Assessing Household Energy Expenditure Dynamics and Energy Availability in Georgia

Davit Narmania [1], Eka Chokheli [2], Manana Kharkheli [2], Nino Vardiashvili [2], Shorena Davitaia [2], Mikheil Makasarashvili [2], Giorgi Morchiladze [3]

[1] *Ivane Javakhishvili Tbilisi State University, Management and Administration Department, University St. 0179, Tbilisi, Georgia*
[2] *Ivane Javakhishvili Tbilisi State University, 2 University St. 0179, Tbilisi, Georgia*
[3] *Ivane Javakhishvili Tbilisi State University, Business Administration, 2 University St. 0179, Tbilisi, Georgia*

Abstract **- This paper explores the dynamics of household energy expenditure in Georgia and emphasizing its socio-economic implications. The study employs Classification of Individual Consumption by Purpose (COICOP) for comparative analysis with other countries, aiming to analyze trends and assess the impact of energy costs on social welfare and sustainable energy management. The study utilizes both primary data collected through electronic questionnaires and secondary data from national and international sources.**

Quantitative analysis reveals that while Georgian households have experienced increasing average monthly incomes from 2018 to 2022, energy expenditure has also risen, albeit with a decreasing share relative to income over time. This suggests improving affordability despite ongoing challenges.

Comparisons with European countries highlight significant disparities in energy expenditure as a proportion of disposable income, with Georgia recording higher percentages, reflecting lower income levels.

The study further examines energy poverty using metrics such as the 2M and M/2 indicators, revealing acute challenges among low-income groups. In contrast to European countries, more low-income households in Georgia face inadequate heating, struggle to manage energy costs efficiently, and experience higher levels of energy poverty. Overall, the findings underscore the critical role of energy expenditure analysis in understanding economic disparities and shaping effective policy interventions to enhance energy efficiency and affordability in Georgia.

Keywords **- Energy expenditure, energy poverty, energy availability.**

1. Introduction

For countries with limited financial resources, such as Georgia, the study and analysis of energy expenditure is of great importance. Understanding the dynamics of household energy costs sheds light on socioeconomic realities, informs policy development, and guides sustainable energy management strategies. Energy poverty, which occurs when a household must reduce its energy consumption to a degree that negatively impacts the inhabitants' health and well-being, is a key concern in this context. It is primarily driven by three root causes: A high proportion of household expenditure spent on energy, low income, and the low energy performance of buildings and appliances. By examining the share of energy expenditure in household income, this study aims to assess economic progress, social inequality, and the effectiveness of energy policies in Georgia.

The paper examines the difficulties of spending energy resources by households in Georgia and uses the International Classification of Individual Consumption According to Purpose (COICOP) for comparative analysis with other countries.

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Corresponding author: Davit Narmania,
Ivane Javakhishvili Tbilisi State University, Management and Administration Department, 2 University St. 0179, Tbilisi, Georgia.
Email: davit.narmania@tsu.ge

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The primary goal of this study is to analyze trends in energy consumption by Georgian households and assess its impact on social welfare and sustainable energy management.

2. Methodology

The methodology used in the paper involved comprehensive collection of data from various sources to ensure robustness and reliability. The primary data was obtained with the help of electronic questionnaires, which included the survey of respondents in different regions of Georgia. The questionnaire included both closed-ended and open-ended questions to assess respondents' views on household energy practices and challenges along with quantitative analysis of key variables. At the initial stage, the questionnaire was tested to identify and resolve any potential issues that could have a negative impact on the quality of the research process. In addition, secondary data from official sources such as the National Statistics Office of Georgia and Eurostat were collected to identify national and international trends in energy consumption.

Quantitative analysis was performed on the data collected for the preparation of relevant conclusions, the average monthly income of households was identified, the energy expenditure was estimated, which gave the opportunity to prepare relevant conclusions about energy poverty.

The research included conducting a comparative analysis with the data of selected European countries. Finally, by using a mixed methods approach and incorporating primary and secondary data sources, this study contributes to a nuanced understanding of the socio-economic drivers of energy poverty.

3. Results and Discussion

Georgia, as a developing country with limited financial resources, faces significant challenges in balancing energy costs. The analysis of the share of expenditure on energy consumption sheds light on the socio-economic reality and priorities within the country, offering information on the sustainability and availability of energy resources for citizens.

This analysis not only provides a picture of the financial behavior of households, but is also a crucial indicator for policy makers and stakeholders seeking to enhance energy efficiency and promote equal access to energy across diverse socio-economic segments of Georgian society.

The study is devoted to the analysis of the dynamics of energy expenditure by households in Georgia, and to the analysis of the specific share of this type of expenditure in household incomes, which will give a certain idea of social well-being and sustainable energy management strategies. The analysis of the dynamics of incomes received by households and the structure of their expenses is an important parameter for evaluating the country's economic progress and development trajectory.

The work aims to analyze the availability of energy, to determine what part of income is spent on energy in different countries. In order to make the data of Georgia comparable with other countries, the study is based on the international classification system COICOP. COICOP's systematic approach not only helps categorize energy-related expenses but also enables a broader understanding of consumption patterns, supporting the evaluation of economic conditions and inequalities. Income inequality is significantly and positively correlated with household energy poverty, implying that widening income inequality leads to energy “poverty enhancement.” This classification was developed by the United Nations Statistics Division to classify and analyze individual consumption expenditures incurred by households, non-profit institutions and the government in general. COICOP consists of 14 groups, the first 12 of which are individual expenses of households, including: food products and non-alcoholic beverages, alcoholic beverages, clothing and shoes, housing, water, electricity, gas, heating and others [1]. In this case, the focus will be on this last group of expenses.

In order to achieve the goal of the research, it was necessary to analyze the incomes received by the households and their expenses on energy. As the database of the National Statistics Office of Georgia shows, the average monthly income per household in Georgia shows an increasing trend in a five-year period and increases from 1123.5 GEL in 2018 to 1453.8 GEL in 2022.

This indicates a potential improvement in household income levels over time, which may contribute to improvements in residents' living standards and economic well-being.

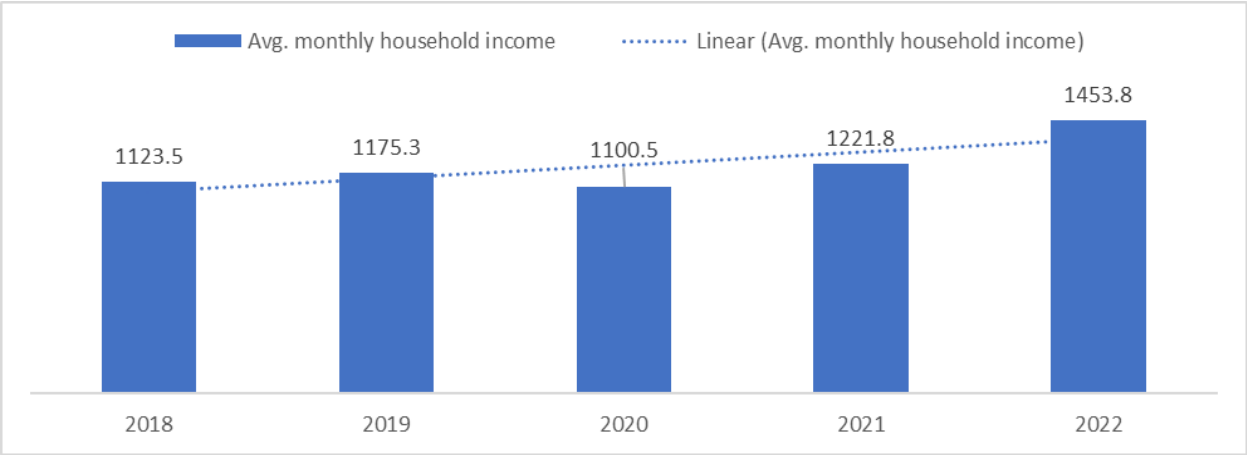


Figure 1. Average monthly household income, GEL [2]

It is interesting to analyze the average monthly incomes of households by town and village. As the information provided by National Statistics Office of Georgia shows, overall, over the years there has been an increasing trend of household income both in cities and in rural areas. Historically, median household income is higher in urban areas than in rural areas.

This urban-rural income gap looks set to persist over the years. However, in 2018, the difference in incomes is very sharp, although it decreases over time, and in 2021, the average monthly income received by households living in rural areas exceeds the average monthly income of households living in cities.

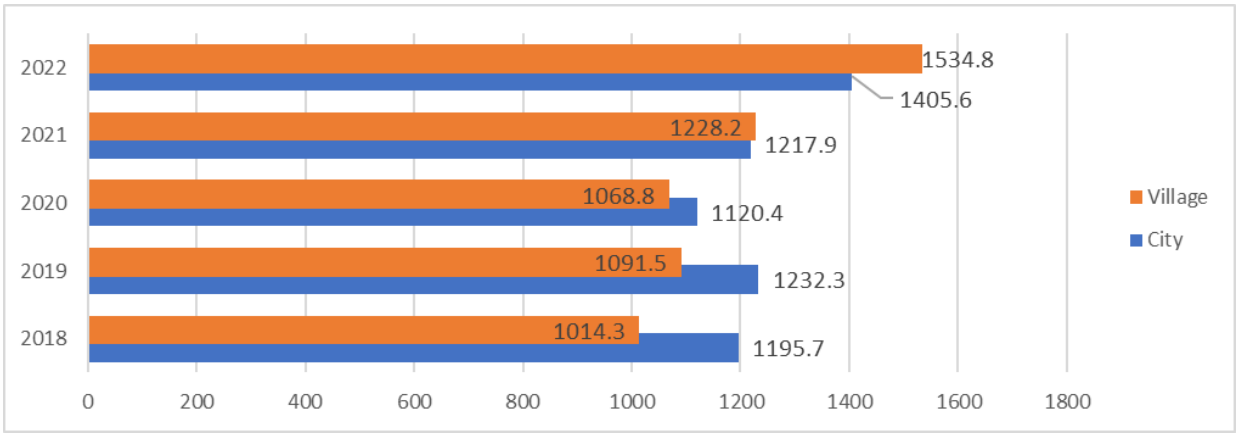


Figure 2. Average monthly household income by city/village, GEL [2]

The reason for this is mainly the increase in non-monetary incomes in rural areas. Rural areas are often more dependent on agriculture, which is why the government often helps farmers with subsidies or offers benefits such as seeds, fertilizers or equipment for agriculture. These subsidies can be one of the reasons for the growth of non-monetary incomes in rural areas.

It should be noted that in 2020 compared to 2019, the average household income decreased, which is mainly due to the decrease in the income of urban households.

This indicates a potential economic downturn or additional factors affecting household income levels during this period. One such factor can be considered the pandemic caused by the COVID-19 and the related restrictions, barriers that affected the city residents more strongly. All this had a negative impact on the country's economy and household incomes.

After examining household incomes, it is necessary to conduct an analysis of the structure and dynamics of household expenses, more precisely, the item defined by the COICOP classification - expenses incurred on housing, water, electricity, gas and other utilities should be analyzed.

Similar to incomes, the analysis of expenses related to utilities and housing also shows a growing trend, despite small fluctuations, the general nature of the increase in expenses in this category can still be observed.

From 2018 to 2022, the expenses incurred by one household for housing, water, electricity, gas and other heating increased from 95.8 GEL to 119 GEL.

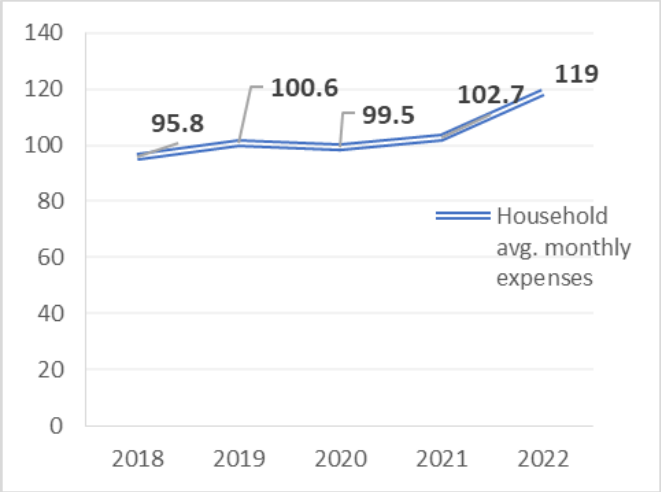


Figure 3. Expenses incurred by households on housing, water, electricity, gas and other heating, GEL [3]

Giving the look at these data in the urban-rural perspective, it can be seen that in the last five years, in contrast to rural households, urban households spend relatively more on housing, water, electricity, gas and heating, which indicates a potential difference in living standards, housing costs and energy consumption indicators.

Although utility and housing-related expenses have been characterized by an increasing trend in recent years, it is interesting to assess its share in consumer monetary expenses.

Figure 4. Expenditures for housing, water, electricity, gas and other heating by city-village, GEL [3]

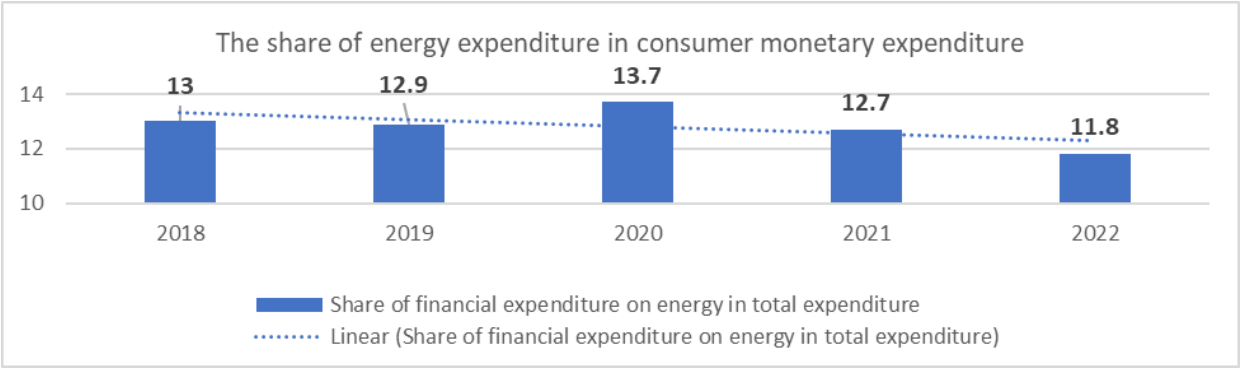


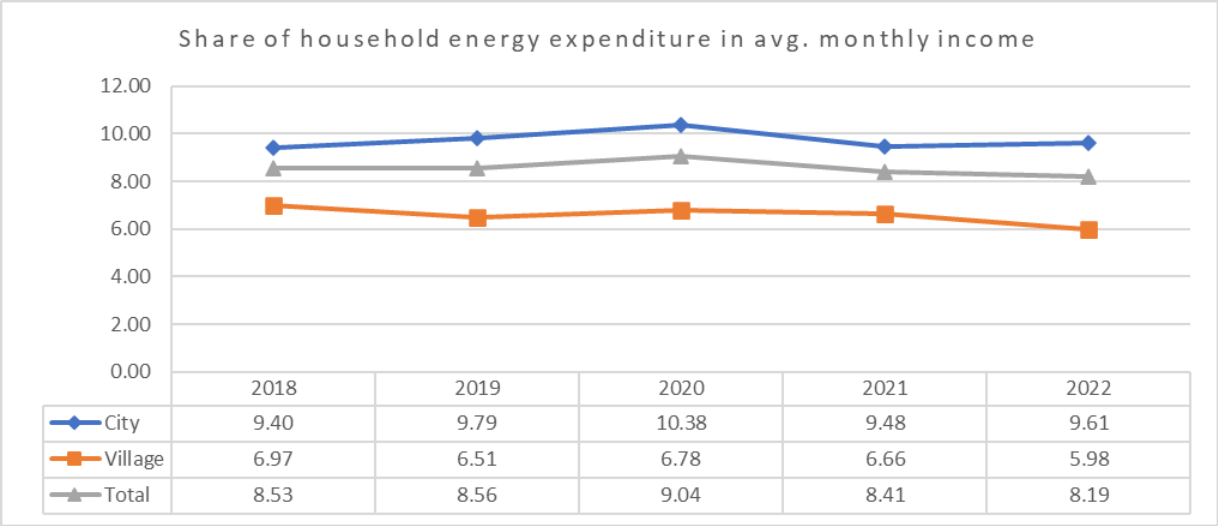
Figure 5. The share of household expenses for housing, water, electricity, gas and other heating in total expenses, (%) [3]

Based on the data published by the National Statistics Office Of Georgia, the share of housing and energy expenditures in consumer spending is calculated. The obtained data show a decreasing trend of the share of this type of spending in consumer spending. Although the absolute values of expenditures on housing, water, electricity, gas, and other utilities are increasing over time, the average monthly income of households is increasing more proportionally, and with it, expenditures are also increasing. Changes are also observed in the structure of expenses: At the expense of a decrease in the specific share of expenditures on housing and energy, expenditures on education, household goods, food, and clothing are increasing.

Due to the mentioned reasons, the specific share of energy expenditure in expenses decreases over time.

The results of the study highlight the importance of housing, water, electricity, gas and heating as essential components of household budgets and create the need for reliable and affordable delivery of these services to both urban and rural populations.

Analyzing the share of energy expenditure in revenues provides important information on energy poverty and the effectiveness of the country's energy policy in general.



	2018	2019	2020	2021	2022
City	9.40	9.79	10.38	9.48	9.61
Village	6.97	6.51	6.78	6.66	5.98
Total	8.53	8.56	9.04	8.41	8.19

Figure 6. The share of expenditure on housing, water, electricity, gas and other heating in income, (%) [2],[3]

As a result of the research, it is established that the share of expenses for housing, water, electricity, gas and other heating in the average monthly income is relatively stable and is characterized by only small fluctuations from year to year. It ranges from 8.53% (in 2018) to 8.19% (in 2022) over the last five years. The data show that households in Georgia were able to maintain a relatively stable share of expenses in income, which indicates a certain level of affordability and financial stability of the population.

Based on the data published by the National Statistics Office Of Georgia, it can be concluded that, compared to households living in rural areas, households living in cities allocate a higher percentage of their income to cover expenses on average. In 2018, the share of expenses in income for rural households was 6.97%, while the same figure for urban households was 9.40%. It is also worth noting that the difference between the city and the countryside is characterized by an increasing trend over time.

The data shows that the cost of living, including the cost of housing, utilities and other essential needs, is higher in urban areas.

It is interesting to study and analyze the European experience in balancing energy costs. Eurostat offers high-quality and reliable statistical indicators by European countries, the site contains information on the structure of household final consumption costs according to the COICOP classification system, and also analyzes the share of energy costs in the average annual disposable income. First of all, the concept of disposable income requires clarification. According to National Statistics Office of Georgia, household disposable income is the income that includes the total monetary income of the household and/or its members. Disposable income does not include regular/mandatory taxes such as income tax from salary, property tax, compulsory insurance tax, etc. It also does not include borrowing money or proceeds from the sale of real estate.

In order for Georgia's data to be comparable with European countries, first of all, the article of disposable income (monetary income and transfers) is identified, and then the data is adjusted according to the currency exchange rate and time period. A part of the expenses were also subject to recalculation.

Along with Georgia, six more countries were selected for analysis, namely: Austria, Belgium, Germany, Lithuania, Hungary and Romania.

Based on the data published by Eurostat, the share of energy costs in disposable income of households are analyzed. As analyze shows costs incurred for electricity, gas and other fuels are dramatically higher in the case of Germany. Considering the country's size and population, such a figure was expected.

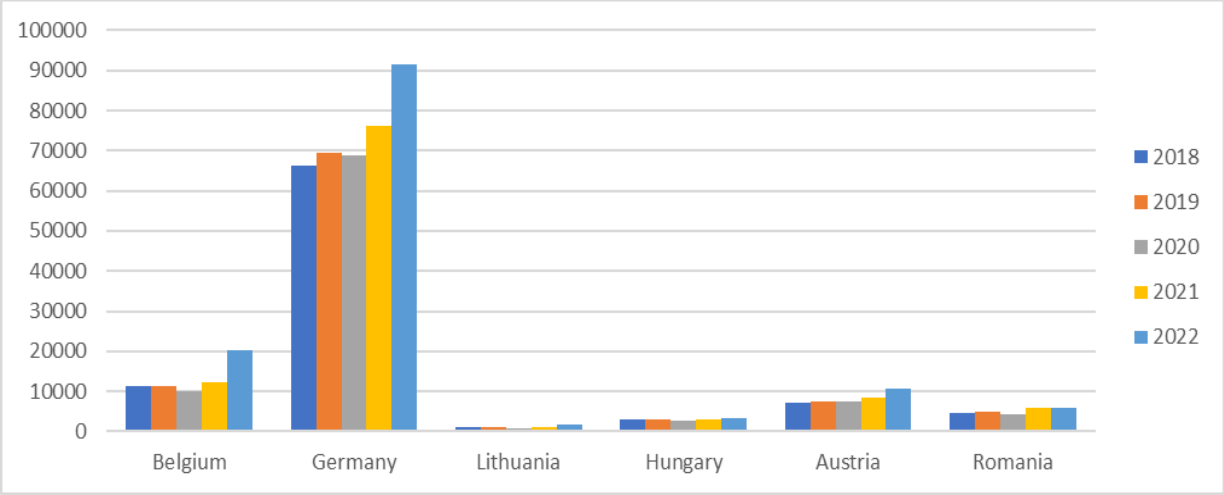
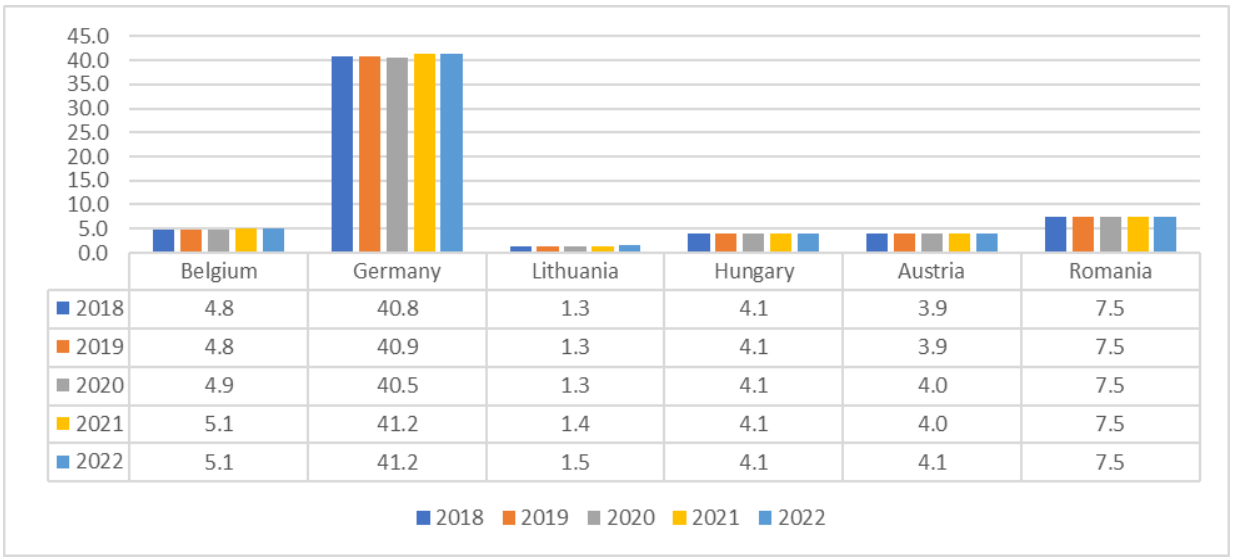


Figure 7. Total expenditure of the household on electricity, gas and other fuels (according to COICOP classification), million EUR [4]

In order for energy expenditure to give the opportunity to compare data from different countries, it is necessary to exclude the effect of population size and calculate the amount of expenditure per household.

Figure 8 shows the number of households by country in 2018-2022. If the energy costs with the number of households are compared, the average annual costs incurred by one household will be estimated as presented.



	Belgium	Germany	Lithuania	Hungary	Austria	Romania
2018	4.8	40.8	1.3	4.1	3.9	7.5
2019	4.8	40.9	1.3	4.1	3.9	7.5
2020	4.9	40.5	1.3	4.1	4.0	7.5
2021	5.1	41.2	1.4	4.1	4.0	7.5
2022	5.1	41.2	1.5	4.1	4.1	7.5

Figure 8. Number of households, million [5]

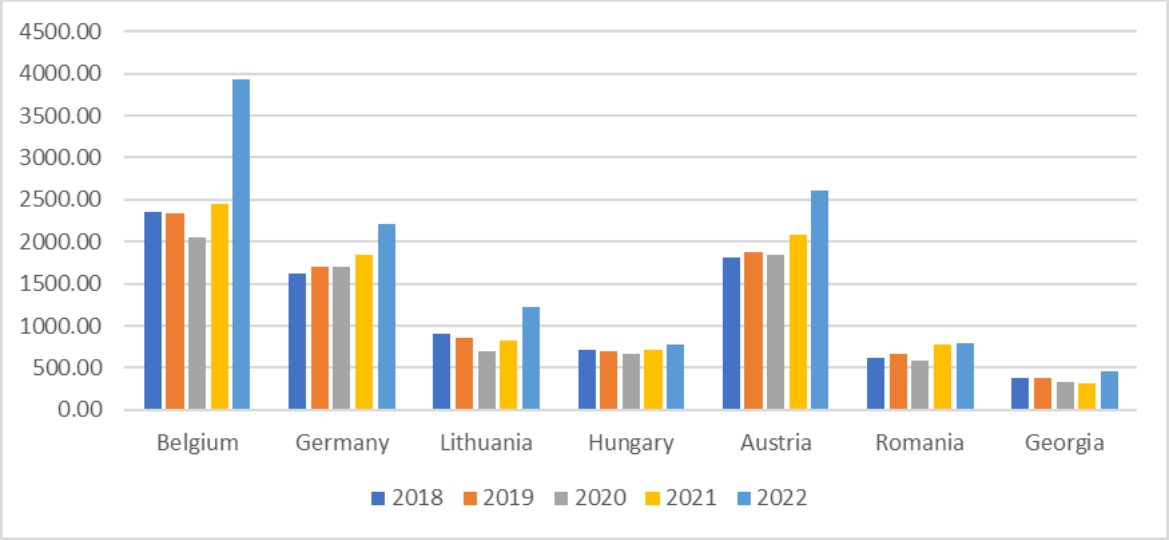


Figure 9. Expenses incurred by one household (according to COICOP classification), EUR [2],[3],[4],[5]

As the research shows, the expenditures made by one household on energy resources in Georgia are quite low compared to the reviewed countries. This is due in part to low energy costs and in part to relatively low living standards and incomes.

The following figure also confirms this opinion. As Figure 10 shows, the average annual disposable income received by a household in Georgia is far behind the similar indicator of European countries.

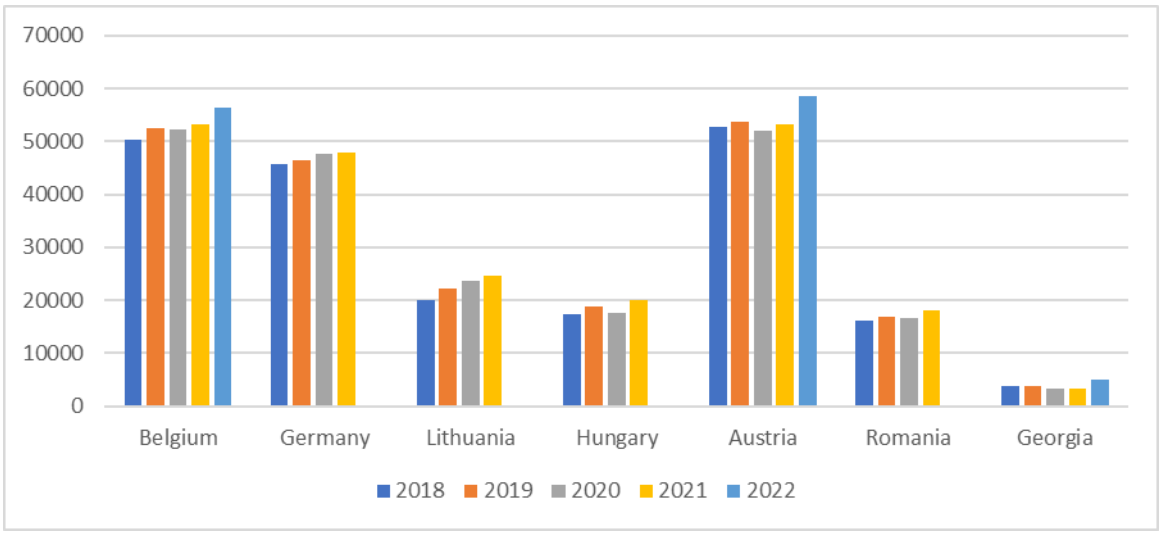
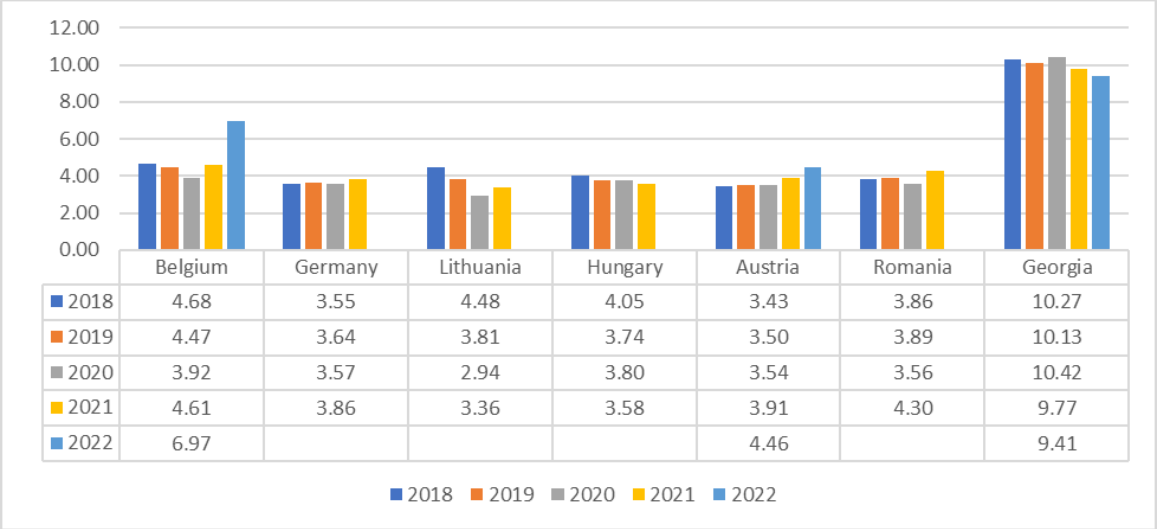


Figure 10. Average annual disposable income received by the household, EUR [6].



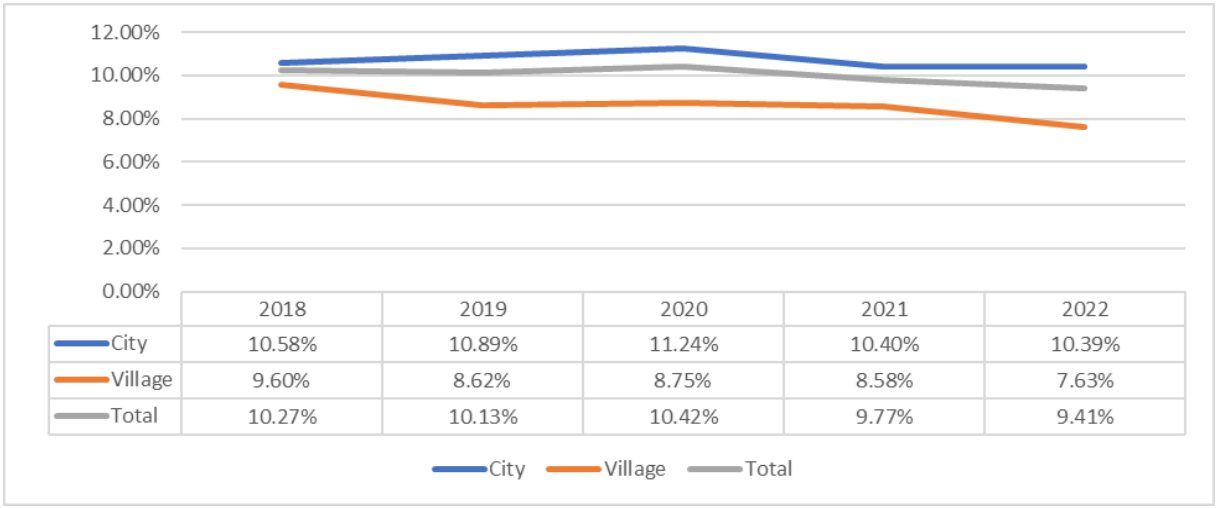
	Belgium	Germany	Lithuania	Hungary	Austria	Romania	Georgia
2018	4.68	3.55	4.48	4.05	3.43	3.86	10.27
2019	4.47	3.64	3.81	3.74	3.50	3.89	10.13
2020	3.92	3.57	2.94	3.80	3.54	3.56	10.42
2021	4.61	3.86	3.36	3.58	3.91	4.30	9.77
2022	6.97				4.46		9.41

Figure 11. Share of energy expenditure in households' disposable income, (%) [2],[3],[4], [5],[6]

Figure 11 offers valuable insights into household energy affordability in different countries, providing insight into the economic conditions and policy environment in those countries.

As the figure shows, Germany, Hungary, Austria and Romania display a relatively stable trend. Despite small fluctuations, energy costs account for about 3%-4% of household disposable income in these countries. A noticeable increase in the share of this type of expenditure is recorded in Belgium in 2022, this increase is due to the supply difficulties that arose after Russia-Ukraine conflict.

Between May 2021 and May 2022, natural gas prices increased by an average of 98.42% in Belgium, increasing the average annual gas bill from €1,215.28 to €2,411.36 [7]. As for Georgia, as it can be seen, it has the highest proportion over the years, but as the figure shows, it experiences a slight decline from 2020 to 2022, and the share of energy expenditure in disposable income decreases. The mentioned result is mainly caused by the low rate of household incomes in Georgia, which is why, compared to European countries, the share of energy expenditure in the disposable income of households in Georgia is significantly higher.



	2018	2019	2020	2021	2022
City	10.58%	10.89%	11.24%	10.40%	10.39%
Village	9.60%	8.62%	8.75%	8.58%	7.63%
Total	10.27%	10.13%	10.42%	9.77%	9.41%

Figure 12. The share of energy expenditure in household disposable income by city-village (%) in Georgia [2],[3],[4],[5],[6]

The share of energy expenditure in disposable income is often used as an official measure of energy poverty. According to this approach, an absolute limit is set in advance, e.g. 10% figure, and if a household's energy expenditure exceeds 10% of disposable income, such a household is considered energy poor.

This indicator was based on a study conducted in England in the 1990s, according to which the poorest 30% of the population paid 10% of their income for energy costs.

If there is an evaluation of the data of households in Georgia with this indicator, it will be seen that this indicator calculated for households across the country is very close to the 10% limit in the last five years. The closeness to the established limit is especially felt for households living in cities. The share of energy expenditure in disposable income is particularly high in 2020, it is equal to 11.24%, which indicates the possible energy poverty of urban households. In this regard, the situation is better in the villages, which may be due to the still large use of alternative sources of heating (for example, firewood). It is important to note that while this indicator provides a straightforward measure, it may not capture the full complexity of energy poverty, which may involve factors beyond a simple percentage of income spent on energy. The pattern of energy poverty varies by residence area, household income, availability of the utilities, and the main sources of energy used for heating [8]. A comprehensive assessment of energy poverty should consider factors such as housing energy efficiency, access to modern energy services, and seasonal variation in energy costs.

Cost-based indicators and surveys are most often used to analyze energy poverty in EU countries. Energy Poverty Observatory (EPOV) has put forward two indicators on energy expenditure (based on HBS data on households' expenditure for electricity, gas and other fuels), known as M/2 and 2M indicators. The 2M indicator shows the number of households whose share of energy costs in disposable income is twice the national median (high energy expenditure). In contrast, the M/2 indicator measures households whose energy expenditure is less than twice the median expenditure, i.e. energy consumption is unusually low (households with low energy expenditure). These indicators are calculated according to income levels, and as a rule, energy poverty studies do not take into account high-income households, because lower than median energy costs, together with poverty, may be due to living in a modern, high energy efficiency building.

In 2019, the Secretariat of the Energy Community conducted a study that aimed to study energy poverty in Georgia, along with other countries. The data obtained by them, which includes the analysis of 2015 and 2019, gives the opportunity to study and evaluate the 2M and M/2 indicators. The next two histograms present the share of household energy expenditure in total disposable income in 2015 and 2019, and show the corresponding median figures.

In order for the results to be representative, households whose share of energy expenditure in disposable income exceeded 70% were excluded from the data.

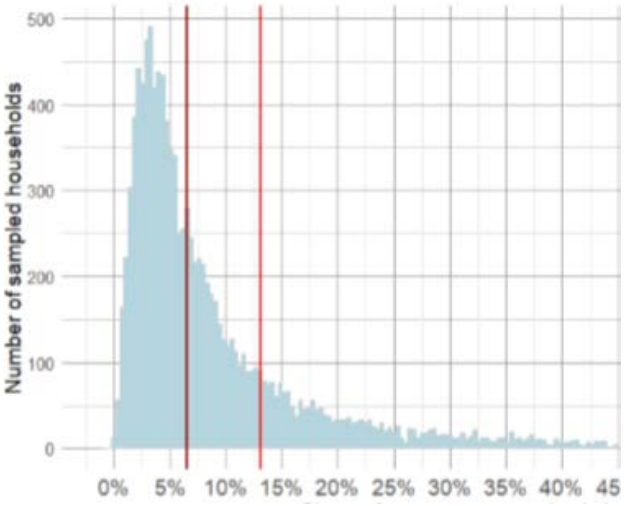


Figure 13. Share of household energy expenditure in income (%) 2015[9]

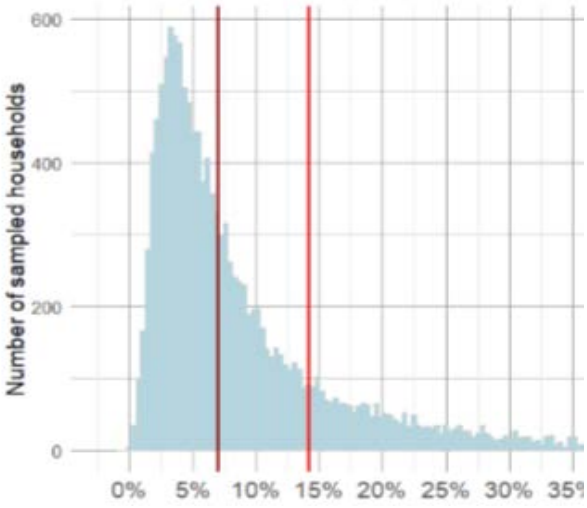


Figure 14. Share of household energy expenditure in income (%) 2019 [9]

The dark red line shows the median value of the share of energy expenditure in revenues, and the light red line shows the double of this median value. As can be seen from the figures above, the median energy expenditure in Georgia is about 7% of the total disposable income of households.

The next two figures show the share of the population that spends twice the median. Figure 15 shows the relative share by income decile groups, and Figure 16 shows the corresponding absolute number of households.

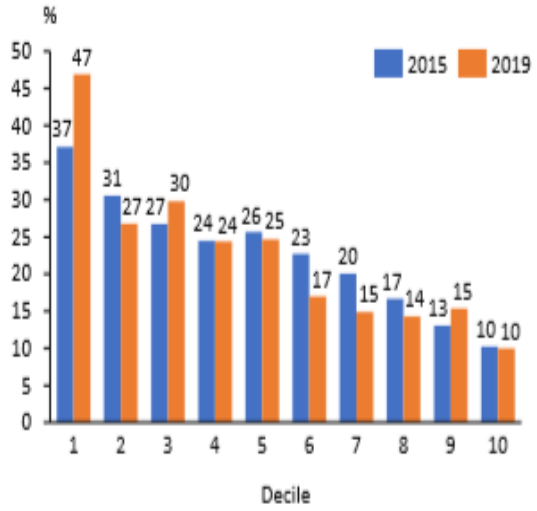


Figure 15. 2M indicator by decile groups (relative share of households, %) [9]

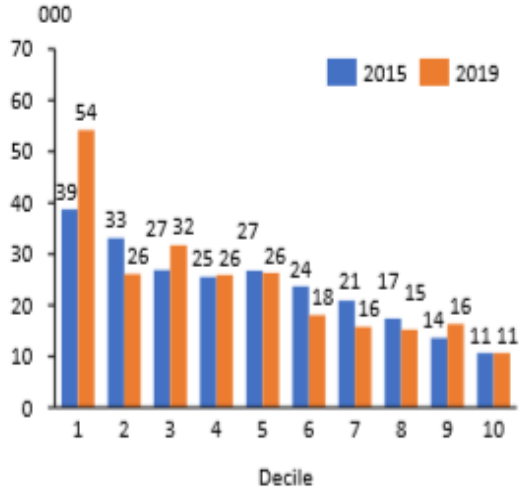


Figure 16. 2M indicator by decile groups (number of households, absolute value), thousand [9]

The issue of excessive consumption of energy is most acutely manifested in the first decile of income, where 37%-47% of households (depending on the years) face the problem of excessive consumption of energy resources. According to the total number, this includes approximately 39 to 54 thousand households (respectively, in 2015-2019), which are characterized by high energy costs. According to the Secretariat of the Energy Community, the total population is taken into account, about 23% of households spend twice the median value on energy in both years [9].

It is interesting to compare the indicators of Georgia with European countries according to the mentioned indicator.

Since the problem of excess energy expenditure was more pronounced in the first decile group of incomes, the focus will be on the mentioned group for comparison. The European Commission published the results of a study on energy poverty in 2022. This study provides an opportunity to analyze household energy expenditures in different countries according to the median value and income decile groups, and thus to create a certain idea about the burden of household energy expenditures. According to the mentioned research, for 2015, the 2M indicator for the first decile group looks like this:

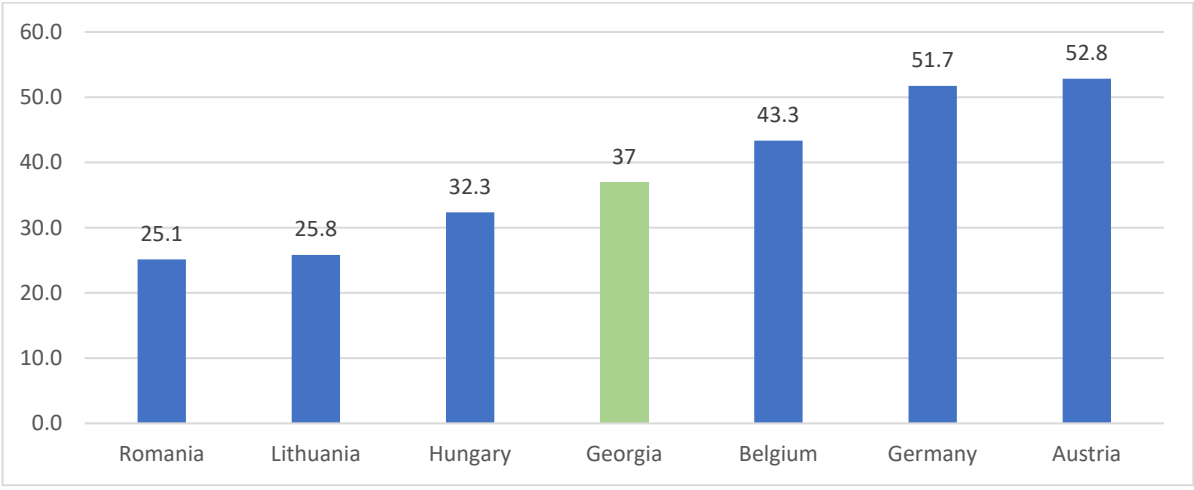


Figure 17. 2M indicator for the first decile group (relative share of households, %) [9],[10]

As the received data shows, Georgia occupies an intermediate position among the countries considered according to the mentioned indicator. While in Austria and Germany more than 50% of the households of the first decile group face the problem of excessive energy consumption, in Georgia this figure is equal to 37%.

In this regard, a better situation is observed in Lithuania and Romania, where the number of households in the first decile group, whose share of energy costs in disposable income is twice the national median figure, reaches 25.1% and 25.8%, respectively.

It is interesting to see the results of the comparative analysis of countries according to the 2M indicator for the last, tenth decile group.

As the figure 18 shows, it is in this case that significant differences between Georgia and European countries are revealed. While, in the case of the tenth decile group according to income in Georgia, 10% of households spend twice more than the median value in energy resources, in the case of Hungary this indicator reaches only 0.3%. One of the reasons for these results may be the lack of energy-efficient buildings in Georgia, the relatively small use of lamps and other energy-saving devices.

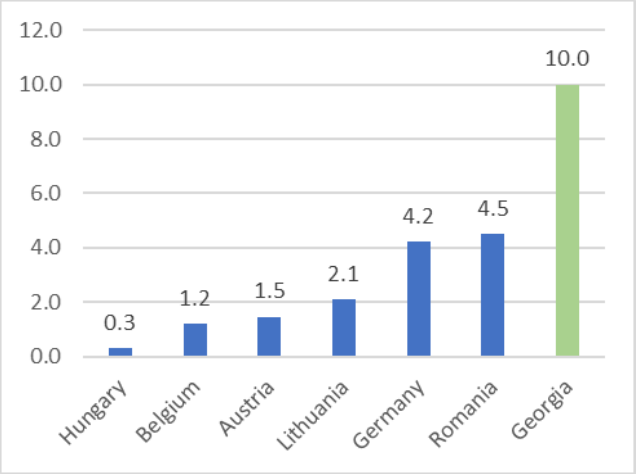


Figure 18. 2M indicator for the tenth decile group, (relative share of households, %) [9],[10]

The second indicator that is analyzed when studying energy poverty is the M/2 indicator. The next two figures show a histogram of energy consumption (expenditure) for Georgia with the median and M/2 values highlighted, for 2015 and 2019. The dark red line represents the median value, and the light red line represents the M/2 value. In order for the results to be representative, households whose average monthly expenditure on energy exceeded 300 GEL are excluded from the data.

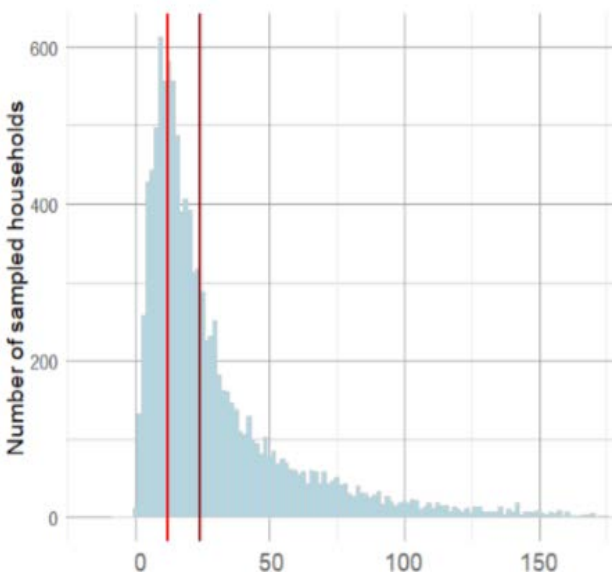


Figure 19. Expenditure histogram for Georgia (2015) Average monthly household expenditure on energy in GEL [9]

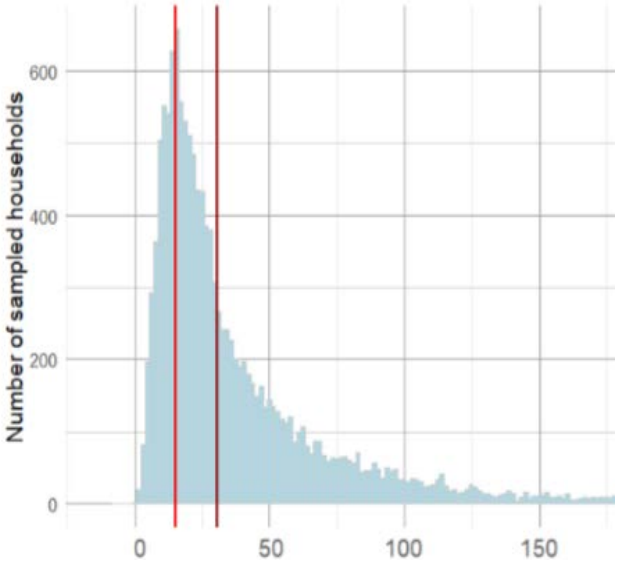


Figure 20. Expenditure histogram for Georgia (2019) Average monthly household expenditure on energy in GEL [9]

Figure 21 and Figure 22 show the relative and absolute values of households whose energy expenditure is less than half of the average median value. As expected, the number of households with an expenditure share of income less than half of the national median decreases over time, as household income tends to increase over time. According to the Secretariat of the Energy Community, if the total population is observed, in 2015, about 21% of households, and in 2019 - 19% spend twice less than the median value on energy.

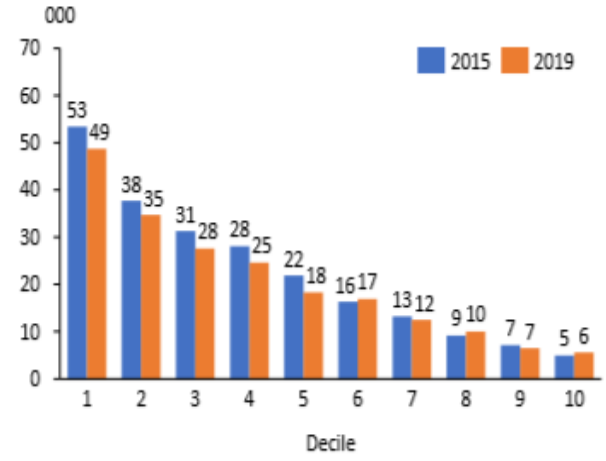


Figure 21. M/2 indicator by decile groups (relative value of households, %) [9]

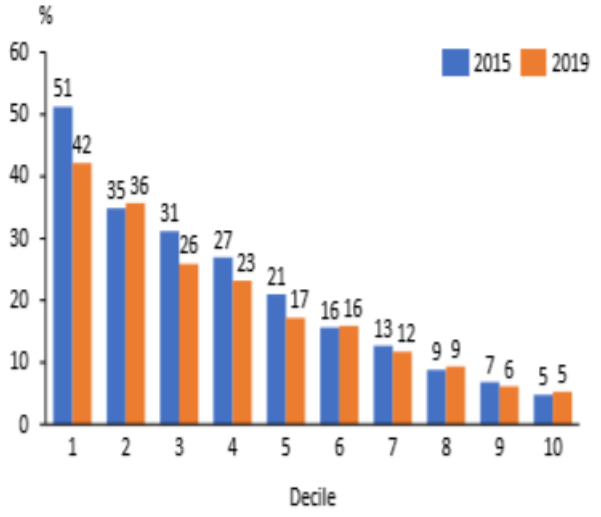


Figure 22. M/2 indicator according to decile groups (absolute value of households), thousand [9]

If there is a comparison of the indicators of Georgia with the European countries for the first decile group with the M/2 indicator, the following picture portrays a result.

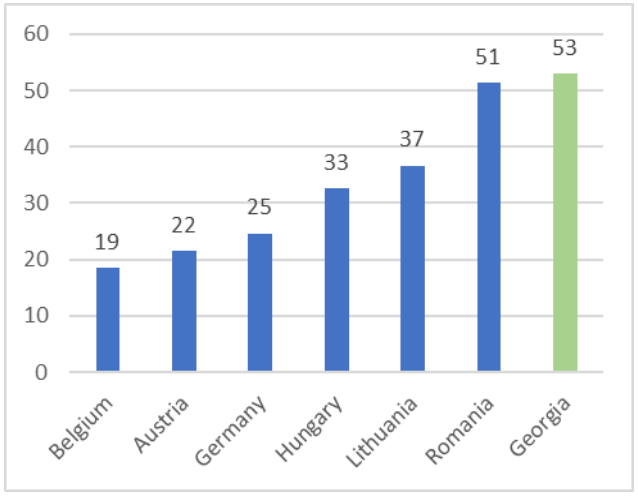


Figure 23. M/2 indicator for the first decile group, (relative share of households, %) [9],[10]

As it can be see, Georgia occupies the highest position among the countries considered according to this indicator. While in Belgium in the lowest income decile group (the first decile group) energy expenditure is twice less than the median value in 19% of households of this group, in Georgia almost three times more low income households face this problem. More specifically, 53% of the households of the first decile group spend twice less than the median value on energy resources, which may indicate improper heating of families, poor use of energy resources to reduce costs, energy poverty.

If the M/2 indicator with the indicators of other countries are compared, for the tenth decile group, it is visible that 5% of the households of the highest income group in Georgia spend twice less than the median energy costs, while in the case of Hungary this indicator is 4%, for Romania it is 3.5%, and for Austria it is 6.3 reaches %.

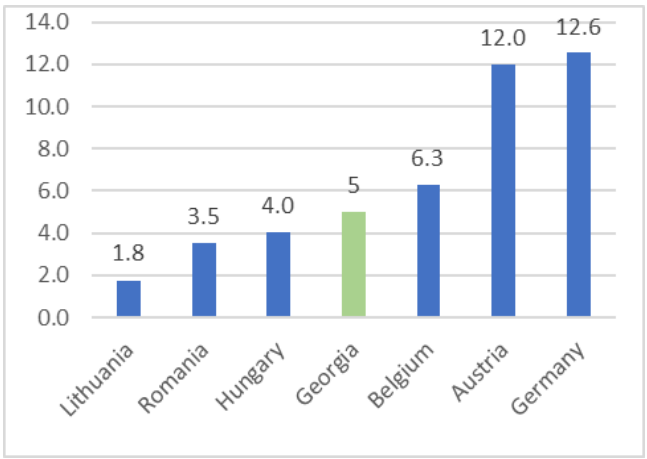


Figure 24. M/2 indicator for the tenth decile group, (relative share of households, %) [9],[10]

The next two figures, Figure 25 and Figure 26, show the median and average share of energy expenditure in household income by decile group. The data indicate that the energy burden for households in the lowest income decile group is not significantly higher than in other decile groups. According to data from both years of observation, the median share of energy expenditure in disposable income for the total population was 7%, and the average share of energy expenditure in disposable income in 2019 and 2015 was 17% and 10%, respectively.

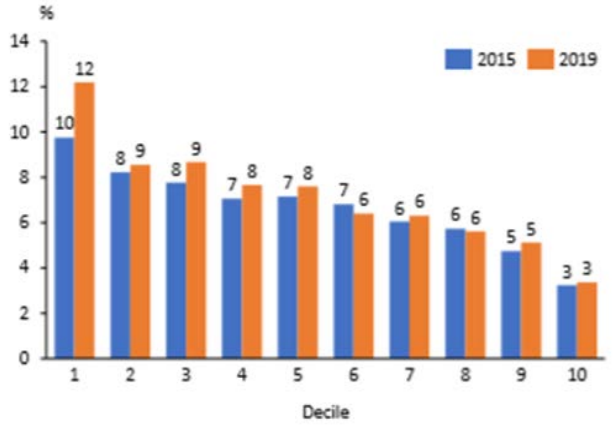


Figure 25. Median value of energy expenditure in disposable income. (according to decile groups of households, %) [9]

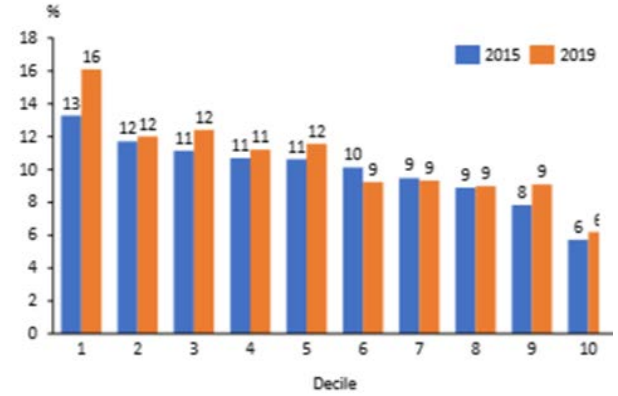


Figure 26. Average value of energy expenditure in disposable income (according to decile groups of households, %) [9]

By combining the 2M and M/2 indicators, the Secretariat of the Energy Community distinguished both types of households: those that spend excessively (due to energy inefficient houses) and those that spend less due to the lack of sufficient financial resources. Based on the survey of household incomes and expenses conducted by the National Statistical Office of Georgia, the Secretariat of the Energy Community calculated the value of the upper limit of energy-poor households for 2019, which is estimated at 24.6%. Therefore, the estimated absolute number of energy-poor households in Georgia in 2019 was 274,000 households.

Based on the obtained results, it was interesting to independently study the energy poverty in the country, which is why from February 16, 2024 to April 16, 2024, the research team conducted a study of the availability of electricity and natural gas in Georgia. The mentioned research was financed by the Shota Rustaveli National Science Foundation of Georgia, and Ivane Javakhishvili Tbilisi State University was involved in the implementation of the research together with the Elizbar Eristavi Energy Training Center. The obtained data clearly represent the current situation in the country.

The research was aimed at studying the incomes of family households, comparing the electricity and natural gas expenses with the received indicators, and preparing appropriate conclusions based on the results. For this purpose, initially, five main groups of income earners were distinguished, in the context of which the analysis of average monthly incomes and expenses on energy should be done.

According to the results of the interviewees, the distribution of respondents according to income has the following form:

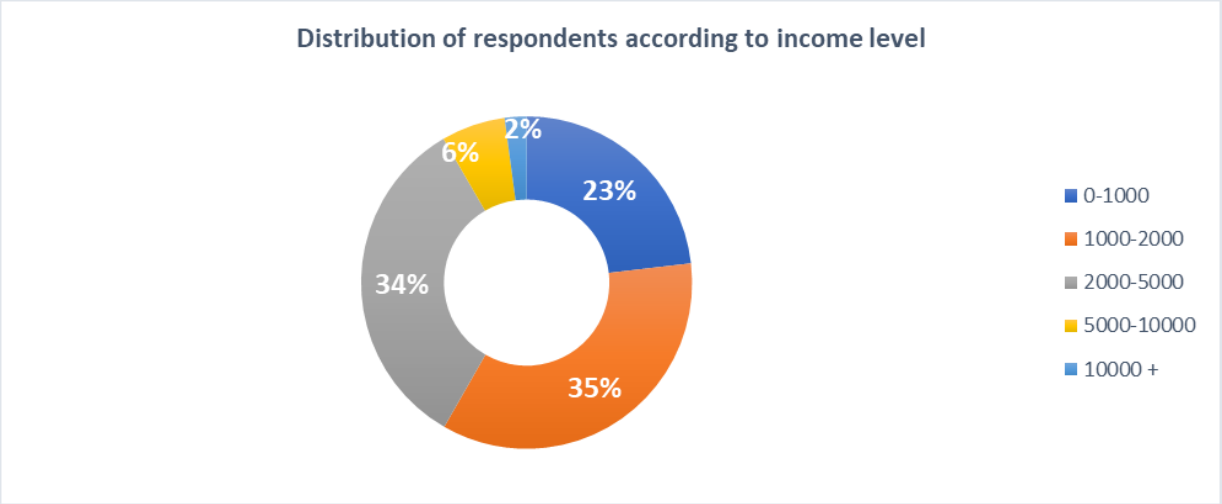


Figure 27. Distribution of respondents according to income level (GEL)

As the results show, two relatively large groups were identified with incomes between 1000-2000 GEL (35% of respondents) and 2000-5000 GEL (34% of respondents).

The average monthly income received by 23% of respondents varies up to 1000 GEL.

Respondents whose average monthly income is 5000-10000 GEL (6% of respondents) or more than 10000 GEL (2% of respondents) belong to the smallest groups.

The next stage of the research was aimed at studying the level of expenditure on electricity and natural gas for the mentioned income groups.

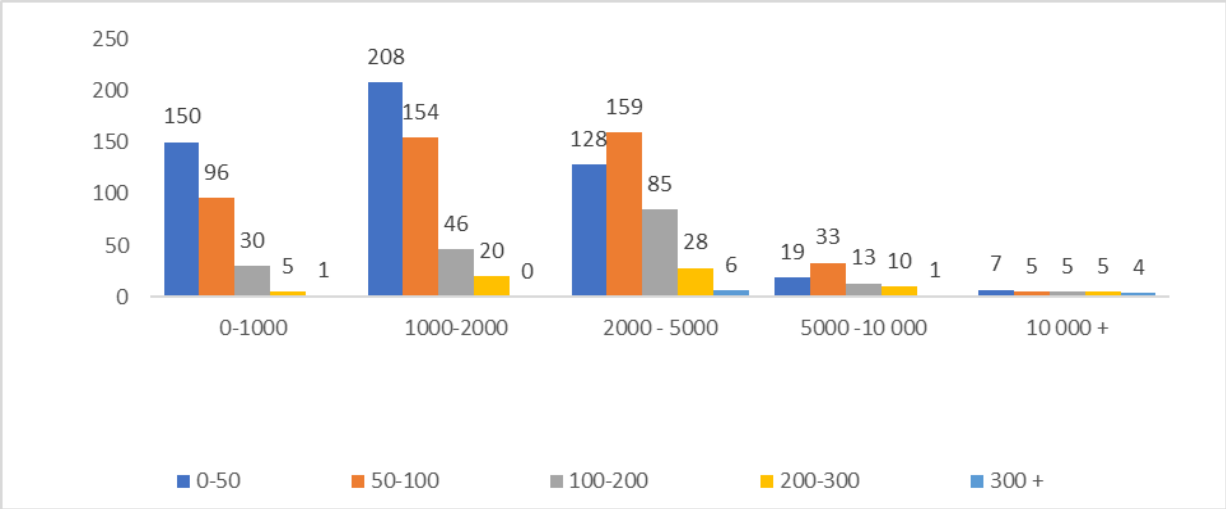


Figure 28. Distribution of respondents according to income and expenses for electricity during the winter season (GEL)

According to the figure , it can be concluded that the electricity expenses incurred by persons with a family income of up to 1000 GEL during the winter season mostly ranges from 0-50 GEL, this figure is recorded by 53% of the respondents of the mentioned group. The second important group in this category of income is the group with electricity expenses from 50 GEL to 100 GEL, whose share in this category reaches 34%. Almost similar results are presented in the category of respondents with family income between 1000 and 2000 GEL. In this case, 49% of the interviewees report the average monthly electricity expenses from 0-50 GEL during the winter season, and 36% of the interviewees indicated the expenses from 50 to 100 GEL.

As the research shows, the specific share of expenses from 50 GEL to 100 GEL occupies the first place in the cases of the following category of income. As a result of the research, it can be concluded that along with the increase in income, the importance of spending on energy in the winter season also increases.

Along with the expenses incurred on electricity, the amount of expenses incurred on natural gas during the month of the winter season was analyzed. It should be noted that in the case of any category of income, the expenses incurred by households on natural gas almost always range from 100 to 200 GEL.

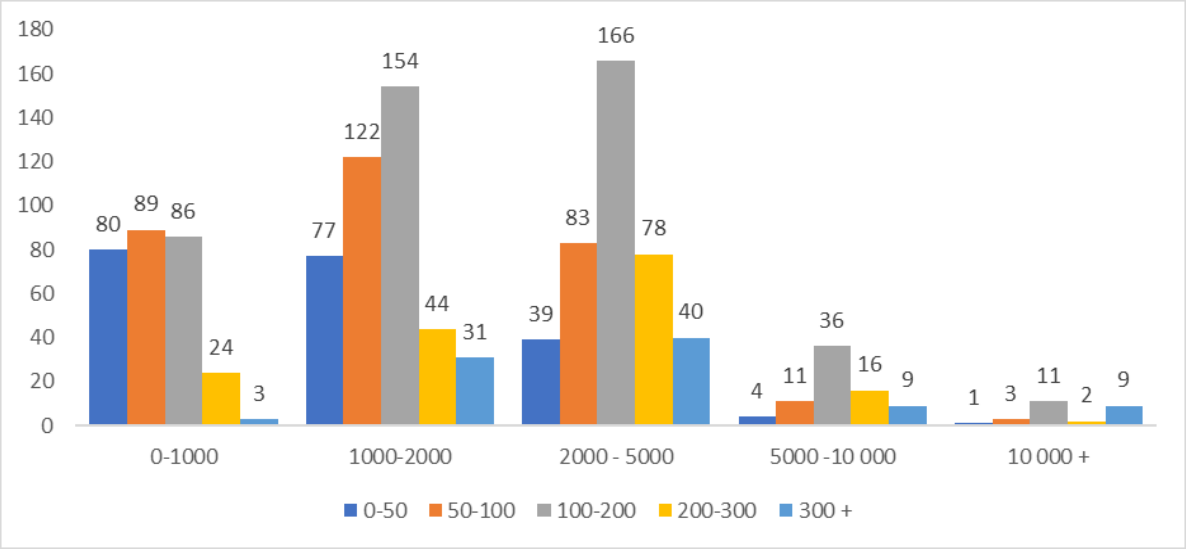


Figure 29. Distribution of respondents according to incomes and expenditures on natural gas during the winter season (GEL)

As the figure shows, with the increase in income, the specific share of respondents with expenses of more than 300 GEL for natural gas increases significantly.

This result will be seen more clearly if the obtained results are measured in relative indicators.

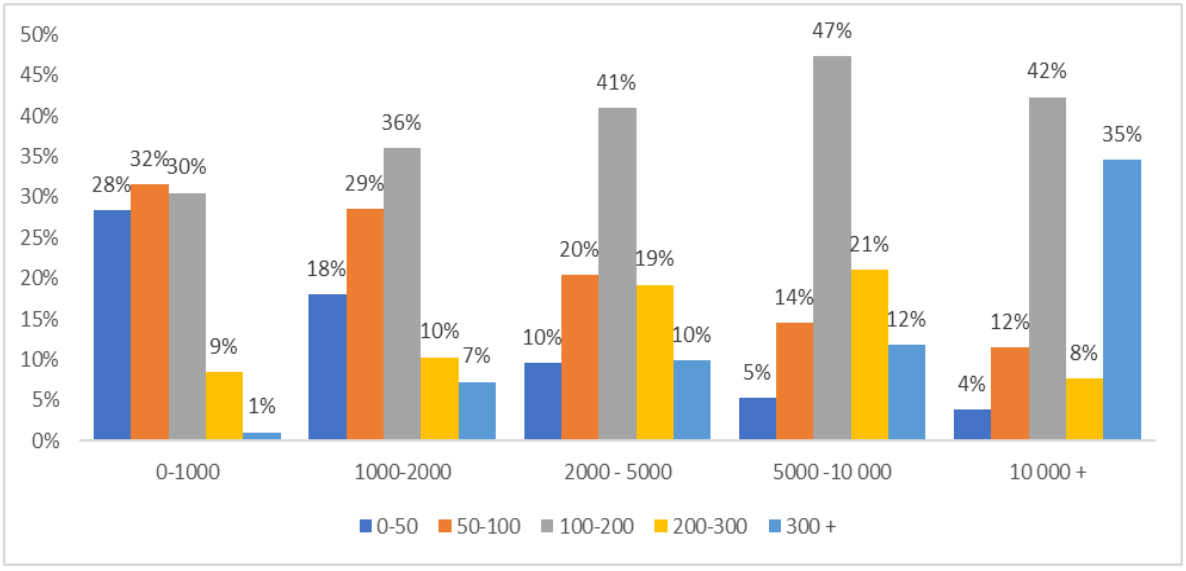


Figure 30. Distribution of respondents according to incomes and expenditures on natural gas during the winter season (%)

As it can be seen, with the increase in income, the specific share of the group spending more than 300 GEL on natural gas in the winter season increases from 1% to 35%.

High costs for natural gas were anticipated, as according to the World Bank, natural gas remains one of the primary sources of heating in Georgia, accounting for 45% of heating consumption in 2021 [11]. Such a high value of natural gas expenses in the winter season is determined by the high rate of use of this energy for heating.

It can be assumed that with the increase in income, the volume of residential space of households increases, the frequency of saving natural gas in order to reduce costs decreases, which ultimately leads to an increase in costs.

In the process of studying energy poverty, the interest was on in identifying the problems of households related to electricity costs. To achieve this goal, the respondents were asked about the existence of such a situation when due to high costs they were forced to reduce their electricity costs.

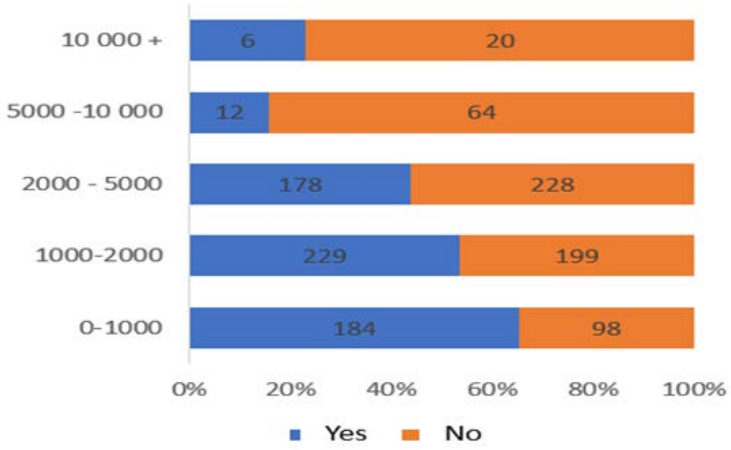
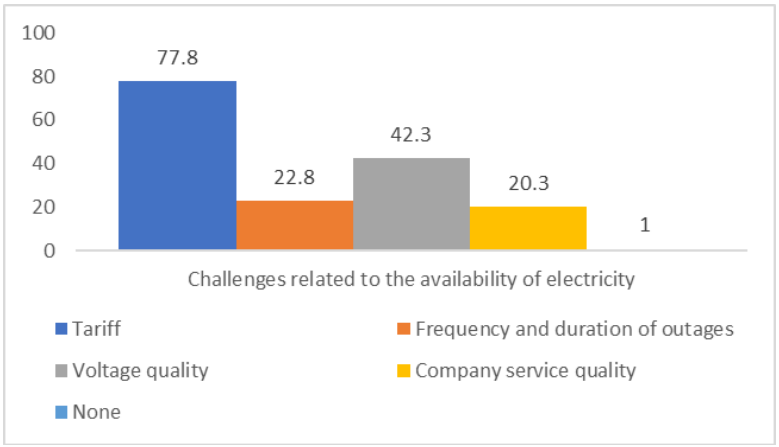


Figure 31. Reduction in electricity consumption by income category due to cost-related issues (man)

As it turns out, in the case of any income category, households have faced a similar dilemma at least once. Of course, the number of respondents who decide to reduce energy consumption due to high costs is higher in low-income groups. Along with the increase in income, their specific share also decreases.

As it turns out from the research, first of all, in order to reduce costs, the respondents turn to the purchase of energy-saving lamps, 786 respondents state this answer. The second group of interviewees (598 respondents) starts to reduce energy use in order to reduce costs, and the third place is the purchase of energy-saving equipment (391 respondents).

(a)



(b)

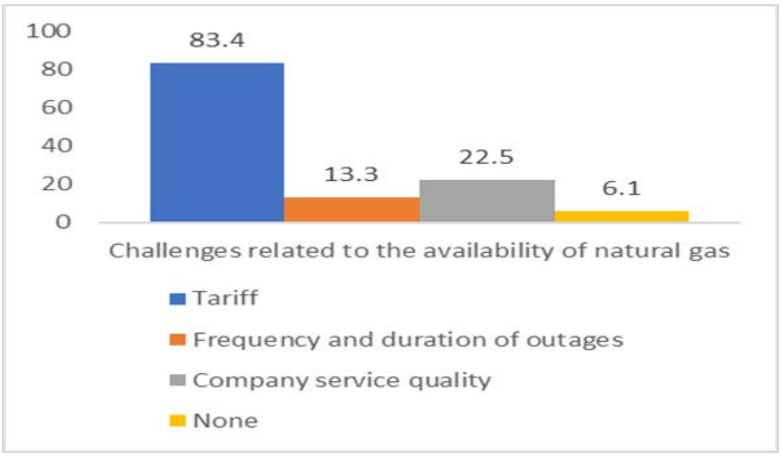


Figure 32. (a) Analysis of challenges related to the availability of electricity (%), (b) Analysis of challenges related to the availability of a natural gas (%)

According to the research, about 11% of the respondents have used different types of help in connection with the payment of electricity bills, such as: tax subsidy by the state, help from the municipality, tax distribution and asking for help from a neighbor/relative. Government subsidy programs can help mitigate these disparities and improve energy access.

As it was found based on previous studies, the energy tax in Georgia was not very high compared to European countries, although the low level of income compared to European countries led to a relatively high share of energy costs in income. The same result is confirmed by the research. Of the 1,218 respondents surveyed, 77.8% believe that the electricity tariff is one of the most important challenges they face regarding the availability of electricity, compared to 83.4% for natural gas.

The respondents name voltage quality as the second important problem in the field of electricity consumption, 42.3% of the respondents support this opinion, 22.8% of the respondents see difficulties regarding the frequency and duration of interruptions, and 20.3% see problems in the company's service quality. In the case of natural gas, according to 22.5% of the respondents, there are challenges in terms of the companies' services, only 13.3% of the respondents indicate problems related to the frequency and duration of interruptions.

4. Conclusion

The research conducted on household incomes and energy costs in Georgia provides important information about the economic well-being of the population and the availability of essential services. Over the five-year period from 2018 to 2022, the average monthly income per household in Georgia shows an increasing trend, indicating a potential improvement in living standards. The growth trend is also observed in the expenditure on energy. However, due to the growth of a higher proportion of incomes, the share of energy expenditure in incomes is characterized by a decreasing trend over time. This situation may indicate a certain level of affordability and financial stability in Georgian households.

A comparative analysis with European countries shows a significant difference between the shares of energy expenditure in disposable income.

While in the considered countries this indicator ranges from 3-5%, in Georgia it reaches 10%, which is mainly due to the low level of income received by households. In this regard, positive changes can be observed from 2020, when the share of energy costs in disposable income starts to decrease.

The analysis of the M2 and M/2 indicators and the comparison of the indicators of Georgia with European countries provide very interesting results.

As the research shows, the problem of excessive energy expenditure is particularly acute in the first group of low-income households. Significant differences between Georgia and European countries are also revealed when studying the last decile group. While 10% of households with the highest income in Georgia spend twice more than the median value in energy resources, in the considered countries this indicator ranges up to 5%. As for the M/2 indicator, as the research shows, more than half of households in the first decile group spend twice less than the median value on energy resources, which may indicate improper heating of families, poor use of energy resources to reduce costs, and energy poverty in these groups.

To solve the mentioned challenges, it is necessary to:

- Implement policies aimed at improving energy efficiency, targeted support for socially vulnerable families, and increasing access to modern energy services.
- Develop energy efficiency programs aimed at teaching families how to use energy efficiently, increasing public awareness and, as a result, reducing their utility bills.
- Invest in infrastructure development to improve energy availability and reliability, particularly in rural areas, ensuring equitable access to basic services.
- Continuous monitoring to identify trends in household income and energy expenditure, assess policy effectiveness and target interventions where they are most needed, such as low-income population groups.

Acknowledgements

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