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Editorial

## Challenges of Energy Renovation

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### Abstract

One of the most complex and urgent challenges in the energy transition is the large-scale refurbishment of the existing housing stock in the built environment. In order to comply with the goals of the Paris convention, the aim is to live “energy-neutral,” that is, a dwelling should produce as much sustainable energy as it consumes on a yearly basis. This means that millions of existing houses need to undergo a radical energy retrofit. In the next 30 years, all dwellings should be upgraded to nearly zero-energy buildings, which is a challenge to accomplish for a reasonable price. Across the EU, many projects have developed successful approaches to the improvement of building technologies and processes, as well as a better involvement of citizens. It is important to compare and contrast such approaches and disseminate lessons learned. In practice, it is crucial to raise the level of participation of inhabitants in neighborhood renovation activities. Therefore, the central question of this issue is: How can we increase the involvement of tenants and homeowners into this radical energy renovation?

### Keywords

local energy policy; (near) zero-energy renovation; owner-occupied dwellings; participation; renewable energy strategy; social housing; user behaviour; user satisfaction

### Issue

This editorial is part of the issue “Zero Energy Renovation: How to Get Users Involved?” edited by Tineke van der Schoor (Hanze University of Applied Sciences) and Fred Sanders (CPONH NGO).

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### 1. The Challenge of Accelerating the Energy Transition

The energy renovation of the existing housing stock is one of the most difficult tasks in the energy transition, not only because energy renovation is radical in a technical sense, but also because homeowners and residents must be willing to cooperate and need to accept the renovation in the usage situation. Convinced that sharing knowledge and experiences is important to support this transition, it is with great pleasure that we as editors have put together an issue on energy renovation. We are delighted that so many researchers were willing to share their results with us in this thematic issue.

Many of the contributions submitted address the behavioural factor of residents for the success of the transition. Here, we quote climate psychologist Dr. G. de Vries:

We know that the climate is changing because of human behaviour, so we could also have a positive effect on climate change, through green behaviour, for example. This is not just behaviour by ordinary citizens, but also governmental bodies, politicians, businesses, science and the media. These factors also influence each other: journalists can initiate a social debate, the government can direct behaviour through policy and citizens in turn can influence the political agenda. I find the interaction between all these players fascinating, particularly as this is a topic that affects us all. (de Vries in TU Delft, n.d., para. 1)

Furthermore, she argues that:

Besides a psychological angle, behavioural change also has technological, financial and administrative

aspects. If you want to make the energy supply green, it not only has to be technically and financially feasible, you must also have the support of politicians and citizens. If citizens are not enthusiastic about carbon storage or geothermal energy, or if they want a solution that will be very expensive, the chance of success is small. (de Vries in TU Delft, n.d., para. 3)

As editors we can endorse these statements from our own research. From her research in sustainable citizens' initiatives, Tineke van der Schoor knows how important it is for citizens that initiatives are taken by someone who can be trusted, with an organizational structure that offers opportunities to participate (van der Schoor et al., 2021). Research by Fred Sanders shows that for sustainable initiatives, the interaction between government, experts, and citizens, whether or not they are formally organized, determines the results. We learn from this research that the sustainable energy transition is an enormous operation where good preparation is decisive for the success that can be achieved (Sanders & de Oliveira, 2020). For this, it is necessary to be open to the knowledge of others, which formed the basis for this thematic issue.

## 2. A Diversity of Scientific Contributions

The theme of (near) zero energy renovation is topical and has attracted the attention of scientific researchers as evidenced by the 10 articles included in this thematic issue. Three articles are based on research in New Zealand, Estonia, and Belgium respectively, one article compares approaches in France and the Netherlands,

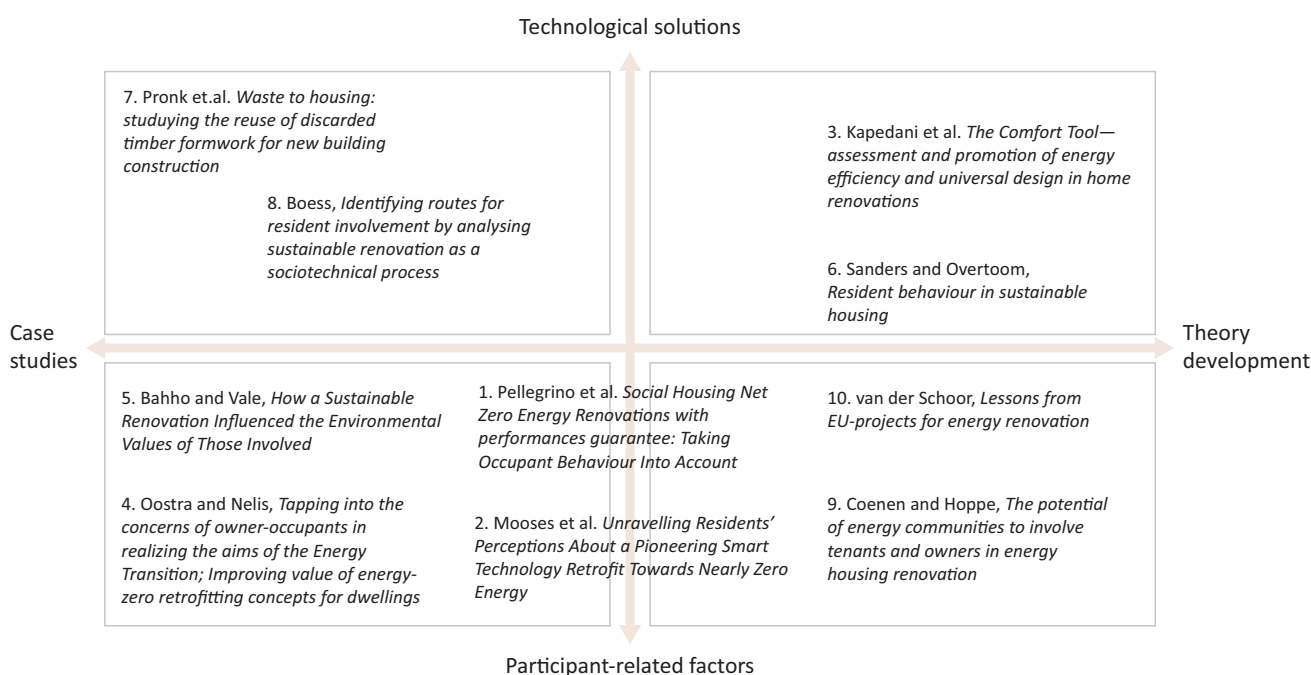
and one article is a review focused on the EU; the remaining five articles are focused on the Netherlands. This means that this thematic issue can be valuable for a broad range of researchers and practitioners in the building sector, thus achieving an important objective of this issue.

Based on the invitation for this thematic issue, the articles can be given a place in the diagram in Figure 1, according to their starting position. We position the articles on two axes: case studies versus theory development, and user behaviour versus technological solutions.

In this diagram, we identify two dimensions. The first dimension concerns the empirical–theoretical axis. All articles emphasizing empirical research describe case studies. However, some articles also aim to contribute to theoretical approaches of energy renovation. The second dimension is about the technological–behavioural axis. Although the majority of the articles present studies of user behaviour, two articles take technological developments as their starting point.

With pleasure, we present the following 10 articles to the readers:

1. Pellegrino et al. (2022): Comparison of energy renovation projects in France and in the Netherlands; findings include that the urgency of the goal of achieving a massive reduction in energy consumption sometimes leads to a lack of attention to residents' interests. A plea to pay more attention to the behaviour of residents in connection to energy renovation projects.
2. Mooses et al. (2022): Research carried out in Estonia after residents' acceptance of smart



**Figure 1.** Diagram positioning the articles on two axes: Case studies versus theory development, and resident behaviour versus technological solutions.

technology when renovating their homes. The article shows that residents interested in the technical interventions are less critical of the results than residents primarily concerned about climate change.

3. Kapedani et al. (2022): Research in Belgium and the EU focused on comfort as a factor that makes residents accept sustainable housing; a “comfort tool” is developed and tested in renovations.
4. Oostra and Nelis (2022): Here, a framework is developed to match the interests of renovation contractors and resident values, to make choices for retrofit sustainable housing renovation.
5. Bahho and Vale (2022): The renovation of a log cabin (in New Zealand) proved that a sustainable retrofit influenced the values of the people related to the project.
6. Sanders and Overtom (2022): Based on grey data from the construction sector enriched by university researchers, action perspectives are identified to handle resident behaviour for sustainable housing construction in the Netherlands.
7. Pronk et al. (2022): Experiences with a house construction (in the Netherlands) by reusing demolition building materials were enriched with other project results, added with socio-economic motivation insights.
8. Boess (2022): Sustainable renovation processes are both technological and social, and for success both have to be detected and taken into account in involving residents, as found in case studies in the Netherlands.
9. Coenen and Hoppe (2022): Renewable energy communities can help to involve tenants and owners in energy renovation projects, based on empirical data from the H2020-project Rescoop.
10. van der Schoor (2022): It is argued that it is important to increase collaboration on the supply-side, for example by One-Stop-Shops. Furthermore, this would also help to simplify the renovation process for customers.

Starting from the diagram for positioning each of these scientific contributions to the field of knowledge determined by the two axes, the recurring message in most of these contributions is that the actors involved have outdated images of each other. The building sector, designers and contractors in particular, appears to be still too far removed from the transition process, as a result of which they act in a passive manner, while the innovation and associated renewal of the products offered for construction and renovation must arise from this sector. On the other hand, citizens are in need of easy to understand technical and financial information on energy renovation to support them in renovation decisions. The lack of such accessible information is one of the factors causing the slow progress of the energy transition in the built environment. European and other governments strive to make progress in the energy transition but forget that

they are dependent on the actions of citizens and the building sector. Collaboration is therefore needed and this requires the exchange of knowledge, to which this thematic issue aims to make a modest contribution.

Given that the articles are mainly based on case studies, it is inevitable that conclusions are difficult to generalize; they apply for a certain target group, for a type of projects, or for homes in specific price categories. On the other hand, in many of the articles it is emphasised that residents should be more involved in sustainable renovation projects and that software and other tools have been developed to use them. It remains challenging to provide clear advice tailored to different situations, while the time pressure for a zero-government housing sector within the EU is increasing further, due to the still increasing CO<sub>2</sub> emissions.

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### Conflict of Interests

The authors declare no conflict of interests.

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**Fred Sanders** recently graduated from the Department of Urbanism at TU Delft with his research on bottom-up resident initiatives for creating sustainable cities. He holds an MSc in civil coastal engineering and an MBA from the Erasmus University of Rotterdam. He has twenty years of experience in real estate management and public administration. He is a keynote speaker, journal editor, columnist, and writer of youth novels, promoting sustainable and resilient initiatives.