

## **Hidden energy poverty in Central and Eastern Europe**

**Lilia Karpinska, Sławomir Śmiech**

This study is the first comparative micro-level analysis of exposure to hidden energy poverty in 11 Central and Eastern European (CEE) countries, i.e. Bulgaria, Croatia, Czechia, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia, and Slovakia. As defined in the literature, hidden energy poverty is a situation when a household has abnormally low energy expenditures (Enerdata, 2020) or have low absolute energy expenditures (EU Energy Poverty Observatory, 2020). We believe that the problem of energy poverty in this region is aggravated by infrastructural deficiencies and is driven by under-consumption of energy exacerbated by income poverty and poor housing stock condition.

Against this background, we propose to estimate the scale of exposure to hidden energy poverty in Poland and in the CEE by analyzing the housing costs. The model we put forward is designed to capture the varying component of housing costs attributed to energy usage. This is done through the inclusion of houses parameters, size, condition, location, regional characteristics. Housing costs estimated for a household with certain characteristics is our baseline. After that, we compare modelled or expected values of housing costs to actual ones for each household. A household is at risk of hidden energy poverty if after deducting the expected housing costs from income this household falls below the relative poverty line.

This methodology works on a number of assumptions. First, we consider energy costs is the only varying component of housing costs captured by the model. Second, we think that the energy poor consciously under-consume energy being constrained by the available budgets. The assumptions are valid for post-socialist economies as the rationale for under-consumption in CEE countries differs from the rationale for self-restrictions in other wealthier state.

Our analysis is based on the cross-sectional component of the EU-SILC dataset, i.e. household registers and household data files. We choose 16 variables suitable for modelling housing costs (variable HH070). The size of the sample varies between countries. The methodology is based on three estimation approaches, such as ordinary least squares, least absolute shrinkage and selection operator (LASSO) and M-estimator (robust regression). All methods produce similar results.

We choose CEE because of the following reasons.

Many studies point to the fact that CEE is one of the most vulnerable regions in terms of energy poverty (Bouzarovski, 2018; Dubois and Meier, 2016). In the European countries with a high incidence of poverty, i.e. countries of Central and Eastern Europe among others, energy poverty is hidden as households in need rely on different coping strategies. These strategies include self-disconnections (O'Sullivan et al., 2015), seating in a bed most of the time etc. (Brunner et al., 2012).

Another aspect of energy poverty is related to the burning of solid fuels in the residential sector for heating and cooking purposes. As reported by IQAir (2019) many countries of the CEE suffer from bad air quality, for example, 15 of 50 most polluted cities on the continent are located in Poland. One of the common coping strategies in Poland is burning in home furnaces: wood (also wet), rubbish, waste. To reduce these improper habits, many cities, e.g. Krakow, banned the use of domestic stoves and fireplaces since 2019.

There is one more reason to believe that energy poverty in the CEE countries, including Poland, is not exposed. The quality of building stock, specifically its energy efficiency, is quite low. There are a lot of decayed blocks of flats and detached houses all around CEE countries. Previous studies of energy poverty in this region confirm that finding (Lampietti and Meyer, 2002; Bouzarovski, 2014).

The results show that in 2017 the share of households being at risk of hidden energy poverty ranges from 15.7% (Czechia) to 31.35% (Bulgaria). On average about 23.6% of the CEE population is exposed to hidden energy poverty. It is interesting to note that the scale of exposure to hidden energy poverty is higher than the scale of income poverty in the respective countries. After identifying the households at risk of hidden energy poverty we show the distribution of the analyzed variables across those households. The profiles are heterogeneous, but we find some common traits. For example, single persons and families living in remote areas seem to be the most affected.

The important implications of the study are as follows. The scale of exposure to hidden energy poverty is quite high. From a policy-making perspective, the group of households being at risk of hidden energy poverty should be divided to the poor and the non-poor. Each group requires differentiated policy actions. The latter include building renovation policy, social assistance, promoting employment outside metropolitan regions etc.

#### References:

- Enerdata, 2020 <https://www.enerdata.net/publications/executive-briefing/fuel-poverty.html>
- EU Energy Poverty Observatory, 2020. Indicators & Data. <https://www.energypoverity.eu/indicators-data>
- IQAir AirVisual, World air quality report. Region and City PM2.5 Ranking. <https://www.airvisual.com/world-most-polluted-cities>
- J.A. Lampietti, A.S. Meyer, Coping with the cold heating strategies for Eastern Europe and Central Asia's urban poor, World Bank Technical Paper 529, Washington D.C., 2002.
- K.-M. Brunner, M. Spitzer, A. Christanell, Experiencing fuel poverty. Coping strategies of low-income households in Vienna/Austria, *Energy Policy* 49 (2012) 53–59, <https://doi.org/10.1016/j.enpol.2011.11.076>.
- K.C. O'Sullivan, P.L. Howden-Chapman, G.M. Fougere, Fuel poverty, policy and equity in New Zealand: The promise of prepayment metering, *Energy Res. Soc. Sci.* 7 (2015) 99-107, <https://doi.org/10.1016/j.erss.2015.03.008>.
- S. Bouzarovski, *Energy Poverty (Dis)Assembling Europe's Infrastructural Divide*, Springer International Publishing AG, Cham, Switzerland, 2018.
- S. Bouzarovski, Energy poverty in the European Union: Landscapes of vulnerability, *WIREs Energy Environ.* 3 (3) (2014) 276-289, <https://doi.org/10.1002/wene.89>.
- U. Dubois, H. Meier, Energy affordability and energy inequality, *Energy Res. Soc. Sci.* 18 (2016) 21-35, <https://doi.org/10.1016/j.erss.2016.04.015>.