

REMOVING BEHAVIOURAL BARRIERS TO ENERGY RENOVATION – A DISCRETE CHOICE EXPERIMENT

Corinne CHATON, CREST - FiME, corinne.chaton@ensae.fr

Valérie LESGARDS, EDF R&D, valerie.lesgards@edf.fr

Samy ZITOUNI, PSE, samy.zitouni@psemail.eu

Overview

The building sector is the biggest consumer of energy and one of the main sources of greenhouse gas (GHG) emissions in France.¹ Energy renovation therefore has a dual environmental and social interest for the public authorities, by reducing both energy demand (and therefore the associated CO₂ emissions) and fuel poverty. Without it, it will be impossible to achieve carbon neutrality by 2050. That is why the French government has set ambitious targets for the energy renovation of buildings.

In 2023, according to the [Agence nationale de l'habitat](https://anah.fr/) (Anah), 569,243 homes underwent energy efficiency renovation (EER), including 71,613 high-performance renovations. This falls short of the French government's target of 90,000 high-performance renovations, raising questions about the feasibility of increasing this target to 200,000 in 2024.

To encourage energy renovations, the French government has introduced various schemes, including reduced-rate VAT, grants, subsidies from Anah, and regulated loans such as the Eco-PTZ (sometimes combined with 'MaPrimeRenov', or the *Prêt Avance Rénovation* (PAR)²). However, a significant barrier remains: many households are unable to finance renovations despite the available support, as the residual costs often remain prohibitive. While additional financing through bank loans is an option, these are only accessible to households meeting specific criteria (e.g., financial solvency, not being elderly or in poor health) and are typically insufficient to cover the full cost of high-performance renovations. The directive on the energy performance of buildings emphasises that aid should be targeted at the most vulnerable households living in the worst-performing homes, to combat fuel poverty and reduce their energy bills. To make PAR more attractive, since 1 September 2024 the French government has made it possible for very low-income or low-income households, depending on the Anah, to benefit from a *zero-rate Prêt Avance Rénovation* (or 'PAR +'), with a zero-interest rate for the first ten years.

Despite these findings, few studies have looked at the financial difficulties encountered by households when faced with a complete renovation. Does easing financial constraints increase investment? The aim of our study is firstly to measure the impact of two types of financial assistance, namely third-party financing, and mortgage loans, on the EER decisions of owner-occupier households in detached houses. Secondly, we assess the willingness to pay attributed by households to improving comfort and reducing their energy bills.

Methods

Our study is based on a questionnaire sent to owner-occupiers in spring 2024 via [Verian's](https://www.verian.fr/) Public Voice probabilistic panel. 513 adults took part in the survey. They were interviewed about the characteristics of their household (income, social class, etc.) and their home (surface area, region, size of conurbation), their renovation practices, their knowledge of renovation grants and the EPC score of their home, their perception of comfort in their home, and their perception of future energy bills and prices. Following this, they were presented with a Discrete Choice Experiment (DCE). The DCE, a method developed in the 1990s, is widely used in the measurement of individual preferences. It has applications in health economics (see de Bekker-Grob et al., 2012) as well as for various contexts, such as selecting electricity tariffs (e.g., Kalkbrenner et al., 2017; Robin et al., 2018; Danne et al., 2021) and electricity attributes (Ruiz-Carvajal, Adrian, 2022). In the field of EER, the role of uncertainty (Bakaloglou and Belaïd, 2023), environmental concerns (Galassi and Madlener, 2017), and debt aversion (Fanghella et al, 2023) have been explored through DCEs. But to our knowledge, this is the first questionnaire devoted to third-party financing, and mortgages for renovation.

Respondents are randomly divided into two equal groups. One of the two groups is presented with the third-party financing system and the other with the mortgage guarantee financing system. Twelve hypothetical choice situations

¹ According to [CITEPA](https://citepa.fr/) estimates, in 2023, this sector will generate 16% of France's GHG emissions (excluding carbon sinks and the carbon budget). These emissions, which are at their lowest level since 1990, are mainly due to the use of fossil fuels for residential and tertiary heating. These emissions, which are at their lowest level since 1990, are mainly due to the use of fossil fuels for residential and tertiary heating. The fall in emissions between 2021 and 2023 is due partly to milder winters and partly to higher energy prices and inflation. According to the French national energy ombudsman, in 2023, 79% of consumers will have turned down their heating to reduce their bills. Of course, the thermal renovation of buildings has also contributed to this reduction.

² The PAR mortgage (reimbursable advance loan), launched in February 2022, was originally aimed at low-income households and the elderly to help them finance energy renovation work.

(choice cards) are presented to respondents. On these cards, which are presented in random order, the individual can choose between carrying out 1) one renovation action, 2) several renovation actions or an overall renovation, or 3) doing nothing. The first two options are described using various characteristics (attributes): the cost of the renovation (in euros), energy savings (in percentage), comfort (discrete attribute), use of a financing operator (yes, no), use of a manager-operator for renovation i.e. global opérateur (yes, no). The values of these attributes vary according to the options and the choice situations.

Then, for both groups, using multinomial logit models, we explain the respondent's choice (to renovate - partial renovation or complete renovation - or not to renovate their home) as a function of the various attributes mentioned above.

Results

The questionnaire that preceded the DCE showed that half of owner-occupiers feel cold or damp in their homes, despite the work they have already carried out. 88% expect energy prices to rise and 60% are worried about their bills. Given these facts, why are energy renovations still insufficient? Is it due to a lack of awareness of the aids/subsidies available? Not really. In fact, 78% of households are familiar with the 'MaPrimeRénov' scheme, and between 30% and 40% are aware of other forms of assistance.

As intuition suggests, an increase in the cost of renovation (respectively in the energy efficiency of renovation) leads to a decrease (respectively an increase) in the probability of choosing to carry out renovation work (partial or complete). Higher energy bills for the dwelling increase the likelihood of choosing renovation.

The more risk-averse the respondent, the more likely they are not to opt for EER. The existence of a manager-operator for renovation increases the likelihood of the work being carried out. This operator takes the risk that the cost of the work will not be offset by the reduction in bills resulting from energy efficiency gains. In the case of third-party financing, respondents are more likely to choose more expensive work. This is not significant for the mortgage. Third-party financing relieves the household in terms of risk, unlike a mortgage.

In our initial estimate, comfort has no significant effect on the respondent's choice. This is probably due to the non-linearity of this effect. For a woman, the probability of choosing to carry out a complete renovation is higher than that of doing nothing. In the 'mortgage' group, the larger the surface area of the home, the greater the likelihood of carrying out work.

Conclusions

In this study, we asked households for their opinion on two methods of financing renovation and on the need for a global operator. This had never been done before. These financing methods are essential for boosting EER, especially as renovation grants are tending to decrease. In fact, at the beginning of 2025, the 'MaPrimeRénov' scheme will be scaled back. As a result, the financial assistance granted to homeowners who carry out targeted renovation work will be considerably reduced. This will increase the amount left to pay, which is a decisive factor in the decision to renovate a home, as our results show. Similarly, financial support for the most affluent households will be reduced.³ Faced with these cuts, households are likely to postpone their renovation work and/or spread it out over time. This is why it would be useful to develop third-party financing, with no remaining amount for the household, which increases the likelihood of carrying out a complete renovation.

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³ The most affluent households are those with higher incomes. These households are characterised by anah. The income limit depends on location (Ile de France, outside Ile de France) and the number of people in the household. So, for example, in 2024, a 4-person household living outside the Ile de France will be considered to have a higher income if its annual income is over €63,235.