

# **Bridging the Energy Poverty Gap: Evaluating the Impact of Shallow Renovations and Micro-Efficiency in Spain**

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## **Abstract-**

Low-income households face severe energy affordability issues due to poor housing quality. To fight this problem, Spanish public administrations and NGOs have collaborated with the Naturgy Foundation's Energy Rehabilitation Solidarity Fund to improve the energy efficiency of vulnerable households through quick and low-cost interventions. This paper evaluates the impact of shallow renovation and micro-efficiency measures implemented within this program on energy poverty across various Spanish provinces. The analysis includes data from 416 households in 10 provinces, examining sociodemographic factors, housing conditions, energy bills, and thermal comfort perceptions. The methodology involved collecting data through two questionnaires and energy bills provided by collaborating entities. The study found that shallow renovation measures reduced the energy poverty gap by 14.51%, from EUR 554/year to EUR 483/year. Despite these gains, many households remain in severe hidden energy poverty, spending less than a quarter of their theoretical energy expenditure. The findings highlight the diversity among different provinces and measures and the need for more extensive structural measures to reduce energy poverty significantly. Eventually, the study underscores the effectiveness of energy renovations carried out by non-profit organizations. Thus, scaling these efforts nationally might help meet the goals of the public energy poverty plans.

**Index Terms-** energy poverty; shallow renovation; low-income households; energy efficiency measures

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