Drivers and barriers for investment decisions about zero-emission renovations of non-residential buildings

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ABSTRACT

A zero-emission built environment by 2050 is part of the EU's Green Deal agreement. The Dutch non-residential buildings stock needs deep thermal renovations to phase out natural gas and to achieve a low building-related energy demand as agreed upon in the Energy Performance of Buildings Directive. Insights into the investment decisions of the non-residential building owners are lacking, while knowledge of their drivers and barriers is needed to develop efficient policies and incentives to achieve the goals. Previous research has shown that various drivers and barriers come into play when taking energy saving measures, however, these researches focused only on non-residential sub-sectors, like the public sector (Kleiwegt, Wegbrands & de Boer, 2023) and manufacturing enterprises (Cagno et al., 2014). This study takes a new approach by comparing non-residential owner types in their investment decision.

A twofold approach was used in this study. First, to gain insight into the investment decisions a categorization of owner types of the non-residential sector was drawn up. Subsequently, interviews were performed with a selection of these owners. For the first approach, a desk study and expert interviews were performed to come to four building owner categories, based on the potential actor that makes investment decisions. This criterion covers the entire non-residential building sector. The categories are landlords and owners of owner-occupied buildings, both in the public and private sectors. For the second approach, their drivers and barriers were collected and categorized from sixteen semi-structured interviews. Thirteen interviews were conducted with both small and large real estate building owners, while three interviews were conducted with public and private sector representatives. The organizations range from large real-estate owners, such as institutional investors or municipalities, to small building owners, such as a SME (Small and Medium Enterprise) or a school. The interviews cover all building categories in the non-residential sector that need to comply with the energy label regulations. The interviews were minuted and coded in ATLAS.ti. A software that enables coding of interviews, the resulting data was subsequently analyzed. Written transcripts were checked by interviewers, with quotes verified by interviewees.

With regard to the current state of implementation of sustainability measures, it is shown that limited triggers exist to initiate renovation measures. They are primarily taken when building elements become outdated, which occur every fifteen to twenty years. This leaves one or two renovation moments per building until 2050. Furthermore, most interviewees are not aware of the current energetic condition of their building portfolio, being described as "very diverse" and "unknown". Almost all interviewees had taken measures in some of their buildings like insulation, LED lighting, or solar-PV panels. All interviewees from the public sector and most interviewees from the private sector have internal sustainability goals. These goals refer to CO_2 neutrality, energy

neutrality, climate neutrality, self sufficiency or the SDGs. However, the translation of these goals into day-to-day practice seems to be missing for most of the interviewees.

The interviews resulted in five categories of investment decision factors, namely: organizational, financial, policy, knowledge and capacities, and other factors. A long list of these drivers and barriers is visualized (Figure 1.). Organizational and financial factors are mentioned most frequently by the interviewees.

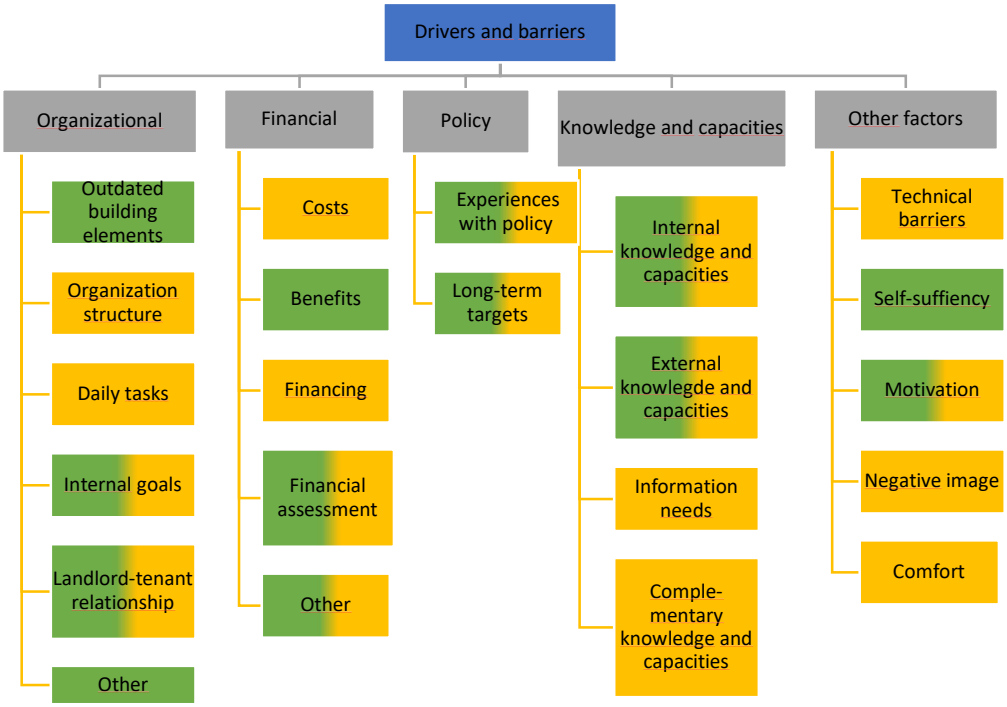

Figure 1. Categorization of drivers (green) and barriers (yellow) in the non-residential sector

A comparison between owners shows that public owners are more aware of long-term policy targets and incorporate these in their sustainability targets. Also, they have more financial support possibilities compared to the private-sector ones. For the private sector, more differences are observed between the ownership categories and within the ownership category. For the private owner-users, two extremes may be observed, on one hand, an ambitious group is driven by intrinsic motivation or the desire to be self-sufficient in energy. On the other hand, a passive group is focused on the survival of their enterprise, being unaware of long-term policy targets or finding them too far in the future or being too busy with their daily tasks. Even larger differences are observed in the category of private landlords. An ambitious group is driven by internal sustainability targets and EU targets, whereas a passive group prioritizes the financial return on their investments. This study also shows that upgrading building elements to zero-emission performance results frequently in a negative cost-benefit analysis, which is handled differently by different building owner categories.

Although the sample size is limited, this study indicates the existence of passive groups, and highlights barriers for other ownership categories. It shows that policy incentives supporting zero-emission renovations are necessary. These policies should align more effectively with the triggers of renovation, provide financial support for a more favorable cost-benefitanalysis, generate more knowledge and support for the phase out of natural gas and draw attention to stranded assets.

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