

# **Barriers To Households Investment in Energy Efficiency and Renewables – Evidence from the OECD Survey on Household Environmental Behaviour and Attitudes**

Nadia Ameli, OECD, Phone +33 01 45 24 18 06, E-mail: [nadia.ameli@oecd.org](mailto:nadia.ameli@oecd.org)  
Nicola Brandt, Phone +33 01 45 24 88 60, E-mail: [nicola.brandt@oecd.org](mailto:nicola.brandt@oecd.org)

## **Overview**

Many studies on household energy efficiency investments suggest that a wide range of seemingly profitable investments are not taken up. Households seem to give a much stronger weight to the initial investment cost – which is often large – than to the present value of future energy savings. This could be explained by costs of searching the best technology and adoption that are not often accounted for in studies estimating the net present value of energy efficiency investments. Other possible explanations include market failures, such as credit constraints or informational asymmetries between buyers and sellers, or principal-agent problems. For energy efficiency investments such principal-agent problems frequently occur when renters pay the energy bill, but have comparatively weak incentives to invest in the energy efficiency of a building, as they are much more likely than owners to leave before the investment pays off. There may also be limits to households' rationality, for example a limited ability or willingness to collect and process the information that is necessary to assess whether an investment is profitable. Finally, attitudes and beliefs may play an important role as a motivation to invest in addition to considerations regarding purely monetary benefits and costs of an investment.

The OECD Survey on Household Environmental Behaviour and Attitudes contains rich data on household characteristics, knowledge, attitudes and behaviour regarding the environment along with information on investment in renewable energy and energy efficiency. This information is used to gather evidence on different hypotheses regarding investment behaviour for energy efficiency and renewables.

## **Methods**

Households' investment in energy efficiency and renewables is investigated within a discrete choice modelling framework.

## **Results/Conclusion**

This study provides evidence regarding different hypotheses explaining underinvestment in energy efficiency and renewables that have been put forward in the literature. The data from OECD Survey on Household Environmental Behaviour and Attitudes provides a rich basis for this investigation.

There is clear evidence supporting the idea that renters may have much weaker incentives to invest than owners. Owners are more likely to invest than renters for all investment goods studied in this paper, with a substantially larger magnitude of the effect for relatively immobile investments (such as windows and thermal insulation). This is often referred to as the owner effect.

There is also evidence for credit constraints, as investment depends positively on income. The results suggest that the probability to invest in energy efficient appliances increases strongly with income, when income levels are low, but this effect levels off for higher income levels. Many energy efficiency and renewable investments have high initial investment costs representing a relevant obstacle, especially for low-income households, if they are credit-constrained. The dependence of the probability to invest on income is an indication that credit constraints may be relevant.

Results also suggest that some households attach a much larger weight to the initial investment costs than to opportunities to reduce the energy bills later on and these households are less likely to invest. This may be another indication that credit constraints are relevant, but there are other explanations. Underinvestment in energy efficiency or renewables can be partly explained by consumer choice behaviour that differs from the neoclassical paradigm of perfect rationality. Consumers may be unwilling or unable to review and evaluate all available options. Instead they may make choices based on incomplete information, simplified evaluation methods or sometimes biased beliefs. For example, households may pay much larger attention to characteristics of an investment good that are easily observable – such as initial investments costs – than to characteristics that are much more difficult to observe, e.g. because they are smaller and require complex calculations, such as future energy savings. Evidence in the energy efficiency context is still limited and a true understating of the extent of these biases remains a relevant topic for further research.

The data suggest that the role of social context is particularly important for investment decisions, as households who are engaged in a NGO are more likely to invest, in particular when the NGO is environmental. Social participation correlates positively with technology adoption. When households are involved in environmental associations, they are even more likely to invest than others, who are engaged in non-environmental NGOs, in some of the investments goods studied in this paper.

Households' knowledge about their energy spending and use also plays a relevant role in technology adoption. Households who meter their energy consumption are more likely to invest than those who are not. But the data also suggest that not all households have a very good knowledge about their energy bill and those who are informed are more likely to invest in some cases. Households who were also able to provide information about the number of kilowatt hours consumed are more likely to invest in some investment goods (e.g. solar panels, energy efficient appliances and light bulbs). This lends support to the idea that the information of many households is less perfect than economic theory would have it and this is important for some investment decisions.

## References

- Hassett K.A., Metcalf G.E. 1995. Energy Tax Credits and Residential Conservation Investment: Evidence from Panel Data. *Journal of Public Economics* 57: 201–17
- Hines J.M., Hungerford H. R., Tomera A. N. (1987). Analysis and Synthesis of Research on Responsible environmental Behaviour: a Meta-Analysis, *Journal of Environmental Education*, Volume 18, issue 2.
- Gintis H. (2000) Beyond homo economicus: evidence from experimental economics. *Ecological Economics* 35 311–322
- Jaffe A. B., R. N Stavins (1995). Dynamic Incentives of Environmental Regulations: The Effects of Alternative Policy Instruments on Technology Diffusion. *Journal of Environmental Economics and Management* 29(3): S43–S63
- Kahneman D., Tversky A. (1979). Prospect Theory: An Analysis of Decision Under Risk. *Econometrica* 47: 263-91
- Michelsen C. C., R. Madlener (2012), homeowner's preferences for adopting innovative residential heating system: a discrete choice analysis for Germany
- OECD (2013a), Greening Household Behaviour: an analysis and policy implication of the 2011 survey – Energy. Technical report.
- OECD (2013b), Greening Household Behaviour: Overview from the 2011 Survey. Technical report.
- Olli E., Grendstad G., Wollebaek D. (2001). Correlates of Environmental Behaviour: bringing back social context. *Environment and Behavior* 33: 181-208
- Wilson C., H. Dowlatabadi (2007), Models of decision making and residential energy use. *Annual Review of Environment Resources*, 32:169-203
- Yates S, Aronson E. (1983). A Social Psychological Perspective on Energy Conservation in Residential Buildings. *American Psychologist* 38: 435–44