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Sustainable Energy Transition CENTER

FIGHTING ENERGY POVERTY IN BOSNIA AND HERZEGOVINA – THE FIRST STEP IN THE ENERGY TRANSITION

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Executive Summary

Energy poverty is one of major and growing social issues in Bosnia and Herzegovina. Liberalisation of the energy market (electricity and gas), led to a considerable increase in energy prices, which significantly impacts access of the population with low income to basic energy services necessary for maintaining normal living conditions (lighting, heating, cooling, cooking, etc.). Energy poor households cannot afford to retrofit existing housing to incorporate energy efficiency measures nor to replace worn-out energy inefficient electrical appliances, are forced to use inadequate heating systems (coal- and fuel wood-fired) which are very often damaging to health and environment. Vulnerable populations, including pensioners, low-income households, single parents with multiple children, and persons with disabilities are particularly vulnerable to energy poverty. In Bosnia and Herzegovina, in addition to the implementation of energy reforms, this problem is reinforced by heavy social impact of the general economic reforms carried out in the process of economic transition.

There is no universal global definition nor methodology to determine which population categories are energy poor. Some European countries apply definitions adapted to their living conditions. In BiH, there is no clear definition of energy poverty and neither a methodology not indicators to detect and monitor energy poverty. It is impossible to establish the exact number of energy poor households, however, certain indicators suggest that this number must exceed 50% of the total population. Available estimates indicate that 69% of households in BiH spend more than 10% of their income on electricity and heating bills, thereby meeting an existing definition's criterion of energy poverty.

Some strategic documents, e.g., the BiH Framework Energy Strategy Until 2035, 2020 Republic of Srpska Law on Electric Power, and 2014 FBiH Law on Electric Power deal with vulnerable consumers only partially, but laws and subordinated regulations are still missing, as well as energy poverty alleviation programmes. Existing measures in implementation primarily involve subsidies for electricity and gas costs, do not treat energy efficiency, and, as such, fail to address the broader problem of energy poverty. These short-term measures aim to alleviate the consequences of energy poverty, not to deal with its causes. This approach leaves the burden of caring for energy poor categories of the population (vulnerable consumers) to local authorities, whose action is focused on socially vulnerable families. Essentially, there are not policies and programmes on the state/entity level that deal with energy poverty, and therefore there is no regulatory framework for its mitigation.

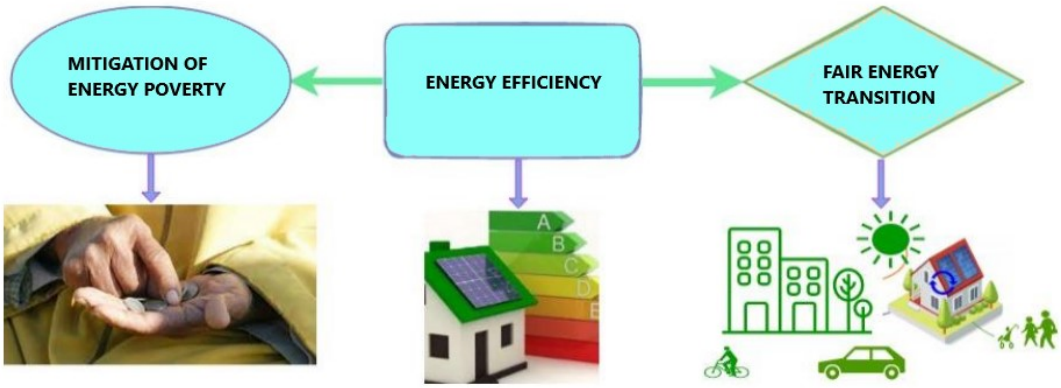
Bosnia and Herzegovina needs to define the concept of energy poverty, develop a methodology to identify energy poor households, and create assistance programmes for these households. Until such time, relevant institutions on all levels of government should recognize the problem of energy poverty and put it into their focus of action. As creating support mechanisms takes a long time, local communities/authorities, with support of all levels of government, could focus on short-term assistance through direct financial support to vulnerable consumers. However, without creation of programmes to mitigate energy poverty, without an adequate protection of the vulnerable categories and without establishing funds to invest in energy efficiency, the number of energy poor households will continue to rise significantly. Any further rise in energy prices (electricity, gas, heating fuels) causes the number of energy poor households to rise. Increasing energy efficiency is a key strategy to mitigate energy poverty, because it leads to

long-term reduction in consumption of energy commodities and in related financial outlays for assorted energy services.

Measures to implement to address energy poverty include:

1. Create a programme to mitigate energy poverty, including indicators, financial schemes and implementation mechanisms;
2. Create a methodology and instruments for collecting data on energy poor households based on established indicators;
3. Organise energy audits and energy counselling and implement simple and low-budget energy efficiency measures for energy poor households;
4. Replace energy inefficient household appliances using „new for old“ trade-in schemes;
5. Energy retrofitting housing (window replacement, installation of external insulation and new building facades, LED lighting, etc.);
6. Upgrade heating systems in households and replace existing inefficient heating systems;
7. Support renewable energy sources, including innovative financing schemes; installation of PV systems for electricity generation; installing solar theral collectors for heating premises and/or water; creation of energy communities that generate electricity from renewable sources for their own needs, etc.

Energy poverty represents an example of a complex social challenge, which had existed before, but emerged as a distinct problem in the process of energy transition. Above measures represent key mechanisms to address energy poverty and as such transcend current practices and policies and constitute a shift towards renewable energy sources and investments in energy efficiency, which is an integral part of energy transition policies.



INTRODUCTION

As part of the sustainable transition of the energy sector, taking into account the need to meet the UN Sustainable Development Goals (UN SDGs), energy poverty has been identified as a growing problem of today.

Energy poverty, currently affecting a considerable number of households, is partly caused by the financial crisis. This phenomenon, relevant for all institutions on various levels of the country, has significant implications for the social, economic, political, and health aspects of the society. The problem of energy poverty gained in prominence with the development of the "clean energy" or "sustainable energy" concepts/policies, as the poor or low-income populations are often forced to resort to using energy from fossil fuels, which is damaging to environment and health, or to greatly reduce the consumption of energy commodities to generate financial savings, which in turn affects the quality of life.

It has been estimated that, in 2020, over 60 million people were affected by energy poverty just in the European Union (EU) member countries (according to the data of the EU Energy Poverty Observatory[2]).

The concept of energy poverty in the EU was highlighted for the first time in the so-called „Third energy package", when the principles of protecting vulnerable energy consumers were defined to reduce energy poverty. In the new energy package entitled „Clean energy for all Europeans", the European Commisison proposed a series of measures to overcome this growing problem (Recommendations on energy poverty, October 2020[3]). This document proposes energy efficiency measures aimed to curb energy poverty and defines indicators to assess and monitor the number of energy poor households. Energy poverty was also addressed in both the Directive on energy efficiency (2018/2002) and the Directive on the energy performance of buildings (2018/844). The Directive on energy efficiency (2021/27/EU) added requirements related to achievement of social goals in order to enable vulnerable categories to access measures for enhancement of energy efficiency and accompanying funds.

Targets for reduction of energy poverty, as well as the timeline for achieving those targets on the state level, in the European Union countries, are implemented as part of the process of adoption of national long-term building renovation strategies and national integrated energy and climate plans (NECPs)

[2] Towards an inclusive energy transition in the European Union" Third pan-EU energy poverty report of the EU Energy Poverty Observatory, Publications Office of the European Union, 2020
[3] Commission Recommendation (EU) 2020/1563 of 14 October 2020 on energy poverty, http://data.europa.eu/eli/reco/2020/1563/oj

The NECP plans should „include estimates of the number of energy poor households, taking into account essential energy services necessary for normal living conditions in the given country context, social and other relevant policies, as well as indicators of energy poverty.“

The Electricity Directive/Regulation also address energy poverty through the concept of vulnerable consumers. In essence, the objective of all above regulations, as well as of the UN Sustainable Development Goals,[4] is to highlight the need to enable all categories of the population to use the energy necessary for a quality life.

By signing the Sofia Declaration and by accesion to the Green Agenda for the Western Balkans, Bosnia and Herzegovina (BiH) undertook to implement specific measures envisaged by the European Green Deal, which include the issues related to energy poverty.

The coronavirus pandemic and rising energy prices, and particularly rising electricity and gas prices, inflation, low household incomes, and energy inefficient housing added to the long-lasting problem of energy poverty in Bosnia and Herzegovina. Above multiple causes accentuate the theme of energy poverty in BiH and the need to address this set of issues in a systematic fashion.

CONCEPT OF ENERGY POVERTY

Energy poverty is a very broad concept. It is treated as a multi-dimensional problem that arises from non-existent/inefficient socio-economic schemes, which is compounded by inadequate systems of energy generation and consumption. A transition to a liberalised energy market, without established mechanisms of consumer protection and with a continuous rise of energy commodity prices constitutes a particulary thorny issue in countries where energy prices were state-regulated and subsidised (as is the case in BiH).

In effect, there is no single definition of energy poverty and it is most often defined as follows:

„Situations when households or individuals are unable to affort basic energy services, such as heating, cooling, cooking, lighting, transportation, etc., which ensure normal/decent living conditions, due to (a) low incomes, (b) high prices of various energy commodities, and (c) low energy of residential buildings."[5]

Although the above factors are widely disparate, there are clear linkages and overlaps between them. There are also other factors that affect energy poverty, such as particular characteristics of individual regions, countries, climate change, fuel availability, cost of living levels, etc.

Let us note that transportation can be seen from two different perspectives: through fuel procurement costs or as the spending on public transportation.

The first official definition of energy poverty introduced in the United Kingdom is also often used, and it states that „a household is in a state of energy poverty if it needs to expend more than 10% of its income on energy commodities to maintain an adequate level of warmth.“

[4] United Nations Sustainable Development Goals, https://sdgs.un.org/goals
[5] "Overview report on the energy poverty concept" Eszter Turai (MRI), Senta Schmatzberger (BPIE), Rutger Broer (BPIE), 2021, www.comact-project.eu

A definition of energy poor consumer includes certain element relevant for energy poverty as it is based on low incomes and is regulated by law in most European countries.

Taking into account the above definitions, as well as potential factors that affect energy poverty, it is worth noting that the two main aspects in consideration of this problem are[6]:

- ✓ Quality and availability of energy services: It is possible to provide sufficient energy for households, however, it is uncertain whether prices of energy commodities and services are acceptable to households.
- ✓ Acceptability of energy commodity prices: Energy costs are acceptable for the population, but the supply of energy services does not fully meet the basic requirements of a quality life.

The above considerations clearly point to the necessity to treat the issue of energy poverty in tandem with corresponding energy and social policy and measures.

Challenges faced by households that fall into one of *energy poor categories* relate to insufficient incomes, inadequate knowledge about energy efficiency, high energy commodity prices, etc. Such households are not in position to reconstruct their residential buildings in line with energy efficiency measures nor to afford sufficient quantities of necessary energy commodities for normal living conditions, which causes numerous economic, social, and health consequences. The need for *„coordinated policy action to address energy poverty through a combination of measures in the energy, social, health, and housing sectors"*[7] is evident.

ENERGY POVERTY IN THE CONTEXT OF A FAIR ENERGY TRANSITION

Bosnia and Herzegovina is entering the process of energy transition. To enable the society to transition from a fossil-fuel economy to a clean-energy economy requires public policies and strategic frameworks that will create the conditions for a fair energy transition. The transition to renewable energy sources, opening of electricity markets, reduction of damaging CO_2 emissions, increasing energy efficiency are fully intertwined with the issue of energy poverty. Large parts of the population in Bosnia and Herzegovina consumes electricity generated in thermal power plants using fossil fuels, while electricity prices in the past were set by government institutions instead of on the basis of market conditions. Therefore, the transition to market pricing of energy commodities and coal exit will considerably raise energy commodity prices, which will be particularlz problematic for energy vulnerable categories of consumers. Forecasts of future retail electricity prices prepared for the recently published study of the Energy Community Secretariat[8] reveal an expected rise of retail electricity prices in BiH in all assumed scenarios. Introduction of CO_2 emissions pricing makes coal-fired power plants

[6] "Overview report on the energy poverty concept" Eszter Turai (MRI), Senta Schmatzberger (BPIE), Rutger Broer (BPIE), 2021, www.comact-project.eu

[7] Stefan Bouzarovski, Robert Šarlamanov, Saska Petrova "Energy poverty policies in the EU: a critical perspective", Energy Policy, Volume 49, October 2012, pages 76-82

[8] Energy Community Secretariat, "Carbon Pricing Design for the Energy Community." 2021 [Online]. Available: https://www.euneighbours.eu/sites/default/files/publications/2021-01/Kantor_carbon_012021.pdf],

in Bosnia and Herzegovina unprofitable, while the electricity demand will have to be met from renewable energy sources (RES) and natural gas.

Large segments of the population in Bosnia and Herzegovina use coal or coal-generated heat for heating, which is in violation of policies defined in the „Clean energy“ package. An additional considerable segment of the population also uses gas for heating. In current conditions, when market price of gas is rising, it is difficult to determine the extent of the impact of this price increase on the energy poor population and on further worsening of its situation.

Increasing energy efficiency in the building/household sector is among the greatest challenges. Problems for energy rehabilitation of buildings include a lack of reconstruction financing/funds, education and familiarisation of building owners with the issues involved, market prices, securing documentation, etc. For thermal insulation of buildings – introduction of new heating and cooling systems, replacing appliances and lighting fixtures to increase energy efficiency requires extensive investment. The question is how energy vulnerable consumers could implement these measures, and who should finance it? In essence, a fair energy transition, to include the above measures, clearly cannot happen without the support of the entire society and without clearly defined energy poverty mitigation policies.

The process of energy transition in Bosnia and Herzegovina is decentralised both vertically and horizontally, with the following division of responsibilities between ministries on the entity/cantonal levels: ministries of energy and mining are in charge of renewable energy sources and for electricity and gas markets, policies to reduce damaging CO_2 emissions are within the purview of the FBiH Ministry of Environment and RS Ministry of Spatial Planning, Construction, and Environment, while ministries for social policy are in charge of protecting the poor segments of the population, which partly include energy poor population categories. When energy poverty is perceived as a social problem, it clearly falls under the purview of ministries of labor and social policy, but when it is linked to energy transition, it is clearly within the purview of the other two ministries as well. This is a clear indication that a cooperation between ministries and responsible institutions through policies, measures, and financing is essential to achieve fair energy transition, in which energy poverty would be eradicated or mitigated to the greater possible degree.

In Bosnia and Herzegovina, just as in certain other countries in the region, prices of some energy commodities (electricity, gas) are considerably lower than in the market, and a price harmonisation would further imperil the situation of socially vulnerable segment of the population, including energy poor consumers. Existing consumer protection measures cannot respond to the requirements of a liberalised market nor can they meet the needs of socially vulnerable consumers. This problem is additionally reinforced in Bosnia and Herzegovina as, in addition to the implementation of energy reforms, social consequences of general economic reforms in the process of economic transition are considerable.

Energy poverty constitutes a complex social challenge, which had existed before, but emerged as a social problem during the process of energy transition. In developing the energy poverty mitigation policies, the following principles need to be taken into account: data quality and availability, openness of the process to include experts from various fields, information exchange, coordination of activities of different actors and sectors, inclusion of all energy vulnerable consumers.

EXISTING LEGAL FRAMEWORK IN BiH

There is no clear global strategic framework to tackle energy poverty, instead various mechanisms are used, such as assistance action plans, cost subsidies, energy efficiency measures, creation of energy communities, and other forms of social protection.

In BiH, there is no clear definition of energy poverty and neither a methodology not indicators to detect and monitor energy poverty, so there is also no regulatory framework for its alleviation.

Policies specially focused on the issue of energy poverty as an integral component of sustainable development in the process of energy transition are missing. Certain public policies deal with vulnerable consumers only partially. A degree of progress was achieved with regard to protection of vulnerable energy consumers in the latest versions of the 2020 Republic of Srpska Law on Electric Power and 2014 Federation of Bosnia and Herzegovina Law on Electric Power. In both cases, however, relevant subordinate regulations, programmes and bylaws still need to be put in place. Concepts such as *vulnerable energy consumers* and *energy protected consumers*[9] (*protected low-income consumers)* are used interchangeably in these documents and their meaning is different in each entity, which will likely increase the complexity of the implementation of measures to counter energy poverty. Conditions such as *energy poverty* and *energy vulnerability* have been recognised in the BiH Framework Energy Strategy Until 2035, in the new Federation of BiH Development Strategy 2021-2027 and in the Republic of Srpska Energy Sector Development Strategy Until 2035. The above documents state that increasing energy efficiency is a key tool to eradicate energy poverty (in the segment of electricity consumption and heating of households). However, key laws and subordinate regulations essential for further improvements and a more direct approach are still missing. The Federation of BiH Law on Energy Efficiency (Official Gazette no. 22, March 24, 2017) ***does not mention vulnerable consumers***.

The Federation of BiH Law on Electric Power (Official Gazette no. 66/2013, 94/2015, and 54/2019) stipulates that the Federation Government shall prepare and adopt the *Programme of Protection of Vulnerable Electricity Consumers in the Household Category*. The preparation of this programme commenced in 2005 but has never been completed, because responsible bodies reported that there was no basis for preparing the document, as no social demography map is available.

In the Republic of Srpska Law on Electric Power (Official Gazette no. 68/20), *protected low-income consumers* was introduced, but from the standpoint of socially vulnerable consumers, with the implementation transferred to local communities/authorities. In these laws, energy vulnerability remains closely interlinked with social vulnerability, so this challenge is transferred to institutions in charge of socila protection as well as to ministries of social policy (on the cantonal level) in the context of protected consumers.

The Brčko District Law on Electric Power (Official Gazette 27/2018) does not mention vulnerable energy consumers, but in the District there are programmes of subsidisation of electricity bills for socially vulnerable consumers.

[9] Study on Adressing Energy Poverty in Energy Communities Contracting Parties, DOOR, EIHP, Dec. 2021

The problem of energy poverty is further complicated by the absence of public data on identification of energy vulnerable consumers on the local, entity, and state level. Therefore, the need for clear definition and prioritisation of the energy poverty issue on all levels of society is evident, as well as for creation of preconditions to establish the at-risk-of-poverty threshold on the basis of identified indicators and related methodologies, and for identification of vulnerable categories of consumers. Because relevant policies and legal framework do not exist on the state/entity levels, creation and implementation of measures on lower levels of government (cantonal/municipal) takes more effort and more time, which leads to inconsistencies between policies and measures on different levels of government. Current tendencies and practices signal that the issues of and responsibility for energy poverty in BiH will be transferred to local governments and non-governmental institutions.

As energy commodity prices, and primarily the prices of electricity and gas, keep rising, availability of energy commodities will inevitably become an even more burning topic of political debates. Low income population is required to pay high bills for the energy they use. Energy accounts for a much greater share in the total monthly incomes of this population, in comparison with the higher-income population. The reason is not only the difference in incomes, but also in heating systems, as well as electrical equipment they use, which are for the most part energy inefficient (obsolete electrical appliances and lighting fixtures). Any further increase in the price of energy commodities will further expand the share of these costs in the total household costs. In essence, energy poverty is hard to alleviate without an increase in the use of energy, which is again in conflict with energy commodity prices. The sustainable energy concept may help overcome these issues, while at the same time meeting the requirements related to climate change and environmental pollution.

The draft Integrated National Climate and Energy Plan of Bosnia and Herzegovina, completed in 2020, and still in the approval process, only generally incorporates energy poverty and sets objectives in this area. The adoption of this document on the state level would create the preconditions for introduction of energy policies on all levels of government in BiH. It would also allow full interlinking of energy poverty policies with energy transition policies. Because of the current situation, energy poor population categories (vulnerable consumers) are mainly recognised by local governments, i.e., through the work of municipalities. The lack of national and/or entity and cantonal programmes and accompanying funds to finance projects and measures of energy poverty alleviation may further worsen the situation of vulnerable energy consumers as the process of energy transition unfolds, which is currently predominantly reflected in a dramatic rise of energy commodity prices.

INDICATORS OF ENERGY POVERTY IN BiH

Available estimates indicate that 69% of households in BiH spend more than 10% of their income on electricity and heating bills, which according to an existing definition puts them into the category of energy poor population. Identification of energy poor households in BiH is not possible solely on this criterion and additional criteria must be applied. The most vulnerable population categories, more exposed to the risk of energy poverty, include welfare beneficiaries, single-parent families with multiple children and persons with disabilities. Pensioners also face the consequences of energy poverty more often than the households in which some members are employed, as their living habits differ. In 2021, the minimum pension was 381 KM.

In essence, there is no exact way to determine who is energy poor, nor who faces this risk. Indicators that signal that households face energy poverty are, most often, low incomes, inability to heat residential buildings, older buildings with low energy efficiency (poor insulation, dampness in residential buildings), delays or failures to pay energy bills, inefficient systems of heating buildings, etc.

Energy poor households can be classified into the following three categories:

- Households with very low incomes that cannot affort quality energy services (heating only some parts of buildings, inadequate lighting, obsolete electrical appliances, etc.),
- Households that receive quality energy services, but lack financial resources to pay for them,
- Households at the verge of energy poverty that can afford quality energy services but at the cost of scarcity in other segments of life.

As mentioned, this form of poverty in BiH is not systematically tracked on any level of government, with individual exceptions, when some non-governmental organisations, in cooperation with local governments collect data about the situation in the field through various projects.

Swiss Caritass and Tuzla Environment and Energy Centre conducted a two-year study (2020/2021) and prepared an analysis of energy poverty on the basis of the data obtained from 10,044 households from six cities/towns in the Tuzla Canton (Tuzla, Živinice, Gračanica, Banovići, Kalesija, and Lukavac).[10]

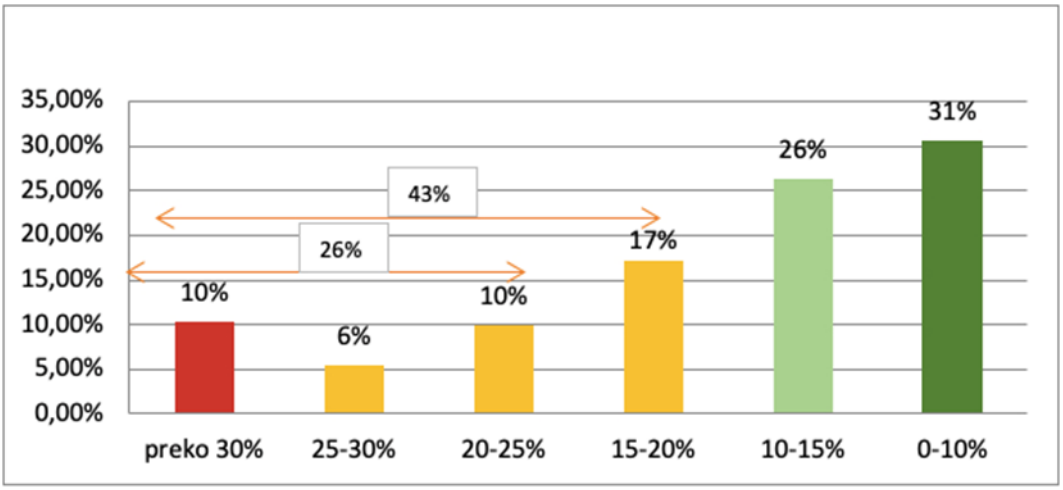
The goal of the study was to determine how many households were energy poor, what the reason of their poverty was, and to propose measures for alleviation of energy poverty through an analysis of data collected about buildings, consumption of electricity and heat, incomes, bill payment problems and illnesses, age of household appliances, and households' level of information about energy efficiency.

Results obtained by the analysis of collected data

Households that spend more than 15% of their incomes on energy were separated from all households covered by the survey and the result was that around 43% of households belong to this category (Graph 1). These households were then subdivided in multiple categories to define measures for particular categories. The result that around 26% of households set side more than 20% of their incomes for electricity and heating costs represents a major problem.

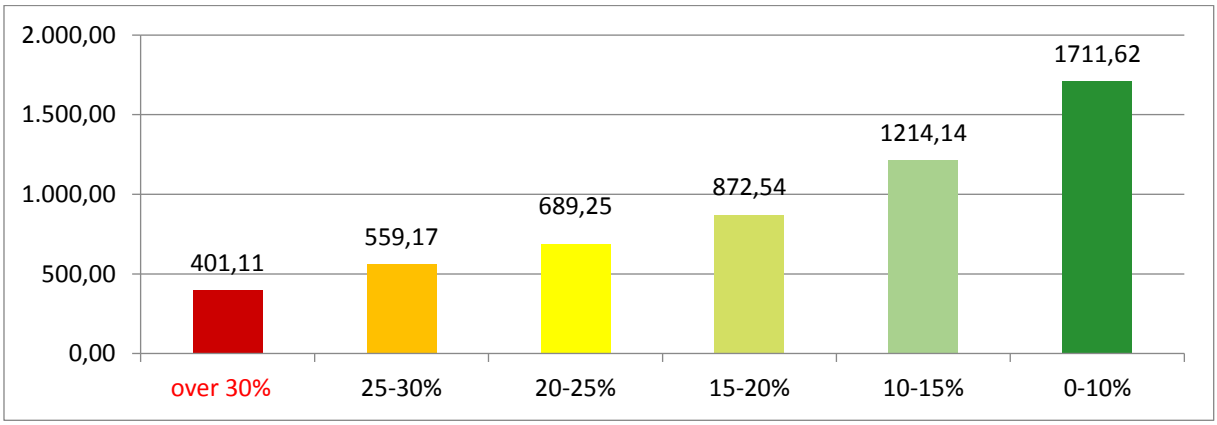
It is devastating that 10% of households set aside more than 30% of their incomes to pay energy bills.

[10] Energy Poverty Situation Analysis – a Survey of 10,000 households from Tuzla, Kalesija, Lukavac, Banovići, Živinice, and Gračanica, Tuzla Environment and Energy Centre, 2021.



Graph 1. Structure of households in terms of the share of energy costs in household incomes, by category

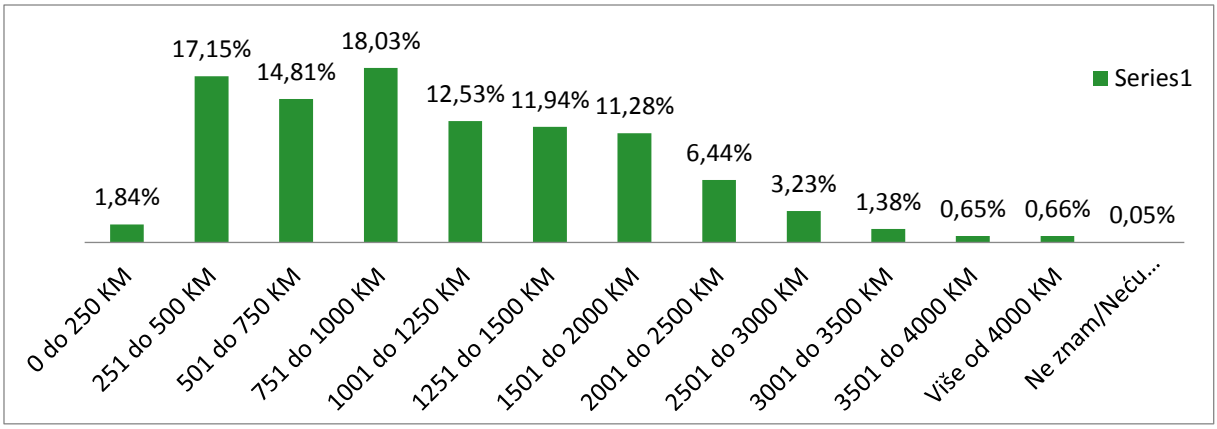
The average monthly income of households whose energy costs exceed 30% of their incomes was 401 KM, and Graph 2 shows that even households with the average incomes of 873 KM spend more than 15% of their incomes to pay energy bills. As it is unrealistic that responsible institutions can assist 43% of the population, at the outset it is important to focus on the most vulnerable.



Graph 2. Energy poverty by income level

Energy poor households in nearly 80% of cases reside in family houses (single units), 12% live in family houses with several housing units, and around 8% reside in apartment buildings.

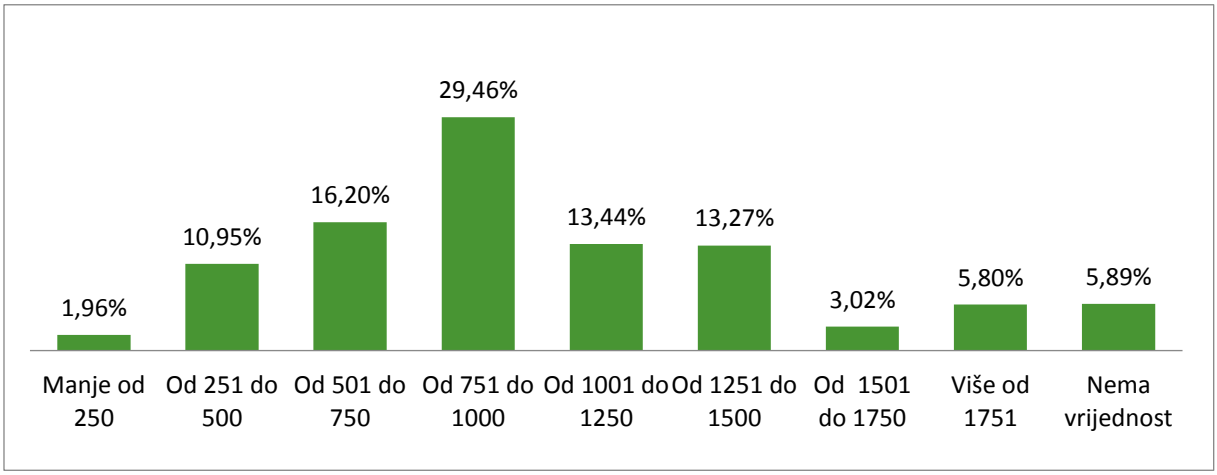
Looking at the average value of incomes of surveyed households, it is evident that around 52% of households have average monthly incomes up to 1,000 KM, 36% of households have average monthly incomes of between 1,000 KM and 2,000 KM, while only 12% of households have an average monthly income over 2,000 KM.



Graph 3. Average monthly incomes of households

When looking at the consumption of an energy commodity, reasons for its high consumption are mainly because families live in old and uninsulated buildings. For instance, 56% of households live in buildings that are more than 29 years old, 36% of households have windows older than 20 years, 55% of households are without insulation, or just one part of the building is insulated, 22% of households have dampness and mold problems, while 74% of households do not heat the entire building's interior in winter. Using wood stoves to heat rooms and the absence of temperature regulation systems in all rooms are detrimental to residents' health.

Total annual heating costs range from under 250 KM to more than 1,751 KM. Graph 4 presents total annual heating costs and it is evident that more than 45% of households spend between 500 KM and 1,000 KM, which in part includes households with monthly incomes of up to 873 KM. Such high costs constitute an excessive outlay for this category of households and make them energy poor.



Graph 4. Total annual heating costs (in KM)

From the standpoint of the cost of heating per m^2, furnaces/single room appliances, which are used by 37% of households, are the most expensive heating system.

If we consider households by their income level, it is found that households with the average income 0-250 KM heat only 48 m^2 of their living space, those with incomes of 250-500 KM heat 59 m^2, and those with incomes of 500-750 KM on average heat 71 m^2. Evidently, the surface area of heated living space is in direct corelation with household incomes.

The analysis confirmed that poorer households tend to use wood and coal more for heating, while households with higher incomes use other energy sources for heating. The systems used for heating are rather inefficient. This confirms that energy poverty has a negative impact both the environment and on climate change. The effects of heating furnaces on premises being heated are particularly worrisome.

An additional reason for high costs for electric and thermal energy is that households are not aware of various options that can lower their consumption of electric and thermal energy. Some 59% of households out of all survey respondents, still uses ordinary lightbulbs, 83% of respondents, when purchasing electric appliances, pay no attention to how energy efficient the appliances are, etc.

After the project implemented education activities, distributed brochures and 4 LED bulbs to each household, the average savings in the consumption of electricity over the next 12 months were 4.47%. Over one year, 10,044 households included in the study achieved savings of over 320,000 KM. This shows that simple measures can reduce energy consumptions.

Regarding the criteria for purchasing electrical appliances, the results show that the price is the key and most important factor in the purchase of an electric appliance, while the appliances' energy efficiency is not taken into account. When only the price is considered as the criterion, around 75% of households pay attention to products' prices, while the price does not matter to 4% of households. In general, one can state that all households that earn up to 1,500 KM per month view the price as the basic selection factor.

More than 30% of electrical appliances used by households are old and energy inefficient. The fact that 61% of households do not have a dishwasher and that 81% of households do not have an air-conditioning unit indicate that owning these appliances is a luxury for most households.

Among families whose incomes are low in relation to their energy costs, only around 4% have outstanding bills. The reason is most likely the fear of disconnection from the power grid, which makes paying electricity bills one of the top priorities even for welfare beneficiaries.

The study showed that many households have limited access to adequate energy services (electricity, heating, cooling) necessary for normal living conditions. Transportation costs were not covered in this study. The analysis covered only a small share of vulnerable households in six municipalities and it is to be expected that the results would be similar for all of BiH. Certain variations could be expected in the analysis of the heating costs due to differences in climate conditions. However, it is evident that a large number of households in Bosnia and Herzegovina were affected by energy poverty. To obtain a more complete insight into the number of energy poor households, further studies on the level of all Bosnia and Herzegovina are needed. As the prices of energy commodities keep increasing, it is expected that the number of energy poor households will rise. The situation is further complicated by the lack of necessary legislation and accompanying funds for financing measures for energy poverty alleviation on all levels of government.

MEASURES AND RECOMMENDATIONS FOR ALEVIATION OF ENERGY POVERTY

There are two main types of measures for alleviation of causes and consequences of energy poverty:

1. Measures to increase household incomes and protection from disconnection of utilities.

2. Measures geared to reduction of energy outlays.

The first group of measures focuses on increasing total household incomes and protection of households from disconnection of utilities, including gas, electricity and/or from the district heating grid.

Such measures are generally considered short-term, as they primarily impact the consequences of energy poverty. This approach typically entails direct financial support – deductions from monthly energy bills, direct financial benefits or financial transfers with the objective to mitigate the overall burden of energy bills for households and protection from disconnection of utilities.

The second set of measures is typically oriented on reducing specific energy consumption in households, such as increasing energy efficiency of households and household appliances and/or implementation of measures to reduce unnecessary energy consumption. Such measures are deemed to have a long-term impact, because they are causes of energy poverty. Typical energy policies that involve increasing energy efficiency focus on:

- subsidisation of improvements to energy efficiency on condition that applicants submit evidence on the energy savings and emission reduction,
- improving heating systems,
- implementation of low-budget measures of energy efficiency, including energy counselling,
- using renewable sources of energy.

As energy poor households use insufficient energy because of financial problems, this population has difficulties in accessing most public subsidisation schemes for increasing energy efficiency.

In terms of support to energy poor households in the European Union countries, most member states chose direct support and mechanisms as their core approach. Such an approach is typically justified by the simplicity of its implementation. A measure of this kind constitutes a good short-term approach. Alleviation of energy poverty requires a fundamental alleviation of its causes, so that implementation of energy commodity cost subsidy measures is sufficient to achieve the short-term objective. However, application of this approach requires using reliable data on energy poor households.

Current measures for overcoming energy poverty in BiH

In Bosnia and Herzegovina there are short-term measures to assist in covering electricity and gas costs for most vulnerable consumers. The current definition uses income and disability as

the chief criteria to address the issue of energy vulnerability. The current measures target most vulnerable members of society and, as such, do not deal with the wider problem of energy poverty. In most cases, this refers to the implementation of additional income schemes for most vulnerable customers, mostly in socially vulnerable categories. Moreover, some measures implement various schemes by which vulnerable consumers will not be disconnected from the grid. Therefore, the existing measures primarily focus on alleviation of the consequences of energy poverty rather than on addressing its causes.

As mentioned above, most measures that are currently in implementation primarily involve electricity and heating subsidies. In the absence of an appropriate programme, the FBiH Government adopted the Decree on Implementation of Measures to Reduce Electricity Costs in Households and Incentives for Energy Efficiency.

The Decree on Implementation of Measures to Reduce Electricity Costs in Households and Incentives for Energy Efficiency (2011-2017) have been in force in the Federation of Bosnia and Herzegovina since 2011 and are used as temporary measures until the *Programme of Protection of Vulnerable Electricity Consumers in the Household Category* is developed and adopted.

The decree supports the categories of electricity consumers by subsidising of below-average consumption. The consumption threshold was set at 268 kWh for consumers receiving electricity from the Elektroprivreda of Bosnia and Herzegovina, and the threshold of 348 kWh was set for consumers that receive electricity from the Elektroprivreda of the HZHB, with subsidies set at 5.50 KM (2.75 EUR) and 7 KM (3.50 EUR), respectively.The above amounts are monthly amounts per household. A total of 24,126,224 KM (12,063,112 EUR) was spent on these subsidies between 2011 and 2021.[11] This amount can also be examined from the following standpoint:

The measure implemented in the Sarajevo Canton relates to subsidies for heating and electricity costs for households that meet certain income and social vulnerability criteria.

Some of the criteria include:

- Total income per household member cannot exceed 70 KM per month (35 EUR).
- Monthly incomes of single-person pensioner houshelds with total monthly incomes of up to 165 KM (82.50 EUR).
- Two-person pensioner households with total monthly income of up to 220 KM (110 EUR).
- Households with members who are beneficiaries of carer's allowance whose total monthly income does not exceed 120 KM (60 EUR).

A total of 2,602,740 KM was disbursed to fund the implementation of this measure in the 2014-2018 period.

In the past three years (including 2022), the Government of the Brčko District adopted the Programme of Financial Support to Socially Vulnerable Consumers for Payment of Utility Bills, Including Electricity Costs.

[11] "Study on Addressing Energy Poverty in the Energy Community Contracting Parties", Energy Community, December 2021

The Republic of Srpska (according to data available) does not implement any measures to protect vulnerable consumers, since such categories have only been included in the latest version of the Law on Electric Power from 2020 and the supporting subordinate legislation does not yet exist.

All above measures are short-term in character, meaning that they are primarily aimed to mitigate the consequences of financial burdens on energy and are focused on socially most vulnerable members of society.

CONCLUSIONS AND RECOMMENDATIONS

In the light of the above considerations, there is evident need to establish a systemic approach to addressing the issue of energy poverty in Bosnia and Herzegovina, based on official policies, strategic documents, and legal frameworks, including accompanying programmes and funds to subsidise energy poverty reduction measures. The *Programme of Mitigation of Energy Poverty* would define measures, determine the modalities for their implementation and funding, implementation deadlines, the level on which the measures will be implemented (local, entity, state). Such an approach requires synergistic action of all relevant ministries/institutions, including the fields of energy, environment, finance, healthcare, and social policy. In effect, the implementation of all measures proposed below depends on creation and implementation of the Programme of Mitigation of Energy Poverty with its accompanying financing schemes. Creating and adopting the ***Programme of Protection of Vulnerable Electricity Consumers in the Household Category*** is one of the obligations BiH assumed by accepting the transposition of the „Clean energy for all Europeans“ package.

Energy poverty is clearly a very grave and growing problem in Bosnia and Herzegovina, and it further analysis requires much additional data and studies. **Defining energy poverty indicators (total income, total outlays for various energy commodities, availability of energy services, status of buildings and appliances, health conditions, etc.)** constitutes a basic precondition for further analysis and implementation of all energy poverty reduction measures.

All local governments should identify energy poor households or population categories that are at risk of falling into energy poverty, on the basis of defined indicators. Analyses such as the one illustrated through the examples of six municipalities in the study referred to above should be conducted and the collected data should be used to compile a list of energy poor households on the level of local governments/entities. Such activities may be conducted in cooperation with social protection centres/departments on the local level. The entire process should be based on transparency and cooperation and on sharing data between all institutions.

It is crucial to formulate measures of ***direct financial support***, which would be related to the protection programmes for vulnerable households and be implemented on the local level, with the funding provided by all levels of government. Higher levels of government (state and entity budgets) should allocate additional funds for this purpose, as local governments cannot set aside sufficient funds in their own budgets. This measure concerns subsidies for monthly electricity and/or gas bills. Introduction of special tariff systems for energy poor households is an integral part of these measures. The direct financial support, however, is not a fully satisfactory approach, because it provides only a short-term solution for most vulnerable groups of consumers. Such financial measures should target only the most socially vulnerable consumers

and should be implemented along with infrastructure measures aimed to alleviate the main causes of energy poverty to achieve longer-term effects.

In effect, a systematic approach should be based on *long-term measures*, intended to invlude energy poor households into the process of a fair energy transition. However, as energy poverty is a burning issue in Bosnia and Herzegovina which will not be simply resolved through higher levels of government, local governments should act with urgency, by implementing simple and low-budget measures. A close cooperation of citizens, the business sector and local government is required to address the problems of households affected by energy poverty, through joint campaigns of assistance and solidarity programmes.

Measures to reduce energy poverty include:

1. ***Energy audits, energy counselling, simple and low-budget energy efficiency measures***. This measure constitutes the essential first step; it is relatively easy to impement, provides instantaneous relief for households, and offers insights into energy poverty in the target area based on collected data. The measure involves organisation of simple energy audits of buildings, advice on consumption of energy commodities or application of some energy efficiency measures that do not require major investment (replacement of existing lighting fixtures), and contributes to the quality of life, more rational energy use, and reduction of bills. The system of energy counselling and introduction of simple energy efficiency measures should be introduced in all local communities. Experiences from the countries in the region (Serbia and Croatia) show that, with minimal savings measures, annual bills are reduced by at least 10%, with potential for even more. Implementation of simple measures by local governments, which could partly be funded from the funds allocated for subsidising electricity costs, may generate long-term financial savings for poor households. Non-governmental organisation can also participate in these activities with various projects.

2. ***Replacing energy inefficient household appliances using „new for old“ trade-in schemes***. This measure is complementary to the measure to use energy efficient electrical household appliances defined in the Energy Efficiency Action Plan in Bosnia and Herzegovina (2016-2018). Replacing household appliances (e.g., old refrigerators and washing machines) reduces energy consumption and often offers a better quality of service, reduces energy bills and enhances quality of life. The „new for old“ scheme is important, because users give up the old appliance before purchasing another similar new one. This approach ensures that households will not retain both old and new appliances, which would lead to increased energy consumption.

3. ***Energy rehabilitation of buildings (replacing windows, installing external insulation and new facades of buildings)***, serves to improve energy efficiency of homes, and thereby reduce consumption of energy commodities and related costs. Implementation of this measure at the same time eliminates detrimental effects on health caused by cold, dampness, and mold due to low energy efficiency. The measure enhances the overall quality of life, creates better living conditions, reduces CO_2 emissions, etc. Improving energy efficiency constitutes one of key measures to alleviate energy poverty.

4. ***Improving heating systems*** for the energy poor involves several kinds of measures, which could be implemented as individual measures or in any combination:
   - Replacing existing systems with the system of the same type, but more efficient, i.e., replacing traditional solid fuel furnaces (estimated efficiency of existing furnaces is 50%) with more efficient ones. Certain studies indicate that, among socially vulnerable citizens, as many as 91% use solid fuel appliances, and 64% use solid-fuel (wood or coal) stoves.[12]
   - Modernisation and expansion of heating systems means replacing entire heating systems with more adequate ones. This measure does not necessarily lead to energy savings, but it increases heating efficiency and living conditions and may be applied to any type of housing.
   - Replacing existing electric water heaters in individual housing units with solar collectors may bring considerable savings in electricity consumption, as the use of such water heaters can save up to 70% of necessary electricity.
   - Transition from fossil fuels to renewable sources is a measure of a particular importance for households that rely on coal and oil as main heating fuels, which will result in a more efficient consumption. The utilisation rate of a pellet furnace is much greater than for a coal furnace, and living conditions are also improved, due to better heating of households and reduced pollution of the premises.

     This measure is complementary with the recommendation „Enhancing energy performance of existing systems and installations, energy efficient technical systems in apartment buildings and family homes“, defined in the Energy Efficiency Action Plan in Bosnia and Herzegovina (2016-2018).

5. ***Support for renewable energy sources*** constitutes one of the most important long-term measures to eradicate energy poverty and it involves the following measures:

   - Installation of photovoltaic panels for own use.
     It is essential to provide financial support for the costs of installation of the system and to accept the excess generated electricity according to different models and at different prices. In this manner, households benefit through lowering their total energy costs, because they can use electricity from solar systems for free. This measure can be implemented both on and off-the-grid, which is a particularly suitable solution for households living in remote areas without direct connections to the power grid (remote rural areas).
   - Installation of solar thermal collectors for heating premises and/or water in households
   - Formation of energy communities that generate electricity from renewable sources, should be defined by the new Law on Renewable Energy Sources on the entity level. Formulation of an energy policy that allows energy communities access to the grid and distribution of energy directly to consumers is a crucial step to encourage local-level energy communities. Inclusion of energy poor households into energy communities may be ensured through subsidy funds or

[12] RES Foundation. Overview of the Basic Results of the Study of Heating Practices Among Users of Individual Heating Appliances in Bosnia and Herzegovina, Decembeer 2021.

community members may permit them to join free of charge. Energy communities may directly supply energy poor households through lower tariffs or free of charge, without those households being part of those communities.

All the above measures are mainly infrastructural in character, and it will be necessary to secure financial incentives/funds through support programmes, since energy poor households cannot fund such projects. In addition to financing through developed mechanisms (social benefits, subsidies, funds on all levels of government, programmatic schemes), there are also innovative models of financing energy efficiency and renewable energy source projects for energy poor households. Some of those modalities are actually recognised as examples of good practices in the EU.

Crowdfunding of energy efficiency projects by gathering funds through micro donations, from a large number of people, typically via internet platforms, may be used as support in financing energy efficiency enhancement projects for **energy poor households**. Projects may include installation of solar systems for electricity generation or heating, reconstruction of energy efficiency buildings, etc. Money is typically collected over a specified period of time (one or two months) and the entire process of collection is transparent, because every payment is visible.

The prerequisite for a successful implementation of all above measures will be to create a **system for efficiency monitoring and tracking of the implementation of measures** in the field, collection and analysis of data, to identify additional activities that will contribute to the reduction of energy poverty.