

## User Knowledge in Housing Energy Innovations

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According to the EU *Green Paper on Energy Efficiency*, the buildings sector accounts for 40% of the EU's energy requirements. Research shows that more than one-fifth of the present energy consumption could be saved by 2010 by applying more ambitious energy standards in buildings. Energy is hence an important aspect of sustainable building innovation.

Energy and energy conservation are traditionally fields in which technical expertise has an important role. Expert knowledge is needed to analyse energy flows, to select and install appliances, and to prioritize conservation measures. From this perspective, ordinary consumers are often seen to exhibit a 'knowledge deficit' and are thus unable to capably adopt their role in energy conservation efforts. On the other hand, other recent research has emphasized the role of 'user innovations' in energy conservation (e.g. Rohracher 2005). The above-mentioned lines of research represent two extremes: in the first, users are represented as ignorant and in need of training and education, whereas in the second they are represented as having important knowledge for the innovation process.

Von Hippel and colleagues have highlighted the crucial role of users in innovation in different industries and types of products (e.g., von Hippel 2005). They describe the innovation process in terms of the distinct domains of knowledge that producers and users possess. Producers have knowledge about technical solutions and production capabilities, and users about their needs, the context of use, and their own capabilities as users. Both sets of knowledge are characterized by 'stickiness': they move relatively freely within their own domain, but are difficult to transfer outside it. Hence, close involvement and user participation is needed to 'unstick' the knowledge, allowing it to contribute to a common innovation process. Yet, there is a lack of research concerning *the type of knowledge that users and producers have in different industries or what actually happens in attempts to transfer this knowledge from one party to another.*

The present article attempts to conceptualize the role of user knowledge in housing energy innovations. Do users possess knowledge that is significant for the development of new energy systems that conserve energy and combat climate change? What is the nature of this knowledge and how can it be mobilized? What can be gained in energy innovation by involving users? We address these questions by applying the user innovation framework to a case study on the development and introduction of a low-energy housing labelling concept in Finland. This project was not fully successful in reaching its aims, and one of the suggested reasons is that it lacked a "homebuilder's perspective." We examine how users were involved, and how knowledge was exchanged among experts and users. We then go on to consider other, alternative, ways in which users might have been involved or have been involved in other projects. On the basis of this analysis, we draw conclusions on the potential and limitations of user involvement from a knowledge management perspective sustainable building innovations.