

## **RE: Low Carbon Housing: the Challenge**

This response has been submitted in an official capacity on behalf of Sero Homes Ltd.

### **Introduction**

Sero Homes is a new venture dedicated to the development, delivery and professional management of energy positive homes. Sero Homes has a long-standing history in renewable energy through our successful company Eco2 Limited with over 300MW of renewable energy projects delivered in the UK.

### **What role can housing can play in Wales' low carbon transition, including the potential positive impacts on greenhouse gas emissions?**

Housing can have a positive impact going forward in three key areas;

- **Reduce** – The building fabric including lighting and some electrical loads can be improved such that overall consumption of energy is reduced.
- **Balance** – Energy storage systems can help alter the demand profile to avoid the network peaks, this can be achieved through thermal mass, heat and electricity storage systems.
- **Generate** – Where feasible, energy can be generated using technology embedded into the building fabric such as solar thermal, PV and other cladding systems.

The domestic sector is responsible for 23% of carbon emissions and there is considerable scope for reductions within the housing sector, particularly in new build. Switching to an electrified form of heat, such as a heat pump with a Coefficient of Performance (CoP) of ~2.5+ whilst generating electricity through roof mounted photovoltaics (PV) could save upwards of 2 tonnes of CO2 per house before building fabric improvements are considered. In addition to this, electrification of heat will also decarbonise further as the national grid reduces in carbon intensity in years come.

Low energy and self-generating homes (“Energy Positive homes”) will require less energy, use less and generate a surplus to offset the need for other forms of centralised generation. The ability to balance out intermittent generation on the grid will enable more renewable energy in the system. Wales has set ambitions for 70% of electricity to be generated by renewable sources by 2030, homes can play important part in the reduction, balancing and generation of electricity.

With energy policy set by the UK government, Welsh Government has more control of CO2 in the energy sector in Wales under a decentralised energy model.

## **The development and availability of technology needed for highly energy efficient housing;**

Established technology is widely available;

- Heat pumps are mature markets in many European countries but account for around 2% of the UK domestic heating market.
- PV is also established with more than 800,000 rooftop installations in the UK, an established supply chain and a network of installers.
- Battery technologies for the home are being installed around the world with a large number of companies including automotive companies entering the market.

The technologies must be considered as part of a full system with seamless integration, a simple user interface and an energy efficient building fabric. This systematic approach has been well demonstrated at a small scale in the UK over many years with the SOLCER project offering an up to date demonstration. Sero Homes promotes the systematic approach being adopted at a site level rather than a house by house basis, the community generates energy that is shared and optimised within the development.

The issues around technology is not capability or reliability, the local supply chain needs to establish a presence in Wales and consumer understanding of technologies needs to improve. For the mass housebuilding sector, it is also considered that traditional cavity wall construction has a future in the short term for Energy Positive homes as a transition to modern methods of construction with lower levels of embodied Carbon.

Wales has some of the oldest housing stock in Europe, It must be considered that a home will generate energy in a number of ways in its lifetime (>100 years) and as a priority it must be a comfortable and desirable place to live.

### **What changes are needed to ensure that existing housing stock is as energy efficient as it can be?**

Sero Homes targets new build developments however the same approach can be taken with renewable technologies. Many of the technologies can be retrofitted to existing buildings but the capital costs will inevitably higher as in a new build the technologies typically offset cost that would have been spent anyway (such as gas boilers, roof coverings, high temperature heating systems).

The extra/over cost in retrofit is at least double that of new build, before building fabric upgrades are factored in.

### **Whether it is possible and feasible to deliver low carbon, Energy Positive, affordable housing at scale in Wales and, if so, how this can be achieved;**

Yes, it is feasible and with initial market support and new business models it is definitely possible.

Firstly, Energy efficiency and affordability go hand in hand, a significant reduction in the energy bill (~70% reduction) is equivalent to a 10% annual saving over the equivalent 'business as usual' new

build home. Comparing this to affordable homes policy, for example; 40% of properties on a site with a 20% saving is equivalent to a net 8% saving overall. Therefore building energy efficient homes will represent an improvement to affordability provided the properties are not sold or rented for a premium, more on this point later in the document.

There is little need for further demonstration at a single or small multiple (<10) scale, the biggest need for the industry is development at large scale (50+). Scale can achieve the following;

- Reduction in technology prices,
- An increase of skilled workers and supply chain establishment,
- Stimulation of market desire for “green” homes, and
- Increase in green financing incentives such as institutional investment in build to rent or green mortgages.

The social housing sector is tuned in to the benefits of energy efficient housing and the long term view in business models will help the transition. Sero Homes believes that the private rental sector will be fundamental in giving the market momentum for Energy Positive homes. Professional build to rent models will attract low cost capital and institutional investors with a different view on technology risk. Rental properties will also address the construction sector concerns that ‘nobody will buy them’, it is important whilst technology prices are high that rentals are competitive with the existing market. Capital grant schemes provided by the Welsh Government such as the The Innovative Housing Programme will reduce the risk for developers attempting large projects. Consumers could be the true beneficiary of the grant by paying a market equivalent rental and gaining a saving in energy.

With a pipeline of developments in Wales it is envisaged that a £20k premium on a £170k property could reduce by around 40% within a three year period, this would bring it within reach of a green mortgage product. In this period new business models in decentralised energy generation will emerge which will help offset the additional capital cost.

Affordability is considered in one dimension which is rental cost. Energy Positive homes have the potential to be affordable in energy and transport with integration of Electrical Vehicle charging and innovative car leasing models. Changing the definition of Affordable Rent to include fuel costs would allow developers to consider increasing rents with lower fuel bills to reach an equivalent position.

Other market incentives for Energy Positive homes could include taxation relief in Land Tax and lower cost of borrowing. Planning policy for affordable homes can recognise the affordability of market value Energy Positive homes as explained above.

### **What are the barriers to delivering transformative change in house building in Wales?**

**Construction Sector** – The biggest barrier is the resistance to change in the construction sector particularly amongst the national housebuilders.

**Capital Cost** – The cost of ‘greening’ a home is not location dependant, in our estimates its £20k on average across the UK. Wales has lower house values which makes the premium more significant when compared to an average house price of £225k in the UK.

**Consumer Awareness** – The population is becoming more climate aware and supportive of renewable energy however the understanding of Energy Positive homes is low.

**Supply Chain & Skills** – The supply chain required to deliver transformative chain is not yet apparent but Wales has opportunities to drive growth in this area.

**What is the role of Ofgem and the national grid in enabling grid evolution to accommodate new types of housing, and what are the challenges presented by decentralised energy supply?**

The Ofgem argument that self-generation increases system costs for other users is right if every home uses the technologies to reduce grid consumption only.

Energy Positive homes have the ability to reduce system costs with smart management, leading to less reinforcement of the network. The homes in aggregation have the ability to offer demand side response services, respond to system changes in the distribution and transmission network and use surplus in an effective manner. Also, building houses with the ability to store and release energy will reduce the system peak when compared to building ‘traditional homes’.

Ofgem and National Grid has already recognised the potential in this area and launched reforms to enable Energy Positive homes to access balancing markets.

**Whether Wales has the requisite skills to facilitate and enable change in the housing sector;**

Wales has the opportunity to attract the necessary skills and increase jobs, Energy Positive homes at scale are in their infancy in the UK. Sero Homes is aware that suppliers in the UK and Europe would consider locating manufacturing or assembly plant close to the demand. Wales has the potential to be a ‘first mover’ as a nation and attracting new companies and jobs to the region.

**What changes are needed to Building Regulations in Wales to accelerate progress towards ‘near zero’ energy standards and beyond?**

Sero Homes does not believe that a change to Building Regulations is required to enable the increase of Energy Positive homes. The need for construction of new homes is great and regulatory change will force developers and housebuilders into England which could lead to failure in achieving housing targets.

Regulatory changes if required should focus on the ‘reduction’ (see Q1) of energy demand through improvements in building fabric.

The market has the potential to drive the change with the correct incentives, such as;

- Capital grants for extra over cost.

- Planning policy incentives.
- Recognition of fuel affordability in policy
- Promoting Build to Rent and attracting long term institutional investment.

**How communities can be planned and shaped to be more energy efficient and low carbon (including examples of good practice in Wales and further afield).**

Local Authorities should be considering energy strategy at the outset and enforcing the strategy through the planning process, typically district heating presents the most efficient low carbon solution.

James Williams  
Director

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