

Written evidence submitted by Energy Saving Trust (DHH0066)

About the Energy Saving Trust

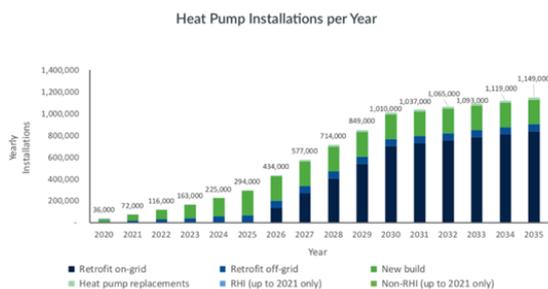
The Energy Saving Trust is an independent organisation dedicated to promoting energy efficiency, low carbon transport and sustainable energy use to address the climate emergency. We deliver programmes on behalf of the UK government and all of the three devolved administrations.

Summary

One key learning from past programmes is that demand-led schemes, where consumers take up changes based on incentives, will not deliver the *transformational* change required to roll out low carbon heating to 29 million homes in less than 30 years.

The Climate Change Committee ([CCC](#)) recommends that the UK should be looking to grow heat pump installations from the current rate (27,000 in 2019) to 1 million units per year in 2030. A steady rate of growth like the one shown below would result in around 3.3 million cumulative units by 2030 compared with around 250,000 today. This scale of scale will require regulation, an attractive customer proposition and support to make it easy for homeowners and their tenants.

Fig. 1: HPA deployment trajectory scaling to 1 million units per year by 2030 ([HPA, 2020](#))



The CCC's new insight (6th Carbon Budget, Central Scenario, December 2020) that the net investment required to upgrade to low-carbon heat (averaging £10,000 per home) will be less than the cumulative energy bill savings by 2050, suggests that there is a business case to supplement the necessary regulation with a generous public support (with a mechanism to recycle the savings).

We recommend that the government sets up a 30-year infrastructure programme in which, as households upgrade their heating, a public fund meets the additional capital cost. This investment could then be (wholly or partially) recouped by a 'shared savings' approach to the resultant bill savings. Part could be retained by the householder with the remainder returned to the fund (via an electricity bill surcharge). This would provide an economic stimulus and new sources of employment.

As past schemes have shown, the public can be reluctant to engage in schemes to change their homes where they perceive the works to be disruptive or risky. The economic crisis is likely to mean a reluctance to take on new loans (even at zero-interest rate) so an approach which avoids upfront cost *and* reduces bills is likely to be a better fit. Whilst the timescales will require regulation, combining this with an attractive customer proposition of no upfront cost and lower bills along with a new advice service to make the process easy, is more likely to secure the necessary public backing.

Response

1. Lessons from past policies, devolved administrations and international comparators

We think that the key lessons here are the need for the following:

- i) Regulatory drivers
- ii) Attractive customer proposition
- iii) Technical standards/ quality systems
- iv) Clear information and a simple customer interface

We have used past policies from both UK and EU programmes to illustrate these

1.1 Lesson 1: The need for regulation and standards

The low uptake of heat and energy efficiency measures via consumer-led schemes such as the Green Deal and the Renewable Heat Incentive highlight the need for underlying regulation. This need to supplement consumer incentives and support with mandate is highlighted by the Scottish Government in their [proposals](#) to require all homes to reach a minimum standard (of Energy Performance Certificate [EPC] Band 'C') at sale. This position has been consistently recommended by the government's formal advisors, the [CCC](#).

Regulation has already 'quietly' transformed the market for the following:

- [Condensing boilers](#) – following regulation in 2005, most boilers are now efficient condensing boilers. This compares with the market-led rollout of central heating which took over 50 years.
- [Lighting and white goods and appliances](#): This analysis by [Carbon Brief](#) highlights the key role that EU product regulation has played. Whilst the UK's success in reducing emissions from the power sector is generally attributed to supply-side changes (increase in renewables, decrease in coal), half of the reduction is due to lower-capita generation (this has dropped by a quarter since 2005). Whilst the off-shoring of energy-intensive industries is also a factor, low-energy lighting has cut electricity use here by up to 90% whilst there has been a 75% reduction for newer "white goods."

How important is the role of choice in domestic heating?

Regulating what homeowners can do in their homes is often seen as difficult but most people don't actively choose their heating system – they are restricted by the options where they live (whether they have a gas connection or not for example) and most inherit a system when they move in and replace it on a like-for-like basis when it fails.

Regulation is likely to be an inevitable part of the net zero heat journey as whilst there will be a role for consumer choice in some areas, there won't be in others. For example, in areas with a heat network (existing or planned), each building owner opting out of the scheme increases the costs for those remaining in it. Similarly, encouraging heat pump take-up in the early action areas (off-grid homes and new build) will not be possible at the scale required without new regulation to make heat pumps the default option here.

Do we want 'choice'? Research by [Citizen's Advice](#)¹ suggests that changing the consumer narrative in the energy market from one of 'choice' to one of 'protection' over heat price and quality could

better received by the public. Despite a decade of encouragement to get us to shop around for the best price, [Ofgem data](#) shows that 47 percent of households have never switched energy supplier. Whilst switching is lowest (as expected) amongst the 5.3million households who are digitally excluded, a large number of respondents aged 16 to 34 do not engage. This suggests that if the offer to consumers restricted their choice of heating system but could guarantee that bills would stay the same or reduce, then this could be largely accepted by the public.

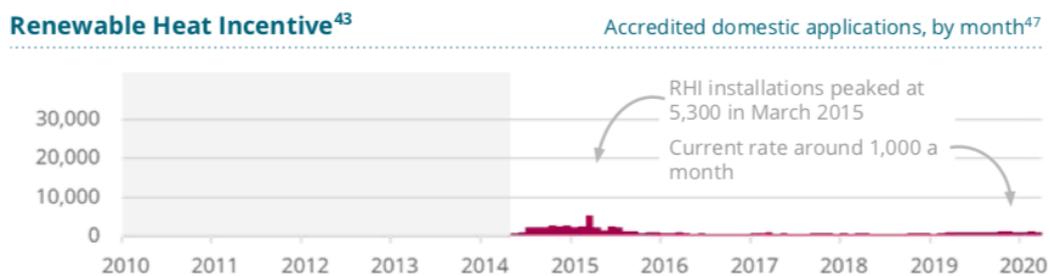
The need for regulation is further highlighted by the schemes below:

- Learning from past policy: the Domestic Renewable Heat Incentive (DRHI)

The DRHI provides quarterly payments over a seven years to homeowners installing heat pumps, biomass or solar thermal. The 2020 [report](#)² shows that whilst 50 percent of the measures installed under the scheme (45,000) have been heat pumps, these accounted for just 20 percent of the revenue payments. The scheme’s stated aim was to *‘prepare the market for mass roll out in the 2020s’* (DECC, 2013) but the delivery has been significantly lower than forecast with the [National Audit Office](#)³ (2018) forecasting that it would deliver just 15 percent of its original heat target.

The scheme has seen heat pump sales increase by just fifty percent (from 18,000 in 2012 to 27,000 in 2019) meaning heat pumps still account for less than 2 percent of the heat market compared to 1.7million gas boiler sales. More significantly perhaps, [BEIS data](#)⁴ suggests that only 27 percent of the public are aware of them. It’s hard to conclude that the sector has moved decisively nearer to *‘mass market rollout in the 2020s’* as a result of this incentive scheme

Figure 1: Take up of the DRHI (Source: [Citizens Advice](#), 2020)



- Learning from past policy: energy efficiency schemes

The chart from [Citizens Advice](#) below shows the take up of the main policies to encourage domestic energy efficiency since 2013. Whilst the Green Deal was expected to stimulate the 14 million retrofits, it delivered only 14,000 such upgrades. The key issue with the Green Deal was lack of demand. The scheme pioneered a new loan mechanism that was linked to the property and allowed households to retrofit their home at no upfront cost.

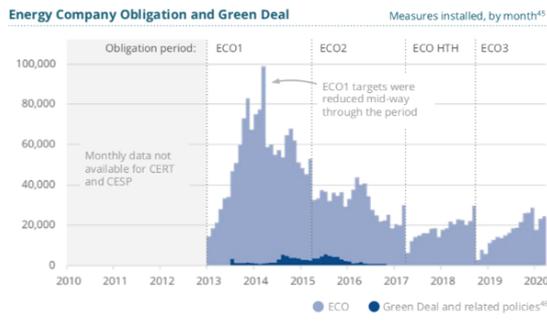
Figure 2: Take up of the energy efficiency schemes (Source: [Citizens Advice](#), 2020)

¹ <https://www.citizensadvice.org.uk/about-us/policy/policy-research-topics/energy-policy-research-and-consultation-responses/energy-policy-research/taking-the-temperature-consumer-choice-and-low-carbon-heating/>

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/881634/changes-to-rhi-impact-assessment.pdf

³ <https://www.nao.org.uk/report/low-carbon-heating-of-homes-and-businesses-and-the-renewable-heat-incentive/>

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776657/BEIS_Public_Attitudes_Tracker_-_Wave_28_-_key_findings.pdf

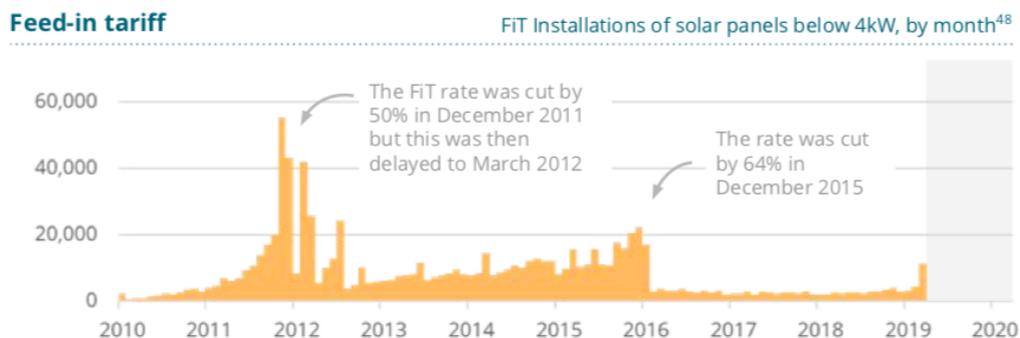


As the refurbishment market clearly shows however, access to finance is not the main reason that most 'able to pay' households don't retrofit their homes. The issue is that, unlike work to extensions, kitchen and bathrooms, spend here is not seen an 'investment' and in the absence of a requirement to do so, most households will not act because the perceived rewards (improved comfort and bill savings) do not outweigh the disruption and the potential risk. This insight is backed up by the number of basic measures still not completed even when their installation is completely free. Despite various schemes offering free measures over the years, one third of cavity walls are unfilled and fifth percent of lofts under-insulated.

- Learning from past policy: the Feed-in-Tariff

The Feed-in-Tariff scheme offered households payments for generating and export electricity from (mainly) solar electric panels. There was a very high take-up in 2011 when a drop in unit costs increased the returns and simple pay-back on the schemes to 8.45 percent and 8.4 respectively. Whilst the tariff was reduced successively after this, the Solar Trade Association suggests that the scheme delivered 900,000 domestic and community installations (compared to RHI's 45,000 heat pumps) and there is high public support for the technology. Whilst the price fall is a factor, it is only part of the story (the RHI gives a higher average 12 percent return). Unlike many energy efficiency measures and heat pumps, solar is 'plug and play' – causing little internal disruption, and is perceived as low-risk (whilst poorly installed insulation or heating can cause damp or mould or result in unreliable or unaffordable heating and hot water). The popularity of 'plug and play' technologies suggest that market-led mass deployment could be feasible in a relatively short time with consistent government support. It also suggests that homeowners need a higher level of support and protection for measures perceived to be 'disruptive' or 'risky'.

Figure 3: Take up of the FIT (Source: Citizens Advice, 2020)



1.2 Lesson 2: Heat pumps need to save consumers money

As highlighted above, there needs to be a clear benefit to acting. [Research](#) by Citizen's Advice into consumer attitudes to heat included this summing up from a participant:

"It's got to be clear and it's got to tell me how it's going to make a difference. I know it's going to save the environment, I get that. But, and this is going to sound a bit selfish, what am I going to benefit from changing this?" (Leeds, recently engaged, lower income)

Experience from Sweden and Finland shows that once fossil fuel heating is no longer the cheapest option, the market can change rapidly.

1.3 Lesson 3: Quality standards needed to build consumer trust

This 2016 [UKERC](#)⁵ paper reviewing the success of European policy in deploying heat pumps concludes that the success of incentives is dependent, in the longer term, on having standards in place for manufacturing, installation and maintenance.

The authors explain, for example, how a surge in German market following the introduction of a tax credit scheme, saw a crash in the mid-1980s, attributed in part to poor installations, a lack of maintenance and low installer experience.

The paper lists successful mechanisms used to improve quality standards including:

- [National heat pump associations](#)
- [Test centres](#) to monitor heat pump performance (Sweden).
- [Quality labels](#) (Switzerland in 1998 and Sweden in 2005)
- [An independent complaints board or 'Heat Pump Court'](#) to address litigation cases relating to the false claims of installers about heat pump performance (Sweden). Court decisions here were made public so that the relevant companies were 'named and shamed'

1.4 Lesson 4: There needs to be a clear and simple customer journey

There needs to be a clear customer journey, designed around the user, with strong consumer protection and end-to-end support. From the consumer end, they need simple interface.

Good practice in the devolved administrations: Home Energy Scotland

The Scottish Government offers a variety of schemes to tackle fuel poverty and reduce domestic emissions. It keeps things easy for the consumer by having a single simple interface - [Home Energy Scotland](#). Funded by the Scottish Government, and managed by the Energy Saving Trust, Home Energy Scotland is a network of local advice centres covering all of Scotland.

Home Energy Scotland's expert advisors help over 90,000 households each year supporting them to understand options for retrofitting their homes, connecting them to relevant finance (the various grant funds or the Scottish Governments [zero percent interest loans, cash back offers and equity loans](#)) and supporting them with after-care.

⁵ <https://d2e1qxpsswcpgz.cloudfront.net/uploads/2020/03/heat-what-works-working-paper.pdf>

England: Increasing fragmentation makes it hard for the public to engage

The emerging picture in England is of multiple, overlapping grant schemes: Green Homes Grant (GHG) and the local authority variant (GHG LADs), Energy Company Obligation (ECO), Renewable Heat Incentive (RHI) and anticipated Home Upgrade Grant (HUG)

ECO: The issue can be seen in a microcosm with the ECO scheme. Paid for through an energy bill levy, the scheme is best suited to low-cost, high-impact single measures such as loft and cavity wall insulation. However, the need to minimise overheads (and therefore impact on bill payers) leads to a scheme that is confusing for the end-user (low-income households).

Put homeowners back in control: BEIS are currently looking at how the scheme could be revised to deliver whole-house retrofit rather than single measures. Increasing the complexity of the scheme however, would increase costs and reduce the volume of low-income households that can benefit.

A better approach might be to strip it right back and use it fund vouchers as with the Green Homes Grant scheme. This would put minimise overheads and put households back in control to spend their voucher with their choice of accredited installers any measures set out in their [PAS2035 home retrofit plan](#) (the new quality standard PAS2035 will apply from mid-2021).

2. Priorities for the forthcoming 'Buildings and Heat Strategy' and our view of the most urgent decisions and actions that need to be taken by 2024

2.1 Heat and Buildings Strategy

We think the Heat and Building Strategy should focus on providing a clear pathway for decarbonising heat by 2050 with clear interim timelines. This should include dates for new regulation on:

- i) New build / conversions
The government's proposed changes to the building regulations ([Future Homes Standard](#)) rule out fossil-fuel heating from 2025. It is important that this is confirmed as soon as possible (we would support an earlier date of 2023) to allow supply chains to adjust. There also needs to be a similar upgrade to the regulations governing conversions given the increasing number of non-domestic properties that are being converted into homes.
- ii) Phasing-out replacement oil, coal and LPG heating in homes off the gas grid
Government has committed to do this before 2030. We would support a date of 2027/8.
- iii) Phase out date for gas heating in homes on the gas grid.
The 15-year lifetime of conventional boilers suggests 2035 is the latest date compatible with net zero by 2050. We would support an earlier date of 2032.
- iv) Mortgage providers to increase the average energy efficiency of their stock

Government has stated an intent to introduce a new requirement on mortgage providers

v) Energy efficiency in buildings

One-third of the stock is owned outright. This includes around 5 million homes in England rated EPC 'D' and below. We think a regulatory driver, such as minimum energy standards at sale and rent is needed to ensure improvement happens at the scale required. Past policy is that demand-led schemes do not deliver at this rate.

vi) Date(s) for decommissioning all/ part of the gas network

2.2 Developing the transformative delivery programme to roll out from 2025

Given the new insights from the CCC, we feel that the primary focus of this parliamentary term should be on developing a transformative delivery programme for low-carbon heat based on 'fair transition' principles in which all households will:

- i) Be financially supported to upgrade their heating
- ii) Retain a portion of the lower energy bills (unless choosing to heat their homes more) with the rest going back to the government to repay the financial support given
- iii) Have recourse to adequate redress if quality standards fall short.

This aligns with the notion of fairness highlighted by the [Climate Assembly](#), in which the change should be fair and everyone supported to make the changes.

The best way of managing this complex undertaking might be via a single delivery body as the Olympic Delivery body. The focus should be on enabling mass market delivery from 2025 onwards

Key tasks for the delivery body

- i) Provide finance: Work with the Green Finance sector to determine the financial mechanism(s) for meeting the cost differential between incumbent heating systems and the low carbon alternatives. Set up the mechanism for sharing the cost savings.
- ii) Reduce the cost of electricity: Work with the Treasury and Ofgem to implement changes to increase the competitiveness of electricity compared to other heating fuels.
- iii) Build capacity, bring down costs and improve quality standards: For heat pumps, we strongly support the agreement of a sector deal between government and the full range of key stakeholders to bring down costs and increase quality, jobs, skills and apprenticeships in line with agreed targets.
- iv) Regional/ local energy area plans: there is an urgent need to determine a framework for regional heat plans including public engagement. We would support a target to have these complete by 2025.
- v) Improve the information provided to consumers: The public need to be provided with clear information on what to do. Once the regional/ local plans are in place, this information could be fed into Building Retrofit Plans produced via the PAS2035 process or into digital Green Building Passports to supplement Energy Performance Certificates.

The energy efficiency and low carbon heat readiness measures will vary depending on the heat solution.

- vi) New Advice Service: Commission a net zero homes advice service to engage households with the change process, support and inform them on their customer journey and ensure swift countering of any misunderstandings.

2.3 Delivery: rapid growth in new build and off-gas grid homes

Alongside this there should be a focus on delivery in the 'no-regret' early action areas of new homes and homes not connected to the gas grid. The offer to consumers should be attractive along with a strong focus on quality standards. An initial focus on social housing would support this. When the framework is set up, we would support devolution of targets and funding to a more regional level.

3. Which technologies are the most viable to deliver the decarbonisation of heating, and what would be the most appropriate mix of technologies?

Our view is that, whilst low carbon gases (such as hydrogen) could play a useful supporting role in decarbonising heating, the current uncertainties around safety, running costs and timescales suggest that energy efficiency, heat pumps (including hybrid systems) and heat networks will be the least-cost pathway to decarbonising heat (with direct electric heating in space-constrained properties and some use of biomass in hard-to-insulate, off-grid properties).

Our view aligns with the position set out by UK Energy Research Centre (UKERC) [here](#)⁶

4. What are the barriers to scaling up low carbon heating technologies?

We think the key barriers are the lack of a coherent framework on heat; the current high costs and the low awareness of the public.

4.1 Lowering costs

Experience from Sweden and Finland shows that once fossil-fuel heating is no longer the cheapest option, the market can change rapidly. There are two main aspects here – reducing the high capital cost and increasing the differential in running costs

Capital costs

Energy Saving Trust [data](#)⁷ suggests the average cost of air source heat pumps is £9,000 -11,000 (compared to £2,300 for a gas boiler). Assuming a £10,000 cost, the changes listed below could reduce the cost by as much as 55 percent to £4,500.

- Economies of scale: The [CCC](#)⁸ have estimated upfront costs can drop by at least 20 percent

⁶ <https://ukerc.ac.uk/publications/net-zero-heating/>

⁷ <https://energysavingtrust.org.uk/advice/air-source-heat-pumps/>

⁸ <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

- **Energy efficiency:** [Carbon Trust](#)⁹ research has found that better energy efficiency (equivalent to EPC 'C') can reduce upfront costs by 20 percent on average (smaller unit cost and reduced need for 'enabling' works such as new, larger radiators/ pipework).
- **VAT:** since 2019, a 20 percent VAT rate applies for part/ all of installations (it varies). Reducing this rate to 5 percent would simplify it and provide an immediate saving.
- **Lifetime costs:** Boilers are replaced every [13](#)¹⁰ years on average with warranties ranging from 2 to 10 years, whereas heat pumps are replaced between 15-20 years. Selling heat pumps with longer warranties would increase the value proposition for the consumer.

Operational costs

- **Rewarding flexibility:** Switching to a Time-of-use tariff (TOU) and changing heating patterns can reduce running costs by between 23- 46 percent according to [UKERC](#)¹¹ and the [Carbon Trust](#)¹². As flexibility markets develop further though, there should be scope for aggregated consumer demand to play more of an active role in grid-balancing, reducing costs elsewhere.
- **Shift the cost of environmental and social levies away from electricity:** [Ofgem](#) (2020) analysis shows that the UK has below average gas prices but above average electricity prices. This is partly to do with decisions the UK has made about how to distribute the costs of energy market environmental and social programmes which sit on the electricity bill – making up 23 percent of the unit cost (but only 2 percent of gas). This distribution needs urgent review. One option (taken by Germany) is to shift part of the levy cost to general taxation.

4.2 Tackling low awareness

Currently there is a very limited awareness of the need for low-carbon heating. This [survey](#)¹³ by Energy Systems Catapult suggest that half the public is not aware that gas boilers are one of the main ways households contribute to climate change and how that needs to change. The CCC's latest [Progress Report](#)¹⁴ highlighted this as the key barrier to low carbon heat.

Whilst reducing costs (capital and running costs) is necessary to build the market, equal attention must be paid to building consumer awareness. Heating is an emotional as well as an economic decision and from our experience of helping home-owners adjust to low carbon heating, this will require a concerted approach to 'hand-hold' consumers throughout the transition.

Moving from a gas boiler to a pure electric heat pump is not 'plug and play' – it is a different approach to heating (from rapid response high temperature heating to low temperature heating over a longer period). This shift and the behaviour change required to optimise bills savings/ earnings from future electricity flexibility markets may be challenging for consumers (particularly those already marginalised by the energy market).

The government emerging customer journey for retrofit (a digital advice platform and the PAS2035 quality framework for installing measures) is unlikely to be sufficient to provide sufficient support

⁹ <https://www.carbontrust.com/resources/heat-pump-retrofit-in-london>

¹⁰ <https://www.bsria.com/doc/VBVwkr/>

¹¹ <https://ukerc.ac.uk/publications/net-zero-heating/>

¹² <https://www.carbontrust.com/resources/heat-pump-retrofit-in-london>

¹³ <https://es.catapult.org.uk/news/1-in-2-not-aware-of-gas-boilers-climate-impact-survey/>

¹⁴ <https://www.theccc.org.uk/publication/reducing-uk-emissions-2020-progress-report-to-parliament/>

and reassurance needed for homeowners and tenants, particularly for the 5.3 million currently classed as digitally excluded.

Our key recommendations here are for:

- A government-backed communication campaign alongside the lines of the digital switchover to provide the narrative around the low-carbon heat transition.
- A government-backed advice service to supplement the digital advice platform ([Simple Energy Advice](#)). Unlike the digital platform this would be able to listen and respond (by phone, email, and potentially home visits), to households and could tailor their advice to the household's specific situation (home, condition, household, region) to support them with starting on their PAS2035 process and then to re-engage for future measures.
- There are different ways to deliver this but we recommend central coordination to ensure consistent advice and quality, combined with regional/ local delivery (heat pathways are likely to have a strong regional dimension).

5. Financing the transition: what is the impact of the existing distribution of environmental levies and should this distribution be reviewed?

5.1 Overview of current levies

The main approach to financing the decarbonisation of electricity has been via levies on electricity. Electricity bill payers currently pay about £7 billion a year for this which is likely to increase to £12 billion by 2030. As well as these direct decarbonisation costs, consumers pay for a range of other social and environmental policies, like energy efficiency, financial assistance to vulnerable consumers, and smart meters via their energy bills.

Overall, the current levy scheme has had a positive impact for the average consumer. Whilst levies currently add about 13 percent to bills (£146, based on [Ofgem's](#)¹⁵ latest estimate of average bills), this is outweighed by the average bill savings from improved energy efficiency from schemes funded through the levies since 2008 (£290).

However, this focus on the *average* impact obscures the impact on low-income households upon whom energy bill levies can have a regressive impact. As an example, a low-income household who received the Warm Homes Discount (WHD) to support with bill cost but has never received any support to upgrade their insulation/ heating through a levy funded scheme would contribute £146 a year in levy payments but receive £140 in WHD - a £5 loss.

5.2 A levy-based approach to financing heat would be regressive

Energy bill levies are regressive because energy costs accounts for a larger share of the household budget in low-income households (10 percent of the lowest decile households but only 1.5 percent

¹⁵ <https://www.theccc.org.uk/publication/energy-prices-and-bills-report-2017/>

of the most affluent). Lower-income households are also less able to make physical changes to their home so it can stay warm with less heating (lower access to finance and information on what to do or in the case of tenants, lack of ownership).

In this report, [Reducing inequality resulting from UK low-carbon policy](#),¹⁶ the authors explain that 2016, the poorest 10 percent of households contributed £271 million towards low-carbon policy costs, whereas over the same period, the revenue recycled to the poorest homes was £220 million. This is also a point about what types of programmes levies are used for – currently only 17 percent of the levy revenue is used to support low-income households (12 percent on demand reduction measures under ECO and 5 percent on reducing the cost of energy bills through the Warm Homes Discount). This highlights that levies are more suited to programmes that support low-income households and those that reduce demand (and therefore consumer costs lessening the impact of the levy). In the example above, for example, whilst the low-income group as a whole has paid out more than it has received directly, the households who have received insulation will gain from the year on year bill reduction.

5.3 Current levies disincentivise a switch to heat pumps

As highlighted earlier, these levies predominantly sit on the electricity bill which artificially inflates the cost of electricity. Removing or reducing this levy cost will be important to improving the economic case for heat pumps. [Barrett and Owen](#), in the report cited above, suggest moving these costs to general taxation on the ground of fairness. Their modelling suggests that this would save the lowest income group £98 a year with the highest income group paying an additional £458 a year. However, whilst *'A saving of £98 a year for the lowest income households could make a significant difference to their welfare, while an additional cost of £9 a week for the households with the highest income is relatively small'*.

6. Financing the transition: How can the costs of decarbonising heat be distributed fairly?

6.1 Options for financing heat

There are various options for financing the financing the transition – via consumer levies, general taxation, carbon tax or government borrowing.

- i) Consumer levies: The scale of investment required to decarbonise heating (around £10bn a year between 2027 and 2048) combined with their inherently regressive impact make levies the *least* good option.
- ii) General taxation: this would be a more equitable approach but might meet public resistance unless the ground is carefully prepared (i.e. could be seen as a new tax')

¹⁶<https://www.tandfonline.com/doi/full/10.1080/14693062.2020.1773754?scroll=top&needAccess=true>

iii) Carbon pricing: we think that a carbon price for heating (to reflect the relative carbon content of different fuels) should be part of the net zero journey as it sends a clear signal to consumers and the market to change behaviour.

Modelling carrying out by [LSE](#)¹⁷ suggests that a progressive approach (compensating those at risk of fuel poverty) could raise around £5 billion a year. However, carbon pricing on heating would only be fair if all households are able to take relevant action. However, where households are not overheating their home, this means insulating their home and changing to low carbon heating. Without significant government intervention to reduce the costs of doing this, this will not be feasible for most.

As part of a much larger scheme to retrofit the whole stock however, carbon pricing could play a useful role by strengthening the incentive for households to switch. It is important that any new tax in this area is accepted by the public so we recommend that revenue raised via this route should be ring-fenced for supporting households with this change (to cover upfront costs and compensation where heating affordability is reduced in the short-term). Alternatively, this could be used to fund the existing levy programme.

iv) Government borrowing: the economic recession means that there is a consensus that government borrowing to grow the economy is necessary. Home retrofit performs strongly as an effective economic stimulus (as this [paper](#)¹⁸ co-authored by the Nobel prize-winning economist, Joseph Stiglitz highlights) so this should be considered.

v) Recycling the energy bill savings: The CCC's insight that the investment will be outweighed by the energy bill savings means that there is a fifth way to fund the investment. We would support this approach - with the initial costs made up from government borrowing as an economic stimulus programme and a more detailed examination of this option is given below

6.2 Using a revolving loan-fund approach (recycling the energy bill savings)

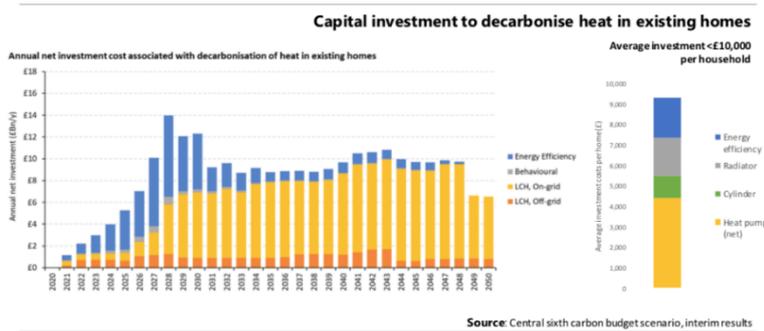
The chart below (6th Budget, December 2020) shows the capital investment required to decarbonise home heating (based on their Central Scenario which largely rests on energy efficiency, electric heat pumps and heat networks).

The average net investment required to retrofit each home (energy efficiency + heating) is £10,000 per home. The total investment builds from £1bn in 2021 to £6bn in 2025, peaking at £14bn in 2030. Between 2031 and 2048, investment is relatively stable ranging from £9bn to £11bn, falling to £6bn in 2049 and 2050.

Figure 4: Capital investment required to decarbonise heating

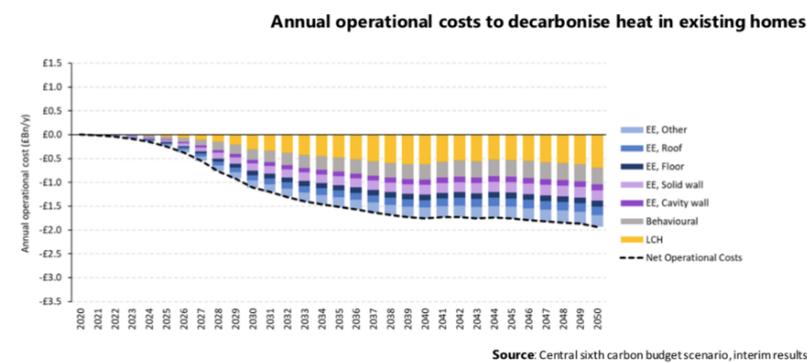
¹⁷ <http://www.lse.ac.uk/GranthamInstitute/publication/distributional-impacts-of-a-carbon-tax-in-the-uk/>

¹⁸ <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>



The next CCC chart shows the operational savings. By 2025 there is a net gain of £0.5bn per year rising to £1bn by 2030 (outweighing the £14bn investment costs for that year). From 2032 onwards, the net gain increases to £1.5bn and then £2bn each year.

Figure 5: Operational savings from decarbonising heating



6.3 This approach could recoup upfront public investment

We think that the CCC’s findings, combined with the consensus on the need for government borrowing as economic stimulus, present a strong case for financing low-carbon heat on an ‘invest to save’ basis. This approach is well established as a means of financing energy efficiency (for example, the Salix loan fund and Energy Performance Contracting approaches).

Whilst the Energy Saving Trust has not carried out detailed modelling, the initial findings suggest that it would be possible for the government to recoup its upfront investment (or much of it) via this route (the increased VAT revenue, even at a lower rate of 5 percent, could supplement it).

The government already has a ‘pay back’ mechanism available – the 2013 Green Deal scheme made it possible for loan payments to sit on the property and be repaid through a surcharge on the electricity bill. An issue with the Green Deal approach was households had to repay 100% of the modelled savings for each measure. This meant that where the modelled savings were based on households under-heating their home (as fuel poor households tend to), they could end up with higher bills. A better approach would be a ‘shared savings’ approach where part of the modelled bill saving was retained by the household and part repaid.

Note: the modelled savings should not include potential savings from participating in emerging flexibility markets [such as time of use tariffs, demand switching etc. Otherwise this would penalise those less able to take part whilst still reducing the incentive to participate for those who are able.

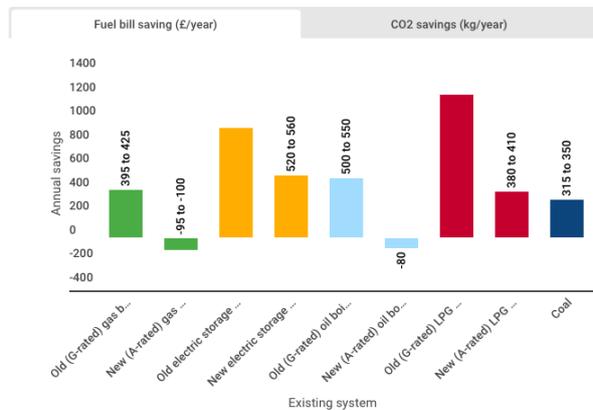
In the early years of the scheme, the public fund would be paying a high level of subsidy for each system and receiving a low level of repayments. However, as the scheme progressed and more systems were installed, each at a lower capital cost with a higher repayment rate, this would improve. The approach could be continued with replacement heat pumps installed in the late 2030s, where the ‘pay-back’ per system would be much better.

6.4 This approach could provide an attractive incentive for households to switch

Energy Saving Trust [data](#) shows that the average cost of installing an air source heat pump (ASHP) (including any enabling costs like pipework changes and larger radiators) ranges from [£9-11,000](#).¹⁹ Assuming £10,000, this is £7,000 higher than the cost of a replacement oil boiler. On current rates, this switch would save the household around £500 per year (£7,500 over its 15 year lifetime).

Fig. 3: Comparison of running costs in heating systems ([Energy Saving Trust, 2020](#))

Potential annual savings of installing a standard air source heat pump in an average sized, four-bedroom detached home.



Our proposal would require the government fund to provide an upfront loan of £7,000. Over a 15 year period, the fund would be repaid £3,750 in total (£250/ yr.). On this system, the fund would make a net loss of £3,250 (more if the cost of capital is included). However, when the system was replaced in 2036, the economics would be very different. Economies of scale, reduced VAT etc. would mean the capital cost was significantly lower – for example, £5,000. Similar, the removal of the levies on electricity, carbon pricing and VAT changes could have increased the bill saving (compared to the oil reference system) to £1,000 per year). This time then, the government fund would pay out £2,000 in upfront costs but recoup £7,500 over the lifetime of the measure. This profit of £5,500 would outweigh the loss made on the previous system.

An innovative approach to financing, as outlined above, could deliver for the economy as a whole and for jobs, whilst ensuring that the transition is fair and equitable (designing out fuel poverty).

Most importantly perhaps, it has the best chance (of the options explored) of appealing to the 29 million homeowners and their tenants who need to make the changes. As the participant in the [Citizen’s Advice](#)²⁰ research quoted earlier said:

“I know it’s going to save the environment ... But ...what am I going to benefit from changing this?”

¹⁹ <https://energysavingtrust.org.uk/advice/air-source-heat-pumps/>

²⁰ <https://www.citizensadvice.org.uk/about-us/policy/policy-research-topics/energy-policy-research-and-consultation-responses/energy-policy-research/taking-the-temperature-consumer-choice-and-low-carbon-heating/>

November 2020