



Decarbonising the private housing sector: Evidence from Nesta Cymru

Nesta is the UK's innovation agency for social good. We design, test and scale new solutions to society's biggest problems, changing millions of lives for the better. The aim of Nesta's **A Sustainable Future** mission is to help rapidly accelerate the reduction of household emissions by 2030, and to ensure that policies and conditions are in place to support continued reduction from 2030 onwards.

This submission addresses the following areas of the inquiry terms of reference:

- The current approach to decarbonising housing in the private rented and owner occupied sectors in Wales
- Actions the Welsh Government should take to progress a programme of retrofit for these sectors in the short, medium and long term
- The key challenges of delivering a programme of retrofit within these sectors

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Executive summary

Context: The climate emergency in Wales

- 1.1. The Welsh Government declared a climate emergency in 2019, and in 2021 restructured its cabinet around a single ministry, with the stated aim of making climate change the top priority across multiple portfolios. They have acknowledged that “We must cut emissions more in the next ten years than we have in the last thirty and innovation will provide part of the solution.”¹
- 1.2. Nesta welcomes this emphasis on both urgency, and innovation. As well as the technical challenge of upgrading homes, success in decarbonisation requires greater focus on the residents - their attitudes, motivations, capacity and confidence to engage with this issue. Social norms will need to shift, and the solutions may require new business and service delivery models to emerge, as well as new financial products and ways for householders to engage with their energy use.

The Welsh Government’s current approach to retrofitting homes does not put decarbonisation first

- 1.3. Carbon emissions are cumulative, so reductions achieved in the early part of this decade have greater value than those achieved later. This means we should be asking what **actions we can take today to achieve the greatest reduction in emissions quickly and sustainably**, with the resources we have.
- 1.4. Nesta's core argument is that the Welsh Government should focus on achieving the fastest possible reductions in emissions in the private housing sector. Such a 'decarbonisation first' approach will mean introducing new policies focused on **replacing gas and oil boilers with electric heating systems**.
- 1.5. **Electric heat pumps** are the best currently available replacement for fossil fuel heating systems, as they deliver the greatest emissions reductions per pound spent compared to other options.
- 1.6. The Climate Change Committee's most ambitious pathway to

¹ <https://gov.wales/sites/default/files/pdf-versions/2022/7/3/1658310241/innovation-strategy-wales.pdf>

net zero advocates a 28 per cent cut in household emissions over the next decade. To achieve this the UK needs to save some 19 million tonnes of carbon dioxide (MtCO₂e) per year by 2030, compared with 2019. Among other measures, this will require at least five million households in the UK to switch to low-carbon heating, and over ten million to install cavity wall, solid wall or floor insulation.

- 1.7. Wales should aim to maximise our contribution to the Climate Change Committee's pathways, and **reduce domestic emissions by nearly 1m tonnes** by 2030. This means **installing 250,000 heat pumps in homes** by 2030 - saving 447,500 tonnes of CO₂ per year.
- 1.8. We currently have around 8,500 heat pump installations recorded on the EPC register. So Wales will need new heat pump-focused policies to increase the pace of installations. These should initially be targeted at the significant proportion of Wales' private housing stock which is already well insulated,
- 1.9. These new policies should complement a continued investment in insulation, as Wales will also need **500,000 properties to install cavity wall, solid wall or floor insulation** to deliver the needed reductions by 2030. Insulation programmes should continue to target households in, or at risk of, fuel poverty or cold related health problems.
- 1.10. We should not default to assuming deep and extensive fabric retrofits will be necessary to decarbonise all homes. **Some homes will not need any fabric retrofit at all** - and the Welsh Government should prioritise these for heat pump installation in the short term.
- 1.11. Driving the uptake of heat pumps sooner rather than later will also help ensure Wales' **heating sector is not left behind the rest of the UK.**

Headline recommendations:

1. Make the **installation of heat pumps in well-insulated private housing** a focus for the forthcoming Heat Strategy
2. Support households to **optimise their existing heating systems**
3. Invest in **research into how to scale learning** from the Optimised Retrofit Programme to the private housing sector
4. Support households in Wales to **apply for the Boiler Upgrade Scheme (BUS)** from Ofgem
5. Ensure **heat electrification workforce / skills are a focus** within wider retrofit skills policy
6. Develop **new finance products for home decarbonisation** in Wales
7. Remove **unnecessary barriers within the planning system** to heat pump uptake, particularly in urban areas

2. Decarbonisation first: Why Welsh Government should focus on electrification of heat

- 2.1. The Welsh Government should focus on achieving the fastest possible reductions in emissions in the private housing sector. A decarbonisation first approach means increasing focus on **replacing gas and oil boilers with electric heating systems** in the short and medium term.

Objectives and prioritisation

- 2.2. When advocating a particular approach to upgrading existing homes stakeholders might have different outcomes in mind:
- Reducing the carbon footprint of homes / heating
 - Reducing household bills and tackling fuel poverty
 - Improving comfort or health outcomes
 - Lowering risks to energy bills long term from volatile gas markets
- 2.3. There are clearly both tradeoffs and positive interactions between these outcomes. So policy should be designed on the basis of a clear ranking of these priorities.
- 2.4. We note the conclusions of the Auditor General for Wales' 2021 report² into the Welsh Government's Warm Homes programmes Nest and Arbed.

“Given its ambitions to achieve net-zero carbon emissions, the Welsh Government will need to rethink the energy efficiency measures offered. Both schemes rely heavily on installing fossil fuel heating, particularly gas boilers. New, efficient boilers may produce less carbon than older ones but are not the most environmentally effective option.”

² Audit Wales - The Welsh Government's Warm Homes Programme (2021)
<https://www.audit.wales/sites/default/files/publications/The%20Welsh%20Governments%20Warm%20Homes%20Programme%20-%20English.pdf>

- 2.5.** This clearly demonstrates the tension between fuel poverty first and decarbonisation first approaches. The Warm Homes schemes have understandably prioritised the immediate cash savings of a replacement boiler, but this has had the unfortunate consequence of potentially locking in a decade of additional fossil fuel emissions from those homes.
- 2.6.** We believe that the private housing sector is a better space for policies where decarbonisation is the top priority.

The case for putting low carbon heat first

- 2.7.** Our analysis of the costs and carbon benefits of the currently available technologies has led us to focus on rapidly increasing the uptake of electric heat pumps, which we think can be achieved by using innovation to reduce their cost, improve their appeal and increase capacity in the installer workforce. We believe this represents the optimal 'decarbonisation first' approach.
- 2.8.** We have chosen to focus on heat pumps because:
- they deliver a **greater CO2 saving per pound spent** than any insulation measure
 - they are a **market-ready technology**, already widely used in other EU nations, including many with much colder average temperatures than Wales
 - they are **highly efficient** delivering almost **three times as much heat per unit** of energy consumed than a gas boiler, and most other electric heat options
- 2.9.** Insulation clearly has an effect on emissions, as well as reducing bills and improving health and comfort. There is clearly a strong argument for continuing and increasing government support for insulation programmes. However, when evaluated from a decarbonisation perspective, **insulation is not the most cost effective way to reduce carbon emissions** when compared to installing heat pumps.
- 2.10.** We of course recognise that the current cost of living crisis changes the context for what governments should prioritise, and we return to this below.

3. Emissions reductions and costs by intervention

- 3.1. Fig. 1 shows the percentage carbon abatement achieved by replacing a gas or oil boiler with a heat pump. Heat pumps are highly efficient. Heat pumps currently installed in UK homes produce on average 2.7 units of heat per unit of energy, compared to 0.85 for fossil fuel boilers, and the highest quality installations achieve efficiencies of 3.5 and above. This has a multiplier effect on an already cleaner technology, resulting in an emissions abatement of just over 60%.

Fig. 1

Emissions per kWh - kg CO ₂ e	Input - emissions per kWh	Efficiency	Output - emissions per kWh
Gas boiler	0.1830	0.85	0.215
Oil boiler	0.2140	0.85	0.252
Heat pump	0.2290	2.7	0.085
Abatement - Heat Pump vs gas boiler			0.130
Abatement %			60.61%
Abatement - Heat Pump vs oil boiler			0.167
Abatement %			66.31%

Source: Greenhouse gas reporting: conversion factors 2021
<https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021>

- 3.2. Fig. 2 shows how this translates into actual tonnage of CO₂ emissions annually. The 13,700kWh figure represents the mean average gas consumption per UK household³. Installing a heat pump delivers a reduction of 1.79 tonnes of CO₂ per year. The earlier this abatement is achieved, the greater the cumulative reduction.

Fig. 2

Annual emissions per 13700 kWh	Tonnes CO ₂ e
Gas boiler (efficiency above)	2.95

³ **Subnational Electricity and Gas Consumption (BEIS 2020)**

Statistics https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1079141/subnational_electricity_and_gas_consumption_summary_report_2020.pdf

Heat pump (efficiency above)	1.16
Annual abatement	1.79
% abatement	60.61%

3.3. Fig. 3 shows the emissions reductions achieved by the most common types of fabric retrofit measures. The greatest reduction achievable comes via solid wall insulation, at around 17% - significantly lower than the 60% reduction from installing a heat pump.

Fig. 3		
	Median energy savings	Mean energy savings
Cavity wall insulation	8.6%	8.1%
Loft insulation	3.7%	2.6%
Solid wall insulation	18.0%	17.0%
Cavity wall and loft combined	13.6%	12.5%

Source: National Energy Efficiency Data Framework (NEED) (BEIS 2019: England and Wales data)

Comparison of costs

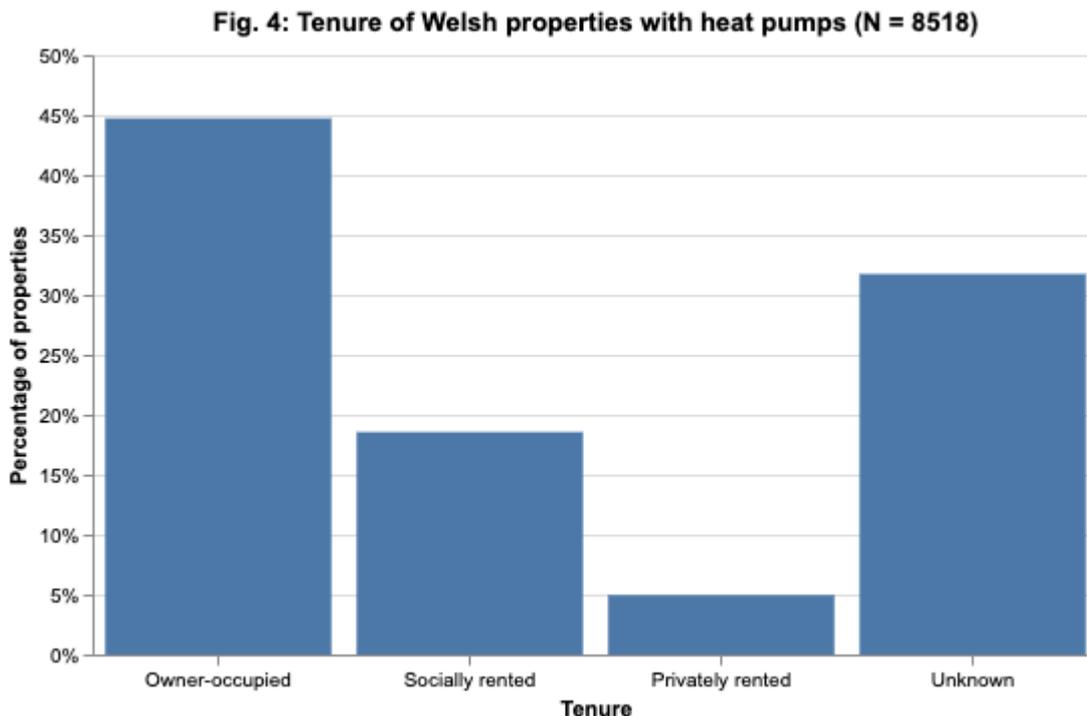
3.4. Nesta's analysis of Microgeneration Certification Scheme (MCS) data⁴ concluded that the median cost of an air-source heat pump installation in the UK is £10,500. This upfront cost will clearly remain a barrier for many households in the early part of this decade. However, with policy changes and achievable improvements in installation quality, heat pumps could generate annual running costs savings sufficient to offset the difference in upfront costs within equipment lifetimes.

3.5. Solid wall insulation is the most directly comparable in terms of cost to a heat pump installation, with average costs quoted by the EPC register broadly falling between £5-15,000. For a 3-bed semi-detached solid wall home with a gas boiler, solid wall insulation might cost around £13k, and would save just under 1000 kgCO₂/year. An air source heat pump costing roughly the same would save 3200 kgCO₂/year.

⁴ How to reduce the cost of heat pumps (Nesta 2022)
https://media.nesta.org.uk/documents/How_to_reduce_the_cost_of_heat_pumps_v4_1.pdf

4. What do we know about homes with heat pumps in Wales?⁵

- 4.1. About 8500 of the 884,000 properties in the Welsh EPC database are recorded as having a heat pump (0.96%). Since the EPC register only includes data on around 63% of Welsh homes, this is likely to be an underestimate of the true number of heat pumps installed.
- 4.2. Of these, 45% are in owner occupied properties, 19% are in social housing, and 5% are in privately rented homes. The remaining 31% are 'unknown' - suggesting their tenure might not have been certain at the time the EPC was undertaken (most likely if they are new builds).



Where are heat pumps in Wales?

- 4.3. Fig. 5 shows a higher concentration of heat pumps in more rural

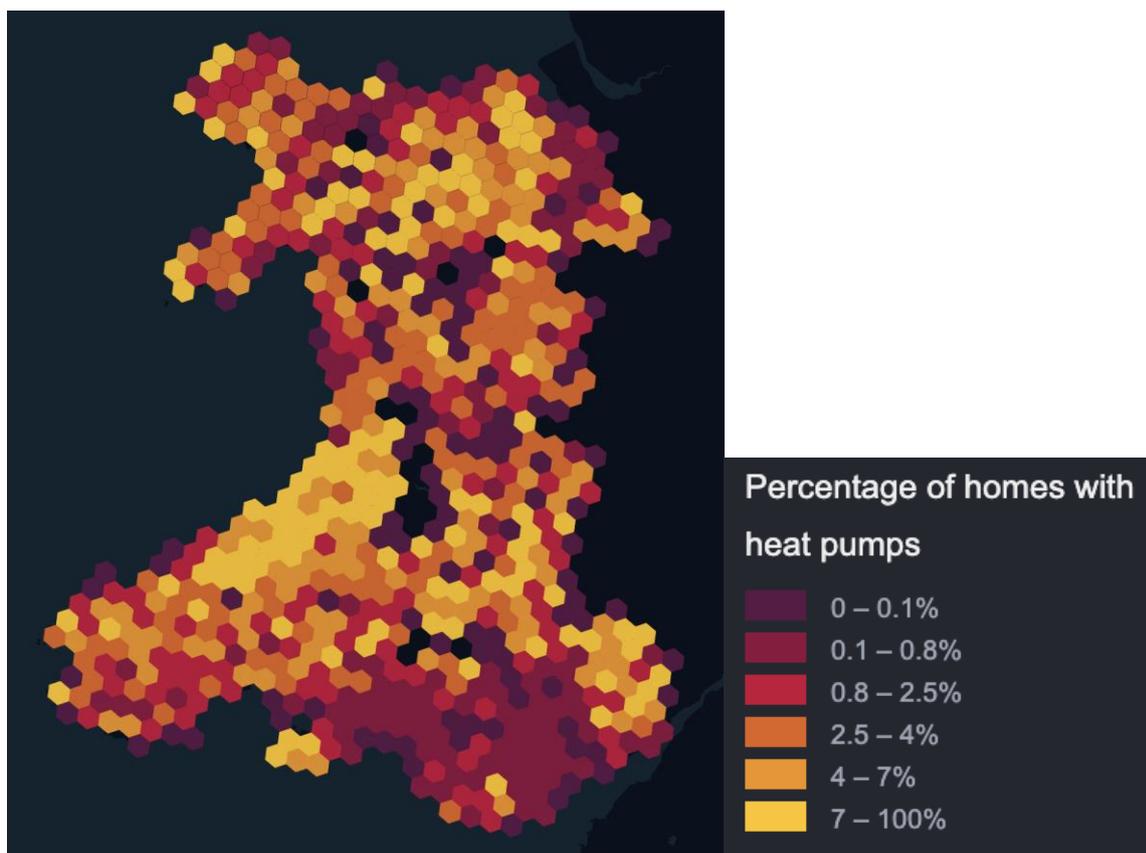
⁵ This section is based heavily on the Energy Performance Certificate (EPC) database. Only around 884,000 of Wales' 1.4m homes are recorded in the database, and the characteristics of homes not on the register may vary from those that are.

We also acknowledge the shortcomings of the EPC register from a methodological point of view - not least the fact that installing a heat pump can actually reduce the EPC rating of a home whilst improving its carbon footprint. Improving the data available to policymakers around housing decarbonisation would be valuable, until then we continue to make use of the EPC record as the best available data set - which at least enables like-for-like comparisons with other users.

parts of Wales, and lower concentrations in cities and urban areas. We have not undertaken detailed research on this for Wales specifically, but factors we could reasonably assume are influencing this would be:

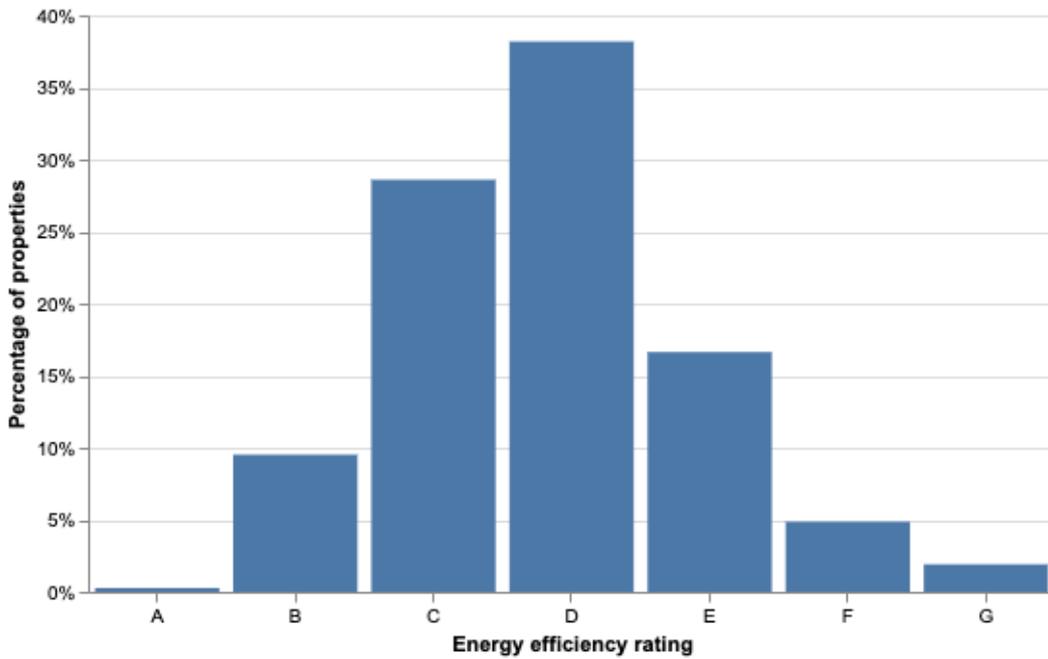
- **Planning restrictions** - which restrict the installation of heat pumps within a certain distance of neighbouring properties, or within a certain line of sight
- **Replacement of off-gas heating systems** - evidence from Nesta in Scotland examining a similar pattern concluded that many heat pumps were being installed to replace LPG or oil boilers. Off-gas grid homes don't have the option of installing combi-boilers and heat pumps may compare more favourably on both installation and running costs with oil or LPG based heating systems.

Fig. 5: Distribution of heat pumps, normalised by property density



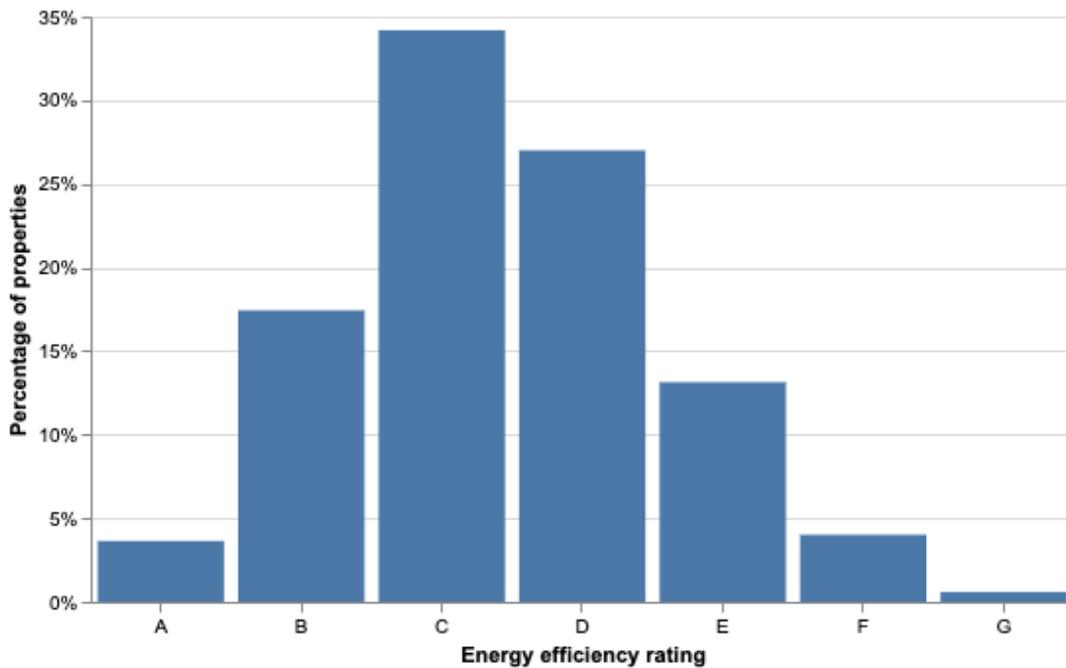
How do heat pump installations correlate with energy efficiency of buildings?

Fig. 6: EPC ratings of all Welsh properties (N = 883,748)



4.4. Fig. 6 shows EPC ratings of all Welsh homes in the EPC database.

Fig. 7: EPC ratings of owner-occupied and privately rented Welsh properties with heat pumps (N = 4233)

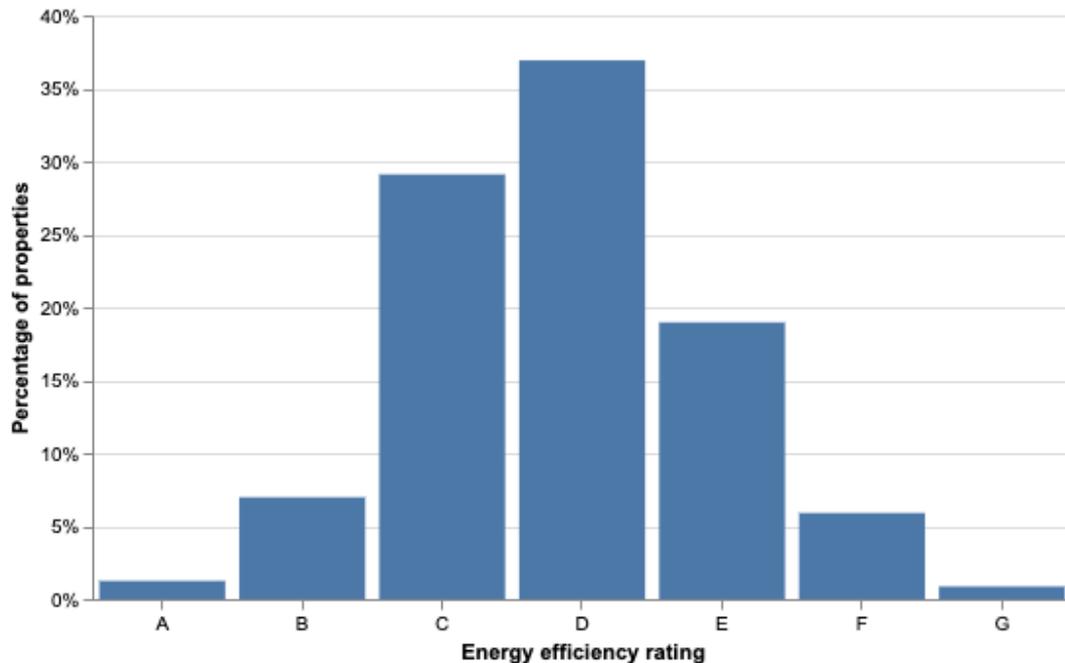


4.5. Fig. 7 shows owner-occupied and privately rented Welsh homes with heat pumps installed. This shows that heat pumps tend to be installed in more efficient homes than the average distribution, but a reasonable proportion are nevertheless in low EPC homes.

- 4.6. Nesta understands that in some cases the installation of a heat pump has caused the EPC rating of a property to decrease. The thermal efficiency of some of these homes may in fact be better than implied by the EPC rating.

Older homes with heat pumps

Fig. 8: EPC ratings of owner-occupied and privately rented Welsh properties with heat pumps, built pre-2007 (N = 2879)



- 4.7. Fig. 8 shows all homes in Wales built before 2007 with heat pumps. These records cover all properties built before 1900 until 2007 - when EPC records began. We have assumed, because of their age, that the majority of these are homes where the heat pump was installed as a retrofit - rather than in a new build property.

- 4.8. Comparing Fig. 7 and 8 we can conclude that heat pumps installed as retrofits appear in private housing in similar proportions to the general distribution of EPCs across the whole housing stock (Fig. 6). The experience of home owners across these housing types would be a valuable area for further investigation.

How many Welsh homes could be 'heat pump ready'?

- 4.9. Heating system design is complex, so homes will need individual assessments before any green upgrades are made, as well as verification and testing after installation to ensure the new system is working optimally.
- 4.10. The assumption is sometimes made that we should aim to install the smallest possible heat pump in homes, as this will have lower operating costs. This often leads to the conclusion that all homes should be assessed for, and receive, fabric insulation retrofit to lower overall demand before a new heating system is installed.
- 4.11. We are concerned that a blanket fabric first approach does not lend itself to achieving the greatest possible pace. For some homes, the amount of additional fabric insulation needed to ensure a heat pump system works well is likely to be minimal. In other cases, the same results could be achieved by resizing radiators. Effective heating controls, which householders know how to use, can also mitigate the need for either insulation or replacement radiators. In some cases, a larger heat pump or a system designed to run at a slightly higher flow temperature will be more cost-effective than a smaller heat pump plus more extensive fabric measures.
- 4.12. In weighing up any of these options, we should be cautious of overestimating the appetite homeowners or landlords will have for the disruption and cost of multiple rounds of building work. If we want people to act, then the message that they absolutely need to have both fabric insulation and a heat pump may result in some homeowners not doing either.
- 4.13. With this in mind, we believe that **between a quarter and a third of Welsh homes might be ready to have a heat pump installed** without any upfront fabric retrofit.

4.14. Our assumptions here are:

- There are 276,256 properties in the EPC databases that are **EPC C and above**, and which **also have 'good' or 'very good' wall insulation** (31.1% of all records)
- Of these, 201,102 **also have 'good' or 'very good' roof insulation** (22.8% of all records)
- These properties are likely to be able to be heated effectively with a low-temperature heating system. In practice, some may need upgrades to pipes and/or emitters (radiators), but further reducing heat loss through insulation is unlikely to be cost effective over the lifetime of a heat pump.

5. Cost of living crisis - the right solutions for the right problem

- 5.1. The ongoing increases in the energy price cap will understandably influence much of the thinking around action to decarbonise homes, particularly as some households are pushed into fuel poverty for the first time. In this context, **government funding for insulation should ideally increase in ambition**. But we should be realistic about how much we can achieve through insulation programmes, and when.
- 5.2. The retrofit sector is not ready to deliver an urgent, unplanned increase in the scale and pace of its activities in time to help households in the winter of 2022. Even if it were, the reduction in energy usage achievable by even the more extensive and costly retrofit remains low (as per Fig. 3 above) at around 17%. Such a reduction would clearly help households, but will also self-evidently not offset all of the anticipated increase.
- 5.3. Sadly, many households in homes that are already energy efficient, and which have already been insulated will also find themselves unable to meet the coming price rises.
- 5.4. Likewise, success in the electrification of heat will play a significant role in reducing our exposure to gas price volatility in wholesale markets. However, there is no real argument that installing a heat pump is a way to reduce costs in the short term. Even if it was, the heat pump installation sector is in a similar position in respect of its capacity to scale up quickly.
- 5.5. Both insulation and heat pumps therefore play *preventative* roles

in reducing costs in the energy system, but we cannot prevent our way out of a crisis.

- 5.6. Support for households during this crisis will most usefully take the form of direct financial assistance. Nesta has previously supported calls by E3G and others regarding the form this should take.
- 5.7. Policy on both insulation and low carbon heat should therefore focus on what both interventions are best placed to achieve in the medium term, and not be over-optimistic about their potential to help with the immediate crisis.
- 5.8. A, hopefully, short term cost crisis should not make policy makers lose focus on getting to grips with reducing our emissions during this crucial decade.

Recommendation 1: Make the installation of heat pumps in well-insulated private housing a focus for the forthcoming Heat Strategy

- 5.9. For the reasons outlined above, we believe there is a clear policy gap in Wales for a **targeted approach to increasing heat pump adoption in well-insulated private homes**. This should be a focus for the forthcoming Heat Strategy (due in 2023).
- 5.10. We outline further actions which could contribute to an increased pace in decarbonisation below.

6. Other actions to speed up the decarbonisation of private housing in the short, medium and long term

- 6.1. We have argued above for a significant shift of emphasis in retrofit policy. Below are some more specific actions which could contribute to the specific goal of increased heat pump adoption, as well as to domestic decarbonisation more generally.

Short term (12 months)

Recommendation 2: Support households to optimise their existing heating systems

- 6.2. While we would like to see heat pump installations scale up rapidly, the majority of households will remain on fossil fuel heating systems for the medium term. We believe that in the interim, many households could reduce their carbon emissions and save money through simple, low- and no-cost actions. One of these is to lower the 'flow temperature' of their combi boilers. This has the effect of reducing the temperature of water in radiators, without affecting room temperatures.
- 6.3. The majority of condensing combi boilers installed in the UK aren't operating to their maximum efficiency. If flow temperatures are too high, the boiler may fail to condense. This means it will burn more gas, generate more emissions and cost households more than they need to.
- 6.4. At installation, combi boiler flow temperatures are often left on a default setting which is too high for efficient operation. Only one in ten households report having changed their boiler flow temperature in the last year⁶. Many householders aren't aware they can change their boiler's settings, and others are worried they would make a mistake by doing so. However, changing this setting is quick and simple, and reversible.
- 6.5. Nesta has developed [a digital tool](#) to help people change their boiler settings, with a communications campaign launching in the autumn. We are keen to work with other organisations to

⁶ ONS Public opinions and social trends, Great Britain: 22 June to 3 July 2022
<https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/bulletins/publicopinionsandsocialtrends/greatbritain/22juneto3july2022>

scale and tailor the advice - including for those who will need additional support (e.g. telephone or face to face advice).

- 6.6. We are also creating an online toolkit for organisations that want to recommend lowering flow temperatures (e.g. community groups, energy suppliers).
- 6.7. Reducing boiler flow temperatures saves money, gas and carbon in the short term, but it also helps households get on the road to a heat pump by normalising low-temperature heating. A home that can be heated with a flow temperature of 50 degrees or lower is highly likely to be heat-pump ready.
- 6.8. As a funder of advice services, the Welsh Government is well-placed to drive increased awareness of boiler optimisation as a simple and quick way to reduce energy usage. It should also mandate the provision of advice on this as part of its future Warm Homes programmes.
- 6.9. Nesta has also commissioned an evidence review and modelling to explore the savings that could be achieved through 18 further low- and no-cost actions, with results due in September 2022.

Recommendation 3: Invest in research to map the most plausible paths to scaling learning from the Optimised Retrofit Programme to the private housing sector.

- 6.10. The Optimised Retrofit Programme is the Welsh Government's flagship 'test and learn' whole house retrofit scheme. Social landlords participating in the programme have an explicit mandate to explore paths to scale outside their own tenure. Nesta believes this has significant potential to increase the pace of decarbonisation, but its success will depend on a proper understanding of how it will be achieved.
- 6.11. Our work on scaling innovation has shown that it requires clarity on:
 - The goals of scaling - **what should be achieved** by growing the impact of a specific intervention - in this case, is it about comfort, reducing bills or reducing carbon emissions?
 - Whether these goals **align with what users want**
 - The key **dependencies** of success - asking 'What made this

successful?' and whether this key factor is also scalable / transferable

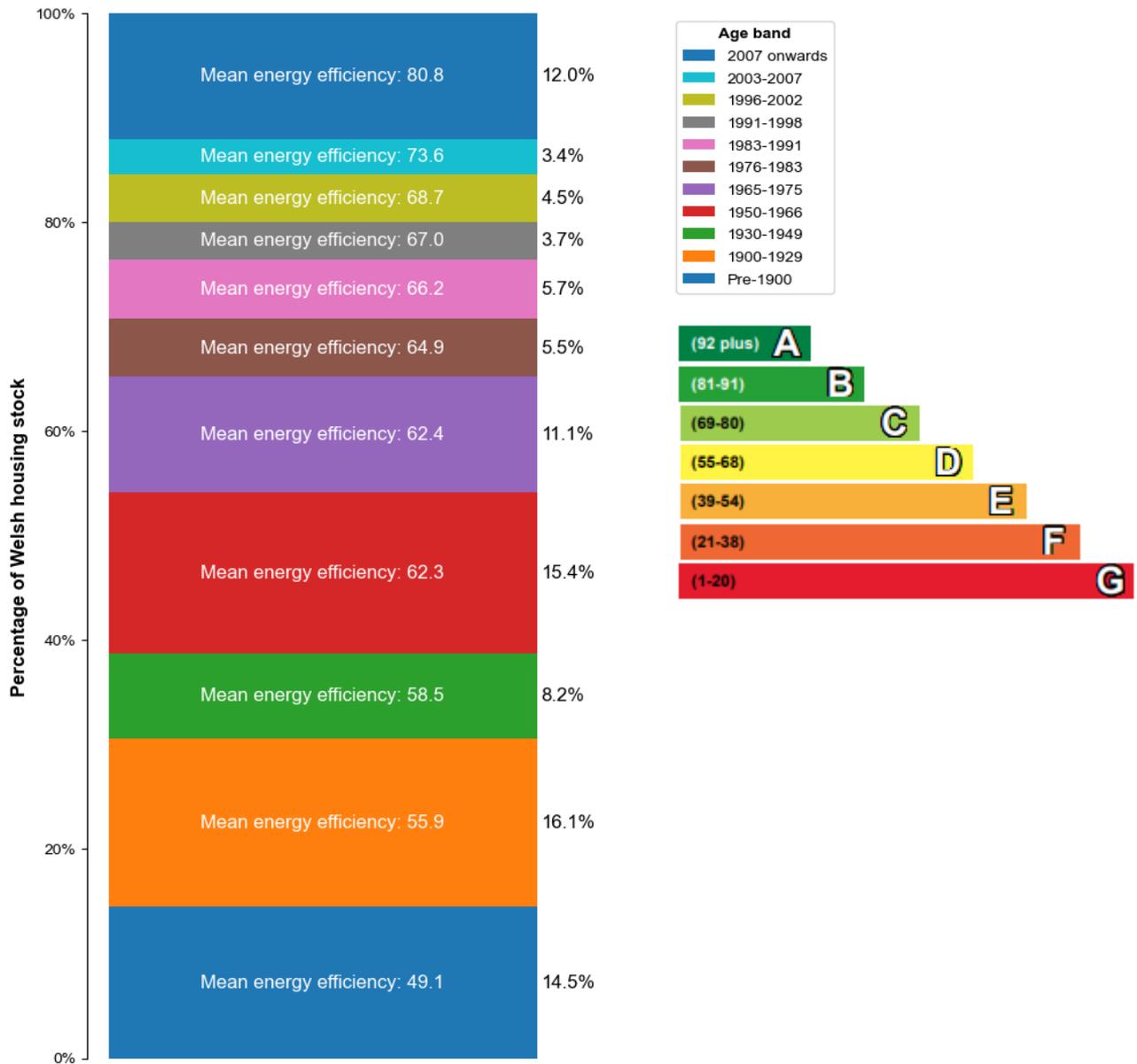
- 6.12. Only then can we understand which **strategies** are likely to be most effective in scaling.
- 6.13. Scaling also requires that there is sufficient **demand** for the lessons. At present, it isn't clear how much demand there is within the private housing sector for the lessons that ORP is likely to generate, or which sorts of homeowners that demand is most likely to come from. Demand is unlikely to be uniform across the owner occupied and privately rented sectors.
- 6.14. The ORP is multifaceted, but clearly two significant dependencies are the availability of large amounts of public funding, and a set of willing delivery partners who are able to make decisions about large volumes of stock.
- 6.15. By contrast, the private housing sector is unlikely to receive the same volume of grant funding, and is fundamentally different in its decision making structures - with 1.1 million individual households in all their diversity requiring a reason to act.
- 6.16. As well as answering the core ORP technical questions like 'What measures work in what housing archetype?', the wider research into scaling should also ask 'What is most persuasive in getting property owners to take action?'. Reliable information about what works technically is unlikely to be sufficient in itself.
- 6.17. Nesta is interested in exploring partnerships in Wales which could explore the question of how ORP learning can scale.
- 6.18. Involving homeowners and landlords directly in research around the ORP at the earliest possible opportunity will enable small-scale testing and insight generation on questions like: How might ORP insights be presented? Who is the most trusted organisation to deliver these messages? Have we tested our assumptions about what private owners and landlords are trying to achieve when upgrading their homes? Does this align with what the ORP is learning?
- 6.19. This can be followed by larger scale trials to see which of the important behavioural barriers can (and cannot) be overcome by the ORP's findings.

- 6.20. To be clear - We have made no conclusions about the extent to which ORP learning can scale, and it is likely to be hugely valuable. But it is clear that we must invest directly in understanding and developing clear paths to scale.

Recommendation 4: Support households in Wales to apply for the BEIS/Ofgem Boiler Upgrade Scheme (BUS).

- 6.21. The BUS provides grants of £5,000-£6,000 towards heat pump installations. Welsh taxpayers have contributed to the funding pot for this scheme, so we should ensure Wales does not miss out relative to England and Scotland.
- 6.22. This activity could focus on the 23-31% of of Welsh housing stock which is already of a good energy efficiency standard (i.e. EPC C and above) - see Fig 9 below.

Fig. 9: Construction age bands and energy efficiencies



Medium term (2-5 years)

Recommendation 5: Ensure heat electrification workforce / skills are a focus within wider retrofit skills policy

- 6.23. The Optimised Retrofit Programme already has extensive activity around skills for fabric retrofit, and this should be complemented with a specific focus on heat installers in Wales.
- 6.24. As well as supporting heat pump rollout in Wales, this will help ensure Wales' heat engineering sector is not left behind the rest of the UK. The design, installation and maintenance of electric heating systems has the potential to provide skilled, secure local

jobs in the foundational economy for decades to come. If Wales moves more slowly, there is a strong possibility that Welsh homes will be upgraded by businesses from over the border.

- 6.25. Nesta has published research⁷ exploring the current state of the heat pump market from a skills, training and productivity perspective and suggests ways of increasing the supply chain's capacity to install heat pumps. Based on direct engagement with the sector, we conclude that the UK as a whole needs to train more engineers each year than there are currently in the whole industry.
- 6.26. Our research found that existing training pathways are complex and fragmented. There is currently no single, clear route for someone new to the industry to train as a heat pump engineer. Training offers are fragmented and sometimes inconsistent.
- 6.27. The industry needs to attract both experienced gas engineers and new entrants. Having enough companies and experienced engineers to take on and help train new workers is vital so the heat pump industry can grow. Attracting new entrants via colleges and apprenticeships will also be crucial given the age demographic of the existing gas workforce.
- 6.28. The pathways for new heat engineers and new fabric retrofit installers are unlikely to be identical. So both should be given a specific focus within the Welsh Government's skills programme around the ORP.

Recommendation 6: Develop new finance products for home decarbonisation in Wales, and target them on wider outcomes

- 6.29. The Decarbonisation of Homes in Wales Advisory Group's 2019 report⁸ and research by the New Economics Foundation on behalf of the Future Generations Commissioner for Wales⁹ identified the provision of publicly funded finance products as a way to address the strategic gap in respect of private housing in

⁷ How to scale a highly skilled heat pump industry (Nesta 2022) https://www.nesta.org.uk/report/how-to-scale-a-highly-skilled-heat-pump-industry/?gclid=Cj0KCQjw3eeXBhD7ARIsAHjsr-LA8BZyQZc3pTQ_nXuDASgK26IRcQFLOlcsfViFTZr4-XJHVNqy-IaApr4EALw_wcB

⁸ Better Homes, Better Wales, Better World: Decarbonising existing homes in Wales (2019) <https://gov.wales/sites/default/files/publications/2019-07/independent-review-on-decarbonising-welsh-homes-report.pdf>

⁹ Homes fit for the Future: The Retrofit Challenge (2021) https://www.futuregenerations.wales/resources_posts/homes-fit-for-the-future-the-retrofit-challenge/

Wales.

- 6.30. Following this, the Development Bank of Wales has begun to invest in developing products which could be used for green home upgrades / retrofit. Nesta has been working in partnership with the Bank to support the development of these potential products, primarily through user testing and insight generation. Our work so far has identified the key needs homeowners¹⁰ have around access to finance, and how to choose the right retrofit measures for their home.
- 6.31. This has informed a large-scale behavioural science experiment to test which of a range of currently hypothetical products might achieve the greatest rate of uptake in Wales. At the time of submission this work has only just begun, but we would be delighted to share our findings with the committee at a later date.
- 6.32. We hope to see the Development Bank pilot a financial product, informed by our work, in the near future. If this pilot proves successful, the Welsh Government should support the scaling of this product and service offering in the longer term.
- 6.33. However whilst a substantial investment of public funding into retrofit in this market would be welcome, we recognise it is unlikely to be possible to fund works in all 1.1m of Wales' privately owned homes. We therefore believe the Welsh Government should consider what else it can achieve by contributing to the development of this finance offer.
- 6.34. For example, a key insight is that householders perceive a big risk in making the wrong decision about what measures to install in their home. They suspect that if they invest in a technology in 2022, they may find this has been superseded by a better technology in the near future. Whilst understandable, this mindset clearly does not lend itself to rapid progress in this crucial period for climate action.
- 6.35. The Welsh Government could address this by using this finance offering to send a clear signal to home owners that there are retrofit measures - like heat pumps - which they can have confidence in installing sooner rather than later. This in turn could

¹⁰ Not including private landlords, at this stage

also send a message to the wider workforce and supply chains.

- 6.36. Householders also clearly identified a need for tailored advice about their own home, and to find trusted installers and tradespeople to do the work. The Welsh Government is well placed to align its advice services funding with the delivery of the Development Bank of Wales' finance offering.

Recommendation 7: Remove unnecessary barriers within the planning system to heat pump uptake - particularly in urban areas

- 6.37. Nesta understands, through our engagement with installers, that planning requirements around air source heat pumps can sometimes present a barrier to uptake in Wales. Particularly in urban areas with higher population density.
- 6.38. Reasons for planning restrictions include assumptions around the noise an outside heat pump unit makes, as well as considerations around placing units at a fixed distance from windows, and out of the line of sight of neighbouring houses.
- 6.39. However, we believe concerns about the noise of heat pumps are often overstated, especially in the context of other noise sources within densely populated areas which go unregulated.
- 6.40. We intend to look more closely at the impact of planning on uptake in Wales, and properly map which regulations apply and where. Given their importance to reducing carbon emissions over the next ten years, awarding heat pumps permitted development status in planning would be more consistent with the approach the Welsh Government has taken on rooftop solar¹¹.

Long term (5 years onwards)

- 6.41. The actions outlined above should align towards a step change in the rate of heat pump adoption in Wales in the second half of this crucial decade.
- 6.42. Further actions in this period could include scaling the learning from the Optimised Retrofit Programme - based on the pathway mapping described above, as well as an increased investment in

¹¹ Gov.wales - Planning permission: solar panels <https://gov.wales/planning-permission-solar-panels>

government finance.

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