

Empty Homes and the Climate Emergency

Carbon Dioxide is the most abundant of the greenhouse gases, accounting for about two thirds of greenhouse gases. Governments across the world are looking at how they can improve the energy efficiency of existing buildings and how they can work towards net zero emissions for new buildings.

The Scottish Government are supporting households to install energy efficiency measures and zero emissions heating systems, as well as working to deliver a net zero emissions buildings sector. The stated aim is for emissions from heating all buildings across Scotland to reach zero by 2045. Elsewhere in the UK, the future homes standard will mean new homes should have carbon dioxide emissions 75%-80% lower than those built to current building regulations from 2025¹

All of this is, of course, to be applauded and encouraged. However, when we talk about housing and carbon dioxide emissions, day to day heating and energy efficiency are only part of the story. The other part is the emissions involved in building homes. A building that can be net zero to maintain is anything but net zero to build.

Operational and embodied carbon emissions

There are two types of carbon emissions that we need to consider when we look at homes.

These are Operational Carbon Emissions and Embodied Carbon Emissions that contribute to the greenhouse phenomenon.

Put simply, the former could be summarised as the emissions created by running and heating a house. The latter could be summarised as the costs associated with creating the house.

In 2013 the Science Direct research paper 'Operational vs. embodied emissions in buildings—A review of current trends' noted 'A great deal of effort has been put into reducing the former as it is assumed that it is higher than the latter. However, studies have revealed the growing significance of embodied emissions in buildings but its importance is often underestimated in lifecycle emissions analysis.'²

Circular Ecology note that 'Embodied carbon is gaining increasing attention from both industry and government where it is now recognised that embodied carbon emissions make up a large fraction of the emissions from the construction sector. In fact, it is often 20-50% of the whole life (embodied + operational) carbon emissions of a new building...Unless the

¹ <https://www.theguardian.com/environment/2021/jan/23/buyers-of-brand-new-homes-face-20000-bill-to-make-them-greener>

² [Operational vs. embodied emissions in buildings—A review of current trends - ScienceDirect](#)

embodied carbon footprint is included in the definition of net zero, it risks neglecting a large amount of upfront carbon emissions.³

'It is also important to remember that unlike operational carbon emissions the embodied energy and carbon cannot be reversed. Once they have been released the opportunity for improvement has passed. In contrast, operational emissions can be improved at any point in the lifetime of a building, for example by implementing a range of energy efficiency measures.'

And yet, the conversation about how to meet housing demand is dominated by building new homes, with little thought given to how we could use old homes that are lying empty.

Empty homes – facts and myths

We know that Scotland needs more homes. We know the UK needs more homes. But we also know that neither Scotland or the rest of the UK are currently making the best use of the homes they already have.

There are over 47,000 long term empty homes in Scotland and a further 44,000 other unoccupied homes, meaning **Scotland has more than 90,000 vacant homes.**

These aren't just homes that have become empty or are taking a bit longer to do up or sell, because of the pandemic. Of the 47,333 long term empty homes reported in 2020, around two thirds had been empty for longer than a year. The same was true in 2019, and figures suggest that there could be almost 20,000 homes that have been empty for four years or longer.

These also aren't just homes in places where people don't want to live anymore. Edinburgh reported that 3,193 homes in the city had been empty for longer than a year in 2020. Glasgow similarly reported 3,513 homes that had been empty for longer than a year.

And **they aren't just homes in places where no one is building homes anymore.** In Aberdeen, in 2019, more than 80% of new homes in the city were built in the ten areas that already had the highest levels of long term empty homes.

We are building homes in places where there are homes lying empty. We are ignoring the assets on our doorstep as we choose to build new homes. In some instances, we're demolishing empty homes and building new ones on the land where they once stood.

Our primary focus should be on keep existing buildings alive as places to live and work, rather than always looking for opportunities to build new homes. This doesn't just mean

³ <https://circularecology.com/embodied-carbon.html>

bringing empty homes back to use, it means converting vacant commercial buildings into housing where appropriate.

We see successful schemes around the country where hotels, shops, breweries, schools, hospitals and other historic buildings have been converted into homes, meaning that local heritage is retained and revitalised, rather than left empty or demolished and replaced with identikit new homes.

We have also seen fragile communities sustained and revived through bringing buildings back into use as affordable housing for teachers, doctors and other essential workers, leading to a new generation of people making rural towns and villages their home.

Where possible we should look to preserve buildings and tackle the climate emergency by making bringing buildings back to use the first choice option, thereby reducing embodied CO2 emissions that can be just as damaging to the environment as operational CO2 emissions in existing housing. Only where there aren't existing empty homes and buildings lying vacant should we be looking to build new.

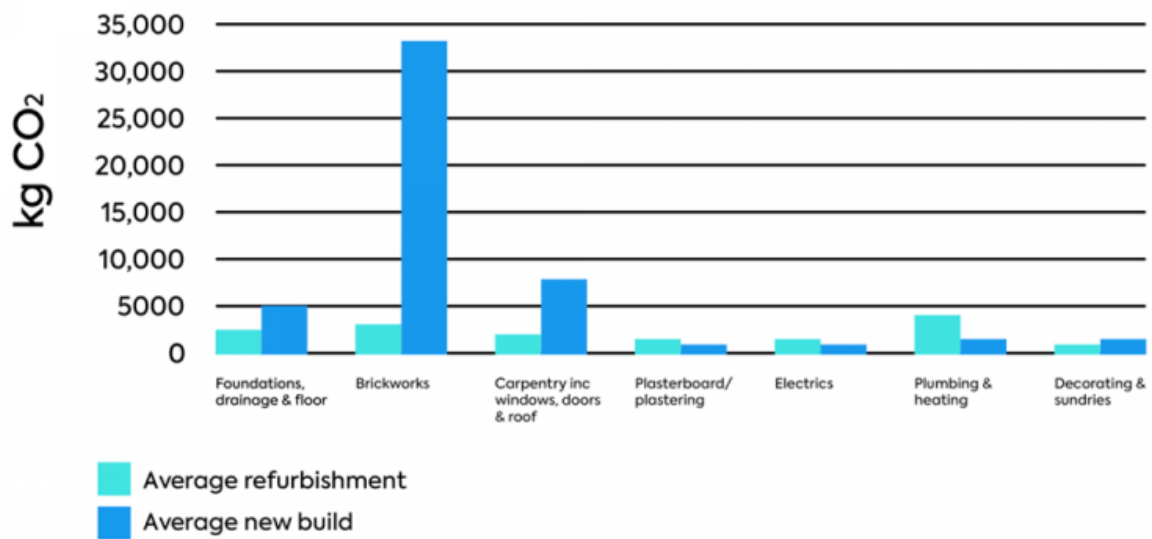
It makes economic sense, and it makes environmental sense.

The environmental case for refurbishment over new builds

The graphic below shows embodied CO2 emissions in new buildings compared to refurbishments from a 2009 study that compared the CO2 given off in building new homes compared to creating new homes through refurbishing old properties⁴.

⁴ <https://www.world-habitat.org/wp-content/uploads/2016/03/New-Tricks-with-Old-Bricks1.pdf> and <https://citu.co.uk/citu-live/what-is-the-carbon-footprint-of-a-house>

Distribution of embodied CO₂



The biggest difference, unsurprisingly, came in brickworks, where the embodied CO₂ emissions in a new build were around ten times that of a refurbishment.

Because of this, the report found that it takes several decades - in most cases more than 50 years – for a well-insulated new home to make up for their high embodied carbon emissions through lower operational carbon emissions.

And it should be borne in mind that the refurbished homes in the study were not in all instances having the most energy efficient heating options installed.

At the time the study was carried out, there was the common response that new buildings were more energy efficient than refurbished buildings, but that does not have to be the case anymore.

The University College London Refurbishment & Demolition of Housing Embodied Carbon: Factsheet notes that 'Refurbishment improves the energy efficiency of existing buildings by adding insulation or replacing old systems with more energy-efficient ones, such as low energy lighting or better boilers. Refurbishment means occupants use less energy day-to-day, but it also means more embodied carbon as more material is added to the building and older systems are thrown away. These additions can extend the lifespan of the building and so they help avoid the embodied carbon needed to replace an old building with a new one.'⁵

⁵ (<https://www.ucl.ac.uk/engineering-exchange/sites/engineering-exchange/files/fact-sheet-embodied-carbon-social-housing.pdf>)

Furthermore, if the new builds are on sites where old homes are being demolished, there is the double hit of embodied carbon. Once for demolition and once for rebuilding.

The UCL Factsheet notes that ‘When a building is demolished energy is used to deconstruct it, and remove, process and dispose of the waste. CO2 may also be released through associated chemical processes. Building a new replacement requires more materials and energy, creating more embodied carbon.’

The cost of retrofitting an existing home or building, by installing zero emission heating systems is broadly similar to installing the same systems in a new building. And many new buildings themselves will need heating systems upgrading or replacing to comply with future emission targets as developers continue to build homes that are neither zero carbon or low carbon ahead of being legally required to do so.

Retrofitted old buildings can provide the same low level of operational carbon emissions as a new build home without needing the high levels of embodied carbon emissions to get there.

So how do we make better use of our empty homes to help tackle the housing emergency and the climate emergency?

There are several measures that we believe could help.

These are:

1. **Support owners of empty homes to bring them back into use as zero emission social housing.**

In the ‘Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update’⁶ paper, the Scottish Government note ‘We will consider how our local tax powers, such as council tax and non-domestic rates, could be used to incentivise or encourage the retrofit of buildings. We will commission further analysis to identify potential options, to be implemented from the middle of the decade where appropriate, subject to consultation and public engagement.’

One way to do this is to **extend the circumstances where the council tax empty home surcharge is not applied to include where the owner commits to installing zero emission heating systems**. This can apply to all empty homes that an owner is intending to bring back to use.

Alongside this, a loan and grant scheme can be operational whereby;

⁶ [Securing a green recovery on a path to net zero: climate change plan 2018–2032 - update - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/2021/04/16/secure-green-recovery-on-a-path-to-net-zero-climate-change-plan-2018-2032-update-2021-04-16/pages/100/)

- **If an owner commits to bringing the property back into use as social housing rented out at LHA rates, the money to retrofit the home is provided in the form of a non-repayable grant.** The grant is non-repayable as long as the home continues to be rented at LHA rates for a minimum stated period. If it is not, then the grant becomes repayable.
 - **Where an owner does not commit to bring the property back into use, an interest free or low interest loan, is made available to fund the work to retrofit the property.**
2. **Give local authorities powers to bring long term empty homes back to use as social housing.**

There are two specific powers that could be introduced to facilitate this. These are **compulsory rental orders** and **compulsory sale orders**. These could fit alongside existing compulsory purchase order powers.

With compulsory rental orders, where;

- a property has been empty for longer than two years; and
- the local authority can demonstrate that there is housing need to justify bringing the property back into use as social housing;
- the owner was making no attempt to return the property use and there is either a significant level of council tax arrears; or
- the property is assessed as a blight on the community or a statutory nuisance

there should be a power for the local authority to compel the owner to bring the property back into use within a set time frame, and where the owner fails to engage with the local authority or to meet this deadline, the local authority should have the power to bring the property back into use as social housing. The costs of retrofitting the property, or other work to return it to habitable use would be deducted from rent charged on the property. Any balance after retrofitting and renovation, and administration of the rental, would be payable to the owner.

Compulsory Sale Order powers could be used where the owner is untraceable, and/or the owner is suspected or known to be deceased and there is no next of kin willing to take on the property.

This power can be used alongside existing compulsory purchase order power, and enable the property to be used as social housing or to be sold for development as new housing. Where the property is sold, a condition of sale would be that the new owner installs zero emission heating systems throughout before the homes are sold or rented on the open market.

3. Incentivise social housing providers to take on long term empty homes as part of targets to deliver new social housing.

New build properties come at a greater price for social housing providers than existing buildings do. They require greater leveraged financing and therefore act as a constraint on how much can be built, because they limit the amount of homes housing associations and others can afford to build.

Ironically, the greater level of rent control the harder it becomes to leverage sufficient finance, because there is less future income to leverage it against. A new home costs on average ten times as much as a refurbished retrofitted property.

So why are new homes so often the first choice? Mainly because existing funding schemes are geared towards new builds and new developments, not small scale refurbishments or acquisition of empty homes.

Making funding available for social housing providers to purchase, refurbish and retrofit long term empty homes can start to address this imbalance and reduce the embodied CO2 emissions that are created as part of the work to meet the targets the Scottish Government has set for increased social housing. It can also help to keep existing communities alive, reducing the increased levels of anti-social behaviour and spiral of decline that set in as homes become empty. It can also help to deliver more high quality social housing at less cost.

The work of organisations like Giroscope in Hull, the Latch in Leeds and Homes For Good in Glasgow show that empty homes can be turned into high quality social housing, with low environmental costs and low financial costs. It can't give us all the social housing we need, but it can provide a significant contribution to the target with the right incentives.

Conclusion

New homes can and should have lower levels of operational carbon emissions, but no matter what the levels of operational carbon emissions are, there will still be the embodied carbon emissions that are not only of equal concern to environmentalists, but that will grow more as we build more social, and other, housing.

It therefore makes sense to look at ways of reducing our embodied carbon emissions wherever we can. Making use of our existing buildings and empty homes to provide homes for the future is a logical and necessary way of doing this. We can't meet all the country's social and affordable housing needs through empty homes alone, but they can make an important contribution, and we should do all we can to ensure this happens.