

Fixing fuel poverty – is there a healthier way?

Winter is here and, with it, another season of misery for many, living in inefficient homes that they can't afford to keep warm and healthy. The Green Deal (as predicted in these pages a couple of years ago) was never going to deliver affordable warmth to low income households; and while the targeting of the ECO (energy company obligations) has been swung around so a higher proportion is directed to the most vulnerable, the overall level of activity has also been cranked right back. Kate de Selincourt hunts for a warm glow somewhere on the horizon.

A little while ago this sad post appeared on an internet chat site. Entitled 'For those who can't afford to use central heating this year - How are you going to cope?', it read; 'We have 2 little girls - 3 and 20 months and already owe money to our suppliers. We are going to have to be careful with not using the heating too much but our house is feeling cold already! We have bought thermals and extra duvets. What else can we do? To be honest I'm dreading it. By the 3rd week of every month we are skint at the moment.'

Suggestions poured in, ranging from hot water bottles and wearing hats indoors, to oil filled radiators and halogen heaters – with others warning that additional electric heaters could make bills even scarier. Numerous posters added miserable tales of their own.

Despite various home energy efficiency programmes over the years, many people still live in grossly inadequate housing. According to campaign group Energy Bill Revolution, 25,000 people still die of the cold every winter.

High energy costs, widespread benefit cuts, poor housing, and, in the private rental sector, sharply rising rents¹ coupled with fear of 'revenge' eviction², have left a lot of people in a pretty desperate place. No-one is really expecting this winter to be any better. A survey in October found 'energy bills are the top financial concern for people in Britain'.³

Warm Front, CERT and CESP are now things of the past, and although the ECO has been re-focused on those in fuel poverty, it has also been shrunk – and reduced to mainly shallow measures, removing the original impetus to kick start a market for solid wall insulation.

And some of the coldest properties are those with solid walls – they tend to have benefited less from previous efficiency programmes. And when the occupants are in fuel poverty they can be really cold.

Some 'baseline' monitoring was done last winter in 18 of the flats in a big council-owned concrete slab block, due for retrofit. Two weeks' data were recorded, in one mild week and one very cold week. Temperature patterns varied a lot. Several households did not heat their bedrooms at all, and of those who did use heating (which was direct electric), some restricted it to a few hours a day and only in the coldest weather.

In the different flats, bedroom average temperatures ranged from 21°C down to 15°C, and living room average temperatures ranged between a cosy 23°C and a freezing 13°C. Most living rooms dropped below 15°C at some point, two even dropped below 10°C.⁴

Below 17°C indoors, the risk of death from a heart attack or stroke is estimated to be 20% higher than if your home is above 19°C. Below 15°C, the risk is 40% higher. Falls, arthritic pain and coughs and flu are also more common.⁵

While solid walled homes may be among the coldest, plenty of cavity-walled buildings either remain untreated, or worse, have been insulated so badly that the house is scarcely any warmer – but the building is no longer eligible for help. Badly installed loft insulation, inefficient/ineffective/absent heating systems, and howling draughts complete the picture of misery.

Enter damp and mould

But it isn't just the cold that menaces health. While the rhetoric tends to focus on cold homes, problems are frequently caused by, and/or exacerbated by, the damp that so frequently accompanies cold. The tale, from a new mother pleading for advice on another family discussion board (see text box next page), exemplifies the way cold and damp, poor housing and fuel poverty, are intertwined.

As well as increasing ventilation, advice from the numerous veterans of this same struggle included buying a dehumidifier (a very common suggestion), and washing with vinegar and bleach sprays. People even reported redecorating their mouldy homes annually, often with mould-retardant paint.

This is the see-sawing battle with both cold and damp, fought simultaneously on opposite fronts. Increase the

Solid walled homes of all ages – hard to heat and hard to insulate



The extensive solid wall building stock in the UK (by no means all of it pre-1919) has yet to receive much attention beyond loft insulation where there are lofts, and a fair bit of (not necessarily that great) replacement glazing. Where the buildings are in disrepair with problems such as leaking fabric or rainwater goods, dripping overflows, and rising damp, the fabric may be soaked and therefore even colder.

ventilation and you freeze. Shut the window and block the vents to get warm, back comes the condensation. The colder and more financially hard-pressed the occupants, the more likely they are to restrict ventilation, to avoid being even colder.

It is not uncommon to read that the landlords or the local authority (like the ones referred to in the box below) have simply advised to occupants to ventilate their homes more, close the bathroom and kitchen doors when cooking

or showering, and avoid drying laundry indoors. Sometimes landlords do install or upgrade ventilation.

Ventilation in many homes in this country certainly is inadequate – background ventilation may well be unreliable, and/or uncomfortable when providing sufficient air changes, so advice and ventilation upgrades are often necessary and (if well-designed, and not just a hole in the wall) very welcome. Improvements to ventilation can improve health in their own right. But ventilation alone cannot solve the damp problem in a home that is not heated.

The colder the dwelling, the colder the indoor surfaces. Once these surfaces are below a certain temperature, condensation is more or less inevitable even with normal ventilation – just from the activities of day to day life. Ventilation and warmth are both necessary.

In many cases, therefore, the damp cannot be fixed unless the home is made warmer – and made warmer without increasing the householder's energy bills, so it can be kept warm reliably. The Warm Front Evaluation found that after efficiency measures were installed, the prevalence of 'severe mould' fell from 12% to 8% - an improvement, though by no means a cure.

Better results were seen in a tower block with bad condensation problems that was retrofitted with external insulation. Occupants had already been given advice about opening windows while cooking and so on, but this only seemed to make the homes colder, without solving the condensation. However, once the insulation was fitted, the problems disappeared almost completely.⁶

In another instance, an apartment building, notorious for its problems with damp and mould, owners Dublin City Council installed solid wall insulation, as well as adding continuous mechanical ventilation. As the Council's senior

On mould and perceived risks

I've read a lot of things recently about mould maybe being a cause of a lot of infant deaths, and I am so worried! I live in a one bed crummy little private flat, and I lowered my five month old's cot base the other day and to my horror see that there was mould on the wall directly next to her cot ... I will be bleaching it all first thing, but I am constantly getting mould around the walls, behind furniture, around windows and even by the toilet, my only concern is my little girl and am extremely worried right now after the articles I've just read! Anyone know anything about it all?? PLEASE!!!????'

She is advised to increase her ventilation:

'... I think I'm going to start opening the bedroom window too. My place is just so freezing, I only have one heater and that's one of them economy 7 ones and not even the modern one the one from the 1980s where you have to use a coin to turn the dial! Needs must I suppose.'

And someone recommends she contact the building owner and the local authority for further help:

'...When I did get the landlord round he pretty much said that there's nothing he can do as it's my fault basically as it's from condensation and there's nothing I can do but open the windows but my little one was born just before Christmas and without heating is absolutely freezing anyway so the thought of having to open a window was just ludicrous. When I spoke to the council they said open a window and disregarded everything else I was trying to tell them.'

architect put it: "I have had no complaints, that usually means the work has been successful!"

Incidentally, these last two examples suggest that although solid walls are harder to insulate than cavity walls, the payoff seems to be that the insulation may perform better. The early findings from the DECC evaluation of some solid wall insulation carried out under CERT a few years ago suggests this too, in an admittedly small sample, gas savings after solid wall insulation were 'typically 14% to 17%', while the average saved after cavity wall insulation was around 9%. There will be a closer look at solid wall insulation in the second part of this article, in the next issue of Green Building.

In the long unimproved or under-improved 'tail' of UK dwellings, the picture is not just of poor and potentially dangerous living conditions, it is of parents worrying about the impact on their children's health – with that worry becoming a health problem in its own right. This mother from Cornwall clearly expresses the strain these kinds of living conditions impose (her young son has asthma); 'Since being in this flat ... my son's health has seriously deteriorated because of the wet walls and the severe damp and mould. This is no place for a baby to live. It's made me feel so low. I just want a safe home for my son and myself.'¹⁷

And of course they are right to worry. With reports of children occupying mould-plagued homes having to be rushed to hospital with asthma attacks⁸, it does start to seem plausible that investment in improving these homes would pay for itself, simply in reduced costs to the health care services, never mind in better lives.

Can health organisations get involved?

As was discussed in the last Green Building article on this subject; without completely reshaping the tariff structures, it is hard to see how an energy saving programme financed directly via energy bills could ever expand to a scale that really cut fuel poverty – without badly worsening fuel poverty for anyone not benefiting from the measures.

There is now a campaign to see home energy efficiency made into a national infrastructure programme as deserving of central investment as, say, HS2. The case being made is that it would offer a widely-spread economic boost, job creation, as well as benefitting health and wellbeing.

Around 18 months ago, when we wrote about the then very new Green Deal, we cited a calculation from Age UK estimating that cold homes were costing the NHS in England £1.36 billion every year – and suggested it would make sense for the NHS to invest some resources into housing retrofit, to cut that bill. Could this happen?

Impacts of fuel poverty

Children and families

At the start of 2014 there were an estimated 2.23 million children England living in fuel poverty.⁹ They are likely to be affected in a number of ways:

- slower infant weight gain, higher hospital admission rates, impact on general development.¹⁰
- more than twice as likely to suffer from respiratory problems.
- cold housing negatively affects schooling and emotional well-being.
- one in four adolescents in cold housing at risk of mental health problems (risk is one in twenty for those in warm housing).
- carers and family members at risk of mental health problems.

Elderly, disabled and chronically sick:

Adults, and especially, older people are also at higher risk of health problems when living in cold homes:

- increased risk of respiratory and other infections.
- increased risk of cardiovascular illness.
- increased pain from arthritic conditions.
- loss of dexterity, increased risk of falls.
- worsening of chronic respiratory conditions.
- three times as likely to die a premature, winter-related death.

The stress and anxiety caused by fuel poverty almost certainly independently contributes to physical health problems; stress affects blood pressure, blood clotting and blood sugar control, for example. Fuel poverty also diverts money and attention from self care – such as buying and preparing nutritious food – and also the care of others.

In new draft guidance on avoiding excess winter deaths, to health professionals and organisations from NICE,¹¹ on tackling excess winter deaths, there is a cautious endorsement for direct investment in improving the energy efficiency of the homes of vulnerable individuals and households, based on a review of existing data, plus some financial modelling; 'Providing home heating and insulation interventions to households where someone has chronic obstructive pulmonary disease, heart disease or is older than 65 [appears] to be cost effective from the perspective of the health sector,' they say – though they go on to add this is assuming the health sector does not bear the full costs, for the most part.

Health organisations have been getting involved in home retrofit in a small way for some time – though more often in energy advice schemes and occasionally, emergency payments for vulnerable patients in acute need. But the transfer of public health into local government is one of the changes that seems to be allowing new alliances to be created. For example, in County Durham, the public health team are working with the county energy efficiency team and funding home energy efficiency improvements

for vulnerable patients who cannot get help via the national programmes. Health and other professionals refer patients, who they consider to be at risk from their housing conditions, and the energy efficiency team arrange a visit to determine what interventions – including both professional advice and physical measures would be most helpful.

As energy efficiency officer for Durham County Council, Sue Carr explains, the public health funding means they are no longer tied to a restricted 'menu' of measures. She said; 'We commission energy efficiency work and any necessary repairs, driven by the need of the person and the building.' It also means they are not constrained in who they help, by national eligibility criteria such as being in receipt of a particular benefit – and the involvement of health professionals means that the households in most need are more likely to be reached.

The Durham public health portfolio lead, Tim Wright, is convinced this is a worthwhile use of the public health budget, "We believe these interventions are very cost-effective, we think the case for this spending is robust. The challenge as I see it is how to get NHS buy-in."

Public health – which is about preventing illness - has a small budget compared to NHS spending on treatment. Spending on treatment is controlled by local clinical commissioning groups (CCGs). A few CCGs have made the leap and are investigating the idea that a warm, dry home may be as valid a treatment for chronic ill-health as medicine or a hospital visit – and that it may even prove better value.

Sunderland clinical commissioning group agreed to make a contribution to home improvements for six sufferers from chronic obstructive pulmonary disease. These are people with very poor health. The six patients involved in the initial trial were reported to have had 63 interactions with the NHS in the six months before the improvements took place, including three emergency admissions. "With the average spend on energy efficiency improvements totalling £5,000 per home and each emergency admission alone costing hospitals £2,500, only a modest reduction in medical interactions over the coming years is required for the scheme to save the CCG money overall," Business Green reported.¹²

In Oldham, the CCG has contributed to a bigger programme, which also draws on ECO funding and local authority sources. Nearly 1000 Oldham residents at risk of fuel poverty were helped last year – the commonest single measure being a new efficient boiler, with insulation also being carried out.

Oldham CCG estimated that problems caused or exacerbated by their fuel poverty may cost the local

NHS something like £6million a year. Fuel-poverty-related mental health problems loomed particularly large, affecting an estimated 6000 residents every year. The CCG's calculations suggest that lifting 1000 residents out of fuel poverty could save NHS spending of up to four times the £45,000 investment, each year.

The CCG's chief executive, Denis Gizzi, is convinced that it makes sense to spend CCG money on tackling the problems at source – and is now collaborating with contractor Keepmoat and Sheffield Hallam University to study the impact.

Although it is not a full calendar year since the interventions were complete, early results are impressive. CCG figures show that participants in the scheme went to hospital around 30% less often after the improvements, than in the equivalent months in the year before¹³. Questionnaires completed before and after the improvements indicate that, while 20% or respondents were at 'high risk' of psychological distress (eg anxiety or depression) beforehand, afterwards, only 1% had high risk scores.

It must be emphasised that these are very early results and further analysis, over a longer term, is still awaited – and will be read with great interest. Nevertheless the CCG is convinced enough to back the scheme for a second year, to reach another 1000 people.

Are these programmes any help with carbon targets?

National home energy efficiency programmes have been,

Proving the benefit

Demonstrating an improvement in health after homes are improved (and energy and fuel poverty advice are offered) is not straightforward, because there are always confounding factors, and of course the study cannot be 'blinded'. If people have had a retrofit, they will know it. Many of the conditions under study are chronic and long-term; improvements may take time, and may never be complete. Studies are generally short – and often on a mixed population, not all of whom suffer the same health conditions.

Nevertheless, studies on the sickest occupants in the worst housing have shown a measurable improvement in health.¹⁴ It is in mental health that the clearest improvements sometimes show up. This was seen in the evaluation of the Kirklees Warm Zone¹⁵ and in an extensive evaluation of the Warm Front programme, participants reported less stress, and healthier scores on mental wellbeing. After the installation, participants were nearly 40% less likely to report a high level of psychological distress.¹⁶

Studies like these are beginning to be used to inform policy (such as the NICE guidance mentioned above), and DECC has commissioned more research on this. It is worth noting, though, that the measures being tested are almost always fairly shallow. It will be interesting to see if more conclusive data can be collected on the health impact of future, deeper retrofits.

and at the moment continue, mainly to be run by DECC, the Department of Energy and Climate Change. And after all, DECC is in great part responsible for getting our carbon emissions down to meet our obligations under the 2008 Climate Change Act, so why shouldn't they be the department driving these programmes?

But ironically, the kind of 'low-hanging fruit' retrofit that has been (and, since the changes to ECO, continues to be) the mainstay of DECC's energy efficiency programmes, don't actually end up saving a great deal of carbon – especially when they are aimed mainly at helping the fuel poor. As just one of many similar analyses puts it; 'The finding from the Warm Front evaluation that [recipients'] fuel consumption did not fall on average ... indicates that, on average, recipients in the UK take the benefit from interventions mainly as improved comfort.'¹⁷

Fuel consumption actually rose after intervention (see graph below), in contrast to the government's prediction of a 60% fall. The researchers believed that as well as enjoying higher indoor temperatures (confirmed by monitoring) recipients of the home improvements were able to heat and use more of their homes. The Warm Front installations evaluated here were from the early 00s, but more recent DECC programmes – CERT for example – have also failed to show the predicted energy savings, probably for the same reasons.

According to energy writer Chris Goodall, "A study of homeowners installing a package of cavity and loft insulation and a new boiler in 2010 indicated a 19% reduction in energy use, and a likely saving of about £140 at current gas prices. The Energy Saving Trust claim[ed]

savings from these measures of twice this amount".¹⁸ This is a mixed population, so again, those in fuel poverty were probably saving less than this.

And overall although less energy is being used than it was, we are scarcely seeing the kind of cuts called for in the Climate Act. Much deeper retrofits would be required for that to be achieved.

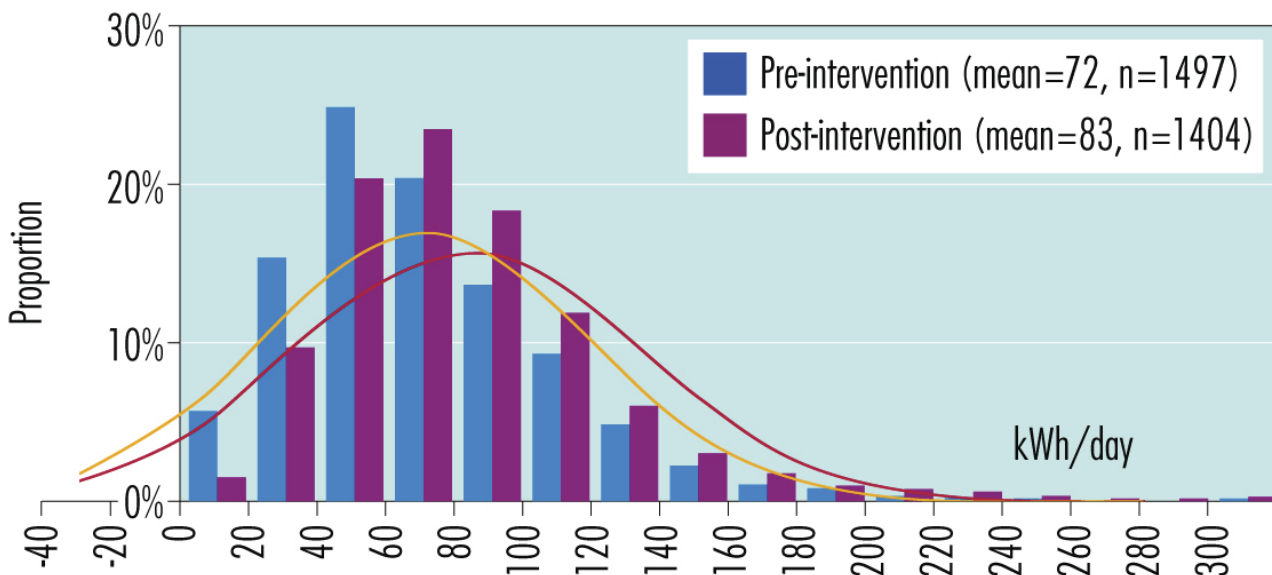
This is not especially an issue for the health service funders in Durham, Oldham and elsewhere, whose priority is for their beneficiaries to be warmer, drier, and less miserable and stressed. And to date, their investment has been in these same familiar measures, which do appear to offer that benefit. But if their vulnerable residents could be lifted out of fuel poverty altogether, so they could be warm while enjoying **lower** heating bills, and live in such well-insulated homes that condensation was more or less eliminated – mightn't that be even better?

Deep retrofit, of the sort that might reliably deliver dramatic improvements in comfort and energy use simultaneously, is still pretty unusual. However, a few notable examples exist, for example the exemplar projects funded under the Retrofit for the Future programme¹⁹, and the Passive House Institute has now introduced a certified standard for retrofit (EnerPHit).

Homes in the Retrofit for the Future programme showed average gas savings of around 50% - with savings of around two-thirds during the heating season. If DECC actually wants to see meaningful carbon and energy savings from its home retrofit programme, it does look as though deeper retrofit is what it is going to have to support.

A number of social landlords have already decided that the extra investment involved in deep, whole house

Fuel consumption before and after Warm Front interventions. From: Health impact Evaluation of the Warm Front Scheme, Geoff Green and Jan Gilbertson, Sheffield Hallam University 2008



retrofit may be worth the effort, and are testing it out. For example, Portsmouth City Council, which owns the block of flats whose numbingly cold indoor temperatures were described above, is having the three blocks in the development upgraded to the EnerPHit standard, with new glazing and sunspaces, external insulation, and mechanical heat recovery ventilation.

The aims are multiple. The landlords wish to end fuel poverty (which after all is also a threat to their rent receipts), protect the concrete structures, improve the condition of the blocks, and reduce ongoing maintenance costs. They also hope the general health and wellbeing of their tenants will be improved – something they will be evaluating alongside energy and comfort monitoring to get a full view of the retrofit's performance.

Other social landlords are also looking to 'deep' retrofit, again, because they believe it will benefit their tenants, and thereby meet their core aims and make sense financially in the long run. As one director of housing at Exeter City Council, Emma Osmundsen, explained; "We are focused on resident need. We want to get residents out of fuel poverty and for them to have healthy homes."

Whether these kinds of retrofits are scalable, and whether there might be pitfalls, as well as advantages, are questions to be looked at in the next part of this article – where we will also look a bit more deeply into what the wider benefits might be.

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