Funded by
the European Union

weg
World Experience for Georgia

Understanding Energy Poverty in Georgia

Tutana Kvaratskhelia

Ute Dubois

Understanding Energy Poverty in Georgia

Tutana Kvaratskhelia **Ute Dubois**

Tbilisi, Georgia 2023

Funded by
the European Union

Understanding Energy Poverty in Georgia

Authors:

Tutana Kvaratskhelia

World Experience for Georgia
Tbilisi, Georgia

Ute Dubois

ISG International Business School,
Paris, France

Editor:

Ute Dubois

ISG International Business School,
Paris, France

This publication has been produced with the assistance of the European Union.
Its contents are the sole responsibility of the authors and do not necessarily reflect the views of the European Union.

Contents

List of abbreviations

CDD: Cooling Degree Days

EPAH: Energy Poverty Advisory Hub

EWM: Excess winter mortality

HDD: Heating Degree Days

NECPs: National Energy and Climate Plans

SDGs: Sustainable Development Goals

SSA: Social Services Agency

TSA: Targeted Social Assistance

WHO: World Health Organization

List of figures

List of tables

List of boxes

Executive summary

While energy poverty analysis and policies have been developed in the EU over the last 15 years, energy poverty has not yet emerged as a policy priority in Georgia. However, as in most post-communist countries, the ingredients of energy poverty are present in Georgia, suggesting that energy poverty could affect a large part of the population: an old and energy-inefficient housing stock, a high level of socio-economic vulnerability of the population, and a large part of the population equipped with inefficient heating and cooking appliances. As a result, the energy services used by households are still inadequate. Georgian households are exposed to high energy costs and a massive problem of under-heating.

Recently, international organisations and experts have examined various issues related to energy poverty, with analyses of the energy needs of Georgian households (UNESCAP, 2021) and the social costs of under-heating (World Bank / ESMAP, 2021). The National Statistical Office of Georgia publishes data on household energy consumption, and household budget surveys have been used to make initial assessments of energy poverty (DOOR and EIHP, 2021). At the national government level, the question of appropriate measurement methods for assessing energy poverty is beginning to be discussed. However, there has been no systematic analysis to investigate the specificities of energy poverty in Georgia and to provide an overall assessment of the difficulties faced by households based on what is already known about the issue.

In this context, this study aims to provide as comprehensive an assessment of energy poverty in Georgia as possible, and to make suggestions for the future development of energy poverty assessment methodologies. This is done by looking at official data and other sources, such as reports, that are already available. Based on the current state of knowledge on energy poverty in Europe and the current frameworks developed by the European Energy Poverty Advisory Hub, the report examines three main issues: (1) the causes of energy poverty, (2) its consequences and (3) the specificities of energy poverty in the country and their implications for the development of measurement tools.

With regard to the causes of energy poverty, the main findings of this report are as follows:

- Low incomes and high levels of socio-economic vulnerability in the country contribute to a high risk of energy poverty for the population. Georgia is on a path to reduce its poverty rates, both in absolute

and relative terms. However, poverty rates remain high compared to European countries. Moreover, within Georgia there are significant differences between Tbilisi and the regions, both in terms of income and socio-economic vulnerability.

- Although there are no official measurements of the energy efficiency of dwellings, it can be assumed that energy inefficiency in housing is widespread in Georgia. Many dwellings were built during the Soviet era, when energy efficiency was not a priority because energy was available at very low cost. And until recently, there were no mandatory energy efficiency standards in Georgia.
- Many households rely on firewood and use inefficient wood-burning stoves, and those that use gas often have individual heaters. This not only leads to high levels of indoor air pollution, but also affects heating practices, resulting in underheating of homes.
- As there are significant regional differences in these factors leading to energy poverty, the report suggests that urban-rural and regional differences should be further explored.

With regard to the consequences of energy poverty, the main findings of this report are as follows:

- Few indicators are currently collected in statistical surveys to assess the impact of energy poverty. Indicators used in the EU, such as inability to keep the home adequately warm and arrears on utility bills, are not collected for the whole population.
- However, a recent GEOSTAT survey on the living conditions of children shows that the inability to keep the home adequately warm is a problem for over 20% of Georgian children, with these difficulties being higher in rural areas than in urban areas.
- Among the indicators to assess the health impacts of energy poverty, the excess winter mortality rate (EWM) can be calculated and compared with other countries. Based on data from 2015 to 2019, we found that the EWM rate for Georgia is 18.4%, with a difference between urban (19.2%) and rural areas (17.6%), placing Georgia in the range of countries with a rather high EWM (top 25% of European countries).
- Other health impacts of energy poverty relate to morbidity caused by indoor air pollution and underheating. Several sources indicate that households generally maintain the temperature of their dwelling below WHO recommended standards in winter. The impact on morbidity could not be measured directly. However, national surveys show that a large proportion of households significantly reduce their living space in winter, heating only one or two rooms.

Regarding the measurement of energy poverty, the main findings of this report are as follows.

- Due to the underheating of dwellings, expenditure-based indicators (2M and M/2) are not sufficient to assess energy poverty in Georgia. As the problem of underheating of dwellings is massive, we assume that the level of energy poverty of the Georgian population is likely to be higher than what can be measured by these expenditure-based indicators. We therefore conclude that the characteristics

of energy poverty in Georgia differ from what is generally known about energy poverty in Western Europe to such an extent that alternative approaches to measuring energy poverty need to be developed.

- Based on the currently available data, the report proposes to explore one possible approach, which would be to develop an underheating indicator. This would contribute to making visible the otherwise invisible energy poverty caused by massive underheating of dwellings.

In order to better diagnose energy poverty in Georgia, we recommend the development of a specific energy poverty measurement framework that would include information on underheating of dwellings. Other national characteristics, such as inefficient housing, burning wood in inefficient stoves, cold winter temperatures in much of the country, a predominance of individual heating systems, and a large proportion of households with low and even extremely low incomes, should be taken into account by developing analyses at the regional level and by differentiating between rural and urban areas.

1. Introduction

1.1. Background

While access to affordable and clean energy is recognised as fundamental to human development, many countries still struggle with the inability of a significant proportion of their population to secure access to adequate levels of energy services. This phenomenon, known as energy poverty, has received increasing attention in public policymaking across Europe over the last 15 years. In parallel, significant research efforts have been undertaken in many regions of the world to explore this multifaceted phenomenon. Against this background, it is timely to analyse the specificities of energy poverty in Georgia.

Georgia, like many post-communist countries, has a legacy of energy-inefficient housing, which impacts on the energy poverty of its population. A significant proportion of the housing stock was built before 1990, in a context where energy was available at very low cost. Therefore, many Georgians now live in cold homes. In rural areas, wood is still an essential fuel for heating and cooking, exposing people to indoor air pollution. The combustion of wood in inefficient stoves also has an impact on how people heat their homes: in winter, many households heat only one or two rooms of their dwelling. These elements suggest that part of the Georgian population is at risk of energy poverty.

The aim of this report is to explore the specificities of energy poverty in Georgia. Based on what is known about energy poverty, especially in Europe, the report examines the main determinants and consequences of energy poverty in the Georgian case. This report groups information from existing sources and presents data on different aspects related to the causes and consequences of energy poverty to provide a first picture of the various dimensions of energy poverty in Georgia. It also formulates recommendations on how energy poverty should be analysed in future work considering these specificities of Georgia.

1.2. Research question

This study has the following objectives:

- To propose a first conceptualisation of energy poverty in Georgia,
- To examine the determinants and consequences of energy poverty in Georgia, based on existing sources such as reports and statistical data,
- To assess the specificities of energy poverty in the Georgian context,
- To propose regional analyses of energy poverty-related difficulties in Georgia,
- To confront what is known about energy poverty-related difficulties of the Georgian population with the approaches of energy poverty that have been developed in the literature on energy poverty, which is mostly based on analyses of Western European countries,
- To discuss the relevance for Georgia of measurement methods proposed in recent analyses for the European Union,
- To explore feasible approaches, based on existing data sources, to assess energy poverty in Georgia,
- To propose avenues for future research on energy poverty in Georgia.

These objectives have been formulated as research questions which provide the basis for this study:

- What are the determinants of energy poverty in Georgia?
- What are the consequences of energy poverty in Georgia?
- How could methods to analyse energy poverty in Georgia be adapted to better take into account the specificities of the country?

1.3. Research methods

This study is mainly based on desk research. It relies on information found in official reports, literature (both academic and grey literature), and on statistical data.

Because energy poverty is an emerging topic in Georgia, only few sources exist that explicitly address the topic of energy poverty. However, we found several sources which discuss topics that are directly related to some determinants or consequences of energy poverty. Through the combination of these sources, the study aims at drawing the first picture of the specificities of energy poverty in Georgia, including as many aspects of the problem as possible.

1.4. Structure of the study

The study starts with presenting the concept of energy poverty and the specificities of energy poverty in post-communist countries in general, and Georgia in particular. Chapter 3 describes the causes of energy poverty and provides an analysis of the main causes for which data are available in Georgia, which relate to socio-economic vulnerability on the one hand, and to the fuels used for heating and for cooking on the other hand. Chapter 4 presents the consequences of energy poverty and presents some consequences that have been analysed for Georgia. Chapter 5 discusses possible approaches for a measurement method of energy poverty that is adapted to the specificities of Georgia. The study closes with conclusions and recommendations.

2.The concept of energy poverty and the specificities of Georgia

Key findings

- To analyse energy poverty, it is necessary to take into account its multifaceted nature.
- Post-communist countries have in certain characteristics in common – in particular an energy-inefficient housing stock inherited from the communist era – which expose their populations to energy poverty.
- Whereas Georgia has implemented reforms to improve its energy infrastructure, a high proportion of its housing stock is old, and many households still use wood for heating and for cooking.

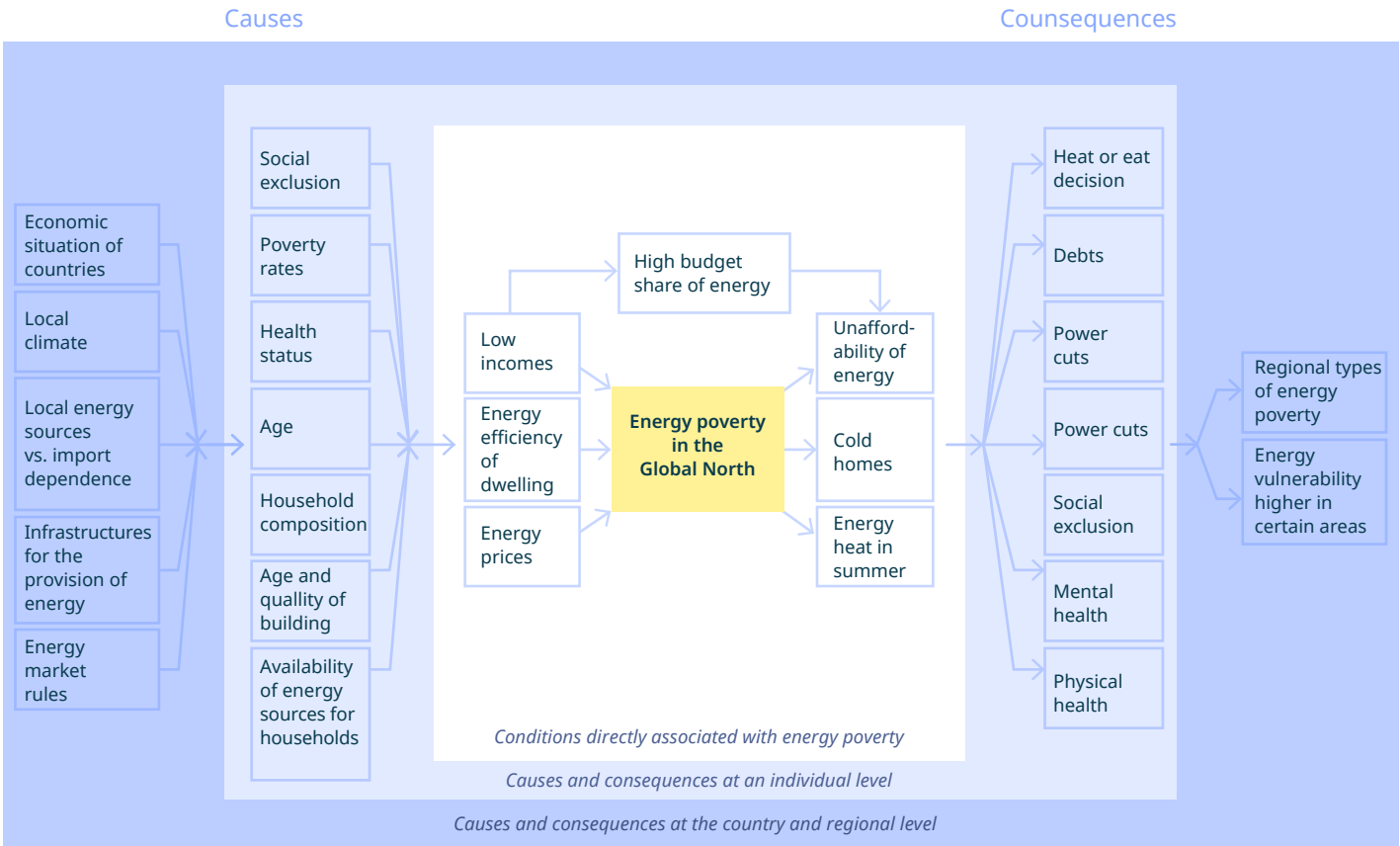
2.1. Energy poverty: a multifaceted concept

Energy poverty, defined as the inability households to secure a socially and materially required level of energy services in the home (Bouzarovski & Petrova, 2015), has gained increased attention over the past two decades in the world, for several reasons:

- For households, the importance of energy and of the services it provides in the home (from heating, cooking, lighting, to communication, through the possibility to charge a mobile phone or to use a computer) and for performing productive activities is now widely recognized.
- Lacking access of populations to energy (especially access to electricity and to clean cooking technologies) is still a problem in many parts of the world, particularly in the Global South. This is reflected in the United Nations' Sustainable Development Goals (SDGs) agreed in 2015, in which SDG7 calls for affordable, reliable, sustainable, and modern energy for all by 2030.
- In the Global North, difficulties of household to heat their homes in winter are a major problem. In the European Union, inability to adequately heat one's home is measured in European surveys.
- The liberalization of the electricity and gas sectors, which has been implemented in the EU for over two decades, raises the question of the protection of household consumers in energy markets where prices are determined by market forces. Since 2009, European law mentions energy poverty as one important concern. With the energy price crisis that started in the EU in 2021 and 2022, the urgency of the issue of energy poverty has become even more visible.
- The quality of the housing stock in many countries is still insufficient. Low energy efficiency levels result in high energy consumption to achieve sometimes poor levels of energy services (especially -heating). Therefore, improving the energy efficiency of homes is an important policy objective. However, implementing energy efficiency policies in the housing stock at a large scale is still difficult. Not only is the cost of renovations high, but there are also implementation difficulties that result in low thermal renovation rates.
- High levels of household energy consumption for poor quality energy services are also damaging the climate, as most buildings are heated with carbonized energy sources. Therefore, fighting energy poverty also contributes to the achievement of climate goals. Several EU energy and climate policies explicitly mention energy poverty and require Member States to address it. In their National Energy and Climate Plans (NECPs) the Member States assess the number of households living in energy poverty and outline adequate measures on how to address energy poverty.

Three decades of research and of development of policy measures in different regions of the world suggest that energy poverty needs to be viewed as a multidimensional issue, as shown in Figure 1. Therefore, from a policy perspective, there is no unique pathway to addressing it. Rather, approaches to address energy poverty should consider the specificities of the local context in each country, or region.

Figure 1: Causes and consequences of energy poverty in the Global North



Source:

adapted from Dubois & Sinea (2023)

In the European Union, a measurement framework has been developed for the assessment of energy poverty at the national level. It includes 21 indicators (EPAH, 2022), with a differentiation between primary and secondary indicators (EPAH, 2022). On the one hand, the primary indicators include a set of variables that can be considered as proxies of energy poverty. They include: (1) Arrears on utility bills, (2) Low absolute expenditure (M/2)[1], (3) High share of energy in income (2M) and (4) Inability to keep home adequately warm. On the other hand, the secondary indicators focus on data related to energy poverty in a larger sense. They include: the prices of different energy sources, the thermal comfort of dwellings in summer and in winter, the location of dwellings (depending on the population density), the energy label of dwellings, the energy expenses per income quintile, household equipment with air conditioning and with heating, excess winter mortality, the number of rooms per person, the poverty risk and the presence of

1. The M/2 and 2M indicators will be discussed in section 5 of this report.

leaks, damp and rot. In 2023, the EPAH has proposed a new classification of indicators which differentiates between topics: climate, facilities and housing, mobility, and socio-economic aspects (EPAH, 2023, page 6). The new indicators that have been added include climate (heating degree days and cooling degree days) and mobility (in particular the affordability of public transport). Indicators such as the number of rooms per person and the location of dwelling in certain areas have been removed.

The following sections of this report will discuss the relevance of these indicators in the case of Georgia, as well as the feasibility of measurement of these dimensions. In this report, we discuss three topics: the causes of energy poverty (Chapter 3), its consequences (Chapter 4) and measurement issues (Chapter 5).

2.2. Energy poverty in post-communist countries

Post-communist countries have in common certain challenges related to energy poverty (Jiglau et al., 2020).

Low incomes: After the collapse of the Soviet Union many countries found themselves in a prolonged economic crisis and recession. Poverty rates have increased, trust in public institutions has declined, and the size of the informal economy has grown. Despite significant progress, poverty remains high in certain areas and inequalities in incomes and in living conditions can be high within the population of certain countries. The general low-income levels put a significant proportion of the population at risk of energy poverty.

Poor energy efficiency of buildings: The energy efficiency of the buildings is an important challenge. Soviet building codes were not designed to prioritize buildings energy efficiency. Energy was cheap and the main policy of the government at that time was to meet the minimum requirements of living conditions. Inefficient construction continued after the Soviet period. As a result, most of the existing buildings in the countries are in need of renovation, especially thin-walled panel buildings. However, the opportunities to invest in measures to improve the energy efficiency of buildings are limited. This is due to both low incomes and general poverty, as well as other structural issues. Multi-unit buildings face issues with property management and condominium formation, renovating common areas, trust between neighbours, and more. There is also a low level of awareness of the benefits of energy efficiency measures.

High energy prices and poor energy supply conditions: The collapse of the Soviet Union affected the availability of energy resources. Although the energy tariffs have been kept low in most cases, the reliability and continuity of supply have deteriorated. There is a high dependency on traditional energy sources such as firewood, which is often consumed in health-damaging ways. Energy markets are not yet fully liberalized, and the transition process poses challenges to the affordability of energy.

2.3. Energy poverty in Georgia in a historical perspective

Georgian households have experienced different forms and intensities of energy poverty over the past three decades. Secession from the Soviet Union in the early 1990s was followed by economic and political crises, including Russian-provoked conflicts in different regions of the country. The energy infrastructure was deteriorated, electricity was available for only 3-4 hours per day, and most of the population relied on illegally obtained firewood to meet the basic energy needs.

While the housing stock has not undergone significant changes (almost 80% of dwellings have been built during or before the communist period), energy sector reforms implemented by successive governments over the years have resulted in significant improvements in the reliability of electricity supply, in the expansion of natural gas networks, and in the deployment of clean energy technologies.

Still, energy poverty remains a major challenge. Many households still use firewood in inefficient wood-burning stoves, leading to indoor air pollution and related health effects. Households reduce their living space in winter, heat only one room, or maintain the temperature below the standards recommended by the WHO (minimum 18° C). In some cases, safety violations in the installation of gas stoves or water heaters lead to gas leaks and human casualties; supply interruptions are still problematic in rural areas; and many other aspects of energy poverty remain hidden due to lack of research and awareness.

Energy sector reforms are still in active phase in Georgia. These reforms are mandated by the Association Agreement between the European Union (EU) and Georgia and the Energy Community Accession Protocol. Georgia is committed to aligning its energy sector with EU energy market rules. It is expected that the granting of EU candidate status to Georgia in 2023 will accelerate the transposition of EU directives into national legislation, including the Energy Poverty Framework.

Energy poverty in Georgia in 2006 and 2009: the difference between urban and rural areas

Previous analyses (Dubois et al., 2023) using data from 2006 and 2009, found that households' energy poverty manifests in an inability of households to afford heating their homes adequately warm, which affects mostly households who make end meet with great difficulty or with difficulty. The inability to pay energy bills generally appears together with inability to keep home adequately warm.

In both 2006 and 2009, severe energy poverty, defined in this paper as inability to keep home adequately warm combined with ability to make ends meet with difficulty or some difficulty, was estimated at over 55% of the Georgian population. Energy poverty was particularly high in rural areas.

The causes for higher levels of energy poverty in rural areas could not be investigated further due to limited data availability. However, it seems reasonable to assume that one cause is the difference in fuels used for heating: in rural areas, a large proportion of the population relies on wood for heating their homes, whereas in urban areas, especially in Tbilisi, more people use gas for heating.

3.Causes of Energy Poverty in Georgia

Key findings

- In Georgia, many energy vulnerability factors are present, suggesting that the country's population may face significant difficulties in terms of energy poverty.
- Most indicators used for energy poverty monitoring in the EU are not available for Georgia.
- The high use of fuelwood in Georgia justifies the inclusion of data on wood in energy poverty analysis.
- Future energy poverty analyses for Georgia should focus especially on rural households.

3.1. Overview of the causes and measurement issues

Since Boardman's seminal book on energy poverty in the UK (Boardman, 1991), a significant body of research has developed around three main factors that cause energy poverty: low incomes, poor energy efficiency of dwellings and high energy prices. As shown in Figure 1, these factors can be related to several other causes, both at the level of countries and regions and at the individual level. This section examines the state of knowledge on these three main causes of energy poverty.

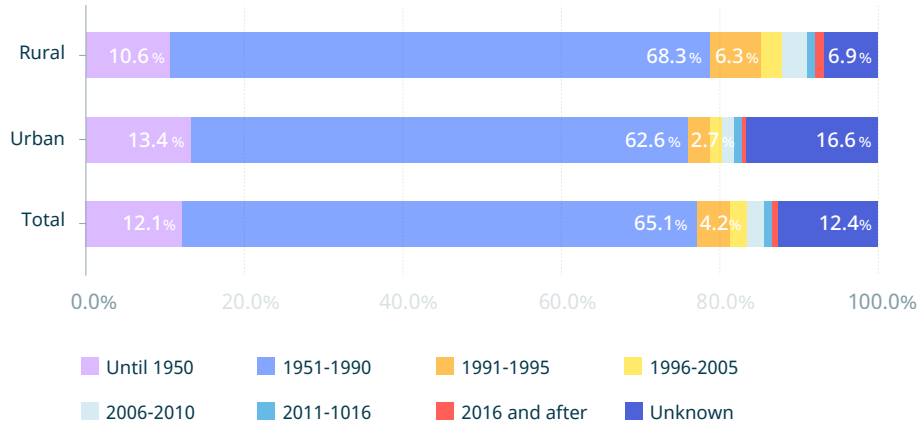
Relevance and availability of the three causes in the case of Georgia: For Georgia, two of the three indicators seem particularly relevant: low incomes and poor energy efficiency of dwellings. The inclusion of energy prices in an assessment of energy poverty is probably less of a priority in Georgia, due to low energy prices.

- **Energy prices:** The level of energy prices is a determinant of the affordability of energy sources for households. Previous research (DOOR & EIHP, 2021) has shown that energy prices in Georgia are comparatively low. Therefore, we assume in this report that the relevance of energy prices for the assessment of the risk for Georgian people to be exposed to energy poverty is lower than for the two other indicators. On the one hand, network energies (i.e., electricity and gas) are generally provided at relatively low prices: as Georgia is a transit country for gas from Azerbaijan, Georgian households benefit from comparatively low gas tariffs, which are set in an administered way, rather than through markets. On the other hand, many Georgian households, especially in rural areas, use wood for heating and for cooking. Therefore, it would be useful to include the prices of wood in the analysis of energy poverty, particularly to assess energy poverty in rural areas. This report does not include an assessment of energy prices, leaving this issue for future analysis.
- **Low incomes** and several other aspects related to socio-economic conditions of the population appear seem relevant in the Georgian case. As shown by statistical data, despite significant reductions the poverty rates over the past decade, low incomes and poverty are still important issues in Georgia (https://data.worldbank.org/). In comparison with Bulgaria and Romania, two EU countries where poverty rates are high, the share of the population exposed to poverty (measured in absolute terms) is significantly higher in Georgia:
  - In 2020, the headcount ratio of the population living with less than $6.85 a day (2017 PPP) was 58% in Georgia, versus 10% in Romania and 5% in Bulgaria.
  - In 2020, the headcount ratio of the population living with less than $3.65 a day (2017 PPP) was 6% in Georgia, versus 2% in Romania and 0% in Bulgaria.
  - In 2022, the poverty rate was 15.6% (World Bank data) and the population under below 60% of the median consumption was 19.9% (Geostat).

Energy efficiency of dwellings is one of the most important drivers of energy poverty. In Georgia energy inefficiency of dwellings is widespread. With a large proportion of buildings built during the Soviet era, i.e. when energy efficiency of buildings was not considered as an important issue because energy was available at a very low cost, Georgia is likely to have a very energy-inefficient housing stock. Figure 2, which represents the distribution of households by the year of completion of dwelling construction, shows that a vast majority of households live in dwellings completed until 1990. Until recently Georgia had no mandatory energy efficiency standards. The government introduced minimum energy performance standards for new buildings and certain categories of existing buildings in July 2023.

As there is no systematic collection of data on the actual energy efficiency of the Georgian housing stock, this information cannot be used for the assessment of energy poverty in the country. The only publicly available information relates to the share of households with different insulation measures (see Table 1).

Figure 2: Distribution of households by the year of completion of dwelling construction



Source:

Geostat (2022) Energy consumption in households 2022 (https://www.geostat.ge/media/52116/Publication_Energy-Consumption-in-Households.pdf)

Table 1: Share of households with insulated external walls, floor, ceiling, and external windows of the dwelling

	Total	Urban	Rural
External walls	4.8%	4.8%	4.7%
Floor	4.0%	3.9%	4.3%
Ceiling	5.2%	4.6%	5.8%
External windows	48.0%	55.3%	38.6%

Source:

Geostat (2022) Energy consumption in households 2022 (https://www.geostat.ge/media/52116/Publication_Energy-Consumption-in-Households.pdf)

In comparison with the EPAH indicators used for energy poverty assessments in the EU, several causal factors contributing to energy poverty cannot be adequately measured in Georgia:

- Climate: the inclusion of climate in the analysis of energy poverty causes would be useful to account for the regional variations in climatic conditions. Despite its small territory, Georgia has highly diverse climate, ranging from a subtropical climate in the West to a dry moderate continental climate. Heating and cooling requirements in buildings due to climate are measured by Heating Degree Days (HDD) and Cooling Degree Days (CDD), which are based on calculations of the difference between measured temperatures and a reference temperature. Official calculations using a reference temperature of 18°C show that HDD vary from 1500 to over 4000, suggesting, that heating needs vary widely between regions. However, the temperature threshold of 18°C for both indicators is not well suited for the assessment of heating and cooling needs. In the EU, the threshold for HDD is 15°C, whereas the threshold for CDD is 24°C. Due to lacking comparability with other international data, we have chosen not include data on climate in this study.
- The share of the population living with leaks, damp and rot is not measured in Georgia, to our knowledge.
- The share of people at risk of poverty or social exclusion: we found no data on this indicator.

Additional data would be useful to include in the causal factors leading to energy poverty in Georgia. Given the widespread use of wood for both heating and cooking, we recommend including t**he use of solid fuels for cooking and for heating.** As shown for other post-communist countries, the use of solid fuels, especially of wood, is related to a higher risk of energy poverty for different reasons.

- Fuelwood for heating is an energy source available in areas without access to networks, and therefore it can be linked to a lack of access to clean energy sources.
- Fuelwood is often used by households who cannot afford to buy other energy sources, and therefore the use of fuelwood can reveal energy affordability problems.
- The use of wood for cooking and the use of traditional (and often inefficient) equipment for cooking often causes indoor air pollution.
- The use of wood is often a coping mechanism used by vulnerable households to protect themselves from rising energy prices, disconnection and further energy deprivation (Stojilovska et al., 2023).
- Many households who use wood for heating in post-communist countries do not burn it in efficient stoves and heat each room with a separate heater. Therefore, the use of fuelwood comes along with problems of underheating of homes (heating only one room, and/or heating only a limited number of hours per day), and in certain cases with indoor air pollution.
- Whereas the use of wood for heating and for cooking can be considered both as a cause and a consequence of energy poverty, in this report, we choose to analyse it together with the causes.

3.2. Socio-economic vulnerabilities in Georgia at the national and regional level

Socio-economic vulnerabilities can be assessed with different indicators. These include poverty rates, the level of disposable income of households, as well as other factors related to unemployment, to being recipient of social assistance, and to old age. Overall, Georgia is on a path of reducing its poverty rates, both in absolute and relative terms. However, 5.5% of the Georgian population still lived with less than 2.15 $ a day in 2021, and 15.6% were below the national poverty line in 2022 (World Bank Data). In terms of unemployment, despite some progress over the past years, the unemployment rate is still high, at 17.3% in 2022 (Geostat).

Within Georgia, there are significant differences in salaries and other income sources between Tbilisi and the regions, which justifies an analysis of the socio-economic vulnerabilities at a regional level. Georgian families and households heavily rely on payments from social welfare schemes. The government's primary mechanism for supporting poor families is the Targeted Social Assistance (TSA) programme which provides cash transfers and some in-kind benefits. After old-age pensions, it is the largest social protection programme in terms of both spending and coverage. It uses a proxy means-testing procedure to identify households eligible for cash transfers and some in-kind benefits, including health insurance. Cash transfers are provided to households below the certain welfare score and the amount of cash benefit is graded based on the scores. According to the Social Services Agency (SSA) which administers the TSA programme, 20% of the households needed subsistence allowance as of February 2023. The weight of different vulnerable groups in the population of each region is given in Table 2.

Table 2: Socio-economic vulnerability factors at the regional level (2022)

	Unemployment rate	Share of population receiving old age pension	Share of population receiving cash transfers under TSA
Tbilisi	19.5%	20.1%	11.0%
Adjara AR	18.4%	16.6%	20.0%
Guria	12.3%	25.7%	26.4%
Imereti	19.4%	27.7%	18.0%
Kakheti	9.0%	23.4%	21.7%
Mtskheta-Mtianeti	8.6%	21.7%	20.3%
Racha-Lechkhumi and Kvemo Svaneti	24.9%	35.5%	53.1%

	Unemployment rate	Share of population receiving old age pension	Share of population receiving cash transfers under TSA
Samegrelo-Zemo Svaneti	11.0%	28.5%	25.3%
Samtskhe-Javakheti	12.7%	21.7%	13.2%
Shida Kartli	17.0%	21.0%	23.4%
Kvemo Kartli	22.9%	18.3%	18.1%

Sources:

National Statistics office of Georgia, Labour force indicators by regions
https://www.geostat.ge/en/modules/categories/683/Employment-Unemployment

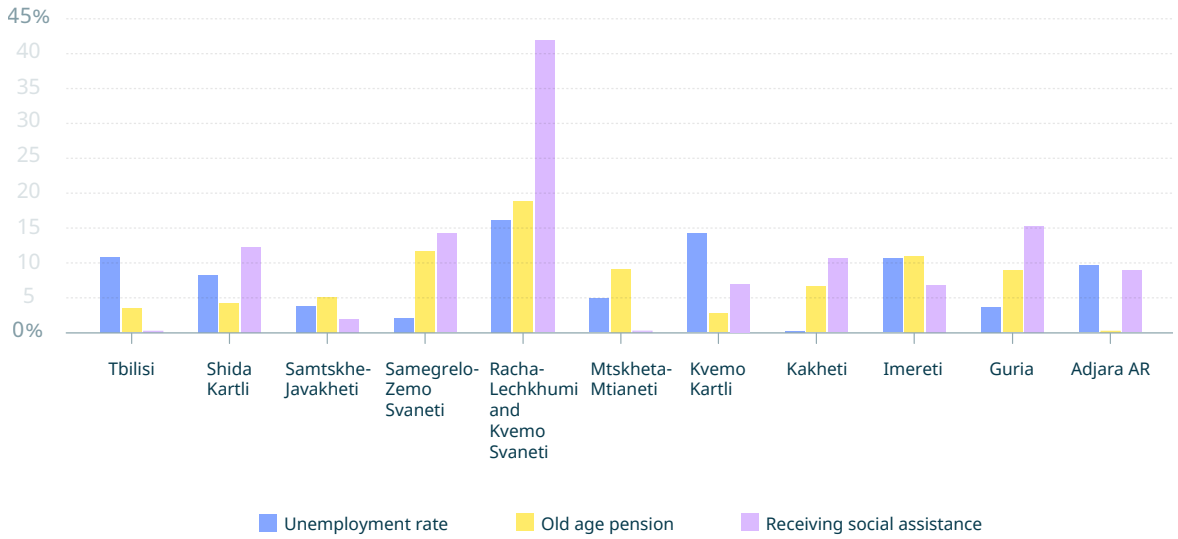
National Statistics office of Georgia, Persons receiving pension by regions
https://www.geostat.ge/en/modules/categories/55/social-protection

Social Service Agency –Targeted Sosial Assistance, database
https://ssa.moh.gov.ge/statistik.php?lang=1&id=20221207000014433342303

To provide a visual representation of the vulnerability profiles at the regional level, for each vulnerability factor we compare the proportion of the population affected in each region with the corresponding proportion in the best performing region, i.e. the region with the lowest vulnerability. This makes it possible to visualise the regions in which groups of vulnerable people are over-represented, as shown in Figure 3. When energy poverty policies are developed, this information could help decision-makers to better target their policies to help energy poor households.

Tbilisi (33% of the Georgian population) displays comparatively low social vulnerability factors. In Samtskhe-Javakheti (4% of the Georgian population), the social vulnerability factors are comparatively low as well on all dimensions. The region Racha-Lechkhumi and Kvemo Svaneti (0.8 % of the Georgian population) displays the comparatively highest socio-economic vulnerability levels, with rates of unemployed people and rates of pensioners more than 15% higher than the region with the lowest unemployment rate, and a share of beneficiaries of social assistance which is more than 40% higher than region with the lowest share of households benefitting from social assistance.

Figure 3: Regional differences in the weight of different vulnerable groups (distance to region with least vulnerability on each dimension)



Sources:

National Statistics office of Georgia, Labour force indicators by regions
https://www.geostat.ge/en/modules/categories/683/Employment-Unemployment

National Statistics office of Georgia, Persons receiving pension by regions
https://www.geostat.ge/en/modules/categories/55/social-protection

Social Service Agency –Targeted Sosial Assistance, database
https://ssa.moh.gov.ge/statistik.php?lang=1&id=20221207000014433342303

3.3. Analysis of fuels and technologies used in Georgian regions

The types of fuels households can use influence their exposure to energy poverty in several ways. Firstly, different energy sources are available at different costs and not all countries, or regions, have access to a large choice of cheap energy sources. Secondly, the types of energy sources influence energy use practices: people will not heat their homes in the same way whatever energy source they use. For example, the heating of homes (indoor temperature, time during which the dwelling is heated every day, surface of the dwelling that is heated) will differ between households who use central heating with gas, electric heating or heating with wood. Therefore, knowledge on the fuels used for heating helps to better understand the energy poverty problems households may face.

Availability of energy sources:

Georgia has almost no fossil fuel resources on its territory. The main domestic energy sources are hydropower and biomass. Hydropower represents over two thirds of electricity production; the remaining electricity being produced by gas-fired power plants. The net imports of energy represent approximately 80% of the country's total energy consumption (IEA, 2023).

Gas - Gas is the main imported energy source. Following a gas shortage organised by Russia in 2006, Georgia now purchases gas from Azerbaijan. The supply conditions of gas are influenced by the situation of Georgia as a gas transit country: households get a certain amount of gas for free in mountainous settlements. For the remainder of their gas consumption, prices are regulated and kept low. Gas is purchased at different prices according to bilateral import and transit agreements. For households and thermal power plants producing electricity, retail and wholesale prices of natural gas are significantly lower than for the commercial sector, due to the government's policy to protect consumers from high gas prices. However, it is obvious that it benefits rich families more than poor ones, who can afford less energy services. Gas is the main fuel used for heating, besides biomass, and it is used mainly in urban areas. Since gas consumption in the residential sector is increasing, keeping gas tariffs low will become an additional burden for the government.

Biomass - In rural areas, despite efforts to develop access to gas, the main energy source used for heating is biomass (essentially wood). Biomass also represents a significant share of the cooking market. The government policy is to protect rural households from extreme energy poverty by allowing them to cut down a certain number of trees in nearby forests. Since 40% of the Georgian territory is covered by forests, firewood is available in almost all regions of Georgia (except Tbilisi). Households pay a symbolic price for the cutting permit; however, collection of firewood is often done by intermediaries and the price may also include the fee for felling trees and the transportation service from the felling zone to the home (GEL 100 per m3). Nevertheless, firewood is cheaper than natural gas, and most people in rural areas rely on firewood for

heating. There is also evidence of illegal logging, a continuation of the practice of the 1990s, when firewood was the only source of energy in certain areas in addition to electricity, which was available several hours a day.

District heating - Unlike to other post-communist countries, there are no district heating networks in Georgia. Therefore, there is no collective provision of heating. Purchasing energy for heating is mostly an individual matter.

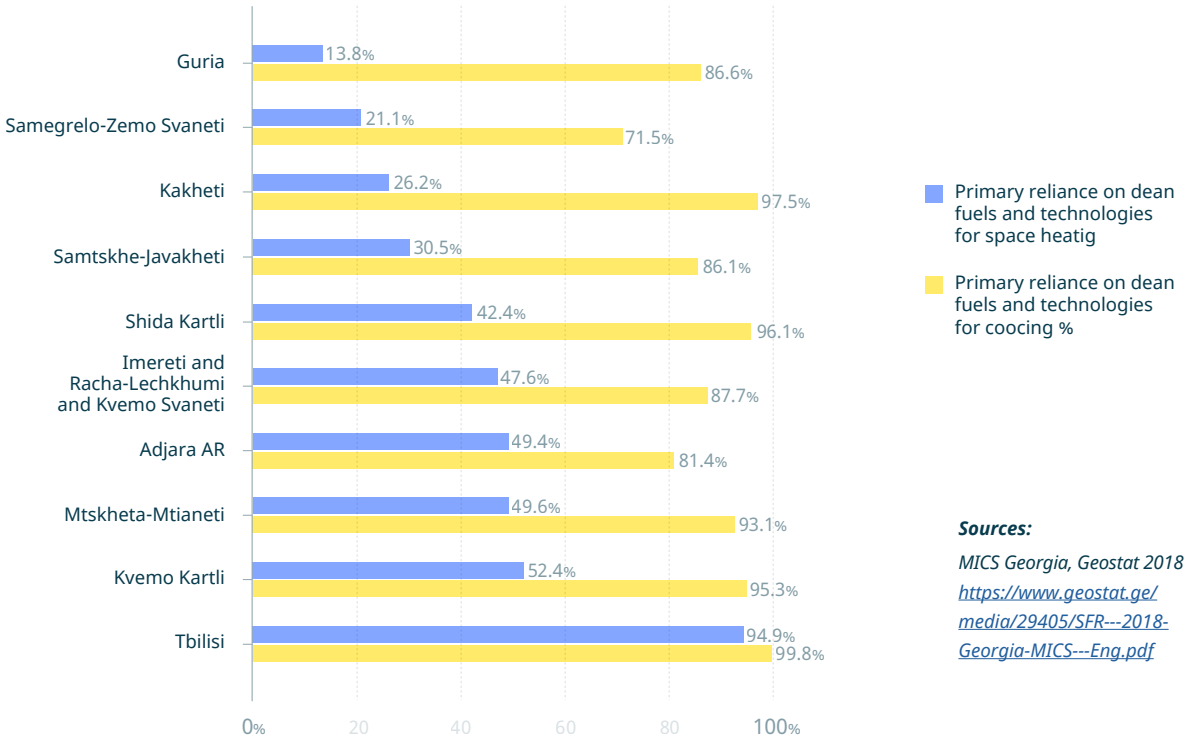
Energy consumption patterns of households

For heating, as no district heating is available, households mostly rely on individual heating facilities (81%) or on central heating system at an apartment level (25.6% in urban areas and 6% in rural areas). Natural gas and firewood are the main sources of heating. 35.4% of all households use firewood for individual heating heating, the majority of which (68.1%) are rural households (Geostat 2022).

The regional patterns in terms of fuels used for heating (Figure 4) reflect the degree of urbanisation of each region (Figure 5). In these figures clean fuels include mainly piped natural gas, and to a lesser extent electricity and liquefied petroleum gas (LPG), which is plays a marginal role for heating. Polluting fuels, on the other hand, include mainly wood, and to a marginal extent other fuels, especially waste (agricultural, animal, and wood), as well as coal and diesel oil (Geostat, 2022).

As in most Georgian regions (except Tbilisi), homes are heated with non-clean energy sources, we suggest that energy poverty analyses for Georgia investigate the impacts of using wood for heating and the effects on energy poverty of people using individual heating facilities, rather than central heating.

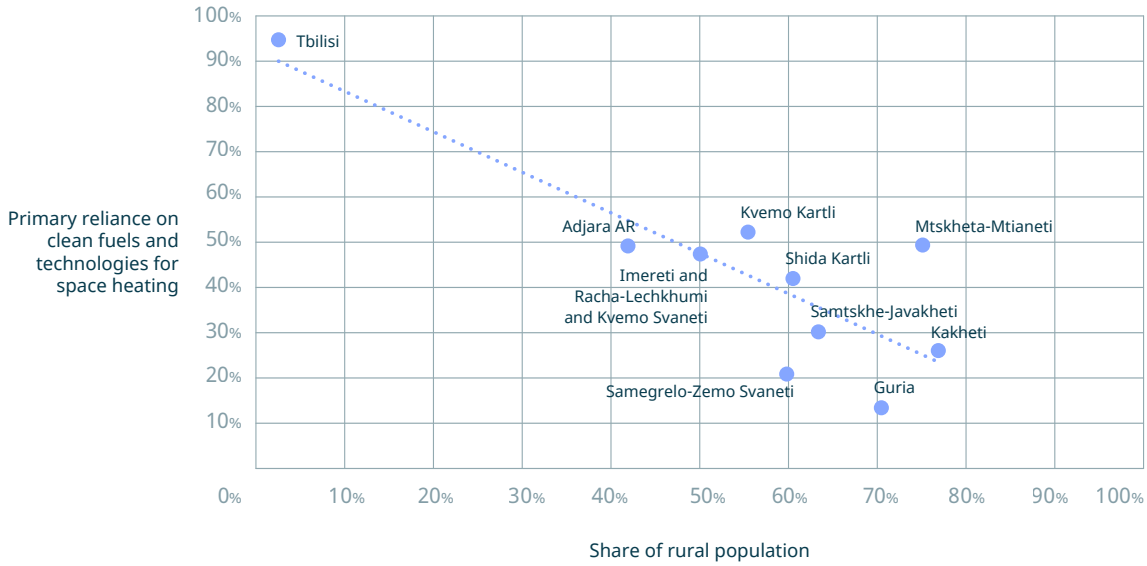
Figure 4: Primary reliance on clean fuels and technologies in Georgian household members in 2018



Sources:

MICS Georgia, Geostat 2018
https://www.geostat.ge/media/29405/SFR---2018-Georgia-MICS---Eng.pdf

Figure 5: The primary reliance on clean fuels and technologies for space heating is related to the share of rural population



Sources:

based on data from MICS Georgia, Geostat 2018
https://www.geostat.ge/media/29405/SFR---2018-Georgia-MICS---Eng.pdf
and Population - National Statistics Office of Georgia (geostat.ge)

For cooking, the recent Geostat survey (2022) shows that 88.2% of households use natural gas for cooking at cooker. The use of natural gas is again higher in urban areas (96.5%) than in rural areas (77.3%). More than one household out of five (22.1%) uses firewood and agricultural waste, 9.8% use liquid gas, and 13.0% of households cook with electricity.

4.Consequences of Energy Poverty in Georgia

Key findings

- In Georgia, there is limited data on the consequences of energy poverty.
- Some consequences, such as living in a household unable to keep home adequately warm, are assessed for children. Rural areas are significantly more affected.
- Excess winter mortality in Georgia is comparable to what has been measured for the top 25% of European countries.
- Underheating of homes is a widespread phenomenon in Georgia.

4.1. Overview of consequences and measurement issues

The consequences of energy poverty cover many aspects of people's lives. The **direct consequences** include being unable to keep home adequately warm, difficulties to pay energy bills, resulting in arrears in utility bills and debts, a lack of thermal comfort (dwelling cold in winter and/or too warm in summer), and various effects on peoples' health and well-being. Some **indirect consequences** include more general effects on people's financial difficulties, such as housing cost overburden or debts, effects on other aspects of peoples' consumption choices, such as the "heat or eat" decision, or limitations of other essential expenses (for example health expenses), housing degradation caused by damp and mould, and social exclusion (inability to invite friends or family at home). Because all the consequences, especially those which are more indirect, cannot directly be related to energy poverty – it is hard to prove that a particular difficulty has been caused by energy poverty – the assessment of the consequences of energy poverty is often based on bundles of indicators, rather than on one single indicator.

Among the **national indicators proposed by EPAH,** the consequences of energy poverty are assessed through the following indicators (see Table 3).

Table3: EPAH indicators related to the consequences of energy poverty.

Socio-economic living conditions	Health
Inability to keep home adequately warm	Causes of death
Arrears on utility bills	Excess winter mortality (EWM)
Housing cost overburden rate	Health expenses of households
Dwelling comfortably during winter time	Population reporting a chronic disease
Dwelling comfortably cool during summer time	

Sources:

EPAH (2023)

In Georgia, the range of indicators available to assess the consequences of energy poverty is limited. Many of the topics covered by the EPAH framework are not covered by public statistics. We found no data for the whole population of Georgia concerning the **socio-economic living conditions** which are affected by energy poverty. However, a statistical survey on children addresses some of these aspects (Geostat, 2023). We present the corresponding data in section 4.2. Concerning the **health effects** of energy poverty, mortality statistics allow calculations of the excess winter mortality (EWM) rate for Georgia, which is probably the aspect that can be related most directly to energy poverty. These calculations are presented in section 4.3. Finally, section 4.4. analyses the consequences of energy poverty in terms of indoor air pollution. As many Georgian households rely on fuelwood for heating, they are exposed to high levels of air pollution which has impacts on health (IEA, 2020).

Box1: Who is most vulnerable to the effects of energy poverty?

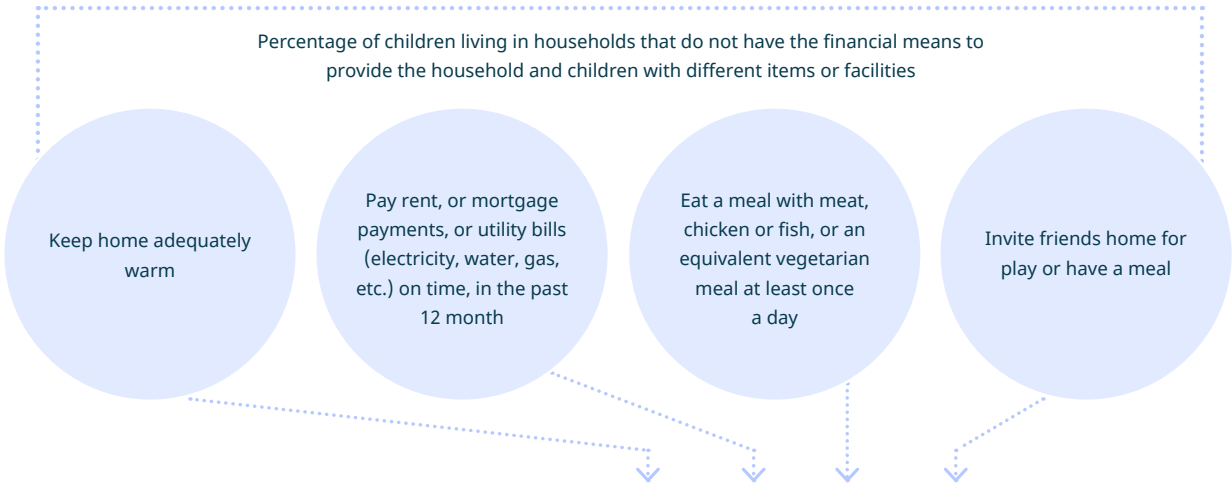
The health effects of energy poverty are particularly severe for those people who need to spend much time indoors, because they are proportionally more exposed to cold indoor temperatures and to smoke.

Some Some segments of population are also more sensitive to potentially harmful impacts of cold indoor temperatures, particularly elderly people, young children, and people with health conditions who need to stay the whole day at home. Regarding indoor air pollution, young children are particularly sensitive to the effects of smoke, which can cause severe respiratory conditions.

4.2. Socio-economic living conditions of children in Georgian regions

Data on socio-economic conditions are not available, to our knowledge, for the whole population. However, a recent survey on the living conditions of children includes information on several factors related to energy poverty. Two of these indicators are also used in EU statistics commonly used to assess energy poverty (see Table 4). Survey data for Georgia shows that inability to keep home adequately warm affects over 20% of households overall (20% of children). In rural areas, the difficulties to keep home adequately warm are more widespread (26.4%) than in urban areas (17.4%). This rate is lowest in Tbilisi (11.3%) while it goes up to 30% or more in several regions. The differences between regions are less pronounced concerning payment difficulties of rent, mortgages, or utility payments.

Table 4: Socio-economic living conditions of children potentially related to energy poverty



Total	**21,2**	**16,2**	**24,4**	**8,2**
Area				
Urban	17,6	15,0	18,2	9,4
Rural	26,4	17,8	33,1	6,4

Region				
Kakheti	24,0	22,0	22,5	9,3
Tbilisi	11,3	13,0	9,6	11,6
Shida Kartli	35,2	24,8	24,0	3,8
Kvemo Kartli	30,2	19,4	42,9	12,1
Samtskhe-Javakheti	23,1	12,2	37,0	2,7
Adjara AR	23,3	12,4	18,1	0,7
Guria	35,1	10,2	8,7	2,8
Samegrelo-Zemo Svaneti	25,4	21,3	31,2	4,4
Imereti	21,3	16,9	21,2	9,1
Mtskheta-Mtianeti	13,4	10,4	13,4	1,5
Racha-Lechkhumi and Kvemo Svaneti	28,6	5,6	0,9	0,0
Wealth index quintile				
Poorest	39,6	29,6	41,1 1	15,9
Second	25,4	18,5	30,7	7,4
Middle	15,8	13,7	25,0	11,2
Fourth	7,0	6,2	10,1	0,8
Richest	8,6	5,6	3,4	1,2

Sources:

Georgia Child Wellbeing survey (2022 data),
https://www.geostat.ge/en/single-archive/3389

Some possible indirect consequences of energy poverty are present as well. While almost one child out of four cannot eat a meal with meat, chicken or fish, or an equivalent vegetarian meal at least once a day, this rate goes up to 33.1% in rural areas. Lack of financial means to invite friends at home is reported in only 8.2% of households.

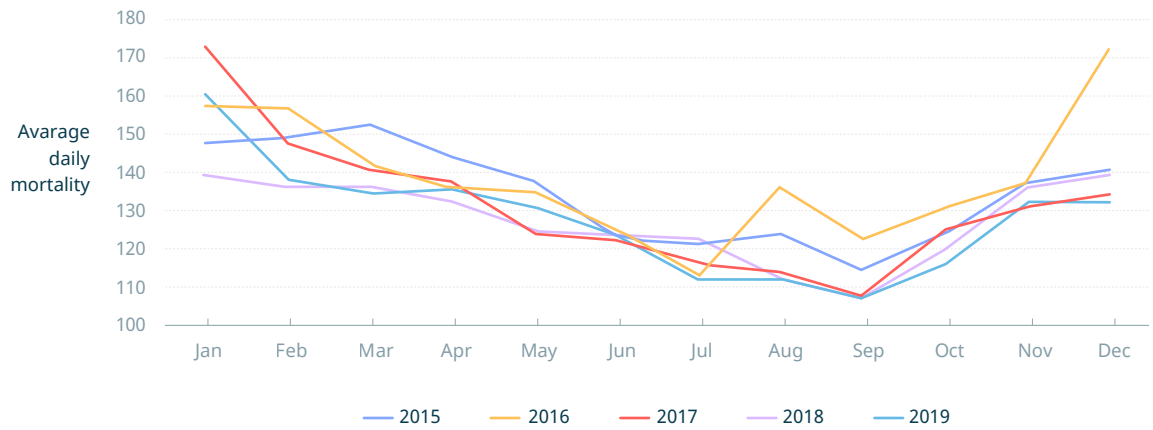
4.3. Excess winter mortality in Georgia

Excess winter mortality (EWM) is a widespread phenomenon in countries with a colder climate in winter. EWM has several causes, some of them not to being related to energy poverty, such as influenza which has a seasonal character. EWM is also a consequence of cold homes, which is one form of energy poverty (Lee et al., 2022). Cold homes (and to a lesser extent the presence of damp or mould inside the home) can result in cardiovascular and respiratory conditions. Young children, older people, or people with certain health vulnerabilities, such as cardiovascular diseases, a long-standing illness, or dementia, are more exposed to the risk of EWM. Beyond mortality, the health impacts of cold homes are higher for people who stay a significant part of the day inside their home.

The share of EWM that is attributable to energy poverty has been estimated in England, where it was considered that approximately 25% of EWM was caused by energy poverty. In France – a country with a comparatively more energy efficient housing stock – it has been estimated that mortality caused by energy poverty is lower than in England. Thus, it can be assumed that in countries with a poorly insulated housing stock, the share of EWM attributable to energy poverty could be higher than 25%.

Based on data from 2015 to 2019, we calculated an excess winter mortality rate for Georgia. Data from 2020 and 2021 were not used for this analysis because the Covid-19 pandemic results in mortality patterns that cannot be related to cold homes. Figure 6 shows the average daily mortality for each month for the years 2015 to 2019.

Figure 6: Monthly variations of mortality in Georgia (2015-2019)



Sources:

based on data provided by the National Statistics office of Georgia in March 2023

The EWM rate is calculated by comparing the mortality of the four winter months (from December to March) with the mortality of the other months of the year. The average EWM rate for the whole country (calculated for the period ranging from December 2015 to March 2019) is 18.4%, with a difference between urban (19.2%) and rural areas (17.6%).

In comparison with other countries (Liddell et al., 2016), this rate is similar to EWM rates measured for the UK for the period 1980-2013 and a bit higher than the EWM rate of Romania and Bulgaria, ranging Georgia in the countries with a rather high EWM (top 25% of European countries).

EWM could also be calculated at the level of Georgian regions. However, the limited number of years for which these data are available, and the small size of the population of some regions do not allow to draw robust conclusions from these data, which are therefore not included in the present report.

For the whole country, applying a rate of 25% to the total EWM to estimate the deaths caused by energy poverty, results in an estimation of deaths caused by energy poverty of 690 on average each year, or 4.6% of the total deaths in the country. These numbers are comparable to the estimations of deaths attributable to cold proposed by the World Bank ESMAP (2021), who estimated that the proportion of total deaths attributable to cold was between 4% and 5.11% between 2016 and 2018.

4.4. Health impacts of heating and cooking with wood and of underheating

In Georgia, in 2022, over 42% of rural households (and 6.2% of urban households) were using wood for cooking and 68% of rural households (10.5% of urban households) were using wood for heating with individual heating facilities. Therefore, the health impacts of using wood are a central aspect when it comes to analysing energy poverty in the country.

Two health impacts are related to heating with wood: (1) the impact of indoor pollution on respiratory health, and (2) the impact of underheating, which is often related to heating only a small portion of the dwelling, or to heating only a few hours a day. The corresponding health risks have been discussed in several publications of international organizations. UNESCAP (2021) mentions in particular the burden of disease caused by indoor air pollution in Georgian households. A report by ESMAP (2021) estimates the state of underheating and estimates the associated economic costs.

Box 2: The UNESCAP (2021) Working Paper "Situational Assessment for Household Energy Needs in Georgia."

Indoor air pollution

"(...) air pollution is the sixth most prevalent environmental risk factor for premature death and disability-adjusted life years in Georgia. The country holds third place in Europe for mortality rated attributed to indoor and outdoor air pollution, with approximately 100 000 die prematurely from exposure to indoor air pollution each year. The World Bank (2015) estimated that in households using solid fuels for space heating and/or cooking, indoor air pollution levels stand on average 30 times above the recommended levels (...). The high indoor air pollution is associated with 740 mortality cases per year in Georgia. The annual cost of health impacts induced by poor air quality is estimated to a reduction in the country's GDP that goes up to 4.3 per cent, compared with an alternate scenario in which clean fuels are used for household activities".

Sources:

UNESCAP (2021), pp. 14-16.

The problematic of underheating and its effects are assessed by ESMAP (2021). Concerning the underheating of homes, the report notes that Georgian households "barely meet the WHO's guidance for indoor air temperature for a healthy living environment", with temperatures that are often below 18°C. This is caused by low energy efficiency of dwellings and by relatively frugal heating practices: many households do not heat their home the whole day, and during the winter period, they tend to heat only one or two rooms, resulting in a reduction of their living space. Moreover, the problem of cold homes "disproportionately affects those people who spend most time at home, including pensioners, homemakers and disabled persons" (ESMAP, 2021, p. 57).

Concerning the estimation of the economic costs of underheating, the report differentiates between mortality and morbidity. Based on an estimation of indoor temperatures in the Georgian housing stock, the study gives an indication of the health effects of home energy efficiency improvements. On the one hand energy efficiency improvements that would increase indoor temperatures between 0.5 and 1.5°C, could prevent between 110 and 330 cold-preventable deaths each year. On the other hand, the report estimates cold temperatures to cause 1.3% of all emergency hospital admissions. With an increase of 2°C in indoor temperatures, emergency hospital admissions could decrease by 0.6%. In economic terms, "a country-wide modest energy-efficiency intervention has a 13.8% internal rate of return (IRR)", the IRR without accounting for health benefits, being estimated at 9.7%.

5. Adapting Energy Poverty measurement methods to the specificities of Georgia

Key findings

- Because they are based on energy expenses, the 2M and M/2 indicators are not well suited to assess energy poverty in Georgia, where underheating – but not necessarily overspending or low energy consumption – is a widespread phenomenon.
- Measuring the extent of underheating among the Georgian population could be a feasible method for the assessment of energy poverty.

5.1. The limited adequacy of measurement methods based on energy expenses for the assessment of energy poverty in Georgia

As suggested by analyses on the measurement of energy poverty in Europe, energy poverty cannot be assessed with a single indicator. This chapter discusses measurement approaches for Georgia taking into account the specificities of the country. We start with a discussion of two indicators that are frequently used in European energy poverty assessments, the 2M indicator and the M/2 indicator (EPAH, 2023; DOOR and EIHP, 2021).

The 2M indicator is used to assess the proportion of households whose budget share dedicated to energy expenses at home (i.e. excluding the purchase of transport fuels) is higher than twice the median share budget share dedicated to energy. It estimates **how many households are overspending on energy,** in comparison with the median household. The energy expenditures used for these calculations are the actual energy expenditures of households, an information collected in household budget surveys.

Calculations of the 2M indicator have been made for the years 2015 to 2019 (DOOR and EIHP, 2021, pp. 237-239). They show that:

- Overspending on energy affects mostly households of the first income deciles: in the first income decile, 37% of households were overspending on energy in 2015 and 47% in 2019 and in the fourth income decile the share of overspending households is 24% for both years.
- Overspending is more widespread in urban areas (27% in 2019) than in rural areas (15% in 2019)
- Overspending is very high in rented dwellings (94% of tenants are overspending in 2019).

The M/2 indicator allows to assess the number of households with a low absolute energy expenditure – which makes it slightly different from the 2M indicator which is based on budget shares. The M/2 indicator estimates how many households spend less than half the median energy expense of the population. Thus, it allows to assess **under-spending on energy, a phenomenon often qualified as "hidden" energy poverty.**

Calculations of the M/2 indicator have been made for the years 2015 to 2019 (DOOR and EIHP, 2021, pp. 237-239). They show that:

- Underspending on energy disproportionately affects households in the lowest income deciles: the share of under-spenders in the first income decile was 53% in 2015 and 49% in 2019 and in the fourth decile it was 28% in 2015 and 25% in 2019.
- Underspending is more widespread in rural areas (35% in 2019) than in urban areas (9% in 2019)

> Underspending mostly affects households who use a dwelling without payment (30% in 2019) and homeowners (20% in 2019).

Analyses on 2M and M/2 give insights into the distribution of households according to their energy expenses. Looking over-spending and under-spending is useful to assess for whom these difficulties are most prevalent. As 2M and M/2 are based on the statistical distribution of households, they essentially reveal inequalities between households. However, they have some limitations in situations where difficulties are widespread, for example when energy poverty-related difficulties are the rule, and not a problem affecting a minority of households. In Georgia, we consider that the interpretation of these indicators is not as straightforward as for Western European countries for several reasons (see Table 5).

Table 5: Specificities of Georgia which may limit the relevance of 2M and M/2

Specificities of households' energy use in Georgia	Implications for the relevance of the 2M indicator	Implications for the relevance of the M/2 indicator
Under-heating of dwellings is the rule, not the exception	Households identified by 2M can be either households with the lowest energy efficiency (need to spend a lot on energy to achieve minimum thermal comfort levels) or households who heat their homes at temperatures in line with WHO recommendations (higher income households). This risk of including the better-off households could be solved by excluding the highest income deciles from the 2M calculations. However, this requires identifying, before applying the 2M indicator, from what income decile on it can be considered that people do not suffer from underheating	Households identified by M/2 are just a fraction of those who under-consume energy.
Households who pay for electricity and for gas usually pay a higher price than households who heat and/or cook with wood	Households identified by 2M may be those households who need to purchase electricity and gas (rather than wood), i.e. mostly urban households. This raises the question of an assessment of energy poverty that would result in an identification of urban households as households over-spending energy, while the problem of energy poverty in Georgia is primarily a problem of under-heating in rural areas. In Georgia, tenants might be more affected by high energy expenses: they live mostly in urban areas, they do not have the choice of their heating equipment and cannot insulate their dwelling, therefore they are at high risk of energy expenses.	Households identified by M/2 could be either the most under-consuming households, or those who can get biomass (fuel wood or agricultural waste) for free. It cannot be entirely excluded that some under-consumers are households who live in highly efficient dwellings (but in this case, they are probably in the highest income groups).
Georgia extends over different climatic zones	Households identified by 2M may be those households who live in the coldest climate zones because they need to heat more to reach the same levels of thermal comfort.	Households who spend less on energy could be those who live in the warmest region (less need to heat).

5.2. Towards a feasible alternative approach for the assessment of energy poverty

Because the 2M and M/2 approaches are probably not sufficient to measure energy poverty in Georgia, alternative approaches to assess energy poverty should be investigated. One feasible alternative approach could consist in including underheating of homes in energy poverty analysis.

Box 3: Underheating as the limitation of heated space in dwellings

> Limitation of the heated space during the winter period is a well-known phenomenon in Georgia. A World Bank study (World Bank, 2021) estimates that whereas the average total number of rooms in the home is almost five rooms, during the winter months, households use only about two rooms on average. During the day and in the evening, the number of rooms heated is less than two rooms on average. Moreover, most homes or apartments do not have heat while everyone is sleeping at night. For rural households (typically detached homes using firewood heating stoves), the average indoor air temperature only reaches 18 and 19°C for about six hours a day.

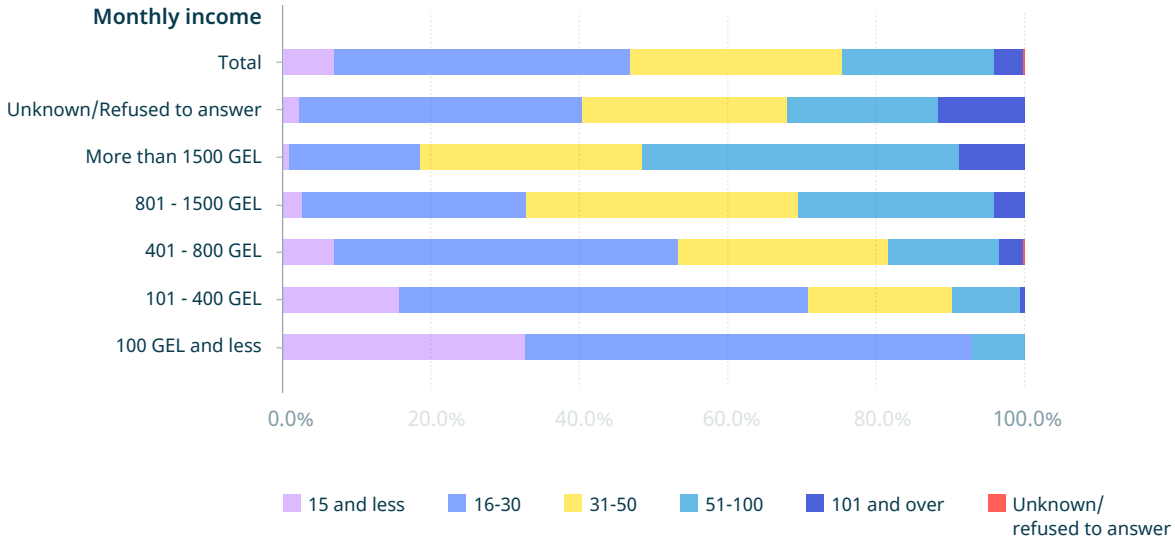
Sources:

World Bank (2021).

The practice of underheating is confirmed by the National Statistics Office of Georgia. While the total area of dwellings is rather large – 46% have a surface between 51 m² and 100 m² and 40% have a surface of more than 100 m² – the heated surface in the winter season is much smaller. A recent survey found that 47% of rural households and 41% of urban households heat only up to 30 m2 of dwelling space (Geostat, 2022). Since many households in rural areas have five members or more (33% in 2022) one can reasonably conclude that household members are often crowded in small places during the heating season, or that they are exposed to excessively cold temperatures.

As show in Figure 7 and in Figure 8, underheating disproportionally affects households on low incomes. In urban areas, some of the poorest households indicate they do not heat their home at all. In rural areas, many households heat a surface of 15 m² or less. Crossing these data with information on household composition would allow to identify of those households where the impacts of underheating might be the most severe, causing either overcrowding of the heated area in the home or situations where people stay in cold rooms.

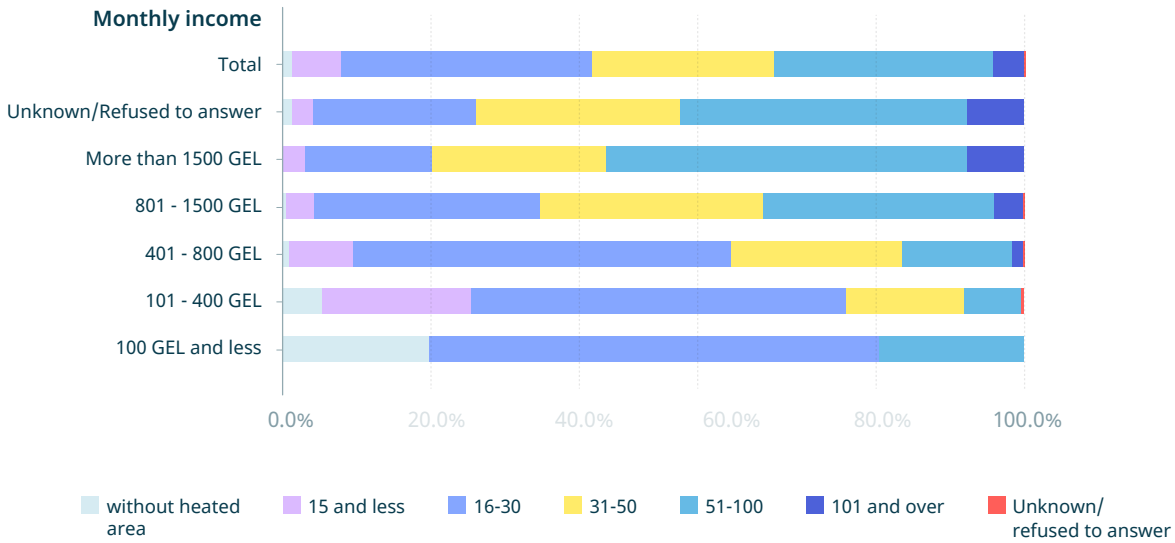
Figure 7: Heated area as a function of income – rural areas



Source: *based on data provided by the National Statistics office of Georgia in August 2023*

Note: *in 2022, the average income per household in rural areas was 1534 GEL (Source: https://www.geostat.ge/en/modules/categories/50/households-income) and the subsistence minimum for a working age male was estimated at 256,9 GEL in January 2023 (Source: https://www.geostat.ge/en/modules/categories/791/subsistence-minimum)*

Figure 8: Heated area as a function of income – urban areas



Source: *based on data provided by the National Statistics office of Georgia in August 2023*

Note: *iNote: in 2022, the average income per household in Urban areas was 1405 GEL https://www.geostat.ge/en/modules/categories/50/households-income) and the subsistence minimum for a working age male was estimated at 256,9 GEL in January 2023 (Source: https://www.geostat.ge/en/modules/categories/791/subsistence-minimum)*

6. Conclusion and policy recommendations

The combination of high levels of household vulnerability with an energy inefficient housing stock and with a high share of biomass as an energy source for heating, and to a lesser extent for cooking, makes Georgia a country where risk for the population to be exposed to energy poverty is high. This study is a preliminary assessment of energy poverty in Georgia for which we have relied on publicly available official sources and statistical data. Based on this information, it can be concluded not only that the vulnerability of the Georgian population to energy poverty is high, but also that the characteristics of energy poverty in Georgia are different from what is generally known about energy poverty in Western Europe. (1) Whereas in Western Europe, a majority of households use clean fuels and technologies for heating and cooking, in Georgia, many households still rely on biomass, especially for heating, which results in specific difficulties such as indoor air pollution, the partial heating of homes, and the limitation of heating to a limited number of hours per day for many households. (2) While in Western Europe, the increases in the cost of energy and the resulting energy burdens for households are currently much debated, in Georgia, the level of energy prices is not a central issue. On the one hand, in Western Europe, the affordability of energy in central in the debate on energy poverty because energy deprivation is often a consequence of lacking affordability. On the other hand, in Georgia, the energy poverty problematic – which has been until now less debated than in Western Europe – is shaped by a lack of de facto access to certain energy sources and by energy deprivations that are part of the households' everyday practices.

The consequences in terms of energy poverty analysis are the following. Firstly, the lack of energy services, and in particular the lack of sufficient heating, probably has major social consequences in terms of quality of life, well-being and in terms of public health. In line with research conducted in recent years on the cost of underheating and on the health impacts of indoor air pollution in Georgia, future analyses of energy poverty in Georgia should continue to investigate these consequences to better assess the social cost of energy poverty. Secondly, the importance of underheating in Georgia probably calls for the development of measurement methods of energy poverty that are better adapted to the situation of the country than indicators based on households' energy expenditures. A first stage of the development of such methods could consist in exploring more systematically the data on the (under)heating of homes.

Another finding of this study is that on the Georgian territory, there are significant regional differences in terms of energy vulnerability factors that would deserve further investigation. On the one hand, there is a considerable difference between urban and rural areas, which would deserve deeper investigation. On the other hand, different regions of Georgia have different characteristics in terms of social vulnerability factors of the populations and in terms of climate, which could be analysed in greater detail.

Because this report is based on available data, the amount of detailed information that could be used for the analysis of energy poverty was limited. To facilitate future research on the topic, more detailed statistical information should be improved, made available, or produced (including at a regional level), for example on:

- socio-demographic characteristics of the population,
- the distribution of incomes within the population,
- the characteristics of the climate in each region,
- the energy efficiency of dwellings.

Due to a lack of data, some aspects could not be discussed in the present study. The most important one relates to the low energy efficiency of dwellings. Poor energy efficiency is likely to contribute to energy poverty to a significant extent, making energy poverty a structural problem. However, as the energy performance of buildings is not measured in Georgia, it is impossible to use this information (as well as other information on the characteristics of buildings) for the assessment of energy poverty.

- Quantitative data collection should be complemented by qualitative analysis based on household interviews to explore the specificities of energy poverty in the Georgian context. We recommend that research organizations and civil society organizations conduct such studies and collect evidence on energy poverty.
- To address the challenge of diagnosing energy poverty in Georgia, we recommend the development of a specific measurement framework for energy poverty issues that takes into account the national characteristics we have identified, including inefficient housing, burning wood in inefficient wood stoves, cold winter temperatures in a large part of the country, a predominance of individual heating systems, and a large proportion of households with low and even extremely low incomes.
- In addition to an energy poverty diagnosis, it is important to introduce measures to address energy poverty. The Georgian government should invest in long-term measures to support energy-poor households and not limit itself to tariff subsidies and energy vouchers. While this type of support is crucial to meet the immediate energy needs of energy poor households, it does not improve energy services and does not address the root causes of energy poverty. Energy poverty in Georgia should not be viewed only as an income poverty issues. Policy debates should highlight the main structural causes of energy poverty, which are related to inadequate housing and lack of access to clean energy sources and technologies.
- We recommend the government to set up funds/mechanisms to assist households to renovate their homes, with a focus on the rural population, on mountain settlements and on households that are

dependent on firewood. These funds should also support the integration of renewables, like solar water heaters, boilers working on firewood, etc.

- Policies should be accompanied by intensive awareness-raising campaigns on the adverse health effects of fuelwood consumption and under-heating. The establishment of credible information sources where households can obtain information on energy-efficient materials and technologies, as well as advice on how to use energy more efficiently, is crucial.
- These efforts should be accompanied by capacity building within national and local governments, to ensure an effective implementation of these measures.

References

Boardman, B. (1991). Fuel poverty: from cold homes to affordable warmth. Pinter Pub Limited.

Bouzarovski, S., & Petrova, S. (2015). A global perspective on domestic energy deprivation: Overcoming the energy poverty–fuel poverty binary. Energy Research & Social Science, 10, 31-40.

DOOR, & EIHP. (2021) Study on Addressing Energy Poverty in the Energy Community Contracting Parties. Final report. Report financed by the Energy Community, December 2021.

Dubois, U., & Sinea, A. (2023). Methodological challenges in energy poverty research. International Journal of Market Research, 65(2-3), 340-358.

Dubois, U., Kvaratskhelia, T., Bartiaux, F. & Bocquier, P. (2023) War, energy poverty, and capabilities: the case of Georgia between 2006 and 2009, submitted to Energy Policy (currently under review).

EPAH. (2022) Energy poverty. National indicators. Insights for a more effective measuring. Energy Poverty Advisory Hub, October 2022. https://energy-poverty.ec.europa.eu/system/files/2023-01/EPAH_Energy%20Poverty%20National%20Indicators%20Report_0.pdf

EPAH. (2023) Energy poverty. National indicators. Uncovering new possibilities for expanded knowledge. Energy Poverty Advisory Hub, October 2023. https://energy-poverty.ec.europa.eu/system/files/2023-10/EPAH2023_2nd%20Indicators%20Report_Final_0.pdf

Geostat. (2022) Energy consumption in households. National statistics of Georgia. 2022, Tbilisi. Accessed at: https://www.geostat.ge/media/52116/Publication_Energy-Consumption-in-Households.pdf

Geostat. (2023) Child well-being in Georgia 2023. Accessed at: https://www.geostat.ge/media/52968/Child-Welfare-Survey-%28CWS%29.pdf

IEA - International Energy Agency. (2020). “Georgia 2020 Energy Policy Review.” Accessed at http://rb.gy/gbaoa

IEA – International Energy Agency. (2023), Georgia energy profile, IEA, Paris https://www.iea.org/reports/georgia-energy-profile, Licence: CC BY 4.0

Jiglau, G., Sinea, A., Dubois, U., & Biermann, P. (Eds.). (2020). Perspectives on energy poverty in post-communist Europe. Routledge.

Lee, A., Sinha, I., Boyce, T., Allen, J., Goldblatt, P. (2022). Fuel poverty, cold homes, and health inequalities. London: Institute of Health Equity, https://www.instituteofhealthequity.org/resources-reports/fuel-poverty-cold-homes-and-health-inequalities-in-the-uk/read-the-report.pdf

Liddell, C., Morris, C., Thomson, H., & Guiney, C. (2016). Excess winter deaths in 30 European countries 1980–2013: a critical review of methods. Journal of Public Health, 38(4), 806-814.

National Statistics Office of Georgia. (2022). “Energy Consumption in Households”. Accessed at https://www.geostat.ge/media/52116/Publication_Energy-Consumption-in-Households.pdf

National Statistics Office of Georgia. (2021). “Energy Balance of Georgia”. Accessed at https://www.geostat.ge/en/single-archive/3381

Stojilovska, A., Dokupilová, D., Gouveia, J. P., Bajomi, A. Z., Tirado-Herrero, S., Feldmár, N., ... & Feenstra, M. (2023). As essential as bread: Fuelwood use as a cultural practice to cope with energy poverty in Europe. Energy Research & Social Science, 97, 102987.

The World Bank. (2015). “Georgia Urban Strategy. Priority area III – Housing” / Mathema, A., Salukvadze, J., Budovitch, M (2015). Georgia Urban Strategy, Priority Area III – Housing. World Bank https://documents1.worldbank.org/curated/fr/422631533128729643/pdf/129128-31-7-2018-13-49-20-GeorgiaHousingFinalFINALComponent.pdf

UNESCAP. (2021), Situational Assessment for Household Energy Needs in Georgia, United Nations ESCAP, Energy Division, September 2021. Bangkok https://shorturl.at/jtwBQ

World Bank, ESMAP. (2021) State of underheating in Georgia and estimation of associated economic costs. Final report. March 2021. Accessed at https://elibrary.worldbank.org/doi/pdf/10.1596/35341

World Health Organization. (2018). WHO Housing and health guidelines. Accessed at https://www.who.int/publications/i/item/9789241550376