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Defining Energy Poverty in Implementing Energy Efficiency Policy in Bulgaria

Emiliya Kulinska*

Summary

Energy efficiency is considered to have the highest priority in achieving the long-term objectives of the European Union in the field of energy and climate. Energy efficiency policy can be seen as an integral part of Bulgaria's energy policy, which is based on national priorities and is in line with the main objectives of the EU energy policy for energy security, competitiveness and sustainable development. Households' "energy poverty" raises concerns and is among the biggest challenges to the energy efficiency policy. The lack of a clear common definition of energy poverty requires that a systematic and critical study is made of the basic theoretical concepts offered by Bulgarian and foreign researchers, as well as an overview of the problems pertaining to the energy poverty of households in Bulgaria and the possible measures to tackle this issue. This paper addresses terminological issues related to the concept of households' "energy poverty" as well as the main factors in its expansion in Bulgaria, such as outdated and energy inefficient housing, low incomes and steadily rising energy prices. The conclusion is drawn that the study of households' behaviour in the conditions of "energy poverty" in terms of energy consumption would facilitate the design of a coherent national policy that combines the principles of social protection and the strategies for energy efficiency.

Key words: energy poverty, energy efficiency, energy policies, Bulgaria

JEL Classification: I31, Q48, Q58

1. Introduction

Energy efficiency is widely recognized as the basic strategy in the field of policies on reduction of energy consumption and climate change. The benefits of efficient energy are mainly related to the reduction of greenhouse gases and air pollution. In addition, the latter reduces the investment in energy infrastructure and the dependence on fossil fuels, while raising competitiveness and improving consumers' wellbeing. The need to improve energy efficiency is one of the main priorities of both the European Union (EU) and the Bulgarian government. Households as an end user are an important actor of this process (SEDA 2005, 2014). In the context of the national and international efforts to achieve sustainable development goals, energy efficiency appears to be the primary tool for their achievement. This affects the change in pattern of behaviour allowing action both in terms of supply and demand in the pursuit of economic growth simultaneously supporting energy security, competitiveness and environmental sustainability (IEA, 2014).

Studies of behaviour in the field of energy efficiency of Bulgarian households suggest that energy poverty is a growing problem (in Europe and in Bulgaria) and that there is

* PhD Student, UNWE, Department: Economics of Natural Resources, Sofia, 0883 310 475, e-mail: emi_kulinska@mail.bg

the risk of its expansion in the future. The driving forces behind this phenomenon are factors related to the specific local social, political and environmental conditions. According to the Sustainable Energy Development Agency (SEDA), the trend whereby energy prices are rising at a faster pace compared to household incomes, together with the lack of initiatives for improving the performance of households and the functionality household facilities, can lead to deterioration of energy comfort of Bulgarian household in the conditions of already reduced costs to satisfy other needs (SEDA, 2005).

The lack of studies on consumer behaviour with regard to policies related to energy efficiency and energy poverty of Bulgarian households requires that an analysis should be made of the current political situation in this area. Emphasis is placed on possible measures that can be taken to reduce energy consumption and boost energy efficiency in order to facilitate the design of a coherent national policy that combines the principles of social protection and the strategies for energy efficiency.

This article aims to make a systematic and critical analysis of the scientific and specialized literature, encompassing Bulgarian and foreign researchers in defining energy poverty. For this purpose, an overview of the policies in the field of energy efficiency and energy poverty of Bulgarian households is made and account is taken of the need to develop effective measures and policies targeted at resolving the problem in Bulgaria, considering that Bulgaria is one of the most affected EU member states with respect to energy poverty.

The inclusion of households and individual consumers is a significant and topical research problem with growing implications for the implementation of energy efficiency policy. At the same time, consumer behaviour in today's globalized world is a complex and multilayered issue, dynamically developing in the course of time. The dynamism of the factors influencing consumer behaviour related to energy use determines the variety of theoretical approaches and models of consumer behaviour.

2. Literature overview

The concerns raised by "energy poverty" of households in Europe and Bulgaria and the risk of its further expansion are among the biggest policy challenges of energy efficiency. Tackling energy poverty will have many positive implications: improving the standard of living for people with low incomes, an expansion of the energy efficient housing sector and the reduction of the costs of National Health Services (Hills, 2012).

The term "energy poverty"

The International Energy Agency suggests the following definition: *"energy poverty refers to a situation where a household has technically access to energy but cannot afford adequate energy services to meet basic needs"* (IEA, 2014).

Due to its multifaceted nature, connected with the enforcement of broader social policies, there is still no common definition of energy poverty of households at European level. The term "energy poverty" is not defined in Bulgarian legislation either.

At the end of 2015, the Ministry of Energy provided a working definition[1], according to which "vulnerable customers" are household customers in whose property, supplied with electricity, live persons who for reasons of old age, health or income are exposed to the risk of social exclusion in relation to the supply and consumption of electricity and

[1] The definition was developed by a working group of experts from the "Domestic Energy Market" Directorate at the European Commission, by the Ministry of Energy, the Ministry of Labor and Social Policy and the Commission for Energy Regulation (ME, 2016).

who benefit from social assistance measures to ensure the necessary electricity supplies (ME, 2016).

Other working definitions are also found. The Economic and Social Council (ESC), in its opinion on "Measures to tackle energy poverty in Bulgaria", proposes that a common general definition of energy poverty is adopted, interpreted as *"difficulty or inability to maintain an adequate temperature[2] in the house and to resort to the use other essential energy services at a reasonable price"* (ESC, 2015). Maintaining the right temperature pertains to the possible heating of the household to adequate levels to ensure its health and comfort, without incurring any financial difficulties. This definition is in line with the current issues related to climate change and energy poverty, which allows for better orchestration of efforts to reduce carbon emissions and to achieve energy effectiveness (Liddell and McKenzie 2013).

For the purposes of the European project ACHIEVE (ACHIEVE, 2014), the following definition is suggested: *"energy poor household is the one which has difficulties and sometimes finds it impossible to satisfy their basic energy needs. Energy poor households have much higher energy costs compared to total income of the household"*.

When considering the few definitions provided on the national level, the one in the UK stands out and it states *"a situation in which a household must allocate more than 10 % of its income in order to achieve a satisfactory level of heating in their home*". Regardless of what definition is used, electricity prices, energy efficiency of housing and household incomes are the three factors that together determine the level, depth and nature of energy poverty (ACE, 2012).

Despite the need for terminological clarity and disambiguation, numerous analyses and assessments emphasise the fact that energy poverty is a growing problem both in Bulgaria and in Europe and there is a danger of its expansion in the future (Bouzarovski, 2011; ESC, 2015; Green Innovation BG 2015; IEA 2014; Kisyov 2014; Peneva, 2014). A study of energy poverty in the EU in 2010 (Bouzarovski, 2011) finds that Bulgaria is the country with the highest values and falling behind other member states according to some combined indicators (inability to maintain the house heated, disproportionately high costs for housing, inadequately insulated houses, unpaid utility bills).

Most Bulgarian homes do not meet contemporary requirements for energy efficiency - only 5 % of them all were built after 2000. This requires that measures should be taken to increase energy efficiency by retrofitting with new energy efficient windows, wall insulation, energy-saving appliances. Some analyses (Green Innovation BG 2015; ODYSSEE-MURE, 2012) point out that "despite the high level of energy inefficiency in residential buildings Bulgarian households continue to use less energy for heating of 1 m^2 of their main homes compared to the average for EU". This is most likely due to the widespread practice of underheating in order to reduce energy consumption and energy bills, or ignore their other needs at the expense of energy comfort (Green Innovation BG 2015; Kisyov, 2014; ODYSSEE-MURE, 2012).

Current statistical survey conducted by Eurostat presents information on the relative proportion of the population in the EU which is not able to maintain the required thermal comfort in their households (Eurostat, 2014). In 2013, 46.6 % of the total population of Bulgaria responded that they cannot maintain adequate thermal comfort in their households, and as a result, Bulgaria took the lead in this respect among the member states of the EU-28.

[2] The definition of the World Health Organization (WHO) is used to determine the adequate temperature in the house which is 21 C in the living room and 18 C in the other rooms.

Against the background of high values in the groups at risk of poverty and social exclusion, households are facing serious problems in terms of unaffordable energy costs (ESC 2015, Green Innovation BG 2015; NSI, 2016; Peneva, 2014). The National Statistical Institute published data which shows that nearly half of the country's population lives in such conditions. In connection with the set goals in key areas of "Europe 2020" strategy, a combined indicator for regular monitoring of countries' progress in implementing the national targets is calculated based on the survey on income and living conditions (EU-SILC). The indicator includes individuals living at risk of poverty, experiencing material deprivation and in jobless households or ones with low intensity of economic activity. The combining of the three indicators shows that in 2015 41.3 % of the population, or 2981,7 thousand people were at risk of poverty and social exclusion. The value of the indicator has increased by 1.2 % compared to 2014, more significantly for women - by 1.7 %, compared to men - 0.7 % (NSI, 2016 a).

It should be borne in mind that social benefits are provided as part of the social policy in the country to meet the heating needs of people whose monthly income for the last six months is lower than the differentiated minimum income. According to the Social Assistance Agency, during the 2014 - 2015 heating period, more than 250,000 Bulgarian households received financial assistance. As was the case in previous years, this assistance is still insufficient to ease the state of energy poverty of vulnerable households (Green Innovations BG, 2015). However, "energy-poverty policies in Bulgaria are fully geared to support through the provision of income which does not lead to change of the factors causing this state" (Kisyov, 2014).

On 26 May 2016 the Ministry of Energy announced plans for financial and non-financial measures which will reduce the burden of the expected growth of prices on socially disadvantaged households. The financial measure is envisaged to cover 14 % of the population who are only 480,000-500,000 people and families or a total of about 1.1 million people (Zahariev, B., Grigorova, V., Yordanov, I., 2016). People that fall into this group are individuals and families who currently receive energy assistance for heating, people exceeding 70 years of age who live alone and receive income only from their pension that is even below the poverty line set for the year, people with over 90 % disability with a caregiver and families with children with disabilities. Many groups which currently do not receive heating benefits due to the stringent eligibility requirements remain uncovered by social assistance. The Social Assistance Agency will cover the relevant target groups of households with only 33 % of the final price of 100-150 kWh of electricity per month.

At the end of 2016, the "Energy Poverty in Bulgaria" national discussion forum was held where the definitions and the possible solutions for tackling the problem were debated. The opinion that one of the most effective methods for solving the problem of energy poverty is investing in energy savings and not just financing households in need was confirmed (National Discussion Forum, 2016).

There is no doubt that energy poverty is becoming a serious problem both in EU and Bulgaria. It is clear that the driving forces behind this are caused by specific local social, political and environmental conditions. The lack of systematic studies hampers the development of effective measures and policies which can be targeted at resolving the problem in Bulgaria, which is one of the most affected countries in the EU (ESC, 2015; Kisyov, 2014; Peneva, 2014). Studying the behaviour of households in terms of energy

consumption would support the design of a coherent national policy combining the principles of social protection and strategies for energy efficiency.

3. Methodology

The study applies the descriptive method of collecting and analysing secondary data from various literary sources such as statistical reports at national and European level, reports of government agencies and advisory bodies, European projects, research papers, etc.

4. Energy efficiency policy in Bulgaria

Energy efficiency is the key to achieving the long-term objectives of EU with respect to energy and climate. In the EU policy it is seen as a cost-effective means to reduce harmful emissions, improve energy security, strengthen competitiveness and create more affordable conditions for consumption for all. Energy efficiency policy can be seen as an integral part of the energy policy of the Republic of Bulgaria, which is based on national priorities and is in harmony with the requirements of the European directives and market mechanisms.

The national priority aim for rapid and sustainable economic growth in Bulgaria is related to the existence of a stable energy sector, utilization of the high potential of energy conservation and large-scale deployment of renewable energy sources (SEDA, 2005, 2012, 2014).

Energy intensity is a key indicator of the efficiency of energy use. It reflects the amount of energy per unit of gross domestic product (GDP). The changes in the primary and the final energy intensity (PEI, FEI) in terms of GDP are the two main indicators for assessment of the effectiveness of energy use at the macroeconomic level.

After joining the EU in 2007, Bulgaria has taken the first place among other member states in terms of energy intensity indicator and is characterized by low energy and resource efficiency. Compared with other EU countries, Bulgaria uses the most energy resources to produce a unit of GDP (Eurostat, 2016 c).

A sustainable trend of a decline in PEI and FEI was observed in Bulgaria before the global financial and economic crisis in the period 2000 - 2009 (SEDA, 2014). As the data in Table 1 show, energy intensity was on the rise as a consequence from the economic crisis in 2010 and 2011. A gradual increase in the consumption of electricity in households per capita is noticed which is accompanied by an increase in primary energy production and stable levels of emission of greenhouse gases into the atmosphere.

According to Eurostat data for 2014, there is no such rapid growth of energy consumption compared to economic growth among the countries in the EU as the one reported in Bulgaria considering the modest growth of GDP. Most EU member states achieve economic growth accompanied by an absolute decline in energy consumption. Bulgaria appears to be the only EU country where GDP growth was accompanied by a proactive energy consumption (Eurostat, 2016 a).

The difference between the energy intensity of the Bulgarian economy and that of the economies of the EU countries remains big and the high values of this indicator for efficiency of energy consumption remains a major challenge for the Bulgarian state. In the aftermath of the global financial and economic crisis, Bulgaria is required to promote the appropriate measures to increase energy efficiency within the scope of its energy policy.

Energy efficiency continues to play an important role in carrying out energy policy at the global level, despite the observed trend of its rise. In 2008 the International

Table 1. *Energy indicators for Bulgaria for the period 2008 – 2014.*

Energy indicators	Unit	2008	2009	2010	2011	2012	2013	2014
Gross domestic consumption	**1000 toe (tonnes of oil equivalent)**	19908	17444	17789	19110	18305	16954	17792
Energy intensity of economy	**Toe per 1000 EUR**	0,683	0,625	**0,637**	**0,674**	**0,644**	**0,589**	**0,608**
Harmful emissions in the atmosphere	**Million tones**	57,13	50,36	51,82	61,52	56,63	47,59	50,27
Production of primary energy	**1000 toe**	9966	9553	10184	11916	11318	10218	10910
Electricity consumption per capita	**kWh**	3756	3536	3593	3850	3807	3789	3827
Electricity consumption of households per capita	**kWh**	1316	1358	1401	1485	1483	1450	1466
Electrical energy – import	**GWh**	3097	2662	1166	1450	2353	3351	4319
Electrical energy – export	**GWh**	8441	7735	9613	12110	10661	9532	13773

Source: data has been collected by the author from National Statistical Institute, (NSI, 2015).

Energy Agency (IEA) developed 25 energy efficiency measures[3], which, applied globally, would lead to saving one-fifth of global energy-driven CO_2 emissions by

[3] Energy efficiency measure is any action or activity taken to improve the ratio of energy consumption to produced or rendered output services (IEA, 2014).

2030. They affect different areas such as buildings, appliances, lighting, transport, industry and the development of energy utilities (OECD/IEA, 2009).

Despite the achievements in the field of energy efficiency, IEA found that global emissions continue to grow at 44 % in the period from 2000 to 2011 (IEA, 2013). This trend could be changed with the adoption of appropriate energy efficiency measures in households which could have a significant impact on mitigating climate change (IEA, 2012, 2013).

European energy efficiency policy led to similar results. In the period 2000 - 2013 energy efficiency at EU level improved by 15 % and showed 1.2 % growth per year. The "Households" sector achieved the greatest improvement in energy efficiency with a growth of 1.7 % per year (ODYSSEE-MURE, 2015).

The main factor for the policies and measures in the field of energy efficiency is the EU legislation, applied mainly in the "Household" and "Services" sectors. Despite the significant improvements in energy efficiency which have been achieved in European households, the final energy consumption increased in effect by 2.3 % between 1990 and 2013, according to statistical data by Eurostat (Eurostat, 2016 b).

Energy efficiency policy in Bulgaria is characterized by a strong focus on the legal and regulatory measures which are complemented by the relatively limited financial and legal and informative measures. The measures to increase energy efficiency in the "Household" sector conducted by public organizations and institutions are completely in line with the EU legislation in this area.

4.1. Harmonization of Bulgarian legislation with the European energy efficiency legislation

The harmonization of Bulgarian legislation with the European one in the field of energy efficiency and the use of renewable energy sources has begun as early as the negotiations for EU accession. In the process Bulgaria committed itself to introducing these provisions in national its legislation and to enforcing the EU legislation in the field of energy adopted by then.

The harmonization of Bulgarian legal framework with the European one has been carried out with the implementation of European acts of acquis communautaire which are part of both the Global and the New Approach. European directives included in the new approach have been implemented with the regulations defining the essential requirements for products under the Technical Requirements for Products Act, the Directives on Energy Performance of Buildings, Conformity Assessment and Marking of Inputs in Construction Products. The Global Approach directives, which deal with the labelling of household appliances, have been implemented in Bulgarian legislation under the Consumer Protection and Trade Rules Act.

The need to improve energy efficiency in Bulgaria is one of the main priorities of Bulgarian government. A new Energy Efficiency Act was adopted in March 2013 in order to transpose the provisions of Directive 2006/32/EC on energy end-use efficiency (SEDA, 2014).

The Plan sets out the following *indicative national targets* for energy savings by 2020:

- Energy savings in Final Energy Consumption (FEC): 716 ktoe/year.
- Energy savings in Primary Energy Consumption (PEC): 1590 ktoe/year, of which 169 ktoe/year in transformation processes, transmission and distribution in the energy sector.

Additional energy savings in FEC are defined in the implementation of clearly marked policy on energy efficiency and optimal utilization of available additional funds from various sources in Bulgaria. It is envisaged that these will be: European funds and programmes (2014-2020 programming period); liable persons (based on the structure of liabilities of energy traders); local sources and the state budget.

The established regulatory framework should act and be improved over the period of the operation of the National Energy Efficiency Plan 2014 - 2020. An important point for harmonization of national legislation with EU's was the transposition of Directive 2012/27/EC on energy efficiency at the end of 2012 (EED, 2012). The new directive establishes a common framework of measures to promote energy efficiency within the Union in order to ensure the achievement of the primary objective - increasing by 20 % the energy efficiency by 2020.

Under the Directive, member states should set indicative national energy efficiency targets by 2020, based on the primary or final energy consumption. The Directive also lays down legally binding rules for end users and energy suppliers. Member States may make these minimum requirements more stringent with a view to energy savings. The directive includes requirements for renovation of at least 3 % of the floor area of buildings owned by the central government and sets long-term national strategies for promotion of investment for renovation of residential and commercial buildings and mandatory regular energy audits of large enterprises. In addition, requirements are included for evaluation of the potential for application of high-efficiency cogeneration and efficient district heating and cooling systems in all member states by the end of 2015. Another requirement is related to the introduction of smart grids and smart meters and the provision of accurate information about energy bills, enabling users to use energy more efficiently and promoting such consumption.

A new National Action Plan for Energy Efficiency 2014 - 2020 has been developed in accordance with the requirements of the Energy Efficiency Directive. The requirements linked to Directive 2010/31/EC on energy performance of buildings (SEDA, 2014) were also taken into account in the drafting of the plan. An important role in the improvement of the operating regulatory framework have the created and existing organizational structures that provide and monitor the implementation of the planned municipal, regional and sectoral programmes for energy efficiency.

5. Energy efficiency and energy poverty in households in Bulgaria

Energy consumption in households reflects the consumption of fuels and energy to meet the household needs of the population and is directly dependent on the lifestyle and economic standard of people. Households are one of the largest end users of energy in the EU and consequently environmental pollutants. The total energy consumption of European households is estimated at 24.8 % of the total consumption in 2014. Households are the cause of 24.4 % of CO_2 emissions in the EU-28 countries, the share of Bulgaria amounts to 9 310 thousand tons of carbon dioxide equivalent in 2014 (Eurostat, 2016 b).

Much of European consumption takes place in the cities and 73 % of EU citizens live in urban areas. This share is expected to grow to 80 % by 2030 when none other than population density and the design of the built and natural environments in the cities will play a crucial role in shaping the consumption patterns. In this regard it is imperative to develop effective policies on limiting the negative impact on the environment as a

result of individual consumption, including energy. It is determined by complex factors which can be identified also by analyzing the differences in the behaviour of individual households within a community, country or region (EEA, 2012).

The European Environment Agency (EEA) emphasised in its reports on the countries of Southeast Europe and the Western Balkans that two-thirds of the negative environmental impact is due to the consumption in households (EEA, 2005, 2007, 2010). These are the following three areas of consumption, which are related mainly to consumption of energy: food and beverages; housing and infrastructure, including residential heating; transport of people and goods.

Statistical data (Eurostat, 2016 b; NSI, 2017) shows differences in the proportion of energy used on average in end energy consumption of households in the EU and Bulgaria. This share for Bulgarian households is about 40 %, which is significantly above the EU average – 24 %. The main reason for this is the low level of gasification of households in Bulgaria and consequently the low rate of use of natural gas in the total energy needs of households – 2.3 % at an EU average of 39 % for 2015 (Eurostat, 2016 b; NSI, 2017). Natural gas used in the EU for heating and domestic use is replaced by electricity in Bulgarian households. According to the latest data from the National Statistical Institute 39.2 % of Bulgarians economise on heating their houses and a third of those households experience difficulties in paying the costs associated with their housing on time (NSI, 2016 a).

The positive impact of energy efficiency on reducing energy costs and energy dependence is supported by the data presented in 2014 for the EU countries (Mellar, 2015). The European requirements that set minimum energy efficiency standards and rules on labelling and eco-design of products, services and infrastructure are considered largely responsible for this. European initiatives aim to increase efficiency along the entire energy chain from delivery to energy consumption by consumers.

Reduction of energy consumption and elimination of energy waste is becoming increasingly important for the economy of Bulgaria. Measures to improve energy efficiency are seen not only as a means to achieve a sustainable energy supply and reduce greenhouse gas emissions but also as a means to increase the competitiveness of Bulgarian economy. All this reflects the adopted legislation in the country in the field of energy efficiency.

The rise in electricity prices is a strong incentive for adopting energy efficiency measures provided the costs incurred for the implementation of energy efficient technologies is offset by accomplished energy savings. Energy efficiency measures in households could reduce the burden of energy costs in the total household budget. According to NSI data for 2015 the expenses on "Housing, water, electricity and fuels for domestic use" come second in the structure of their expenses with a share of 14.3 % of the total consumer spending after the expenses for food and soft drinks with a share of 31.4 % (NSI, 2016 b). There was insufficient opportunity to realize savings or additional investments in modern appliances that would reduce monthly energy consumption.

Poverty and social inclusion indicators are part of the EU general indicators for monitoring the countries' progress in combating poverty and social exclusion. The main source of statistical data for calculating indicators is the annually conducted "Survey on Income and Living Conditions (EU-SILC)" (NSI, 2016 a). Estimates of poverty depending by type of household show that it

is concentrated among elder single-person households, single parents with children and households with three or more children. The highest share of poor people is observed among multi-member households consisting of two adults with three or more dependent children - 66.1 % and the greatest increase of risk of poverty in 2015 compared to 2014 was observed in single-person households with a person aged over 65 years - by 13.8 %. The share of poor people is the lowest in households with two adults and one child (12.9 %) and in households with two adults below 65 years (15.1 %). Among single-person households the risk of poverty for women is 24.6 % higher than for men. If a person over 65 years lives in the household, the risk of poverty is 29.5 % higher than in a household where a person under 65 years lives (NSI, 2016 a).

Identical are the data in terms of *material deprivations* faced by these types of households. Subjective indicators related to material deprivation are included in the general indicators of poverty assessment. They show the subjective assessment and personal attitudes of individuals and households on the options to meet individual needs and necessities. Nine questions related to consumption of specific goods and services are used in the assessment of material deprivation of households.

In 2015, 34.2 % of the population lived in severe material deprivation (restrictions in 4 of 9 indicators). It turns out that they have difficulties in accessing specific products or services used by the households: durable goods, medical services, education, etc. A third of the people in those households experienced difficulties in paying on time the expenses relating to the house, and 39.2 % of people economised on heating of the house (NSI, 2016 a). Compared with the high percentage of Bulgarians who possess essential electrical appliances, e.g. refrigerator – 97.9 %, an automatic washing machine - 91.9 %, the majority of the population cannot afford the provision of additional comfort in their households. In 2015 only one-third of Bulgarians had air conditioners and only 9.5 % of them bought a dishwasher which contributes not only to a comfortable lifestyle but also to the effective way of energy and water consumption leading to lower monthly bills. It is important to add the requirement that the minimum consumption is calculated using the most economical and energy efficient technologies. At the same time, it could be said that the use of inefficient technologies and appliances in the household is part of

Table 2. *Basic poverty indicators for the period 2011 - 2015*

Year	2011	2012	2013	2014	2015
Poverty line - average monthly rate - levs.	283,8	279,7	285,9	323,8	325,8
Persons below the poverty line - thousands	1672	1559	1528	1578	1586
Proportion of poor people - % of the population	22,2	21,2	21,0	21,8	22,0

Source: Annually conducted "Survey on Income and Living Conditions (EU-SILC)" (NSI, 2016 a).

the picture of poverty. Even when for purely economic reasons a new generation of appliances not only improves the quality of life but also repays the cost of the investment through energy savings a certain poor household may not be able to buy them even with a loan or on lease.

According to the conducted survey EU-SILC (NSI, 2016 a), 41.3 % of Bulgarians live in a *risk of poverty and social exclusion* and the already identified riskiest types of households are with the highest share. Table. 2 presents data for the 2011 - 2015 period on the poverty line, which gradually rose by 12.8 % and the proportion of poor people remains on average more than 21 % of the population.

The social protection system is essential for poverty reduction. Data for 2015 shows that if household incomes include incomes from pensions but exclude other social payments (compensations, social and family benefits and allowances), the poverty rate increases from 22 % to 28.4 %, or by 6.4 %. Accordingly, the exclusion of pensions and other social payments raises the poverty rate to 42.9 %, or by 20.9 % (NSI, 2016 a).

According to data from the National Statistical Institute (NSI), there was a dramatic growth of nearly 60 % in the compensations paid for social protection in the 2009 - 2014 period. Information from all social protection schemes in Bulgaria (e.g. "Pensions" Fund, "Unemployment" Fund, Social Assistance, etc.) is included in the scope of the data. Some 236.525 million BGN were paid out in 2014, which shows a nearly 100 million BGN increase compared to the benefits paid in 2009. Social protection encompasses all interventions from public or private bodies and organizations aimed at easing the exposure of households or individuals to certain risks or needs. In this group fall those households that experience difficulty in covering their expenses on heating (NSI, 2016 b).

6. Conclusion

In today's globalising world the need for energy consumption is growing in all areas of life: industry, transport, services, households, among other ones. This leads to increasing depletion of fossil fuels, emission of greenhouse gases and air pollution. Energy efficiency is seen as a means not only to combat pollution and climate change but also to improve the quality of energy services at a reasonable cost to society and as an opportunity to reduce energy consumption by implementing specific measures to save energy.

The high energy intensity of Bulgarian economy compared to the economies of EU member states remains a major challenge to the Bulgarian state. Bulgaria needs to promote appropriate measures to increase energy efficiency within its energy policy in the aftermath of the global financial and economic crisis.

Energy efficiency can be seen as an integral part of Bulgaria's energy policy which is based on national priorities and is in line with the requirements of the European directives and market mechanisms. *Legislation* in this area is fully consistent with the main objectives of EU's policy on energy security, competitiveness and sustainable development. Energy efficiency policy in Bulgaria is characterized by an increased focus on legal and regulatory measures which are complemented by the relatively limited financial, legal and information measures. The measures to increase energy efficiency in the "Households" sector, adopted in the country, reflect completely the EU law in this area. At the same time, it is noted that the potential has not been unleashed with regard to the measures pertaining to the change in consumer behaviour, which may further reduce energy consumption and increase energy efficiency without bringing additional costs.

When considering energy efficiency policy of households, it is necessary to acknowledge the processes related to the concept of "energy poverty". Numerous analyses and assessments emphasise the trend of energy poverty as a growing problem (in Europe and Bulgaria including) which threatens to expand in the future. The driving forces are factors related to the specific local social, political and environmental conditions. The lack of systematic studies does not allow the development of effective measures and policies which would be targeted at resolving the problem in Bulgaria as one of the most affected countries in the EU. Studying the behaviour of households that find themselves in the state of "energy poverty" in terms of energy consumption would facilitate the design of a coherent national policy that incorporates the principles of social protection and the strategies for energy efficiency.

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References

ACE Association for Conservation of Energy, 2012. Fuel Poverty: 2014 Update, Energy Bill Revolution, United Kingdom.

ACHIEVE, 2014. Actions in low income Households to Improve energy efficiency through Visits and Energy diagnosis – ACHIEVE", Co-funded by the Intelligent Energy Europe Programme of the European Union.– Final report, may 2014 [Online] Available at: www.achieve-project.eu (in Bulgarian).

Bouzarovski, S., 2011. Energy Poverty in the EU: a review of the evidence, School of Geography, Earth and Environmental Sciences, University of Birmingham.

EEA European Environment Agency, 2005. Household Consumption and the Environment, EEA Report No 11/2005 (Copenhagen: European Environment Agency).

EEA European Environment Agency, 2007. Sustainable Consumption and Production in South East Europe and Eastern Europe, Caucasus and Central Asia, EEA Report No 3/2007 (Copenhagen: European Environment Agency).

EEA European Environment Agency, 2010. Environmental Trends and Perspectives in the Western Balkans: Future Production and Consumption Patterns, EEA Report No 1/2010 (Copenhagen: European Environment Agency).

EEA European Environment Agency, 2012. "Consumption and the environment: 2012 update – the European environment state and outlook 2010", Copenhagen: European Environment Agency.

EED Energy Efficiency Directive, 2012. Directive 2012/27/EU of the European Parliament and of the Council of October 25 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC [Online] Available at: www.eur-lex.europa.eu (in Bulgarian).

ESC Economic and Social Council, 2015. Own-initiative opinion on "Measures to overcome energy poverty in Bulgaria" ESC/3/030/2015 Labour, Incomes, Living Standard and Industrial Relations Commission, Social Policy Commission, Sofia, 2015 (in Bulgarian).

Eurostat, 2014. Inability to keep home adequately warm (source: SILC), Eurostat Statistical Books, 2014 edition, Publications Office of the European Union.

Eurostat, 2016 a. Gross inland energy consumption by fuel type, Consumption of energy, Compiling agency: Eurostat, the Statistical Office of the European Union.

Eurostat, 2016 b. Energy, transport and environment indicators, Eurostat pocketbook, 2016 edition, Publications Office of the European Union.

Eurostat, 2016 c. Energy intensity of the economy, Gross inland energy consumption by fuel type, Consumption of energy, Compiling agency: Eurostat, the Statistical Office of the European Union.

Green Innovation BG, 2015. Good practices and policy options, Applied Research and Communications Fund, editors: T. Georgieva, R. Stefanov, Sofia (in Bulgarian).

Hills, J., 2012. Getting the measure of fuel poverty, Final Report of the Fuel Poverty Review, CASE report 72, commissioned by Department of Energy and Climate Change, United Kingdom.

IEA International Energy Agency, 2012. World Energy Outlook 2011, OECD publication, France.

IEA International Energy Agency, 2013. CO2 Emissions from Fuel Combustion Highlights, IEA Statistics, France.

IEA International Energy Agency, 2014. Capturing the Multiple Benefits of Energy Efficiency, OECD/IEA publication, France.

Kisyov, P., 2014. Report on national situation in the field of fuel poverty, product of the activities under the second work package (WP2) of the project "Reduce Energy Consumption and Change Habits" (acr. REACH), co-funded by the Intelligent Energy Europe Program of the European Union (in Bulgarian).

Liddell, C. and McKenzie, P., 2013. Tackling Fuel Poverty in Northern Ireland, An area-based approach to finding households most in need, University of Ulster, United Kingdom.

Mellar, B., 2015. Energy efficiency, Fact Sheets on the European Union - 2016, European parliament, [Online] Available: www.europarl.europa.eu [2015] (in Bulgarian).

ME Ministry of Energy, 2016. Defining and measures for support of vulnerable customers, presentation from 26.02.2016 (in Bulgarian).

National Discussion Forum, 2016. XII National Conference of Bulgarian energy agencies and centres according Energy poverty - a main barrier in front of liberalization of energy market in Bulgaria, organized by Bulgarian energy and mining forum, Institute for Market Economics and Association of Energy Agencies in Bulgaria, Balkan Hotel, Sofia, 2016 (in Bulgarian).

NSI National Statistical Institute, 2015. Energy balances 2014, Energy, Multi-Domain Statistics and User Services Directorate (in Bulgarian).

NSI National Statistical Institute, 2016 a. Poverty and Social Inclusion Indicators, Survey on income and living conditions (EU-SILC), section Social Inclusion and Living Condition (in Bulgarian).

NSI National Statistical Institute, 2016 b. Demographic and social statistics, Multi-Domain Statistics and User Services Directorate (in Bulgarian).

NSI National Statistical Institute, 2017 a. Overall energy balance sheet 2015, Energy, Multi-Domain Statistics and User Services Directorate (in Bulgarian).

ODYSSEE-MURE, 2012. Project Monitoring energy efficiency targets of the EU and Bulgaria – ODYSSEE-MURE", Co-funded by the Intelligent Energy Europe Programme of the European Union. Policies and measures of energy efficiency in Bulgaria, brochure, [Online] Available at: www.seea.government.bg (in Bulgarian).

ODYSSEE-MURE, 2015. Synthesis: Energy Efficiency Trends and Policies in the EU, An Analysis Based on the ODYSSEE-MURE Databases, Co-funded by the Intelligent Energy Europe Programme of the European Union, 2015, [Online] Available at: www.seea.government.bg.

OECD/IEA, 2009. Energy Policies of IEA Countries: Portugal 2009 Review, International Energy Agency/Organisation for Co-operation and Development, Paris, 2009.

Peneva, T., 2014. Energy Poverty: The Bulgarian Case, International Association for Energy Economics, [Online] Available at: www.iaee.org.

SEDA Sustainable Energy Development Agency, 2005. National Long term Programme for Energy Efficiency until 2015, [Online] Available at: www.seea.government.bg [2015] (in Bulgarian).

SEDA Sustainable Energy Development Agency, 2012. Policies and Measures of Energy Efficiency in Bulgaria (in Bulgarian).

SEDA Sustainable Energy Development Agency, 2014. National energy efficiency Action plan 2014 - 2020, [Online] Available at: www.seea.government.bg [2015] (in Bulgarian).

Zahariev, B., Grigorova, V., Yordanov, I., 2016. Energy Poverty in Bulgaria, Open Society Institute, Sofia, 2016 (in Bulgarian).