BACKGROUND AND OBJECTIVES

Denmark is, as the rest of the world, battling the increasing climate changes. One way to fight these changes is to reduce our energy consumption and thereby the CO₂-emission. The European Commission has set up goals for energy savings for the coming years and Denmark is as a member state of the Union obliged to comply with these objectives.

The building sector is responsible for around 40% of the total energy consumption in Denmark and 75% of this is used for heating in buildings erected before 1979\(^\text{1}\). The project focuses on the approximately 440,000 Danish single-family houses from the 1960\(^\text{t}\) and 1970\(^\text{t}\). These buildings have proven to have the far largest energy saving potential when taking into account the economic sensibility of the investment versus the building state and if renovated to a state comparable to new build the energy saving potential is 7.811 TJ\(^\text{2}\). Previous results from the project have shown that an overwhelming amount of barriers, among both professionals and private homeowners, prevent energy renovations from being carried out despite demonstrable benefits. These barriers are a combination of lack of interest, knowledge, commitment and economic incentives.

The project objective is to define if and how homeowners of Danish single-family houses can be motivated to conducting deep and extensive energy renovations, since these renovations are a crucial part of the energy saving strategy in order to reach both the Danish and the European Commission’s targets.

METHOD

To be able to conclude if and how the Danish single-family homeowners can be motivated to carry out private energy renovations a quantitative questionnaire survey was conducted to define an average profile of the owners in these houses. The questionnaire contained questions about the homeowners’ background, energy consumption and renovation, architecture, comfort and environment and finally economy. The themes were selected on the basis of a literature study about the barriers for energy renovations and where themes that were dominating throughout the literature.

The respondent group was selected by a multi-stage cluster sampling including a simple sampling in total a five stage selection process. In the prestage the group consists of all Danish single-family houses from the 1960\(^\text{t}\) and 70\(^\text{t}\) of a total of approximately 440,000 units. The first cluster sampling defined four clusters (the four largest cities in Denmark). In the second cluster sampling one cluster is defined in each of the previous four clusters. These are the houses connected to the district heating grid. For the third cluster sampling the district heating companies supplied information of large uniform groups of buildings within the target group. The fourth and final stage was a simple random sampling where 1,000 addresses (owners) were selected randomly within the four clusters. In this five stage process, the 440,000 single-family houses were reduced to 4,000 addresses to which the questionnaires were sent and of these were 900 completed.

RESULTS

The results from the questionnaire survey first of all show that the homeowners can be motivated by improvements in indoor environment, comfort and architecture, but the economy of the projects are crucial and must be sensible for the homeowners to find the renovations interesting regardless of the benefits. Energy savings by itself have very limited effect, but can support other parameters.

Secondly it is clear that the homeowners are not a homogeneous group of people, but a group consisting of a variation of homeowners with different preferences for their houses and different parameters which can motivated them to performing an energy renovation. At least two homeowner groups can be defined; the younger and the older homeowners. The younger homeowners have in their house a limited number of years, children are living at home, they have a fairly high income, are still working and are below the age of 50 years. The older homeowners have in many cases lived in the house since it was constructed, the children have moved, they are often retired from work, have a relatively low income and are above the age of 50 years. The older homeowners can be motivated by improvements in comfort and lay-out, whereas the younger homeowners are motivated by energy savings, architectural changes and improvements in comfort, indoor environment and lay-out.

Furthermore have the results concluded that the craftmen are the ones the homeowners will seek their guidance from and the professional actors they put the most trust in. The craftsmen are hence the ones expected to be able to generate the highest level of motivation in the homeowners and therefore they should be dressed for this task, which for the Danish craftsmen is a new skill required.

In the questionnaire the homeowners also picked out aspects crucial to obtain respectively good indoor environment and good comfort. A list of 9 and 6 aspects were presented and from this the homeowners could chose or add their own aspects. For good comfort the results showed that four aspects are crucial; the ability to open windows and get in fresh air, a lay-out fitted to the homeowners needs, a stable temperature and good and plenty daylight. To obtain a good indoor environment the right temperature and plenty of daylight are again essential aspect while no draught is furthermore added to the list here. The results indicate that in particular these five aspects can be very beneficial as part of the motivation strategy if the outcome of the renovation include improvements of these.

CONCLUSION

The huge energy saving potential found in the Danish single-family house can be utilized by motivating the homeowners to conduct extensive energy renovations. The survey have shown that the homeowners can be motivated by improvements in comfort, indoor environment and architecture. However, the economy of the projects has to be sensible within a limited timeframe for the renovations to happen regardless of the amount and size of improvements and benefits. Furthermore have the results proven that the homeowners are not alike when it comes to their prioritisations and the potential motivation factors. At least two groups of homeowners can be defined according to age, number of years lived in the house, income, children living in the house etc. and these groups need different information in order to motivate them. The two groups are referred to as the younger and the older homeowners.

The key is to accept that the homeowners are not alike and therefore should be treated differently. The motivation strategy expected to have highest impact on the number of private energy renovations is an approach that consider and utilises these dissimilarities.

References: