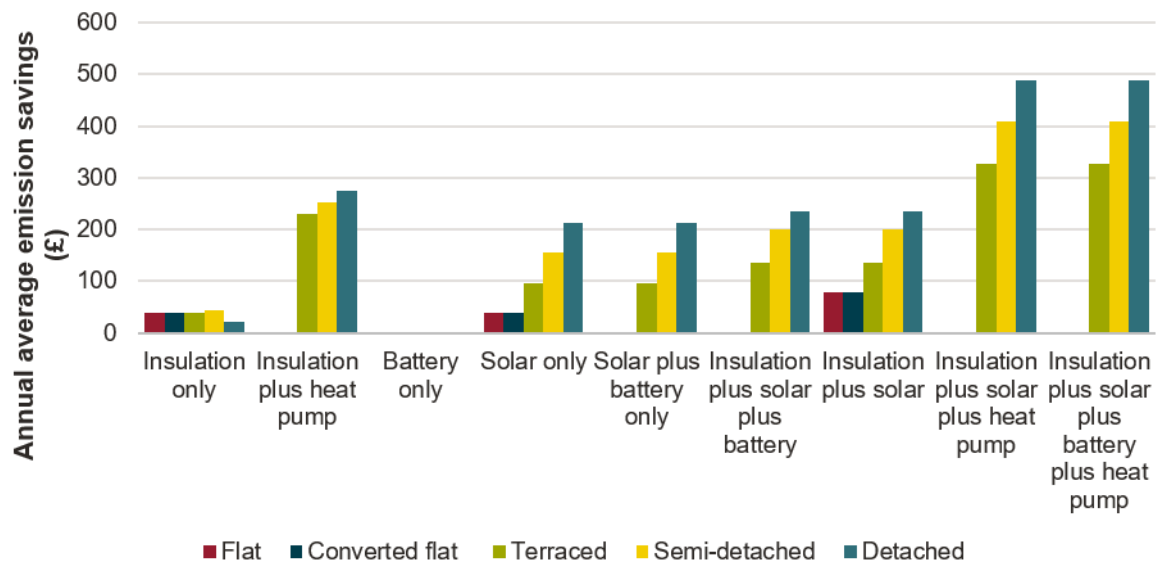
Emission savings

Figure 17 presents the annual emission savings for FPEER D households with direct electric heating.

Emission savings are lowest for direct electric households, because electricity generates lower emissions than fossil fuels.

Focussing on FPEER D purpose-built flats, upgrades generate £40 of monetised emission savings. Flats cannot get heat pumps in our model: a terraced house generates emission savings of £229 (less than half the saving of the same household with a gas boiler).

Figure 17 Emission savings for FPEER D households with direct electric heating



Source: Frontier Economics

Note: Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C

Annex C – Additional bill savings in a price spike scenario

In this section, we consider how bill savings change where there is a price spike. This allows us to understand the potential additional benefit in protection against price spikes that home upgrades can deliver.

In this Annex, we set out:

- the implication of the price spike on prices across our modelling period (2027-2031); and
- the impact on bill savings achieved from each of the packages for oil and direct electric homes, in the year of the price spike.

Equivalent results for gas households are presented in Section 4.1.1.

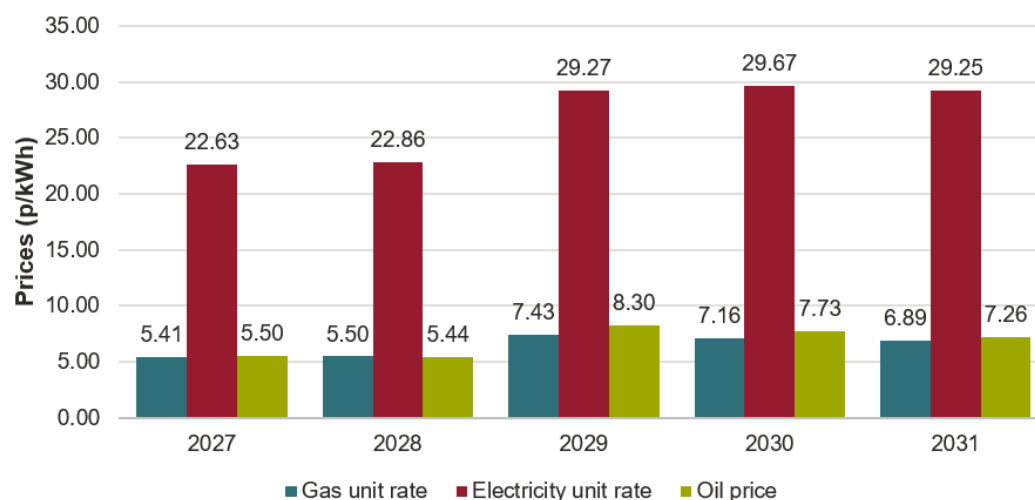
C.1 Impact on prices

As set out in Annex A.2, we align our approach with the CCC's approach as part of its Seventh Carbon Budget advice and assume the price spike is in line with the observed increase in wholesale prices between 2021 and 2022 (as a result of the Russia/Ukraine war).¹¹¹

We assume that the price spike occurs in 2029. This is a purely illustrative assumption: it does not reflect an expectation that a price spike will occur in that year.

Figure 18 presents the modelled unit rates for electricity and gas, and the oil price per unit.¹¹²

Figure 18 Illustrative prices under a price spike scenario



¹¹¹ CCC (2026). [Progress in reducing emissions 2026 report to Parliament](#). Cost of Net Zero by 2050 less than a single fossil fuel price shock

¹¹² Standing charges are not affected by the price spike and so are not presented here.

Source: Frontier Economics

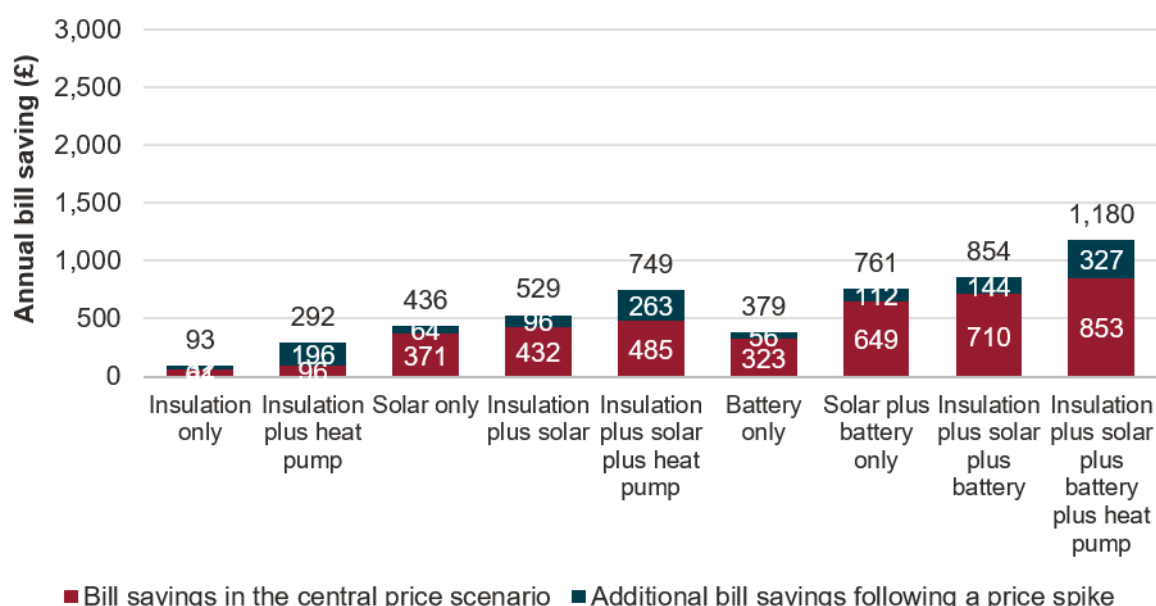
Note: Prices are illustrative, subject to significant uncertainty and based on simplifications.

C.2 Oil households

Figure 19 shows the results for an oil household.

As for gas households (see Section 4.1.1), the additional savings are greatest in packages which switch from fossil fuels (oil). Comparing a price spike scenario to the non-price spike scenario, savings are 204% higher for an upgrade plus heat pump (i.e. three times higher) and 53% higher with an upgrade only following a price spike.

Figure 19 Bill savings for FPEER D terraced households with an oil boiler, in the central scenario vs the price spike scenario, in the year of a price spike



Source: Frontier Economics

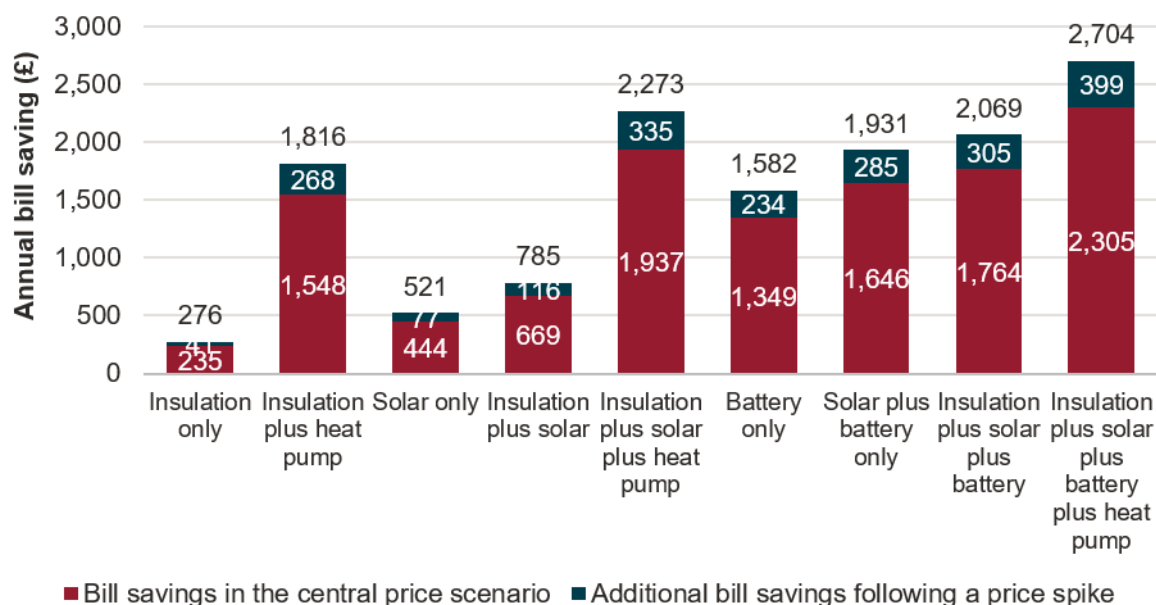
Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C

C.3 Direct electric households

Figure 20 presents the results for a direct electric household.

We find that bill savings rise by 17% across all packages, in line with the increase in the electricity price. The increase in bill savings is lowest for direct electric households, as electricity prices grow less than oil or gas prices.

Figure 20 Bill savings for FPEER D terraced households with direct electric heating, in the central scenario vs the price spike scenario, in the year of a price spike



Source: Frontier Economics

Note: Bill savings do not include upfront costs. Solar savings vary slightly across the three nations of GB. 'Insulation' means an insulation upgrade to bring the household up to band C

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