

Consultation response from Dr Joanne Patterson

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

Technologies required for highly energy efficient housing are available on the market. Careful planning is essential through the entire process from the selection of appropriate solutions (for the housing type), together with correct implementation and utilisation post installation. Collaboration between all stakeholders is essential at all stages from planning, design, implementation and operation so that technologies perform as they should in the long term. Technologies should have appropriate warranties and should be reasonably supported through appropriate maintenance packages so the risk associated with making the change to normal working practices is lowered.

Technology is always progressing and therefore, support for new industry and markets in Wales across the supply chain should take place. This should include material technologies and IT and appropriate smart technologies that are user specific. As resources to do this are limited, advice from SMEs that are successful and well established, should be sought to help to support emerging companies that demonstrate ambition and enthusiasm in the field. These companies should also be provided with relevant support, not necessarily finance, but opportunities such as appropriate training in different geographical locations to develop further. The allocation of funds should not be directed because of political influence.

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

Investment is needed to take forward holistic retrofit programmes rather than a 'blanket' approach. The holistic approach enables the house to perform efficiently as a whole rather than fixing one problem and then having to return at a later date to fix another problem which can impact negatively on each other. Programmes (such as Arbed) need to be consistent rather than stop/start as this would provide more stability to the supply chain and the skills market adding value to the economy.

Policy should be modified to increase tax for people that own more than one home. Although there is a shortage in affordable housing, this is exacerbated by multiple home owners who charge high rents for poor quality housing.

- **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;**

It is possible to deliver low carbon energy positive and affordable housing at scale in Wales – see the demonstration projects, Solcer House and Ty Solar. This has to be done in a staged approach, from demonstration projects to pilots. The Innovative Housing Programme is a great way of doing this to help build confidence in selecting and using new technologies appropriate to context. However, there does need to be careful monitoring of the allocation of these resources to ensure that they are given to housing that is truly 'low carbon, affordable housing' and that projects are carefully monitored – for cost, performance and householder satisfaction and comfort.

The real 'value' of providing good quality, low carbon housing has to be considered rather than the capital expenditure. Quality of life, carbon emissions, air quality, health and well-being, fuel poverty, aesthetically improved communities can all significantly improved as a result of good quality, affordable, low carbon housing. This value has to be taken into account for future generations of Wales and to enable low carbon new builds and retrofits to take place.

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

Skills and knowledge – there is a lack of respect for key staff involved in the construction sector (electricians/plumbers) which limits more academically able people taking up these roles. As the welsh building stock becomes older and the range of technologies increases, these 'experts' will need to be more flexible and knowledgeable in their working practices which will require a higher level of education and training. Support will be required to establish and adapt to meet the needs of the building stock.

Clarity and responsibility in the supply chain – the supply chain comprises of manufacturers, suppliers and installers – at present there is a lack of responsibility with regards to problems that arise. This needs to be more clear to increase confidence in all low carbon technologies.

Planning procedures – the planning process needs to be clearer with response times for applications being well defined and adhered to, to allow for developments to progress more quickly. From experience it feels as if planners are in place to prevent works to take place rather than to enable them to happen. It is not clear whether this is a lack of clarity from governance or whether there are staff shortages preventing this from happening. Planning should also not be influenced politically but should be guided in a fair and consistent manner. It should also be flexible to fit the context and not to driven by history.

Perception that householders do not want change – there is a reluctance for the appearance of housing to be changed as there is a perception that householders do not want change. A survey has confirmed that during a visit to the Solcer House 90% of visitors found the house aesthetically pleasing.

Stakeholder buy in – there needs to be support from all levels of stakeholder groups:

- Occupier of the homes need to learn to use technologies and take care of them
- Owner – (RSL/private rent) – need to provide full support throughout the organisation from maintenance and financial support to allow programmes to take place;
- Technology suppliers – need to provide long term maintenance, if necessary, with appropriate warranties. Staff should also be trained to provide quality and confidence with a changing market place.

- **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?**

Flexibility to work with fluctuating supply and demand levels.

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

No it does not. See above.

This information has been obtained through the following experiences:

[Jones, Phillip, Li, Xiaojun, Perisoglou, Emmanouil](#) and [Patterson, Joanne](#) 2017. [Five energy retrofit houses in South Wales](#). *Energy and Buildings* 154 , pp. 335-342. [10.1016/j.enbuild.2017.08.032](#)

[Li, Xiaojun, Jones, Phillip John](#) and [Patterson, Joanne](#) 2017. [Building and community energy retrofit housing in Wales](#). Presented at: *World Sustainable Built Environment Conference 2017 Hong Kong Transforming Our Built Environment through Innovation and Integration: Putting Ideas into Action*, Hong Kong, China, 5-7 June 2017.

[Jones, Phillip, Li, Xiaojun, Coma Bassas, Ester](#) and [Patterson, Joanne](#) 2017. [The SOLCER energy positive house: whole system simulation](#). Presented at: *Building Simulation 2017: 15th Conference of International Building Performance Simulation Association*, San Francisco, CA, USA, 7-9 August 2017. *Proceedings of Building Simulation 2017: 15th Conference of International Building Performance Simulation Association, San Francisco, USA, August 7-9, 2017*.

[Patterson, Joanne Louise](#) 2016. [Evaluation of a regional retrofit programme to upgrade existing housing stock to reduce carbon emissions, fuel poverty and support the local supply chain](#). *Sustainability* 8 (12), 1261. [10.3390/su8121261](#)

[Jones, Phillip John, Li, Xiaojun, Patterson, Joanne Louise, Coma Bassas, Ester](#) and [Lannon, Simon Charles](#) 2016. [Preparation for an energy positive community in the UK: modelling-led innovative housing practice in Wales](#). Presented at: *PLEA 2016 - 32nd International Conference on Passive and Low Energy Architecture. Cities, Buildings, People: Towards Regenerative Environments*, Los Angeles, USA, 11-13 July. Published in: La Roche, Pablo and Schiller, Marc eds. *PLEA 2016 - 32nd International Conference on Passive and Low Energy Architecture. Cities, Buildings, People: Towards Regenerative Environments*. PLEA, pp. 1095-1101

Calzada, Jamie Roset, Kaltenegger, Ingrid, [Patterson, Joanne Louise](#) and [Varriale, Fabrizio](#), eds. 2016. [Smart Energy Regions – skills, knowledge and supply chains](#). Cardiff: Welsh School of Architecture.

[Patterson, Joanne Louise, Coma Bassas, Ester](#) and [Varriale, Fabrizio](#) 2016. [Systems based approach to replicable low cost housing: renewable energy supply, storage and demand reduction](#). In: Roset Calzada, Jaume, Kaltenegge, Ingrid, Patterson, Joanne Louise and Varriale, Fabrizio eds. *Smart Energy Regions - Skills, knowledge, training and supply chains*, [Smart Energy Regions - Skills, knowledge, training and supply chains]. Cardiff: Welsh School of Architecture, pp. 239-245.