



Decarbonising our Housing Stock: Roadmap for 2030 **zero carbon**

Summary Report

Lewes District Council and Eastbourne Borough Council

February 2023

HOMES FIRST

Achieving net zero homes

Lewes and Eastbourne Councils have [committed to achieving net zero housing by 2030](#). A pragmatic strategy for achieving this has now been established and is summarised in this document.

The methodology for this work was to analyse and evaluate our housing stock using archetypes, SAP and dynamic modelling, remote seasonal monitoring, physical inspections from PAS 2035 assessors and architects, stock profiling, and asset plan modelling. The work was underpinned by a peer review panel made up of leading national expert individual and organisations.

This work was fully funded by Lewes and Eastbourne Councils.

Balancing factors

In achieving net zero homes, a number of factors needed to be balanced, it is not just about reducing operational carbon.



Cost



Fuel poverty



Tenant Disruption



Thermal Comfort



Scalable



Scale of Delivery



High-density Housing



Private Housing Adoption



UK Manufacturer and Supply Chain



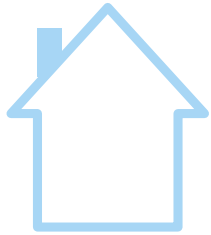
Climate Resilience



Whole Life Carbon



Natural Resource Depletion



Cost

Expenses must work within current asset management budgets and grant funding, and ideally also pool together household and infrastructure budgets



Fuel poverty

Not making fuel poverty worse, maximising renewables to reduce energy bills



Tenant Disruption

Avoid disruption to tenant's lifestyles and improve household comfort



Thermal Comfort

Provide homes with an efficient heating system



Scalable

Solutions must be standardised and repeatable across a large number of communities



Scale of Delivery

Focus on immediate and proven solutions by the supply chain as time is short



High-density Housing

Limited internal space may restrict options; external space may open up options



Private Housing Adoption

Investments in social housing must reflect developments in the private housing sector to maximise impact and avoid siloed solutions



UK Manufacturer and Supply Chain

Over relying on imports affects the cost and delivery timescales



Climate Resilience

Prepare solutions and materials that will remain resilient in extreme climates



Whole Life Carbon

Utilise low-carbon materials and reduce waste



Natural Resource Depletion

Limit the number of raw materials excavated whilst promoting biodiversity



Conclusions

Based on the modelling and analysis completed during development of the Roadmap to 2030, nine key conclusions have been identified.

1

To **optimise delivery**, we should **pool** together Council, Government, and utility infrastructure **budgets** as well as what consumers are willing to spend on energy

2

Knowledge of assets is key to ensure you have a correctly costed and profiled programme.

3

To reduce tariffs, energy bills and carbon emissions **local power solutions** such as a mass solar photovoltaic roll-out should be implemented

4

Supply chains require support and certainty through a five-to-seven-year **pipeline of work to provide the right capacity and cost**

5

Green heat networks could be delivered as a service to communities, supporting rural area's transition to zero carbon and reducing potential demand for gas alternatives in suitable urban areas

6

Affordable retrofits are likely to be component based and not deep retrofit with external wall insulation. Windows, doors and draughtproofing to the highest standards could still achieve a 20% reduction in energy use.

7

Overheating, ventilation, and building fabric lifecycles will become a significant issue as climate change worsens and could be more important than deep retrofit and winter energy needs. If budgets are finite, then it is better to invest in affordable retrofit and climate adaptation

8

To improve delivery efficiency and reduce costs **a light inspection process with simple fabric targets** could be used, both for affordable retrofit and deep retrofit (if required on some buildings)

9

With the **high number of gas boilers** in use, the need to transition to zero carbon quickly, and that there will be a mismatch between renewable energy supply and demand, **hydrogen is likely to play some role** in the domestic market

Report Findings

The Decarbonising our housing stock – Roadmap for 2030 zero carbon identifies a number of key findings:





Cost

- Affordable retrofits are likely to be component based and not deep retrofit with external wall insulation (EWI). Upgrading windows, doors and draughtproofing to the highest standards could still achieve up to a 20% reduction in energy use
- Knowledge of archetypes will have a key role in streamlining a component-based retrofit as it will identify differences in build type that contractors and manufacturers can work with to scale up
- PAS 2035, Energy Performance Certificate (EPC) C and 90kWh/m² targets generally come to the same set of recommended U values for key components on a range of different properties. It is more cost effective to work to set of pre-agreed U values, with a PAS 2035 “arm’s length” or Building Control approach, and curate a library of open-source designs for EWI where there is risk of cold bridging. This could also make it quicker to deliver retrofit programmes
- Thermal storage and time of use tariffs could be used to reduce the ongoing costs of heat pumps, however there is uncertainty if there will be enough green electricity for heat pumps in times of peak winter demand
- Reduced electricity prices can make as big an impact as deep retrofit, and will encourage the switch to low carbon heating systems
- Available asset management funding is more suitable for upgrading components, and not EWI. Grants will need to be nearer to 100% if EWI is to be pursued
- If Local Authorities are to bring forward 30 year asset management spending plans into a condensed 5 to 10 year programme, affordable loans are required to meet the additional budget gap
- The cost of solar photovoltaics and batteries could be reduced through community wide roll out
- Installing heat pumps must be coupled with significantly improved building fabric for them to have efficient running costs unless grid electricity prices are significantly lower
- If there is no cost limitation, or budget constraint, it is better to complete a deep retrofit





Fuel poverty

- Energy tariffs and tenant usage can have as much impact on fuel bills as retrofit works. If the amount that might be spent on retrofit was instead spent on clean energy this could potentially be a quicker and more achievable pathway for UK PLC
- As air source heat pumps are more expensive to run than gas boilers, there is a risk of increasing fuel poverty unless very significant investments are made in the fabric of the building
- Achieving EPC band C may not result in the achievement of space heating targets
- A ground source heat pump community heating solution has a long life, allowing heat to be potentially priced competitively if the upfront costs are also spread over a long period
- Tenants (and private home residents) will have an upper limit on what they can pay for energy. This threshold should be the benchmark for how we decide what measures to install
- To reduce energy bills, tariffs, and carbon emissions local power solutions such as a mass solar photovoltaic roll-out should be implemented
- Increasing investment for solar PV provides an energy buffer for electrically led heat solutions and increases the potential for neighbourhood microgrids





Thermal comfort

- A range of expected changes for occupancy patterns should be developed to support asset management investments
- Domestic hot water demand will become a greater proportion of a home's total energy demand with increased energy efficiency
- A business model which includes infrastructure to supply a cluster of homes should be developed



Tenant disruption & Decent homes

- Effective planning and coordination is required to ensure tenant disruption is minimised
- A good pragmatic approach to retrofit benefits people's health and well being and their quality of life





High density housing

- Heritage buildings will require unique solutions to improve their fabric and heating systems
- Council flats have limited space for an air source heat pump and hot water tanks



Scalable

- The Standard Assessment Procedure (SAP) is not suitable for an energy use design tool
- Specific U-values and PAS 2035 design standards should be used to ensure scalability whilst saving time and costs
- PAS 2035 objectives will help ensure that the energy efficiency works are completed to a high standard
- Building Control, supported by organisations such as RIBA or the Green Building Council should monitor building standards to reduce duplicate designs and cold bridging



Whole life carbon

- Very little kitchen and bathroom waste should be going to landfill
- Waste should be reused as much as possible and disposed of correctly
- The switch away from gas is more effective at reducing whole life emissions than switching to sustainable materials





Scale of delivery

- To optimise delivery, the pooling of Council, Government and utility infrastructure budgets, as well as what consumers are willing to pay for energy is required. Council budgets on their own cannot make the required difference
- Supply chains require support and certainty through a five-to-seven-year pipelines of work
- The rate at which heat pumps can be installed is unlikely to meet the Councils 2030 target
- The UK is at risk of not being able to provide sufficient heat from air source heat pumps (ASHP) in the winter when demand will be high
- Inflation and supply chain constraints have significantly pushed up the price of zero carbon measures. A longer-term programme of works is the best way to increase the chances of reducing prices
- Solar PV is now a mature technology and is one sector of the supply chain that has the best chance to scale up and deliver its part of the zero carbon solution
- Hydrogen will not be the single solution to zero carbon heat but it could be part of a wider solution, given the high number of gas boilers in homes and the speed we need to move away from gas
- Globally there is enough natural resources to create a global hydrogen economy to replace oil and gas. If this accelerates then hydrogen may have a bigger impact in the UK than first envisaged. It will potentially be quicker to roll out hydrogen heat than to roll out individual heat pumps. Community ground source heat pump (GSHP) based green heat networks in rural areas or suitable urban areas could reduce the demand for hydrogen





Private homes adoption

- It is unlikely that UK PLC will be able to afford a nationwide deep retrofit rollout
- To date, there is little evidence to demonstrate the private sector will adopt deep retrofit and ASHP at scale. If the private sector does not follow this pathway, the Council will need to work with whatever solution is being developed and not add an additional burden of unnecessary debt to its accounts
- Community heat pumps or hydrogen heating would be required in homes where pipework or space is not compatible for an individual ASHP solution



UK manufacturer and supply chain

- A unified approach to clean energy, working with both the electricity and gas infrastructure organisations to create clean energy, and targeting lower energy tariffs as opposed to high investments in deep retrofit is preferable and likely to be quicker and better for consumers
- The workforce should follow best practice guidance such as PAS 2035 for retrofit works
- It should be ensured that building surveyors have the correct experience and qualifications to carry out accurate and reliable work
- A Retrofit Coordinator should possess the correct experience as per the PAS 2035 guidance
- A national framework with key suppliers could be set up for Small and Medium Enterprises (SME) to tackle rising costs and price volatility.
- A realistic approach must be adopted when retrofitting homes
- An independent team should be employed to ensure standards are maintained





Climate resilience

- Funding will be required to install technologies to prevent overheating during heatwaves, which are expected to increase in frequency
- Coastal homes with cavity wall insulation may require additional measures to prevent installation failure and moisture damage from increased winter precipitation
- Generally, with increased extreme weather (e.g. more rainfall) this could shorten the life of building fabric components and create local issues e.g. flooding
- With increased funding, balconies on flats could double up as thermal buffers and greenhouses to support additional growing spaces



Natural resource depletion

- Sustainable materials are available for all fabric retrofit solutions however they still come at a price premium
- Embedded carbon in materials (i.e. sustainable materials) is important but the biggest carbon saving in retrofit is switching from gas. If there was a choice between cheaper standard products and moving away from gas, this should be chosen
- Actions that deplete a particular resource should be avoided



The Decarbonising our Housing Stock research was an 18-month project fully funded and led by Lewes and Eastbourne Councils. The main report is authored by Ian Fitzpatrick Deputy Chief Executive and Director of Regeneration and Planning, and Nick Adlam Strategic Programme Manager – Decarbonisation & Net Zero Property and Development, who collectively bring over 40 years of experience in the housing and environment sectors.

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