ComAct

Community
Tailored Actions
for Energy Poverty
Mitigation

Guidebook on the concept of energy poverty and its relevance in the five pilot countries

Energy poverty in multi-family buildings in the post-socialist regions

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ComAct Community Tailored Actions for Energy Poverty Mitigation

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Executive summary

This guidebook provides evidence-based information on the nature of energy poverty (EP) in urban multi-family apartment buildings (MFABs) in three post-socialist regions in the Eastern part of Europe: Central and Eastern Europe (CEE), the former Soviet republics, and the Balkan region. The results are primarily based on a household survey conducted in the autumn of 2021 with 1,025 respondents in the five ComAct pilot sites: **Burgas** in Bulgaria, **Budapest** in Hungary, **Karposh** (Skopje) and **Kavadarci** in North Macedonia, **Odessa** in Ukraine, and **Kaišiadorys** and **Tauragė** in Lithuania.

The survey research is complemented by scientific literature and national and local data on the survey sites. The guidebook consists of three main parts:

Chapter 1

provides a comprehensive picture of the survey sites and the characteristics of the surveyed population. The research targeted owners living in non-renovated multi-family apartment buildings in a below average technical and/or social position, with a significant number of energy poor residents. The results focus on this specific segment, which usually receives less attention in the energy poverty literature. The summary shows that the households reached are older, have fewer children but are higher-educated than the national average, in line with the character of urban poverty.

Chapter 2

presents the main risk factors of energy poverty in the segment of vulnerable multi-family apartment buildings and specifies target groups for related policies. The analysis builds on the *Overview report on the energy poverty concept* [1], which discusses various understandings of energy poverty and how it is manifested in the CEE, CIS and Balkan regions. It explores the causes of energy poverty including factors like income, energy cost, technical conditions of buildings, heating systems and other social and physical features.

Chapter 3

aims to answer the crucial question: what makes owners, even poor ones, willing to contribute to a building renovation? The chapter explores ways of involving energy-poor communities in building renovations, which is considered to be one of the most efficient and sustainable ways of tackling energy poverty in multi-family apartment buildings.

The guidebook calls attention to the differences between these regions and Western and Northern Europe that have implications for energy poverty:

- Energy prices are generally lower than in the western part of Europe, but make up a higher share of household income, since incomes are generally much lower.
- The physical state of multi-family apartment buildings is much worse.
- Over 90% of the housing stock is in private ownership, so energy poverty is not concentrated in the public rental stock and renovation measures require the involvement of low-income owners.

The following conclusions were formulated about the ***nature of energy poverty*** and its relation to the ***willingness of the owners to support renovation measures*** financially.

- Energy poverty has multiple faces. Measuring them by different indicators reveals different factors behind energy poverty and highlights somewhat different groups suffering from energy poverty. Some people are more exposed to insufficient thermal comfort, while others are more affected by the affordability dimension of energy poverty.
- The strongest factors behind energy poverty, regardless of which indicator is used, are low income, older age and the size of the living space/person. These factors are relevant in all five pilot locations, while technical factors (like heating types or building size) are more country-specific.
- In multi-family apartment buildings, single pensioners are at greatest risk from energy poverty. This is partly due to their generally lower income and the proportionally large living space they have to heat or cool.
- Household attributes that appeared to be less relevant to energy poverty than expected include education level, having 1-2 children, and having control over energy consumption.
- Income level is the most important indicator of the amount people are willing to pay for renovation, either as a lump sum or in instalments. Age is an important additional factor: younger residents are more eager to contribute to the renovation costs.
- Regardless of income level and age, residents living in financially more stable communities are more likely to pay for a renovation. Cohesion among the residents also plays a role: those who are dissatisfied with the community and are afraid of high arrears rates are less likely to contribute.
- Even in multi-family apartment buildings where a significant share of the households can be considered energy poor, the majority of the respondents show a willingness to contribute financially to the renovation costs, especially in instalments.

These observations have a consequence on formulating ***policies against energy poverty***.

- Energy poverty definitions should be based on the national/local context and should cover both the comfort and the affordability aspects of energy poverty.
- As income is the most crucial factor behind energy poverty the financial scheme for renovations has to include a grant element that allows buildings with low-income owners to participate.
- While older people (especially single pensioners) are at greatest risk, they are also least likely to contribute to renovation. This indicates that special policies have to be developed for this target group both on a local level and on a building level, which may include tailor-made social subsidies and mobilising family support in the renovation process.
- Stable building communities are the foundations of renovation activities, so states or local municipalities must act to strengthen the operation of multi-family buildings. Such efforts may include well-designed legislation for multi-family apartment buildings, establishing joint loan financial schemes, providing technical assistance for communities to improve the efficiency of management, and supporting condominiums in arrears management.

Introduction

This guidebook provides in-depth information to policymakers on EU, national and local level on the issue of energy poverty. It focuses on the specific situation in the post-socialist countries through the examples of Bulgaria, Hungary, Lithuania, North Macedonia and Ukraine. Policymakers at various levels can use the lessons and recommendations presented to create tailored policies to support the deep renovation of the lower-status segment of the residential housing stock in the area.

For several reasons, such as the largely owner-occupied and partially run-down residential building stock, the high dependence on oil and gas, low household incomes, and less-developed social assistance, **energy poverty is much more of an issue in the post-socialist regions than elsewhere in Europe**. A particular issue is the high share of multi-family apartment buildings in the urban environment, which were largely constructed in the socialist era, often without proper insulation as energy efficiency standards were low at that time. In certain countries these buildings, which are mainly owner-occupied, operate without a clear legal framework for housing associations. Importantly, there is a big spatial difference regarding the energy efficiency of the building stock: countries of the former Soviet Union and the Balkan region face a much more severe energy efficiency problem than the CEE region. Russia's invasion of Ukraine will undoubtedly make both the financial and technical conditions more severe.

Heating with firewood and other solid fuels is more widespread in CEE and the Balkan region than in the Western and Northern parts of Europe. Heating with solid fuels is especially widespread in rural and suburban areas, but in the Balkans it is present in urban areas as well, even in multi-family apartment buildings, which happens very seldom in the rest of Europe. As these fuels are rarely included in utility costs, the share of households with arrears on utility bills most probably underestimates the level of energy poverty in these countries. Energy poverty indicators also fail to capture the harmful effects of air pollution on these neighbourhoods as a result of heating with solid fuels and old stoves.

Household incomes in these regions are substantially lower than the EU average, which has important consequences both for the energy poverty of residents and the energy efficiency of the building stock. Even with the same share of energy expenditure within the household budget, the absolute amount of residual income might make a huge difference to the social situation of a given family or person. Also, low wages and limited personal savings make energy-efficient investments hardly affordable or attractive for residents. State support and financial tools for lower-income people are therefore particularly important in these countries.

In post-socialist countries, energy poverty in multi-family apartment buildings typically affects homeowners, frequently with a mixed social composition within the same building. As energy efficient interventions with the highest impact (e.g. deep renovation of buildings) require building-level action and the cooperation of different homeowners, there is a need for a method to identify energy-poor buildings as well as energy-poor households.

This happens even though policies in many post-socialist countries focus on keeping energy prices low; energy price subsidies, regulated prices and non-competitive energy markets are typical policy tools in many post-socialist countries. While keeping prices low contributes to the affordability of energy and can help energy-poor households to avoid debts and secure a certain level of energy provision, in itself it is not sufficient to tackle energy poverty. On the one hand, it does not provide a sustainable solution, and on the other, universally low energy prices disincentivise energy-efficient renovations by extending the payback period of an investment, especially in the case of deep renovations. As inefficient residential buildings are one of the most significant

sources of CO_2 emissions and air pollution in Europe, keeping the price of energy at unsustainably low levels can also be considered problematic from an environmental perspective.

The unique situation in the post-socialist regions means that EU, national and local policies and funding streams need to keep both specific target groups and circumstances in mind. This guidebook aims to help with precisely that. It seeks to showcase the specific issues in five selected countries – Hungary, Bulgaria, North Macedonia, Lithuania and Ukraine – in the region, and show how energy poverty appears in owner-occupied multi-family apartment buildings. The overall aim of the guidebook is to support the design of policies and programmes tailored to these countries to reach a decarbonisation of the European building stock by 2050 through deep renovation.

The guidebook's findings are based on the already developed deliverable of the ComAct project that aimed at summarising the scientific concept of energy poverty[1], and a household survey[2] conducted in autumn 2021 in the five pilot locations, involving 1,025 respondents living in multi-family buildings in urban areas.

[1] The deliverable can be found at: https://comact-project.eu/pilot_content/overview-report-on-the-energy-poverty-concept

[2] For the methodology see Annex A. The questionnaire is available in Annex B.

1. Overview of the surveyed population

1.1. About the survey sites[3]

BULGARIA

- EU Member State, post-socialist country in the eastern Balkans, CEE
- Population: 7 million
- GDP/capita: US$9,976
- HDI: very high, 56th

Burgas

- Population: 202,700
- Located in eastern Bulgaria, on the Black Sea coast

LITHUANIA

- EU Member State; former Soviet country in the Baltic region, CEE
- Population: 2.8 million
- GDP/capita: US$20,000
- HDI: very high, 34th
- Tauragė Population: 21,520
- Located on the Jūra River, close to the Baltic Sea coast

Kaišiadorys

- Population: 7,366
- Located between Vilnius and Kaunas

REPUBLIC OF NORTH MACEDONIA

- Non-EU state; former Yugoslavian state in the southern Balkans
- Population: 2 million
- GDP/capita: US$5,900
- HDI: high, 82nd

Skopje, Karposh district

- Capital of North Macedonia
- Population: 595,000
- Located in the north of the country, on the Vardar River

Kavadarci

- Population: 38,741 (2002)
- Located near Lake Tikveš

UKRAINE

- Non-EU state; former Soviet country in Eastern Europe
- Population: 44 million
- GDP/capita: US$3,727
- HDI: high, 74th

Odessa

- Population: 114,430
- Located in the south-west of the country, on the north-western shore of the Black Sea

At the time of finishing this report, Ukraine is being attacked by the Russian army. All results presented in the guidebook apply to the situation preceding the invasion, and their relevance may be affected by the war.

HUNGARY

- EU Member State; post-socialist country in Central Europe
- Population: 9.7 million
- GDP/capita: US$15,900
- HDI: very high, 40th

Budapest

- Capital of Hungary
- Population: 1.7 million
- Located in the middle of Hungary, on the River Danube

[3] The Human Development Index (HDI) is a summary composite measure of a country's average achievements in three basic aspects of human development: health, knowledge and standard of living. HDI combines four major

1.2. Sampling and methodology

In the survey process, we interviewed 1,025 households in five countries. (There were 200 respondents everywhere, except for Lithuania, where the sample was slightly bigger, 225.) The respondents were all homeowners. Sampling happened on several levels, as it had to ensure that the survey found a very specific population segment: households living in multi-family buildings that have a higher than average share of energy-poor residents. (The details of sampling can be found in the Annex.) As a result, the survey is not meant to be statistically representative, although national data, where available, did provide an important reference point. Rather, it aims to reflect the ongoing processes in energy-poor areas and shed light on how energy poverty becomes apparent in an urban multi-family building context and how it influences potential renovation processes. The multi-family segment was an especially important condition since very little is known about the context of energy poverty within these condominiums and cooperative buildings, as energy poverty statistics tend to focus on households as a unit of analysis. More generally, country-level studies tend to analyse urban and rural energy poverty together, while the two differ substantially.

As a result, well-known energy poverty indicators do not allow an in-depth understanding of how energy poverty appears in multi-apartment buildings, let alone the specific post-socialist context. In the countries of the former Easter bloc, low-income households became owners in multi-family buildings as a consequence of mass privatisation after the transition. The cost of maintenance and renovation in these building must be shared between (at times) a very heterogeneous set of owners.

Taking into consideration these prerequisites, the five pilot teams aimed to find a population that is more exposed to energy poverty. To do so, they chose multi-family buildings:

- where major energy efficiency interventions have not yet taken place;
- in lower status areas in their cities; and/or
- in which the residents' socioeconomic status is presumed lower than average.

The pilots targeted neighbourhoods and buildings based on data available, so the exact selection criteria varied from pilot to pilot. Additionally, the buildings were chosen to include a variety of heating and construction types as both of these contribute to energy poverty. The actual survey process was left to professional companies, ensuring a qualified selection process for all pilots. Nevertheless, there could be slight deviations from the expectations, as no sampling is perfect.[4]

1.3. Demographic characteristics

Surveyors in the pilots were asked to try to avoid overrepresentation of any age group. Nevertheless, the general picture that emerges from the sample is that the respondents:

- are rather advanced in age;
- seem to have fewer children;

indicators: life expectancy, expected years of schooling, mean of years of schooling ,and gross national income per capita.

[4] A more detailed description of the sampling methodology can be found in Annex A.

- live alone to a greater extent than the national statistics of their respective countries would suggest.

This could be because of the special target group of the survey, but also due to the designated pilot areas that all have their specific demographic dynamics.

Regarding age, there are large differences within the sample, varying between 51.2 years as an average (Lithuania) and 59.4 years (Ukraine). The Lithuanian site had only 28% of respondents over 60, which is slightly lower than the national average of 33%. At the same time, in Hungary, the sample's 41% is way above the national 26%. The share of respondents above 60 years was the highest in Ukraine at 53% (See Figure 1). Both the Hungarian and the Ukrainian phenomena can be explained by the particular characteristics of the surveyed neighbourhoods, as urban low-income areas in multi-unit buildings have a very high share of older people. Additionally, people belonging to this age group have more time and seem more willing to respond to surveys.

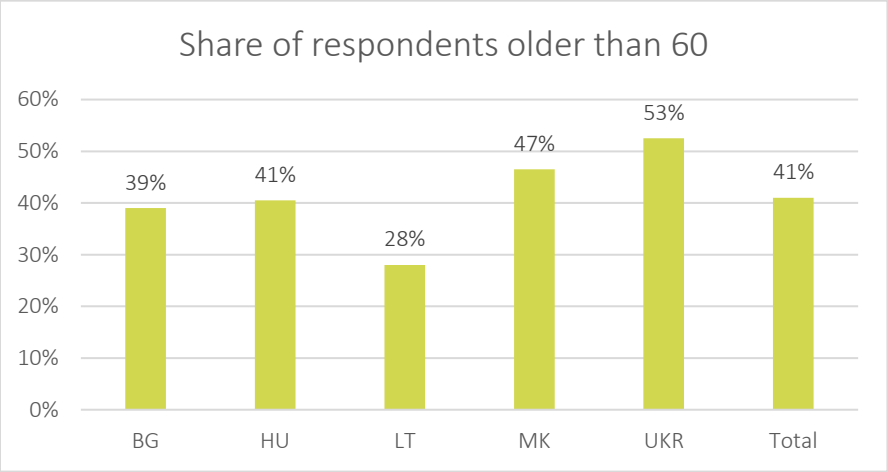


Figure 1 - Share of respondents older than 60

This age structure has a direct consequence on other demographic characteristics of the sample, namely the number of children and the household size of the respondents. **The overwhelming majority of respondents (80% across all countries) live in households without children.** In the Hungarian sample, the proportion of childless households reached almost 90%. By contrast, in Bulgaria, where 25% of the households had children, which is actually higher than the national average (19%) (see Figure 2 for details).

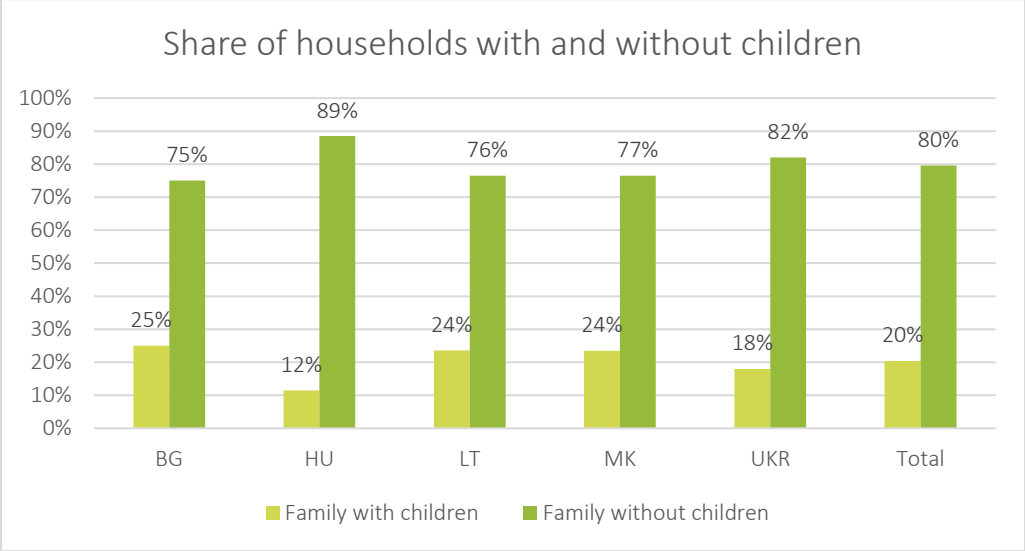


Figure 2 – Share of families with and without children

Family structure matters from the perspective of the current analysis, as the sample in this case does not allow us to look into energy poverty problems specific to large families with children.

Finally, the share of single-person households is an important variable. People living alone are dramatically less likely to be able to cope with crises, pay bills (including energy bills) or pay for energy efficiency investments. Hungary stands out here, with 47% of the sample being single-person households, compared to the national average of 31%. The Lithuanian sample also has a high proportion of single-person households at 45%, although this is not much larger than the national average of 40%. Single-person households are less apparent in Bulgaria (18%, lower than the national average, which is similar to Hungary's). In North Macedonia and Ukraine, the proportion of single-person households was significantly higher than average: 30% in North Macedonia, where the official average is below 10%, and 29% in Ukraine, where the national average is 18.7% and the regional average in Odessa – where the pilot buildings are located – is slightly above 10%.

1.4. Financial situation of households

The income of the surveyed people depended a lot on their age structure. **Older respondents have less income than younger ones**. The difference seems to be the biggest in Lithuania and the smallest in Ukraine. The average Lithuanian respondent over 60 had a monthly income of €343, whereas below 60 this is €693.[5] In Ukraine respondents over 60 had a monthly average income of €169, while for those below 60 the average was €186. Still, big differences within a country don't seem to directly correlate with households' subjective financial assessment. Older households were actually the most satisfied with their income in Lithuania, and the least in Ukraine, but generally respondents over the age of 60 are much less satisfied with their financial situation. Looking at the financial satisfaction level in the whole sample, the highest rate was in Lithuania – slightly more than 20% of the sample said that they were living comfortably with their present income – and the lowest in

[5] Equalised household income per person.

North Macedoniaand Ukraine. This is partially likely related to the fact that the income in Lithuania is the highest, whereas in Ukraine is the lowest. In North Macedonia the income of respondents below 60 reached €374 on average, which is only slightly more than half of the overall average in the Lithuanian sample.

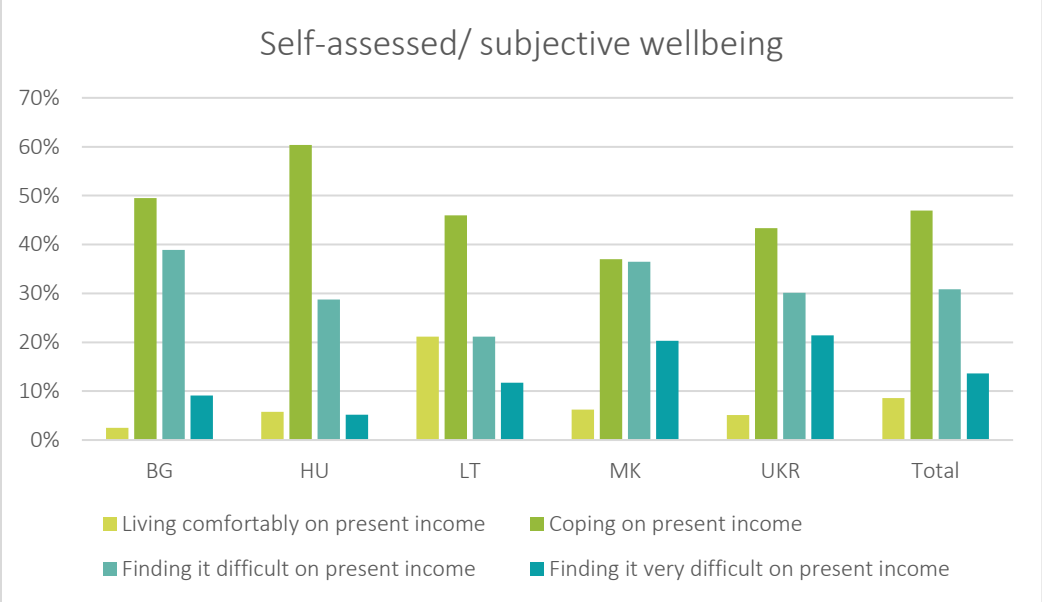


Figure 3 – Self-assessed/subjective wellbeing

As we will see in the analysis in Chapters 2 and 3, **households with higher income levels are not necessarily more satisfied with their financial situation than lower-income households**. What seems to influence the self-assessed financial situation more strongly is education level. Respondents with a higher education degree seem to be more likely to be satisfied than those without.

Unemployment plays an important role in only a few countries from the sample, most importantly in Macedonia. Here, 12% of the households have an unemployed member, compared to Hungary with just 2%.[6] This data corresponds to national statistics, where the tendencies are similar, although the numbers are occasionally slightly higher (e.g., the unemployment rate was 3.8% in Hungary, 5.5% in Bulgaria, and 6.7 in Lithuania in September 2021, according to Eurostat). These relatively low unemployment figures reflect labour force shortages in many countries in the post-socialist regions, despite the economic difficulties of the pandemic.

Table 1 Share of households with an unemployed member

	BG	HU	LT	MK	UKR	Total
Someone is unemployed in the household	4%	2%	6%	12%	6%	6%

[6] Note that the share of respondents being unemployed in the sample is not equal to the unemployment rate, as unemployment rate is measured among those who are active in the labour market and not among the whole population.

Education level is another factor that may influence energy poverty. The following figures display the share of respondents with elementary, secondary and higher levels of education[7].

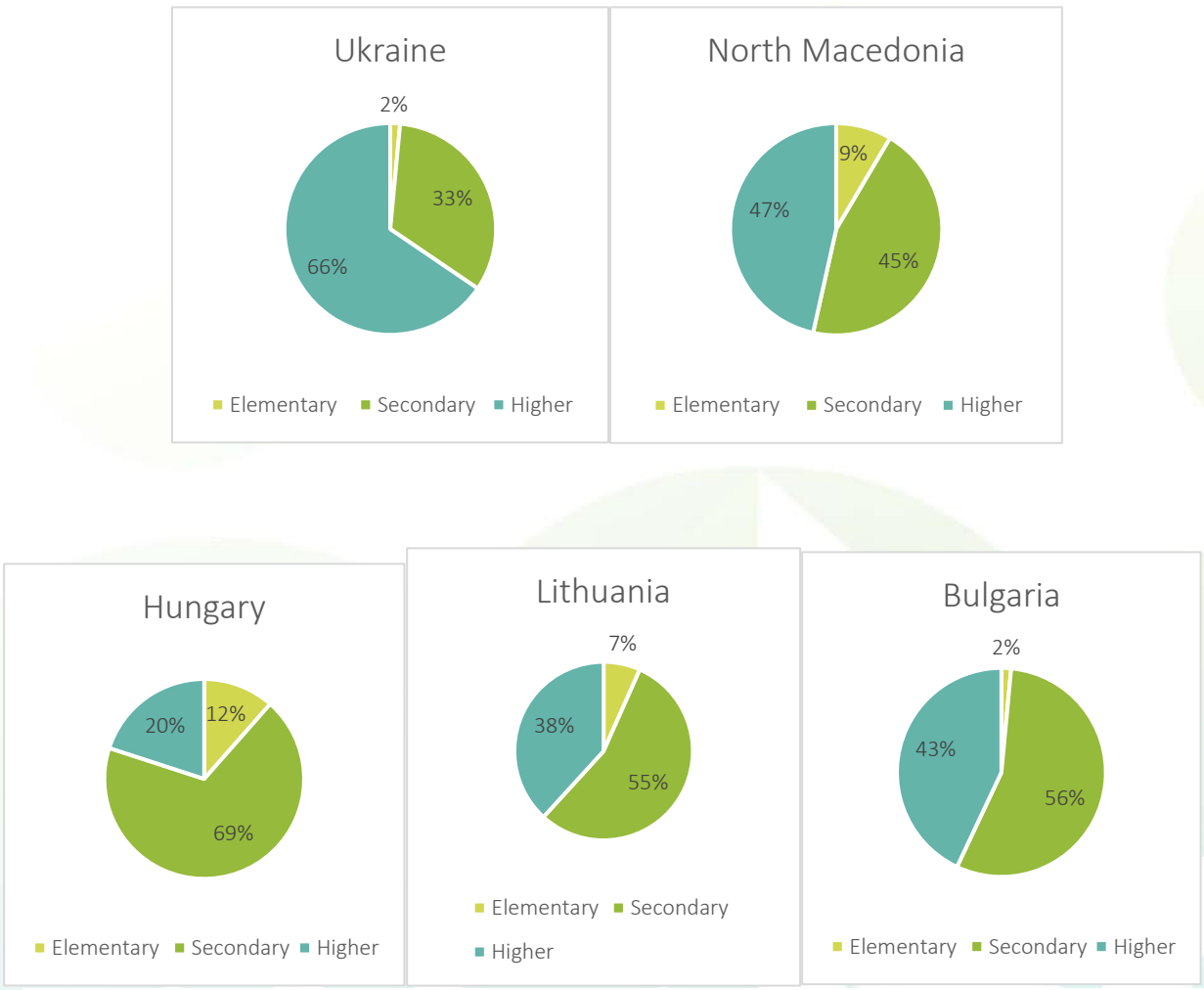


Figure 4 – Share of respondents with elementary, secondary and higher levels of education in each survey country

The education level in the sample is strikingly high in Ukraine (66% with a higher education degree) but it is also surprisingly high in North Macedonia (47% with a higher education degree) and Bulgaria (43% with a higher education degree) – both significantly higher than the national average. Only in the Hungarian sample is the education level lower than the national and most importantly the Budapest level, indicating that the sample focuses on the lower status areas of the city.

Based on factors presented above, we can draft a social profile of the surveyed population in the five pilot countries.

[7] The three-level scale simplifies the education levels in each country to allow comparison.

	BG	HU	LT	MK	UKR
Age	Middle-aged	Older	Younger	Older	Older
Having children	Many children	Few children	Moderate children	Moderate children	Few children
Household structure	Bigger families	High share of singles	High share of singles	Medium, but more single than national	Medium, but more single than national
Subjective income assessment	Moderate income	Moderate income	Mixed income distribution	Poorer	Poorer
Education	Highly educated	Less educated	Highly educated	Highly educated	Highly educated
Complex profile	**Active population with moderate income**	**Older, lower middle class**	**Mixed social composition**	**Older, educated, struggling financially**	**Older, educated, struggling financially**

Table 2 - Social profile of the surveyed population in the five pilot countries

Overarching characteristics of the sample

Although household size is often a factor in determining energy poverty, the sample does not allow us to look into the matter of families with many children. However, this also reflects the common character of urban poverty, which is more focused on single-person/single-provider households	Data highlights the importance of age as a determining factor influencing the financial situation and, thus, the vulnerability of older respondents	The unemployment rate is relatively low everywhere, and could not exert a tangible influence on energy poverty for this analysis.

1.5. Buildings and neighbourhoods

Although the neighbourhoods where the selected buildings are situated are not in the focus of the inquiry, some general remarks can be made based on the survey results. We can observe that the people moving in after 2015 are typically younger, a bit more affluent, and have a higher level of education than earlier occupants. The

socioeconomic characteristics of the newcomers suggest a **stable, stagnating area in all survey sites, definitely not urban slums**. The changes in the residents' social composition are in line with national trends since younger people have higher levels of education everywhere. Similarly, a 'privatisation effect' is apparent, since many of the former residents were able to buy their homes in the privatisation process at a reduced price, while the newcomers needed to buy their apartments on the market, necessitating higher income levels than many older residents have.

The buildings themselves are in variable condition. This is a result of the sampling method: the pilot partners targeted buildings with lower-income residents, where regular maintenance is often difficult, and/or with worse-than-average energy efficiency parameters. None of the surveyed buildings had went through a major energy efficient refurbishment.

The selection process resulted in the following building types in the five pilot locations. The photos are illustrations of the building types, not the exact buildings surveyed.

Burgas, Bulgaria

The heating type was the main selection criteria in Bulgaria, where buildings with and without district heating were included. Here the surveyed buildings are dispersed in three neighborhoods, none of them more prestigious than any other.

Figure 5 – Typical multi-family apartment buildings in Burgas, Bulgaria (illustration of the selected building types). Source: ComAct

Budapest, Hungary

In Hungary, three building types were surveyed which are typical in multi-family settings in Budapest:

1. Buildings built before World War II with traditional building technologies
2. Buildings built in the 1950s-1960s with brick and industrialised blocks
3. Buildings in the biggest housing estate of the district built from prefabricated concrete panels (see Large Panel System, LPS construction method) in the 1970s.

They are located in three separate neighbourhoods in District 3 of Budapest. None of the three areas are considered 'slums' or severely marginalised, even though they have many poor residents. The buildings were selected based on a so-called ‘crisis map’, which was available for the pilot team and highlighted those blocks of flats in the city that suffer from social deprivation taking into account several social factors (e.g. unemployment, education level, the share of municipal units, etc.). In Budapest, residents of panel buildings – which took up 50% of the Hungarian sample – tend to be on lower incomes and sometimes also less educated. This half of the sample includes panel buildings located on the outskirts, which also makes residents more likely to have a lower socioeconomic status.

Figure 6 – Typical multi-family apartment buildings in Budapest, Hungary (illustration of the selected building types). Traditional pre-WWII (top), 1950s-1960s (middle), large housing estate built with panel technology (bottom). Source: ComAct.

Tauragė and Kaišiadorys, Lithuania

Lithuania selected:

1. Brick buildings with district heating

2. Panel buildings with district heating.

Both types are built in the socialist era. Almost all buildings are connected to the district heating system, but some dwellings have been disconnected and use individual heating. The survey sites are two small towns (Tauragė and Kaišiadorys), in which the surveyed buildings are dispersed. The survey included different neighbourhoods. It covered almost all multi-family apartment buildings in Kaisiadorys, and those that were not yet insulated in Taurage. The two building categories do not have distinctive features, either socially or from technical and energy efficiency points of view. They are both typical building types in the country among multi-family apartment buildings.

Figure 7: Typical multi-family apartment buildings in Tauragė and Kaišiadorys, Lithuania (illustration of the selected building types). Source: ComAct.

Karposh district of Skopje and Kavadarci, North Macedonia

In North Macedonia the building selection only took into consideration the construction year, creating two categories:

1. Buildings built before 1965
2. Buildings built between 1965 and 1980

The latter category was expected to house more people with small incomes. The selected buildings are located in two municipalities, Karposh and Kavadarci. Karposh is one of 10 municipalities in the capital city of Skopje. Kavadarci is a city with 118 multi-family apartment buildings; the selected buildings are dispersed throughout the city. The whole territory of the Karposh municipality is connected to the district central heating, so the homeowners have an option to use or not to use it; homeowners from Kavadarci don't have available district heating and their only available option is individual heating.

Figure 8: Typical multi-family apartment buildings in Karposh district of Skopje and Kavadarci, North Macedonia (illustration of the selected building types). Source: ComAct.

Odessa, Ukraine

In Ukraine, the survey was conducted in the city of Odessa. Three major building types were selected:

1. 5-storey buildings, so named “Khrushchovkas”, constructed between 1957 and 1985
2. 9-storey buildings, constructed from prefabricated building panels
3. 16-storey buildings (high-rises).

According to social indicators, there are no specific slum areas in Odessa, but the buildings were selected based on the rate of arrears being higher than average. The buildings are located in three districts: Kyivksy, Malinovsky and Suvorovsky.

Figure 9: Typical multi-family apartment buildings in Odessa, Ukraine (illustration of the selected building types). 5-storey "Khrushchovkas" (top), 9-storey panel buildings (middle), 16-storey high-rises (bottom). Source: Wikimedia Commons.

The survey results reflected the assumption that residents with higher education or income levels prefer certain building types. In Hungary, for example, there is a prestige hierarchy between the building types, with the traditional brick buildings housing proportionally slightly better educated and higher-income respondents. At the same time, no such correlation could be established in North Macedonia, while in Ukraine the pattern is rather contradictory: residents in the high rises (16-storey buildings) tend to be slightly better off, while the other two building types attract comparatively more residents with a higher education degree.

Regarding the condition of the building, we can rely only on the subjective assessment provided by the surveyors, as we did not have the opportunity to connect the survey with technical audits. The following figure presents the surveyors' external evaluation of the buildings.

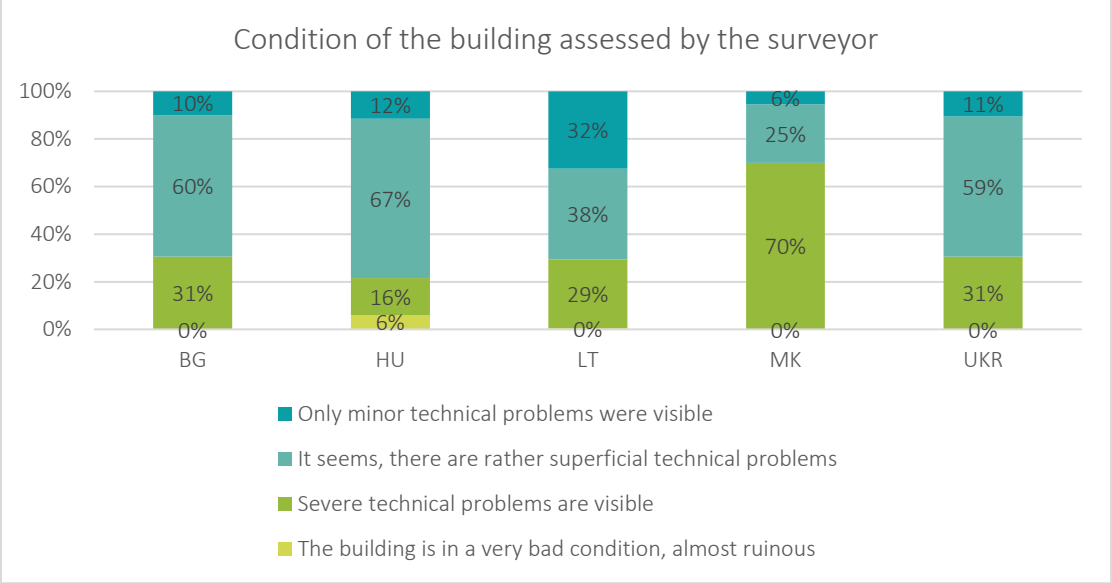


Figure 10 – Building condition assessed by the surveyor

The perspective of the surveyor doesn't allow us to make a cross-country comparison, as surveyors most probably evaluate the buildings compared to a typical building in the given country. Rather, the figures illustrate the condition of the buildings compared to their counterparts in the same location. Regarding the social composition of the buildings, we see a significant connection between the financial situation of the respondent and the building conditions. In three countries – Bulgaria, North Macedonia and Lithuania – **respondents with a lower income are more likely to live in buildings that were found to be in an unsatisfactory condition** by the surveyor.

Regarding the dwelling size, the sample seems very balanced, and only Bulgaria stands out. Here the average dwelling size is 20-25 m^2 bigger than apartments in the four remaining countries.

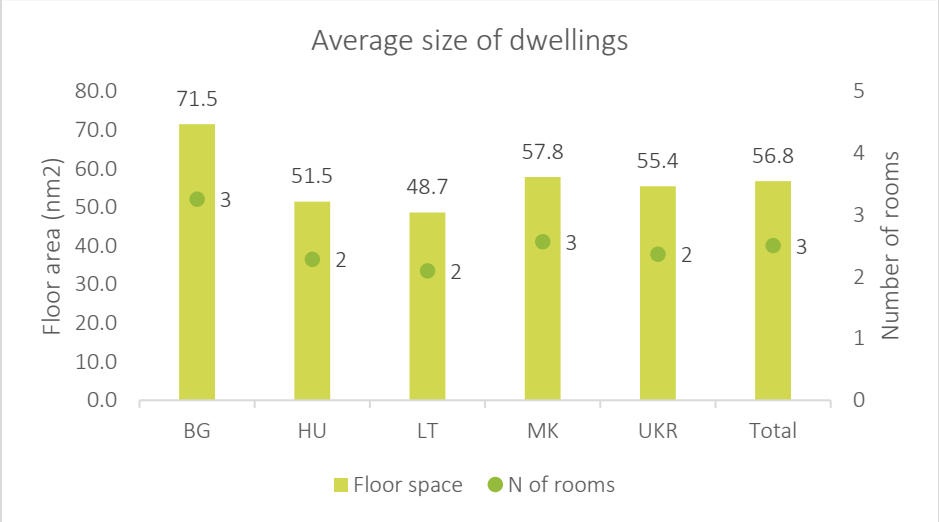


Figure 11 – Average dwelling size

Finally, we surveyed the heating system of the buildings. This is a crucial factor in energy poverty, as it profoundly influences the cost of heating and also a household's ability to regulate its consumption. We looked at the use of district heating, which can be an environmentally friendly but rather inflexible way of heating, often hard to regulate and adapt to the actual dwelling use.

We found large variations between countries, the result of the different sampling strategies (see above). In Ukraine and Lithuania, the overwhelming majority of households live in buildings with district heating, whereas in Bulgaria only one-fifth of the respondents have access to district heating. The Hungarian and Macedonian samples are between.

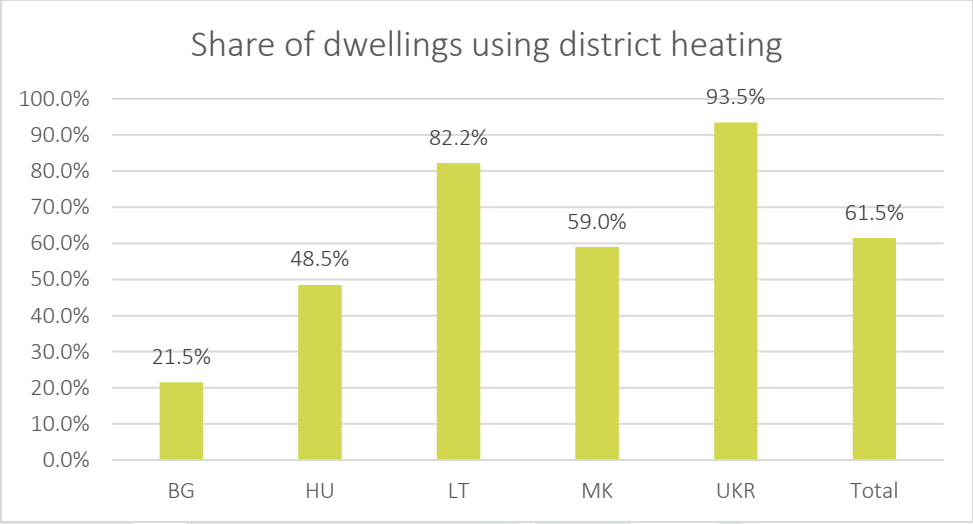


Figure 12 – Share of dwellings using district heating

In every country, households could or still can leave the district heating system, even where this is the dominant heating form in the building. In our sample 15-17% of the households have chosen to do so in Bulgaria and Lithuania. These households could choose from alternative heating sources, including electric, heating with air conditioning or even wood. While this strategy allows great flexibility for a household, it adversely affects the environment in numerous circumstances.

If we look at the general heating picture country by country we can see that households that do not use district heating as their primary heating source often choose individual electric solutions or an air conditioner for heating. Both of these options are feasible and preferred in Southern countries, as the pie charts show below.

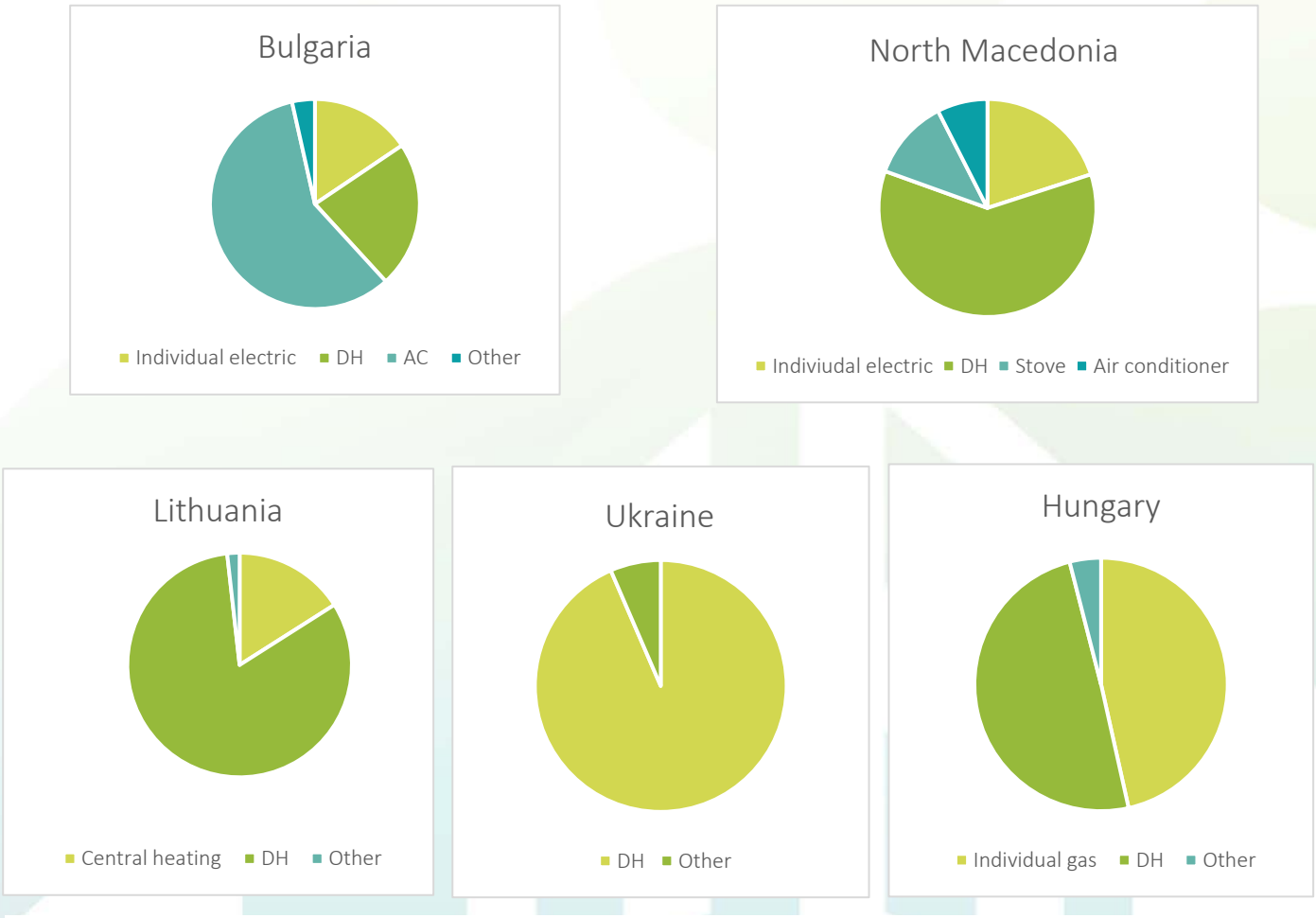


Figure 13 - General heating usage in the five countries

Macedonia's multi-family apartment buildings stand out in their use of wood and coal to heat, which is less common elsewhere. In Hungary, the importance of gas heating stands out, which allows individual heating for the dwellings.

Fuel usage varies considerably between the EU Member States and associated countries. Solid fuels such as coal and biomass are more widespread in Central and Eastern Europe than in Western Europe. Zooming in on the individual Member States in these regions, it becomes clear that the use of solid fuels is also unevenly distributed within countries. In particular, rural and suburban areas have a higher tendency to depend on such fuels. The main reason for using these fuels is a lack of modern energy services, such as gas and renewables, or sufficient energy infrastructure

Our analysis of the physical characteristics of our sample, which provides insight into on multi-family apartment buildings with a higher-than-average share of energy-poor households, is summarised in the following table:

Table 3 - Analysis of the physical characteristics of our sample

	BG	HU	LT	MK	UKR
Selected building types	**Burgas**: • Panel with DH • Panel without DH Non-insulated	**Budapest**: • Before WWII, traditional • 1950s-60s brick and blocks • 1970s panel Non-insulated	**Kaišiadorys and Tauragė:** • Brick • Panel Non-insulated	**Karposh (Skopje) and Kavadarci:** • Before 1965 • 1965-80 Non-insulated	**Odessa**: • 5-storey 'Khrushchovkas' • 9-storey panel • 16-storey panel Non-insulated
Condition of the buildings, according to surveyors	Acceptable /poor	Acceptable	Mixed	Most problematic	Acceptable /poor
Average dwelling size	71.5 m²	51.5 m²	48.7 m²	57.8 m²	55.4 m²
Heating types	District heated and individual (air conditioner, electricity)	District heated and individual (gas)	District heated and individual (central gas)	District heated and individual (air conditioner, electricity, solid fuel)	Predominantly district heated

General notes

Energy poverty in multi-family apartment buildings often appears in stable neighbourhoods, where the population is mixed.	Residents of multi-family apartment buildings in the region use a variety of heating methods, including even solid fuels like wood and coal in North Macedonia, which is very different from heating sources typical in Western Europe.

2. Energy poverty in multi-family apartment buildings in CEE, CIS and Balkan countries

2.1. What is energy poverty?

Energy poverty is not the same as *income poverty*. Although income poverty is an important factor, energy poverty deserves its own definition because it requires specific, energy-related issues to be resolved. Households may become energy poor even if they are not income poor simply because of the technical condition of their habitation – for example, they may live in badly insulated and larger dwellings, or have access only to more expensive sources of heating, like electricity.

In Europe, energy poverty is primarily caused by the combination of low income, high energy prices and poor energy performance of buildings [1]. These are not mutually exclusive causes of energy poverty and can occur simultaneously. Moreover, in certain areas, overall availability of energy services may be insufficient.

Energy poverty is hard to define, as illustrated by the variety of definitions of energy poverty and the uncertainty of international comparisons. However, growing awareness among policymakers and civil society about the impact of energy poverty and the lack of a common definition and monitoring system have contributed to these issues becoming central in the political agenda in the EU.

In 2021 the European Commission established an Energy Poverty Advisory Hub (EPAH) [2], which aims to assist scientists and policymakers in establishing a shared understanding of the concept of energy poverty and designing measures against it. According to the Hub, "adequate warmth, cooling, lighting, and energy to power appliances are essential services needed to guarantee energy-efficient homes and a decent standard of living, thermal comfort, and citizens' health. Energy poor households experience inadequate levels of these essential energy services." The inadequate level of services may be rooted in financial or technical causes or the combination of the two.

In early 2022, members of the European Parliament for the first time proposed an EU-wide energy poverty definition [3]:

"*Households in the lowest income deciles whose energy costs exceed twice the median ratio between energy costs and disposable income after deduction of housing costs*."

Because energy poverty is a multi-dimensional phenomenon that can be measured in several ways, multiple indicators exist to quantify it. The EU Energy Poverty Advisory Hub has published a guideline with four primary indicators that can be used to measure energy poverty. These indicators are [4]:

- The inability to keep the house adequately warm (subjective assessment of the resident)
- Arrears on energy bills[8]
- High share of energy expenditure: share of households with energy costs above twice the national median (2M)

[8] These two indicators are measured in a comparative way by the European Union Statistics on Income and Living Conditions – EU SILC.

- Low absolute energy expenditure or 'hidden energy poverty' – share of households with energy expenditures below the half of the national median (M/2).

As this list shows, some indicators are describing the lack of sufficient ***comfort in the dwelling*** (inability to keep the home warm), while other indicators are pointing at the ***affordability of energy*** – either manifested in a form of arrears on utility bills or in disproportionate energy costs compared to the household's income (2M). The different indicators indicate different phenomena. The 2M indicator mostly focuses on households who have to spend too much of their income on energy because of their low income and/or high energy costs, while the M/2 indicator can reveal households that are economising on energy by under-heating. Additionally, the different indicators put different target groups into focus: while certain indicators are crucial in an urban context, others occur more in rural environments. Similarly, while some indicators point mostly to single pensioners others are more sensitive to families with children.

There have been several other attempts to develop an indicator that grasps the core of the problem adequately, such as the Low Income High Cost (LIHC) indicator; however, these are mostly quite complicated to measure.[9] The difficulty of all measurements is to provide a sophisticated enough definition while having appropriate data to use it. For example, both the comfort of the dwelling and the affordability dimension of energy poverty are grasped well by the LIHC method, as it takes into consideration the residual income of the household after paying the energy bills, and also the amount of energy needed to heat the apartment. However, the application of such an indicator requires such a huge amount of data which makes it rarely used in practice.

While official national definitions for energy poverty are absent in most European countries, statistics based on the primary indicators presented above are available.

Figure 13 visualises these statistics to allow comparison between the pilot countries.

[9] E.g. Low Income High Cost indicator: A household is considered to be energy poor when: 1) its required fuel costs are above the national median level (modelled to the building type, size of the flat and the household composition) and 2) were it to spend this required amount, it would be left with a residual income below the official poverty line.

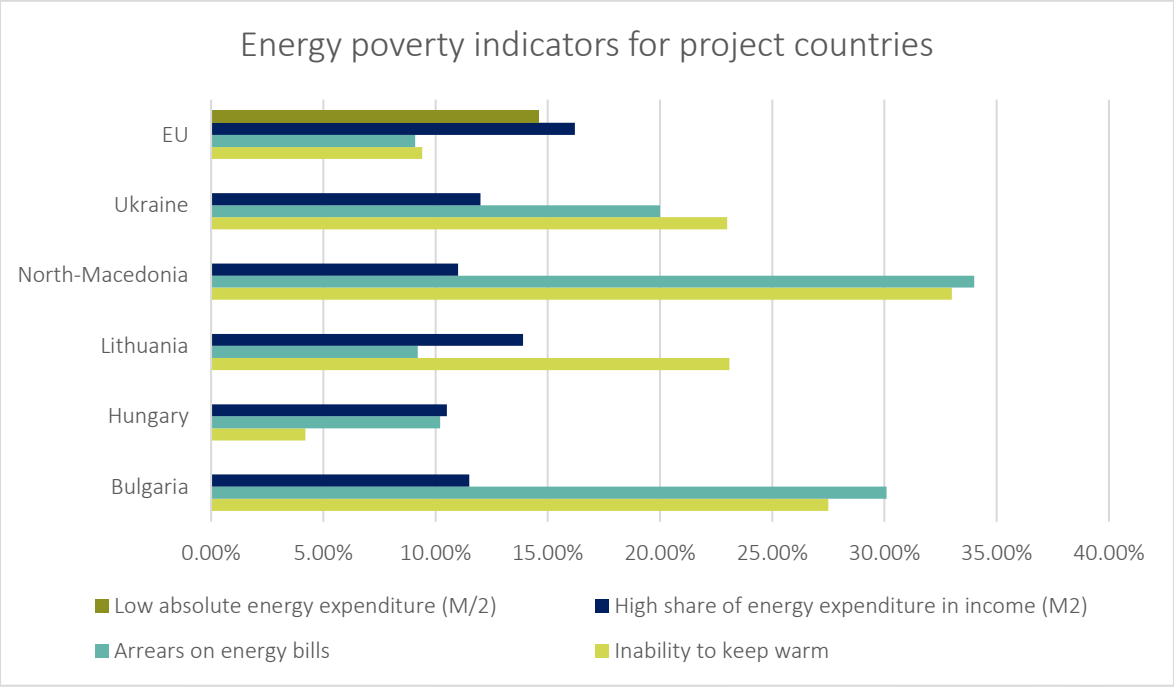


Figure 13 - Energy poverty indicators for project countries[10]

The energy poverty gap in Europe

Although European economic integration promised the convergence of the new Member States with the old ones, differences still exist within the EU and, more generally, between the Western-Northern and Southern-Eastern parts of Europe in terms of energy prices, household income and the efficiency of buildings and appliances. This has many economic, historic and political causes, and leads to significant inequalities between Member States in the degree to which households are exposed to energy poverty. This is reflected in the geographical distribution of the inability to keep homes adequately warm across Europe, as shown in Figure 14 below.[11]

[10] The data related to inability to keep the home adequately warm for Bulgaria, Hungary and Lithuania is taken from the most recent Eurostat data (https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_mdes01&lang=en); other data is from the Energy Poverty Advisory Hub (https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20211105-1). The most recent data for North Macedonia and Ukraine is from a recent study published by the Energy Community [6].

[11] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20211105-1

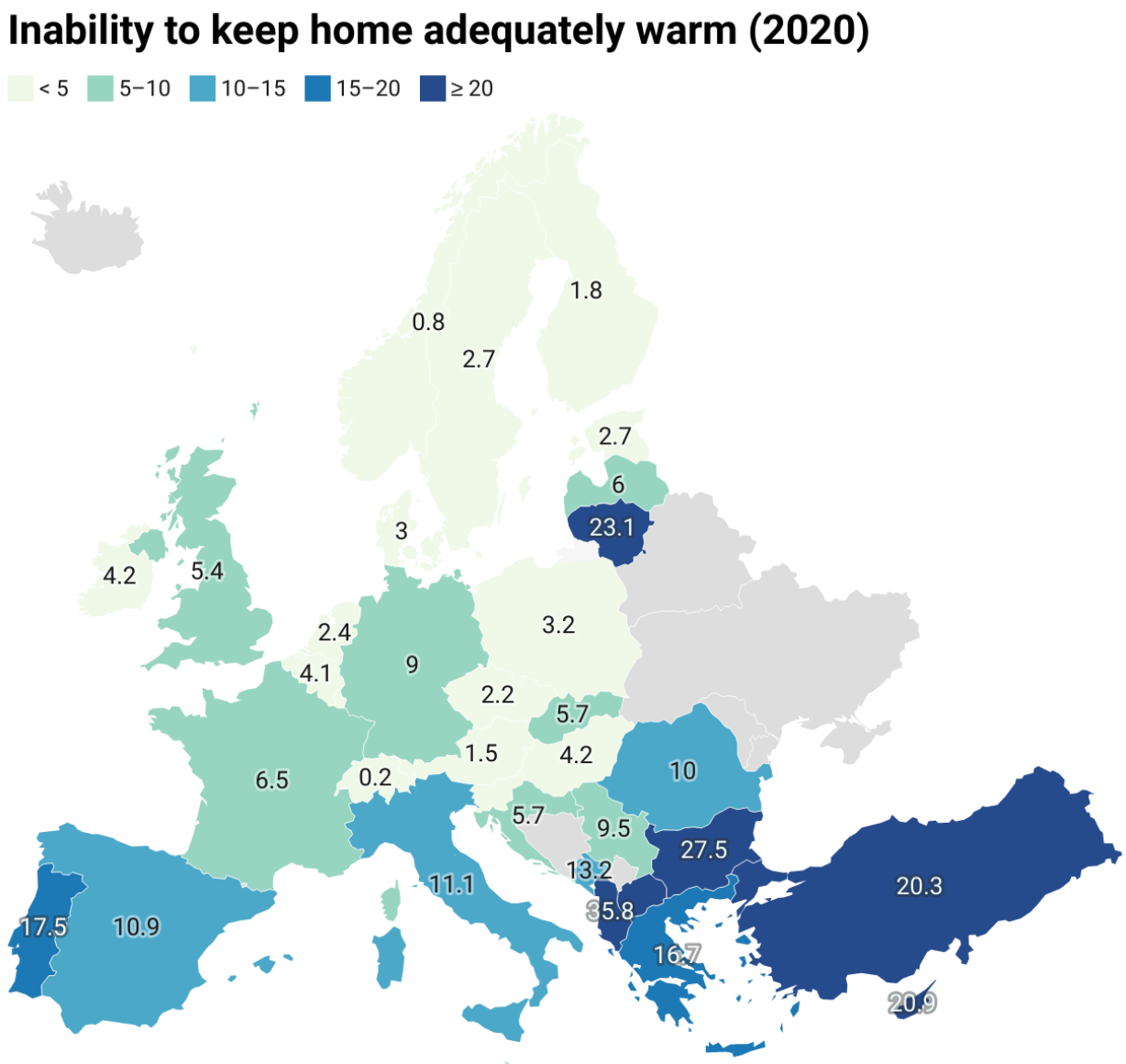


Figure 14 - Geographical distribution of households' inability to keep their homes adequately warm across Europe

Nevertheless, there have been changes over the last decade, with a slight decrease in energy poverty in Western European countries and a bigger decline in Central Europe [6]. Figure 15 illustrates the changing trend in the share of households unable to keep their dwelling warm in winter in the CEE region and the EU-27 countries on average.

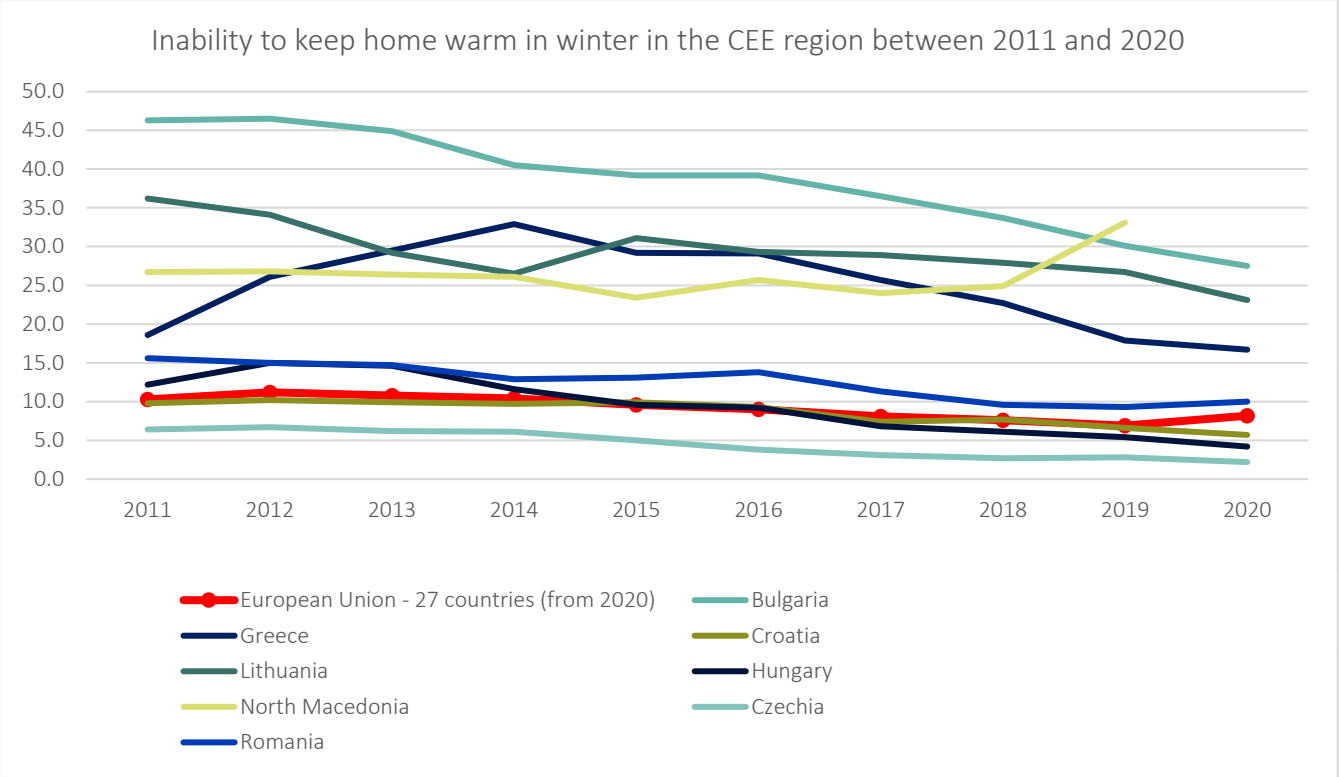


Figure 15 – Inability to keep home warm in winter in the CEE region between 2011 and 2020

The question remains, which underlying factors contribute to these differences in energy poverty within Europe? As was elaborated in the ComAct report D1.1 [1], the most important causes of higher energy poverty rates in the CEE, CIS and Balkan regions are lower incomes and the worse condition of the building stock. This is compounded by the use of inefficient fuels, the social and economic effects of privatisation, and policy failures, like a low share of households obtaining housing allowances. Interestingly, the energy poverty gap exists despite the lower energy prices in the post-socialist and post-Soviet regions.

The energy poverty level in the sample based on different indicators

The ComAct survey aimed to highlight the main factors behind energy poverty in the region. To reach that goal, energy-poor households first had to be identified. For this, we defined a list of potential energy poverty indicators that can be calculated using the survey data. These indicators are:[12]

1. The inability to keep homes adequately warm in winter: This is a commonly recognised primary indicator of energy poverty that has a subjective characteristic (how people feel about being or not being able to warm their homes) and an affordability parameter taking the financial capacity of respondents into account.

[12] One of the most common indicators of energy poverty is the share of households being in arrears in paying utility bills. However, this indicator turned out to be insignificant in our sample.

2. The inability to keep home comfortably cool in summer: As climate change intensifies, heatwaves endanger the health of more and more people, highlighting the growing importance of the ability to keep homes cool.
3. The share of households whose energy expenses exceed 15% of their income: This indicator is close to the 2M indicator described above, but as we do not have exact information on the median rate of energy and income ratios in the pilot cities, we had to set a common threshold which is close to the median rates in most European states.
4. Energy cost/income ratio: This does not show whether or not the household is *energy poor,* but allows us to estimate the *extent* of the affordability problem faced by the household.

As the survey was not aimed to be statistically representative, it cannot provide evidence on precise energy poverty *rates* in multi-family apartment buildings in the pilot countries. Also, as the sampling was based on slightly different criteria in each pilot country – depending on the availability of population data – the figures don't necessarily correspond to the cross-country differences regarding the level of energy poverty. Instead of making statements regarding the energy poverty level of our pilot locations, this guidebook aims to explore the causes and characteristics of energy poverty in each pilot site, comparing the different groups *within* each sample, rather than comparing the samples to each other. Depending on which indicator is selected the share of energy-poor households changes everywhere. Nevertheless, the outstandingly high rates of the two comfort indicators in Ukraine – see Figure 16 below – imply that there is an extremely severe energy poverty issue in Odessa, at least in buildings and/or populations similar to those covered by the survey.

Figure 16 shows the energy poverty levels in the five pilot locations based on the results of the survey.

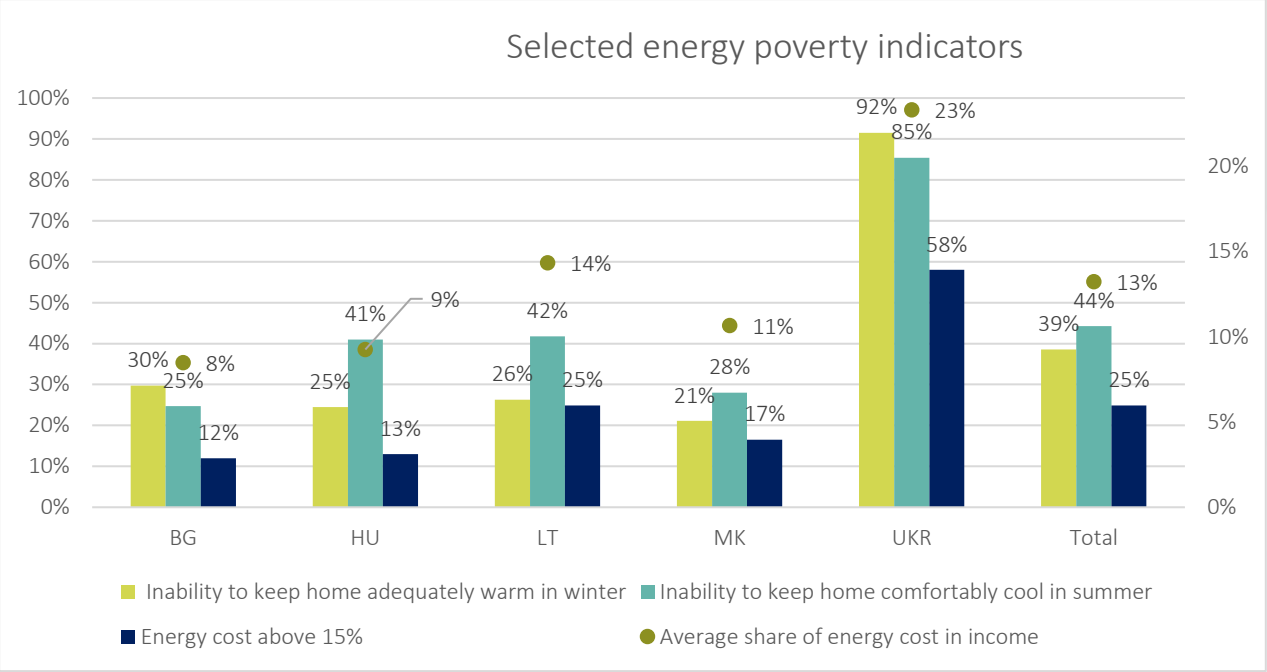


Figure 16 - Energy poverty levels in the five pilot locations based on the results of the survey

The data also highlights that the subjective thermal discomfort of the residents is higher everywhere than an energy poverty indicator – the share of households spending more than 15% of their income on energy – would suggest. Additionally, corresponding to the national data, keeping the home comfortably cool in summer seems

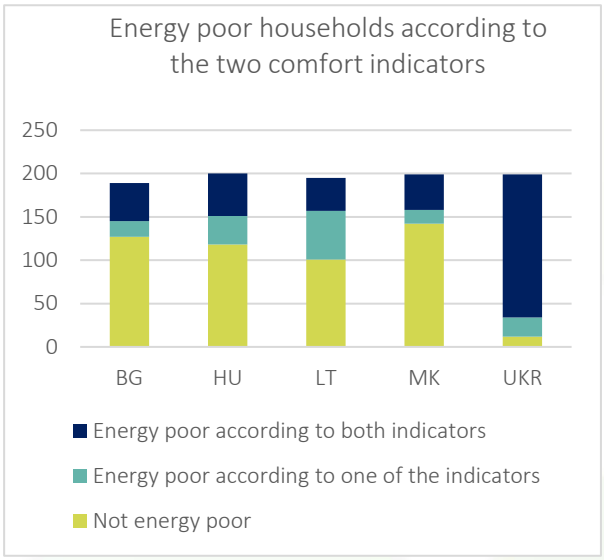


Figure 17 – Energy poor households according to the two comfort indicators

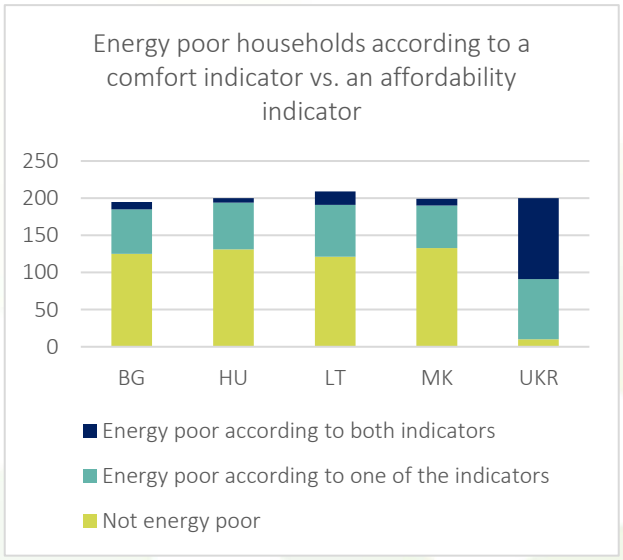


Figure 18 – Energy poor households according to a comfort indicator vs. an affordability indicator

to be much more difficult than keeping the dwelling sufficiently warm in winter in Hungary and Lithuania, where air conditioning is not widespread, especially among low-income people.

The figures above show that only a few households can be considered energy poor from all different aspects. Most are affected by one type. This might be attributed to the different strategies households pursue: some insist on lowering utility costs (so spend a lower share of their income on energy bills) but sacrifice their thermal comfort or may be unable to warm their apartments properly. Additionally, the technical characteristics of the buildings can differ: while some households would have sufficient income to pay the utility bills, the poor energy parameters of the building combined with the non-regulated district heating system make it impossible to heat rooms comfortably.

Figure 19 shows the share of households with an underheated dwelling. The analysis is based on two questions: in the first case, respondents were asked about the temperature in the living room during winter, while in the second case the question was whether all the rooms (except for bathrooms, wardrobes etc.) are heated in winter.

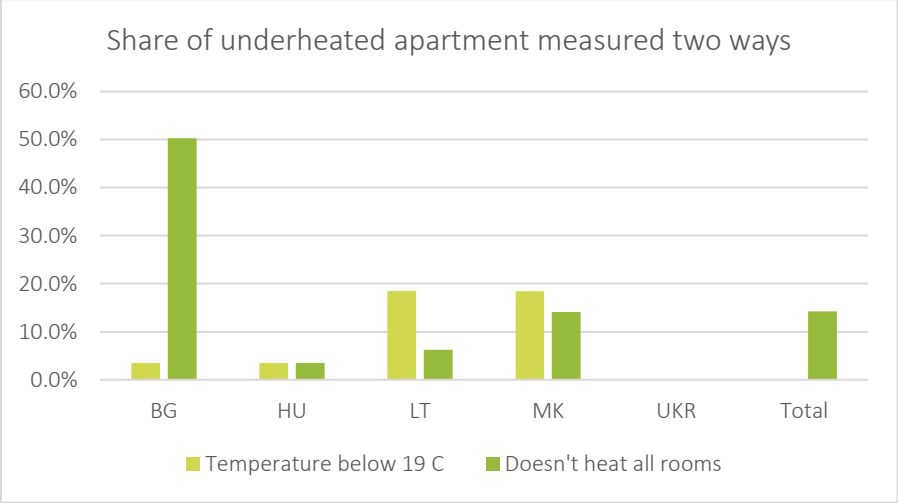


Figure 19 – Share of underheated apartments, measured two ways

Figure 20 presents the share of households who had to limit their spending on basic goods (e.g. food, medicine, etc.) to pay their utility bills on time. This indicator can be interpreted as affordability based on respondents' self-assessment.

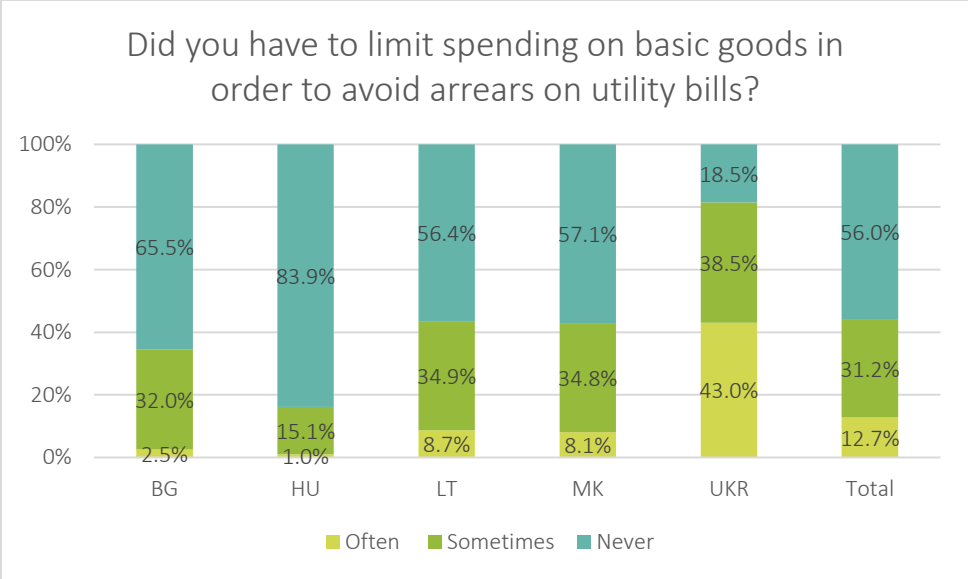


Figure 20 - Share of households who had to limit their spending on basic goods

Main takeaways		
Energy poverty indicators in general, and also in our survey, define different types of vulnerable groups. Whereas some bring the financial consequences of energy poverty into focus, others highlight the technical difficulties of not being able to provide sufficient thermal comfort for their homes.	As the energy poverty indicators focus on different target groups the policy implications can also be different – it is useful to make local surveys to highlight the different faces of energy poverty.	The survey highlighted that the Ukrainian population – at least in Odessa – is far more affected by energy poverty than the population of other countries.

2.2. Factors behind energy poverty: vulnerable households and risk factors

One of the most important research goals of the survey was to reveal the most relevant factors behind energy poverty. This attempt can help in identifying those social groups and building types that have the highest risk of energy poverty. In parallel, we can gain insight into the causes of energy poverty – whether it is caused by lack of income, the bad physical state of the buildings, heating problems or even specific household demographics.

Literature on energy poverty emphasises that it may have multiple causes and affect diverse groups of people.

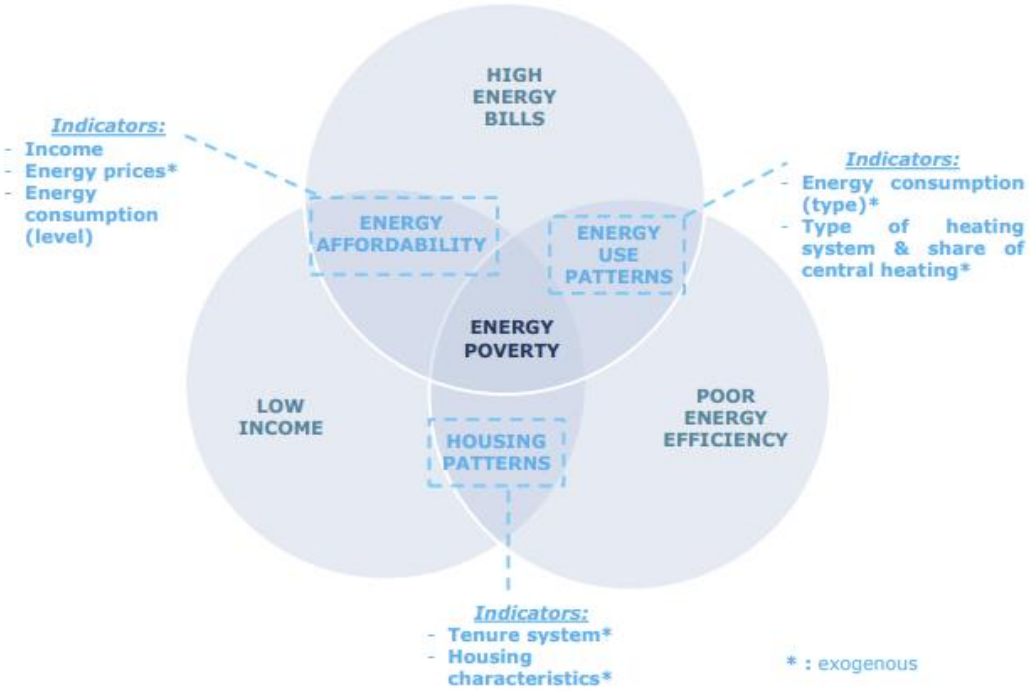


Figure 21 – Drivers of energy poverty and key indicators. Source: Insight Report 2015 [5]

In the survey, we analysed the effect of the following factors on energy poverty:

- Social factors:
  - Financial situation
  - Age
  - Household structure, number of children
- Physical factors:
  - Means of heating
  - Building characteristics
  - Size of dwelling

For methodological reasons, we chose the energy cost/income ratio as an indicator to compare the effect of different factors[13] – although it is not the most perfect indicator of energy poverty. There are some general

[13] With this sample size, we could analyse the compound effect of different independent variables with regression in case of a continuous dependent variable, which is the energy cost/income ratio. Other indicators are binary ones and could be analysed only in two- or three-dimensional cross tables, which make it possible to compare the effect of two independent variables.

patterns in the five pilot countries (e.g. income or age), while some factors are either not comparable due to the slightly different samples (e.g. heating types) or depend on the country-specific context.

The following section presents the main risk factors of energy poverty in each country, and suggests potential target groups of measures against energy poverty.

The financial aspects of energy poverty

In line with previous research results (e.g. WHO, 2022), our data highlights that **the most important cause of energy poverty is low income level**. The connection is the clearest in the affordability dimension: in all countries, this has the strongest effect on how much a household spends on energy compared to its income. Also, low income explains the vulnerability of certain social groups, as we can see from the analysis below. As the following figure shows, that the higher the household's income, the lower the share they spend on energy.

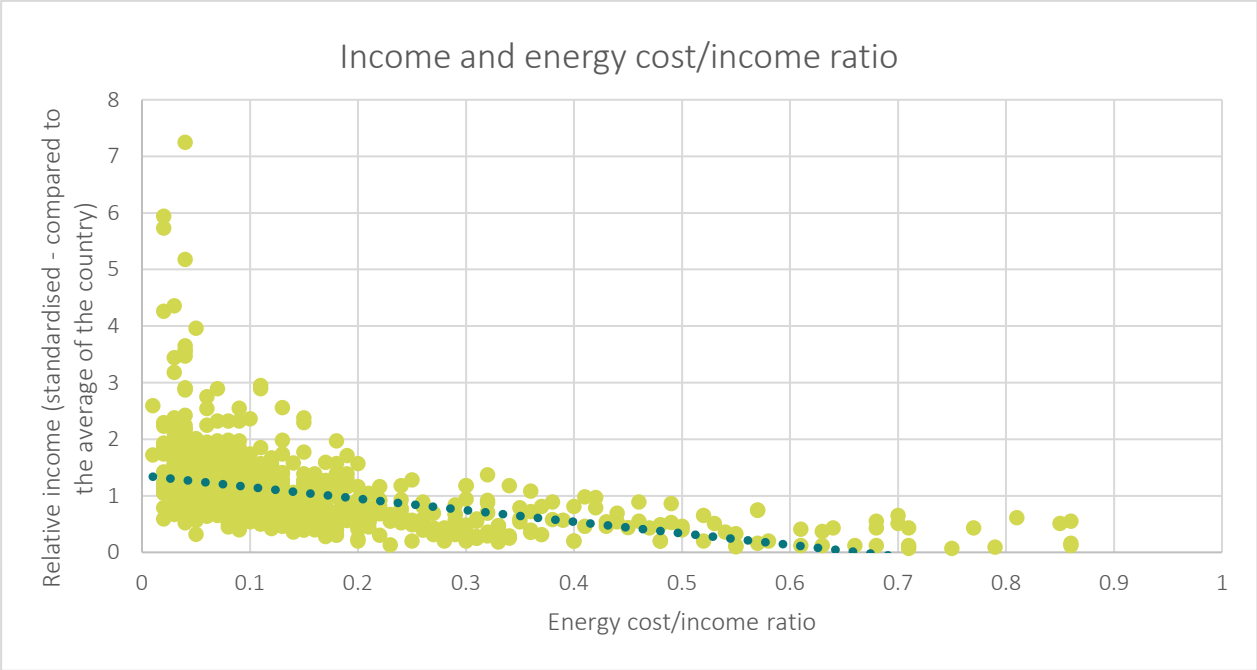
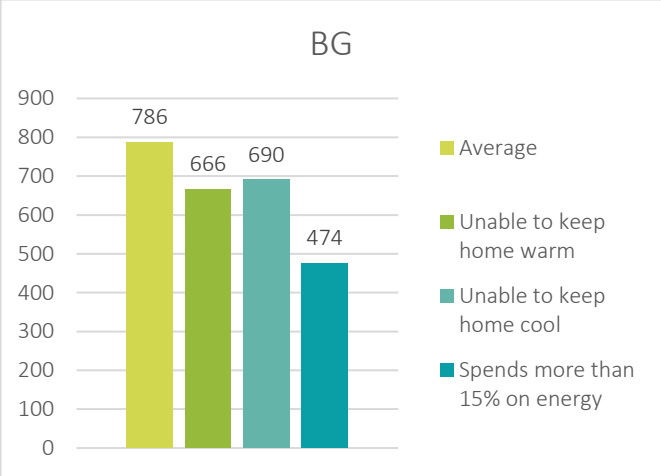
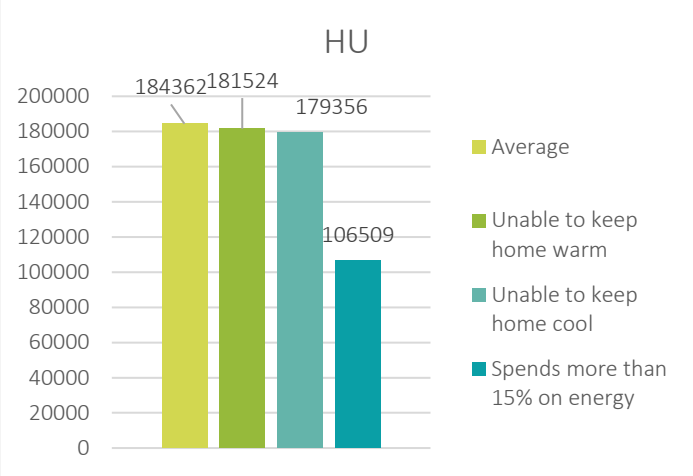


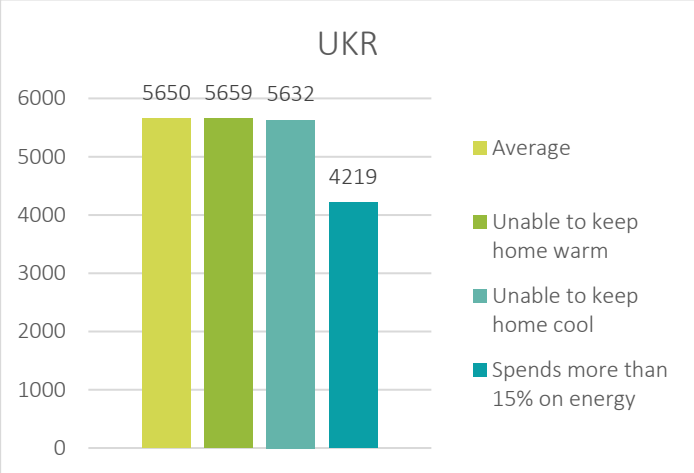
Figure 22 – Energy cost/income ratio and household income

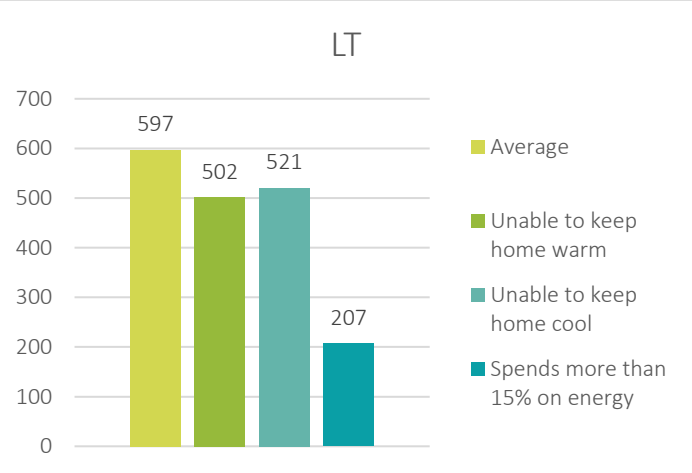
Comfort (being able to warm or cool homes) is less sensitive to income. This can be partly explained by the fact that the comfort indicators we applied measure a self-assessed, subjective feeling of discomfort, which may not correspond to the actual financial situation. On the other hand, thermal comfort may also be more heavily influenced by technical parameters, such as living in a building with poor energy efficiency.

The following figures[14] present the average income and the income of energy-poor households (per person) based on different indicators. We can see the difference between comfort-based and affordability-based indicators, with those classed as energy-poor according to affordability-based indicators having a significantly lower income. In some cases, it is between half and two-thirds of the average, but in the case of Lithuania, those who spend more than 15% of their income on energy costs have a per capita income of only one-third of the average.









[14] All figures represent equalised net income per person.

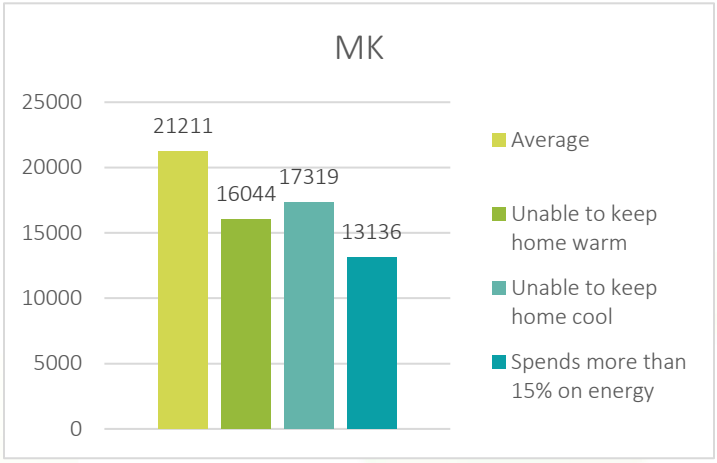


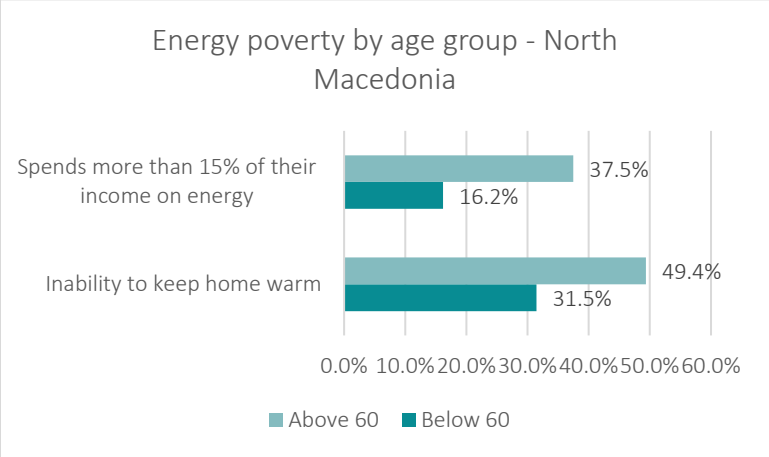
Figure 23 - Income of average and energy-poor households by different indicators in each country

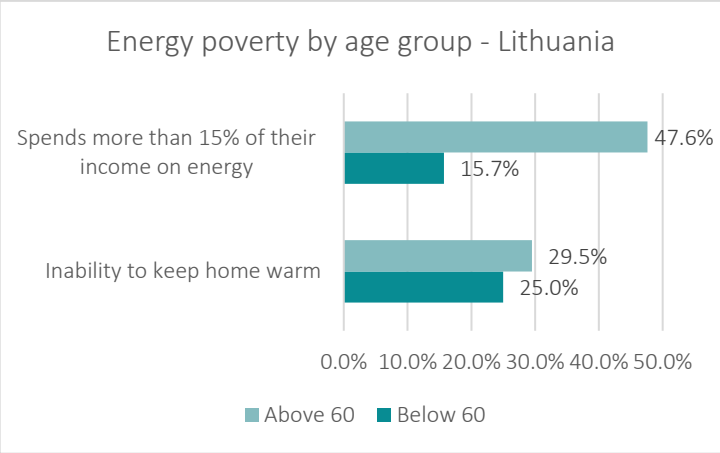
A less subjective measurement of thermal comfort is the temperature of the living room in winter. If we look at this, we find that in four out of five countries, people who underheat their apartment have lower incomes than people who don't.

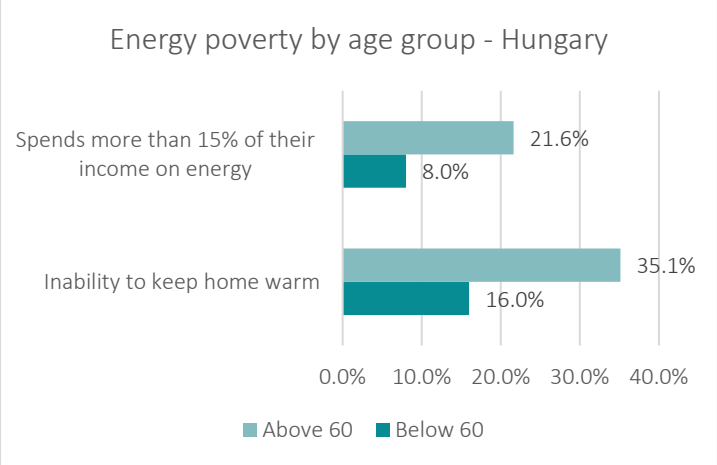
Our results highlight that low income is the most general cause of energy poverty. However, to find the most effective tools in fighting energy poverty, it is worth looking at other causes of the problem, as well as the target groups that are highlighted by the interaction of income and other factors.

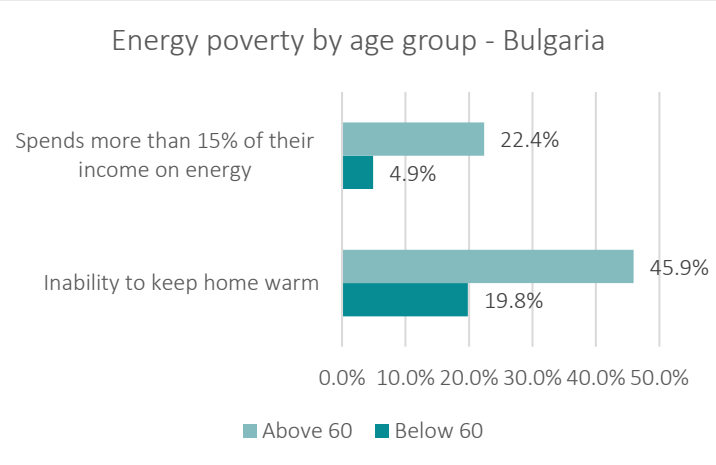
The most vulnerable group is older women

The most consistent pattern highlighted by our survey is the vulnerability of older people, especially single pensioners. This is most striking when we look at affordability (spending more than 15% of income on energy). In three countries (Bulgaria, Hungary and North Macedonia), older people are also significantly more likely to be unable to ensure an adequate temperature in their homes. We can see a difference between thermal comfort of the two age-groups everywhere, but in Ukraine and Lithuania the variation turned out to be not statistically significant.









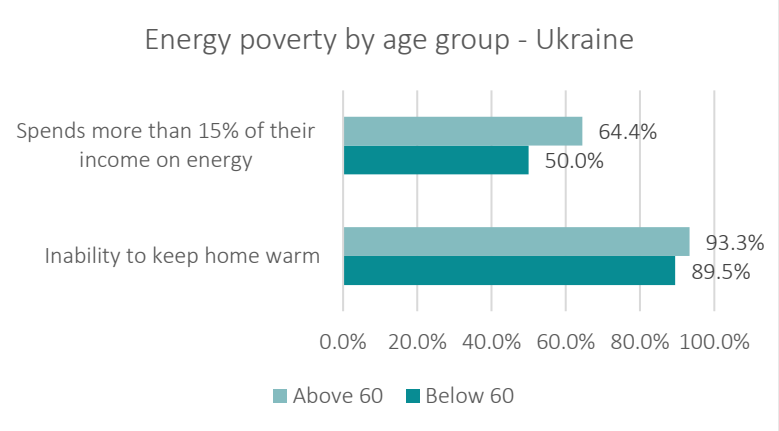


Figure 24 - Energy poverty by age group in each country

Why are older people more exposed to energy poverty? The reason is partly that pensions provide considerably lower income everywhere except for Ukraine, where our data doesn't show a significant difference in income between age groups. Correspondingly, Ukraine is one of the two sites where the thermal comfort of older households is not significantly worse than that of younger households.

On the other hand, age remains a strong factor of energy poverty even if we disregard the income parameter, which indicates that there are additional non-financial causes.

Respondents over 60 are more likely to live alone and/or in a proportionately bigger dwelling than younger respondents in all ComAct countries. Our analysis shows that low income, living alone and high age are affecting energy affordability independently from each other, which means that living alone increases the risk of energy poverty not only among pensioners but in the case of younger people too. Data shows that the vulnerability of both older people and single households lies in the relatively large living space per person, which means more area to heat, light and so on from one pension or wage. In all countries, m²/person is a reliable predictor of energy poverty, especially when it comes to affordability.

In three countries – Hungary, North Macedonia and Ukraine – older respondents are also more likely to live in buildings in a worse technical condition, which also increases their vulnerability to energy poverty.

Figure 25 illustrates the underlying factors of energy poverty that make (single) pensioners the most affected group based on the survey results:

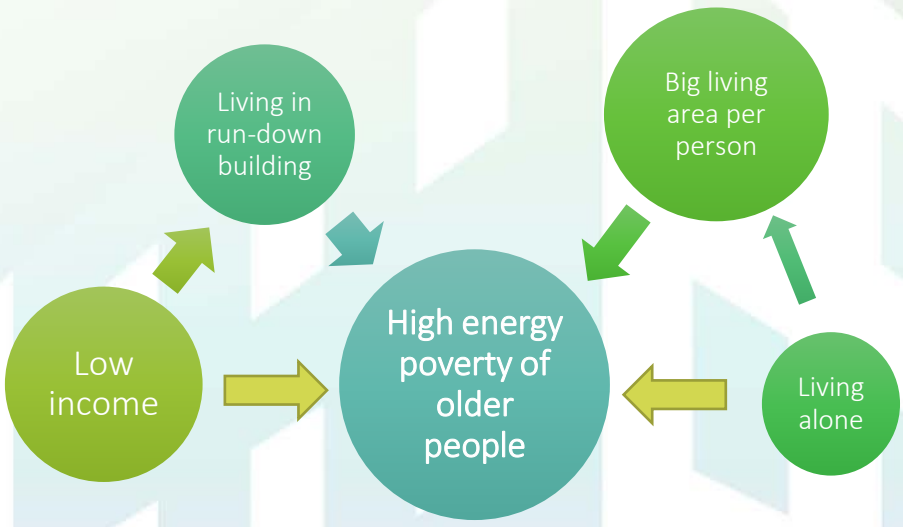


Figure 25 - Underlying factors of energy poverty which make (single) pensioners the most affected group

Interestingly, the income gap between older and younger households is the biggest in Lithuania. However, this is not reflected in the energy poverty rates. Age doesn't matter when it comes to the inability to keep homes warm in winter or cool in summer: older people face bigger affordability problems than others, but only among lower-income respondents. Those with higher incomes can override the effect of age.

In Bulgaria and North Macedonia, thermal comfort in summer seems to be a bigger issue for older people irrespective of their social status: in the case of inability to keep the home cool, older people are significantly more exposed to energy poverty among the better-off and worse-off alike. This may be connected to the Mediterranean climate of these countries.[15]

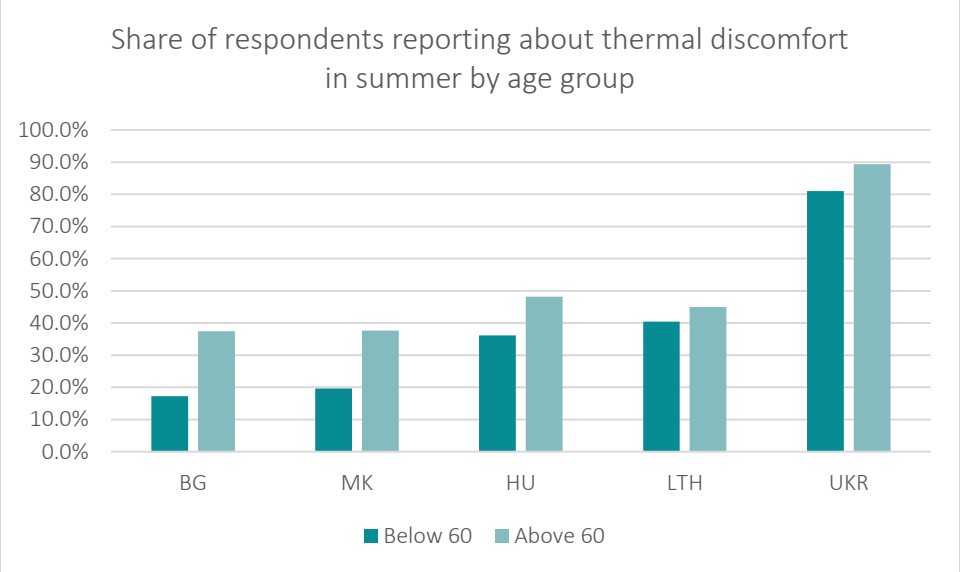


Figure 26 – Share of respondents unable to keep their home cool in summer by age group

[15] An additional aspect suggested by local sources may be that in North Macedonia air conditioners are highly expensive compared to pensions and also unpopular among the elderly.

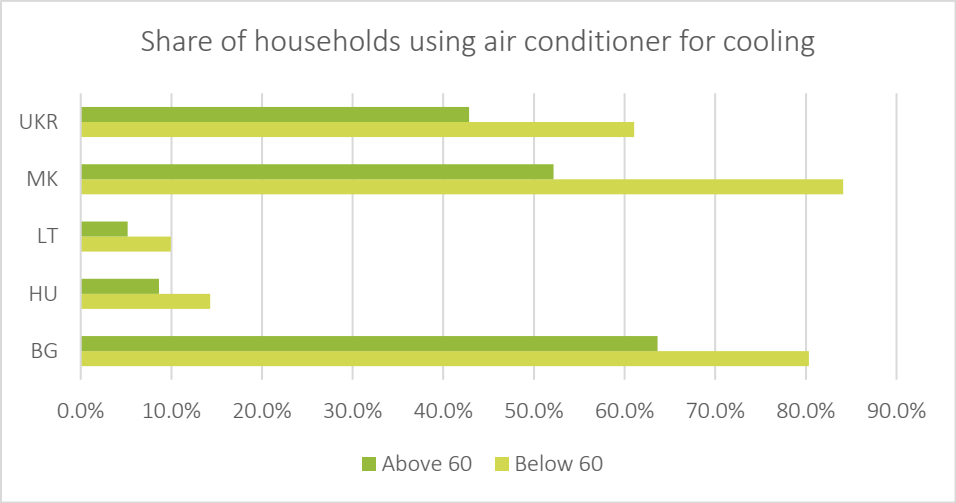


Figure 27 – Share of households using an air conditioner for cooling

The energy poverty rate among single pensioners has a strong gender dimenson. The share of women among pensioners living alone and suffering from excessive energy costs is 85% across the countries, reaching 94% in Hungary and Ukraine; the whole sample is 65% female.

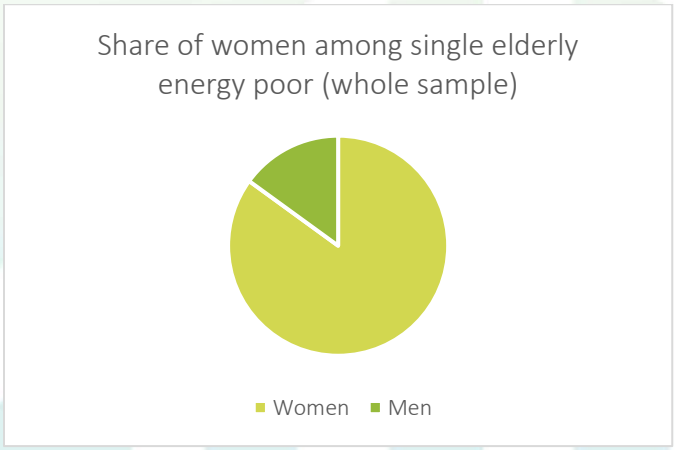


Figure 28 – Share of women among single elderly energy poor

Families with children are generally considered a group at risk of energy poverty [6], but having children did not prove to be a risk factor in the context of multi-family apartment buildings. The reason could lie in the sample, as most families in our sample have only one or two children. The disadvantage of raising children could be more visible if the sample included more families with three or more children. Residents of urban areas and multi-family buildings generally have fewer children than inhabitants of smaller settlements or agglomeration areas (see e.g. [7], [8]). It may therefore be realistic to suggest that in the case of multi-family apartment buildings, **having one or two children is not necessarily a risk factor of energy poverty.**

Physical features

Heating system

Although the effect of heating types on energy poverty seems to be weaker than income and age, it is worth noting that different heating sources can influence the comfort level and/or heating affordability. In the survey, the effect of the heating system turned out to be highly dependent on the local context.

In **Budapest**, Hungary, district heating performs better on comfort indicators – decreasing the level of energy poverty – but causes affordability problems. If we cross-check the effect of having control over the consumption and heating type, we can see that district heating can be both highly beneficial and highly problematic, depending on whether or not the households can influence their consumption. The share of those who are unable to heat their apartment properly is highest (37%) among district heating users who are not able to control their consumption individually; it is lowest among those who are also using district heating but can control their consumption – only 2.2%. Users of gas heating fall in between, but closer to the worse end of the scale, at 28%.

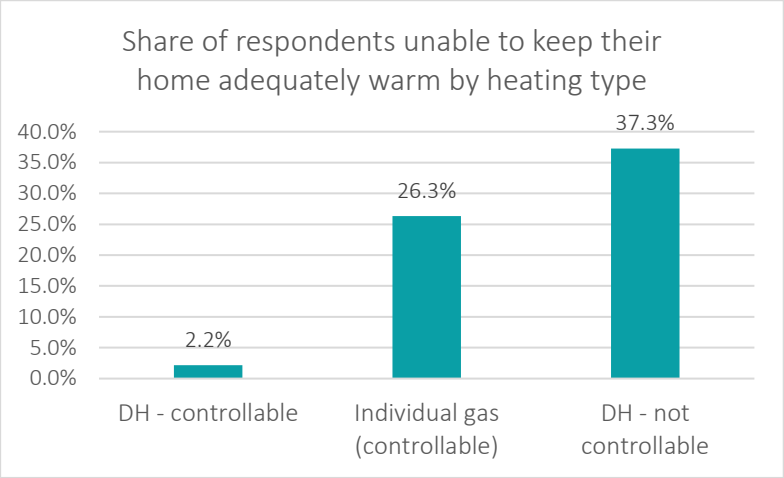


Figure 29 – Share of respondents unable to keep their home adequately warm by heating type, Hungary

Interestingly, the same does not apply to affordability – having control over consumption does not affect affordability in itself. There is a correlation caused by the effect of district heating, but among district heating users, those who can control their consumption cannot spare much money on energy bills. We have to bear in mind that the Hungarian sample – like all the other samples – contained buildings that were not yet insulated. In such cases, controlling the consumption of district heating at the apartment level is likely to lead to residents improving comfort levels rather than reducing energy costs, which is reflected in the corresponding energy poverty indicators.

In **Burgas**, Bulgaria, the heating type has a significant effect on the two comfort indicators. Air conditioner users are less energy poor, electric heating correlates with worse thermal comfort, while district heating is in between the two. As for affordability, users of air conditioning again appear to be in a better position – among them, only 7% of households experience excessive energy costs (above 15% of their income), compared to 18-19% among users of other heating types.

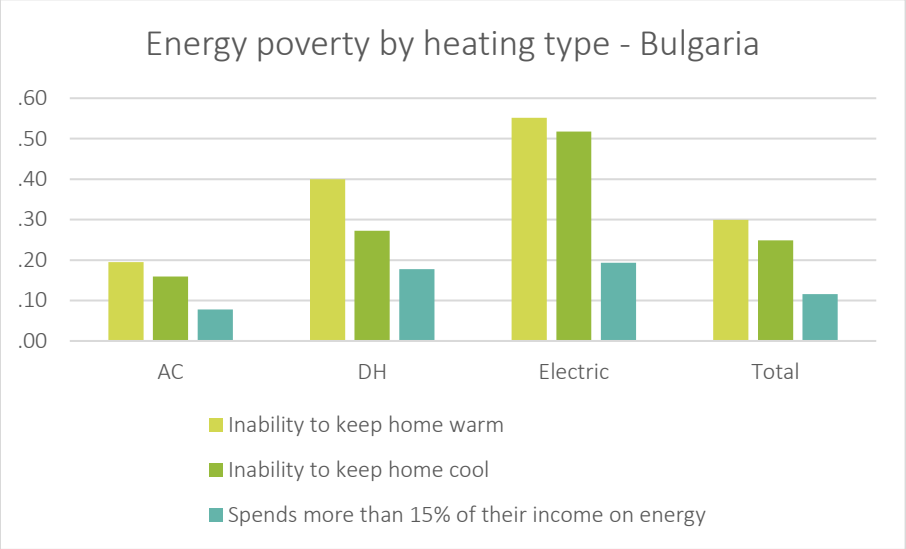


Figure 30 – Energy poverty by heating type, Bulgaria

Stoves and solid fuels are used mostly in **Kavadarci** in **North Macedonia**. In this town, practically noone uses district heating, the alternative of solid fuels is individual electric heating. Using these electric devices correlate with higher energy poverty rates than stoves (87% and 71% respectively), according to inability to keep the home warm, however, they perform better in terms of affordability. While those using stoves spend 25% of their income on energy, the same figure is only 6% among residents using electric heating. In Kavadarci, there is no signficant income-difference between those using solid fuels and those using individual electric heating.

In **Karposh**, a relatively well-off district of Skopje, we can compare district heating and individual electric heating. In this comparison, district heating turned out to be much more efficient, although a bit more expensive. None of the district heating users said they have problems with keeping the apartment warm in winter, while 24% of electric heating users turned out to be energy poor in this dimension. Interestingly, heating system does not seem to influence affordability of energy: both groups spend around 10% of their income on energy.

As illustrated by Figure 31, the comparison of the two North Macedonian survey sites illustrates that the two dimensions of energy poverty don't always can show very different patterns. The thermal comfort of respondents is strikingly better in Karposh district than in Kavadarci. While in the former, 4% and 13% of the respondents said that they cannot keep their home warm in winter and cool in summer, respectively, the same figures are 72% and 74% in Kavadarci. However, energy affordability is almost the same in the two sites, even though the average income of respondents in Karposh is 30% more than in Kavadarci.

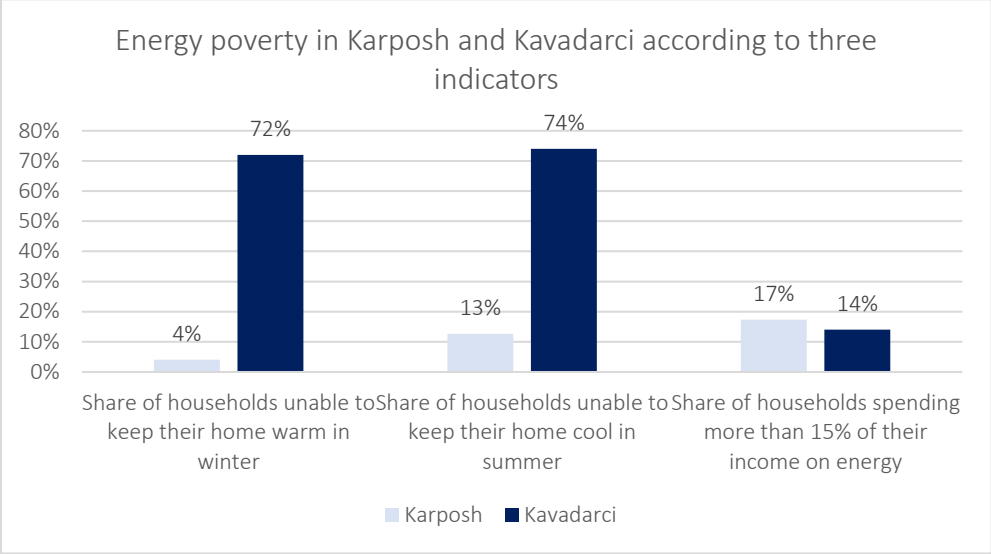


Figure 31 – Energy poverty according to three indicators in Karposh and Kavadarci, North Macedonia

Compared to district heating, both stove and individual electric heating are highly inefficient and correlate with higher energy poverty rates, so having control over its consumption doesn't seem to help the energy poor in the North Macedonian sample.

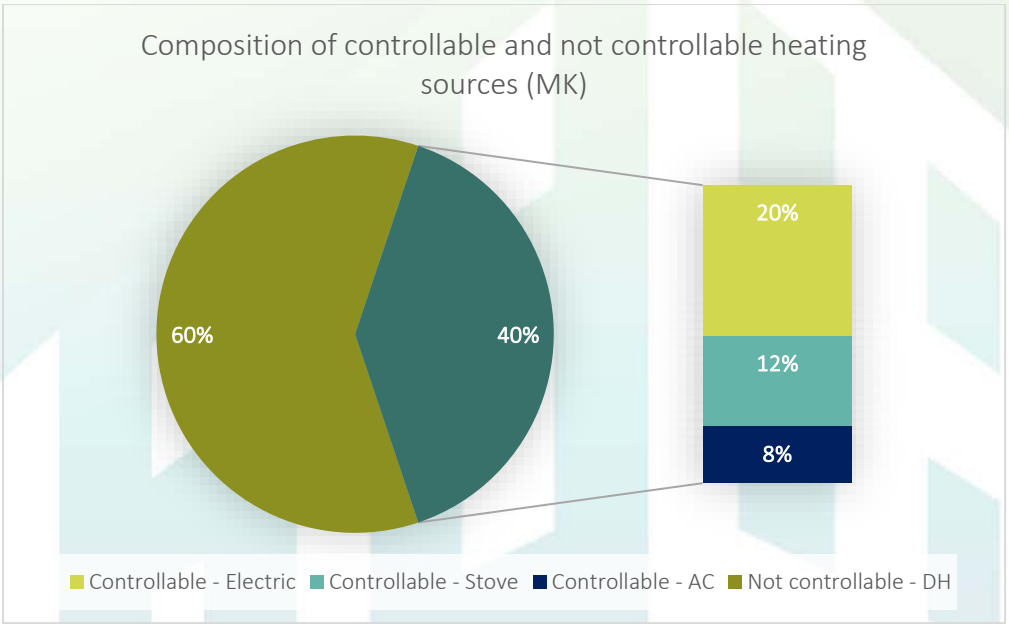


Figure 32 – Composition of controllable and not controllable heating sources, North Macedonia

In **Lithuania**, our data did not reveal any straightforward connection between the heating system used and energy poverty. Having control over heating consumption does not influence energy poverty: households who can influence their consumption are just as likely to have a too cold home in winter or too high energy cost as those who cannot. The effect of district heating on ability to keep home warm could be analysed only in **Tauragė**. Here,

data does not show any significant connection between the two. In **Kaišiadorys**, where all households are district heating-users, only one of them are energy poor, however, this may be explained by the fact that respondents here have significantly higher average income, than those in Tauragė.

In **Tauragė**, the building type turned out to be an influential factor in summer thermal comfort. More than half of the residents of brick buildings reported about difficulty to keep their home comfortably cool, while this share is only one-third among families living in panel buildings. There is no significant income-difference between the residents of different building types, which shows that it is the construction method which affects energy poverty, not the difference in the socioeconomic status of residents.

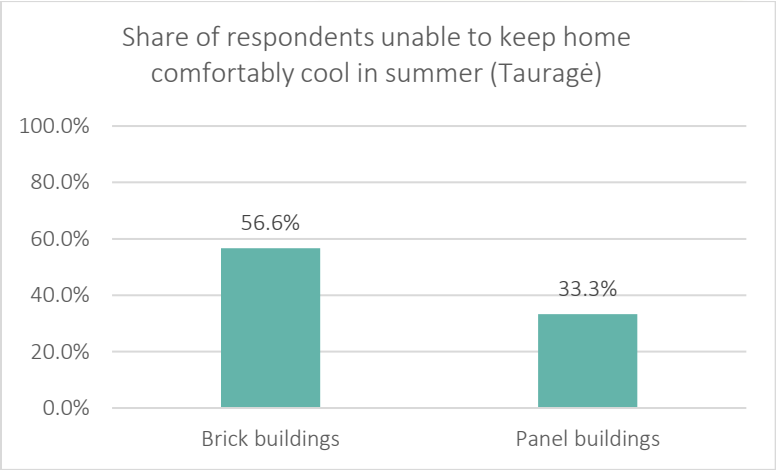


Figure 33 – Inability to keep home cool in summer in the two building types in Tauragė, Lithuania

In **Odessa, Ukraine**, from a comfort point of view, nearly all respondents can be considered energy poor. But affordability turned out to be much worse among district heating users than among users of other heating sources. Among district heating, 60% of respondents spend significantly more than 15% of their income on energy; for other heating sources, this share is only 15%.

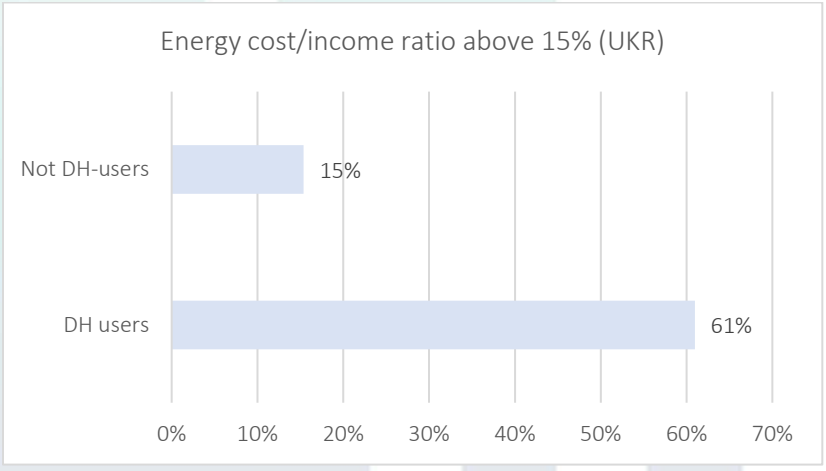


Figure 34 – Energy cost/income ratio above 15%, Odessa, Ukraine

Although control over heating consumption is considered to have a major influence on energy poverty, our data supports this only partially. Generally, controllable heating doesn't go together with lower energy poverty rates, as it often goes hand in hand with more expensive heating sources. However, in some cases, greater control contributed to lower energy poverty rates, as seen in Hungary and North Macedonia.

The survey contained questions about secondary heating sources as well. We found that secondary heating sources complement primary heating sources sufficiently only in households with a high enough income to pay for them. In these cases, secondary heating sources increase thermal comfort significantly. However, for low-income households the problem of not being able to heat their homes properly remains.

Condition of the buildings

Both the respondents and the surveyors had the chance to evaluate the physical condition of the buildings on a four-point scale. We found that the state of the building does not generally play a role in making a household energy poor in itself, though the panel buildings in Lithuania, Hungary and North Macedonia were an exception.

The high-rise panels (10+ floors) of **Burgas** in Bulgaria seem to have worse energy poverty rates on both dimensions than average, especially in the case of buildings with district heating – even though they don't seem to be inhabited by lower-income residents. High-rises have more maintenance problems according to the respondents and are also in worse condition. However, the worse energy performance of these buildings may be linked to other technical factors too.

Besides the physical condition of the building, the internal location of the dwelling could make a difference; for example, flats on the edges of the buildings may need more energy to be properly heated. We found, however, no correlation between the households' energy poverty level and the location of their dwellings. There are two possible reasons for this: 1) in many district-heated buildings, residents pay the same amount for heating irrespective of the energy used; 2) other factors that have more influence on the energy poverty level – such as income and age – mask the effect of the location of the dwelling.

The two faces of energy poverty: comfort vs. affordability

As discussed above, energy poverty has a comfort dimension, which affects whether a household can ensure adequate thermal comfort, and an affordability dimension, which is about the financial burden of energy costs. The two dimensions of energy poverty are often connected and affect the same groups; however, in some cases, they behave differently. As an example, older people suffer more from affordability problems than younger households in all countries, while the comfort dimension affects older people only in some countries. The same applies to single households, partly because it is often older people who live alone.

The building category to which the surveyed buildings belonged shows even bigger differences between the two dimensions in most countries. In Hungary, residents of the buildings from the 1950s and 1960s suffer from being both too cold and too hot much more than those in other building types, but the financial burden of energy costs is less heavy. In Lithuania, residents of brick buildings are distinctly more energy poor from a comfort point of view, while there are no significant differences regarding affordability. In North Macedonia, the same applies to buildings built after 1965. Ukraine categorised the buildings based on size. In this case, those living in high-rise panels are more exposed to affordability problems, while there are no differences in the comfort dimension. The poor condition of the building is connected either to comfort problems or to affordability problems in each country, depending on the local specificities. Living in a large dwelling mostly caused affordability problems only,

not affecting residents' ability to keep their home warm in winter or cool in the summer. The differences are illustrated in the following table:

Table 4 – Comfort and affordability problems connected to the poor condition of the building

	Advanced age		Building category (specific for the pilots)		Poor condition of the building		Too big living area per person	
	Comfort	Affordability	Comfort	Affordability	Comfort	Affordability	Comfort	Affordability
BG	X	X	No effect	No effect		X	X	X
HU	X	X	Buildings from the 50s and 60s are worse	Buildings from the 50s and 60s are better	X			X
LT		X	Brick is worse	No effect	X			X
MK	X	X	Newer building is worse	No effect	X			X
UKR		X	No effect	High-rise is worse		X	----------	----------

Main takeaways

Summary of the findings					
Energy poverty is a complex phenomenon that is created by the interaction of social and technical disadvantages. As a rule, the socio-demographic profile of energy poverty is more universal across the countries, while the effect of technical factors on energy poverty – such as heating type or building size – are much more country-specific.	The most decisive factors behind energy poverty (regarding both its comfort and affordability aspects) are income levels of households (low-income residents are much more affected), age (older people are much more affected) and the size of the dwellings per person (bigger dwellings with fewer owners are much more affected).	Based on these three factors the most vulnerable group from an energy poverty point of view are pensioners, living alone in bigger units. In this category, female residents are significantly overrepresented.	District heating may decrease or increase the probability of being energy poor depending on the local context.	Being able to control the consumption of heating is not a factor that reduces the chance of being energy poor when the individual heating system is based on expensive and/or inefficient sources of energy, like solid fuel or electricity.	The maintanence problems and technical condition of high-rises need special attention and further research.

Policy implications

As low income is the most general cause of energy poverty, interventions targeting low-income households seem to be the most appropriate approach to tackle energy poverty. Short-term results might be expected through providing means-tested housing/heating allowances. Income should also be considered when a renovation subsidy system is established.

In the urban multi-family apartment building context, single elderly people should be a major target group of policy interventions aiming to tackle energy poverty.

Energy efficient renovation of dwellings which are difficult to maintain on a single income can help to reduce energy poverty. Where the owner prefers to move to a smaller apartment, assisting them to do so can be another way to tackle energy poverty.

3. Implementing energy-efficient renovations: how to involve energy-poor communities

3.1. Most residents are ready to contribute

Residents' willingness to pay for renovation works is key to successful implementation. There is a basic assumption that those households who are in a better financial position are more keen to pay, either as a lump sum or in instalments. Our data supports this notion, but other factors play a role as well.

Even though the survey was conducted in multi-family buildings where a significant share of the households can be considered energy poor, the majority of respondents were still willing to contribute financially to the renovation costs. If a majority votes for a renovation in a condominium/homeowners' association, then the renovation work can start (usually a simple majority decision is enough to start the process under homeowners' association legislation, but a two-thirds majority is advised in Bulgaria and Lithuania[16]).

Based on the comparison of the pilot sites, the willingness to pay for renovation doesn't have much to do with the economic condition of the pilot country: in some wealthier countries (higher GDP/capita) the contribution rate might be lower than in poorer countries. The willingness also does not correlate with the average income of the respondents in our samples: in pilot cities where respondents had a lower average income, the share of people who are willing to contribute to the renovation costs may be higher, as can be seen in the figures below.

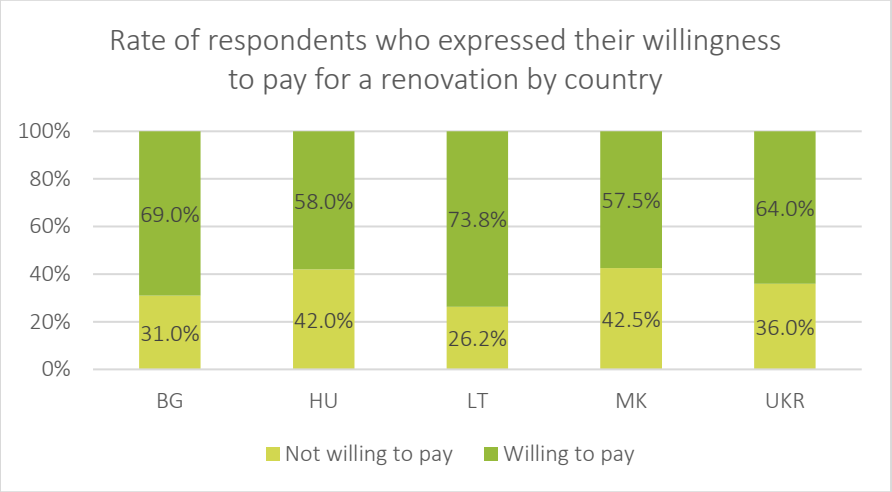


Figure 35 – Rate of respondents who expressed their willingness to pay for a renovation by country

[16] It is important to note that the rates of respondents willing to pay for the renovation referred to the whole surveyed population, who are living in different buildings. The rates may not necessary be the same in one specific building.

Not surprisingly, people are more willing to pay for the renovation in instalments. This fits their household's budgetary strategy better.

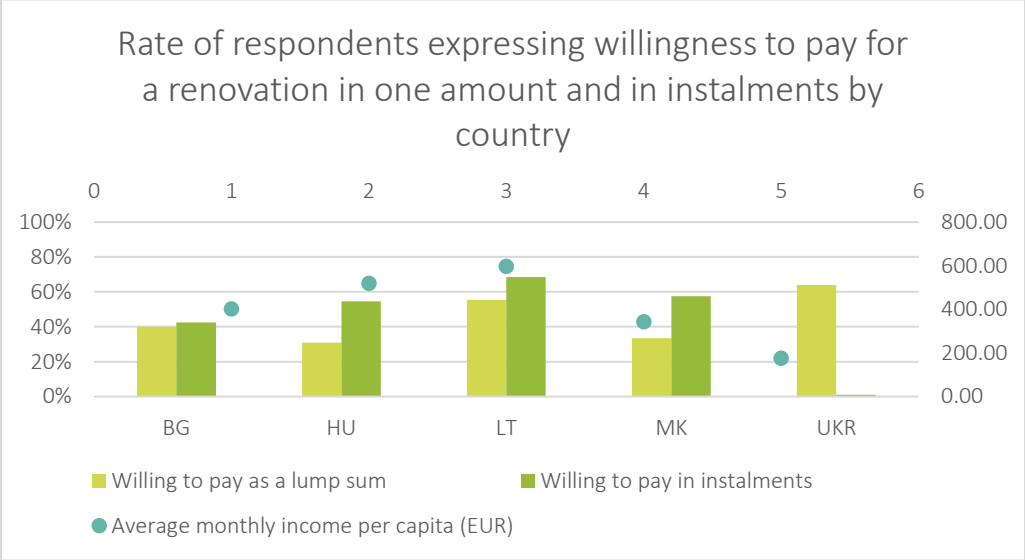


Figure 36 – Rate of respondents expressing willingness to pay for a renovation as a lump sum and in instalments by country

It is also visible from figure 36 that households in countries (HU, LT, MK) that have experience with condominium loans prefer paying in instalments to paying as a lump sum. This can happen either though commercial banks, as in Hungary or Lithuania, or through NGOs, as in North Macedonia. In these countries, there is widespread public awareness about joint loans, and even the building communities that were surveyed may have some personal experience with them. In Ukraine, interestingly, practically no one answered responded that they were willing to pay in instalments, but a relatively high share of respondents expressed willingness to contribute to a renovation as a lump sum. Our local sources say the reason behind this is the instability of the Ukrainian economic situation – even before the Russian invasion of 2022. This makes households highly uncertain about their future incomes and expenses, so engaging in a long-term loan seems very risky. At the same time, energy efficient modernisation may seem to be a good investment option for Ukrainian households who often keep their savings in cash at home.

3.2. Does income matter?

The willingness to contribute to the renovation in a single amount correlates strongly with the financial situation of the households. This is the strongest factor behind the amount of payment: the higher the respondents' income, the more they intend to pay for the renovation in one sum. This connection was the strongest in all pilot locations (except for Ukraine[17]). Figure 37 presents the relationship between the amount the respondent is willing to pay and the income of the household per family member.

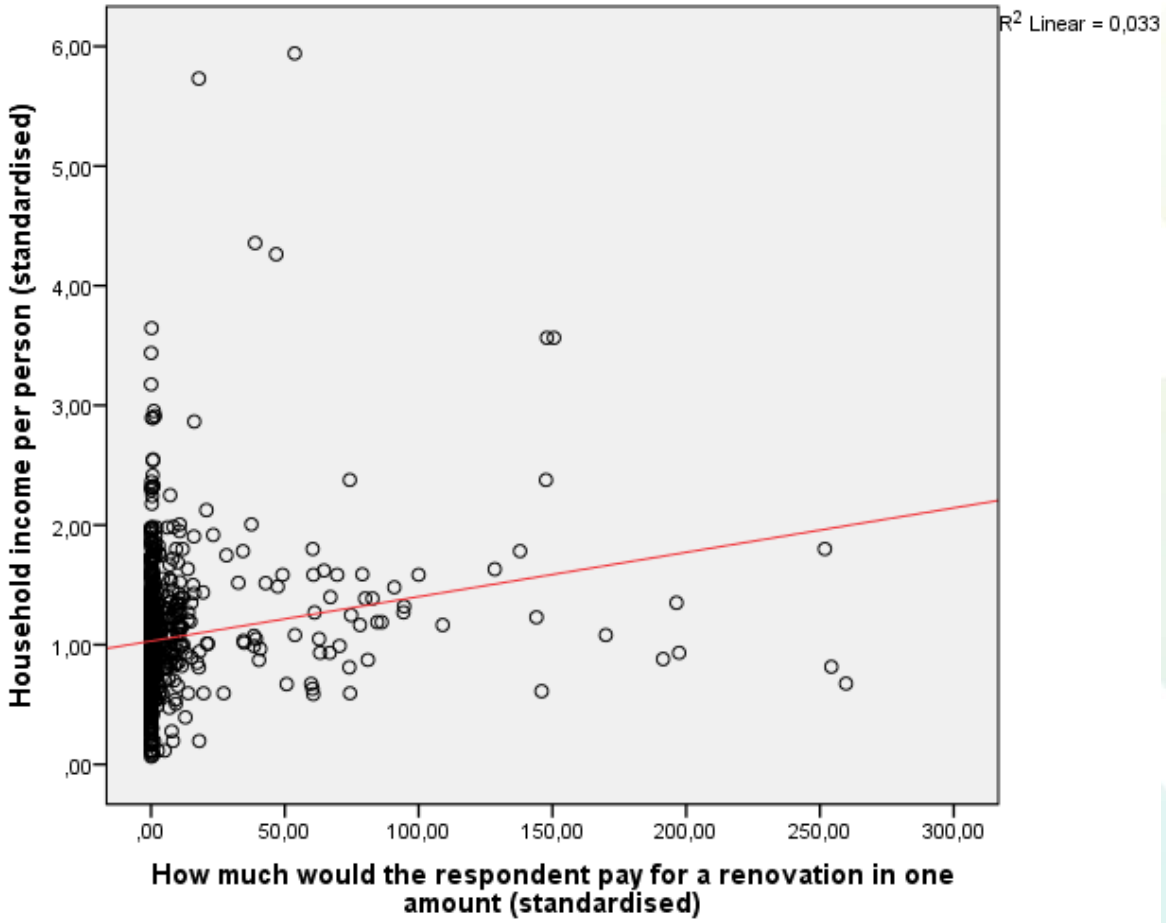


Figure 37 - Relationship between the amount the respondent is willing to pay and the income of the household per family member

[17] Odessa is the only one of our survey sites where income does not influence willingness to pay for the renovation signficantly. According to our local sources, the high prevalence of informal work and incomes in Ukraine may contribute to this, as many respondents could have reported only their official earnings, and not their informal ones.

The connection between per capita income and the amount to devote for the renovation in instalments was weaker. Paying in instalments creates more financial space for households, so establishing a financial scheme based on instalments might fit more to the needs of residential communities with mixed social (income) composition.

Interestingly, the perceived/self-assessed financial situation matters more in many cases than the actual income of the household. For example, in Hungary, Lithuania and Ukraine, those whose real income is above the average but who find it harder to comfortably make a living showed less willingness to contribute to a renovation[18] than those who earn below the average but perceive their income sufficient. In some cases, the reason behind this behaviour can be a regular high expenditure in the household budget that their higher income does not cover (e.g. illness in the family). Or it can be explained by the fact that people's subjective feeling about their financial capacity might not directly correspond to their actual income. Some households appear willing to contribute to improve the state of the building despite their relatively low income, while others who could actually afford to contribute do not think it necessary. This result corresponds to our interviews with housing managers, who also reported that the income level and the willingness to contribute to the renovation do not go hand-in-hand.

Another interpretation of income was important in Lithuania. Here, the respondents' judgement of whether their income is lower or higher than that of the other residents in the same building mattered. Where the self-assessed income level of the respondent was lower than that of the other residents, the amount they were prepared to contribute was also substantially lower, independently of the actual income level.

3.3. Does educational level matter?

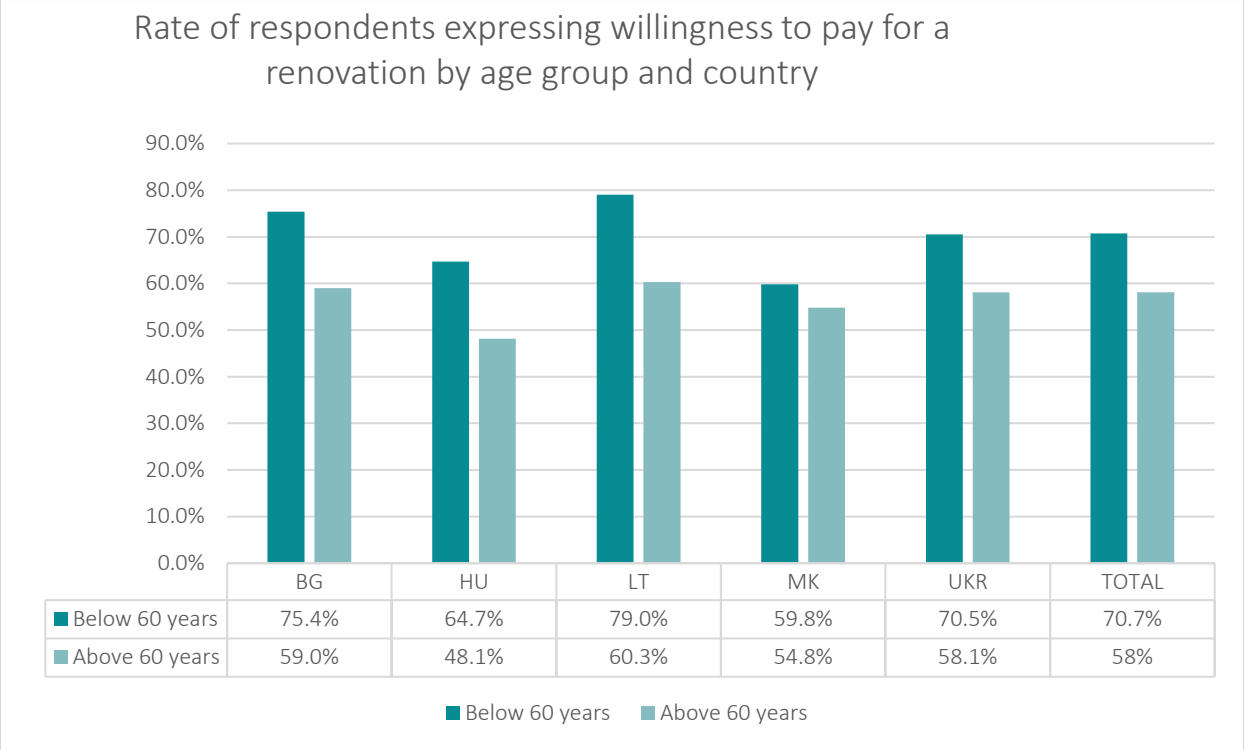
Perhaps surprisingly, respondents' willingness to pay for renovation appears quite independent from education. Education level affects the financial situation of the households, but it also affects people's attitudes, information sources and how well-informed they are. The role of these factors turned out to be important only in some settings; in general it seems to have a minor effect.

In Bulgaria and Lithuania, education didn't make any difference to the amount respondents were prepared to dedicate to renovation works. In North Macedonia and in Hungary, those who have a university degree were likely to pay more as a single amount, but willingness to pay in instalments was not affected. There was no difference between groups with lower education levels. The only exception was Ukraine, where people with either a secondary education or a university degree were more likely to contribute.

[18] This applies to whether the respondent named any amount that she/he could pay, either as a lump sum or in instalments. Thus, one's willingness to pay does not include the amount, only the fact that one did not refuse to pay.

3.4. Does age matter?

Younger respondents seem to be more enthusiastic when it comes to paying for a renovation, independently from their financial situation. Respondents over the age of 60 were substantially less eager to contribute.



	BG	HU	LT	MK	UKR	TOTAL
Below 60 years	75.4%	64.7%	79.0%	59.8%	70.5%	70.7%
Above 60 years	59.0%	48.1%	60.3%	54.8%	58.1%	58%

Figure 38 – Rate of respondents expressing willingness to pay for a renovation by age group and country

One reason for this is clearly financial: elderly households tend to have a lower income, which reduces willingness to contribute. But even where incomes are the same, age still turns to be a relevant factor, which indicates that there are other reasons behind this phenomenon.

Young people are more mobile and may consider renovation as a measure to increase the real estate value of their property, which they can realise when they leave the building. Also, working age people spend fewer hours at home and tend to be bothered less by the renovation works, which may create serious discomfort for older retired people. In addition, energy renovations can have a long payback time, and older residents may feel that they will not see a return on their investment, while paying for the renovation is burdening their budget. The family situation of older people may make a difference as well, both as a source of financing and as inheritors for whom the real estate value of the dwelling matters.

Besides age, having or not having children seems also to have an impact on the willingness to pay for renovation – among respondents with the same age and employment status, those with children are more willing to pay. People with children who do intend to pay, however, are prepared to pay less than average. This indicates that households with children would like to improve their living conditions, but have less disposable income to contribute.

3.5. Does community and management matter?

Willingness to pay is very much influenced by the cohesion and operation of the building community, from both a financial and an organisational point of view.

Those inhabitants who assume that their community has an arrears problem with regard to the payment of maintenance and operational costs are willing to contribute a lower amount. This correlation was present in all pilot countries except Lithuania. It means people see that investing their money or taking a loan in the name of such a community entails strong financial risks.

Like the financial state of the community, the cohesion between people is also crucial. Those inhabitants that observe conflicts between the residents and whose personal ties to other inhabitants are loose tend to reject contributing to the renovation costs. Those who are satisfied with how the community operates are much more eager to pay for the renovation. This generic observation was strongest in Hungary and Bulgaria.

While the financial state of the community and the cohesion between residents strongly affects the willingness to pay, leadership (quality of property management) seems to be less relevant. Dissatisfaction with the work of the housing manager doesn't reduce people's willingness to pay in any of the pilot locations.

Finally, the physical state of the building seems less relevant in most of the pilot countries than expected: even if residents experience serious defects in the condition of the building it does not raise their willingness to contribute to improvements.

Table 5 – The most decisive factors for contributing more or less to the renovation costs in the pilot countries

	In instalments		As a lump sum	
	+	-	+	-
Bulgaria	• High income • Perception of maintenance-issues	• Perception of arrears problem	• High income or sufficient self-assessed income • Perception of maintenance issues	• Perception of arrears problem
Hungary	• University degree • Sufficient self-assessed income • Perception of maintenance issues	• Aged over 60	• High income • Dissatisfied with the community	• Perception of arrears problem
Lithuania	• Sufficient self-assessed income • More family members working	• Worse-off financially compared to neighbours (self-assessed)	• High income • More family members working • Having children	• Worse-off financially compared to neighbours (self-assessed)
North Macedonia	• High income • Having children • University degree	• Dissatisfied with the community	• High income • Having children	• Dissatisfied with the community • Dissatisfied with the management
Ukraine	-	-	• High school or university degree	• Having children • Aged over 60 • Perception of arrears problem
Overall	• High income or sufficient self-assessed income	• Worse-off financially compared to neighbours (self-assessed) • Perception of arrears problem • Aged over 60	• High income or sufficient self-assessed income • Having children	• Aged over 60

3.6 Main takeaways

Summary of the findings				
Despite the common assumption that building communities with a significant share of energy-poor households are not able/eager to contribute financially to a renovation, a majority of respondents (sometimes more than two-thirds) were willing to pay in all pilot countries.	People are more willing to pay in instalments than as a lump sum.	The most decisive factor in how much someone is willing to contribute to renovation costs is the income level of the household. Households' subjective assessment of their financial state (having or not having sufficient income) also matters.	The age of residents influences the motivation to pay for renovation as well: younger residents, particularly if they have children, are more willing to contribute to the renovation costs, than elderly people. This is a crucial issue as elderly people also turned out to be particularly exposed to energy poverty.	Community cohesion and the perceived financial stability of the condominium (lack of arrear problems) can incentivise residents to contribute more to the renovation expenses.

Policy implications

- Financial schemes (commercial loans, municipal loans, NGO loans) need to be developed to enable payment in instalments.
- Financial schemes for renovations must include a grant element that allows buildings with low-income owners to participate.
- Developing a special motivation scheme for older people is crucial. This should contain financial incentives and special financial assistance to energy-poor households, and potentially involve the wider family to assist older residents both emotionally and financially.
- Building trust in the community and strengthening cohesion between residents have a clear material benefit and increase people's motivation to contribute to common goals.
- Transparency with regard to financial streams and thorough arrears management can also help build trust in the financial sustainability of the building community, which is a strong trigger point for investing households' money in common interventions.

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Annex

Annex A.: Methodology of the survey

Principles of creating the sample

The ultimate goal of the household survey was to acquire up-to-date information on a housing segment that is the main target of ComAct project, namely those urban multi-family buildings that have an above average share of energy-poor households and/or are most probably not able to implement the deep renovation process by themselves but require some moderate assistance to be able to benefit from mainstream renovation subsidy schemes.

More specifically the survey had two main scientific goals:

- To explore the most important social and technical factors behind energy poverty in the surveyed households in owner-occupied multi-family apartment buildings with a higher than average share of energy-poor households.
- To create a hypothesis about the main obstacles of renovation in this segment and possible ways to overcome them.

Beyond information gathering goals, the survey aimed to serve engagement goals as well. Through the surveying process, pilot partners created contacts with the housing managers/homeowners' associations and met the surveyed households face to face. Via leaflets and posters all residents acquired basic information about the research and the ComAct project.

Creating the sample for the survey was a difficult task for several reasons:

- Due to the size of the ComAct budget a sample of 200 households/pilot location was the maximum realistic aim, which is a limited number compared to the scale of the urban multi-family housing stock in the pilot locations.
- The category of 'higher than average' share of energy-poor households is not easy to capture taking into account that there is no information on individual households' situation in this regard. It was not possible to define exactly which buildings belong to this category, and the major characteristics of these buildings that can be used to create internal quotas for the sample (e.g. regarding age, education level, household structure of the respondents).

In order to overcome these barriers, the research used a four-step approach:

1. Defining the socially more vulnerable building segment

In each pilot location, we pre-defined which types of urban multi-family buildings may be considered as more vulnerable regarding energy poverty. These classifications may have been based on social characteristics (e.g. social data of certain neighborhoods from census or other sources), real estate prices (neighborhoods with a lower than average price), technical parameters (non-renovated buildings, buildings with the worst technical parameters).

2. Stratification

In the pre-defined urban neighborhoods/building blocks/building segments different types of buildings were selected, which have different technical parameters. This stratification was based on the preliminary assumption that the construction type of the building combined with its heating system may have an impact on energy poverty, so different building types should be selected. As each building type should have contained at least 40-50 questionnaires – in order that the number would be sufficient for statistical analysis – no more than three types could be defined in each pilot location.

The categories were created based on the following aspects:

- Main energy parameters of the building categorised, most probably by construction methods in combination with the period of construction.
- Type of heating system (e.g. district heating, individual solid fuel heating, individual gas heating, electricity), heating control on a household level (whether the consumption can be regulated or not).
- Size of building.

3. Selecting the buildings

After the categories were identified, and a pool of possible buildings for survey was established, the buildings themselves were selected based on different approaches. One of the approaches was random sampling, or creating a balance with regard to the size of the buildings (e.g. some smaller and also some larger ones), or by special parameters (e.g. having buildings with a limited share of rentals – as the questionnaire was addressed exclusively to owner-occupiers).

4. Random sampling of households

Within the chosen buildings in all categories the surveyed households were selected using random sampling, such as choosing every fifth apartment (or every 10^{th} in a big building) after a randomly picked starting point. This method ensured that other factors (e.g. household type, income level, location of the flat within the building) were represented in the sample.

This methodology ensured that we can gain an insight into the opinion of people living in owner-occupied dwellings in multi-family buildings, but certainly could not allow us to formulate statements about energy-poor *buildings themselves*. We had to make a typical trade-off. One option was to fill in a high number of questionnaires in one building, which would allow us to formulate statements with regard to the building community – but a 200 sample of 200 households would make it possible to survey only 2-5 buildings, which would not make it possible to investigate the factors behind energy poverty in different building types. The other choice was to have 5-10 respondents in one building, which is not enough to characterise the operation of specific buildings but would make it possible to involve 20-40 buildings, providing enough variety of buildings with different technical parameters. After careful consideration, we chose the second option.

In spite of all these efforts, we have to emphasise that the sample is not considered statistically representative as we do not have the data to compare it with basic attributes of energy-poor buildings. On the other hand, the survey made it possible to find energy-poor households in different technical and social settings, which enables us to draw conclusions on the nature of energy poverty.

Altogether 1,025 questionnaire were filled in (Bulgaria: 200, Hungary: 200, North Macedonia: 200, Lithuania: 225, Ukraine: 200). Residents questioned were all owners of the dwellings, not tenants. The reason behind this decision was to question only those who are entitled to decide on renovation and take part in general assemblies.

The survey was conducted in the autumn of 2021, in the beginning of the fourth wave of the Covid pandemic. Although this created some difficulties, it was still possible to carry out a face-to-face survey with the residents in all five pilot locations.

The methodological preparation and the elaboration of the questionnaire was done by ComAct researchers. The selection criteria for the buildings/areas were developed by the pilot partners, supported by the ComAct team, while the visits to the households were carried out by professional survey companies. The survey was totally anonymous; the respondents were not influenced by any means by the partner organisations.

Methodological notes on the data analysis

Due to the guidebook genre of the deliverable, we did not include methodological parts in the main text. The most important methodological notes are presented below.

The analysis was substantially influenced by the size of the sample. Due to the different sampling techniques and slightly different population surveyed in each pilot country, the country samples were rarely merged and analysed as one sample. In most cases we examined them one by one; as a result, we usually worked with a sample size of 200-225. This had three main implications:

- All basic variables required imputation of the missing data. Most importantly, missing income data, utility costs and basic dwelling parameters were imputed based on the data of similar cases regarding relevant variables. In some cases, however, we decided to avoid complementing the missing data, e.g. in the case of two key energy poverty indicators: inability to keep home warm and inability to keep home cool in summer. In these cases we used only the cases where the respondents provided information.
- The sample size required using several binary indicators in order to have the sufficient number of cases in one cell. Most four-point scales were reduced to dichotomous variables, e.g. in case of attitude questions and subjective assessment of financial situation.
- In some cases we could not analyse important correlations because of the insufficient amount of cases in one cell.
- In the case of several correlations, which we expected to be relevant based on previous research, our data did not provide evidence on the correlation being statistically significant. We suppose that many of these cases were due to the low sample size; however, we could not use our data to support or disprove these correlations.

In Chapter 2 and Chapter 3, which serve to present the main results of the analysis, all presented correlations are statistically significant at a 0.05 significance level.

In the analysis for Chapter 2, we used three dichotomous variables (inability to keep home warm in winter, inability to keep home cool in summer and energy cost exceeding 15% of income), and one continouos variable (energy cost/income ratio) as dependent variables. The independent variables used were mostly categorical, except for income, age of respondent and average age of the household. The income variable mainly used is the equalised per person income of the household. In cases where the income variable needed to be comparable across country samples, we used the ratio of the household's equalised income per person and the average income of the given country sample to have a standardised measurement.

In the analysis which backs Chapter 3 we focused on two continuous variables: the amount someone is willing to pay for a renovation in instalments and the amount someone is willing to pay for a renovation as a lump sum. In

order to make the amounts comparable across countries, we used a ratio of the amount the respondent is willing to pay and utility bills paid by the household to have a standardised measurement. Some results are based on the dichotomous variable which shows whether the respondent expressed willingness to pay either in instalments or as a lump sum.

Dichotomous variables were analysed using chi square test of independence in two-way and three-way contingency tables. Continous variables were analysed using regression and ANOVA. Due to the nature of the phenomenon, all indicators which represent the comfort dimension of energy poverty are binary indicators, which limited the comparison of the comfort dimension and the affordability dimension to some extent, as the comfort dimensions was not analysed with regression.

The analysis of the collected data was done with IBM SPSS program.

Annex B.: The questionnaire

The questionnaire was almost the same for all sites with minor modifications to tailor it to the local context.

HOUSEHOLD SURVEY

ABOUT THE ENERGY CONSUMPTION AND LIVING CONDITIONS OF HOUSEHOLDS LIVING IN MULTI-FAMILY APARTMENT BUILDINGS

for the ComAct project

[*NAME OF THE RESPONSIBLE PILOT PARTNER*]

[*NAME OF THE SURVEY COMPANY*]

2021

Questionnaire number

Address:……

I declare that I conducted the interview in accordance with the rules of surveying. I will keep the data and information I have recorded and handled confidential, I will share them only with those who are authorized to handle them in the research project.

Signature of the interviewer: ……

Code of the Interviewer

A. Interviewer's Section

A.1 Interview information

	SURVEY AREA:			
	DATE OF INTERVIEW:			
	STARTING TIME OF THE INTERVIEW:		END TIME OF THE INTERVIEW:	
	COMMENTS ABOUT THE INTERVIEW (COMPLICATIONS, DISTURBING FACTORS)			

A.2 Building and dwelling information

	BUILDING INFORMATION			
	BUILDING CATEGORY	1 – 2 – 3 – 4 -		
	NUMBER OF FLOORS IN THE BUILDING	……		
	NUMBER OF DWELLINGS WITHIN THE BUILDING	……		
	CONDITION OF THE BUILDING (1-4)	1 – The building is in a very bad condition, almost ruinous 2 – Severe technical problems are visible (e.g. unstable corridors, lack of plastering) 3 – It seems, there are rather superficial technical problems (e.g. loose plastering, damaged heaters) 4 – Only minor technical problems were visible		
	DISTRICT HEATING	1 – Yes 2 - No		
	DWELLING INFORMATION			
	FLOOR	……		

B. Instructions for the interviewer

- Text in bold should be read out to the respondent. Text in italics is additional information for the interviewer. It may contain explanations in case the respondent does not understand the question. Always read the instructions before asking the given question.
- When no other instruction is given, only one answer is possible. Questions with more than one options are always indicated in the instruction.
- Some questions are followed with a 'Jump to…' instruction, meaning that you have to skip one or more questions.
- In case when numerical data is required from the respondent
    - If the respondent is uncertain about the number, encourage them to give an estimation at least.
    - If the respondent provides a threshold instead of an exact number (e.g. 'between 50 and 100), ask him/her to choose one number or write an average.
    - Wait patiently for the respondent to answer.
    - Help the respondent calculate if needed.
- Do not forget to fill Section A.

Introduction

This survey research is organized by [*Name of the pilot partner*]. We talk to homeowners and collect their answers anonymously. This survey is a part of a scientific research about the energy consumption and living conditions of households. May I ask you whether ….[FILTERING QUESTIONS]

C. Filtering questions

C1. Does the owner live in this dwelling?

1	Yes	
2	No	2 or 99 → STOP THE INTERVIEW
99	Doesn't know/No answer	

C2. Do the inhabitants reside here more than 6 months a year?

1	Yes	
2	No	2 or 99 → STOP THE INTERVIEW
99	Doesn't know/No answer	

C3. Is it possible to speak with a person who is responsible for financial decisions, paying the bills etc.?

Only ONE answer.

1	Yes	
2	No	2 → ARRANGE INTERVIEW FOR ANOTHER TIME, WHEN YOU CAN INTERVIEW THE RESPONSIBLE PERSON 99 → STOP THE INTERVIEW
99	Doesn't know/No answer	

C4. Does your dwelling have individual heating? [BG, MK, UA]

1 – Yes

2 – No

---

99 – Doesn't know X – No answer

Basic information about the project, asking for consent

ComAct is an international project, which aims to improve the housing conditions of people in Eastern European countries. It focuses on the affordability of utility costs and the energy efficiency of buildings. The project facilitates the renovation of multi-apartment buildings. With the help of this survey research we will know more about the living conditions of people, and understand how they cope with their utility costs and what do they think about these topics. You can help our project a lot by answering these questions. Further information about the project can be found in this Information sheet.

The questionnaire takes around 45 minutes. All information is handled anonymously and the respondents will not be identifiable, the answers will be analysed with statistical methods together with hundreds of other respondents. (E.g. '50% of the people answered yes to this or that question.')

This interview will consist of structured questions. During the interview, I may ask you additional questions to further clarify or elaborate on your answer. You may choose not to answer a particular question, in that event please feel free to inform me. You may also ask to take a break or end the interview at any time.

I declare that I have received the needed information on the ComAct project and the purpose of the survey, I understand that my participation in the project is voluntary and that I am free to withdraw at any time without giving a reason and I agree that any data collected may be stored and passed to other researchers without containing my personal data (address).

Signature of the interviewee:……

Household and dwelling information

First I would like to ask you questions about the apartment you live in.

1. In which year did you move into this dwelling?

……

99 – Doesn't know X – No answer

2. Is this dwelling at the corner of the building?

1 – Yes

2 – No

99 – Doesn't know X – No answer

3. What is the size of your dwelling? *Without cellar, attic, garage, etc.*

.....m^2 ⟶ *JUMP TO 5!*

99 – Doesn't know X – No answer

IF 3=DOESN'T KNOW OR NO ANSWER:

4. What range does your dwelling belong to?

1 – Below 35 m^2

2 – 36-50 m^2

3 – 51-70 m^2

4 – 70-90 m^2

7 – More than 90 m^2

99 – Doesn't know X – No answer

5. How many rooms does the dwelling have? *Apart from the bathroom and storage rooms. Half room (<10m^2) counts as one room.*

.....

99 – Doesn't know X – No answer

6. Are the apartments around your apartment heated during the winter?

1 – They are all heated

2 – They are mostly heated (= *Not all of them, OR some of them is heated insufficiently.)*

3 – They are mostly unheated

4 – None of the apartments around my dwelling is heated

99 – Doesn't know X – No answer

7. Does this building have district heating?

1 – Yes

2 – No

99 – Doesn't know X – No answer

8. What do you use for heating the apartment in winter? List the secondary heating sources in use as well.
Primary: the heating source the household mainly relies on – ONLY ONE; secondary: other, additional heating sources
SECONDARY: CHECK ALL APPLICABLE OPTIONS.

	Primary (one)	Secondary
(1) Individual electric heating – electric radiator or heater	☐	☐
(2) Stove fuelled by wood, coal, liquid or other	☐	☐
(3) Individual gas-fired convection heater (bottled gas - BG)	☐	☐
(4) Central heating (the building's own heating system)/ BG: Connection to the gas distribution network	☐	☐
(5) District heating	☐	☐
(6) Air conditioning	☐	☐
(7) Other, namely:……	☐	☐

99 – Doesn't know X – No answer

9. Can you control your heating consumption independently from the whole building? [HU, LT, MK, UA]

1 – Yes, my bill is calculated based on the consumption of our dwelling
2 – Yes, I can control the consumption, but we cannot pay separately, based on our consumption
3 – No → *JUMP TO 11!*

99 – Doesn't know X – No answer

IF 9=YES:

10. Can you control the heating separately in each room? [HU, LT, MK, UA]

1 – Yes
2 – No

99 – Doesn't know X – No answer

Energy consumption and comfort

In the following section, I would like to ask a few questions about the energy consumption and comfort level of your dwelling.

11. During the last heating season, did you heat all the rooms in your dwelling (apart from the bathroom(s), toilet(s) and storerooms)?

1 – Yes, all of them
2 – No, I heated only …… [*number*] rooms and kept the remaining rooms unheated
3 – I didn't heat my apartment at all

_____

99 – Doesn't know X – No answer

HLM12. What was the average temperature during the last winter in the living room? [HU, LT,MK]
1 - 24°C or more
2 - 19°C -23°C
3 – 18°C or less

_____

99 – Doesn't know X – No answer

B12. What was the average temperature during the last winter in the living room? [BG]
1 - 24°C or more
2 - 22°C -23°C
3 - 20°C -21°C
4 - 18°C -19°C
5 – 14°C -17°C
6 – 13°C or less

_____

99 – Doesn't know X – No answer

U12. What was the average temperature during the last winter in the living room? [UA]

1 - 24°C or more
2 - 18°C -23°C
3 - 14°C -17°C
4 – 13°C or less

_____

99 – Doesn't know X – No answer

13. Do you use any of the following types of equipment for cooling during the summer?
CHECK ALL APPLICABLE OPTIONS.

		YES	NO	Doesn't know	No answer
13.1	Ventillator	1	2	99	X
13.2	Air conditioner	1	2	99	X
13.3	Other, namely: ……	1	2	99	X

14. Can you please assess the amount your household pays each month for the following utility and maintenance services?
Help the respondent calculate. Only payments made concerning the main dwelling should be recorded. If the household does not need to pay for a given service, mark 0!
If he/she pays a flat rate utility bill, calculate based on the total annual cost.
The respondent is not expected to show you bills, but let him/her to do so if it is helpful.
Note that the winter cost is not applicable in every category!
'Condo fee including water/heating/electricity' is applied only for cases in which the services are included in the condo fee.

		Cost in the coldest winter month (HUF)	Average cost/month in the past 12 months (HUF)	Before the pandemic: More = 1; Less = 2; Same = 3; Flat rate utility bill = 4
		Doesn't know = 99; Not applicable = 88; No answer = X		
14.1	Electricity			
14.2	Gas			
14.3	Bottled gas [BG]			
14.4	District heating			
14.5	Other heating source (e.g. wood/coal)			
14.6	Water	----------		
14.7	Condo fee/Cost of maintaining the common areas	----------		
14.8	Condo fee including water [HU]	----------		
14.9	Condo fee including heating [HU]			
14.10	Condo fee including electricity [HU]			

15. Many people find it difficult to make ends meet, including paying for the utility costs. Did you have to limit your spending on food, medicine or other basic goods so that you can avoid being in arrears with the utility bills in the past 2 years?

1 – Yes, often

2 – Yes, sometimes

3 – Sometimes we had to choose, but we decided to be late with the payment of bills

4 – We did not have to make such a decision

99 – Doesn't know X – No answer

16. Has your household been in arrears at any time in the last 12 months, that is, unable to pay any of the utility bills on time?

1 - Yes
2 – No → *JUMP TO 18!*

99 – Doesn't know X – No answer

IF 16=YES:

17. Which statement describes best the problem of arrears in your household?

1 – We are rarely late with the payments due to financial difficulties.
2 – We are often behind with the payments.
3 – Our household is disconnected from the utility services from time to time due to delayed payments.

99 – Doesn't know X – No answer

The following questions are related to the comfort level of your apartment. 18-19: If you have to use secondary heating sources/cooling devices, but it doesn't cause financial difficulties for your family, mark 'Yes'.

		YES	NO	DOESN'T KNOW	NO ANSWER
18.	Is there mould in the dwelling?	1	2	99	X
19.	Can your household afford to keep your home adequately warm in winter?	1	2	99	X

20.	Can your household afford to keep the dwelling comfortably cool during summertime?	1	2	99	X

21. In your opinion, how much monthly income would be sufficient for your family to live a comfortable life?

…… HUF

99 – Doesn't know X – No answer

Management and the community of residents

The next section has questions on the management of this building and the community of residents.

22. Does your building have a janitor/caretaker? [BG, HU, LT, MK]

1 – Yes

2 – No

99 – Doesn't know X – No answer

23. Does your building* have a formal Homeowners' Association (HOA) or another formal form of management? [BG, LT, MK, UA]

1 – Yes

2 – No

99 – Doesn't know X – No answer

24. Who does the management of the building/staircase/entrance? Informal management: there are channels of common decisions, someone manages the operation of the building but without a registered legal form.

1 – An individual, who is one of the residents

2 – An individual, who does not live here

3 – A company

4 – A housing cooperative

5 – A Homeowners' Association (HOA) [if applicable]

6 - Other

7 – There is no management, not even an informal one → *JUMP TO 26!*

99 – Doesn't know X – No answer

IF 24 = 1, 2, 3, 4 or 5:

25. What is the unit of the (formal or informal) management: the whole building or only a part of it? [BG, LT, MK]

1 – The whole building

2 – Only a part of the building (e.g. staircase, entrance)

3 – The buildings of the housing cooperative

99 – Doesn't know X – No answer

IF 24 = 1, 2, 3, 4 or 5:

26. I will list statements about the work of the housing manager/manager company. Indicate whether you agree with them on a scale on which 1=I do not agree at all; 4=I absolutely agree.

'I don't have experience with it / I haven't tried it' is applicable only in the first and fifth option!

		I do not agree at all			I absolutely agree	I don't have experience about it / I haven't attempted it	Doesn't know	No answer
26.1	I feel that the h.m. is always supportive if a resident asks for his/her help.	1	2	3	4	5	99	X
26.2	I think the h.m. is enthusiastic about the development of the building.	1	2	3	4	-	99	X
26.3	I am satisfied with the work of the h.m.	1	2	3	4	-	99	X
26.4	I regularly meet the h.m./representative personally or talk to him/her on the phone.	1	2	3	4	-	99	X
26.5	I have the opportunity to access information or check documents regarding the finances of the building	1	2	3	4	5	99	X

27. I will list statements about the community of residents in your building. Indicate whether you agree with them on a scale on which 1=I do not agree at all; 4=I absolutely agree.

		I do not agree at all			I absolutely agree	Doesn't know	No answer
27.1	Sometimes I feel it would be better to move because of how some of the residents behave	1	2	3	4	99	X
27.2	I have conflicts with residents of the building	1	2	3	4	99	X
27.3	I think residents of this building are nice	1	2	3	4	99	X
27.4	Conflicts frequently occur in the building community	1	2	3	4	99	X
27.5	I frequently chat with my neighbours or other residents	1	2	3	4	99	X

28. Before the pandemic, how many condominium meetings have you attended in an average year?
…… (number)

99 – Doesn't know X – No answer

29. Before the pandemic, how many condominium meetings were organized per year?
…… (number)

99 – Doesn't know X – No answer

30. In general, how many of the homeowners participate in condominium meetings?
1 – More than 2/3 of the homeowners
2 – Between the half and the 2/3
3 – Less than half of them
4 – Only a few families

99 – Doesn't know X – No answer

31. In some buildings, some families are often in arrears with the condo fee. What do you think, how significant is this problem in your building?

1 – There is no such problem in our building / not significant at all.

2 – Not so significant

3 – Somewhat significant

4 - Very significant

99 – Doesn't know X – No answer

32. Please think about the general condition of the building and the problems that may occur with the maintenance. Which of the following statement is the most typical of your building?

1 - The building is in a good technical condition: appliances and public utilities (e.g. elevator, wiring) work well, if there are any problems, they are solved quickly

2 - The building usually functions, but some problems occur from time to time

3 – Only the most urgent problems are getting solved in our building, the condition of the building is constantly worsening
4 - Our building is almost unable to function, technical problems often stop the operation of basic functions

99 – Doesn't know X – No answer

Renovation initiatives and support schemes

The next section has questions on building renovation initiatives and programmes.

33. Every multi-apartment building has some kind of technical or other problems or deficiencies. Please list the three problems or things that could be improved in your building that you find the most important.
Short answer. We will provide a detailed list of problems with codes in the coding instructions. (E.g. Leaking roof = 1; Heating consumption cannot be controled = 2; etc.) Problems that are not on the list will remain uncoded and translated as text.

1.: Problem:……
2.: Problem:……
3.: Problem:……

99 - Doesn't know X – No answer

34. Think about the above mentioned problems (see 34.), or any other major issues in the building. Considering the reasons behind the problems of your buildings and the obstacles of the necessary refurbishments, which of the following statements is true in this building?

1 In the past 5 years,the residents haven't discussed the possibility of renovations.

2 - We have discussed the possibility of renovation in the past 5 years, but eventually we didn't apply to any programme

3 - We have already decided to apply to a programme, currently we are in the process of applying/we are waiting for the result of our application

4 - We applied to a renovation programme, but our application weren't approved

BG:

34. Think about the above mentioned problems (see 34.), or any other major issues in the building. Considering the reasons behind the problems of your buildings and the obstacles of the necessary refurbishments, which of the following statements is true in this building?

1 - We, the residents haven't discussed the possibility of renovations.

2 - We have discussed the possibility of renovation, but eventually we haven't applied to any programme

3 - We have decided to apply to the National programme for energy efficiency, but haven't taken any action yet

4 - We applied to a the National programme for energy efficiency, but our application weren't approved

→ *IF 34=1,3 or 4 → JUMP TO 36!*

IF 34=2

35. Why haven't you applied to any programme? CHECK ALL APPLICABLE OPTIONS.

		YES	NO	NOT APPLICABLE	DOESN'T KNOW	NO ANSWER
35.1	Because there is no programme that would provide the sufficient amount of subsidy	1	2	3	99	X
35.2	Because the programme available has other disadvantages, namely:..... (e.g. too difficult to apply)	1	2	3		
35.3	Because the renovation needs the consent and financial contribution of all residents, which is difficult to obtain	1	2	3	99	X
35.4	Because the homeowners did not agree with the content of the planned renovation or did not find it necessary	1	2	3	99	X
35.5	Because the homeowners decided that the renovation process would be too uncomfortable (e.g. mess, noise)	1	2	3	99	X
35.6	Because nobody was there to organize the process	1	2	3	99	X
35.7	Other:	1	2	3	99	X

36. Sometimes the state or local municipalities provide subsidies for the renovation of multi-apartment buildings. Have you heard about such subsidy schemes? If yes, could you name or describe them?

Write down the answer and code it.

Programme(s):..... , Code:.....

99 - Doesn't know X – No answer → *JUMP TO 43!*

B36. Have you heard about the National programme for energy efficiency in the multifamily residential buildings? [BG]

1 – Yes

2 – No → *JUMP TO 43 (Section 5)!*

99 - Doesn't know X – No answer

37. Do you know that you can apply for a specific loan to help you start making your own solar energy? Did you heard about Loan for solar panels? [LT]

1 – Yes

3 – No

99 – Doesn't know X – No answer

38. Do you know that you can save by buying a solar power plant? Government supports acquisition of power plants up to 10 kW power to produce electricity for your home needs. Amount of support reaches up to 323 Euros per 1 kW of installed solar power. [LT]

1 – Yes

3 – No

99 – Doesn't know X – No answer

IF 36=YES:

39. How would you rate your level of knowledge and understanding of the program? [HU]

		Low (I have heard about the program, but don't know any details)	Moderate (I am aware of the main aspects of the program, but don't know about the application process)	High (I know about the program and the application process)	Doesn't know	No answer
39.1		1	2	3	99	X
39.2		1	2	3	99	X
39.3		1	2	3	99	X

IF 36=YES:

40. How did you learn about the program? [BG]

1 – TV

2 - Radio

3 -Newspapers

4 - Internet

5 - Brochures (informative or advertising)

6 - Outdoor advertisements (billboards)

7 - Public events

8 - Neighbors

9 - Relatives/acquaintances/friends

10 - Other (please specify .....)

99 - Doesn't know X – No answer

41. If the Programme is continued with co-financing from the owners, which of the following changes in the rules and procedures would make you more willing to invest your own money in combination with a public subsidy? [BG]

		Yes	No	Doesn't know	No answer
41.1	More transparency in the entire procedure	1	2	99	X
41.2	More information about the advantages of the measures	1	2	99	X
41.3	Access to credit lines with preferential conditions	1	2	99	X
41.4	Easier application process	1	2	99	X
41.5	New / changed selection criteria	1	2	99	X
41.6	Participation of the owners in the decision making about what measures should be implemented	1	2	99	X
41.7	Participation of the owners in the selection of contractors	1	2	99	X
41.8	Participation of the owners in the quality control	1	2	99	X
41.9	Guarantees for the quality of materials and work	1	2	99	X
41.10	Other, namely:.....	1	2	99	X

42. If you had to provide some funding for the renovation measures in your building/ entrance, what percentage of the cost would you be able to provide? [BG]

1 - Up to 5%

2 - 5% - 10%

3 - 10% - 20%

4 - 20% - 30%

5 - 30% - 50%

6 - I can't provide any funding

7 – Other, namely: ……

_____

99 - Doesn't know X – No answer

BG:

B43. If these changes were implemented and you had to provide some funding for the EE measures in your building/entrance, how much would you be able to provide in one amount?

…… EUR

0 - I cannot provide any funding

_____

99 - Doesn't know X – No answer

43. How much would you be willing to pay for a renovation that includes the improvement of the above-listed issues in one amount? [HU, LT, MK, UA]

……HUF

0 - I cannot provide any funding

_____

99 - Doesn't know X – No answer

44. If you have to pay for the renovation, how would you prefer to pay for it? READ THE OPTIONS AND WRITE THE FIRST AND SECOND PREFERENCE INTO THE TABLE. SELECT MAX. 2 OPTIONS.

44.1	First preference:……[CODE OF THE OPTION]	99 – Doesn't know	X – No answer
44.2	Second preference:…… [CODE OF THE OPTION]	99 – Doesn't know	X – No answer

44. *44. CODES OF FORMS OF PAYMENT*

1 - Using my own savings

2 - By an interest-free loan to a commercial bank

3 - By an interest-free loan to the state or municipal fund

4 - By annual additions to the local taxes paid to the municipality

5 - By monthly additions to the electricity/heating bill

6 - By monthly payments to a professional facility manager, the bill including entrance maintenance (loan taken by the building)

7 – Other, namely:……..

99 - Doesn't know X – No answer

M45.1. There is a loan for the renovation of multi-apartment buildings managed by Habitat for Humanity Macedonia in cooperation with municipalities and financial institutions. [*ADDITIONAL INFO ABOUT THE PROGRAMME*] Would you support that your condominium apply to this loan, which would mean increased condo fee or payments in instalments from the homeowners? [MK]

1 – Yes

2 – No

99 - Doesn't know X – No answer

M45.2. There is loan for the renovation of multi-apartment buildings provided by the European Bank for Reconstruction and Development (EBRD). [*ADDITIONAL INFO ABOUT THE PROGRAMME*] Would you support that your condominium apply to this loan, which would mean increased condo fee or payments in instalments from the homeowners? [MK]

1 – Yes

2 – No

99 - Doesn't know X – No answer

ONLY IN KARPOS:

M45.3. There is subsidized loan for the renovation of multi-apartment buildings provided by the Municipality of Karposh. [*ADDITIONAL INFO ABOUT THE PROGRAMME*] Would you support that your condominium apply to this loan, which would mean increased condo fee or payments in instalments from the homeowners? [MK]

1 – Yes

2 – No

99 - Doesn't know X – No answer

U45. There is the Program "ENERGODIM" of the state Energy Efficiency Fund of Ukraine which is providing the Grants for reimburse from 40 to 70% of costs for energy modernization for the HOAs houses. The local municipalities add to this grant some additional payments for reimburse the costs of renovation. All of the Program "ENERGODIM" payments are made through a commercial bank after realised works on EE renovation. After adoption the HOA application by the EEF of Ukraine, your HOA should to sign the agreement with special commercial banks for it loan. Would you support that your HOA apply to this Program "ENERGODIM" and in case of it adoption of your application head of your HOA will sign with commercial bank agreement for loan, which would mean increased condo fee or payments in instalments from the homeowners? [UA]

1 – Yes

2 – No

99 - Doesn't know X – No answer

46. How much could you pay in instalments per month in a form of a loan or an increase in the condo fee?
In instalments/increase of condo-fee: ……HUF /month
0 – I cannot provide any funding in instalments or increase in the condo fee

99 - Doesn't know X – No answer

Socio-demographic data and the effects of the pandemic

I would like to ask a few questions regarding your family's current financial situation and how the Covid-19 pandemic affected your household.

47. Who are you living with in this dwelling? I would like to ask for some general information about them, which doesn't include the name or other personal data.

	FAMILY RELATIONSHIP (HOW IS HE/SHE RELATED TO THE RESPONDENT)	GENDER (WOMAN=1, MAN=2)		YEAR OF BIRTH	IS HE OR SHE WORKING/STUDYING/NONE OF THEM?
1		1	2		
2		1	2		
3		1	2		
4		1	2		
5		1	2		
6		1	2		
7		1	2		
8		1	2		
9		1	2		

47. CODES OF FAMILY RELATIONSHIPS

1 - Respondent

2 - Partner/spouse

3 - Children or children of the spouse

4 - Parent or parent of the spouse

5 - Grandchildren

6 - Grandparent

7 - Sibling or sister/brother in law

8 - Other

99 - Doesn't know

X – No answer

CODES OF EMPLOYMENT STATUS

1 – Working full-time

2 – Working part-time

3 – Unemployed

4 – Pensioner

5 – Homemaker

6 – Student or is under the age of 6

7 – Other economically inactive adult

99 – Doesn't know

X – No answer

48. What is the highest level of education the head of household/adult with the highest education level in the family have completed?

1 –

2-

3-

4-

5-

6-

99 - Doesn't know X – No answer

49. What was the average net monthly income of your household over the last 12 months?

..... HUF → *JUMP TO 51!*

99 - Doesn't know X – No answer

IF 49=REFUSES TO ANSWER OR DOESN'T KNOW:

50. Would you indicate in this sheet the category to which your household's net income belongs? Let me remind you that all answers will be handled anonymously, together with the data of hundreds of other respondents.

1 – Below 100 000 HUF
2 - 100 000 - 150 000 HUF
3 – 150 000 – 250 000 HUF
4 – 251 000 – 400 000 HUF
5 – 400 000 – 600 000 HUF
6 – 601 000 – 800 000 HUF
7 – 801 000 – 1 million HUF
8 – More than 1 million HUF

99 - Doesn't know X – No answer

51. Which of the descriptions below comes closest to how you feel about your household's income nowadays?

1 - Living comfortably on present income

2 - Coping on present income

3 - Finding it difficult on present income

4 - Finding it very difficult on present income

99 - Doesn't know X – No answer

52. How would you describe your/your family's financial situation compared to an average family in the building?

1 - Much better
2 - Somewhat better
3 - About the same
4 - Somewhat worse
5 - Much worse

99 - Doesn't know X – No answer

53. In the past 12 months, have you received financial support from the state or local municipality for the maintainance of your dwelling and/or the utility costs?

		Yes	No	Doesn't know	No answer
53.1	I have received regular support (not pandemic-related)	1	2	99	X
53.2	I have received support due to the pandemic or lockdown	1	2	99	X

54. Did the pandemic affect your/your family's income?

1 – Decreased
2 – Didn't affect
3 – Increased

99 - Doesn't know X – No answer

55. Which of the following statements describes the best how the pandemic and the lockdown affected your expenditures?

1 – All in all, our expenditures have increased during the pandemic
2 – Our expenditures remained about the same
3 – Our expenditures decreased during the pandemic

99 - Doesn't know X – No answer

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