

Does Income Affect Climbing the Energy Ladder? A New Utility-Based Approach for Measuring Energy Poverty

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Current approaches to energy poverty measurement invoke some strong and sometimes implausible assumptions. In most research and policy works, energy poverty is virtually synonymous with income poverty. In addition, they expect households to progress through the energy ladder as income increases to move away from polluted traditional fuels. However, data show that even in well-off households, the energy mix could consist of both carbon-intensive traditional biomass and clean, modern energy. Therefore, the current energy poverty measures, mainly based on affordability and accessibility to modern energy, hold limited relevancy, especially in countries with a varied residential energy mix. Consequently, energy poverty alleviation programs may be mistargeted and lose effectiveness.

In this paper, we developed a new method to evaluate energy poverty based on the disutility that occurs if households use polluted energy, e.g. solid biomass, or have to give up other demands to afford clean energy, e.g. electricity. We proposed an extension of the Exact Affine Stone Index (EASI) demand system to quantify implied disutility associated with consumer choices when facing different energy emissions and energy prices, called the EASI-E demand system. The results from our EASI-E demand system can capture the impact of emissions or potential health risks and the tradeoffs between energy and other demands. In addition, the EASI-E demand system does not require pre-setting the mandatory conditions of energy poverty in terms of income thresholds or fuel types.

In an illustration, we apply our model to three waves (2012, 2014, and 2016) of the Vietnam Household Living Standards Survey data. According to the empirical results, the number of households living in energy poverty in Vietnam remained around 44% from 2012 to 2016. The findings also show that household income may not encourage households to climb the energy ladder as many families in the highest income level continue to consume conventional fuels. In addition, using polluted energy does not necessarily link to energy poverty. However, homes at different income levels could be in energy poverty if they have the disutility, either because of excessive use of high emission energies or compromise other demands to consume clean energy.

From these findings, we suggest that the definition of energy poverty should not be tied to the income-poor but be expanded, where households at any income level could be in energy poverty. The key policy insights from the findings are (i) those low-income and middle-income households in energy poverty could receive more support and incentives, and (ii) higher-income families who consume dirty fuels should be encouraged to change their consumption habits in favor of cleaner and more healthy sources.

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