

## SUMMARY FOR DECISION MAKERS

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### **Financing energy efficiency retrofits in Chilean households: The role of financial instruments, savings and uncertainty**

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Energy efficiency is recognized as one of the most sustainable methods to reduce household energy usage and contribute to improving environmental conditions. This is especially the case in countries such as Chile that is suffering from high levels of air pollution derived from the use of energy in households, particularly for cooking and heating. The implementation of energy efficiency measures is a key strategy for reducing indoor and outdoor air pollution, reducing bills and increasing comfort. However, homeowners are not always aware of the benefits of these investments and they may be reluctant to invest in retrofitting their houses.

This study aims to investigate the role of financial instruments, benefits in terms of savings and uncertainty in the decision to implement retrofits by households in the central-south Chile. The study examines what the incentives are for these households to invest in energy efficiency measures (EEMs) in order to reduce the high

levels of indoor and outdoor air pollution produced in this area of the country. The study focuses on energy efficiency measures related to improvements of housing thermal insulation. The main problem associated with investments in EEMs is the lack of both information and financial incentives from public and private sources. In this work, we study what the preferences of Chilean households are for different type of financial instruments to fund investments in EEMs. We used a choice experiment to explore the trade-off between different financial instruments, the savings and the uncertainty of achieving the theoretical benefits provided by engineering and architectural models.

Results show that households prefer to invest in retrofits or energy efficiency measures with lower costs and uncertainty, but that maximize savings. The financial instrument is the attribute most considered by households, followed by the potential savings in energy.

Uncertainty was found to be the less influential and least considered attribute, which may be explained by the respondents' belief that they may be willing to accommodate their behavior to avoid or reduce the potential rebound effect.

The most preferred financial instrument was found to be mixed sources, i.e. households in Chile would be more likely to perform retrofits when they can finance part of the cost with an external credit and cover the other part with own resources, such as savings. In terms of credits, the medium term credit (4 years) was preferred over short term (1 year) and the long term (10 years or over) ones. Savings always are shown to be a well-considered option, especially for households in the highest income levels. The least preferred financial instrument was the long-term credits.

These results are highly relevant to the design of policies to support investments in these types of measures in Chile since most of the current financial instruments linked to energy efficiency investments are designed into long-term repayment types of mortgages. However, households would be more likely to invest if they can access credits for a shorter period at a preferential interest rate such as currently used in the eco-credits. Also, the financial instrument must be associated with an energy audit of the dwelling, carried out by certified specialists to identify interventions and costs. The cost of the audit can be absorbed by the credit.

At the moment, the "eco-credits" tool that the Chilean Government is starting to implement may be a good alternative for the move towards efficient homes. This tool is available to all socioeconomic groups at a lower interest rate, it is not linked to the house mortgage, and it does not require the property as collateral. This financing tool matches the user's preferences that we found in the choice experiment, but technical and operational aspects must be implemented for these financial tools to be applied.

On the other hand, we found that investment in EEMs for all income groups is higher than expected, which could

be explained by the education campaigns implemented in recent years by the Ministries of Housing and Planning, Environment and Energy, as part of the PDAs (Atmospheric Decontamination Plans). Although the level of investment is high, the focus of the intervention is not efficient, prioritizing measures that can be physically seen such as the replacement of windows, over measures that are more efficient but not visible, such as insulation. We found that the investments in different measures differ significantly between medium and high-income levels and therefore it could be a sign that policies could be differentiated.

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Alejandra Schueftan is an architect from Pontificia Universidad Católica de Chile with a MSc and a PhD from Universidad Austral de Chile.

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