



Assessment of Energy Poverty in New European Union Member States: The Case of Bulgaria, Croatia and Romania

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ABSTRACT

Energy poverty has become a rising issue in European Union (EU), especially in new member states, but still there is no uniform methodology in defining energy poverty and policy measures. The aim of our paper is to assess and compare the number of energy poor households in three new EU member states based on quantitative indicators like the number of energy poor households that use financial measures related to energy sector and the number of households that spend more than 10% of their income on energy. Our results show that the number of energy poor population increased in the period 2009-2014 in all three countries according to the level of monthly (Bulgaria and Romania) and guaranteed minimum allowances (Croatia), while the share of heating allowances decreased only in Romania, but is still very high. In all three countries the problem of energy poverty is present in 4 to 5 deciles. Additionally, the share of the population who consider that they cannot keep their homes warm is the biggest problem in Bulgaria (45%), then in Romania (14%) and Croatia (10%).

Keywords: Energy Poverty, Bulgaria, Croatia, Romania

JEL Classifications: Q48, I32

1. INTRODUCTION

Due to global economic recession that has started in 2007, volatile energy prices and low energy efficiency in residential buildings, the number of households in European Union (EU) that are facing energy poverty is increasing. They are known as energy/fuel poor households. However, at the European and global scale there is an inconsistent use of terminology (Thomson and Snell, 2013), with the term energy poverty sometimes used interchangeably with fuel poverty, whilst at other times it is used to conceptualise a more extreme set of circumstances (Thomson, 2013). Sometimes energy and fuel poverty are considered as different concepts with energy poverty referring to the lack of access to modern energy services in developing countries (Bazilian et al. [2010]; Birol (2007) and Sagar [2005]), and fuel poverty referring to “a problem of affordability rather than access, which is present in some of the world’s most developed countries” (Househam and Musatescu, 2012). However, the energy sources covered by the term fuel poverty are broader than those considered in the energy poverty references in the internal electricity and gas market legislation

(EC, 2010). Although these terms are not synonymous, we decide to use energy poverty terminology since it is widely used in scientific literature.

According to EC (2015), many EU member states do have measures in place to protect vulnerable households, but nearly 11% of EU’s population, mostly in new Member States of Central Eastern and Southeastern Europe is in a situation where they are not able to adequately heat their homes at an affordable cost. This paper focuses three newest EU Member States: Bulgaria, Croatia and Romania that have been burdened with similar problems arisen from low GDP p/c, non-market history and low electricity and gas prices until few years ago due to high cross-sectors energy subsidies. However, energy market liberalization became a global process and it resulted in higher energy prices, while the recession decreased disposable income of households.

After the years of lobbying by a number of international organizations, academics and political groups, the notion of “energy poverty” finally entered in the legislation of the EU. The institutional framework was presented within the third energy

package, in directives on concerning common rules for the internal market in electricity and natural gas supply (Directives 2009/72/EC and Directive 2009/73/EC). Member states shall define the concept of vulnerable customers which may refer to energy poverty and to the prohibition of disconnection of electricity and gas to such customers in critical times. Defining the concept became a legal obligation for all Member States by the end of 2015. Furthermore, Member States should ensure the necessary energy supply for vulnerable customers. In doing so, an integrated approach, such as in the framework of social policy, could be used and measures could include social policies or energy efficiency improvements for housing. However, energy poverty is a broader concept and since it refers not only to vulnerable consumers, different metrics to define and measure is required.

In 2011 Bulgaria has adopted the energy strategy (OG 43/11) till 2020 in which one of the reason for energy efficiency improvement is combating energy poverty. According to the strategy, the reduction in energy consumption in households that are affected by this problem is the appropriate tool for reducing energy poverty. With amendments to the Law on Energy Sector (OG 107/03, last amended in 98/14), the concept of vulnerable customers entered in the Bulgarian legislation. Vulnerable customer is a customer from the household category who is a beneficiary of targeted allowance for electricity, heat or natural gas under the law on social assistance. The definition implied the placement of energy poverty problem in the area of social policy, and not energy. According to the Law on Social Assistance (OG 56/98, Last Amended in 120/02), vulnerable households are entitled to targeted allowance for electricity, heat or natural gas (for heating) in a specific monetary amount. Financial assistance is awarded during the winter months and contributes to only short-term problem solving, moreover facilitates individuals only a survival. Unfortunately, regardless of the adoption of the National Action Plan for Energy Efficiency 2014-2020 and the National Programme for the reconstruction of buildings 2005-2020, energy efficiency is not placed into service for reducing energy poverty as the only long-term solution.

Croatia adopted Energy Strategy in 2009 (OG 130/09) and defined the concept and status of vulnerable customer for the first time in the energy act (OG 120/12, 14/14,95/15,102/15) following by the Law on Electricity Market (OG 22/13,95/15,102/15) and the Law on Gas Market (OG 28/13, 14/14). Vulnerable customer is an energy final customer from household category who because of its social status and/or health conditions is entitled to energy supply under special conditions. Final customer from household category, who meets the condition of poverty, is entitled to a social minimum energy consumption determined by the conditions of supply in the housing in which he lives, number of family members and their health and economic status. In September 2015 Government adopted the decision according to which the vulnerable customer is a customer from household category who is a beneficiary of minimum guaranteed social allowance and/or disability allowance.

Aside from directives on the internal market for electricity and natural gas, Croatia transposed the provisions of the directive on energy efficiency (2012/27/EC) which are incorporated in the law on energy efficiency and the appropriate National

Energy Efficiency Action Plan for the period from 2014 to 2020. According to the law on energy efficiency OG 127/14 some measures to increase energy efficiency might be implemented as a priority for vulnerable customers. In addition, potential financial sources for the implementation of energy poverty measures are listed in the Air Protection Act (OG 130/11, 47/14), and in the poverty reduction strategy.

Romanian energy strategy which was adopted in 2011, states that energy prices for vulnerable customers must be beyond the regulation domain. Also, it states that the social tariffs for natural gas, electricity and heat must be replaced by direct social benefits. Vulnerable customer is defined in the Law on Electricity and Natural Gas (OG 123/12) as household customers at risk of social exclusion because of its older age, health or low-income and who is, in order to prevent risk, a beneficiary of social protection measures, including financial ones. In addition to the Law on Electricity and Natural Gas (OG 123/12), the term vulnerable customer is defined in the Emergency Regulation on Measures of Social Protection During the Winter (OG 70/11, 27/13) for the purpose of social assistance, as a household (individual/family) who cannot provide to cover all costs of heating and whose income is within the predefined limits.

Less than a third of EU countries officially recognize energy poverty and only a few have an official definition in their national legislation. Since there is no official definition of energy poverty on EU level and no uniform methodology and policy measures for reducing energy poverty, it is obvious that much more needs to be done to develop an internationally consistent measurement framework and to put in place data collection systems that will enable regular reporting.

Assessment of energy poor households represents an important first step in dealing with the problem. We are aware that the issue of energy poverty could be analyzed and measured in a multidimensional framework; however we choose a more narrow approach. The aim of our paper is to assess and compare the number of energy poor households in three new EU Member States based on quantitative indicators like the number of energy poor households that use financial measures related to energy sector. Since it is a first step in tackling the problem of energy poverty, we hope that this paper gives a small contribution to addressing this issue by using comparative analysis of three less developed EU countries.

2. ENERGY POVERTY AND ENERGY PRICES: EMPIRICAL FRAMEWORK

Since energy prices strongly influence the occurrence of energy poverty, the following analysis focuses the development of energy prices and energy mix of households in Bulgaria, Croatia and Romania.

Figures 1 and 2 shows the development of electricity and natural gas prices for a household that consumes 2500-5000 kWh/year, which represents an average household consumption in the period from 2007 to 2014 in selected countries.

Data show that Bulgaria constantly had the lowest level of electricity prices for households compared to Croatia and Romania, but also compared to the EU average. During the period, prices in Bulgaria grew on average by only 2% annually although it was a time of high prices of primary energy sources like gas and oil. Contrary to Bulgaria, electricity prices in Romania significantly fluctuated over the years. For example, large price drop of almost 10% in 2009, and an increase of 23% in 2013 were recorded. Compared with prices in Romania and Bulgaria, prices in Croatia are the highest and they grew on average by 5% per year. In all three countries electricity prices for households decreased in 2014 because of the large price drop on the wholesale market. In all three countries the process of electricity market liberalization took place as a part economy-wide structural adjustment programs and influenced the level of prices that have become more cost reflective. As a legacy of non-market economy till the beginning of 90s, state-owned and highly bundled monopolies were strongly subsidized from the state budget, while electricity and other energy prices were artificially low. However, liberalization and privatization in energy sector created different macroeconomic environment and increased electricity prices. Similar pattern can be seen in gas sector as well (Figure 2).

Data show that the prices of natural gas increased by 50% in Bulgaria, by 65% in Croatia, while decreased by 8% in Romania in comparison with 2007. Unlike the prices of electricity, natural

gas prices are the highest in Bulgaria and not only among observed countries, but also in comparison with the EU average as well. The increase in gas prices in most EU countries that are strongly import-dependent on Russia, was the reality till the end of 2014.

Changing prices of energy impacted the structure of final energy consumption of households in the mid-term run and therefore it would be interesting to see broader structural changes. When faced with growing prices of certain energy source, households are prone to change the energy source if they are able to. Consequently, final energy consumption changes over time. Figure 3 presents the structure of final energy consumption in households by energy sources in Bulgaria (marked by B), Croatia (marked by C) and Romania (marked by R) in the period 2005-2012.

According to the presented data, electricity is the most important energy source in Bulgaria (40%) followed by firewood (32%). District heating is also represented (15%), as well as coal (10%). Natural gas comprises only 2% in the overall structure. The reason for high electricity consumption lies in its low price. In fact, in several Bulgarian cities the newly constructed gas distribution network led to increase in natural gas prices that became too expensive for many households. As a result, most of the people who were connected to the distribution network, ceased to use gas for heating during the winter months. On the other hand, because of an underdeveloped gas network, large share of the total households has no access to natural gas as an energy source. Also, many households have switched from district heating to electricity because the heat prices were no longer subsidized (Peneva, 2014).

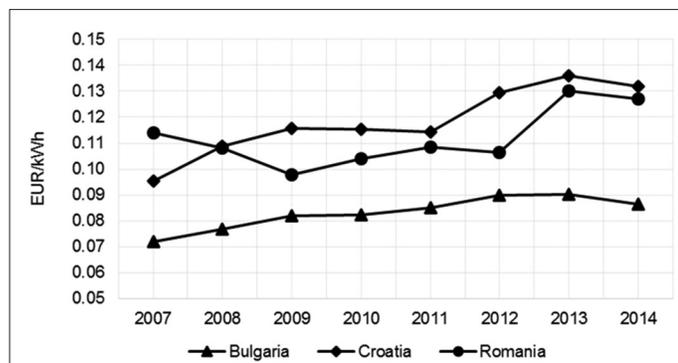
Energy prices in Romania influence the structure of final energy consumption in households as well. Data show that firewood has the largest share (44%) followed by natural gas (28%). Electricity is used only 12%. Due to the cessation on subsidizing the heat price, district heating consumption decreased and currently amounts only 13% of the total energy consumption.

Households in Croatia mostly use electricity (30%) and slightly less gas (28%). District heating participates 8% in total consumption due to the fact that only a small number of cities are connected to heating systems. During the analyzed period, share of gas and district heating decreased due to the rising prices accompanied with the fall in disposable income of households. The result is the return of traditional biomass use and growing share of firewood in final energy consumption (23%).

3. DATA AND METHODOLOGY

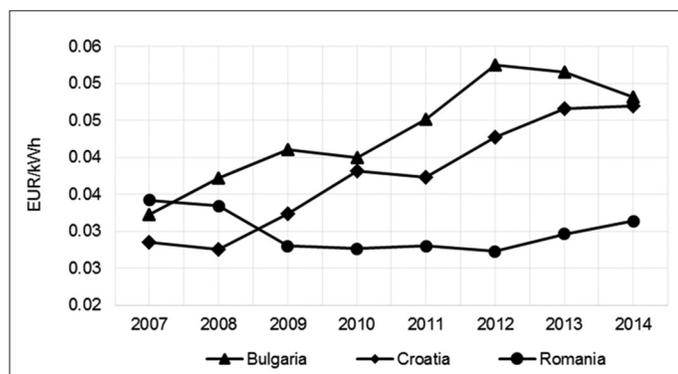
The assessment of energy poverty is based on several indicators. First we calculate the number of energy poor population who are beneficiaries of various social policy measures that are related to energy sector. The number of beneficiaries (families and single people) is placed in the ratio with the total number of households. Then we calculate the share of households energy expenditures in their total income in order to see how many households spend more than 10% on energy, which represents the margin for energy poor household (Boardman, 1991). The third indicator is the share of household expenditures on energy in the total income.

Figure 1: Electricity prices in Bulgaria, Croatia and Romania in the period 2007-2014, VAT included

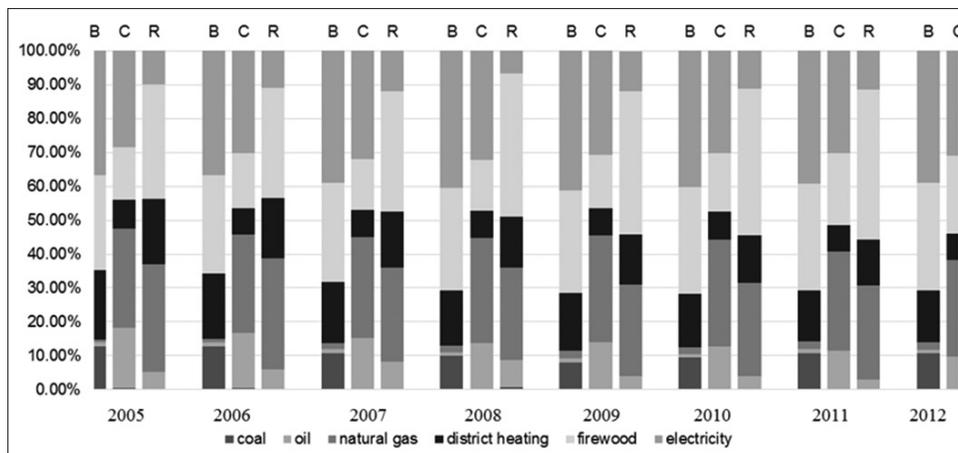


Source: Eurostat Database, 2015

Figure 2: Natural gas prices in Bulgaria, Croatia and Romania in the period 2007-2014, VAT included



Source: Eurostat, 2015

Figure 3: Structure of final energy consumption in Bulgaria, Croatia and Romania, 2005-2012

Source: Authors according to ODYSEE MURE base, 2015

Households are divided with regard to income into the decile classes. The decile classes are formed by dividing the basic set on ten equal parts by calculating the average net income per household, classifying households by income from the lowest to the highest and by classifying the households from the basic set into the corresponding decile. Thus, the households that have the lowest annual net income are in the first decile, while households that are in the tenth decile have the highest annual net income. Subsequently, the total expenditure on energy by decile is set into the ratio with total household income. Additionally, we also use the EU-SILC (EU-statistic on income and living conditions) indicator that shows the share of the population who cannot keep their homes warm.

Data are collected from national statistics published by National Statistical Institute of all three countries and they cover the period from 2009 till 2013/2014. The share of households in Bulgaria covered by the social policy measures aimed to mitigate the energy poverty is based on Budget survey published by the Ministry of Labor and Social Affairs and Ordinance on the terms and conditions for allocation of targeted assistance for heating (OG 49/08). These measures include monthly and heating allowance. Estimation of the energy poor population in Croatia is based on statistical data of the Ministry of Social Policy and Youth. According to the Law, the beneficiaries of the guaranteed minimal allowance are the poorest part of the Croatian population and they represent the minimum number of potential energy poor residents. These measures include guaranteed minimum allowance and heating allowance. The estimates for Romania are based on statistical reports provided by Romanian Ministry of Labor, Family, Social Affairs and the Elderly. The share of households covered by social policy measures aimed to mitigate the energy poverty is calculated for Romania by using measures that include guaranteed monthly allowance and heating allowance according to the Law on minimum wage (OG 416/01).

4. RESULTS AND DISCUSSION

Estimated results on the energy poor population in three analyzed countries are presented in following figures. The data for Bulgaria,

the less developed country according to GDP p/c, are shown in Figure 4.

Approximately 2% of the total number of households in Bulgaria was beneficiaries of monthly allowance in 2014, which represents the simplest form of social assistance. Almost 10% of the population was beneficiaries of heating allowance during the winter. The data also show that the number of beneficiaries for heating allowance has increased during the last 3 years, and the number of monthly allowance beneficiaries has increased during the whole analyzed period.

Similar trends of rising number of energy poor population could be seen in Croatia as well. However, Croatia is the most developed among the analyzed countries and these shares are considerably lower in comparison with Bulgaria and Romania, but still they are increasing over the analyzed period. The data on Croatia are presented in the Figure 5.

Approximately 3.4% of the total number of households in Croatia was beneficiaries of monthly allowance and 2.9% of heating allowances in 2013. During the analyzed period, the number of monthly allowance beneficiaries has grown, as well as the number of heating allowance beneficiaries.

The estimation for Romania is shown in the Figure 6.

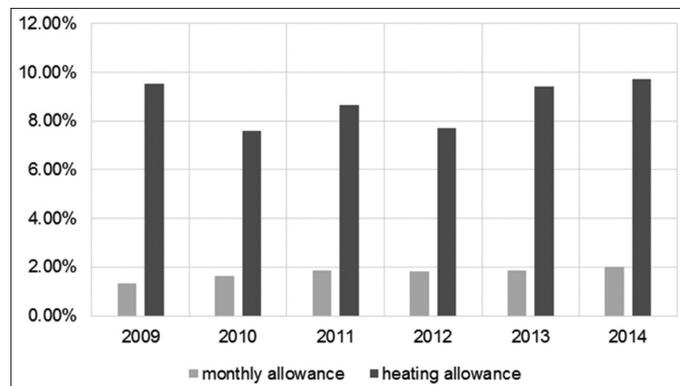
Although Romania is more developed than Bulgaria (and less than Croatia), the share of energy poor population is much higher than in other analyzed countries. On the basis of the total number of households, about 3.4% were beneficiaries of monthly allowance and 14.5% of heating allowance. During the observed period the number of guaranteed minimum allowance beneficiaries increased slightly, while the number of heating beneficiaries decreased but it is still on a very high level that indicates energy poverty as a big social problem.

The second step in assessing the energy poverty is to calculate the share of households' expenditure on energy in relation to total disposable income by decile classes. Due to data availability these shares are calculated for Bulgaria in 2013, Croatia in 2011 and Romania in 2013. The limit of energy poverty is set to 10%

and marked by red line. The share of households above the red line is considered to be energy-poor. Figure 7 shows the share of household expenditure on energy in Bulgaria, Figure 8 presents the share of household expenditure on energy in Croatia, while Figure 9 presents this share in Romania.

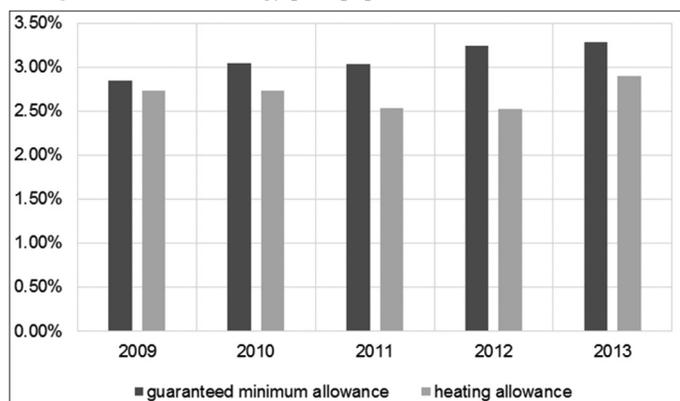
The results are in a way unexpected because they indicate that in Croatia, the most developed country with the least energy poor population, there are the most households that spend on energy more than 10% of their income. According to presented data, in all three countries there are energy poor households

Figure 4: The share of energy poor population in Bulgaria, 2009-2014



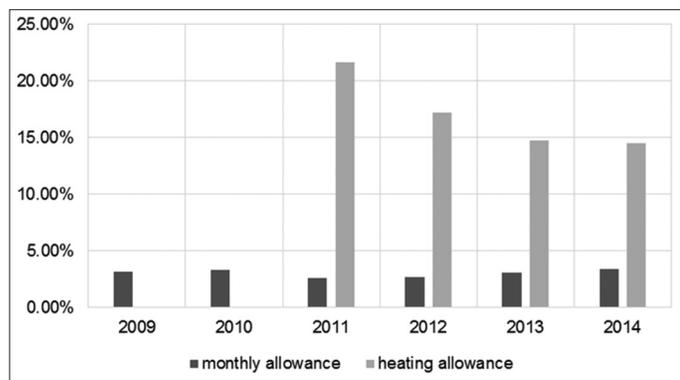
Source: Authors according to data from www.mlsp.government.bg

Figure 5: Share of energy poor population in Croatia, 2009-2013



Source: Authors according to data from www.mspm.hr

Figure 6: Share of energy poor population in Romania, 2009-2014



Source: Authors according to data from www.mmssf.ro

in 4-5 deciles, but the problem is the most pronounced in Croatia. Although net income in Croatia is higher than income in Bulgaria and Romania, prices of electricity and natural gas for households in Croatia are also higher and reach the average level in EU.

One of the indicators analyzed in the framework of the EU-SILC is the proportion of the population who cannot keep their homes warm. This indicator refers to the ability to pay for adequate heating of living space. It should be noted that the indicator is calculated on the basis of the survey in accordance with the perception by the residents and it is not the objective calculation of the thermal comfort in households. The survey results for all three analysed countries are presented in the Figure 10.

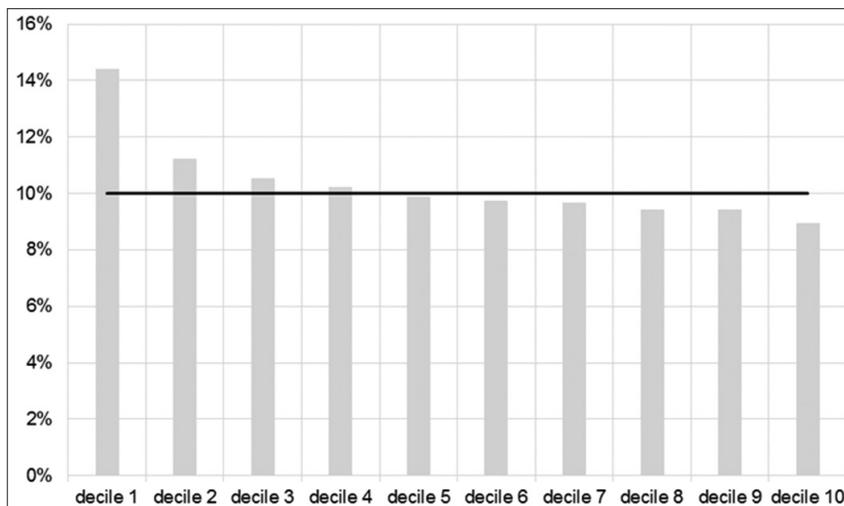
According to EU-SILC data, about 45% of households in Bulgaria consider that they cannot keep their home warm. Comparing these data with the previously assessed indicators, it can be seen that this percentage is much higher than the share of households that receive heating allowance (10%). In Croatia, there is also a difference between the number of households receiving some form of social assistance aimed to address the energy poverty problem (3%) and the actual number of energy-poor households according to this last indicator (10%). In Romania, the share of the households which expressed the inability to adequately heat their homes is the same as the share of the household which receives heating allowance during the winter (about 14%).

These results should be analyzed in a wider context of energy markets liberalization that has led to increase in energy prices in all countries. Due to liberalization, energy prices for households are not regulated any more, as they used to be in the past. Till recently the most of new Member States have still retained the distorted price structure, which was the legacy of a system in which domestic consumption of electricity was subsidized at the expense of industrial and commercial consumption. However, the situation changed and today energy prices have become cost-reflective, which strongly influence the number of households that are beneficiaries of some kind of allowances related to energy. According to presented data, it could be concluded that cost-reflective tariffs in three analyzed countries have resulted in restrictions of comfort, inadequate heating in households and high share of income spent on energy bills in new EU member states. There is no doubt that these problems should be tackled by European Commission and national authorities since they have become serious economic and social issues.

5. CONCLUSION

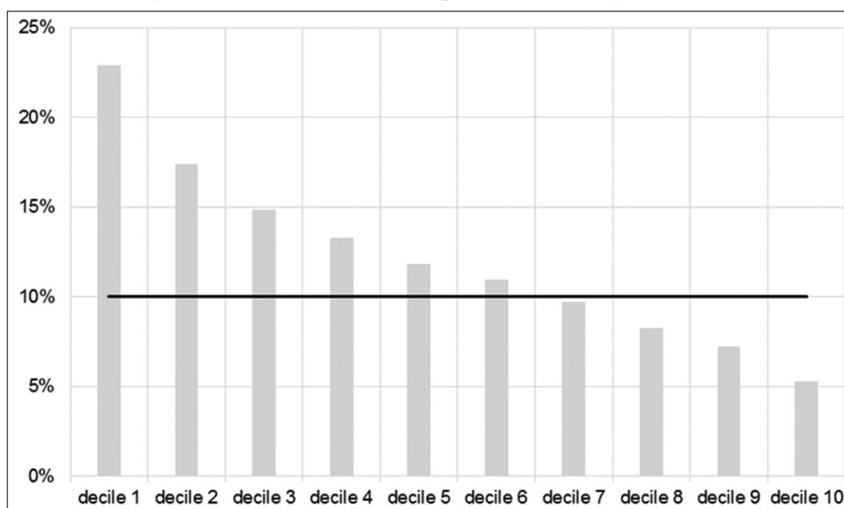
The analysis shows that the number of energy poor population increased in the period 2009-2014 in all three selected countries according to the level of monthly (Bulgaria and Romania) and guaranteed minimum allowances (Croatia), while the share of heating allowances decreased only in Romania, though from very high level of over 20-14%. The second step was to calculate the share of households' expenditure on energy in relation to total disposable income by decile classes. The limit of energy poverty is set to 10%. According to our results, in all

Figure 7: Share of household expenditure on energy in Bulgaria



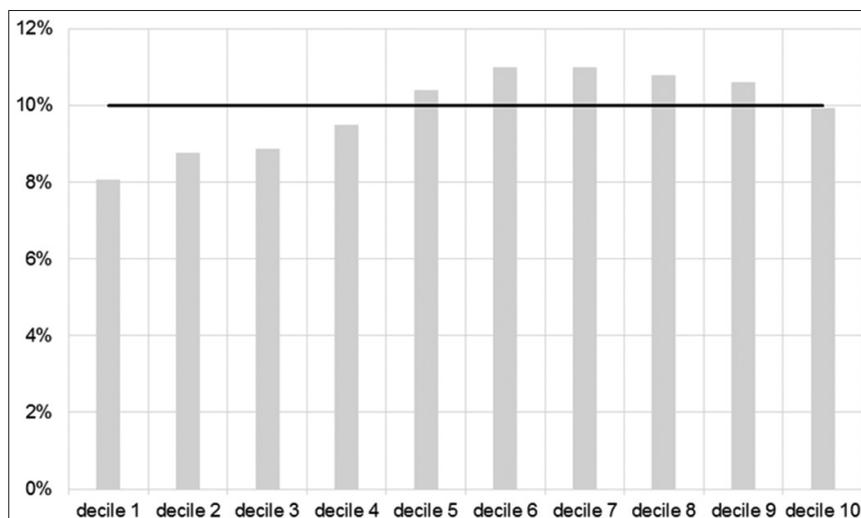
Source: Authors according to National Statistics Institute Bulgaria, 2015

Figure 8: Share of household expenditure on energy in Croatia

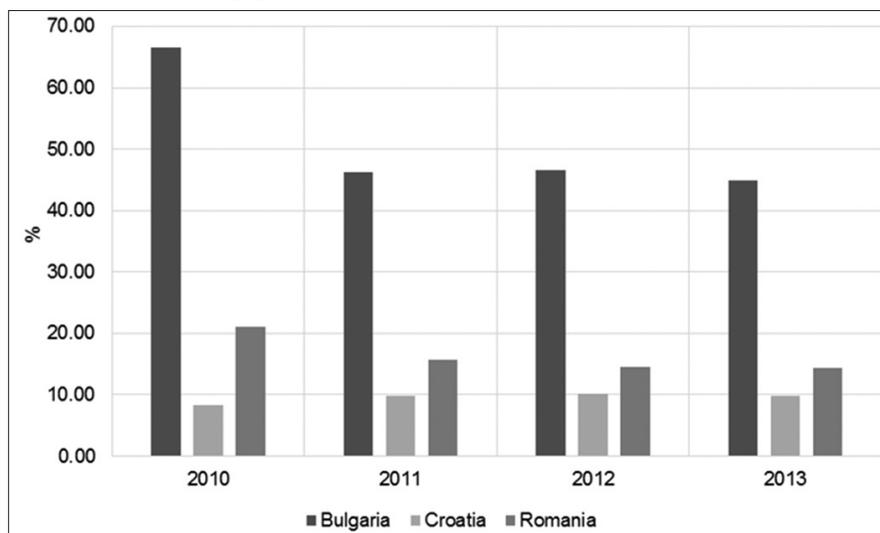


Source: Authors according to Croatian Bureau of Statistics, 2012

Figure 9: Share of household expenditure on energy in Romania



Source: Authors according to National Institute for Statistics Romania, 2013

Figure 10: Share of population that cannot keep its home adequately warm, 2010-2013

Source: Eurostat database, 2015

three countries the problem of energy poverty is present in 4-5 deciles, although is the most pronounced in Croatia due to higher electricity and natural gas prices in comparison with Bulgaria and Romania. Another indicator has been analyzed that shows the share of the population who consider that they cannot keep their homes warm and results show that the energy poverty is the biggest problem in Bulgaria where 45% of households consider that they cannot keep their home warm, 14% in Romania and 10% in Croatia.

The overview of measures in each country shows that there is no uniform approach and that tackling the problem of energy poverty still remains within social policy since financial allowances are based only on households' income. All observed countries need systematic and long-term approach in dealing with this problem that should include indirect measures like improving energy efficiency.

6. ACKNOWLEDGMENT

This work has been fully supported by Croatian Science Foundation under the project IP-2013-11-2203.

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