

Title: EU SILC Database analysis: identifying techno-socio-economic building archetypes and their available budget to invest on building energy performance improvement. A cross country comparison.

Authors: Iná Maia, Fabian Schipfer, Lukas Kranzl, Matthias Lang

EU's building sector is one of the largest energy consumers in Europe, and responsible for more than one third of the EU's emissions. However, yearly less than 1% of the buildings undergo energy efficient renovation. Given these low renovation activities, huge efforts have to be made, in order to achieve EU's building stock decarbonisation targets latest until 2050. In this context, appropriated financing schemes play a key-role as they should help building owners in affording investments in energy efficient renovation projects. Nevertheless, there is a need for an increased understanding of household's techno-economic situation and conditions to invest on increasing the building's energy performance. The present paper contributes to this context by providing the results of a statistical analysis of the EU SILC database on different building archetypes and their household's available budget. In other words, the results from the present paper should help providing more insights about the affordability of buildings owners to invest on building's energy efficiency improvement. The present paper aims to answer to following research questions: based on an analysis of the EU SILC database in a cross country comparison, 1) how to define techno-economic-socio building archetypes for a simplified but comprehensive representation of European households?; 2) for each identified archetype, which ranges of budget available for energy efficiency improvement investments can be observed? And; 3) which country specific singularities can be observed and have to be considered in this context. The method consists of mainly two steps. In the first step, the relevance of the variables available in the EU SILC database for clustering the different household archetypes was ranked. Then, the second step consists of carrying out an EU cross-country comparison applying the method of descriptive statistical analysis to the EU SILC database. The available data will be assessed and compared for at least ten countries forming a representative cross-section of economies, population and climates for the European continent<sup>1</sup>. Preliminary analysis identified that following EU SILC variables would be relevant in the present study: dwelling type, tenure status, disposable income and total housing costs. Based on that, about 100 archetypes were identified. Further analysis will include applying an automatically clustering algorithm to deliver more aggregated archetypes. And, quantitatively assessing the country specific distribution of each building archetypes. Finally, for each archetype, and each country, the range of budget available for investments in energy efficiency improvement will be addressed. By mapping the available budget for different households' archetypes, it will be possible to derive conclusions regarding more target group oriented financing schemes<sup>2</sup> for improving building's energy efficiency.

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<sup>1</sup> [https://en.wikipedia.org/wiki/List\\_of\\_European\\_countries\\_by\\_population](https://en.wikipedia.org/wiki/List_of_European_countries_by_population)

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[https://www.researchgate.net/publication/342357713\\_How\\_to\\_finance\\_energy\\_renovation\\_of\\_residential\\_buildings\\_Review\\_of\\_current\\_and\\_emerging\\_financing\\_instruments\\_in\\_the\\_EU](https://www.researchgate.net/publication/342357713_How_to_finance_energy_renovation_of_residential_buildings_Review_of_current_and_emerging_financing_instruments_in_the_EU)