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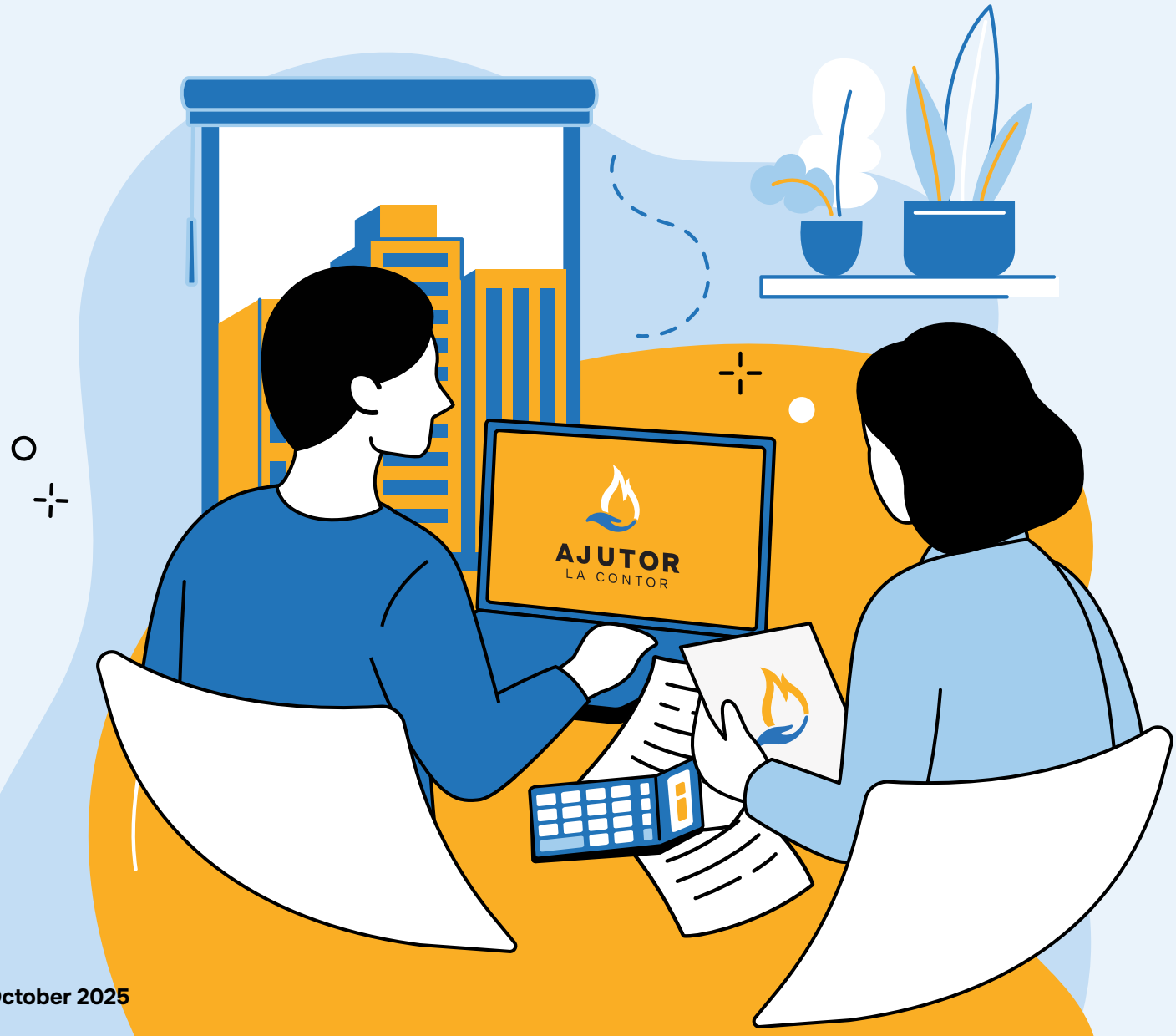
REPORT ON THE WELFARE IMPACT OF ENERGY COMPENSATIONS IN MOLDOVA IN 2021-2025



October 2025

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ABBREVIATIONS

AIDS – Almost-Ideal Demand System

EVRF - Energy Vulnerability Reduction Fund

EVIS – Energy Vulnerability Information System

HBS – Households Budget Survey

MDL – Moldovan national currency (leu)

NBS – National Bureau of Statistics

M – million

EXECUTIVE SUMMARY

This updated edition builds on the previous UNDP study assessing the welfare impact of the Energy Vulnerability Reduction Fund (EVRF) in the Republic of Moldova. Compared to the earlier version, this report benefits from significant methodological improvements allowing for a better accounting of the seasonal and territorial patterns of energy consumption, from the inclusion of the 2024 Household Budget Survey (HBS) data, which enables a full assessment of the 2023-2024 heating season (the previous edition covered only November–December 2023) and which permits a preliminary analysis of the new cash-based compensation scheme using data for November–December 2024.

In addition, the extended dataset improves the econometric estimates of price and income elasticities of energy consumption. While certain quantitative results have changed following the methodological and dataset improvements, the overall qualitative conclusions remain consistent.

The Government of the Republic of Moldova provided the first round of energy compensations to households during the 2021–2022 heating season[1] preceding the establishment of the Energy Vulnerability Reduction Fund (EVRF) in July 2022. Since then, the EVRF has managed all subsequent compensation cycles.

According to the results of microsimulation models based on data from Moldova's Household Budget Survey[2], these compensations have made a substantial contribution to reducing both energy and monetary poverty. In this paper, a household is defined as energy poor if energy represents more than 10% of its consumption expenditure. A household is monetary poor if its monthly consumption expenditure falls below the official poverty line. Moldova has adopted two official poverty lines: the absolute poverty line in 2023 equaled 3,337 MDL (186 USD); the extreme (food) poverty line was 2,691 MDL (148 USD)[3]. In 2024 the absolute poverty line increased to 3,493 MDL (193 USD); the extreme poverty line increased up to 2,817 MDL (153 USD).

In the 2021-2022 cold season, the energy compensations, even though provided before the formal establishment of the EVRF, lowered the incidence of energy poverty from 97.7% in the hypothetical scenario when such compensations are not provided (henceforth called counterfactual or alternative scenario) to 83.2% in the baseline scenario (when compensations were made available).

During the subsequent two cold seasons of 2022-2023 and 2023-2024, when compensations were provided through the EVRF, the overall energy poverty rate declined from 97.4% to 87.3%. Similarly, the absolute poverty rate declined during those seasons from 44.3% to 34.9% (i.e. by 9.4 percentage points). Welfare effects are equally strong in the case of food poverty, which contracted from 25.6% to 17.8% (i.e. 7.8 percentage points).

A significant policy adjustment took place in 2024, when on-bill compensations were replaced by direct cash payments to eligible households. In addition, new rules were adopted for determination of the amount of payment. The data indicate that, despite the change in payment modality, the positive impact of the EVRF persisted during the heating season 2024-25 (based on HBS data available for November and December 2024). The energy poverty rate (as measured against the 10% relative threshold), declined from 97.8% to 84.5%. In case of the absolute poverty, its incidence declined during the heating season - from 39.9% to 34.8%, while that of extreme poverty declined from 22.8% to 17.1%.

In general, during the three heating seasons when compensations were provided from EVRF, the total reduction in energy poverty amounted to 10.6 percentage points (from 97.4% to 86.8%), while absolute monetary poverty decreased by 3.9 percentage points (from 34.0% to 30.2%) and food poverty by 3.3 percentage points (from 17.8% to 14.5%). This represents a significant welfare improvement, considering the scale of the energy price shock.

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1 In Republic of Moldova cold seasons begins on 1st of November and ends on 31st of March next year. "Cold season", "cold period" and "heating season" and are used interchangeably in this report.

2 Household Budgets Survey is a nationally representative survey conducted by the National Bureau of Statistics on a representative sample of dwellings and, respectively, households from urban and rural areas that are randomly selected from across the entire country, except for areas on the left bank of the Nistru river and the Bender municipality. The 2019-2023 HBS dataset used as part of this research included observations for 12 thousand households with 27 thousand individual members.

3 Data on official monetary poverty indicators of Moldova are available on the National Bureau of Statistics databank. The following is the direct link to official poverty lines for the period of 2014-2023: https://statbank.statistica.md/PxWeb/pxweb/ro/30%20Statistica%20sociala/30%20Statistica%20sociala__04%20NIV__NIV070/NIV070050.px/table/tableViewLayout2/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774

These findings are consistent with earlier studies and evaluations. The World Bank's "Moldova Economic Update" of April 2024 reports that during the 2023-2024 heating season the EVRF had reduced the shock of energy prices on income poverty by 8.3 percentage points[4]. Our own estimate for the same period is 7.0 percentage points. The difference can be attributed to variations in methodological assumptions, such as price elasticities of energy consumption, and differences in the setup of the microsimulation models.

Our estimates for the impact on energy poverty during the 2022-2023 heating season also align with findings from the UNDP report "Moldova's energy crisis and the impact of the Energy Vulnerability Reduction Fund in alleviating poverty during the winter of 2022-2023"[5]. Some discrepancies arise due to methodological differences and to the fact that our study included data for the entire 2022-2023 heating season, whereas the quoted report was based only on observations from November to December 2022.

The impact of the EVRF varied across geographic areas, with relatively stronger results observed in urban settings, while rural regions continued to face higher exposure to energy vulnerability.

For example, during the entire 2023-2024 heating season, the energy poverty rate in cities dropped from 92% to 70% due to access to on-bill compensations, while in towns and villages, the reductions were from 98% to 92% and from 99% to 91%, respectively.

The differences in magnitude persisted in the first two months of the 2024-2025 heating season – a decline from 93% to 65% in cities, from 98% to 89% in towns and from practically 100% to 92% in villages.

This underlines the importance of continuing efforts to enhance targeting mechanisms and introduce complementary structural measures in smaller urban and rural areas, where households remain more exposed to energy vulnerability despite the extensive coverage provided through both on-bill and cash-based compensations.

Notably, the compensations policy was effective in mitigating the risk of higher poverty rates among the socioeconomically more vulnerable groups, including female-headed households and elderly populations, for whom the energy costs typically represent a higher share of the overall household budget. It also contributed to improving the welfare of households in higher energy vulnerability categories. In 2022-2023 the EVRF regulation established 4 vulnerability categories - low, medium, high and very high. In 2023-2024 there were 6 categories - primary vulnerability, low, medium, high, very high and extreme. The categories basically reflected the size of household income remaining after paying the energy bills. The lower the remaining income, the higher the vulnerability category. (No categories were defined for the heating season 2024-2025).

We also found that Ukrainian refugees staying in Moldova have benefited of the EVRF energy compensations. Using data from the Energy Vulnerability Information System (EVIS) of the EVRF, the analysis indicates that that energy compensation provided by Government of Moldova as part of the EVRF reduced the monetary poverty incidence among local households by 35% and by 18% among refugee households. As for the energy poverty, its incidence declined by 18% among local households and by 7% among refugee households[6]. The differentiated impact is explained by the very low initial level of income among Ukrainian refugees, which makes their poverty gap much bigger.

Overall, these findings underscore the positive impact of targeted energy subsidies on household welfare, as they have contributed to reductions in the risk of both energy and monetary poverty. However, the varying impact of the compensations across regions/places of residence and vulnerability categories suggests that there is still some room for enhancing the targeting mechanisms and complementing compensations with long-term energy efficiency improvements which can lead to reductions in household energy needs/costs.

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4 World Bank, "Moldova Economic Update. Special topic: Energy Affordability", Macroeconomics, Trade and Investment Global Practice, April 2024, https://thedocs.worldbank.org/en/doc/9a4979b9cb56380179fbe177ed17dc66-0080012024/original/Moldova-MEU-English.pdf

5 UNDP Moldova, Moldova's energy crisis and the impact of the Energy Vulnerability Reduction Fund in alleviating poverty during the winter of 2022-2023, September 2023, available at: https://www.undp.org/moldova/publications/impact-assessment-energy-vulnerability-reduction-fund-winter-2022-2023

6 Results reported in this paragraph are not comparable with those provided above and in other parts of the report, as the former were derived from a different set of data and using a different methodological approach.

To enhance the effectiveness of energy subsidies and reduce energy poverty further, several policy measures are recommended:

1. Improving targeting mechanisms: Enhancing the accuracy of the EVRF's eligibility criteria, particularly in rural areas where energy poverty remains more prevalent, remains a key priority. Applying a monetary-equivalent energy poverty threshold (as outlined in Annex 1) could refine the identification of eligible households by linking support to affordability and residual income. This would ensure greater equity, enhance fiscal sustainability, and help the EVRF reach those most exposed to energy vulnerability.
2. Integrating energy efficiency measures: For a sustainable long-term impact, energy efficiency measures should complement, and gradually reduce reliance on consumption subsidies. Investments in thermal insulation, modern heating systems, and efficient appliances can lower household energy needs and strengthen resilience to future price shocks.
3. Tailoring support for vulnerable households: Beyond eligibility, refining the level and form of assistance for specific groups - such as female-headed, elderly, or disability-affected households - could strengthen inclusivity and ensure that compensations more effectively address those facing the highest energy burden.
4. Linking energy support with broader social protection reforms: To ensure sustainability and reduce reliance on seasonal compensations, future adjustments could focus on integrating energy assistance within the broader social protection and social assistance system. This would support a gradual transition from temporary, consumption-based measures toward more permanent, proactive instruments that strengthen household resilience and align with ongoing social protection reforms.

Implementing these directions would further strengthen the EVRF's contribution to poverty reduction and energy resilience, aligning with national reform priorities and the joint efforts of the Government and its development partners. These actions support the objectives set out in the EU - Moldova Reform Agenda[7], fostering a more sustainable, inclusive, and data-driven social protection system that combines immediate assistance with long-term resilience and closer alignment with EU practices.

[7] European Commission, "EU and Moldova sign EU Reform and Growth Plan for Moldova", 9 May 2025, https://euneighbourseast.eu/news/latest-news/eu-and-moldova-sign-eu-reform-and-growth-plan-for-moldova/

INTRODUCTION

This report is based on the analysis carried out using primary data mainly from the Household Budget Survey (HBS), generously provided by the National Bureau of Statistics (NBS) and covering the period from January 2021 to December 2024. In addition, to evaluate the impact on Ukrainian refugees, we have used the administrative data from the Energy Vulnerability Information System (EVIS) for the period November 2023 – March 2024 and November 2024 – March 2025.

The **first section** of the report conducts an exploratory data analysis by examining key indicators relevant to estimating levels and types of energy poverty in the Republic of Moldova. It focuses on standard metrics, such as the share of household budgets allocated to energy expenditures, overall household income, and, to the extent data permits, indicators related to the energy efficiency of dwellings and appliances.

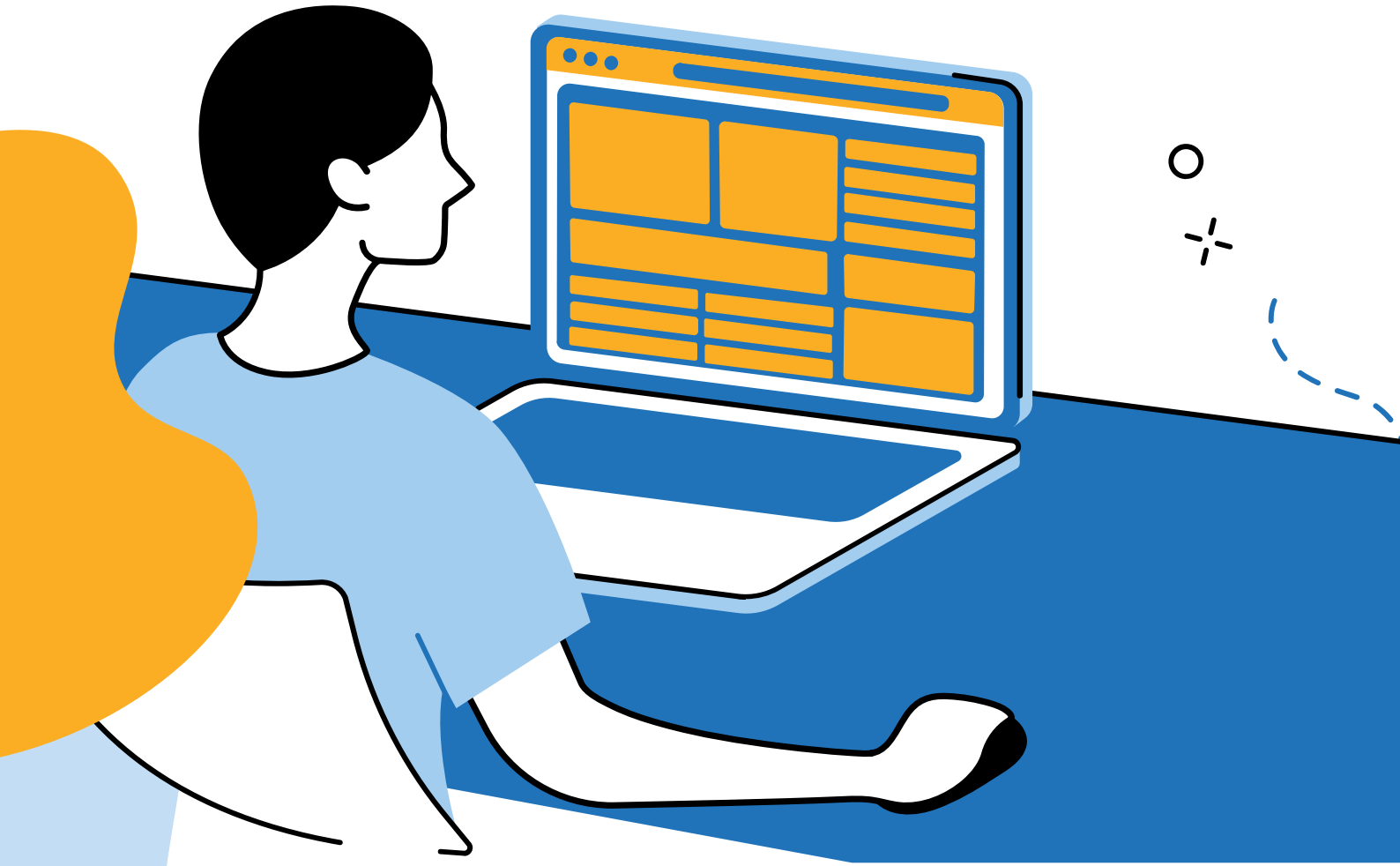
The **second section** outlines the response to the energy crisis of the Moldovan Government and development partners, with the UNDP playing a leading role in the conceptualization and implementation of the Energy Vulnerability Reduction Fund (EVRF).

The **third section** employs a microsimulation approach based on HBS data to quantitatively evaluate the impact of government interventions in the energy market during the cold seasons of the years 2021-2022, 2022-2023, 2023-2024 and 2024-2025. The latter period is restricted to the months of November and December, as only data on these months can be derived from the HBS dataset.

Using the set of administrative records from the EVIS, the **fourth section** examines the impact of energy compensations on the welfare indicators of the Ukrainian refugee households.

The **fifth section** presents key conclusions derived from the analysis in the previous sections.

The **final section** discusses the policy implications of the findings, offering insights and recommendations for addressing energy poverty and improving future interventions.



1

ENERGY POVERTY AND VULNERABILITY IN THE CONTEXT OF THE REPUBLIC OF MOLDOVA

Energy poverty is a complex and multifaceted issue. One of the most straightforward definitions, as adopted by the European Commission, states that energy poverty occurs when a household must reduce its energy consumption to a degree that negatively impacts the inhabitants' health and well-being[8]. According to the same source, energy poverty is driven by the interplay of three key factors:

- A high proportion of household expenditure on energy (for example, more than 10%, the benchmark we adopt in this report);
- Generally low-income levels;
- Poor energy performance of buildings and appliances.

Examining these factors against the dramatic energy price hikes, it is unsurprising to find that energy poverty has become one of the most pressing policy concerns in the Republic of Moldova. Geographic location, gender, household size and composition and age emerge as significant predictors of energy vulnerability, influencing the extent to which households are affected by energy poverty.

1.1. Share of energy

HBS data reveal that the share of household budget expenditure devoted to energy was already high even before the onset of the energy crisis in October 2021. During the warm season of 2021, energy costs made up approximately 12% of household budgets in major cities such as Chisinau and Balti, about 15% in smaller towns, and slightly over 16% in villages. It is worthwhile mentioning that in Republic of Moldova there is no official energy poverty line[9]. Considering the need for a quantitatively simple and implementable approach and following economic literature[10], in this report we adopt the definition of energy poverty as the situation when the household spends more than 10% of its expenditures on energy. This metric has been used in countries such as the UK, Ireland or Australia. As any quantitative indicators trying to address complex phenomena, this simple indicator has its own advantages and weaknesses which are extensively discussed in the literature, including by Moldovan authors[11]. The same indicator has been used in a previous UNDP Moldova report on the impact of policy measures on energy impact[12]. In the Annex 1 we propose an alternative methodology for energy poverty measurement which can guide future policy interventions.

Using the above-mentioned 10% definition, in mid-2021, i.e. even during the warm season of the year, about 71% of the Moldovan population would qualify as energy poor. Since then, the average share of energy expenditures in total household expenditure has remained relatively stable in large urban areas but has shown an upward long-term trend in smaller towns and villages (Figure 1). During the cold period 2023-24, the average share of household budget expenditure allocated to energy was 17% in cities, compared to 22% in towns and 19% in villages. By end of 2024 the shares were even higher in villages (almost 21%), while in towns it stayed at the previous year level, while in larger cities it declined to 14%.

These figures represent the effectively observed shares, factoring in the effects of energy compensations.

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8 European Commission, https://energy.ec.europa.eu/topics/markets-and-consumers/energy-consumers-and-prosumers/energy-poverty_en

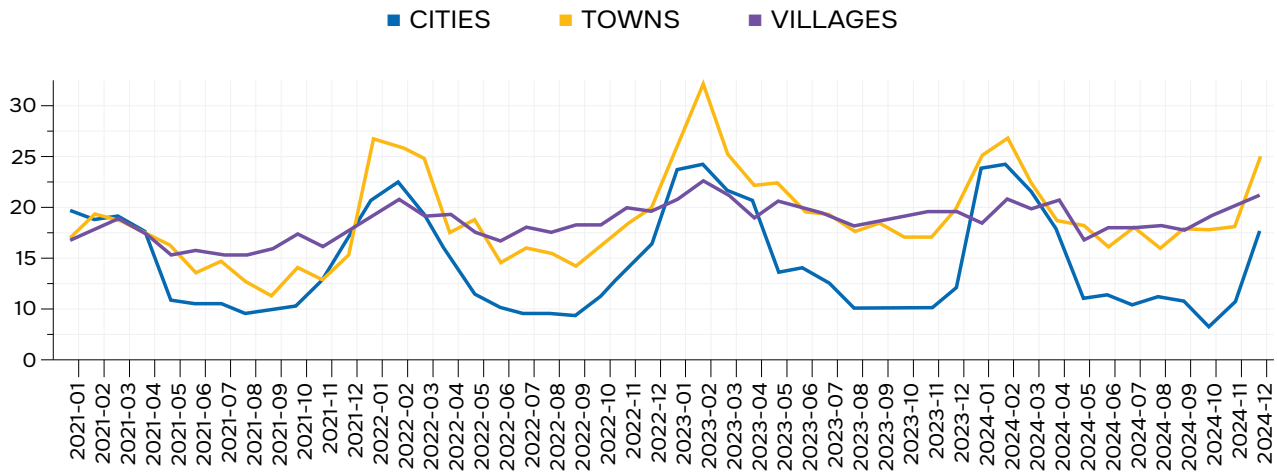
9 Victor Parlicov, Maria Vremis, Viorica Craievschi-Toarta and Eugen Cepoi, "Report on energy poverty assessment and support mechanisms in the Republic of Moldova", UNDP Moldova, 2022, https://www.undp.org/sites/g/files/zskgke326/files/2022-09/Report%20Energy%20Poverty%20EN.pdf

10 Rudolph Schuessler, "Energy poverty indicators: conceptual issues", Center for European Economic Research, Discussion paper no.14-037, https://ftp.zew.de/pub/zew-docs/dp/dp14037.pdf

11 Victor Parlicov, Maria Vremis, Viorica Craievschi-Toarta and Eugeniu Cepoi, "Report on energy poverty assessment and support mechanisms in the Republic of Moldova", UNDP Moldova, 2022, https://www.undp.org/sites/g/files/zskgke326/files/2022-09/Report%20Energy%20Poverty%20EN.pdf

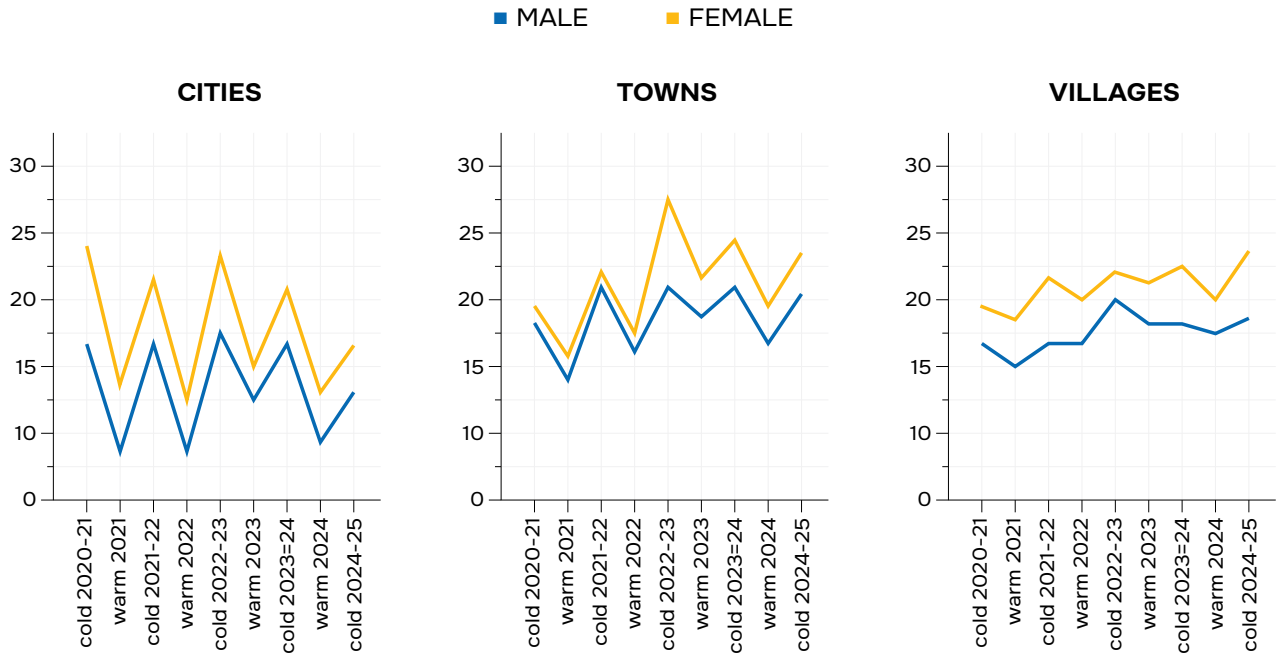
12 UNDP Moldova, Moldova's energy crisis and the impact of the Energy Vulnerability Reduction Fund in alleviating poverty during the winter of 2022-2023, September 2023, available at: https://www.undp.org/moldova/publications/impact-assessment-energy-vulnerability-reduction-fund-winter-2022-2023

Figure 1. Evolution of the share of energy as % of household expenditures, by areas of residence, January 2021 – December 2024



Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

Figure 2. Evolution of the share of energy as % of household expenditures, by sex of household head, areas of residence and seasons, 2021-2024



Source: calculated by author based on HBS data for 2021-2024 providezd by NBS.

The data suggests that households run by women consistently allocate a higher share of their budget to energy expenses compared to those run by men. This is a pattern observed across all geographic areas and all seasons (Figure 2).

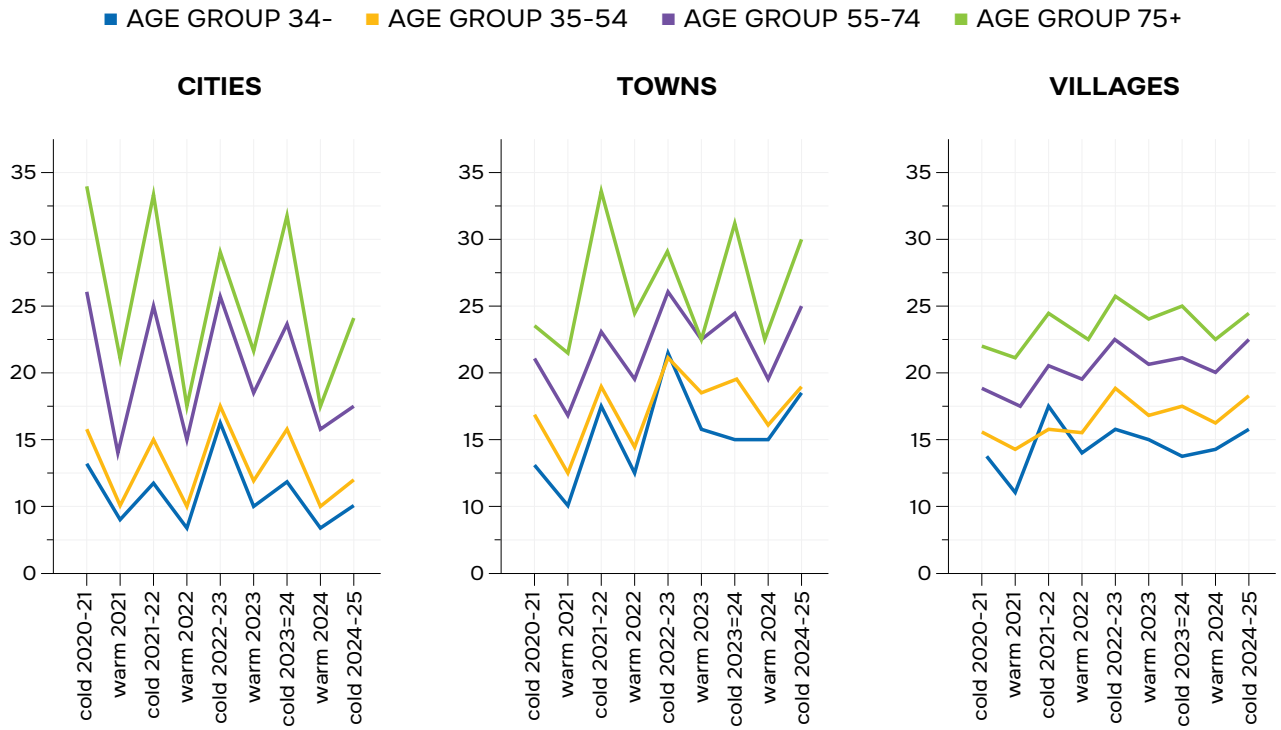
During the 2023-2024 cold season, female-run households in cities spent 22% of their budget on energy, while male-run households spent about 17%. The pattern was broadly the same during the two months of the 2024-2025 cold season, with women-run households spending 16% compared to 12.5% in male-run households. In smaller towns, the energy expenditure share was close to 25% for female-run households versus 20% for male-run ones in 2023-2024, while in 2024-2025 the gap narrowed a bit, with women-run households spending 23% versus 22% in male-run ones. In villages, the difference is even bigger during the previous heating season, with female-run households spending 22.5% of their budget on energy compared to 17.5% for male-run households. During the 2024-25 heating season the gender gap in villages seems to have widened even more, with female-run households spending almost 24%, while in the male-run households the share stayed at 17.5%.

These disparities can be partly attributed to the significant gender pay gap and gender pension gap in

Moldova – female-run households are more likely to have lower overall levels of household income and also lower levels of total expenditure.

Age is another structural factor influencing the risk of energy poverty, a trend consistent across all geographic areas and seasons (Figure 3). Even though it may seem a bit counterintuitive, during the cold periods of the year, the elderly households in cities and towns seem more vulnerable than their peers in villages.

Figure 3. Evolution of the share of energy as % of household expenditures, by age of household head, areas of residence and seasons, 2021-2024

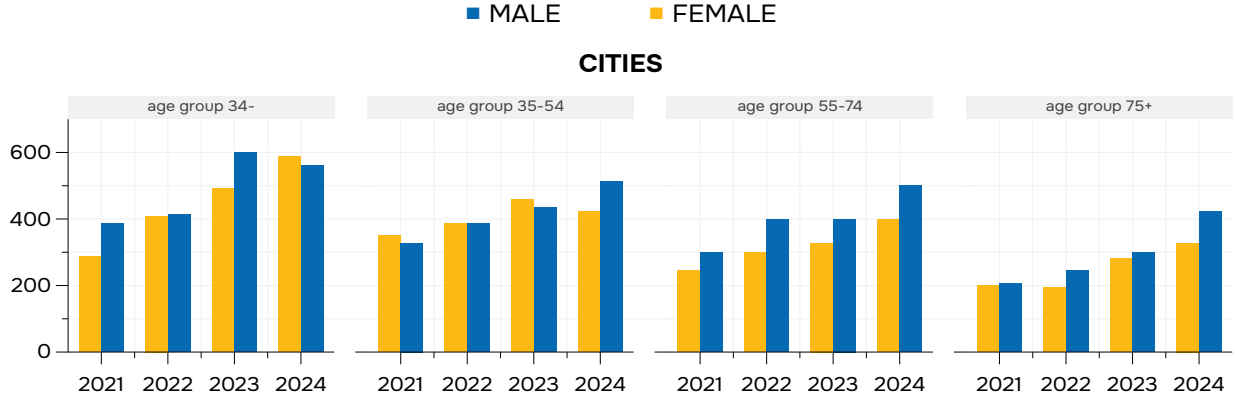


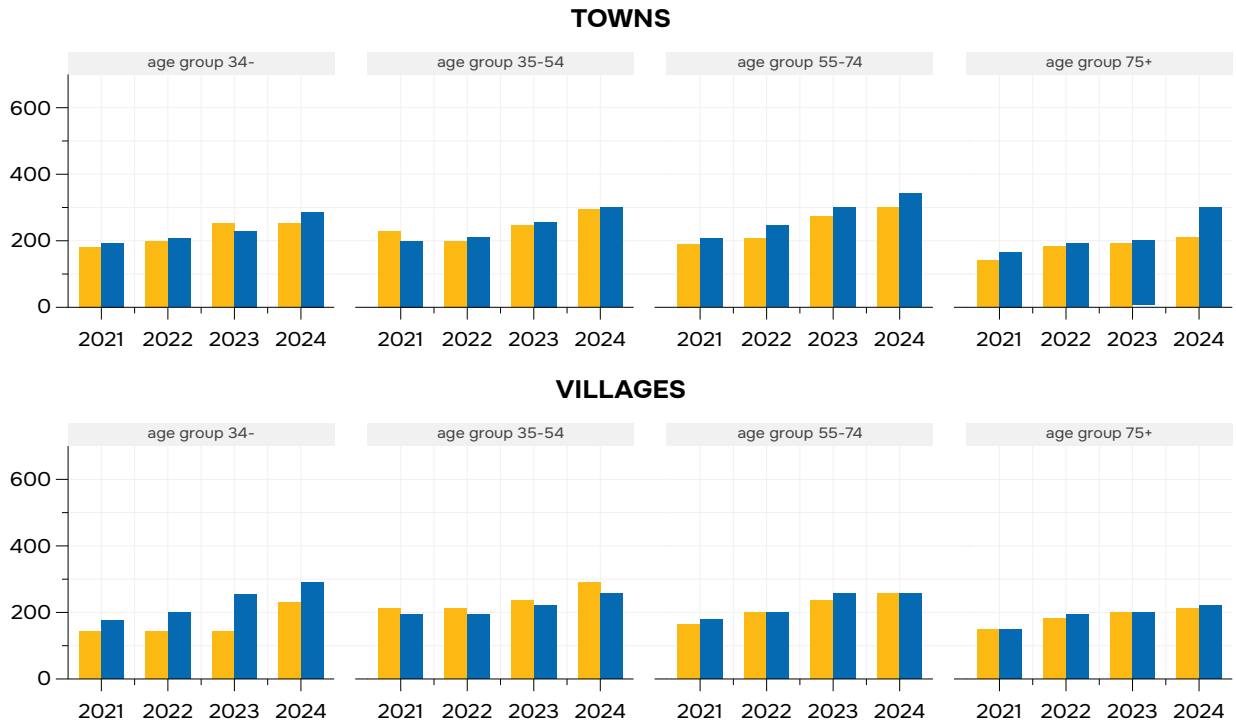
Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

1.2. Level of income

Data from the HBS indicate that mean per capita income rose from USD 215 in 2021 to USD 241 in 2022, to USD 292 in 2023 and further to USD 319 in 2024 but the general level remains very low. In addition, significant disparities exist across geographic regions, with urban centers, particularly two major cities of Chisinau and Balti, reporting substantially higher and faster growing income levels compared to smaller towns and villages. Per capita income disparities by sex and age group are less significant and exhibit less consistent patterns compared to the variations seen in the share of household budgets allocated to energy expenses (Figure 4).

Figure 4. Per capita income by age and sex of household head, areas of residence and years, USD





Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

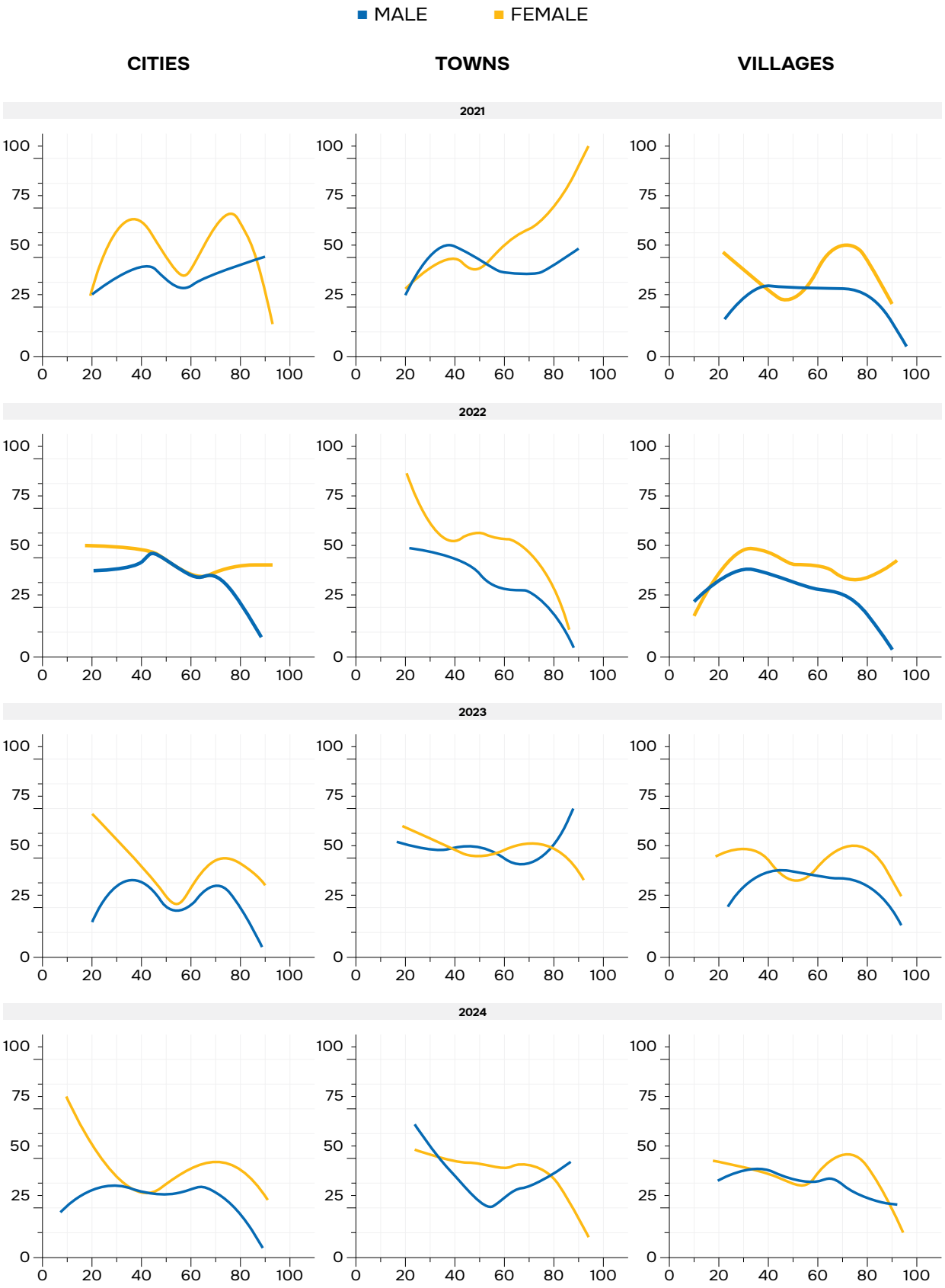
A critical indicator for assessing the implications of energy poverty is the proportion of households experiencing financial stress, i.e. households whose overall expenditures exceed disposable income. Notably, the EVRF regulations for the 2023-2024 and for 2024-2025 cold periods included specific criteria based on income-expenditure gap to identify the two most vulnerable categories of households. According to the HBS data, each year, approximately 40% of Moldovan households report financial stress.

Gender is, again, a significant predictor of financial stress (Figure 6). Across all areas of residence and all years for which data are available, female-run households consistently exhibit a higher risk of financial stress. For instance, in 2023, the financial stress rate among female-run households was 45%, compared to 37% for those run by men. In 2024 the stress lessened a bit but still affected 41% of the women-run households and 33% for the male-run households.

Geographically, financial stress rates during the 2021-2022 cold period were similar in villages and cities, at around 38%. However, this rate increased significantly in villages in 2023. Towns have consistently shown slightly higher financial stress rates than both villages and cities, ranging from 44% to 46%, indicating increased vulnerability to financial stress in these areas. This counterintuitive pattern may be due to the more limited diversification of income-earning opportunities in towns compared to cities, combined with fewer options for subsistence agricultural activities compared to villages.

Data suggest that in 2024 the level of financial stress receded a bit across all areas of residence – 35% in cities, 33% in towns and 38% in villages. The slower growth of consumers prices, including for energy, coupled with a faster growth in income explains the relief in the level of financial stress experienced during 2024.

Figure 5. Rate of financial stress by areas of residence, household head age and household head sex in the period 2021-2024, % of households in the group



Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

1.3. Energy efficiency

HBS data provides fewer details on the third factor contributing to energy poverty: the energy efficiency of dwellings and appliances. However, available data allows for a reasonable assessment of these conditions.

In villages and smaller towns, approximately 57% and, respectively, 26% of dwellings are constructed from clay or dried-mud bricks (according to the most recent 2024 HBS data). While seemingly counterintuitive, these building materials frequently offer better insulation properties compared to the prefabricated concrete blocks commonly used in urban areas, where about 44% of the residential building stock is made of such blocks.

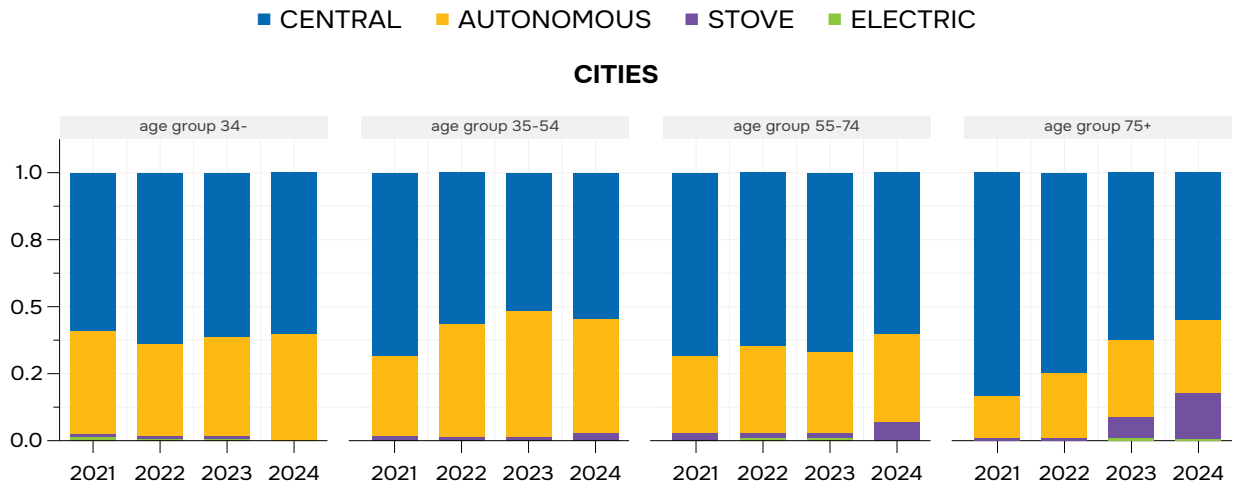
The vast majority of residential buildings across all regions were constructed during periods when energy efficiency was not a primary consideration. In cities, only 19% of residential buildings were built after 2005; in villages, this figure is 17%, and in towns, it drops to 14%. Because of this, the overall technical energy efficiency of dwellings is likely to be low across the country, with urban households potentially facing greater challenges due to the less energy-efficient building materials used at a broader scale. These findings reveal the structural (permanent) factors behind energy vulnerability in Moldova and call for a shift in the policy objective from subsidizing current energy consumption towards subsidizing investment in enhancing energy efficiency of the residential stock.

Heating systems vary significantly across different household groups, particularly by geographic location (see Figure 6). This variation effectively divides the country into three distinct technological regions in terms of heating practices.

In rural areas, solid fuel-burning traditional stoves are the predominant heating method. This preference is influenced by cultural factors as well as the financial and physical availability of wood and agricultural residues as a primary fuel source. It is worthwhile mentioning that consumption of solid fuel has not been directly compensated from the EVRF, which could explain, as shown below, the lower impact of the energy compensations in the rural areas.

The widespread use of stoves may also indicate limited access to the more modern solutions, such as piped gas, biomass boilers or heat pumps. Only 49% of rural households have access to piped gas. Even in urban areas, access to piped gas is not universal. In smaller towns, 85.7% of households have access to piped gas, while in cities this proportion is 85.8%.

Figure 6. Prevalence of heating systems by areas and age groups in the period 2021-2024



Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

Even in towns, stoves remain a primary source of heating for about half of the households, especially among older generations. In contrast, younger households are increasingly adopting autonomous gas-based heating systems, which offer enhanced control and comfort. In urban areas, centrally provided heating is the dominant source.

The long-term trends show growing preference for gas-based autonomous systems among younger residents, likely due to the versatility and technical-economic efficiency of this source. However, the surge in gas prices during 2022-2023 has led to a noticeable shift in heating preferences, with many households reverting to traditional stoves as a financially more affordable option. Consequently, the proportion of households using stoves as their main heating method increased from 62% in 2021 to 66% in 2023 and 2024.

Despite widespread use, traditional stoves are efficient at heating only one or two adjacent rooms. Their widespread use suggests that households composed of large number of members residing in multi-room dwellings may experience inadequate thermal comfort when relying solely on stove heating. HBS data suggests significant disparity in both thermal comfort and energy expenditure. Over the four-year analysis period, households relying on stove-heating allocated, on average, 17.7% of their budget to energy expenses. In comparison, those using centrally-provided heating (thermal energy) spent 12%, households with autonomous systems allocated 13.6%, and those using electric heating spent 15.4% of their budget on energy. This indicates that households relying on stove heating may bear a relatively higher financial burden for heating, despite the more limited comfort it provides. In addition, using low-standard stoves can have very negative impact on the quality of indoor air quality and on the health of the household members, thus leading to even higher long-term expenditures for health recovery. En-mass use of stoves in the rural communities can also worsen the outdoor air quality and thus pose public health problems.

Furthermore, the overall energy inefficiency in rural areas and towns may be exacerbated by a lack of access to basic utilities. For instance, a significant number of households lack indoor bathrooms - 45% in villages and 15% in towns. This absence of basic amenities could contribute to higher energy inefficiency, as it limits the potential for the more technically and economically efficient combination of house-heating and water-heating systems.

2

EVRF - ADDRESSING THE ENERGY VULNERABILITY AND POVERTY

The Energy Vulnerability Reduction Fund (EVRF) is the Government's central policy instrument for addressing household energy vulnerability and poverty, developed and implemented with UNDP support in response to the energy crisis that began in 2021 and continued to affect Moldova in subsequent years. The country faced severe gas and electricity shortages, which caused tariffs to spike, increasing sevenfold for natural gas and by 400% for electricity. As a result, immediately ahead of winter 2022, more than 70% of the households in the country were deemed energy-vulnerable (increasing from 64.4% in 2021[13]), as they were spending more than 10% of their incomes on energy during the cold period (November through March). An early simulation by UNDP[14] suggested that, under the food and energy inflation levels recorded in February 2022, about 250,000 people were at risk of falling below the poverty line.

In 2021-2022, the Government reacted promptly by providing on-bill support to all households, without differentiation by income or economic status. Given the urgency of the situation and the magnitude of the energy shock, this universal approach represented a pragmatic immediate response.

In 2022, in order to address the energy crisis in a more structured manner, the Government of Moldova, together with UNDP, designed and implemented an evidence-based, on-bill compensation scheme to minimize the negative impact of energy price inflation on Moldovan households - the Energy Vulnerability Reduction Fund (EVRF). The EVRF has since been implemented across three heating seasons (2022-2023, 2023-2024, and 2024-2025), with a fourth season (2025-2026) in preparation.

The introduction of the EVRF marked a defining policy milestone in Moldova's social protection and energy policy landscape. During the first two heating seasons (2022-2023 and 2023-2024), the implementation of the EVRF relied substantially on external contributions from development partners, complementing national allocations and enabling the Government to ensure continuity of assistance to vulnerable households despite fiscal pressures.

In 2024-2025, although the share of development partners funding decreased compared to previous years, external contributions remained critical to the Fund's continued operation. The Government initially planned to fully finance compensations from the state budget; however, an unexpected energy price surge in January 2025 created additional fiscal pressure. In response, development partners provided generous and timely financial support, with some contributions channeled directly through the state budget and others leveraged with UNDP engagement. These complementary resources ensured the Fund's full operational coverage and responsiveness, underscoring once again the strong partnership between the Government and its development partners in safeguarding household energy security during another challenging heating season.

Thanks to this initiative and the support provided, the EVRF played a key role in preventing a further deepening of energy poverty and ensuring continued protection for vulnerable households during successive heating seasons.

The EVRF is operationalized through the EVIS – the Energy Vulnerability Information System - in which households can apply for the support online, directly, and if needed, or if required by EVRF regulation, with the help of a social assistant or a librarian. During the first two seasons of EVRF support, each applicant was automatically assigned an energy vulnerability category through the use of a detailed algorithm. The algorithm was formulated to guarantee full transparency on the methodology used for assigning the category of energy vulnerability and the amount of compensation to which the household was entitled. This amount was translated into a reduced tariff which was then applied to bills for natural gas, electricity, or centralized heating, i.e. the compensation was received not in cash, but on-bill, through a reduction in the household's energy bills. There were four vulnerability categories in 2022-2023, which were increased to six in 2023-2024. In 2024-2025, the categorization was discontinued, with compensations being determined individually for each applicant based on an updated formula that reflected household characteristics and income parameters. This adjustment was introduced to simplify administration and increase targeting precision, allowing compensations to be more closely aligned with actual household affordability levels rather than predefined vulnerability categories.

The EVRF was implemented using a very simple application procedure, relying on administrative data and their digital exchange, when possible, to access necessary information and details on household characteristics and requiring minimal supporting documentation from recipients. The system balanced targeting efficiency with a reduced administrative burden, ensuring that in the first seasons (2022-2023) even those who chose not to register received compensation according to the low energy vulnerability category by default.

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[13] UNDP Moldova, September 2022, Report on Energy Poverty Assessment and Support Mechanisms in the Republic of Moldova, available at: https://www.undp.org/moldova/publications/report-energy-poverty-assessment-and-support-mechanisms-republic-moldova

[14] UNDP, May 2022, Moldova: Potential impacts of increased food and energy prices on poverty and vulnerability, available at: https://www.undp.org/moldova/publications/moldova-potential-impacts-increased-food-and-energy-prices-poverty-and-vulnerability

UNDP supported the development of EVIS, as well as the creation and operation of a dedicated Call Center to assist households with the registration process. Complementary support included a nationwide communication campaign (radio and TV spots, posters, billboards, social media materials, video tutorials), training for social workers and librarians, and the provision of registration forms and materials. Throughout all heating seasons, the Support Unit remained consistently active, providing information, guidance, and technical assistance to applicants. On average, over 50% of all household registrations were facilitated or assisted by social workers and librarians – a major effort coordinated by the Ministry of Labour and Social Protection with UNDP support. During the 2024–2025 heating season alone, the Support Unit provided over 1,300 in-person consultations, responded to more than 136,000 calls and 31,000 emails, and facilitated more than 395,000 registrations.

For the fourth consecutive season, UNDP will be providing advisory and technical support for the update of the informational system for online registration, which is set to be relaunched in November 2025.

Inclusiveness was foundational to the EVRF's architecture, contributing directly to SDG 1 (ending poverty in all its forms) and target 1.3 (expanding access to social protection). By expanding access to social protection mechanisms, the EVRF also contributed indirectly to SDG 7 on affordable and clean energy and SDG 10 on reducing inequalities, underscoring its multidimensional impact on household well-being.

These results were achieved based on substantive policy and programmatic support to the Moldovan Government, designed by UNDP and based on a timely assessment of energy poverty, conducted in early 2022[15]. The assessment was crucial in anticipating the increases in energy poverty, addressing vulnerabilities, and increasing cohesion during a difficult socio-economic period for the country.

The assessment:

- Looked at options for defining energy poverty in the Moldovan context, considering existing and emerging household vulnerabilities, and how to measure energy poverty using available data.
- Assessed options for designing a compensation scheme for vulnerable households and estimating the related fiscal costs.
- Provided key policy recommendations and programmatic approaches to mitigate the risks of energy poverty, which could be replicated in other countries facing similar crises.

The UNDP support to the EVRF has ensured that the Fund effectively targets a broad spectrum of households, helping vulnerable families reduce the financial burden of energy costs and better allocate resources to essential needs.

[15] UNDP Moldova, September 2022, Report on Energy Poverty Assessment and Support Mechanisms in the Republic of Moldova, available at: https://www.undp.org/moldova/publications/report-energy-poverty-assessment-and-support-mechanisms-republic-moldova

3

QUANTITATIVE ASSESSMENT OF THE IMPACT OF ENERGY COMPENSATIONS

This section employs a microsimulation model to evaluate the impact of energy compensation measures provided by the Moldovan Government through the Energy Vulnerability Reduction Fund (EVRF).

It has to be mentioned that eligibility and vulnerability criteria have varied greatly since the inception of the EVRF. During the heating seasons of 2022-2023 and 2023-2024, on-bill compensations were allocated based on criteria outlined in the EVRF regulations, specifically targeting households classified according to their level of energy vulnerability. In 2022-2023 there were four vulnerability categories: low, medium, high and very high. In 2023-2024 the classification was expanded to include six categories: primary vulnerability, low, medium, high, very high and extreme. In each heating season, there was also a group of non-vulnerable households not requesting or not entitled to compensations.

The households' classification by vulnerability categories was made of many variables, such as: disposable income, financial stress, the proportion of energy expenditures in the total household budget, household composition, and the presence of persons with disabilities in the household. In the microsimulation model, we reproduced most of eligibility criteria. However, due to data limitations, some relevant factors, like mortgage payments, could not be accounted for in our microsimulation-based analysis as they are not included in the HBS.

Energy compensation policy suffered a significant conceptual shift in 2024, with the cash-based mechanism substituting the previous on-bill mechanism. From the microeconomic perspective, there are important differences between the two approaches. The on-bill compensations reduce directly the marginal prices of energy goods and create substitution toward more energy from other goods; additionally, this mechanism may weaken incentives to increase efficiency of consumption and save energy. The cash-based mechanism does not influence the price of energy, and therefore does not create significant substitution effects. Under this mechanism, the consumption behavior changes mainly following the higher income created by the monetary compensation. Contrary to the on-bill compensations, the cash-based compensations are less distorting for the energy saving motivations. During the 2024-2025 heating season, there were not (explicit) vulnerability criteria, and the amount of compensation was determined based on various rules reflecting prevailing heating system, total income of the household members and the ratios between available income and normative costs of energy. Again, in our simulations we try to mimic as close as possible the (rather complex) decision rules establishing household-level monetary compensation provided in 2024-2025.

We also assess the impact of earlier interventions implemented during the cold period of 2021-2022, which preceded the formal establishment of the EVRF. Although those initial measures were not guided by specific energy vulnerability categories, they are expected to have had an impact on reducing energy poverty. The interventions in that period provided similar financial support mechanisms to households, albeit in a less targeted manner compared to the more structured approach of the EVRF.

Our analysis, therefore, covers the impact of governmental interventions over four distinct heating seasons: November 2021 - March 2022, November 2022 - March 2023, November 2023 - March 2024 and November - December 2024 (as the data for January - March 2025 are not yet available). During the first three heating season, the on-bill compensations effectively lowered the price that households paid for energy resources – thus, from microeconomic perspective, the compensations can be regarded as providing price discounts directly influencing energy consumption behavior. In 2021-2022, the government provided compensation for thermal energy and gas. In the subsequent heating seasons of 2022-2023 and 2023-2024, the compensation scheme was expanded to include not only gas and centrally provided heating but also electricity, as well as compensation in form of monetary payments in the amount of 800 MDL/month for households explicitly requiring such payments. However, in 2023-2024 electricity was compensated only to households using electricity as their main source of heating. Starting with the 2024-2025 heating season, the compensation scheme provided monetary transfers and thus supported the overall consumption of the household, not linking (at least not directly or explicitly) with the price of the energy.

This evaluation aims to quantify the extent to which these compensations mitigated energy poverty, particularly by examining how they influenced the share of household expenditures on energy and how they alleviated financial stress. By comparing the actually observed data from the HBS with an artificially constructed counterfactual scenario where no governmental compensations were provided, we can assess the effectiveness of these measures in shielding households from the full impact of rising energy prices.

In the counterfactual scenario, when no energy compensations were provided, households would have to pay the full price for each type of energy (during the 2022-23 and 2023-24 heating seasons) or would be deprived of any monetary transfers (during the 2024-25 season). The on-bill compensations function as a price discount, because the households have to pay less for the same quantity of energy. To estimate the impact of the compensations, in the microsimulation model we calculate the price discounts as a percentage of the full (market) price that households benefited of from 2021 to 2023. The results of this calculation

are presented in Table 1. The methodology for calculating the price discounts accounted for all essential factors, including the maximum compensated quantity (and, for gas, the two different threshold quantities applied in 2021-2022, each with a different discount); the compensated price based on vulnerability criteria (except for 2021-2022, when all households received compensation), the full (market) price, and the effect of other allowances.

Table 1. Price discounts by heating seasons when on-bill compensations applied, vulnerability categories and types of energy, % of full price

Heating season	Vulnerability category	Electricity	Gas	Heating
2021-2022	All	0.0	37.6	28.0
2022-2023	0	0.0	0.0	0.0
	1	0.0	18.0	17.7
	2	0.0	41.5	36.0
	3	6.4	51.2	45.0
	4	12.6	59.0	53.6
2023-2024	0	0.0	0.0	0.0
	1	0.2	0.0	8.8
	2	0.2	5.9	29.4
	3	0.4	23.0	47.9
	4	0.1	24.3	49.6
	5	0.8	25.4	50.6
	6	2.7	25.9	50.7

Note: in the heating season 2023-2024 electricity discounts apply only to households using electricity as main heating source. Together with the small number of HBS observations, this explains the small average values for electricity price discounts in the table and the lack of progressivity along the vulnerability continuum.

Source: calculated by author based on HBS data for 2021-2023 provided by NBS.

The calculated price discounts clearly show that the energy compensation policy is highly progressive (except electricity in 2023-2024 which was compensated to a very small number of households using electricity-based heating systems). I.e., in general, the better-off households received lower price discounts.

The price discounts allowed households to purchase larger quantities of energy than they would have in the counterfactual scenario. As a result, their well-being during the heating seasons 2022-2023 and 2023-2024 in the baseline scenario was higher than in the counterfactual. The extent of the adjustment in the quantities purchased due to the discounts depends on the own-price and cross-price elasticity coefficients. Elasticity coefficients reveal by how much consumed quantity varies given a 1% change in the price.

We estimated these elasticity coefficients using the iteratively linear Almost Ideal Demand System (AIDS) estimation procedure in the 'micEcoAids' package in R, separately for cities, towns, and villages. We included months of the year as demand-shifting variables to account for seasonality in energy consumption. Compared with the previous UNDP study on this subject[16], we found similar by magnitude absolute values for own price elasticity coefficients, and similar sub-unitary values for income elasticity (Table 2).

[16] UNDP, The impact assessment of the Energy Vulnerability Reduction Fund in the winter of 2022-2023, https://www.undp.org/moldova/publications/impact-assessment-energy-vulnerability-reduction-fund-winter-2022-2023

At the same time, the analysis identifies practically nil values for cross-price elasticity coefficients. This should come with no surprise, considering the fact that within the same household it is technically very difficult to substitute one type of energy with another, especially when prices for all sources increase in parallel. Since the elasticity coefficients are below unity, the relative increase in the quantity of energy purchased will be smaller than the price discounts provided by the compensation policy.

Income elasticity coefficients are central in determining the consumption behavior during the heating season of 2024-2025. They are employed in a similar fashion as that described above except for the fact that prices stay constant and only income of the household increased by the amount of the monetary compensation it is entitled to. The minimum compensation paid to entitled households (not all households were entitled) was set to 300 MDL/month, while the maximum amount – 800 MDL/month, with a continuum of possible values in between determined by the income available for energy payment, the normative cost of the energy bundle specific to the heating system, the ratio of the two as well as household size and componence.

In all heating seasons, the welfare impact of the governmental interventions is assessed against two key indicators:

- **Energy poverty rate:** Recall that this is defined as the proportion of households spending more than 10% of their total resources on energy;
- **Monetary poverty rate:** This is defined as the proportion of households with expenditures below the national poverty line.[17]

Conceptually, the welfare impact is evaluated by comparing the actual situation observed in the HBS data (the baseline scenario) with the counterfactual scenario in which the government does not provide energy compensations, leaving households to fully absorb the increased energy costs.

Using the estimated elasticity coefficients, we conduct counterfactual simulations in which energy price discounts (heating seasons 2021-22, 2022-23 and 2023-24) or monetary compensations (heating season 2024-25) are removed, and households are required to face the full financial burden involved by the increased price for energy. This allows us to determine the impact of the energy compensations on energy poverty.

Table 2. Energy consumption elasticity coefficients, by types of energy and area of residence

Value	Area	Own price elasticity coefficient	Income elasticity coefficient
Electricity	Cities	-0.153	0.501
Gas	Cities	-0.039	0.829
Heating	Cities	-0.497	0.137
Electricity	Towns	-0.381	0.543
Gas	Towns	-0.401	0.686
Electricity	Villages	-0.479	0.683
Gas	Villages	-0.572	0.862

Note: all coefficients, except gas in cities, are significant at least at 5% significance level.

Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

For monetary poverty, the welfare impact is modeled by adjusting both absolute and relative prices; while adjusting total expenditures by the income-equivalent effect generated by energy compensations (only income effect applies in the simulations for the heating season 2024-2025). The removal of compensations (price discounts) in the alternative scenario increases the absolute level of prices faced by all households (measured by the Consumer Price Index), which raises the poverty line proportionally.

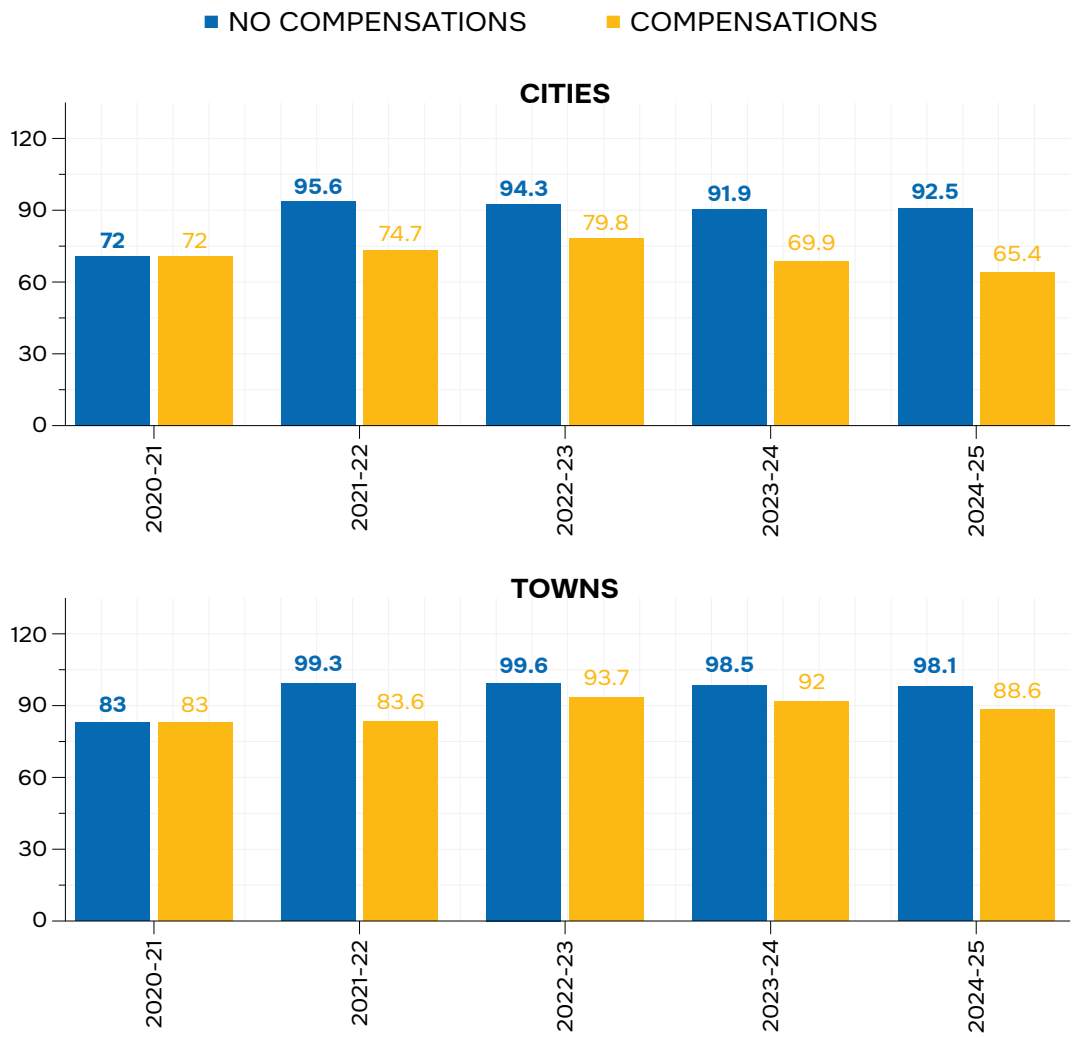
[17] We adjust the poverty line by including the health expenditures which are not accounted for by the NBS in its own poverty calculations. We do this because we do not include health as separate category in the estimation of the price and income elasticity coefficients.

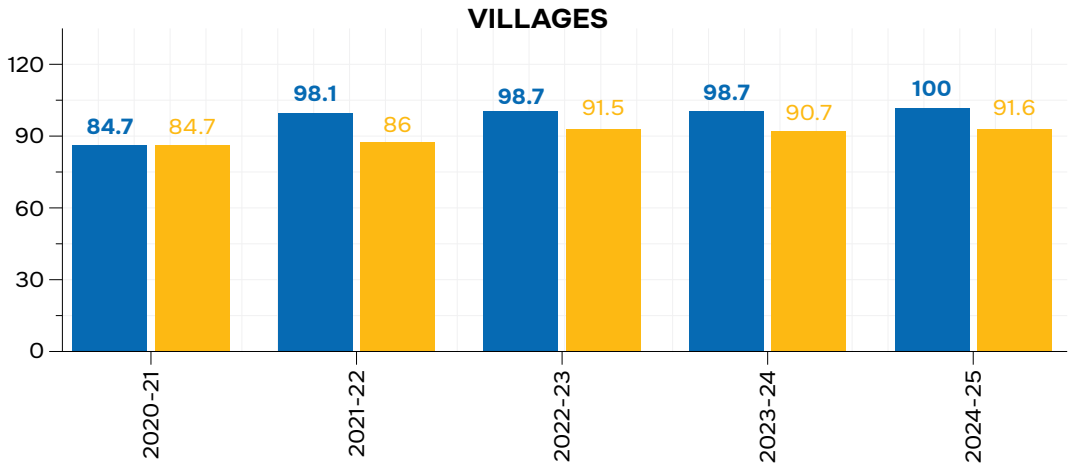
Additionally, changes in relative prices affect the household-specific price indexes which are used to normalize the level of household expenditures across the months of the year – this accounts for seasonal price factors and for season-specific shares of energy in total consumption. In the simulations for the heating season 2024-2025 the purchasing power of the household under the counterfactual scenario decreases with respect to all goods and services.

3.1. Impact on energy poverty

The simulation results demonstrate that the government's compensation scheme had significant positive effects on household welfare by reducing energy poverty in all heating seasons from 2021 to 2024, across all groups, albeit to varying degrees. In the cold period of 2021-2022, the compensation program reduced overall energy poverty from 97.7% to 83.2%; in 2022-2023, from 97.8% to 89.1%; and in 2023-2024, it decreased from 96.9% to 85.5%. Despite the change in the payment modality, the scheme preserved its energy poverty alleviating impact, with the energy poverty incidence in 2024-2025 declining from 97.8% to 84.5%. However, it should be reminded that for the heating period 2024-2025 the results refer only to the months of November and December.

Figure 7. Energy poverty rate by geographic areas, cold seasons and scenarios, %





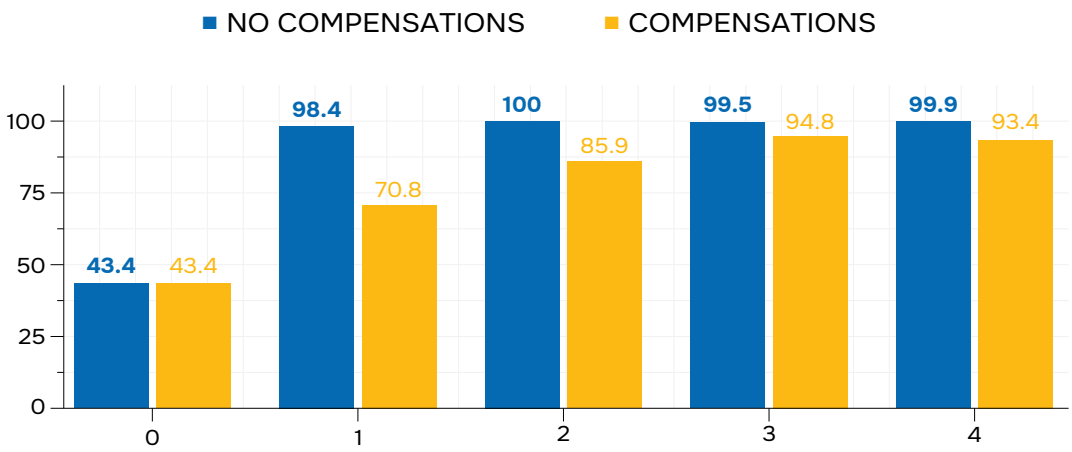
Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

The data also reveal that, in relative terms, urban residents appear to have benefited more from the compensations than those living in towns and villages. For example, according to the estimates based on complete dataset for the year 2024, in the heating season of 2023-2024, the energy compensations reduced the simulated energy poverty rate among city residents from 92% to 70% (Figure 7). In towns and villages, however, the energy welfare effects were of lower magnitude, given their higher initial vulnerability to energy poverty. In towns, the energy poverty rate dropped from 98% to 92%, while in villages it went from 99% to 91%. This pattern prevailed over the most recent heating season of 2024-2025, when the energy poverty incidence in cities dropped from 92% to 65%, while in towns – from 98% to 87% and in villages - from 100% to 92%. The high levels of poverty (including as high as 100%) in the counterfactual should be surprising, considering the relatively generous energy poverty threshold (10%), the initial very high level of exposure of the households and the high level of the energy prices / low level of income.

Note that the energy compensations provided prior to the establishment of the EVRF also had a positive impact on welfare. In cities, energy poverty decreased from 96% to 75% due to the compensations for heating and gas provided by the government. The effect in towns and villages was also important, with energy poverty falling from 99% to 84% in towns and from 98% to 86% in villages. The lower impact on villages could be partly attributed to the fact that solid fuel price was not directly compensated.

From the perspective of vulnerability categories which applied over two heating seasons (2022-2023 and 2023-2024), the policy impact does not appear as progressive as the price discounts displayed in Table 1 may suggest. For instance, in the cold period of 2022-2023, the least vulnerable category (the first category) saw its energy poverty rate declining from 98% to 71% (i.e. about 27% reduction). In contrast, the marginal effect on more vulnerable categories was smaller (7% in case of the most vulnerable fourth category), though still clearly positive (Figure 8). The main reason for the relatively more limited impact on the more vulnerable is due to their larger energy poverty gap (distance from their current share of energy expenditures to the 10% energy poverty threshold).

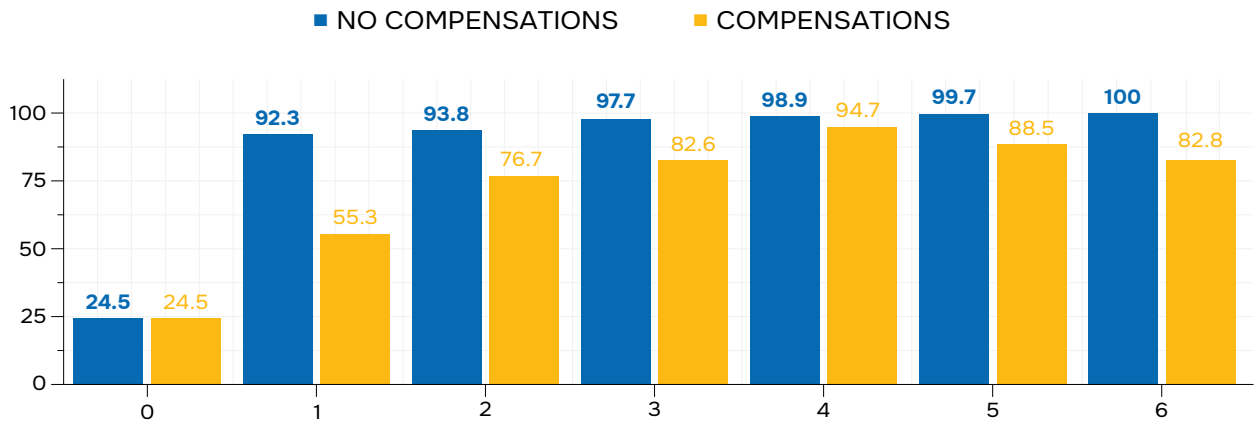
Figure 8. Energy poverty rate by vulnerability categories and scenarios in the cold season 2022-2023, %



Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

In the heating season of 2023-2024, relative improvements in the welfare indicators for the more vulnerable categories look a bit more impressive than in 2022-2023. While the least vulnerable category still benefited the most in relative terms from the energy price compensations (with a decrease from 92% to 55% in the category-specific energy poverty rate, Figure 9), the impact was also strong for categories 2 (low vulnerability) and 3 (medium vulnerability). However, the effect in category 4 (high vulnerability) was puzzlingly weak compared to ex-ante economic intuition. The welfare impact was relatively more substantial for categories 5 (very high vulnerability) and particularly so for the category 6 (extreme vulnerability), with the energy poverty rate of the latter declining from 100% to 82%. The relatively weaker impact observed in the 4th category may indicate that the threshold between categories 4 and 5 was narrow, suggesting an opportunity to refine the delineation of vulnerability levels in future exercises.

Figure 9. Energy poverty rate by vulnerability categories and scenarios in the cold period 2023-2024, %



Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

When examining the geographic areas more closely, the picture becomes a bit more nuanced. In cities, during the cold period of 2023-2024 the better-off households seem to have benefited more from the compensations policy than the more vulnerable categories. In contrast, in towns and villages, the policy appears to have been more tilted against the most vulnerable households.

Starting with the 2024-2025 heating season, the Government transitioned from predefined vulnerability categories to a more tailored, formula-based approach for determining compensation at the household level. While this shift enhanced the precision of targeting, it also means that assessing the policy's progressivity or regressivity can no longer be conducted using the same categorical framework applied in previous years.

3.2. Impact on monetary poverty

Energy compensations not only improved indicators of energy poverty but also had a positive effect on monetary poverty. Moreover, due to the year-round price effects, impact of compensations on monetary poverty extends well beyond the cold periods into the warm periods of the year.

Take, for instance, the year 2021, when compensations were provided only for two months at the end of the year. The incidence of monetary absolute poverty declined in that year from 24.5% in the counterfactual to 24.3% in the baseline scenario[18], while the food poverty incidence, from 11.3% to 11.0% (Table 3). For 2022, microsimulation results show that poverty incidence decreased from 33.8% to 29.0% for absolute poverty and from 17.3% to 13.9% for food poverty. In 2023, the effects were of a similar magnitude for absolute poverty (a decline from 33.8% to 29.7%) and for food poverty (from 18.0% to 14.2%). The data for 2024 suggest that the impact on absolute poverty was, in relative terms, a bit smaller than in 2023, pushing the incidence of monetary poverty from 34.8% down to 32.2%, while the food poverty declined from 18.4% to 15.6%. Considering the shift in policy (from on-bill to cash-based compensations) and the smaller size of the income-equivalent compensation in 2024-2025, the relatively smaller policy impact in 2024 should not be surprising.

[18] Our calculated poverty indicators in the baseline scenario are very close but not identical with NBS calculations, which employs a more sophisticated methodology for poverty estimation, accounting for spatial differences in food prices, deducting expenditures for health, rent and accounting for other special factors.

Table 3. Monetary poverty indicators by types of poverty, indicators, scenarios and calendar years, %

	Absolute poverty				Food poverty			
	Poverty rate		Poverty gap		Poverty rate		Poverty gap	
	Baseline	Alternative	Baseline	Alternative	Baseline	Alternative	Baseline	Alternative
2021	24.3	24.5	4.6	4.7	11.0	11.3	1.8	1.8
2022	29.0	33.8	5.6	7.1	13.9	17.3	2.2	2.9
2023	29.7	33.8	5.9	7.6	14.2	18.0	2.4	3.4
2024	32.2	34.8	6.4	7.5	15.6	18.4	2.6	3.3

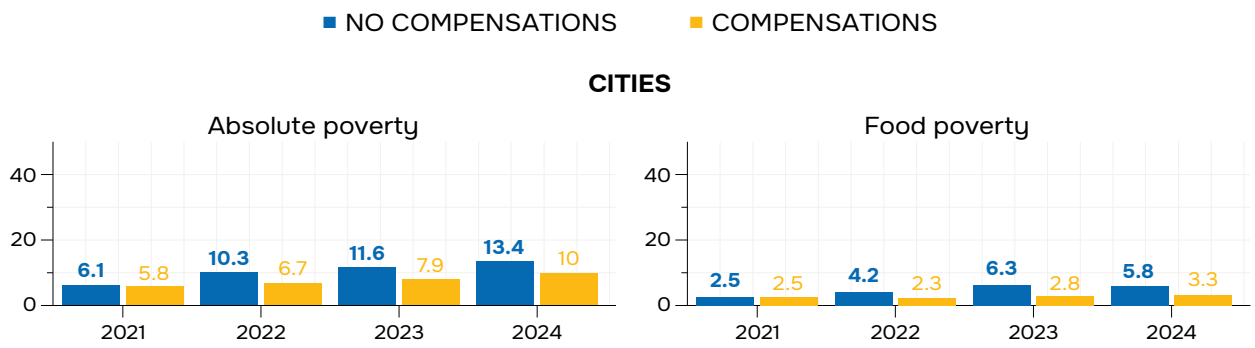
Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

Across all years included in analysis, the poverty gap indicators have narrowed both for absolute and food poverty due to energy compensations. This means that monetary-poor households moved closer to the corresponding poverty lines. For instance, in 2023, in the counterfactual scenario the average absolute poverty gap was 7.6%, while in the baseline the gap was 5.9%. In 2024 the absolute and relative magnitude of improvement in the poverty gap was comparable to that of 2023, with the absolute poverty gap narrowing 7.5% to 6.4%, while the food poverty gap – from 3.3% to 2.6%.

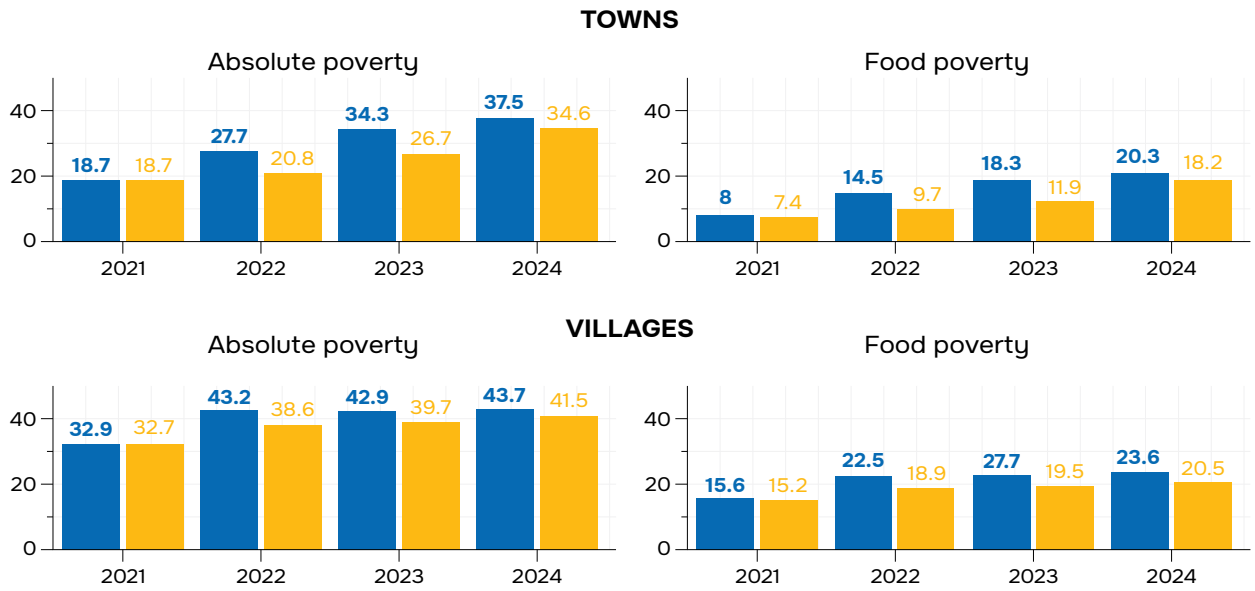
As seen in the data, the impact of energy compensations on monetary poverty in villages and towns was somewhat stronger (in percentage points terms) compared to cities (Figure 10), but they were of weaker magnitude in relative terms during 2022 and 2023. However, in 2024, the impact on monetary poverty in cities was stronger than in towns and villages as measured along both percentage points and percent variation lines. In cities the poverty incidence declined from 13.4% in the counterfactual to 10.0% in the baseline scenario (an absolute improvement of 3.4 p.p. and a relative one of 25%), while in towns the absolute improvement was about 2.9 p.p. and 8%. In villages, the poverty incidence the same year declined from 43.7% to 41.5%, i.e. a 2.2 p.p. absolute improvement and only a 5% relative one.

Compensations had a greater impact on the more vulnerable households in terms of monetary poverty reduction, as indicated by the percentage point deviation between the alternative and baseline scenarios (Figure 11). For instance, in the cold period of 2022-2023 the compensations policy helped reduce the absolute poverty rate by 30% (or by almost 20 percentage points) in the case of the fourth most vulnerable category. This figure is lower than the 43% result reported in a similar study conducted by UNDP in September 2023[19]. This difference is explained by the fact that in our study we already had data for the entire year 2023 and these data show persistently growing energy prices in January-March 2023. In addition, we estimated the consumption elasticity coefficients separately for residence area, rather than separately for vulnerability group.

Figure 10. Monetary poverty rate by residence areas, types of poverty and scenarios in the period 2021-2024, %



[19] UNDP, The impact assessment of the Energy Vulnerability Reduction Fund in the winter of 2022-2023, available at: https://www.undp.org/moldova/publications/impact-assessment-energy-vulnerability-reduction-fund-winter-2022-2023



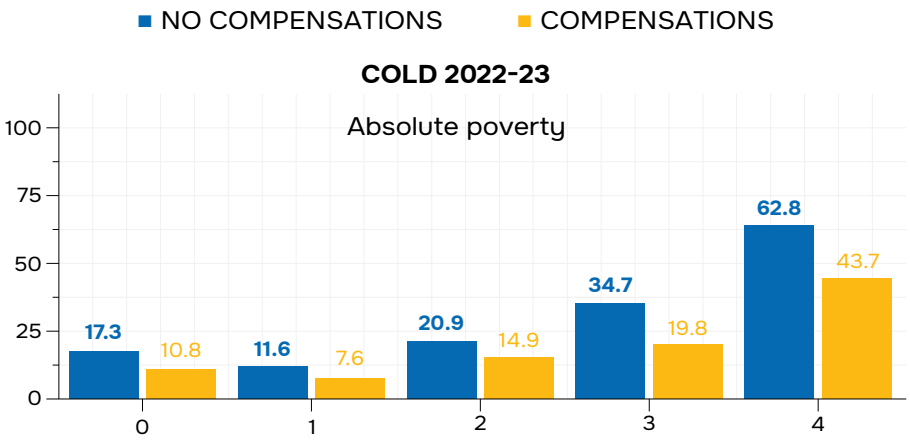
Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

For the same cold period of 2022-2023 we found that energy compensations had strong countervailing effects on food poverty, leading to a 43% reduction in poverty rate (or 18 percent points).

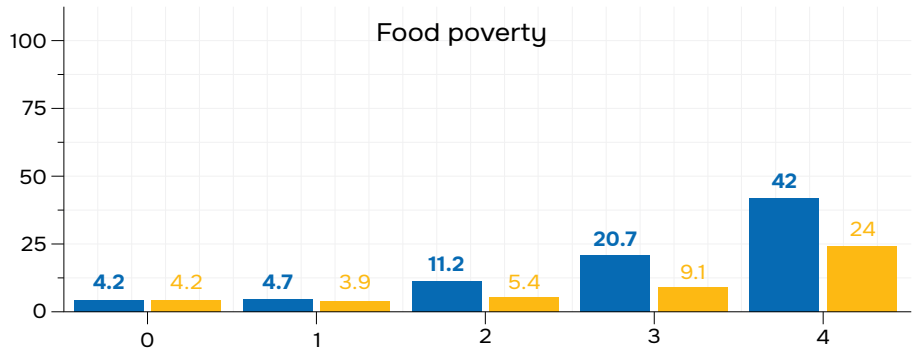
In the 2023-2024 cold season, the compensations policy reduced the absolute poverty rate and food poverty among the most energy vulnerable households by 11% (8.6 percentage points) and, correspondingly, by 19% (11 percentage points). A similar study done by the World Bank found a similar magnitude impact, 8.3%, on the absolute poverty rate[20]. As understood from the World Bank report, their simulations were done based on data from the HBS 2020, whereas we used observed data in the HBS 2021-2023.

While the poverty-reduction effects of the EVRF may appear smaller in 2023-2024 compared to the previous heating season, this does not reflect a reduced policy impact. The difference is largely methodological. First, the vulnerability categories are not directly comparable between the two seasons, as the classification system evolved from four to six categories. Second, achieving significant reductions in poverty is naturally more challenging among the poorest households, whose income levels are far below the poverty line. In 2023-2024, the sixth category included the most economically deprived households, which explains the relatively smaller measurable improvement despite continued support.

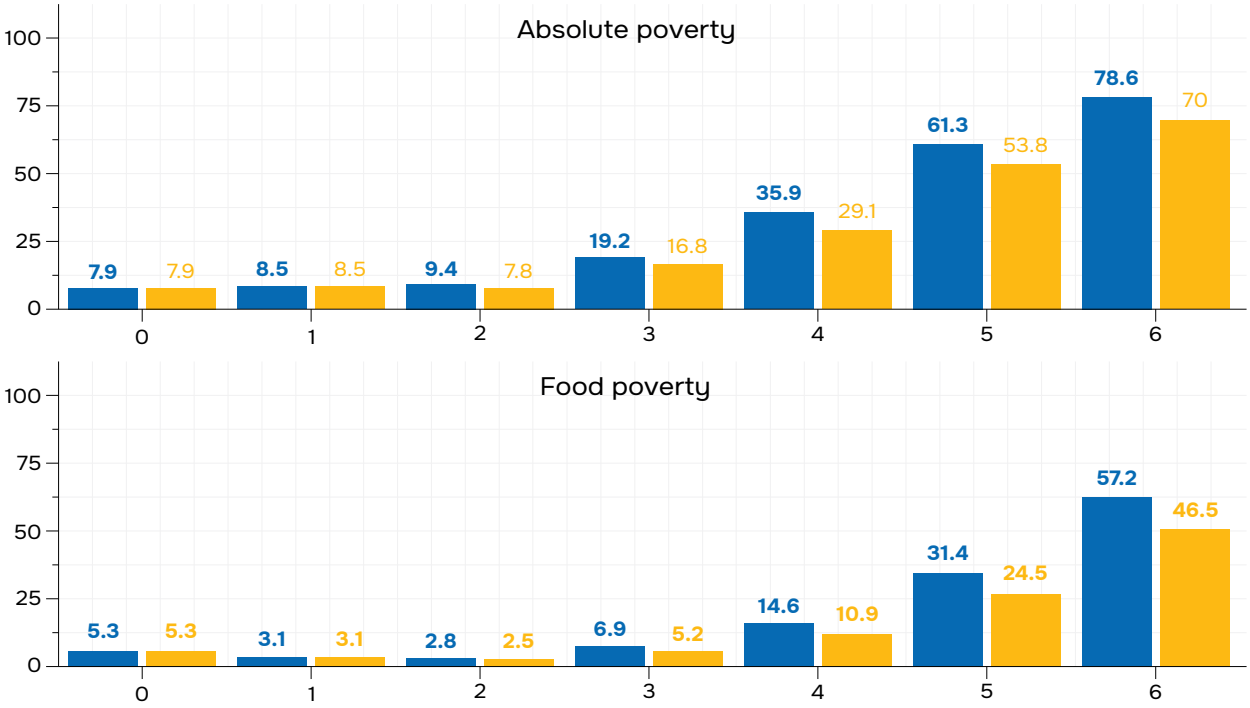
Figure 11. Monetary poverty rate by residence areas, types of poverty and scenarios in the period 2021-2023, %



[20] World Bank, Moldova Economic Update, Special Topic: Energy Affordability, April 2024, available at: https://thedocs.worldbank.org/en/doc/9a4979b9cb56380179fbe177ed17dc66-0080012024/original/Moldova-MEU-English.pdf?cid=eca_fb_moldova_en_ext



COLD 2023-24

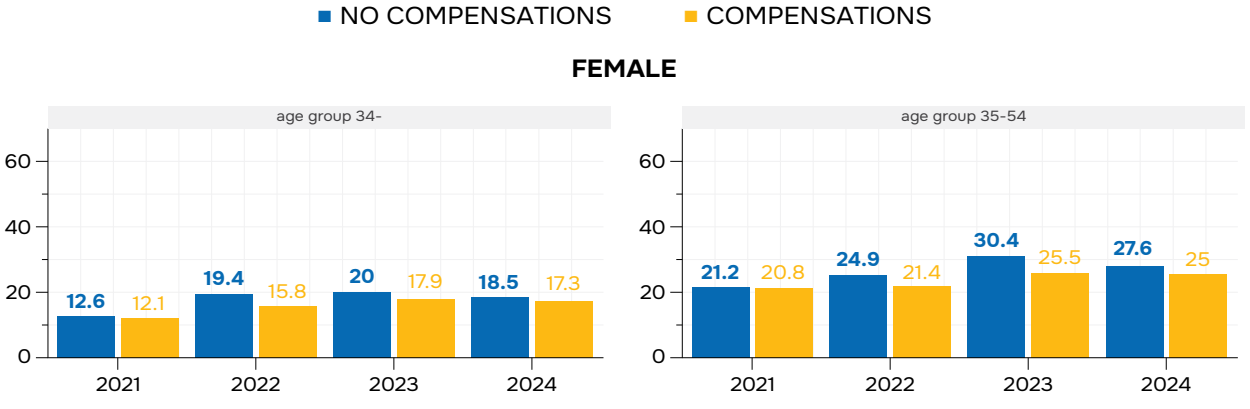


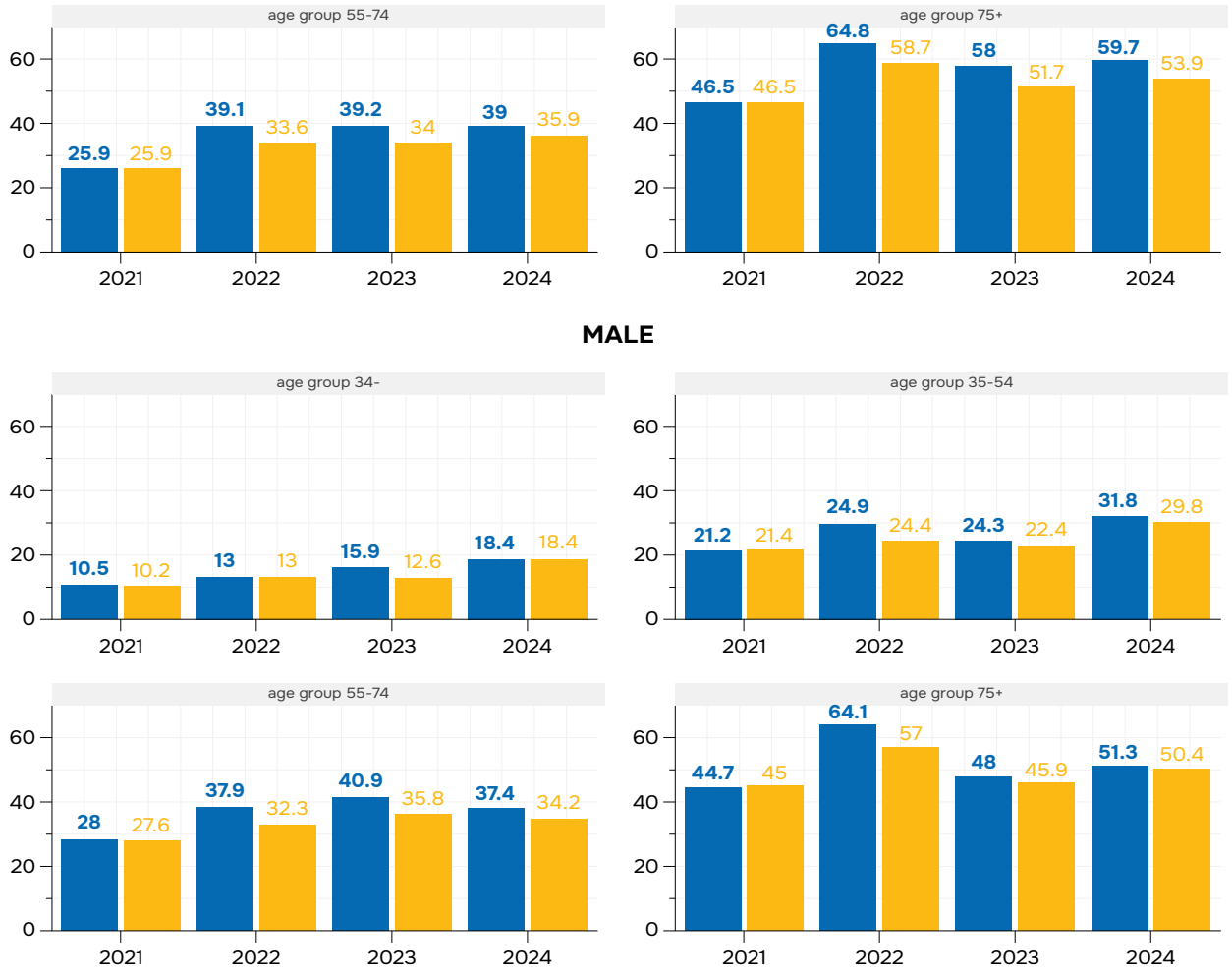
Note: vulnerability categories for 2022 and 2023 are not comparable.

Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

Importantly, despite the higher incidence of income poverty observed among female-headed households and older generations, the microsimulation results indicate that the compensation policy maintained equitable coverage across these more vulnerable groups, ensuring they were not disadvantaged in accessing support (Figure 12).

Figure 12. Absolute poverty rate by household heads age groups, sex and scenarios in the period 2021-2024, %





Source: calculated by author based on HBS data for 2021-2024 provided by NBS.

4

REDUCING ENERGY VULNERABILITY AMONG UKRAINIAN REFUGEES

As during previous several heating seasons, in November 2024 – March 2025 the Government of Moldova continued implementing the energy compensations under the Energy Vulnerability Reduction Fund (EVRF) to cushion the impact of high energy costs on vulnerable groups, including both Moldovan residents and beneficiaries of the temporary protection status – virtually all being represented by refugees from Ukraine.

According to data from SIVE, a total number of 3,880 applied for compensations and only 20 cases were rejected based on non-eligibility criteria. These households encompassed a total number of 8,142 persons, i.e. 0.6% of total beneficiaries of the EVRF during the reported season.

Among the households receiving compensation at least once during any of the five months of the heating season, the resident households mean monthly compensation was about 745 MDL, while among the Ukrainian refugees the mean compensation was a bit higher - 832 MDL per month.

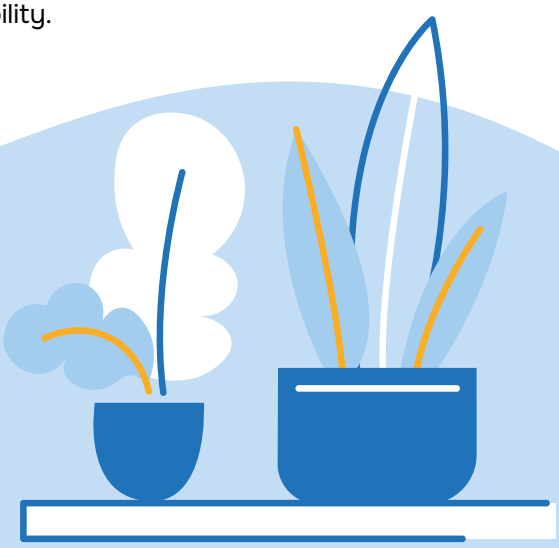
The higher amount of average support among refugees reflects their greater vulnerability, as they typically belong to lower-income categories within the EVRF eligibility system. Indeed, average monthly income per household member among refugees was only 3,949 MDL, less than half the level observed among residents (9,435 MDL).

These income disparities translate directly into differences in propensity to poverty risks and different magnitudes of reaction to compensations.

To assess the impact on energy poverty, we use the energy poverty methodology presented in the Annex 1. In the baseline scenario, where EVRF compensations are included, the poverty incidence stood at 34.5% among residents and 36.4% among refugees. Without compensations, however, poverty would have increased sharply—to 47.6% among residents and as high as 62.7% among refugees. It is clear that the marginal impact of compensations on poverty – be it measured as relative improvement or percent points improvement – has been much higher for the households with refugees than among the resident households.

Nevertheless, the persistence of high poverty levels even in the compensated scenario underlines the structural nature of energy vulnerability in Moldova. Strengthening household resilience—through energy efficiency investments, better housing conditions, and income-generating opportunities—remains essential to complement temporary consumption support and ensure longer-term sustainability.

This evidence confirms that the EVRF played a critical role in protecting both residents and refugees during the winter of 2024–2025, substantially mitigating the short-term poverty impacts of elevated energy prices. While compensations were modest in absolute terms, they effectively targeted the most vulnerable groups and helped prevent a significant surge in poverty.



Conclusions

Energy poverty in Moldova is a significant issue, exacerbated by factors such as high shares of energy expenditure in household budgets, low average overall household income levels, and poor energy efficiency of dwellings. Data from the Household Budget Survey (HBS) show that energy costs represent a considerable portion of household budgets, especially in rural areas where the share is about 20%. Gender and age also play important roles, with female-run households and elderly populations facing higher energy expenditure burdens. Geographic disparities, however, are especially pertinent, with urban areas typically having better income levels, while rural areas are more vulnerable due to outdated housing and energy infrastructure.

In response to energy price hikes that began in October 2021, the Moldovan Government introduced energy price compensations, initially in an ad-hoc manner, and with the start of the 2022-2023 cold season in a more structured manner via the Energy Vulnerability Reduction Fund (EVRF). These compensations targeted households based on vulnerability criteria such as income, financial stress, and household composition. The compensations reduced energy costs and alleviated energy poverty. During the two cold periods of the calendar years 2022-2024 when energy prices were compensated from the EVRF, the average energy poverty rate declined from 97.4% to 87.3%. During the first two months of the cold period of 2024-2025, the energy poverty rate declined 97.8% to 84.5% - i.e. the policy kept its strong pro-poor emphasis despite significant changes in concept and mechanism of compensations.

Compensations positively impacted monetary poverty levels as well. Restricting the analysis to the three cold periods of 2022-2025 when EVRF provided either on-bill or cash-based compensations, the microsimulation model suggests that the average absolute poverty rate declined from on average from 43.2% to 34.8%, while the food poverty rate – from 24.7% to 17.6%.

For the entire year 2022, the absolute poverty rate declined from 33.8% to 30.0%, and food poverty decreased from 17.3% to 13.9%. The welfare effects were of a similar magnitude for the entire year 2023 – 33.8% absolute poverty rate without compensations against 29.7% with compensations, and 18.0% against 14.2% for food poverty rate the same year.

Data suggest that in the year 2024 the effects were a bit smaller in size compared to 2023, with the absolute poverty incidence improving from 34.8% to 32.2%, and with food poverty incidence – from 18.4% to 15.6%. Over the entire period of analysis, the compensations also helped reduce poverty among the more vulnerable categories, especially those with extreme energy vulnerability, with some categories of households seeing a reduction in average poverty rates of up to 5-6 percentage points.

The EVRF has also effectively provided essential financial support to Ukrainian refugee households in Moldova, enhancing their energy security during the critical cold season. During the 2024-2025 heating season, 3,880 refugee households (0.6% of total EVRF beneficiaries) received compensation. Among all households receiving compensation at least once, the mean monthly amount was about 745 MDL for residents and 832 MDL for refugees. The higher level of support among refugees reflects their greater vulnerability, as they typically belong to lower-income categories within the EVRF eligibility system. Average monthly income per household member among refugees was only 3,949 MDL, less than half that of residents (9,435 MDL). Without compensations, the energy poverty rate among refugees would have reached 62.7%, compared to 36.4% with EVRF support, confirming the Fund's critical role in preventing a sharp deterioration in welfare among both residents and refugees.

However, there were significant differences in terms of relative improvements observed across regions. In the 2023-2024 heating season, energy poverty in cities dropped from 92% to 70%, while the reduction was less prominent in rural areas (from 98.7% to 91%). The same geographic pattern prevailed in 2024-2025, with the energy poverty in cities declining from 93% to 65% and from 99.6% to 90.6% in villages and towns.

In conclusion, the energy compensations policy, implemented initially in an ad-hoc manner in 2021-2022 and in a more targeted manner based on the EVRF afterwards, has helped mitigate energy poverty and improved overall welfare, especially for the most vulnerable households, while also reducing monetary poverty, among both local and refugee households. However, there are still challenges in ensuring that the policy's positive impacts are equitably distributed across different regions and demographic groups.

Policy discussion

While the energy compensations both on-bill (during 2022-2023 and 2023-2024 heating seasons) and in cash (starting with the 2024-2025 heating season) provided by the Moldovan government have had a positive impact on reducing energy poverty and improving welfare, several challenges and opportunities for policy improvement remain. These efforts are consistent with the broader reform directions pursued by the Government under the EU-Moldova Growth Plan, which aims to strengthen social resilience and improve the targeting of public support schemes.

The targeted approach of the Energy Vulnerability Reduction Fund (EVRF) has proven effective in alleviating energy costs for households, but its impact has not been uniformly distributed. Urban households, particularly those in cities, appear to have benefited more than those in rural areas and smaller towns. This pattern does not seem to have changed greatly despite the recent transition of compensations policy from on-bill payments mechanism to the direct cash payments (a more complete set of data for the heating season 2024-2025 is not likely to change this preliminary conclusion).

This disparity highlights the need for yet more nuanced targeting mechanisms that address regional vulnerabilities and ensure that households in the most disadvantaged areas are better covered. Such refinements would also contribute to advancing ongoing social protection reforms aimed at improving equity, efficiency, and fiscal sustainability of public support programmes.

One key observation is the vulnerability of older populations and female-headed households. Fortunately, these groups, already facing higher shares of energy expenditures in their budgets due to lower incomes and less energy-efficient homes, have not been penalized by the compensations policy. However, future policy interventions should consider further integrating gender and age-specific factors into the eligibility criteria. This would align with national commitments to inclusive growth and ensure that energy support mechanisms remain consistent with evolving social policy reforms. For instance, policies could prioritize households led by women and the elderly, especially in rural and town areas where energy inefficiency is most present.

The limited impact of compensations in towns and villages suggests that additional measures may be needed to improve the energy efficiency of housing, particularly among vulnerable households in rural areas where old building materials and inefficient heating systems are prevalent. The government could consider expanding its support for retrofitting homes with more energy-efficient materials or providing incentives for the installation of autonomous and more efficient heating systems. Given the widespread reliance on stoves, which provide limited comfort and higher energy costs, promoting alternative heating methods could be a priority. It would be recommended to achieve a higher coherence and leveraging effects between energy efficiency measures and EVRF, including monitoring of the combined effects of these on household energy poverty.

On a more strategic level, while the compensations have had a positive effect on energy and monetary poverty, the long-term sustainability of this approach needs serious consideration. In this context, linking energy assistance with wider structural reforms in social protection and fiscal management could help consolidate outcomes and support a gradual transition from compensatory measures toward more resilient, forward-looking systems. A shift towards more structural interventions, such as improving overall energy infrastructure and enhancing the financial resilience of households through broader economic and employment policies, could provide a more lasting solution to energy poverty. Strengthening public awareness and providing education on energy-saving measures could further complement these efforts, enabling households to reduce their energy consumption and improve efficiency independently.

In conclusion, while the compensations policy has made important strides in reducing energy poverty and improving monetary welfare, targeted adjustments and a broader approach to energy efficiency and household resilience will be crucial for ensuring long-term improvements and equitable outcomes for all households in Moldova. These priorities align with Moldova's reform trajectory under the EU–Moldova Growth Plan, where social inclusion and resilience form central pillars.

Building on these national efforts, these priorities also resonate with UNDP's broader engagement in supporting evidence-based social protection and resilience-building in Moldova. Through ongoing collaboration with national institutions, UNDP continues to contribute analytical, digital, and policy expertise aimed at strengthening the integration between energy assistance, social protection, and sustainable development measures. This integrated approach supports the Government's efforts to enhance targeting efficiency, fiscal sustainability, and inclusion in line with the reform directions under the EU-Moldova Growth Plan.

7

TOWARDS A MORE STRATEGIC POLICY APPROACH: A FRAMEWORK FOR ANALYSIS OF IMPACT OF TRANSITION FROM ENERGY CONSUMPTION SUBSIDIES TO ENERGY EFFICIENCY INVESTMENT SUBSIDIES IN MOLDOVA

The Energy Vulnerability Reduction Fund has reached a natural point of evolution. Having stabilized household affordability during successive heating seasons, the mechanism can now progress from seasonal compensations toward a more integrated approach that combines targeted protection with incentives for longer-term resilience. The forthcoming integration of the Energy Vulnerability Information System within the eSocial platform provides the institutional context for this transition, enabling better data use, interoperability, and alignment with the wider social protection system. What follows is a narrative overview of three complementary policy paths - referred to interchangeably as paths or scenarios - that the Government could pursue sequentially or in combination, depending on priorities, institutional readiness, and fiscal conditions.

While seasonal compensations ensured short-term protection, they offer weak incentives for household efficiency and raise fiscal sustainability concerns over time. A gradual shift toward investment-oriented support can address structural drivers of energy vulnerability and reduce the need for compensations.

Path 1 - maintaining the current mechanism with additional filters

This path preserves the existing scheme and strengthens its evidence-based targeting through incremental refinements. The mechanism would introduce a small set of additional exclusion criteria designed to reflect household financial capacity more accurately while preserving accessibility for those in need. Illustrative adjustments include a vehicle ownership criterion - for example, excluding households owning a relatively new vehicle or multiple vehicles - and an interest income criterion that uses reported interest to infer significant deposits where data-sharing on balances is not available. In parallel, existing screens would be optimized, such as recalibrating high-consumption thresholds so that atypical consumption is identified more consistently. Implementation would be largely technical, limited to parameter updates in EVIS and clear communication to applicants and local intermediaries.

The advantage of this path is its practicality. It can be introduced quickly within the current administrative and regulatory framework, and it improves fairness and transparency without altering the familiar structure of the scheme. It also allows ex-post review of how each filter performs, thereby strengthening the evidence base for future decisions. The key consideration is that the seasonal and compensatory character of the mechanism remains unchanged. While coverage becomes more precisely aligned to verifiable need, the approach does not yet address structural drivers of vulnerability or reduce dependency on compensations over time.

Path 2 - refining eligibility thresholds within the existing framework

This path retains the programme architecture but adjusts the parameters that define eligibility, with the goal of concentrating support where affordability constraints are most acute. In operational terms, this means recalibrating the energy-burden threshold used by the allocation formula so that resources are increasingly focused on households with the highest verified energy-to-income ratios. The adjustment is implemented through an algorithmic update and accompanied by a clear public explanation of the rationale - strengthening fairness, maintaining protection for the most vulnerable, and reinforcing fiscal responsibility.

The principal advantage is that this path can deliver meaningful efficiency gains with minimal procedural change, while sharpening the link between measured vulnerability and benefit entitlement. It acts as a bridge between incremental fine-tuning and deeper reform. The main consideration is that changes in thresholds can affect borderline cases, so careful sequencing, transparent messaging, and monitoring are needed to maintain trust. As with Path 1, the mechanism remains seasonal and compensatory, even if its focus becomes more selective and better targeted.

Path 3 - transition to a permanent, energy-poverty-based and efficiency-linked system

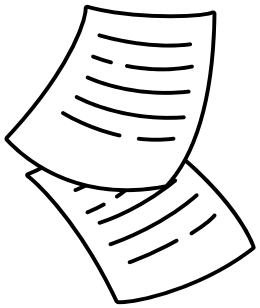
This path introduces a structural shift: eligibility is based on a dedicated energy poverty criterion that measures whether a household's disposable income can cover the cost of an adequate energy basket after essential non-energy needs. The methodology distinguishes household types and contexts - for example, dwelling characteristics, heating systems, and composition - allowing for consistent identification of those unable to afford required energy. Embedded within eSocial, the mechanism can operate year-round, ensuring continuity and predictability and creating a single, stable reference point for policy planning.

Over time, this path enables a second movement within the same framework: linking targeted support to measures that reduce energy needs structurally. A share of the fiscal space created by more precise targeting is gradually redirected toward household-level efficiency measures - improved thermal insulation, replacement of obsolete heating systems, or access to small-scale renewables where appropriate. The scheme thus evolves from offsetting high bills to addressing their root causes. The main advantage is long-term sustainability: eligibility becomes transparent and consistent, social and energy policies are better aligned, and incentives support durable reductions in household demand. The principal consideration is that the transition requires careful sequencing, inter-institutional coordination, data governance arrangements, and time for piloting and learning to ensure continuity of protection during change.

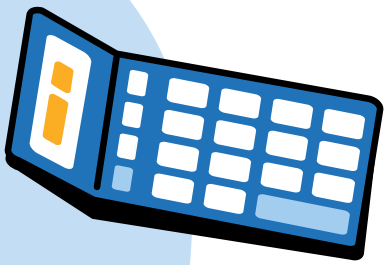
These paths are complementary. Path 1 and Path 2 can be applied consecutively or in combination in the short term to improve fairness, strengthen targeting accuracy, and align the scheme with available fiscal space - all while the mechanism remains operationally familiar to households and administrators. Path 3 represents the medium - to long - term direction of travel: institutionalization within eSocial, adoption of a clear energy poverty criterion, and gradual linkage with energy-efficiency measures that reduce bills structurally rather than temporarily. Taken together, the paths map a steady reform trajectory that preserves credibility and accessibility while creating the conditions for a sustainable, integrated model that supports social inclusion and Moldova's energy transition.

To calibrate the pace and sequencing, we will use an integrated evidence base - micro simulations, distributional analysis, and macro impact modelling - including scenarios with potential future energy shocks and safeguards for the most vulnerable.

The next phase can therefore be planned as a continuum: start with incremental refinement to strengthen fairness and transparency; advance toward threshold recalibration to concentrate resources where need is greatest; and prepare the institutional shift to a permanent energy-poverty-based model that gradually links compensations with household-level efficiency measures. This approach preserves continuity while enabling measured reform, consistent with the directions set out earlier in the report and with the EU - Moldova Growth Plan. UNDP will continue to support this evolution with analytical, digital, and institutional expertise so that the mechanism remains an inclusive, data-driven instrument that protects households today and lowers their energy needs tomorrow.



Whichever combination is selected, success will depend on measured sequencing, consistent communication, and strong data governance. Immediate steps can focus on parameter updates and filter optimization, with transparent guidance to beneficiaries and local actors. In parallel, technical work can progress on the energy poverty methodology, its operationalization within eSocial, and the data-sharing protocols needed for a permanent mechanism. As the new targeting framework stabilizes, the programme can begin to pilot efficiency-linked incentives, initially in a limited number of localities and dwelling types, with evaluation findings informing scale-up. Throughout, monitoring and feedback loops will be important to maintain equity, ensure proportionality of support, and refine the design as the socio-economic context evolves.



ANNEX 1. A PROPOSAL OF A MONETARY-EQUIVALENT ENERGY POVERTY THRESHOLD

Energy poverty in Moldova is defined as the situation in which, after covering normal non-energy expenditures, a household's remaining resources are insufficient to afford a normative energy basket. Unlike percentage-based rules used in some countries (e.g. the 10% of net income before housing costs benchmark, historically referenced[21] in the UK and Ireland) this residual income criterion reflects both income capacity and essential consumption needs, adapts to changes in prices and living costs, and can be tailored to local conditions (urban or rural setting, dwelling type, heating system, seasonality).

By focusing on residual resources, it distinguishes households with similar bills but different capacities to pay, including those with additional needs such as disability, and it can be applied consistently within the EVRF module of eSocial for eligibility and benefit calibration.

The methodology consists of four main building blocks:

1. Normative consumption baskets

- A "normative" expenditure for non-energy goods and services ($\bar{Q}_a$) and for energy ($\bar{Q}_e$) is determined.
- These values are based on the **average of quintiles 2 and 3** of household expenditure in the 2020 Household Budget Survey (a year with stable energy prices). Only households not experiencing problems with dwelling heating have been considered.
- Norms are expressed in MDL per equivalized household member per month.

2. Equivalence scales

- To account for household size and composition, separate equivalence coefficients are applied for energy and for non-energy goods.
- Scales differentiate only between members with severe disabilities and without disabilities and are calibrated separately for urban and rural areas.
- With the household head considered 1 equivalent member, the household equivalence sizes are computed as:

$$N_e = 1+\sum c_{e,j}, N_a = 1+\sum c_{a,j}$$

3. Residual income test

- Total annual household income I is converted to monthly average (I/12).
- Normal non-energy costs are calculated: $C^{NE}=\bar{Q}_a \times N_a$
- Residual resources are determined: $R=I/12-C^{NE}$
- Normal energy costs are calculated: $C^{E}=\bar{Q}_e \times N_e$

4. Decision rule

- If $R<C^{E}$, the household is considered **energy poor.**
- If $R \geq C^{E}$, the household is **not energy poor.**
- If R is negative, the household cannot cover even basic non-energy needs, i.e. it is automatically poor.

[21] Boardman, B., Fuel poverty synthesis: lessons learnt, actions needed, Energy Policy 49 (2012) 143-148

To illustrate the application of the proposed methodology, two simplified household scenarios are presented below. These examples demonstrate how differences in income levels, household composition, and disability status influence the classification of energy poverty under the residual income approach.

- **Urban household, 3 members, annual income 126,000 MDL** - residual resources after normal non-energy spending: 6,803 MDL/month; normative energy cost: 370 MDL.
  Since residual resources exceed the normative energy cost, the household is **not energy poor.**
- **Rural household, 2 members (one with severe disability), annual income 12,000 MDL** - residual resources are negative; normative energy cost: 243 MDL.

  Because residual resources do not cover the normative energy cost, the household is **energy poor.**

> **Note:** if residual resources are negative, the household cannot meet basic non-energy needs and should be flagged for broader social assistance review.

The proposed methodology introduces a monetary threshold for defining energy poverty that can be directly applied by the National Center for Sustainable Energy (CNED) as an eligibility criterion for subsidy allocation. Unlike the traditional 10% rule, which assumes uniform spending patterns across households, this approach is specifically adapted to Moldova's socio-economic context. It reflects actual household consumption structures, income composition, and regional cost variations.

By incorporating an equivalence scale, the methodology ensures fairness across households of different sizes and demographic compositions, accounting for both economies of scale and specific needs such as disability status.

The use of a residual income test further refines targeting by ensuring that support reaches households whose disposable income, after covering energy needs, falls below a socially acceptable minimum. This balances the dual policy objectives of protecting vulnerable households and maintaining fiscal discipline by avoiding untargeted, blanket subsidies. The main advantages and potential limitations of the proposed methodology are summarized below.

ADVANTAGES:

- Establishes a direct connection between affordability and household welfare, ensuring that support measures reflect real energy needs and financial capacities.
- The approach is transparent and reproducible, allowing decision-makers and analysts to consistently apply and update the methodology using available data.
- It is sensitive to household structure and disability status, recognizing that energy needs differ depending on household size, age composition, and specific vulnerabilities.
- The model is adaptable to different policy instruments, making it suitable for both short-term consumption subsidies and longer-term investment measures such as energy efficiency improvements.

LIMITATIONS:

- The methodology requires annual indexation of reference energy quantities ($\bar{Q}_a$,$\bar{Q}_e$) with relevant price indices to remain aligned with changing market conditions.
- Since it relies on self-reported income data, there is a potential risk of bias, which may necessitate verification or cross-checking with administrative sources.
- Households that engage in forced under-consumption may appear above the energy poverty threshold, unless the analysis is complemented with self-reported indicators on heating adequacy or unmet energy needs.

Overall, this methodology provides a transparent and context-specific definition of energy poverty suited to Moldova's conditions. It offers a practical basis for policy implementation, enabling the government to align social support with household welfare and fiscal capacity. It can also inform the gradual transition from short-term consumption subsidies to investment-based measures that enhance energy efficiency and resilience.