NO HOME LEFT BEHIND

FUNDING A JUST TRANSITION TO CLEAN HEAT IN SCOTLAND

Dave Hawkey

February 2024

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This paper was first published in February 2024.

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ABOUT THIS PAPER

The transition to clean heating requires investment right across Scotland's housing stock. How can we ensure that investment drives a just transition, sharing costs and benefits fairly? We model different policy approaches, testing them against several dimensions of fairness. We find the fairest way to deliver investment as retrofit moves from niche to mainstream, is to share a high proportion of costs via the public finances.

ACKNOWLEDGEMENTS

Thanks to the Pebble Trust for its support of this work, and to Oxfam Scotland and the Scottish Federation of Housing Associations for partnering in and supporting for this work.

Thanks also to participants at our policy development workshop to everyone else with whom we have discussed the analyses underpinning this paper.

Finally, thanks to Lewis Ryder-Jones, Eli Harji, Joshua Emden, Henry Parkes, Philip Whyte, Casey Smith, Jamie Livingstone, Susie Fitton and Cassandra Dove for comments and feedback through this research.

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Citation

If you are using this document in your own writing, our preferred citation is:

Hawkey D (2024) *No home left behind: Funding a just transition to clean heat in Scotland*, IPPR Scotland.

http://www.ippr.org/articles/no-home-left-behind

SUMMARY

Retrofitting all homes by 2045 needs a massive acceleration in the number of households upgrading their energy efficiency and installing clean heating systems. The pace of change must grow dramatically, from fewer than 10,000 homes per year at present to well over 100,000 each year to 2045 (Scottish government 2021, 2023b, 2023c).

Achieving that acceleration is a complex policy challenge cutting across planning, delivery, supply chains and more. In this paper we focus on one critical issue: how the cost of retrofit should be covered.

Clarity on questions of cost is critical to a just transition. The impact of moving to clean heating must be to reduce inequalities, not widen them. But a just transition must also be seen to be fair. This is because the transition needs far greater participation across society than we have seen so far. For households in Scotland to agree to widespread participation – whether that be by consenting to new regulations or by taking voluntary action – they need to know that their own contribution is part of a truly just transition that shares the costs fairly. Without this, the transition will neither be fair nor reach the pace demanded by the climate emergency.

To explore fairness issues, we have constructed a model of the heat transition. By combining information about the retrofit characteristics of buildings with data on the demographics of households, we are able to explore how different policy packages impact different groups. This allows us to understand the fairness implications of a range of policy approaches.

Within our model, the upfront cost of retrofitting homes in Scotland falls largely in the range of £10,000 to £15,000 per home. Crucially, costs are similar across the income spectrum. This means that, if no policy were in place to share costs, the transition would have a deeply regressive impact, costing poorer households a much larger proportion of their income than richer households. It is therefore critical that Scottish government sets out explicitly its approach to how retrofit costs will be shared.

> Recommendation 1. **Scottish government should set out a clear long-term approach to how the costs of transition will be shared across households, structured transparently around social and environmental principles of fairness.**

Those principles should take into consideration differences in households' financial circumstances. Households with the broadest financial shoulders should make the greatest contribution, both because they have the greatest financial resources available, and in order that the transition helps reverse the growth of inequality. Asking those with higher incomes to make a greater contribution also aligns with the 'polluter pays' principle, one of the Scottish government's 'guiding principles' on the environment (Scottish government 2023e). This is because, on average, households with higher income levels also have higher overall emissions (Owen et al 2023). Importantly the polluter pays principle should not mean that households whose current heating system is more polluting should contribute more – heating emissions today are largely the legacy of past decisions (on infrastructure, building standards, energy policy and so on).

In putting fairness principles into practice, the first priority must be to support those with the least. Households experiencing or at risk of poverty, and those with heating-related vulnerabilities, should not be expected to finance the upfront costs of retrofitting their home. In addition, while our modelling anticipates most households will see lower energy bills as a result of the transition, this expectation should be underwritten for low-income and vulnerable households.

> Recommendation 2. **Build on the precedent established by the Warmer Homes Scotland programme and commit to full grant funding for low-income and vulnerable households. Expand energy cost protection to low-income and vulnerable households who use clean heating to shield them from unexpected price movements. This should be delivered as Winter Heating Payments for qualifying households that are set at levels determined by energy prices and the clean heating technology a household has installed.**

Support for low-income and vulnerable households should also underpin the Scottish government's approach to supporting clean heating retrofit in social housing, given these groups comprise around 80 per cent of social tenants. If support for social landlords is inadequate, this raises the real risk they will have to pass costs on to their tenants in higher rents, undermining the sector's crucial role in tackling poverty.

> Recommendation 3. **Provide clarity to the social housing sector on future funding for energy efficiency and clean heat, allowing social landlords to plan expansion of retrofit programmes to a pace adequate to energy and climate change targets. The level of funding should reflect what is being asked of social housing, particularly where required standards are higher than those required of other tenures. As a minimum, the funding package for social housing retrofit should not fall below the budget Scottish government would need if social tenants were supported under programmes offered to owner-occupiers and private renters.**

For owner-occupiers and private renters who would not qualify for the support above, additional issues of fairness must also be addressed. Alongside fairness across the income distribution, the Scottish government's policy approach should make clear how the allocation of costs between households who retrofit early and those who retrofit late will be fair. Without this, the transition risks creating financial incentives for households to retrofit as late as possible, delaying the speed of transition and undermining the acceptability of regulations that will require some households to retrofit earlier than others.

Our modelling shows that the fairest and most effective way to balance these objectives is by providing upfront grants. These shift the balance of households' contribution to the cost of the transition by reducing the amount they must pay directly at the point of retrofit in exchange for contributing to the transition via taxes. This reduces the impact of a household's retrofit on its own financial position, and so counters the private financial incentive to prefer later retrofit.

We have modelled alternative approaches to tackling incentives to delay, and find they are less fair. These approaches aim to minimise the role of the public finances by making grants available only to low-income and vulnerable households. Households that are not eligible for a grant must finance costs directly, creating a financial incentive to defer these costs by delaying retrofit. This dynamic could, in principle, be counteracted with additional policies that incentivise the use of clean heating, for example by using subsidies to drive a very large shift in the balance between gas and electricity prices. But such policies must be paid for, either through public spending (defeating the attempt to minimise the role of public finances) or by transferring resources from households who use polluting heating to those using clean heating. When we model the latter approach, we find regressive effects: some low-income households see higher costs because they retrofit late, while some high-income households benefit because they retrofit early. Any policy approach that effectively transfers resources from low- to high-income households in this manner would run counter to distributional fairness and should be rejected.

> Recommendation 4. **Develop a long-term grant offer available across the income spectrum. The size of grants should reflect both the different cost of retrofit for different homes, and the income level of the receiving household. For those households that are ineligible for full grant funding, this would mean the after-grant cost households pay themselves would be more reflective of their financial circumstances than whether the cost of undoing the legacy of fossil fuels in their own home happens to be high or low.**

The total cost of delivering the support side of the package we have modelled is in the region of £1 billion per year. This is a significant increase on current budgets, so the Scottish government's approach should also set out how these costs would be funded.

In this paper, we outline one specific approach to taxation that could be used to raise the revenue needed to cover the cost of support, namely the application of a Just Transition Supplement on income tax. This approach has the advantage of being a modification to an established progressive tax that is already largely devolved. Other options which should also be considered include the use of reformed local taxes, or the introduction of wealth taxes or taxes aimed at high-emitting activities (Blom and Walsh 2023). In considering options, the Scottish government should examine both their revenue potential as well as their role in ensuring the transition reduces inequality.

> Recommendation 5. **The Scottish government's heat strategy should recognise the role of progressive taxation in securing a just transition. For households ineligible for full grants, the strategy should set out clearly how the government's approach balances higher taxes with lower requirements for households to finance retrofit costs directly, making explicit the implications for fairness. A Just Transition Supplement on income tax should be used as a benchmark against which to test other options.**

1. INTRODUCTION

The transition to clean heat is an unprecedented project for Scotland. Virtually all our homes need a retrofit to raise energy efficiency standards and switch away from using fossil fuels (Scottish government 2023b).

Moving retrofit from its current niche cottage industry to mass deployment will raise new challenges. Today a small number of households are choosing to upgrade their heating systems and social landlords are installing clean heat within the constraints of Scottish government funding support. But retrofitting all homes by 2045 needs a massive acceleration from fewer than 10,000 clean heat retrofits per year to over 100,000 (Scottish government 2023c; Audit Scotland 2024).

That acceleration has implications for how the transition is paid for. At today's slow pace, clean heating retrofit in Scotland is generally supported by Scottish government grants (Scottish government 2023c). But when considering the full cost of transition, the Scottish government's position has been that "clearly, the cost cannot be borne by the public sector alone" (Scottish government 2021, p4), and to emphasise the role of private finance.

However, where the balance should lie between public funding support for households and self-financing is unclear in Scottish policy. The absence of concrete proposals to handle the cost of transition risks undermining confidence, and stymies judgement as to whether the transition will be fair. We address this absence by considering what a fair policy package to pay for the heat transition should look like.

We must be clear about what the costs of the heat transition represent. We have inherited a building stock deeply dependent on fossil fuels. Much of this legacy was formed long before our commitments to tackle climate change. We are transitioning to a different housing stock, with different costs – often lower energy bills but more sophisticated heating systems. But to get there we face a large investment cost of undoing the shared legacy of fossil fuels – the polluting heating systems and poor efficiency levels – built into the fabric of our homes. Some of these costs will form part of long-term ongoing costs, such as the replacement of a clean heating system at the end of its life. But others (particularly energy efficiency, infrastructure, radiators and pipework), where needed, should be considered one-off costs of conversion.

HOW WE APPROACH "RETROFIT" IN THIS REPORT

Following Scottish government, we refer to boilers that use fossil fuels as 'polluting heating systems', and alternative heating systems that do not release emissions at the point of use as 'clean heating systems'.

Our analysis is driven by the switch from polluting to clean heating systems, as this is the only way to achieve emissions reductions on the scale demanded by the 2045 net zero target.

Scotland's building stock needs both an energy efficiency upgrade and the replacement of polluting heating systems with clean heating systems. We take a 'fabric first' approach, and assume that, where a home does need an energy efficiency upgrade, this either accompanies a clean heating system, or happens earlier. After retrofit, a home in our analysis will have both a clean heating system and a good level of energy efficiency.

The benchmark we use for whether a home needs to upgrade its energy efficiency is whether its Energy Performance Certificate (EPC) rating is worse than band C.

The clean heating systems we consider are air-source heat pumps, district heating connections and electric storage heaters.

Viewed narrowly at the level of homes in Scotland, undoing the legacy of polluting heating represents a net financial cost. That is because, while investment in retrofitting energy efficiency and clean heating will be offset by lower energy costs over time, upfront costs will not be fully offset (Climate Change Committee 2020). That should not dampen our determination to retrofit our homes. As well as the contribution of retrofit to improving our homes, to jobs and to economic development (Emden and Rankin 2021; Jennings et al 2022; WWF Scotland 2023), undoing the legacy of polluting heating systems is an urgent requirement if the already spiralling impacts of the climate crisis – which are disproportionately being faced by people in low-income and climate vulnerable countries, who generate few, if any, emissions – are to be minimised.

But the narrow financial view is important to ensuring the transition is just. The financial costs of the transition in Scotland must be shared fairly between social groups and across the income spectrum, reducing, not exacerbating, socioeconomic inequalities. Tragically, the cost of living crisis is deepening these inequalities, as growing numbers of households struggle with the invidious choice between heating and eating (Fitzpatrick et al 2023).

This trend must be reversed, and so the first and clearest priority for a just transition must be to enhance, not damage, the financial security of those with least.

This imperative, of course, applies irrespective of whether someone owns their home or rents. In particular, the important role social housing plays in reducing poverty among low-income tenants is a critical value that must not be compromised (Whyte et al 2023). Retrofit support must be fair across tenures.

Beyond protection for low-income households, a just transition means a progressive distribution of costs: those with the greatest resources should contribute most. This will help rein in growing economic inequalities, but is also aligned with the polluter pays principle. On average, households' consumption- and travel-related emissions increase with income (Owen et al 2023). A greater financial contribution from wealthier households will be distributionally fair and also help redress this carbon inequality, mirroring the principle of common but differentiated responsibility to address climate change, embedded in international processes, particularly the Paris Agreement. Critically, however, the polluter pays principle does not mean that households whose current heating system is more polluting should pay more – heating emissions are the legacy of past decisions far more than the result of choices households make today. As such, this report focuses on a household's income level when assessing whether policy approaches reflect the polluter pays principle.

Differentiated financial contributions to retrofit in Scotland also raises questions about timing. We must ensure financial contributions are fair between households who retrofit early and those who retrofit later – with Scottish government's 'backstop' date for all homes to use clean heating being 2045, over two decades away. The risk of unfairness arises in part because costs are expected to be lower further in the future (Scottish government 2023b). But it also reflects the general value people attach to being able to defer costs

(Cohen et al 2020). If households have to make their financial contribution to the overall transition at the same time as they retrofit their home, this will create an incentive to retrofit closer to the backstop date rather than in the near term.

This incentive to delay represents a potentially huge barrier to wider policies aimed at accelerating the pace of retrofit. For example, area-based delivery programmes could coordinate local supply and demand, benefit from scale economies, establish local social norms for participation and coordinate retrofit with infrastructure development (Butterworth et al 2011; Scottish Energy Networks Strategic Leadership Group 2021; National Infrastructure Commission 2023). But for participation in an early area-based scheme to be successful, policy also needs to ensure households don't see a financial advantage to retrofitting at a later date.

Area-based schemes are just one example of where fairness between early- and late-retrofitters is important for policy success. The Scottish government has set out the need for regulation to drive higher rates of retrofit (Scottish government 2021, 2023b), but the logic of any regulatory approach is that some households will be required to retrofit earlier than others. Addressing fairness between early- and late-retrofit is therefore critical to securing the widespread support necessary to underpin the democratic legitimacy of regulations.

In summary, a deliverable just transition for heat will need to do the following.

- Ensure all households can retrofit their homes. This means low-income and vulnerable households must be supported with the costs of transition.
- Ensure costs are fair across the income spectrum – meaning a progressive distribution, which also aligns with the (broad) polluter pays principle.
- Ensure fairness between households that retrofit early and those that retrofit late – both as a value in itself, but also to prevent costs giving households an incentive to prefer to defer retrofit into the future.

To explore how these forms of fairness can be delivered, we have constructed a statistical model of Scotland's homes, combining details about their construction and energy performance with information about the lives and incomes of the people who live in those homes. We use this model to test various approaches to paying for the heat transition.

Of course, where policies rely on government grants, this money must come from somewhere, particularly at a time where the outlook for the Scottish government budget is bleak. Within our model, we combine analysis of the costs of retrofit with the distribution of progressive taxes used to cover higher heat-in-buildings budgets.

Our modelling aims to capture the range of outcomes. Whereas other studies have sought to do this by modelling a dozen or so situations (Sissons et al 2022; WWF Scotland 2023), our model draws on energy models and sociodemographic data to produce over 24,000 archetypes. Through this modelling, we build a rich picture of how policy choices will shape financial fairness in the heat transition.

While our model captures the diversity of retrofit across the transition, there remain many uncertainties and assumptions embedded in this complex area. We present costs to give a sense of scale, but emphasise these are broad estimates with much uncertainty. More important than the precise estimates are the insights we generate into how different policy approaches affect the distribution of costs across households.

2.
IPPR SCOTLAND HEAT IN HOMES MODEL

As the aphorism has it, all models are wrong but some are useful. We have constructed a model of the heat transition to explore the consequences of different policy approaches. In doing this we rely on a wide range of estimates, assumptions and approximations. The model is not a crystal ball, but a tool to illustrate in broad terms how costs are shared across society. We do present order-of-magnitude estimates of cost (all in 2023 prices), and often err on the side of caution. But the precise figures we present are less important than the patterns and relationships they reveal. It is these that policymakers need to take into account when making policy that allocates costs across society.

Our analysis combines household microdata from the Scottish Household Survey (Scottish government and Ipsos Mori 2021) with cost, energy and technology suitability information taken from Element Energy modelling commissioned and published by the Scottish government (Scottish government 2023d). These assumptions include cost reductions over time, as well as anticipated improvements to technology performance (for example, improvements to the efficiency of heat pumps). We supplement these sources with further cost assumptions from the Climate Change Committee's analyses for the sixth carbon budget (Element Energy 2021) and UK government's Green Book guidance on energy prices (Department for Energy Security & Net Zero 2022).

We combine these to produce a statistical model of the heat transition. We allocate each household the lowest lifetime-cost technology among the Scottish government's (2021) strategic priorities technologies – air-source heat pumps and district heating – with electric storage heaters where neither of these technologies is suitable.

By assuming electric storage heating in all homes that do not use an air-source heat pump or district heating, we omit potentially cheaper running cost options, such as communal systems in flats or air-to-air heat pumps (WWF Scotland 2023). The actual configuration of technologies, particularly in the minority of homes where mainstream options are not available, is a persistent uncertainty in the transition. Our model errs on the side of caution, assuming a relatively expensive running cost option as a way of exploring the policy response that may be needed to handle this potential challenge. Where this assumption risks skewing our results, we omit these households from analysis.

We have not modelled either hydrogen or bioenergy options. Should these technologies prove to be available for widespread use and at lower cost than the options we have included, this could relieve the financial pressure on our model. But we cannot embark on the transition in the hope that the acute challenges to widespread hydrogen and bioenergy use – high cost, low volumes, competing uses in harder-to-decarbonise sectors (Climate Change Committee 2018; National Infrastructure Commission 2023) – will be resolved.

The pace of retrofit has a critical bearing on how costs are distributed, particularly in relation to the extent of government support for retrofit costs.

The faster the pace of retrofit, the higher the amount of support needed in any given year, but also the faster emissions from heating will be reduced. In our model, we assume a fixed timeline for retrofit. That is, the timing of each household's retrofit is an input to the model, not something that is estimated in response to policies. This is because our focus is on how different policies alter the balance of who ultimately pays for the transition, and the timing of each household's retrofit will be determined by a broader range of factors, including regulations.

The timeline we have assumed reflects Scottish government policy. Unfortunately, ambition in this area has recently been scaled back. While the Heat in Buildings Strategy (Scottish government 2021) set an ambition for over a million homes to switch from fossil fuels by 2030, that target has now been abandoned, with no alternate timeline proposed beyond the intention that all homes use clean heat by 2045 (Scottish government 2023b).

We assume Scottish government policy succeeds in driving rates of retrofit higher than recent performance of well below 10,000 conversions per year (Scottish government 2023c). We assume deployment rates increase to an average 100,000 per year from 2026 to 2030, and a steady pace of 130,000 per year thereafter to reach the whole stock by 2045.

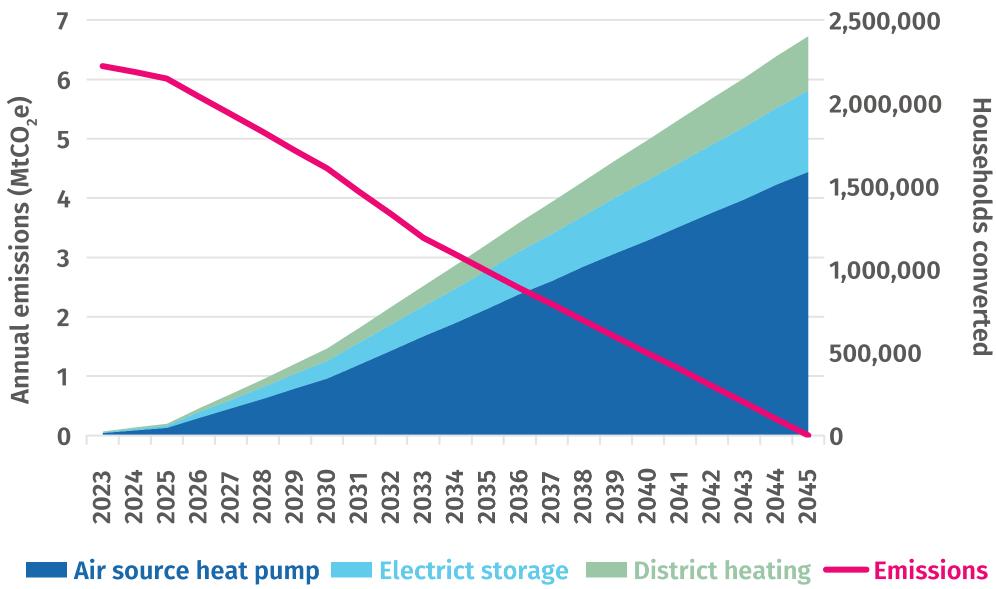
We also assume homes reach a good standard of energy efficiency: where homes are currently below an Energy Performance Certificate (EPC) rating of C, we assume they improve their energy efficiency to an EPC C at the same time as installing clean heat.[1] Homes for which electric storage heating is the only option in our model are assumed to improve their energy efficiency even if they are already at EPC C or better to avoid very high energy bills. Where a household installs clean heat after 2033, we also model them as upgrading their energy efficiency at some point between 2024 and 2033. This reflects the Scottish government's proposal to set minimum energy efficiency standards to be met by 2033, though for simplicity we do not model different standards at different dates for different tenures (Scottish government 2023a, 2023b).

Figure 2.1 shows the deployment pathway we assume across our cost modelling. We have also estimated emissions along this pathway. In its last Climate Change Plan, Scottish government (2020) projected emissions from heat in buildings (domestic and non-domestic) would fall to 2.6 MtCO2e in 2030. Our pathway misses that target by quite some distance. This is mainly because our pathway does not deliver the million conversions by 2030 that used to be Scottish government's policy. While not the main focus of this report, the Scottish government's scaled-back ambition for retrofit in the 2020s will either need to be reversed – with knock-on implications for the scale and speed of the retrofit programme – or it will need to identify additional emissions reductions elsewhere in the economy if the statutory 2030 emissions reduction target is to be met. The Scottish government is expected to publish an updated Climate Change Plan some time in 2024, explaining how it will meet its overarching 2030 target.

1 Scottish government (2023b) is currently consulting on an alternative approach to energy efficiency standards for the private sector, based on a required list of measures rather than a target EPC level, the main impact of which is likely to be to reduce requirements for solid wall insulation. As we discuss, solid wall insulation may drive some of the higher costs in our model, though this effect is not overwhelming.

FIGURE 2.1: DEPLOYMENT OF CLEAN HEATING TECHNOLOGIES IN HOMES ASSUMED ACROSS OUR MODELLING

Cumulative retrofit conversions, and emissions from heat in buildings. Emissions are also affected by energy efficiency upgrades that happen before heating system conversion (not shown on chart).



Source: IPPR Scotland Heat in Buildings model, using data from Element Energy (2020) and Scottish Household Survey (Scottish government and Ipsos Mori 2021).

CAPITAL COSTS

The cost of retrofit varies depending on interactions across new and old heating systems, insulation, and the type and size of building. In our model, the retrofit cost for the majority of homes falls in the range of £10,000 to £15,000. Homes modelled as connecting to district heating see much lower upfront costs, as these are assumed to be borne by the heat network provider, which recovers them through heat charges (Element Energy 2020).

Costs are broadly similar across the income spectrum. There is a slight tendency for costs to rise with income as wealthier households are more likely to live in larger homes and have uninsulated solid walls. However, the broad similarity of costs means retrofit costs (before any financial support) make a much higher proportion of low-income households' income. Unchecked, the heat transition risks significantly regressive costs.

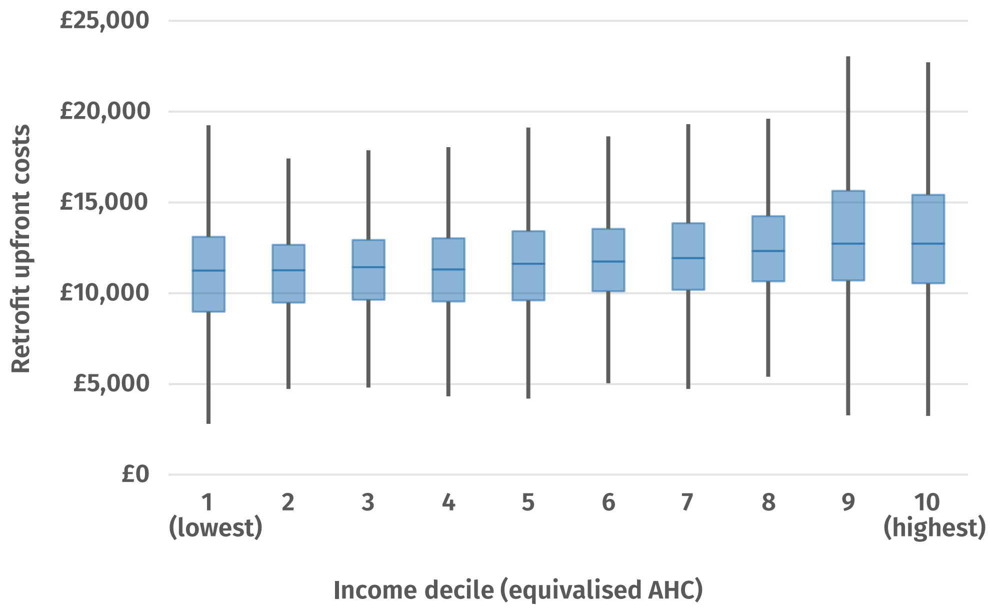
Figure 2.2 shows the main distribution of costs estimated in the model. The figure does not include outliers, but these are worth mentioning. Around 10 per cent of homes are modelled as having capital costs over £20,000, predominantly because we have modelled these homes as needing solid wall insulation. The role of solid wall insulation in the transition, particularly the extent to which it will be required to meet regulatory energy efficiency standards, is uncertain.[2] Our model again errs on the side of caution, drawing on the relatively high efficiency standards embedded in the modelling sources we have considered (Element Energy 2020). However, the impact of this caution is not overwhelming, with the total of the

2 The uncertainty has been increased by the Scottish government's (2023b) proposal to adopt a more relaxed energy efficiency standard, though not for social housing.

excess of costs over £20,000 accounting for around 7 per cent of the total capital cost across the whole building stock.

FIGURE 2.2: UPFRONT RETROFIT COSTS SHOW LITTLE VARIATION ACROSS THE INCOME SPECTRUM

Distribution of total retrofit costs (energy efficiency and clean heating upgrade) across households grouped by equivalised disposable income (after housing costs – AHC).



Source: IPPR Scotland Heat in Homes model, using data from Element Energy (2020) and Scottish Household Survey (Scottish government and Ipsos Mori 2021). Note: Boxes represent the interquartile range – the costs for half of households in each decile fall within the box – and the midline represents the median cost. The whiskers (the lines above and below each box) extend to 1.5 times the interquartile range. Outliers are omitted, but discussed in the text.

IMPACTS ON ENERGY BILLS

Will retrofit leave households with higher or lower energy bills? The answer to this will vary across different technologies. Here we focus on the change in energy bills when a household switches from a polluting boiler to an air-source heat pump (ASHP). We focus on this group because it is the most common type of retrofit in our model.

The impact of retrofit on energy bills will depend on energy prices. Our central analysis uses UK government (2022) gas and electricity retail prices assumptions. With these price projections, we find most households would see reduced bills due to retrofit (WWF Scotland 2023), with the average being around £50 to £100 per year. This saving is the outcome of several factors combined. While the price of one unit of electricity remains considerably higher than a unit of gas throughout the period, the efficiency of a heat pump and the reduced heat demand due to energy efficiency upgrades offsets this difference. For households switching away from gas, no longer paying a gas standing charge also contributes.

Translating these modelled savings into real-world bill reductions is, of course, dependent on the model's assumptions matching reality. This requires retrofit to meet quality standards like PAS 2035,[3] ensuring that heat pumps achieve high

3 See: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2030-installation-of-energy-efficiency-measures-in-existing-dwellings/

efficiency and that insulation adequately keeps heat from leaking out of the house. Our discussions with social housing providers for this report suggest target heat pump performance levels can be achieved in practice, though there are examples where outcomes have been disappointing, such as oversized heat pumps resulting in low efficiency levels. Embedding high standards in delivery and monitoring real-world performance will be important to securing confidence in the impact of retrofit on energy bills.

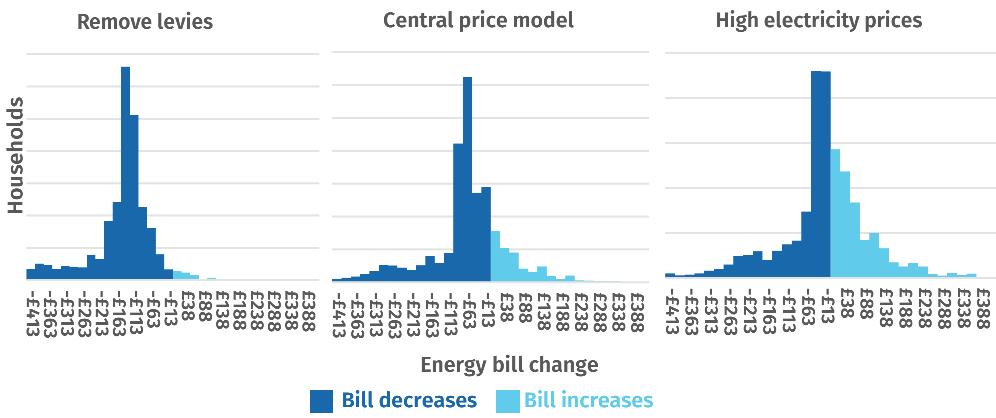
The likelihood and size of energy bill savings could be increased through the use of reserved powers by the UK government. Energy prices currently include levies – additional costs which energy suppliers collect from households to fund a range of policies including social policies and legacy renewables support, which primarily apply to electricity tariffs (Boorman et al 2021). Moving these costs into general taxation would have an immediate progressive impact, shifting the burden away from low-income to higher income households (Emden and Rankin 2021). It would also improve heat pump energy bills relative to gas (figure 2.3, left panel).

In his independent review of net zero policy, commissioned by the UK government, Chris Skidmore MP (2022) recommended this approach. In response, the UK government has committed to "outline a clear approach to gas vs electricity rebalancing by the end of 2023/4" (Department for Energy Security & Net Zero 2023).

However, the future of energy prices is a critical uncertainty. The approach the UK government might take to rebalancing is not yet known, and recent experience has demonstrated how volatile energy prices can be. In the right-hand panel of figure 2.3, we present a pessimistic scenario, in which electricity prices are high relative to our central scenario. While this outcome would represent a UK government policy failure, it highlights the sensitivity of energy bill impacts to future price developments. A just transition in Scotland must handle this risk, and give low-income households security that they would be protected if energy prices drove higher costs for clean heat.

FIGURE 2.3: HOUSEHOLDS RETROFITTING WITH A HEAT PUMP SHOULD SEE SAVINGS IN THEIR ENERGY BILLS, BUT THIS DEPENDS ON RELATIVE PRICES

Distribution of energy bill impacts for households retrofitting an ASHP in the year they change heating system, as compared with the bill they would have paid continuing to use a gas or oil boiler and not upgrading energy efficiency.



Source: IPPR Scotland Heat in Homes model, using data from Element Energy (2020), Scottish Household Survey (Scottish government and Ipsos Mori 2021) and Green Book price assumptions (Department for Energy Security & Net Zero 2022).

3.
PROTECTING LOW-INCOME AND VULNERABLE HOUSEHOLDS

The Heat in Buildings Strategy commits the Scottish government to "ensure that interventions through our delivery programmes do not have a detrimental impact on fuel poverty and build in additional support where required to ensure people can continue to enjoy warm homes that are affordable to heat" (Scottish government 2021). For the transition to be just, this cannot mean delivery avoids households in or at risk of poverty or fuel poverty. The heat transition and economic inequality are two challenges that must both be solved, not traded off each other.

SUPPORT FOR FUEL BILLS

As noted above, UK reserved energy policy should aim to ensure heat pumps deliver a cost advantage. However, Scottish government policy should be ready to protect low-income households in the event prices drive clean heating costs higher, making good on its 'no detriment' commitment without jeopardising the transition.

How should this be done? The evolving system of Winter Heating Payments (WHP) recognises some households have additional heating needs, and some, such as elderly households, are vulnerable to low temperatures. The scope of WHP should be expanded to include low-income households that use clean heating, with payment rates calculated to broadly cover the difference between a typical heating bill for a home with zero direct emissions heating (ZDEH) systems and a home with a gas boiler. This would protect low-income and vulnerable households from the risk that energy prices do not favour clean heating systems. Naturally, the size of payment will vary depending on the heating system in place, with, for example, households using electric storage heaters more exposed to electricity prices than those with heat pumps. We have modelled a two-rate system, one for heat pumps and one for storage heaters.

On our central price forecast, the size of this heating assistance could be around £90 in the latter part of this decade, falling to £20 to £40 in the 2030s and costing Scottish government around £10 million per year. With the removal of levies from electricity bills, payments within our model would actually fall to zero. The value of this mechanism, though, is its response to adverse changes in energy prices, giving low-income households confidence that retrofit will not disadvantage them financially, however energy prices evolve. In our high electricity price scenario, the mechanism would compensate low-income households at around £60 to £90 in the 2030s and 2040s. Should prices see a similar spike to that which we are currently experiencing, our model estimates compensation would be around £130 per year.

Costs for support to households installing higher running cost heating are more speculative, not least because we have restricted our focus to electric storage heaters as the most widely available alternative to ASHPs. Support for those installing storage heaters on our assumptions would be in the region of £500 per year in our baseline scenario. Here, technology alternatives are likely to reduce costs, such as air-to-air heat pumps (WWF Scotland 2023).

CAPITAL COSTS FOR VULNERABLE AND LOW-INCOME HOUSEHOLDS

The Warmer Homes Scotland (WHS) scheme recognises that low-income and vulnerable households need support to replace heating systems and improve energy efficiency. The scheme currently meets the full costs of retrofitting qualifying households in the private sector. This policy already embodies important principles of fairness in Scotland, identifying groups who should be supported with retrofit costs. Qualifying households include those in receipt of a 'passport benefit'[4] and those without central heating where someone aged over 75 lives (Energy Saving Trust 2023). We estimate just over a quarter of owner-occupied or private rented households – almost 500,000 – fall within these categories.[5]

As well as protecting the WHS target group, a just transition should prevent costs being loaded onto households experiencing poverty or fuel poverty. The WHS qualifying benefits do not fully capture households in poverty, with only 37 per cent of owner-occupiers and private renters who experience poverty receiving passport benefits, meaning around 200,000 households in poverty in private housing do not qualify.[6] A just transition will require the eligibility for full support to be expanded to include households experiencing poverty.

This brings around 700,000 private sector households into scope of support for low-income or vulnerable households; around 35 per cent of the total private sector. Because these households should not be expected to pay the additional costs of transforming the housing stock, we model 100 per cent grant funding for owner-occupiers and private renters in these groups.

The annual cost of this support depends on the pace at which homes are retrofitted, which we have assumed to be the same across the income spectrum. On our central trajectory, the annual cost would reach around £350 to £450 million per year.[7]

4 The list of passport benefits is: Adult Disability Payment; Armed Forces Independence Payment; Attendance Allowance; Carer's Allowance; Constant Attendance Allowance; Council Tax Reduction (excluding 25 per cent discount, for example students or single persons); Scottish Child Payment; Child Disability Payment; Child Tax Credit; Disability Living Allowance; Housing Benefit; Income Support; Income-based Jobseeker's Allowance (JSA); Income-related Employment and Support Allowance (ESA); Industrial Injuries Disablement Benefits; Pension Credit – Guarantee; Personal Independence Payment (PIP); Severe Disablement Allowance; Universal Credit; War Pensions Mobility Supplement; Working Tax Credit (Energy Saving Trust 2023).

5 Author's analysis of Scottish House Condition Survey microdata 2017-2019.

6 Author's analysis of DWP Households Below Average Income average over 2019-2022.

7 A portion of these costs may be offset by current energy supplier obligations and their potential successors. With ECO4 aiming to deliver £4 billion over four years, and the Great British Insulation Scheme an additional £1 billion over three years (UK government 2023), a Scotland share of these programmes may reach around £100-150 million per year. However, given supplier obligations are part of the complex of energy levies that risk both regressive impacts and disincentives to switch to renewable heat (Boorman et al 2021), and in the context of growing calls for levies to be moved to general taxation, we do not model a long-term role for supplier obligations.

4. A FAIR DEAL FOR SOCIAL HOUSING

Social housing providers have a long track record of upgrading their stock in response to regulatory standards. Both the Scottish Housing Quality Standard and the Energy Efficiency for Social Housing standard have driven up energy efficiency levels, making the socially rented stock more energy efficient than private housing (Scottish government 2023g).

The Scottish government (2023a) is currently consulting on a new Social Housing Net Zero Standard, which comprises both a fabric element and a requirement to install clean heating by 2045. The consultation sets out the current funding available to social landlords, and states "future levels of available funding will depend on decisions at those times".

The need for substantial support is clear. The aggregate cost of retrofit in social housing falls in the range £250 to £300 million per year, or an average additional cost per tenancy of around £400 to £500 per year. That is, in the absence of grant support, landlords would need to increase annual rents by an average of £400 to £500 (in 2023 prices) on top of inflation and other increases factored into their existing financial models. Given the high proportion of social housing tenants who have low incomes, this would clearly be a catastrophic failure of a just transition.

It is important to note that, while social landlords could in principle borrow to finance retrofit, this mechanism has less impact on annual costs to households than it does for owner-occupiers. This is because finance takes one year's cost and spreads it over multiple years. For social tenants, we already assume annual costs are spread, but over tenancies rather than time. Through this cost-sharing, each tenant, in effect, pays the additional cost of their retrofit over time (including some tenants paying before their own home is retrofitted). Were landlords to borrow to finance retrofit, this would defer rent increases as retrofit-debt built up, but would not reduce the eventual rental impact, and indeed may increase it due to additional interest payments.

In addition, social landlords do not have limitless borrowing capacity, and the more this is used for heat and energy efficiency retrofit, the less it is available to finance increases in the social housing stock. This challenge is all the more pressing in light of the huge uncertainty caused by Scottish government's cuts to its Affordable Housing Supply Programme reaching 37 per cent over the last two years (Spowage et al 2023).

Currently social housing providers (housing associations and local authority landlords) receive support through the Social Housing Net Zero Heat Fund (SHNZHF).[8] The size of the fund – £200 million to be spent over a six-year period to 2026, or an annual average of £33 million – is small by comparison with the future annual costs estimated above. The fund also operates on a competitive basis, which can create risk and delay, and may be an unsuitable approach for high-volume retrofit programmes.

8 See: https://www.gov.scot/publications/social-housing-net-zero-heat-fund---call-for-funding-applications/

What scale of funding should Scottish government prepare for? We look at this in two ways: first, we extrapolate a funding package from the SHNZHF, estimating the cost of grants covering a similar proportion of upfront costs as the current scheme. Second, we construct a comparison with our recommendation above for grant support to low-income and WHS-qualifying households in the private sector – how much funding would that approach provide to social housing tenants if they instead lived in private housing. This comparison is not intended as a recommended funding model, with funding for each social landlord reflecting the demographics of their tenants. It is instead used as a benchmark to test whether funding for social landlords would be fair in the context of our recommended approach to funding for private housing.

The SHNZHF fund currently supports just over half of retrofit costs, contributing up to 60 per cent of the costs of clean heating systems and up to 50 per cent of the costs of energy efficiency.[9] Along our pathway, we estimate that would amount to around £150 to £200 million per year funding from Scottish government. The remaining retrofit cost would require social landlords to spend around £100 to £150 million per year, or a ballpark of £150 to £200 added to annual rents.

Would funding at that level represent a just transition? One way of approaching this is to compare funding across private and social housing sectors. We approach this question by asking what grant support the Scottish government would provide to social housing tenants if, instead, they were in the private sector. Such comparison naturally depends on the funding support we assume is made to the private sector. Later in this report we explore a range of funding packages for private housing, but here we focus on support for vulnerable households and those in poverty or fuel poverty.

We estimate around 80 per cent of social tenants either receive WHS-qualifying benefits or experience poverty, or both.[10] This high rate reflects the critical role social housing plays in supporting some of the most disadvantaged groups in Scotland. If these social tenants were instead in the private sector and received full grant funding, the Scottish government would need an additional budget allocation in the region of £200 to £250 million per year.

This comparison is not a recommendation for a specific funding formula for social housing providers. That is something that will need further engagement between the sector and Scottish government to understand the distributional implications of different approaches. But a funding level that falls below the private sector comparator will tend to leave social housing tenants paying more than they would if they were owner-occupiers or rented property in the private sector.

Given these findings, the Scottish government should set out a clear commitment to long-term funding to support social housing clean heat retrofit. As well as underpinning fairness with households in the private sector, support should be designed to enable social landlords to plan an increased pace. This means funding mechanisms should afford a greater degree of certainty in how costs will be shared than the current competitive SHNZHF system, which adds risk to project development.

As noted in chapter 2, as with any modelling exercise, there are limits to the accuracy of our estimates. In particular, social housing providers we have spoken with have reported relatively high maintenance costs and sometimes disappointing lifespans of clean heating systems. Scottish government should work with social

9 SHNZHF offers slightly higher funding levels in rural areas, to reflect additional cost drivers. We have not incorporated those drivers in our model, and so do not model the higher rural support rate under SHNZHF.

10 Analysis of DWP Households Below Average Income, average proportion in Scotland 2018 to 2021.

landlords as part of its overarching approach to monitoring and evaluation of heat transition policy, identifying any potential issues that might be driving costs above assumptions, but likewise ensuring real-world experience informs its approach to funding levels.

5. POLICY PACKAGES

To explore policy options to fairly cover the costs of the heat transition, we have constructed four policy packages, each taking a different approach to balancing the different forms of financial fairness across the heat transition.

We have argued above that the Scottish government's policy package should include full support for low-income and vulnerable households, and that the amount of support available to social landlords should match the support that Scottish government would otherwise give if those households were in the private sector.

All four of our policy packages, therefore, include these design features (including updating the budget for social housing support to match where packages make more support available to owner-occupiers and private renters).

- **Package 1: Protect.** Low-income and vulnerable households receive a full retrofit grant, and additional price-responsive Winter Heating Payments to shield them from the risk of higher bills.
- **Package 2: Incentivise.** In addition to the support in package 1, energy companies are required to reduce the cost of domestic electricity, and pay for this by increasing the cost of domestic gas until a target ratio is reached. This package compensates retrofitting households' upfront installation costs by making the ongoing running costs of a heat pump cheaper than those of a gas boiler, both by cutting the cost of the former and raising the cost of the latter. We set the electricity to gas prices at a level at which, within our model, clean heat fuel bill savings are about the same size as the costs of a retrofit loan repayment. This ratio is 2.3 (in other words, 1 kWh electricity costs the same as 2.3 kWh gas). The aim of this package is to compensate retrofitters for having to pay upfront costs, but to do so without increasing public spending.[11] It does this by the policy running through energy suppliers, who offset the cost to them of reducing electricity prices by drawing higher revenue from increased gas prices. As energy pricing is a reserved policy area, this approach would require UK government action.
- **Package 3: Cap costs.** This package draws inspiration from France's successful income-relative approach to retrofit funding (Energy Saving Trust and Green Alliance 2023), under which higher grants are available where more extensive work is undertaken. Instead of an ongoing incentive, grants are provided to cap the upfront cost faced by a household, with the cap being based on household income.[12] Households would pay costs up to the cap, with grants covering all costs above the cap. In our simple model, the bottom third of households by

11 In addition to the price rebalancing incentive, we have also analysed a rough model that uses council tax, with a £600 discount to households using clean heat funded by higher council tax rates. The impacts of the two policies are very similar, both in their effect on financial incentives and the distribution of costs. We have not modelled Land and Buildings Transaction Tax (LBTT) as an incentive, an option proposed by the Green Heat Finance Taskforce (2023). This incentive is, in effect, equivalent to an upfront grant, would be relatively modest for the average home (LBTT is around £1,000 on an average house price of £195,000) and would only apply when a home is sold.

12 The Scottish government (2023b) has suggested cost caps may be needed, but proposes these as a way of exempting households from the transition, risking both emission targets and the habitability of those homes as unabated fossil fuels are phased out.

income have a cap of £0, the middle third £2,500 and the top third £7,500, with grants covering all costs above the cap.

- **Package 4: Full grant.** To test the boundaries of cost sharing via tax and subsidies, we model a package that fully grant funds all households' retrofit costs across all tenures. This package reflects the recommendation from Scotland's Climate Assembly (2021) that all households be given a grant to retrofit their home.

These packages explore different approaches to distributing the cost of the transition. The first – protect – is focused on protecting the most economically disadvantaged in society from additional costs. All other packages build on the protect package, implementing additional policies in conjunction with protections for the most economically disadvantaged.

The second package – incentivise – aims to promote fairness between those who retrofit early and those who retrofit late while keeping the impact on the public finances as low as possible. It does this by bringing the overall annualised cost to a household of installing and using a clean heating system in line with the equivalent cost for polluting heating, so households do not see a jump in costs when they retrofit (annualised costs are described in more detail in the next section). Because households do not see a jump in costs when they retrofit, this removes the financial driver to prefer to retrofit later in the transition.

The third package – cap costs – also aims to bring the costs of installing and using a clean heating system close to the equivalent of using polluting heating, but does so by tackling the upfront costs. This approach would have a larger impact on the public finances than the first two packages, though this impact is mitigated by requiring households to contribute some costs directly. Household contributions are designed to scale upwards with incomes, supporting an overall progressive impact. By limiting the upfront costs households must cover, the financial incentive to delay retrofit is reduced.

The fourth package – full grant – transfers all upfront retrofit costs from households to the public finances, financed through taxation. This means the direct impact of retrofit on households' finances is limited to the change in ongoing costs – energy bills and maintenance costs.

TABLE 5.1: SUMMARY OF POLICY PACKAGES

<table>
<tr><th>Package</th><th>Low-income and vulnerable households</th><th>Grants for households not eligible for full grants</th><th>Ongoing retrofit incentive</th><th>Social housing</th></tr>
<tr><td>Protect</td><td>Full grants and energy price protection</td><td>No grants</td><td>None</td><td rowspan="4">Budget for social housing matches the funding level that would be available if these households were in the private sector</td></tr>
<tr><td>Incentivise</td><td>As protect</td><td>No grants</td><td>Gas and electricity price rebalancing</td></tr>
<tr><td>Cap costs</td><td>As protect</td><td>Grants tailored to cap household upfront costs according to their income</td><td>None</td></tr>
<tr><td>Full grants</td><td>As protect</td><td>100% grants</td><td>None</td></tr>
</table>

Source: Authors' analysis

In chapter 7, we explore how Scottish government spending to support households could be balanced by using taxes to generate matching revenue. Within both our cap costs and full grant packages, households exchange lower upfront costs for higher taxes.

Across all packages, we follow the UK government's recommended energy price assumptions for policy analysis (Department for Energy Security & Net Zero 2022). We have not assumed electricity levies are moved over to general taxation as UK policy on this is an ongoing uncertainty. The rebalancing of gas and electricity prices in our incentivise package represents a significantly larger shift in relative prices.

6. MINIMISING THE FINANCIAL DISINCENTIVE TO RETROFIT

In this section we consider the financial consequences to households that arise when they switch from polluting heating to a clean heating system under our four policy packages. To examine this, we calculate a 'retrofit financial impact' to reflect the change in a household's financial position caused by the retrofit of their own home.

CALCULATING THE RETROFIT FINANCIAL IMPACT

The retrofit financial impact measures how a household's financial position changes as a consequence of their own retrofit. It does this by comparing costs a household faces when retrofitting with the costs the household would otherwise face if it continued using its polluting heating system.

The change in a household's financial position depends on how much financial support they can access, the upfront costs of retrofit they must cover themselves and changes in ongoing costs, particularly energy bills. It may also depend on financial incentives put in place by policymakers.

These costs have different time profiles – upfront costs may be large but one-off, while changes in energy bills may be smaller but recur each year. To combine costs into a single measure, we convert upfront costs to an annual equivalent. We do this by modelling households as taking on debt to cover the upfront costs they are left with after receiving any grants.[13]

This calculation reflects a core part of the Scottish government's approach to the heat transition: expanding the availability of private finance. This is an area explored by the Green Heat Finance Taskforce (2023), noting a range of barriers on both lending and borrowing sides. Our calculation assumes Scottish government's strategy is successful in overcoming those barriers and, perhaps optimistically, that all households are able to access the same low interest rate.[14]

To simplify our analysis, we model private rented housing as equivalent to the owner-occupied stock. The policy packages we model make the same grants available to owners and landlords, and our calculation of the retrofit financial impact allocates all remaining costs to tenants (for example, loan repayments are passed on as higher rents). While this simplification ignores issues like split incentives and the details of interaction between landlord costs and rents, it gives us a first approximation of the financial impact of retrofit on private renters under different policy packages.

13 In reality, some households might cover upfront costs by spending their savings rather than taking on debt. In terms of opportunity costs, the two are broadly equivalent. The household who takes on debt has less disposable income available each year after servicing their debt. The household who uses savings cannot spend those savings again, and so has less purchasing power each subsequent year.

14 We assume all households use property-linked finance at an annual interest rate of 3 per cent over a term that matches the expected lifetime of the household's zero emissions heat system, or 20 years for other upgrade costs.

We combine annualised upfront costs with ongoing costs (fuel bills, maintenance and so on) to estimate the size of a household's financial incentive / disincentive to switch to clean heat.[15] This simulates the financial decision a household would be confronted with – for example, if fuel bill savings are expected to be higher than loan repayments, the net financial impact will be a saving.

Because we focus on the change in household costs due to their retrofit, the calculation does not include contributions that a household might make to overall costs which are not tied to their own retrofit. Where a policy package funds support through an increase in taxes, we model households as paying the additional tax both before and after they retrofit. That means the retrofit financial impact is not the total financial contribution a household makes. It is the change in costs they see when they switch to clean heating.

To simplify our analysis, we focus on the retrofit financial impact faced by owner-occupiers and private renters who switch from a polluting heating system to an air-source heat pump. This means that, in this section, we are looking at the retrofit financial impact for a large group of households (around a million), though not the entirety of Scotland's 2.4 million households. Further work would be needed to detail the dynamics of retrofit financial impacts for other groups. Our analysis here, though, illustrates the broad issues confronting policymakers when considering the financial impacts of retrofit from households' perspectives.

Under our minimal protect package, as shown in the top left panel of figure 6.1 above, some households see fuel bill reductions that outweigh upfront costs (blue shading), but these are a minority. They are generally households who receive full upfront cost support. The most common retrofit financial impact when switching to a heat pump on these assumptions would be a disincentive (orange-red shading) in the region of £500 to £700 per year, though some households would see this reach above £1,000. Many middle-income households would be confronted with a retrofit financial disincentive of more than £500 per year.[16]

By bolting on a running-cost incentive, the incentivise package shifts this picture (top right panel of figure 6.1). Most households see similar costs before and after retrofit, creating a broadly neutral retrofit financial impact (white shading). Only a small minority would be confronted with a financial disincentive of over £300 per year. Because this package cuts heat pump running costs, it also creates positive incentives, mainly among households receiving upfront grants.

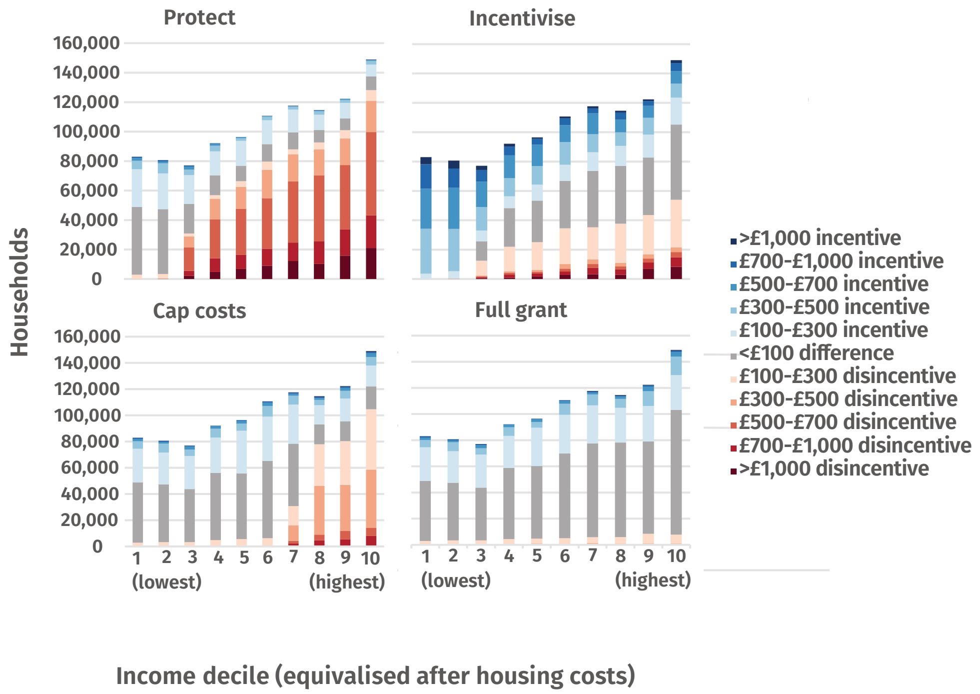
The cap costs (bottom left panel of figure 6.1) and full grant (bottom right panel of figure 6.1) packages reduce or eliminate the principal cost driver – upfront costs – from the financial impact of retrofit. This leaves most households with fuel bills as the decision-relevant impact, which in our model is generally favourable to retrofit. Under cap costs, financial disincentives apply only at the upper end of the income spectrum where they are likely to be less significant to household decisions.

15 For each modelled household, we calculate costs in the year they install ZDEH, and compare the annualised costs with ZDEH with annualised costs without change. Costs include impacts of policies, so, for example, low-income households may receive ZDEH winter heating assistance.

16 As noted above, we do not assume energy levies are transferred to general taxation. While removing levies would mitigate some of the additional cost, the impact on the difference between incumbent and retrofit energy bills, around £100-150 per year (see figure 2.3 earlier in this report), is small compared to most retrofit financial disincentives.

FIGURE 6.1: RETROFIT FINANCIAL IMPACT FOR HOUSEHOLDS SWITCHING FROM POLLUTING GAS OR OIL BOILERS TO AIR-SOURCE HEAT PUMPS

Annualised retrofit financial impact arising at the point of retrofit. Excludes social housing.



Source: IPPR Scotland Heat in Homes model, using data from Element Energy (2020), Scottish Household Survey (Scottish government and Ipsos Mori 2021) and UK government Green Book price assumptions (Department for Energy Security & Net Zero 2022). Note: the number of households in each income decile is not constant because we are only considering a subset of households based on tenure and clean heat technology.

Tackling the retrofit financial impact is an important aspect of a successful just transition policy package. But we also need to examine what the distributional impacts of the different packages are. To do that, chapter 7 sets out the revenue side of each package, and chapter 8 brings together households' contributions via taxes and direct spending to understand how each distributes the overall costs of the transition.

7.
RAISING REVENUE TO COVER PACKAGE COSTS

All four of our packages necessitate an increase in Scottish government spending. This is because we have assumed the transition shakes out of its current sluggish pace and accelerates to a speed that can reach the whole housing stock by 2045, reflecting the urgent necessity of reducing emissions. Our minimal ‘protect’ package would require a budget in the region of £650 to £750 million, which is more than the £360 million allocated in the 2024-25 budget (Scottish government 2023f). Given the growing long-term pressures on finances across the public sector (Scottish Fiscal Commission 2022), we do not assume public spending on the heat transition can be financed without additional revenue being raised.

Money available to the Scottish government is determined by a mix of UK government decisions and devolved taxes. As homes in other parts of the UK will also need support to remain liveable as fossil fuels are phased out, UK government will confront similar challenges to those set out above.

How the UK government responds will shape the relationship between retrofit support spending and taxpayer contributions.

- Should support at UK level increase, the Scottish budget would see consequential increases. If the UK government funded its additional spending with reserved tax increases, depending on how these are designed, some households and/or businesses in Scotland would see higher tax bills.
- If the UK government used non-reserved taxes, the block grant adjustment – the mechanism through which the Scottish budget is adjusted – would reduce the Scottish budget by a compensating amount, creating a need to raise additional revenue in Scotland.
- Finally, if the UK government is slow to drive the transition, the delivery of more ambitious Scottish targets will also need revenue raised through the use of devolved tax powers in Scotland.

Across all options, a proportion of Scottish households will therefore be exposed, via higher taxation, to the cost of support provided across the income distribution with retrofit costs.

To deliver a just transition, those with the broadest shoulders should contribute more – not only because they have the greatest financial resources available, but also to reflect the strong correlation between, on average, household incomes and their contribution to emissions (Owen et al 2023). In practice this means the cost of support should be collected via progressive taxation, with higher contributions reflecting individuals’ level of income and wealth. As well as traditional tax mechanisms that could deliver revenue progressively, significant revenue potential lies in a range of options targeting high emission activities, such as a frequent flyer levy or taxes on high-emission luxury travel (Blom and Walsh 2023).

While several progressive options are available, we represent the broad effect of using devolved income tax powers, with a new Just Transition Supplement added to existing rates and progressively rising across tax bands.[17] While our model assumes a higher supplement at the top end of the income spectrum, it does gather contributions across the income spectrum. This allows us to test whether a broad-based tax supplement risks undermining the principle that low-income households should be protected, and whether an alternative tax targeting just the top of the income spectrum would be fairer. Such options include adding the supplement only to the highest income tax rates, or alternatively targeting other taxes, such as the UK government using reserved powers over capital gains tax to raise rates, thereby shifting the basis of the Just Transition Supplement towards wealth.

TABLE 7.2: ANNUAL COST OF MODELLED POLICY PACKAGES, AND BROADLY ILLUSTRATIVE INCOME TAX IMPACTS

Package	Annual spend via Scottish government (with breakdown)	Illustrative income tax impacts via a new Just Transition Supplement		
		Starter, basic and intermediate rates	Higher and advanced rates	Top rate
Protect	£650-750 million (comprising £400-500 million support to low-income and vulnerable households, and £200-250 million support to social landlords)	0-1%	~1%	1-2%
Incentivise	£550-700 million (comprising £350-450 million support to low-income and vulnerable households, and £200-250 million support to social landlords)	0-1%	~1%	~1%
Cap costs	£1-1.3 billion (comprising £400-500 million support to low-income and vulnerable households, £250-300 million support to social landlords, and £350-500 million other grants)	1-2%	2-3%	3-4%
Full grant	£1.3-1.7 billion (comprising £400-500 million support to low-income and vulnerable households, £250-300 million support to social landlords, and £600-800 million other grants)	~2%	3-4%	4-5%

Source: IPPR Scotland Heat in Homes model and IPPR Tax and Benefits Model. Note: illustrative tax rates are calibrated to raise target revenue levels after accounting for behavioural response using Scottish Fiscal Commission (2018) methodology, though should be taken as broadly illustrative rather than precise. Estimate ranges reflect the modelled evolution of costs and deployment rates over the period 2025 to 2045. Component ranges do not always sum to headline ranges as policy components change at different paces, so minimum and maximum levels do not always happen at the same time.

In estimating the tax revenue needed, we do not assume support for heat decarbonisation is entirely additional spend. The Scottish draft budget for 2024-25 allocates £360 million to heat and energy efficiency. We assume real terms spend of this scale (which we round up to £400 million per year, reflecting the broad nature of cost estimates in this report) is already factored into future Scottish budgets, and assess the taxation needed to fund costs above this level.

17 We model the parts of income tax which are devolved to Scotland, namely non-savings, non-dividend income tax.

Table 7.2 sets out Scottish government spend under each package, and an illustrative Just Transition Supplement added to income tax adequate to cover the additional cost. The size of the supplement would grow over time to reach the level set out in the table. Note that all packages assume the same underlying cost scenario, so costs not covered by Scottish government are faced directly by households in Scotland.

8.
WHO PAYS?
THE DISTRIBUTION OF FINANCIAL IMPACTS ACROSS THE INCOME SPECTRUM

To explore the distributional consequences of our policy packages, we examine the costs households face relative to their incomes. For each household, we take the annualised additional cost each household would face under each package over the period from 2023 to 2050, as compared with a no-transition scenario.[18] These costs include the impact of energy costs, increased taxes, avoided fossil fuel boiler replacement and loan repayments (or higher rents for tenants). We then divide this additional cost by each household's disposable annual income (in 2023) to produce an income-relative impact.

Additional costs vary within income deciles, because the physical characteristics of homes vary within income deciles, often to a greater degree than the variation across deciles (as reflected in figure 2.2). Within an income decile, some households will see higher impacts and others lower impacts. To understand whether a package delivers fairness across the income distribution, therefore, we need to do more than only consider average impacts within each decile, and consider the upper end of impacts in each income decile too.

Accordingly, figure 8.1 shows the median impact in each income decile, along with the upper quartile impact within each decile to track the range of impacts. It should be noted, though, that one in four households will see relative impacts above the upper quartile level.

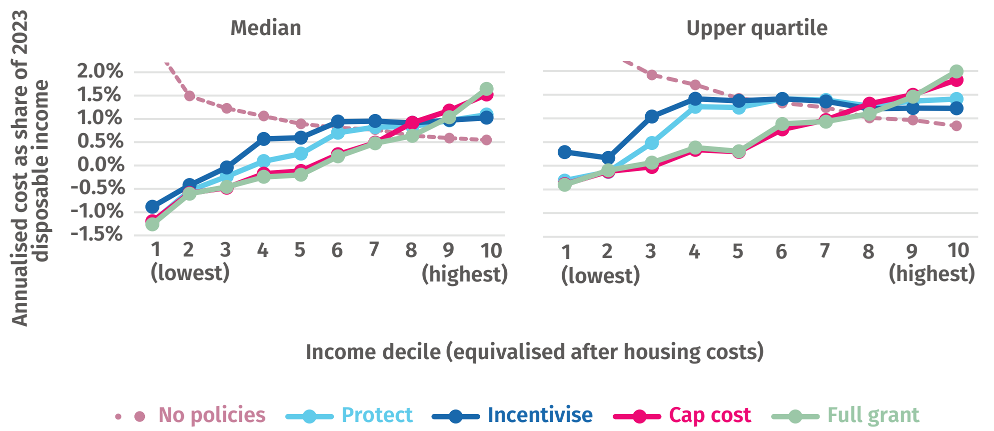
Figure 8.1 underscores the importance of protecting low-income households. A hypothetical scenario in which no policy support is available shows a downward sloping relative cost curve (dashed line). Because capital costs do not vary much with household income (see figure 2.2 earlier in this report), an unsupported transition would require low-income households to spend a much larger share of their income than high-income households. This is clearly, therefore, not a realistic policy approach, and we present it just to illustrate the importance of support for low-income households.

Support under the protect package reverses the pattern for median impacts (the left panel of figure 8.1). The combination of grants for low-income households and progressive taxes produce a generally upward-sloping cost distribution, consistent with the principle that those with the broadest financial shoulders should contribute more, and aligned to the polluter pays principle. The median impact in the bottom three income deciles is a saving relative to a no-transition scenario.

18 In other words, we compare scenario costs against costs they would face if their heating and insulation did not change, and gas and electricity prices evolve according to UK government's central scenario. As with all costs in the project, we represent costs in inflation-corrected 2023 prices. Capital costs are represented as loan repayments and include interest at 3 per cent. For renters, costs include rent increases levied to cover repayment of loans on capital costs.

FIGURE 8.1: WHO PAYS FOR THE HEAT TRANSITION UNDER DIFFERENT POLICY PACKAGES

Relative cost impacts (median and upper quartile) by income decile. Households switching from fossil fuel boiler to ASHP.



Source: IPPR Scotland Heat in Homes model, using data from Element Energy (2020), Scottish Household Survey (Scottish government and Ipsos Mori 2021) and UK government Green Book price assumptions (Department for Energy Security & Net Zero 2022).

However, when we consider the range of impacts under the protect package, the distribution is less strongly progressive. At the upper quartile (the right panel of figure 8.1), households across the top seven deciles actually see similar relative impacts. There is therefore scope to go further in driving a progressive distribution of costs, contributing to reducing financial inequality.

The bolt-on incentivise package aims at fairness between those who retrofit early and those who retrofit late, but bringing the cost of installing and using clean and polluting heating systems in line with each other. Delivering this form of fairness actually undermines distributional fairness across the income spectrum. Households at the upper end of the income spectrum see lower relative impacts as compared with the protect package. This is because costs are passed back down the income spectrum, resulting in higher impacts relative to protect lower down the income spectrum. This is evident at both the median and upper quartile impacts (figure 8.1).

This is because our model of energy price rebalancing leads some low-income households (those who retrofit late) to pay higher gas prices in advance of retrofit. While energy price rebalancing is a specific form of incentive policy, it is likely that any attempt to financially incentivise retrofit without using a progressive revenue mechanism will have a similar outcome, transferring resource from low-income late-retrofitters to high-income early ones.[19]

Put starkly, any package that emphasises household borrowing, but tries to financially incentivise retrofit without a progressive underpinning (which in practical terms means progressive taxation), would have the effect of making

19 Our modelling found similar outcomes using council tax rather than energy bills as the incentive mechanism.

low-income households help richer households pay off their retrofit loans.[20] This is in opposition to both distributional fairness and the polluter pays principle.

Our cap costs and full grant packages, by contrast, do rely on a progressive mechanism – income tax within the model – to overcome financial disincentives. This results in a much closer alignment between households' contributions and their financial resources. Right across the spectrum, income-relative impacts scale up with higher income levels. These packages therefore distribute costs more fairly, working to reduce inequality while also being more consistent with the polluter pays principle. Crucially, this pattern is evident both in median impacts and at the upper quartile (figure 8.1), showing the progressive impact of these packages occurs across households generally, whether they happen to have low income and live in an expensive-to-retrofit home or vice versa.

20 Of course, an ongoing incentive *could* be funded by progressive taxation, so it only applies a saving after retrofit and does not create a cost for pre-retrofit households. However, such a mechanism would be little more than a convoluted way of retrofit costs being subsidised by taxes, just with the intervening step of households taking on private debt. Spreading subsidy through time in this way would do little to ease the impact on public finances as each year's increase in the number of eligible households would make the annual subsidy cost grow to about the same annual level that it would have reached were upfront grants given instead to achieve the same degree of incentive.

9. CONCLUSION

Ensuring the heat transition delivers financial fairness is a major policy challenge which must be addressed as part of the programme of ramping up retrofit rates.

Within our model, the upfront cost of retrofitting homes in Scotland falls largely in the range of £10,000 to £15,000 per home. Crucially, costs are similar across the income spectrum. This means that, if no policy were in place to share costs, the transition would have a deeply regressive impact. It is therefore critical that Scottish government sets out explicitly its approach to how retrofit costs will be shared.

Our analysis shows the following.

- Support for low-income and vulnerable households, critical to a just transition, will alone demand support in the region of £650 to £700 million per year. It is therefore critical that Scottish government is clear how it will fund support as the transition accelerates.
- A policy package that supports only low-income and vulnerable households only weakly delivers a progressive distribution among higher income households and does not address fairness between early- and late-retrofitters created by financial disincentives to retrofit.
- Efforts to reduce financial disincentives for retrofit without increasing public spending are likely to work against a just transition, as their effect will likely be regressive.
- Sharing the cost of transition via grants across the income spectrum, backed up by progressive taxes, drives a fairer outcome for all. Wealthier households not only support those further down the income spectrum, but also shift balance of costs for their own homes' retrofit from direct payment to payment via taxes (which return as a grant). This approach thereby drives fairness across the income spectrum, by asking those with the greatest financial resources to support those with least. It also drives fairness between early- and late-retrofitters, by uncoupling the timing of a household's retrofit from the mechanism by which that household contributes financially to the cost of undoing our shared legacies of fossil fuels.

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