

Climate Change, Environment and Infrastructure Committee Evidence. Housing Decarbonisation Retrofit of Homes 28.04.2022

Introduction

1. This Paper is submitted on behalf of Linc Cymru, ClwydAlyn and Pobl Group. We endorse the need for ambitious decarbonisation targets and share a willingness to participate with the social housing sector to deliver these; this paper focusses on a number of the challenges and potential solutions of delivering the decarbonisation of Welsh social housing by 2033 and some contextual observations.

SAP 92 - an observation on the language used around the target?

2. The Standard Assessment Procedure (SAP) target of 92 is being widely adopted as a proxy for a zero-carbon home. Whilst the Energy Performance Certificate (EPC) with its SAP scores is a familiar and understandable metric, SAP 92 is not Zero Carbon. The energy use component that informs whether a home will reach SAP 92 reflects Primary Energy only; it does not take account of secondary energy use in the home IE plug in electrical devices such as charging an electric vehicle, boiling a kettle, watching a TV, using a microwave oven or computer etc. So, although a good target by comparison with the average existing home in Wales, it could be misleading to represent SAP 92 as zero carbon or call it a standard that equates to the decarbonisation of a home. It is really a standard of likely carbon emissions caused by that home when using Primary Energy.
3. SAP 92 can also be achieved with a fossil fuel burning heating appliance, photovoltaic panels, battery storage and excellent building fabric enhancements so not delivering on the zero carbon agenda. With the changes to the RD SAP modelling software due in summer 22 (SAP 10) the advances made with electricity generation through low carbon technologies will be remodelled. As SAP 10 is introduced old assumptions that electric heating is highly carbon dirty will change and homes will get a better SAP score with electric heating, giving more opportunities for electric heating design and the possible demise of like for like gas boiler replacement programmes. However, the issue with this is that due to the differential in the cost of purchasing gas and electricity, without in some instances, carrying out major improvements to the property fabric as the boiler is changed, the householder faces the risk of fuel poverty.

4. SAP 92 takes no account of the *embodied* energy used to win raw materials, transport them to a manufacturing/processing plant, component manufacture, transport to site, energy used to construct the home and remove waste. Therefore, using materials and technologies that have travelled significant distances to retrofit a home to SAP 92, creates its own carbon footprint which whilst not classed as part of decarbonisation – nonetheless creates significant carbon impact. A solution is local sourcing of renewable products and labour and this may represent an opportunity for Unnos to invest in the manufacture of certain key products and technologies such as air source heat pumps, semiconductor chip technology or saw mills.
5. Reaching SAP 92 will also be uneconomical for a proportion of the oldest or non-traditionally constructed homes (34% of all homes in Wales were constructed pre-1919) that it makes little sense to make a disproportionate investment to push beyond say SAP 80 or 83 for these homes at this time. Carbon offsetting for the last 12 points or so could be an alternative approach to deliver value for money whilst decarbonising the stock.

Financing Decarbonisation

6. The Welsh School of Architecture (WSA) indicate an average decarbonisation cost per home of approximately £18,445¹ to achieve SAP 92. This figure is now 2-3 years out of date. It was hoped that as the ‘green economy’ grows, material costs would reduce. However, recently with the perfect storm of energy cost rises, general inflation, the covid pandemic, material and staff shortages it could be some time before costs reduce. This will put significant pressure on delivering decarb measures within a shortened 10 year window.
7. We would recommend that energy efficiency / decarb measures be undertaken via an approach that maximises the life of existing components. As an example, if a gas fired boiler due to be replaced in 2028, is swapped for an air source heat pump (ASHP) instead of a replacement gas boiler, the cost of the gas boiler is deducted from the replacement ASHP to indicate the extra over cost only. The above WSA model lacks some practical challenges. If the home in our example is only 15 years old in 2028 it is true the boiler will be at the end of its theoretical design life but will often continue working for several more years adding value. Then there is the life of the radiators; in 2028 these are only 50% of the way through their predicted life cycle and substitution of an ASHP requires all the radiators to be replaced as they will be undersized for the ASHP to work effectively.
8. Not only does this generate a lot of waste from the disposal of functioning radiators and probably all the pipework as it is changed from a micro bore to a

¹ This figure is drawn from early findings of the stage 3 research by the Welsh School of Architecture (WSA) into decarbonising of the Welsh housing stock (work that was commissioned by the Welsh Government).

mini bore system; but as a social landlord will have only depreciated 50% of the radiator and pipe costs so there is a negative impact to the income and expenditure account to the business – a trading loss and reduction of surplus/profit. With a decarbonisation programme on the scale and a timeline proposed (2033) many components such as windows, doors, wiring systems and roofs will be a long way away from the end of their economic life placing significant pressure on the income and expenditure account.

9. Staying with gas boiler by the 2028 example, this approach also puts pressure on programmes of work to ensure that the fabric is 'electric heating ready' by that date to ensure the resident isn't disadvantaged by the difference in electricity verses gas cost.
10. All the above will affect the health of the RSL's business. Social landlords use a Net Present Value (NPV) calculation to understand whether properties are a liability or an asset to the business. The NPV essentially measures the income received from rent over 30 years minus all costs such as repairs, financing costs, component replacements and management costs of the homes. If the rental income has a surplus at the end of 30 years then we have a profitable home; if not then we have a loss making home – and wide scale loss making homes can equal a loss making unsustainable business.
11. The net present value of homes without a large financial grant, will in many cases become net present negative over the life of the business plan. Simply knowing how much the cost of decarbonising the homes will be, having adequate materials and labour does not in itself mean the landlord can afford to carry out the works. There is also a further accounting challenge where our auditors may take the view that all our assets are impaired due to the cost to value ratio of the work versus the asset and this would significantly affect the balance sheet and loan covenants as well as RSLs ability to generate private finance.
12. Additionally, the cost of servicing and maintaining much of the decarbonisation technology has not been factored into current business plans. Insulation and draught stripping are generally fine, once installed needs little if any attention. Mechanical devices however need regular servicing, repair from time to time and have shorter life spans (PV inverters 15 years, ASHPs 15-18 years, mechanical ventilation 15 years etc). Once this is factored into business plans, budgets must be found. This aspect of decarbonisation cost is not included in the much-quoted average of £18,445 per home to decarbonise which is the one-off implementation cost only.
13. Existing UK energy efficiency grants are not particularly helpful to social landlords in Wales. Take the Energy Commitment Obligation 3 (ECO) grant funding, it is aimed at very poorly performing homes with EPC G, F and E. As most RSLs in Wales have improved their homes beyond SAP 65 (EPC D)

only the Welsh private sector and English households will qualify to access the mainstream elements of these grants, despite our tenants paying for the grants via their electricity bills.

14. A key obstacle for RSLs raising loans to fund decarbonisation of homes is no financial return to the landlord to service, and in time, repay the loan. Without a rent formula that enables at least a proportion of the financial saving to be recouped by the landlord, it is difficult to invest at scale and pace.
15. If financial institutions see the cost of decarbonisation and the challenges RSL's face repaying loans we could see credit ratings drop making borrowing more expensive. Although the provision of VAT relief on Energy Efficiency Measures (EEM) is welcomed as it will help to reduce upfront costs, it is believed that reducing VAT simply removes one of many barriers. Further incentives will be required to stimulate the private sector.

The unintended consequences of improvements and technology.

16. With the installation of the ASHP in our above example, it will require a hot water storage cylinder; most homes today have a gas combination boiler that provides the heating and hot water so does not have a storage cylinder. Finding space for a storage cylinder is not always possible, especially in a one bedroomed flat with no loft space. Additionally, battery storage which will be an essential component for a Photovoltaic system is sizeable, often considered by the fire and rescue service as a fire hazard (necessitating a fire resisting cupboard on occasion), and again can be difficult to accommodate.
17. Some of our tenants have refused to have these sizeable *ugly* devices in their lounge (the only practical location in some apartments) as a last resort and necessitate the purchase a more expensive weather resistant external type of battery that due to cost must be housed in a secure cage in the garden. None of these additional costs appear in the £18,445 estimate above. There have also been ancillary costs coming to light from initial retrofits. Some tenants have concerns around new wiring being surface mounted in conduits and these being unsightly compared to the much more expensive (dust creating) alternative of embedding wiring in new plasterwork.
18. Next is the need to use ASHPs in a very different way to a gas fired boiler. These pumps operate at much lower temperatures and the heating in winter must be left on for approximately 16 – 18 hours a day; and the radiators only feel moderately warm. Householders have considerable difficulty accepting these new norms. With ASHP's there could also be the need to obtain planning permission for the installation of the heat pump due to the requirement for approvals if closer than 3 metres to the property boundary which again adds cost and potential delays. This is an understandable concern regarding the noise they generate reducing the enjoyment of neighbouring homes. A change to planning legislation to provide a blanket

exemption on side and rear elevations for heat pumps that do not exceed a specified (reasonable) sound level would be beneficial.

19. The inconvenient truth is that whilst we have resolved the technology of insulation and controlled ventilation for a fabric first approach; the renewable heat technology is somewhat still in its infancy. There are positive signs from mainland Europe where high temperature ASHPs are emerging that can replicate the temperatures for water that a gas boiler achieves but they work under higher pressure and are currently less efficient than the low temperature ASHPs in the UK. Hopefully technological advances will reduce this efficiency gap in time.
20. Although there are many benefits to retrofitting homes there can also be unintended consequences. Some works trigger the need for an electrical consumer unit replacement, or full rewiring of the home, and where laminate flooring needs to be lifted, lofts emptied of storage, decline due to the level of disruption tenants anticipate is common. We have needed to install storage platforms above the insulation in lofts to persuade tenants to allow a loft top up – costs not factored into the average of £18,445 per home to decarbonise.
21. Some tenants cite carbon reduction as an ambition of the Middle Classes; “we are just trying to survive; leave my gas alone” – not unreasonable given that for retrofit homes it is difficult to improve the building fabric sufficiently to compensate for the higher kWh unit rate of electricity to the kWh rate for gas, even taking account of the coefficient of performance of the heat pump; especially in winter.
22. In some situations, there are mixed tenures, either a terraced row of homes or block of apartments and undertaking a scheme such as external wall insulation becomes almost impossible unless someone is willing to pay the cost for a low-income private homeowner or a reluctant participant with other priorities.
23. A further challenge is carrying out retrofit work with the resident in-situ. Installation of internal wall insulation systems will cause great disruption to the existing resident as kitchen units and bathroom suites are removed from the walls. If this is to be left until such times as the property is void although reducing tenant disruption this could elongate the overall program, it would have an impact on void turnaround times, increasing rent loss and negatively impacting RSLs ability to generate a surplus to cover the issues identified above.
24. We also need to be mindful of how insulation works could cause some homes to overheat and potentially cause other issues such as condensation and mould growth if ventilation and moisture levels are imbalanced. Net zero carbon and ‘air quality’ are not always comfortable bedfellows. Research

shows how fresh clean air can help reduce respiratory related health issues, clean fresh air needs to be factored in to net zero challenge we can't just seal homes entirely. So draught exclusion (uncontrolled air infiltration) will often need to go hand in hand with the installation of a whole house mechanical ventilation unit (with or without heat recovery) – assuming there's room to fit it in. This means some measures if applied individually can be detrimental.

25. Intelligent Energy Systems reporting data back to the landlord (and under the Optimised Retrofit Programme (ORP) the Welsh Government) currently need a data card (SIMS) to work correctly. These devices are a prerequisite to receiving ORP grant but are only funded for 12 months after which the RSL or resident must fund the system. At £2 month x 12 months, £120,000 p/a for every 5000 homes an RSL owns.

Residents voice and choice

26. Reduction of energy bills will often be less than expected following retrofit for two reasons. Those on the lowest incomes will often have been underheating their homes – being barely comfortable for let's say £1400 per annum (a figure pre the current energy price spike). The improvements to the home's fabric will see many households take the benefit in comfort not a reduction in cash or carbon. IE still spend £1400 per annum but for the first time being comfortable.
27. Secondly, we need to influence and encourage change in the householder's behaviour by utilising the new technology appropriately and not for example removing a cardigan and slippers and turning the heating level up. We would also wish to see a reduction in the use of 'unregulated energy' to lower energy usage and reduce CO2 producing products. Perhaps more accessibility for those on lower incomes to highly efficient fridges, washing machines, kettles etc rather than buying less efficient second-hand appliances. Recognising that the current cost of living crisis will force many to just switch appliances off.

Regulatory Challenges

28. The recently updated British energy security strategy, references Networks, Storage and Flexibility. Quite what this will deliver remains to be seen but social landlords are experience a particular problem relating to tariffs when creating 'Community energy Aggregation Schemes' IE where the excess electricity from homes with Photovoltaic systems and batteries on that estate wish to share the excess generated electricity between homes locally. As soon as we export the electricity it attracts all the Govt tariffs and network transport costs, significantly inflating the cost. The current regulations never envisaged local schemes of this nature, rather it is structured for someone in Lands' End selling their electricity into the grid and it being bought by someone in John O'Groats. A change to these Regulations will significantly assist reduce fuel poverty in local Welsh communities via such schemes.

Inadequate Infrastructure

29. Putting aside electric vehicle charging housing associations are finding Western Power Distribution stating that in many cases their infrastructure is old and unable to accommodate PV and ASHP systems. They are requiring housing associations to fund the replacement of Western Power Distribution substations and cables to homes. We have experienced them insisting we remove our single-phase wiring (the norm for domestic properties) and replace with new 3-phase wiring costing over £180,000 for one scheme of 40 homes. None of this cost is factored into the average of £18,445 per home to decarbonise.
30. As each home needs an intelligent energy system (IES) to help the householder and energy management company spot failings (such as the ASHP defaulting to run 100% on the emersion heater) we need SMART Meters in all homes. Currently as a landlord due to Ofgem Regulations we have to rely upon the tenant (customer of the energy company) to request the installation of new SMART Meter(s). Many refuse to do so. And where they do request a meter there are long delays by the energy companies to install them. It would be beneficial if this could be facilitated by Welsh Government to reinforce the importance of co-operation by providers.

Emerging technologies

31. We do not know how quickly new materials and devices will be developed so avoiding a deep retrofit approach now for most property types will be a necessary approach to ensure a 'No Regrets' investment approach. The emerging high temperature ASHPs in mainland Europe is a perfect example of managing this challenge.
32. Will the heating system of choice be green hydrogen boilers, or ASHPs? Perhaps in 2033 we will look back and regret the charge made to install electrical heating systems. Certainly, the pathway to zero passport approach assists with this challenge; incremental improvements to specific housing archetypes over time will allow in part the embracing of new technological developments, however the shorter the final programme date the less these benefits can be embraced.

Supply Chain Challenges

33. In parallel with the implementation of new technologies is the need for a highly trained workforce to maintain and repair the new devices. Decarbonisation at pace will be difficult without an adequately skilled workforce of sufficient size to meet demand. Get this equation wrong and we will see excessive costs as landlords fight to recruit and retain staff where there is a shortage of supply; or a waste of training for skills that remain unused if we have an oversupply years before it is needed.

34. In practical terms the World is emerging from Covid disruptions and is causing material shortages which in turn is delaying work and increasing cost. The microchip shortages that are much reported in relation to new car manufacture are the same factories that supply microchips for intelligent energy monitoring systems and boilers now on 12-week lead times. Some delays will be short lived once Covid absences from the workplace are a thing of the past but as the World rushes to decarbonise, using the same technologies, at the same time there is a real risk that a ready and willing social landlord will not be able to decarbonise at the pace planned due to a world shortage of products needed. This also presents a unique opportunity for Wales to develop the manufacturing basis to serve not only the localised market but also a global one. It would be helpful to understand the inward investments team approach to this area of the market to make sure there is alignment between government priorities and lever as much value from the decarb programme for the Country.

35. A further supply chain challenge specifically relates to adopting PAS 2035 when access grants, it is an extremely complex and detailed approach. Certainly, some rigour is needed with the design and implementation of decarbonisation but the additional resource and cost implications, not only for RSLs but within the supply chain is significant. Whether a 'PAS 2035 lite' version can be used is worthy of exploration.

Disposal of difficult to treat housing

36. Almost all social landlords will own some homes that are so expensive to decarbonise and potentially in lower demand areas that the decision point of investing £40k - £70k to decarbonise will raise the disposal question. Some of these homes have a low 'Existing Use Value' and disposal will realise a significant capital receipt for reinvestment in re-provision.

37. Disposal could for some locations attract private owners who have the financial means and desire to decarbonise the home; for other less desirable homes that fall into the private rented sector there may be little improvement beyond that required by the Minimum Energy Efficiency Standard (MEES).

38. Perhaps a more tailored, socially driven, disposal methodology, where each asset is evaluated, and where suitable, upgraded to provide good quality homes for first home buyers and other end users is required. This approach would however require significant grant as such improvements can equate to 70%+ of the property's existing value and is uneconomical for social landlords to fund.

39. In our view, we must also think of replacement homes as an important part of the solution. Using the proceeds to develop new homes means that we can improve and evolve our asset base to become younger, less costly to

maintain, as well as more sustainable. Each new home built from disposal proceeds is a home which wouldn't exist otherwise.

Welsh Housing Quality Standard 2 (WHQS)

40. We anticipate that the proposed new Quality standard will seek to increase standards and understandably so. Yet the WHQS 1 standard is already well above the English equivalent the Decent Homes Standard. In some areas this reasoning is not clear and increases costs to Welsh Social landlords diverting limited funds away from decarbonisation. For example, in Wales we change a kitchen every 15 years, the same kitchens from the same manufacturers in England requires changing only every 20 years. Bathroom suites are similar at 25 years in Wales and 30 years in England. There is no logic to this and potentially costs Welsh social landlords millions unnecessarily. If WHQS 2 seeks to push the non-decarbonisation standards significantly higher this will take funding capacity away from RSLs ability to decarbonise their homes.

 41. With the Safer Buildings Bill, England will bring down the maximum height to 5 – 6 storeys, in Wales its proposed to come down to 2 storeys – millions of pounds of additional cost. We are still dealing with the impacts of the New Fire Safety Act 2021. Delivering decarb in the relatively short time may have the effect of increasing cost as the delivery sector currently isn't at sufficient size to meet demand. Can Social Landlords afford this ambition within the existing financial model?

 42. Social Landlords remain committed to delivering low carbon homes for the good of their customers, the environment, and the planet. However, when there is a limited financial pie to be carved up the safety matters will take a higher priority than decarbonisation ambitions despite them being placed within the WHQS framework.

 43. This same conundrum applies to the supply of much needed new build social rented homes; just how much of a housing association's borrowing capacity should be utilised for decarbonisation of existing homes when there is such a shortage of social housing to meet housing need. It would be helpful to understand the work coming from other sectors to solve this funding challenge to ensure we continue to deliver good quality new build homes as well as efficient and warm existing stock.
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