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GREEN DEAL'S IMPACT ON ENERGY POVERTY IN BULGARIA[2]

With no definition of energy poverty in Bulgaria and with obligations for decentralisation and decarbonisation of the energy sector, our country is entering a period of new commitments related to the Green Deal. What measures will the government take for these purposes in the households' sector, and how will this affect energy poverty levels? Will the measures have a significant effect on reducing energy poverty levels and take us out of the top position for this indicator in the EU? The article attempts to answer these questions by assessing the impact of a set of policies to reduce energy poverty among households, using anonymous data on energy income and expenditure from the 2017 Survey of Household Budget Surveys with a sample of 2950 households.
Keywords: green deal; policies; energy poverty
JEL: I32; I38; P36; P46; P48

Introduction

The Green Deal set new targets for the governments of the EU member states at the end of 2019, and required specific action plans with investments in Renewable Energy Sources (RES). By signing the agreement, the member states commit to develop and adopt a number of long-term strategic documents to ensure the achievement of the goals of the Green Deal for decarbonisation, decentralisation, democratisation, justice, etc. Among the most important documents concerning energy poverty is the "*Long-term national strategy for supporting the renovation of the national building stock of residential and non-residential buildings until 2050*", published for public discussion in July 2020.[3] The strategy plans an investment of nearly BGN 23 billion for the renovation of 46% of the living area of inhabited residential buildings in Bulgaria by 2050, which is part of a total investments of BGN 27 billion for all buildings in the country, including municipal and business. The strategy identifies 10 types of package measures varying according to the energy class of multi-family buildings and 11

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[3] Long-term national strategy to support the renovation of the national building stock of residential and non-residential buildings until 2050, http://www.strategy.bg/PublicConsultations/View.aspx?lang=bg-BG&Id=5315.

packages for single-family houses, and estimates the cost per square meter for each of the packages. The strategy also shows the results of previous government programs to renovate the country's housing stock.

On this basis, the author uses anomised data on household income and energy expenditure for 2017 to estimate the effect on energy poverty of individual groups of households living in single-family houses and multi-family buildings, considering only a reduction in energy consumption. Possible factors with a strong impact on energy poverty, such as income, household structure, etc., are not considered.

The aim of the study is to evaluate the effect of a set of policies from the green deal on energy poverty in single-family and multi-family houses and apartments in multi-family buildings.

Subject: Energy poverty in the country before and after the measures.

Object: 2950 households from the survey "Monitoring of household budgets" conducted by the NSI in 2017 divided into three groups – living in single-family, multi-family houses and apartments in multi-family buildings.

Tasks:

- To review energy poverty policies and new strategic guidelines.
- to analyse the specifics of households by types of buildings, in order to better assess the impact of policies.
- to calculate the effect of policies on energy poverty among the target groups.

Methods:

- Statistical analysis of anomized data on income and energy expenditure of 2960 households participating in the NSI survey.
- 4 types of definitions of energy poverty are applied: 1) **10% rule**: a household is energy poor if its energy expenditure exceeds 10% of net total income; 2) **Poverty after energy expenditure** measures households with net total income after expenditure for energy below the official poverty line; 3) **Low income** – **high cost-share** (LI-HCS) – households with net total income after energy expenditure below the poverty line and share of energy expenditure above 10%; 4) **Low income** – **high cost** (LI-HC) – households with net total income below the poverty line and energy expenditure above the median for the country. The poverty line for the three definitions is BGN 5,222 for 2017.
- The effect of an average statistical package of measures defined in the long-term national strategy for renovation of the building stock of Bulgaria for single-family and multi-family houses is calculated on the basis of expenditure per unit area and a number of households out of energy poverty. Three variants of measures are considered – for multi-family buildings, for single-family houses, and for households with disposable income below the official poverty line.

1. Changes in Energy Poverty Policies in Bulgaria

1.1. Energy poverty policies before the Green Deal

One of the biggest problems in the understanding of society and government officials is the intertwining of the term "vulnerable consumers"[4], which is officially defined in the Energy Act §1, item 66 (Ministry of Energy, 2016), with the terms "energy poor" and "socially weak". Each of these concepts is different, and by the end of 2020 **there is no official definition of energy-poor households in Bulgaria**. Energy poverty policies have changed little in the years before the Green Deal, with the following being in place:

- **Ordinance № 5** providing heating allowance in operation since 1995, the only instrument for social protection linked to inflation, reflecting the increase in energy prices annually, covering 252,615 persons and families in the 2019/2020 season (about 3% of the population). Until 2007, the aid was determined on the basis of 450 kWh for heating per room, which is reduced to 385 kWh in 2008 and increased to 500 kWh per month in 2019. For the 2019/2020 season, this amount is equal to BGN 93.18 per month, or BGN 465.90 per season, or BGN 495.8 for the current 2020/2021 season.
- **Program "Support for energy efficiency in multi-family residential buildings"**[5] of the Operational Program "Regional Development" (2007-2013) with a total budget of BGN 500 million, with renovated 155 buildings with 2,184 homes for the period 2007-2013.
- **National Program for Energy Efficiency of Multi-family Residential Buildings (2015-2020)**[6] with a total budget of BGN 1 billion with renovated 2,022 buildings and 147,761 dwellings with a total area of 11,525,389 m^2 and expected savings of 975,226 MWh /year of energy and 319 $ktCO^2$ /year of greenhouse gases.
- "Improving Ambient Air Quality"[7] Program of the Operational Program "Environment 2014-2020", including replacement of old solid fuel stoves (15,000 in Sofia for BGN 44.5 million[8]), Life+ program for stoves replacement in Sofia), Vidin (1600 families of BGN 3,000[9] each), and 26 other identified municipalities with a requirement to replace solid fuel stoves by 2021 in order to reduce pollution with fine dust particles and fulfil the World Bank requirements (Nikolov, 2018).
- Other programs and projects for reducing energy poverty, with local scope: **REACH, POVERTY, REPLACE, IDEA, etc.**

These policies are characterised by their partial effect on energy poverty. Ordinance №5 of 1995, for example, serves the lowest-income 7% of the population (just over 500,000 people), and has a much smaller coverage than the population living below the poverty line (fluctuating by 2 percentage points around an average level of 22% for the period 2007-

[4] Households in the market placed at a disadvantage in terms of product purchase. This is an artificial category designed to set out a group of consumers, representing an explicit 'minority' of society, to be granted a minimum free access to energy resources for a limited period of time in order to reduce the number of energy supply disruptions.

[5] Report of the program "Support for energy efficiency in multifamily residential buildings", http://www.bgregio.eu/op-regionalno-razvitie/izpalnenie-na-oprr-2007-2013.aspx.

[6] National program for energy efficiency of multifamily residential buildings, https://www.mrrb.bg/bg/energijna-efektivnost/nacionalna-programa-za-ee-na-mnogofamilni-jilistni-sgradi/.

[7] National Program for Improving Atmospheric Air Quality (2018-2024), http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=1288.

[8] https://www.segabg.com/node/147530.

[9] All solid fuel stoves replaced by 2021, 24chasa.bg https://www.24chasa.bg/novini/article/7075387.

2019). The effectiveness of this type of aid is weak, it meets short-term needs, and it does not have the capacity to reduce energy poverty in the long run, which is not the goal of the program. Energy efficiency programs are long-term, but target the entire population, and do not have an income criterion, as buildings are usually inhabited by families with different types of income. The last largest program renovated only 3% of the multi-family homes in the country (2,022 buildings out of 66,865 inhabited buildings). The „Improving the Ambient Air Quality" Program aims to reduce fine dust particles, and although it is aimed at poor households, its aim is to improve air quality, with a lack of ex-post follow-up control over the use of replaced stoves.

The effect of the above policies is weak, the scope is small, and the real energy poverty, measured by officially recognised methodologies in the world, increased in the period 2014-2017, despite the subjective measures of Eurostat (Peneva, 2019, p. 174-182) described in the long-term strategy. According to these measures, energy poverty in Bulgaria fell sharply from 67% in 2010 to 46% in 2011 and a gradual decline in the remaining few years to 30.1% in 2019, without significant changes in research methodology (Peneva, 2020, p. 43).

1.2. Energy poverty policies set out in the Green Deal

The European Commission envisages that 458 million euros of the European budget will be set aside for Bulgaria between 2021-2027 to help it make the transition to a cleaner economy (Dimitrova, 2020).

With the adoption of the Green Deal, EU Member States are committed to developing long-term strategies and drawing up roadmaps for housing renovation and energy savings in every sector, including buildings. One of the leading programs of the Green Deal is "Buildings renovation", with the aim of doubling or tripling the level of renovation of the buildings, which at the time of adoption of the document is about 1% (for all buildings).[10]

To develop the strategy, there is a specific document – Commission Recommendation (EU) on the renovation of buildings.[11] In the section "Review of policies to increase the efficiency of the building stock", monitoring is required in several aspects, as the following indicators of energy poverty are: 1) percentage of people affected by energy poverty; 2) share of household disposable income spent for energy; 3) arrears on utility bills; 4) population living in inadequate housing conditions (leaking roof, for example) or insufficient heating and cooling.[12] However, the Bulgarian government chooses subjective Eurostat criteria that are inadequate for the situation in the country (Peneva, 2020, p. 43). The share of disposable

[10] The European Green Pact. Communication from the Commission. COM (2019) 640. Brussels. 12/11/2019, https://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:52019DC0640&from=EN.

[11] Commission Recommendation (EU) 2019/786 – of 8 May 2019 – on the refurbishment of buildings – (notified under document number C (2019) 3352) (europa.eu) https://eur-lex.europa.eu/legal- content / BG / TXT / PDF /? uri = CELEX: 32019H0786 & from = DE.

[12] Commission Recommendation (EU) 2019/786 on the renovation of buildings, https://eur-lex.europa.eu/legal-content/BG/TXT/PDF/?uri=CELEX:32019H0786&from=DE.

income is not considered on its own, and the percentage of people affected by energy poverty is much higher than Eurostat's subjective measurement.

On July 10, 2020, Bulgaria published a draft "Long-term national strategy to support the renovation of the national building stock of residential and non-residential buildings until 2050"[13] (hereinafter "the Strategy"), which outlines the main steps, types of measures by type of building and energy class, financial instruments and scope of individual programs for the renovation of the building stock. The set goals for achievement are shown on Table 1.

Table 1

Indicators for milestones for the renovation of residential buildings

		2021-2030	2031-2040	2041-2050
Saved energy	GWh	2477	5694	6294
Renovated area	**m^2**	**19 026 656**	**43 735 175**	**48 343 297**
Emissions savings CO^2	tonne	1065184	2448461	2706441
Share of total area (%)		**7.9**	**18.2**	**20.1**

Source: The Strategy.

More than 95% of the total number of year-round inhabited buildings in Bulgaria are single-family houses, with a usable area of less than 49% of the total. The share is calculated on the basis of data in the strategy for year-round residential buildings, 2011 (Table 2).

Table 2

Year-round occupied residential buildings, 2011

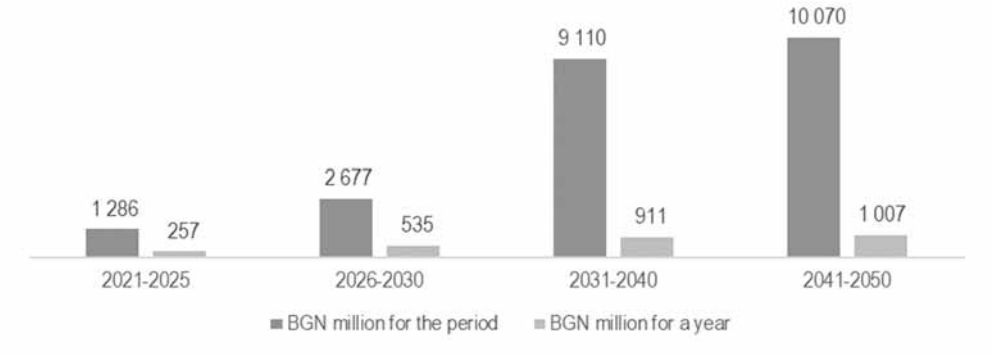
	Buildings Number	Area, sq.m м2	Number of dwellings
Single-family houses	1 291 549	118 300 032	1 490 460
Multifamily buildings	66 865	117 158 877	1 640 120
Mixed type buildings	6 465	4 052 585	53 838
Dormitories	1 019	1 103 153	20 157
Total	**1 365 898**	**240 614 647**	**3 204 575**

Source: The Strategy.

According to the national strategy for the renovation of the building stock in Bulgaria by 2050, the state will invest BGN 27 billion for the renovation of 60% of private homes and 17% of public buildings such as hospitals, kindergartens and ministries. In the first five years of the period, namely in 2021-2025, the state will invest BGN 1.5 billion, and in the next 5 years – BGN 3 billion. In the decade after 2030, investments will increase to 10.5 billion, and in the next – up to BGN 11.7 billion.

[13] Long-term national strategy to support the renovation of the national building stock of residential and non-residential buildings until 2050, http://www.strategy.bg/PublicConsultations/View.aspx?lang=bg-BG&Id=5315.

Figure 1
Necessary investments for the renovation of residential buildings 2021-2050



Source: The Strategy.

At the end of October, the government published a National Plan for Reconstruction and Sustainability, in which BGN 1.6 billion are planned for renovation of buildings in the period 2021-2023, as over BGN 1.5 billion are provided for residential buildings, of which over 90% for multi-family. A total of BGN 103 million of this money will be for the renovation of single-family houses (Tsvetkov, 2020). As it is difficult to predict in what percentage the single-family and multi-family buildings will be financed, in the present study, the effect is calculated alone for each group separately, with the most desired 100% scope of measures for all households in the country.

2. Empirical Analysis

2.1. Methodology

The analysis of household income and expenditure data in a sample of 2950 households is made using only the following indicators:

- Net total income (only this type of income is commented everywhere in the analysis)
- Energy consumption
- Number of household members
- Age of members
- Type of building

Four types of energy poverty indicators are applied: 1) 10% rule: a household is energy poor if its energy expenditure exceeds 10% of net total income; 2) Poverty after energy expenditure measures households with net total income after energy expenditure below the official poverty line; 3) Low income – high cost share (LI-HCS) – households with net total

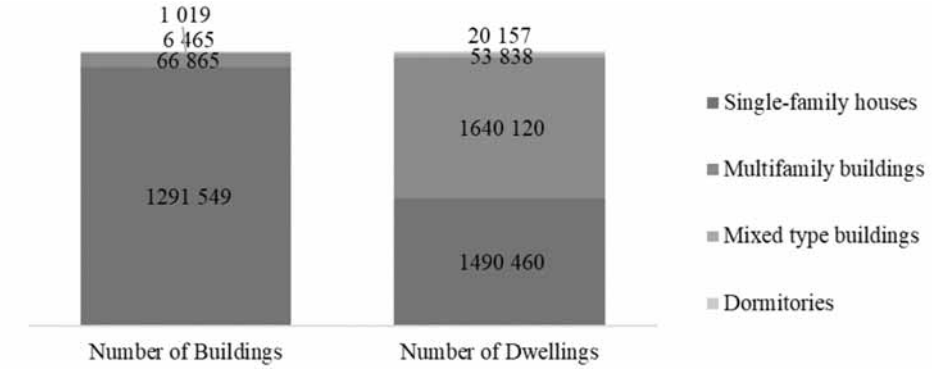
income after energy expenditure below the poverty line and share of energy expenditure above 10%; 4) Low income – high cost (LI-HC) – households with net total income below the poverty line and energy expenditure above the median for the country. The poverty line for the three definitions is BGN 5.222 for 2017. The medians of each measure are recalculated, and are applied to each indicator with expenditure thresholds.

2.2. Specifics of energy poverty by type of buildings

According to data from the long-term strategy, 1.29 million single-family homes have 1.49 million dwellings (47% of the total), and 66,865 multi-family houses have 1.64 million dwellings (51% of the total number) and about 2% of the dwellings are in mixed type buildings.

Figure 2

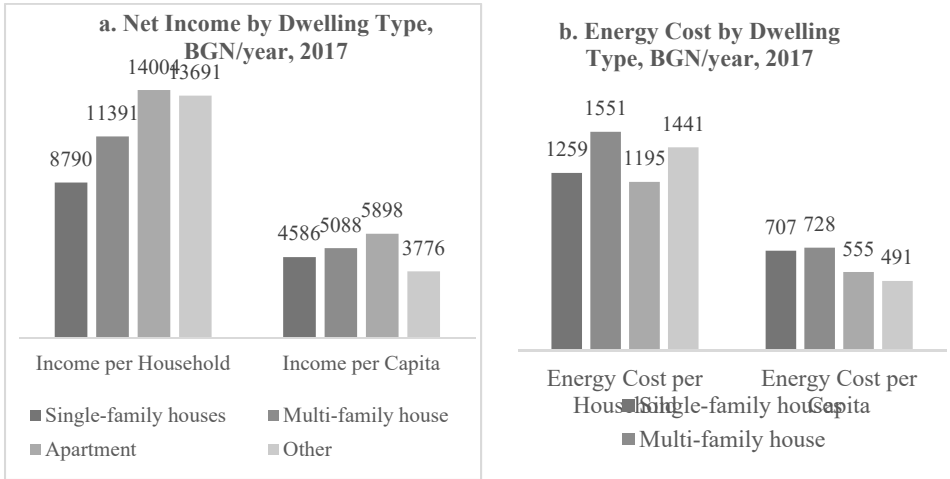
Distribution of buildings, dwellings, population by type of buildings, 2011

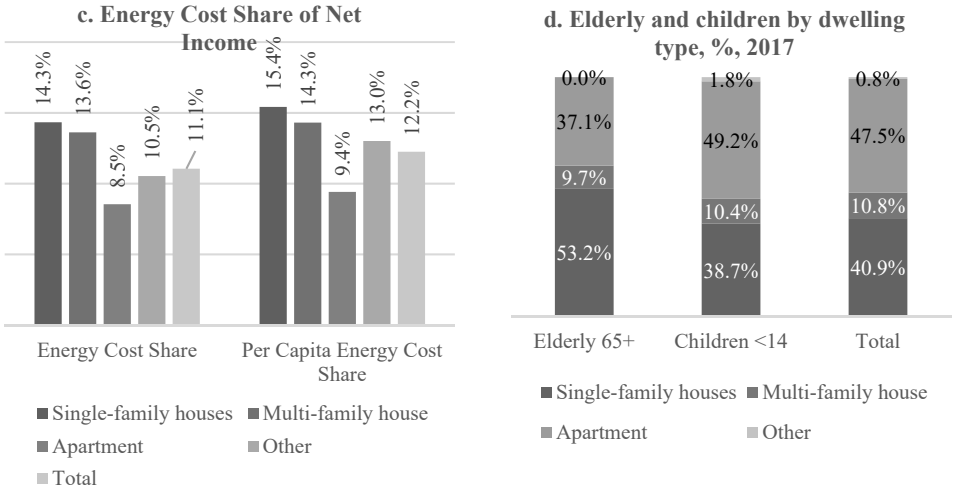


Source: The Strategy.

Figure 3

Income, expenditure and structure of households by type of building



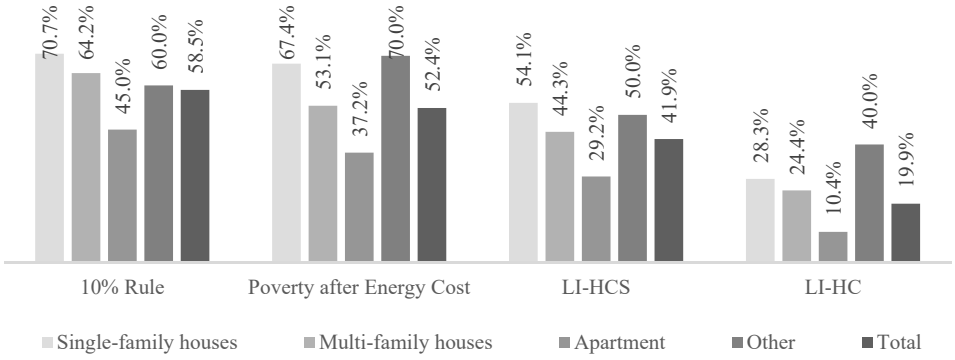


Source: Calculations with anomized data from the NSI.

The data show that people living in detached houses are mostly energy-poor, have lower incomes, afford lower energy costs, and at the same time, the share of total income expenditures is much higher than the average for all households in the sample of 11.1%, and over 53% of those living there are over 65 years of age.

Figure 4

Energy-poor households by dwelling type, 2017



Source: Calculations with anomised data from the NSI

The data clearly show the difference in energy poverty by type of building, with **energy poverty predominating in detached houses**, reaching the highest levels by all definitions, covering as much as 25% more households than in apartments according to the 10% Rule and the Low Income – High-Cost Share Definition, and over 30% according to the definition of poverty after energy consumption. According to the definition of Low Income – High

Cost, there are 2.8 times more energy-poor households in houses than in apartments, but this indicator is unsuitable for application in Bulgarian conditions, as the only thing that shows is that there are households with income below the poverty line, which have an energy consumption above the median for the country. This type of consumption is not typical for Bulgarians, and therefore the range of energy-poor in this indicator is very limited in our country.

It should be noted that in the NSI sample, there are about 10% living in "other" type of buildings, which are characterised by a much higher number of household members, with more children and almost no adults. Given that the sample is nationally representative and updated annually, they should be leading.

2.3. Effect of programs by type of buildings

Multi-family buildings

According to data from the Strategy, multi-family homes in our country, inhabited year-round, account for 1.64 million dwellings, in 66,865 buildings. In this type of buildings, according to anomised data from the NSI from 2017, live 47% of the population and nearly 50% of children under 14. They are characterised by slightly higher incomes, as they are located mainly in large cities with better-developed economy, and a lower share of energy expenditure in net total income, relatively lower levels of energy poverty. About 37.2% of households fall below the poverty line of BGN 5.222 per year, after energy consumption, against the background of 52.4% for the whole population and 67.4% in single-family homes.

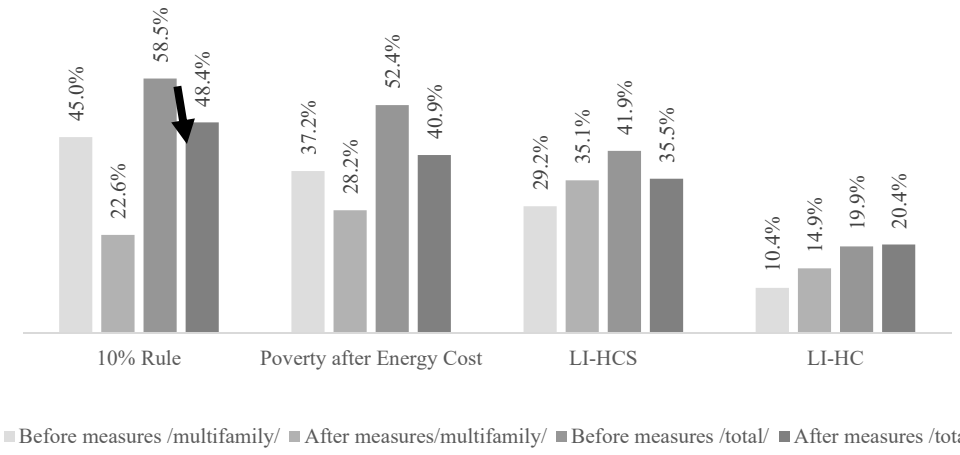
Data of the Sustainable Energy Development Agency on the effect of the renovation of residential buildings from the largest national program conducted from 2015 to 2020 show that for buildings up to classes B the average monthly cost of housing with an average heating area of 65 m^2 falls from 156 BGN to BGN 107. This is according to calculations from the surveys of buildings, which also show that the largest share are class E buildings (40.5%), followed by class F (35.3%) and class G (16.1%).

A survey of the Ministry of Regional Development among households in renovated buildings from 2017 shows that nearly 60% of the respondents believe that the bills have decreased significantly, 26.6% not significantly, and the rest that there is no change in the bills. The report expects that the renovation of a building can result in a reduction in the average monthly cost of BGN 48.74. for 5.5 winter months during the year, or for BGN 268.07 per year.

Features in some parameters of the model:

The median energy expenditure changes in the formulas for energy poverty, falling from BGN 990 in 2017 to BGN 915 after deducting BGN 268.07 from the annual energy expenditure of households living in multi-family buildings. About 14 households remain with an expenditure of BGN 0, these are households that had an expenditure below this amount.

Figure 5
Energy-poor households before and after lowering energy consumption in multi-family buildings, 2017



Source: Calculations with anomised data from the NSI.

Specifications of the model are that the cost of all residents in multi-family buildings has been reduced by BGN 268, which is 17% of the total cost for the segment, but for some low-income households, it is much higher percentage. This is considered to be the more adequate way to reduce expenditure with the BGN equivalent rather than in percentage terms, as it is possible to make inaccuracies in high-cost households.

The results show that a reduction of BGN 268 of the annual expenditure of all multi-family buildings in Bulgaria would reduce energy poverty by 10% under the 10% rule and by 9% in poverty line calculations after energy expenditure, as the percentage of energy-poor households in multi-family buildings, it will fall by 23% from 45% to 22.6%, where the expenditure will exceed 10% of the net total household income.

The result after decreasing energy cost in the last two definitions, which measure only the population below the official poverty line, is interesting. In the first case, with a share of expenditures above 10%, and in the other with expenditures above the median. According to these definitions, after the decrease in energy cost, poverty increases! This is a paradoxical result, which shows clearly **how inadequate these definitions are for Bulgaria**.[14] This is because after deducting BGN 268 from the expenses of all multi-family houses, the median expenditure falls, which automatically brings households with higher energy cost above the

[14] All definitions for energy poverty in the UK and Western Europe do not use the actual energy consumption, but a modelled cost – the necessary cost for the given housing characteristics and features of the household, which is made on the basis of an annual survey. In Bulgaria this cost is not developed. The author believes that the current cost in Bulgaria is much lower than the required to maintain comfort of 21^0C in winter (according to WHO requirements).

threshold and turns them into energy poor, without actually changing the situation in any way.

The fact that the strategy envisages renovation of no more than 46% of the buildings by 2050 is not considered here either. All these calculations are based on a total renovation of 100% of the multi-family buildings. This means that only half of these results are achievable with measures for half of the multi-family buildings within the intended investment of BGN 23 billion.

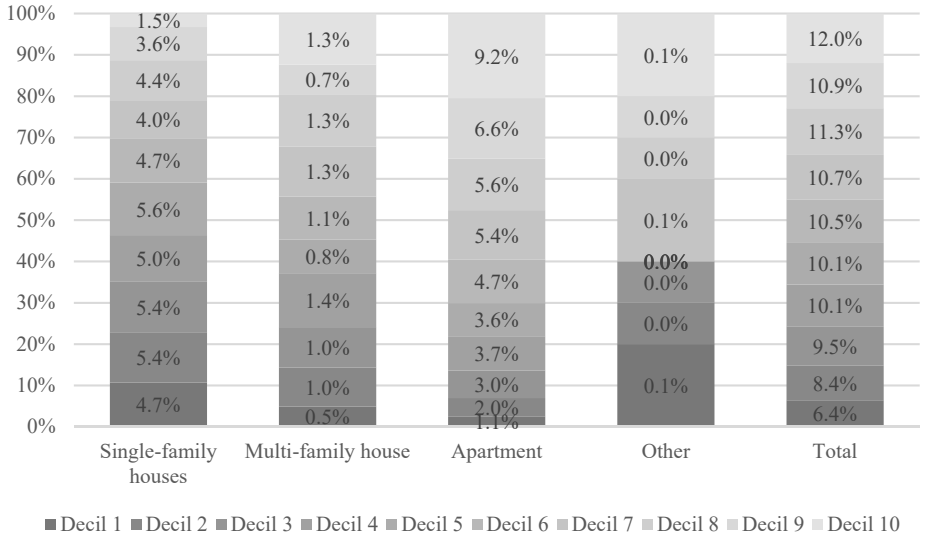
Single-family houses

Single-family homes are inhabited by about 40.9% of the population, over 53% of the elderly over 65, and in most cases, low-income families. Energy poverty in this segment is extremely high, over 70% of households spend more than 10% of their income on energy, and the average share of their expenditure on energy alone exceeds 14.3% of the net income in 2017. These are nearly 1.49 million buildings.

The following graph shows the distribution of decile groups in different buildings, to understand more clearly the income difference of each segment.

Figure 6

Percentage of households by decile group and type of building, 2017



Source: Calculations with anomised data from the NSI.

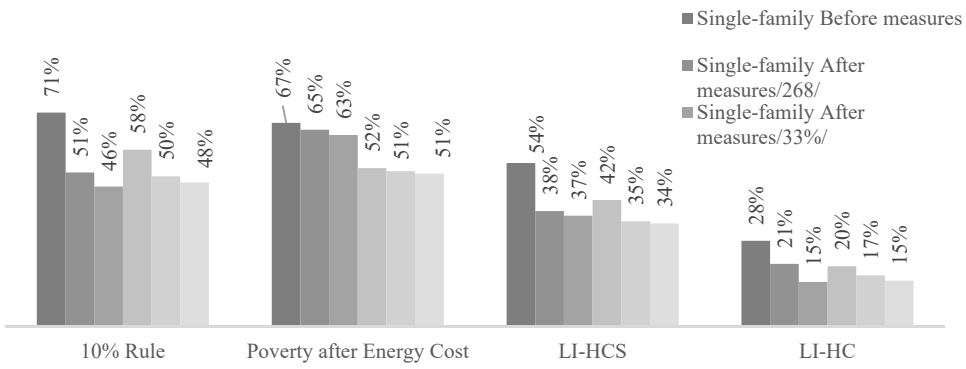
In the case of single-family houses, the question is with what percentage or amount of the cost to be deducted, as there has been no national program so far or a reputable institution to release official data on the effect on heating bills after renovation. A decrease in the energy bill by BGN 268 per year for single-family buildings is no longer 17% of the net total income,

but 21.2%, due to the lower total expenditure and lower incomes of households in this segment. Accordingly, the measures needed to renovate single-family houses are calculated for an air-conditioned volume of 195m^2, according to strategy data[15], while the 8-storey panel building is for a volume of 3800 m^2 with an average of 24.5 apartments or a volume of 155 m^2 per dwelling.

Due to data limitations and limited possibility of applying different types of measures, the same amount is applied in this segment – BGN 268.07, to compare the effect, in the next step, a calculation of the effect of reducing the financial cost by 33% is used, taken from a report on good practices of the Replace project (Peneva, Nikolaev, 2020), using an example of a replaced solid fuel pellet stove and installed solar collectors.

Figure 7

Energy-poor households before and after lowering energy consumption in single-family homes, 2017



Source: Calculations with anomised data from the NSI.

The results of the calculations show similar results of multi-family buildings, a decrease of 25% in the share of energy-poor households after a decrease of 33% in the costs of single-family buildings, and a decrease of 20% in the share of energy-poor households after a decrease of BGN 268.

The low decline in the definition of "poverty after energy consumption", which is close to the official poverty line, shows how little energy expenditure has an impact on overall poverty, and how a reduction of BGN 268 is much more effective than a reduction of BGN 33% of cost, which is already very low. Suppressed consumption is clearly visible in low-income groups. The paradoxical trends for the last two definitions – LI-HC and LI-HSE – are present again, when consumption is reduced by an absolute amount equal for all households, energy poverty increases. With a percentage decrease, there is a decrease in energy poverty.

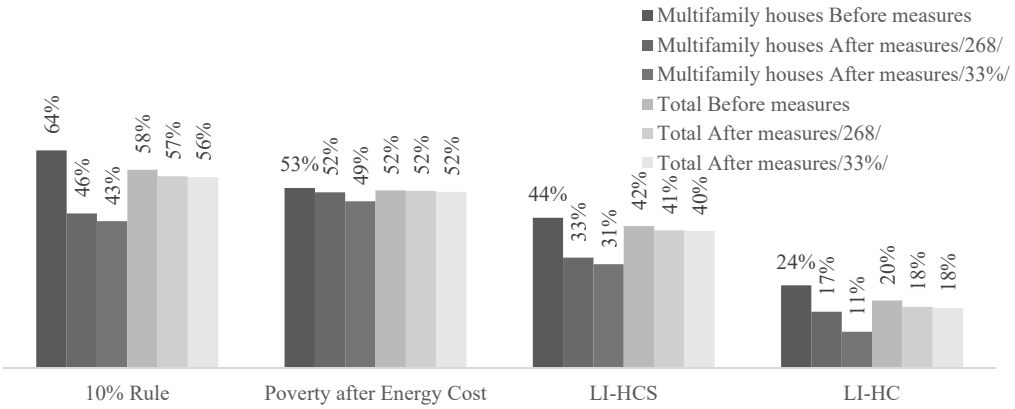
[15] Annex 3 of the Long-Term National Strategy to support the renovation of the national building stock from residential and non-residential buildings until 2050.

Multi-family houses

About 10.8% of the households in the sample (nationally representative) of this study live in multi-family houses (see Figure 3d). Half of the occupants of this type of buildings are very poor, more often large families, while the other half are very rich. Therefore, this segment should be regarded carefully when setting policies. Regardless of the definition, measures in this segment have a minimal effect on the overall energy poverty due to their low share in the total. The decrease in the share of costs in the segment is smaller than in the application of the same measures in the other segments.

Figure 8

Energy-poor households before and after lowering energy consumption in multi-family houses, 2017



Source: Calculations with anomized data from the NSI.

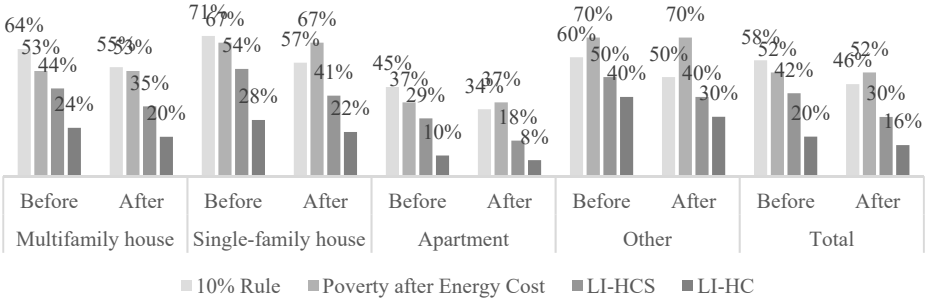
2.4. Targeted measures to households below the official poverty line

This section examines the effect of the measures if a formal definition of the energy-poor is applied. The financing of buildings is set specifically for these households and not for all. Energy expenditure is reduced by BGN 268 per year for all households with incomes below the poverty line, in the sample, these are 40% of all households in the country (net total income).

Targeted measures undoubtedly have a better effect. To summarise the measures by buildings, let's see the effect after the different types of soft, by each of the definitions. It is important to clarify again that the median cost as a threshold for some of the definitions is different in the application of each measure and reflects the median result after the measure.

Figure 9

Energy poverty after measures for low-income households only



Source: Calculations with anomised data from the NSI.

Table 3

Decrease in the percentage of energy-poor households after energy efficiency measures[16]

	Ten percent rule	Poverty after energy cost	Low Income High Share of Energy	Low Income-High Cost
Measure 1:	**All dwellings (cost reduction of BGN 268/year)**			
Single house	0.0	0.0	0.0	-3.1
Multifamily house	0.0	0.0	0.0	-3.3
Apartments	22.4	2.1	14.3	2.9
Total	**10.1**	**0.9**	**6.4**	**-0.4**
Measure 2:	**All single houses (cost reduction of BGN 268/year)**			
Single house	19.8	2.3	15.9	7.6
Multifamily house	0.0	0.0	0.0	-0.7
Apartments	0.0	0.0	0.0	-0.6
Total	**8.8**	**1.0**	**7.1**	**3.1**
Measure 3:	**All single houses (cost reduction by 33%)**			
Single house	24.4	4.0	17.4	13.6
Multifamily house	0.0	0.0	0.0	-3.3
Apartments	0.0	0.0	0.0	-2.0
Total	**10.8**	**1.8**	**7.7**	**4.8**
Measure 4:	**Low-income households (cost reduction of BGN 268/year)**			
Single house	13.4	0.0	13.4	5.4
Multifamily house	9.1	0.0	9.1	3.6
Apartments	11.3	0.0	11.3	1.9
Total	**12.0**	**0.0**	**12.0**	**3.7**

[16] The presence of negative results in the last definition again shows the inapplicability of this definition in Bulgaria. Low income-high cost is a very popular definition in Western Europe, and is the official one for England in the UK. However it uses not the actual, but the modelled individual cost for a home. We do not have such a regulatory cost and such a database.

Targeting measures specifically on households below the poverty line would involve more single-family homes.

3. Conclusion

The effect of the Green Deal on the well-being of the population will be small, as the level of energy poverty in Bulgaria is high. In Bulgaria, people already consume the minimum amount of energy needed to survive the winter, and any upgrade of the building envelope would increase their comfort, but would fairly reduce their cost. This is also a good effect, but the expectations for energy savings can only remain on paper.

In order to reduce poverty, it is necessary to develop small investment tools for more households and to apply a differentiated income criterion.

The analysis of the NSI data shows **the impossibility of a complete or tangible reduction of energy poverty by reducing energy cost**, as household income is a stronger determinant. In order to make better use of the budget provided for the Green Deal, it is important to expand the possibilities for creating more prosumers[17], so that the measures have a double effect – to reduce costs and generate income. Only in this way, over time, can these measures partially replace social benefits for low-income families, as they now fail to have a long-term effect. Targeting a resource (program) to low-income families in single-family homes would be the fastest and most appropriate measure for the strongest possible effect, and could, with much less investment, lead to a significant difference in the well-being of the population.

The introduction of an official definition close to the current official poverty line with deduction of energy costs, as well as the development of special measures linked to the definition, will significantly support the work in implementing the measures to achieve the objectives of the Green Deal. Such a definition can use the indicator for poverty after energy. A stronger effect is a great incentive for any government to develop and implement specific tools specifically for energy-poor households with differentiated income criteria.

It is important that the government's approach is comprehensive and combines both approaches – energy cost reduction and income increase (Peneva, 2017). Otherwise, it may have little effect on energy poverty in general. Reducing energy poverty must go hand in hand with measures to reduce poverty and inequality, otherwise, it will not be effective.

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