

## **PREVALENCE AND SPATIAL DISTRIBUTION OF FUEL POVERTY IN HOUSEHOLDS IN POLAND**

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### **ABSTRACT**

Fuel poverty is a phenomenon of experiencing difficulties in satisfying basic energy needs at the place of residence at a reasonable cost, which consists of maintaining an adequate heat standard and supplying other energy types to meet the basic biological and social needs of household members. The aim of the article is to characterise the prevalence and spatial distribution of fuel poverty in Polish households. The article presents the main causes and effects associated with this problem. Data from the Central Statistical Office (GUS) and the Institute for Structural Research (IBS) was used for analysis.

**Key words:** fuel poverty, household, energy costs, income

### **INTRODUCTION**

The political transformation in Poland has brought with it many positive changes in the political, economic and social systems. Most of these have led to a significant increase in the quality of life for many Polish families. However, despite these positive effects, including a rise in the population's income, many households are still experiencing problems of an economic nature, including poverty [Kalinka 2014].

In order to diligently research poverty-related issues, it is necessary to focus on three aspects of this phenomenon. The first refers to the definition of poverty itself, the second to its origins, while the third should define some general social and economic solutions that can lead to overcoming poverty [Pilch and Lepalczyk 1995].

Many definitions of poverty have been put forward, but they all have a common element in that poverty is linked to the inability to meet certain needs at a desired level. Some authors point out that poverty is seen by society as a lack of sufficient means to subsist, as destitution, deprivation, etc. [Ratyński 2003]. In general, poverty can be defined as a state below a certain income threshold variable over time or a threshold for meeting the needs of an individual, family or social group [Boczoń et al. 1991]. Szamrej-Baran [2011] defines poverty as “the inability to lead a full life due to the scarcity of economic means”. Poverty disrupts the balance between social and economic order.

### **MATERIAL AND METHODS**

The aim of the article is to characterise the scale and spatial distribution of fuel poverty in Polish households. The article presents the main causes and effects associated with this problem. The analysis has been performed

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using data from the Central Statistical Office (GUS) and the Institute for Structural Research (IBS). Descriptive and graphical methods have been used to present results of the studies.

## RESULTS AND DISCUSSION

One of the types of poverty observed in households is “fuel poverty”. In Poland, this concept is quite new, even though the phenomenon itself is not. It is only in recent years that attempts have been made to define it and treat it as a separate item in relation to income poverty. Fuel poverty is only slightly correlated with income poverty, which indicates that it is distinct in nature from income poverty, even though a moderate overlap of these two concepts can be noted. Fuel poverty is a multi-faceted problem affecting economics, health, social affairs and housing.

Fuel poverty occurs when maintaining a comfortable temperature at home is a problem for household members; they have no means to pay for heating bills, repair broken heating systems or install new ones; the home or the flat are continuously cold and humid, often leading to illness [Stępniaak and Tomaszewska 2013].

In order to understand the nature of fuel poverty better, it would be useful to trace the origins of this concept. The problem of fuel poverty was first noticed and defined in the UK, which has the most experience in combating this phenomenon. The impulse to take action against fuel poverty came from the analysis of data showing high death rate in the winter months. When performing the study, it was noted that many poor households live in cold, damp flats. The basic cause of this condition was determined, which was bad insulation of buildings, as well as a non-economical and inefficient heating system in dwellings (especially in older buildings). In order to counter the effects, work has been undertaken to improve the living conditions of households. The UK government has decided to reduce the scale of fuel poverty by 2018 [*The UK Fuel Poverty Strategy* 2008].

The United Kingdom is the only country where a definition of fuel poverty based on objective measures has been developed, which says that a fuel poverty situation applies to a household that has to spend more than 10% of its income on maintaining a sufficient level of heating [*The UK Fuel Poverty Strategy* 2008]. However, given the differences between countries, for example different climates, heating systems and income levels, this definition cannot be directly transferred and applied in other countries [Szamrej-Baran 2012].

The general definition formulated by the EPEE project co-funded by the European Commission identifies fuel poverty as follows: “where a household finds it difficult or impossible to ensure adequate heating in the dwelling at an affordable price.” [EPEE Consortium 2008a].

The EPEE Project (European Fuel Poverty and Energy Efficiency Project) is co-financed by the European Commission, and, more precisely, received funding from the Intelligent Energy for Europe Programme. The objectives of the EPEE project are as follows: to raise knowledge and understanding of fuel poverty, to estimate the number of households subject to it in five partner countries (Belgium, France, Spain, the UK and Italy), as well as to identify mechanisms and actions to combat this phenomenon.

The EPEE reports outline three main causes for fuel poverty (Fig. 1), which occur separately or intensify each other [EPEE Consortium 2009]:

- low household incomes, limited financial opportunities, often economic poverty, making it impossible to pay regular energy fees;
- high energy prices and inefficient use of available energy – using ineffective, inefficient equipment, lack of awareness of unwarranted energy losses, lack of knowledge regarding simple energy-saving options;
- low energy efficiency of buildings, poor technical condition of residential buildings and heating systems, and their low energy efficiency.

By exerting an influence on the causes of fuel poverty, the scale of this phenomenon can be limited. Improving the energy efficiency of buildings and flats, using better insulation and a more efficient heating system reduces energy bills and, in effect, ameliorated the financial situation of households. Energy prices are a key factor

shaping household energy bills and budgets, and, consequently, their social position. The increase in the number of households in a situation of fuel poverty is linked to rising energy and gas prices. Low household incomes are another cause of fuel poverty.



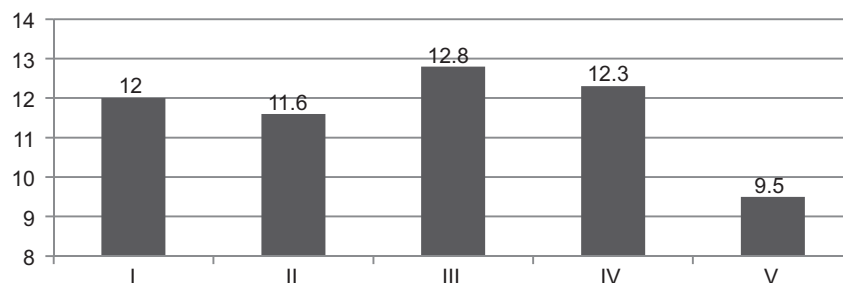
**Fig. 1.** Primary causes of fuel poverty according to EPEE

Source: Tackling Fuel Poverty in Europe. Recommendations Guide for Policy Makers. EPEE Consortium, September 2009.

Two important aspects are linked to fuel poverty: the financial (energy prices and household solvency within the scope of utility bills) and the technical (energy efficiency of the building).

According to the definition established in the UK, fuel poverty occurs in the case of households whose energy costs, mainly heating, account for more than 10% of income. It follows that the more expensive energy is, the more energy is consumed and the lower the income, the greater the risk of fuel poverty. Poor housing conditions (leaky windows, leaking roofs, damp walls and foundations or insufficient building insulation), as well as problems with the heating system – its lack, failure or ineffectiveness – compound this. These factors make it difficult to keep the right temperature in the dwelling and so increase energy consumption and, in effect, costs. Therefore, there is a clear correlation between the price of energy and the level of the problem in question. In 2002–2015 a significant increase in the prices of most household energy carriers in Poland was observed, which was mainly due to the rise in global fuel prices, but also related to causes originating in the country, i.e. introduction or increase in excise tax and increase in VAT. The biggest growth occurred in prices of fuel used directly in households. The increase in electricity and heat prices, of which the fuel price is a significant but not the only cost component, was relatively lower, despite the need to incur additional fiscal burdens. In relation to average total household expenditures, an increase in the share of expenditure on energy can be noted, from 10.5% in 2002 to 11.4% in 2015. The highest share of energy expenditure occurred in 2011–2013, when it exceeded 12% [GUS 2017].

In turn, by analysing the distribution of household spending on energy, it can be stated that in 2015 there was a falling tendency for this share, which accompanied an increase in disposable income. This was mainly because the share in question fell in the highest income group, which was the only one with a share of energy expenditure below the average for the population as a whole. In the other quintal groups, the share of expenditure was significantly higher, with the highest value for the third quintile (12.8%). This result may suggest that the problem of so-called fuel poverty is not just a question of income (Fig. 2).



**Fig. 2.** Share of energy expenditure per capita in quintile groups (as per disposable income per capita) in percentage  
Source: Energy consumption in households in 2015 [GUS 2017].

The objective measure of fuel poverty is therefore the relationship between household income and its energy expenditure. The subjective measure of poverty is the declared discomfort associated with the inability to maintain proper temperature in the dwelling (insufficiently warm in winter, insufficiently cool in summer), the quality of thermal insulation, default on energy payments. According to the results of a multi-faceted household survey, social cohesion research completed in 2015, 30% of Polish households declared they were unable to maintain an appropriate temperature in the dwelling [GUS 2017].

The energy efficiency of households in Poland has improved between 2002 and 2015. Consumption per dwelling decreased by 11.0% and by 7.2% when adjusted for climate. The highest consumption was observed in 2010, which was largely due to a severe winter, while the highest consumption adjusted for climate was in 2006. Consumption per dwelling in 2015 was 55.9 GJ, and 61.4 GJ when taking into account the weather conditions and these were the lowest values in the presented period [GUS 2017].

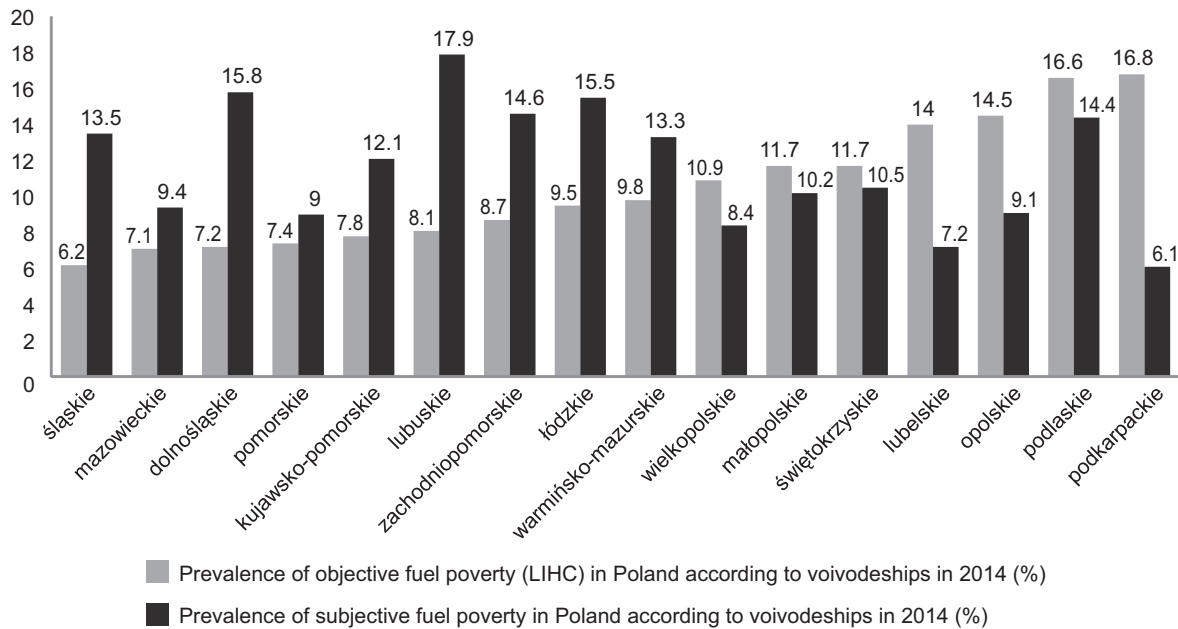
In Poland, the issue of fuel poverty has been covered most extensively by the Institute for Sustainable Development, the Institute for Structural Research and the Institute of Public Affairs, which co-operated on the first statistics-based description of fuel poverty in Poland based on the set definition of the group affected in our country.

The first institutional attempts to tackle fuel poverty in Poland were made in 2013 when the amended Energy Law Act introduced the definition of a sensitive recipient and in the draft Energy Policy of Poland until 2050 [2014] the concept of fuel poverty was mentioned.

According to BBGD (household budget survey) GUS data from 2014, fuel poverty according to the objective LIHC measure<sup>1</sup> touched about 9.6% of households (1.3 million), or 4.5 million people, in Poland. The phenomenon occurred in all voivodeships, but to varying degrees. Fuel poverty according to the LIHC measure was most prevalent in the eastern voivodeships: Podkarpackie (17% of households), Podlaskie (17%), Lubelskie (14%) and Opolskie (15%). The lowest prevalence was noted in the following voivodeships: Śląskie (6%), Mazowieckie (7%), Dolnośląskie (7%) and Pomorskie (7%). Therefore, the difference in the risk of fuel poverty between voivodeships on extreme ends was almost threefold.

According to the subjective measure of fuel poverty, 11.5% of Polish households declared living in premises not sufficiently heated in winter in 2014. As in the case of the LIHC measure, the scale of regional variation in subjective poverty was almost threefold: from 6.1% in the Podkarpackie voivodeship to 17.9% in the Lubuskie voivodeship. For most voivodeships, the relationship between the LIHC measure and the subjective measure of fuel poverty shows a negative gradient, i.e. the higher the percentage of poverty according to LIHC, the lower the percentage of poverty according to the subjective measure is (Fig. 3).

<sup>1</sup> LIHC (Low Income High Costs) – a measure of fuel poverty developed by Hills (2011) that is based on hypothetical energy expenditure. In order for a household to be classified as subject to fuel poverty according to the LIHC definition, it must meet two criteria simultaneously: low income (LI) and high hypothetical energy expenditure (HC).

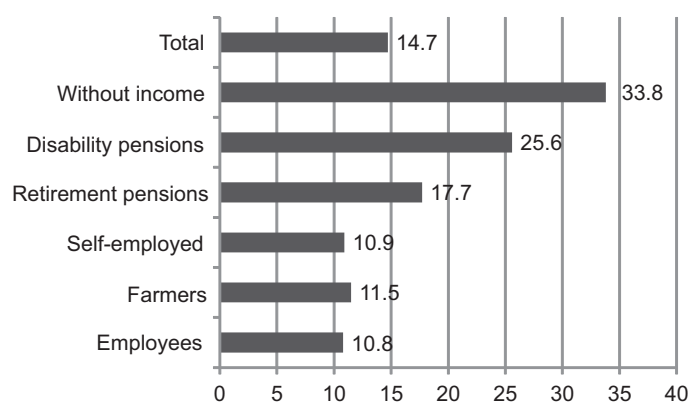


**Fig. 3.** Scale of fuel poverty in Poland by voivodeship in 2014

Source: Adopted from Lis et al. [2016].

As the above statistics and estimates show, the problem of fuel poverty in Poland is significant. The probability of its occurrence varies according to the place of residence, the structure and number of people in the household, and its wealth. The following are potentially most at risk: households of persons on disability pensions and pensioners, households located in small towns with a population of up to 20 thousand and between 20 and 100 thousand, occupying small (but not the smallest) dwellings – such with an area of 40–54 m<sup>2</sup>, single-parent households and single parents [Kurowski 2012].

In terms of income sources, households of people without a source of income and pensioners had the biggest difficulties in heating dwellings in Poland in 2012 (Fig. 4). In terms of the households' place of residence, the households were located in villages and small towns with a population of up to 20 thousand (Fig. 5).

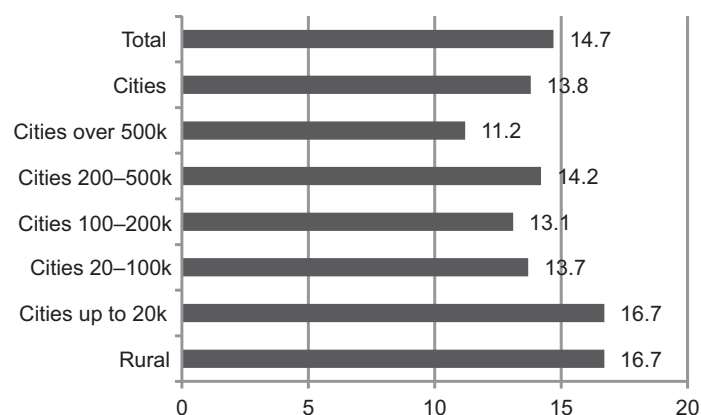


**Fig. 4.** Difficulties in heating a flat to household sources of income in 2012

Source: EU-SILC study [GUS 2017].

Aside from the economic situation, the problem may also be the technical condition of the home or flat (e.g. lack or insufficient thermal insulation, inefficient or expensive heating source, inefficient electrical equipment) and lack of adequate knowledge and awareness and, as a result, ineffective and inefficient use of heat and electricity [Pyka et al. 2014].

In addition, the highest percentage of fuel poverty was observed in buildings from 1946–1960 and the smallest in recently commissioned buildings (after 2006) and relatively new ones, i.e. built between 1996 and 2006. This shows the relationship of the phenomenon with the low energy efficiency of buildings, such as insufficient insulation or leaks in windows and doors [Owczarek and Miazga 2015].



**Fig. 5.** Difficulties in sufficient heating of a flat according to the households' place of residence in 2012

Source: EU-SILC study [GUS 2017].

Fuel poverty can have a negative impact on physical and mental health. This mainly concerns socially vulnerable consumers, such as children, the elderly and the chronically ill. Permanent cold and humidity can lead to respiratory problems, such as asthma or bronchitis. People who find themselves in a fuel poverty situation are prone to mental health problems. Poor housing conditions can cause anxiety, leading to social exclusion and isolation, and have a negative impact on self-esteem. Another consequence of fuel poverty is building degradation. Moisture in dwellings can very quickly contribute to the degradation of a building. Inadequate insulation of windows, walls or doors contributes to heat losses. The worse the housing situation, the harder it is to maintain the right temperature and, in effect, stop the rising damp process. Households affected by fuel poverty may fall into the trap of over-indebtedness. Low-income households are unable to pay electricity bills, which leads to debt. The need to pay high energy bills leads to a decrease in income that could be used on other basic items such as food and transportation. Fuel poverty also has negative consequences for the natural environment, as it leads to increased carbon dioxide emissions. A low building energy standard leads to an increase in energy consumption needed to heat it, which contributes to an increase in carbon dioxide emissions [EPEE Consortium 2008b].

The introduction of a policy to combat fuel poverty requires identifying the situation and the affected individuals/households. Fuel poverty is becoming a multi-faceted problem that affects very different situations. It is therefore very difficult to choose indicators for households in fuel poverty, but it is not impossible.

The best way to prevent the phenomenon of fuel poverty are activities providing long-lasting effects and minimising the occurrence of the causes for the issue, which are primarily regular increases in energy efficiency of residential buildings through thermal efficiency improvements, as well as the conscious purchase of energy efficient appliances (including lighting) and sparing use of energy by persons at risk of the described issue [Stepniak 2016].

## CONCLUSIONS

The issue of fuel poverty is very important for a large segment of society. This is especially true for those in an economically detrimental situation, especially in eastern Poland. Fuel poverty has negative consequences for cognitive development, health and even the lives of those exposed to it. Therefore, its existence should be included in social policy in the form of systemic solutions aimed at counteracting related undesirable phenomena. Fuel poverty can affect the following people: low income, collecting welfare, working part-time, in debt, elderly, disabled and single parents. The phenomenon can affect both families and individuals. Fuel poverty is being treated with increasing seriousness in the European Union. Although there are currently no documents and strategies directly devoted to its prevention and combating it, numerous legal acts – indirectly related to the subject – note the problem. Member States should recognise the fuel poverty situation and adapt the EU's common definition to its own national conditions. Undoubtedly, all measures must be taken to prevent fuel poverty, which affects the prevalence of poverty in general, as well as the level of social exclusion.

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## **SKALA I PRZESTRZENNE ROZMIESZCZENIE UBÓSTWA ENERGETYCZNEGO W GOSPODARSTWACH DOMOWYCH W POLSCE**

### **STRESZCZENIE**

Ubóstwo energetyczne to zjawisko polegające na doświadczeniu trudności w zaspokojeniu podstawowych potrzeb energetycznych w miejscu zamieszkania za rozsądną cenę, na które składa się utrzymanie adekwatnego standardu ciepła i zaopatrzenie w pozostałe rodzaje energii służące zaspokojeniu w adekwatny sposób podstawowych potrzeb funkcjonowania biologicznego i społecznego członków gospodarstwa domowego. Celem artykułu jest scharakteryzowanie skali i przestrzennego rozmieszczenia zjawiska ubóstwa energetycznego w gospodarstwach domowych w Polsce. W artykule ukazano najważniejsze przyczyny i skutki związane z tym problemem. Do analizy wykorzystano dane Głównego Urzędu Statystycznego oraz Instytutu Badań Strukturalnych.

**Słowa kluczowe:** ubóstwo energetyczne, gospodarstwo domowe, koszty energii, dochód