Getting to Zero: International Perspectives on Low Carbon Housing
Workshop Summary by Andrew Karvonen
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28 February 2013

Low and zero carbon housing has emerged as an icon of European policy ambition to reduce national carbon emissions. Policymakers have devised regulations and incentive programmes while urban development actors have translated these measures into economic models, marketing strategies, and new housing typologies. On 28 February 2013, the Manchester Architecture Research Centre (MARC) at the University of Manchester hosted an academic workshop with colleagues from Denmark, Sweden, Norway, Austria, and the United Kingdom to compare and contrast the formulation, interpretation, and translation of low carbon residential strategies in different national contexts using a sociotechnical understanding of development and design. The following paragraphs provide a brief summary of the event.

Simon Guy and Andrew Karvonen from MARC led off the workshop with a presentation on low and zero carbon housing in the United Kingdom. National building regulations are driving the homebuilding industry to develop an approach to delivering zero carbon houses beginning in 2016. Simon and Andy described three pathways of zero carbon habitation – demonstrating, mainstreaming, and socialising – to suggest that the carbon agenda is being interpreted in significantly different ways by architects, homebuilders, policymakers, social entrepreneurs, and occupants. They then applied practice theory and Schatzki's notion of the 'special hand' to emphasise the importance of the design team in constructing the material arrangements that shape domestic carbon practices. They concluded by summarising some emerging ideas about creating new notions of normalcy and convention, the importance of intermediation and translation, and the contested boundaries of domestic carbon.

Eli Støa from the Norwegian University of Science and Technology then presented findings from an action research project, the Brøset mixed-use development in Trondheim. This new self-build, mixed-income community is designed to allow residents to live a 'low emission life' by breaking the 'spell of normality' and blurring the lines between building design and lifestyle. She argued that action research is an effective approach to linking up academic and planning experts with homeowners and occupants through an interdisciplinary and discursive process of design and development. This approach requires a careful balance between collaboration and critical distance. Brøset is unique because it is a 'performative urban landscape' that

encourages the agency of occupants while reducing private space provision and increasing public spaces to foster social interaction. She noted that the design team is continually struggling to develop precise and definitive plans for the project while also being flexible and open to change.

Harald Rohracher from Linköping University in Sweden reflected on twenty years of passive house experiences in Austria. Today, about a quarter of new houses in Austria are built to passive house standards and achieve 90% energy savings when compared with a conventional house. He argued that the success of the passive house concept in Austria is due to the flexibility of the socio-technical core comprised of planning procedures, professional practice, construction skills, and user perceptions and behaviour. A sustained emphasis on system building activities created coalitions of sustainable building professionals as well as strong intermediary organisations to interpret stringent energy efficiency strategies for the building industry. Harald also noted the emergence of regional dialogues that situated innovation in communities of practice and a focus quality of life as the main benefit of passive houses rather than energy savings. For future research, he noted the importance of non-residential buildings, retrofit of existing residential buildings, and the scaling up of the passive house concept from individual buildings to districts.

The Danish experience with low and zero carbon housing was presented by Maj-Britt Quitzau and Jens Stissing Jensen from Aalborg University Copenhagen. They traced energy efficiency housing practice to the 1970s oil crisis and then noted two distinct approaches that have emerged in the intervening decades: a construction sector approach focusing on building design requirements and an energy sector approach emphasising the rollout of district heating infrastructure. Path dependencies in both of these approaches prevent the adoption of some technologies and strategies such as heat pumps, solar energy technologies, and co-housing. For example, the provision of heat through district systems, a highly acclaimed energy efficiency strategy in Denmark, makes household heating technologies less attractive or redundant. Through a case study of a 700-house project called Stenløse South, they demonstrated how local authorities were acting as intermediaries for new configurations between houses and energy. Similar to Eli's presentation on Broset, they noted that close dialogue with occupants was essential to realising energy efficiency goals.

Michael Ornetzeder from the Austrian Academy of Sciences provided a second interpretation of the Austrian passive house experience by applying ideas from practice theory. He presented a timeline of housing change that spanned from the

'fossil house' to the 'energy efficient house' and then onto two generations of 'passive house'. While Harald focused on the system of provision of housing in Austria, Michael was more interested in the demand side and how occupant routines and entrenched patterns were disrupted with the introduction of energy efficiency strategies and technologies. He noted the continual tensions between old and new elements in houses and the changes in domestic practice, resulting in incremental rather than abrupt changes in energy consumption. His presentation highlighted the on-going negotiation of energy use by occupants.

In the final session, Heather Lovell from the University of Edinburgh reflected on some shared themes in all of the presentations. She highlighted the central role of codes and standards in the pursuit of low carbon housing and argued that this raises important questions about the types of expertise being applied and the role of context. With respect to occupants, she noted that none of the presenters described any conflict or resistance in reducing their carbon footprints. She noted that while a decade ago, energy efficient housing was still a novel subject, today there is historical depth to these ideas that allow for more informed reflection and learning. She was encouraged by the diversity and interaction of sociotechnical concepts and frameworks being utilised by the presenters (practice theory, transition theory, lock-in, and so on) and the potential for future research in each country on the rollout of low carbon housing.

As a whole, the workshop revealed that the pursuit of zero carbon housing is closely tied to narratives that were specific to each country (and in some cases, to specific regions). There was a surprising lack of knowledge sharing between the countries, although there were examples of design strategies such as fabric first and passive house as well as low carbon technologies that were common amongst the research findings. There was a shared understanding that the distinction between supply and demand of domestic energy is blurring with the emphasis on reducing carbon emissions. And finally, there was an emphasis on the significance of intermediaries in translating energy performance targets into design and development practice.

The event was funded by the Sustainable Practices Research Group, a consortium of UK academics that are studying sustainability as it relates to food, water, and shelter.