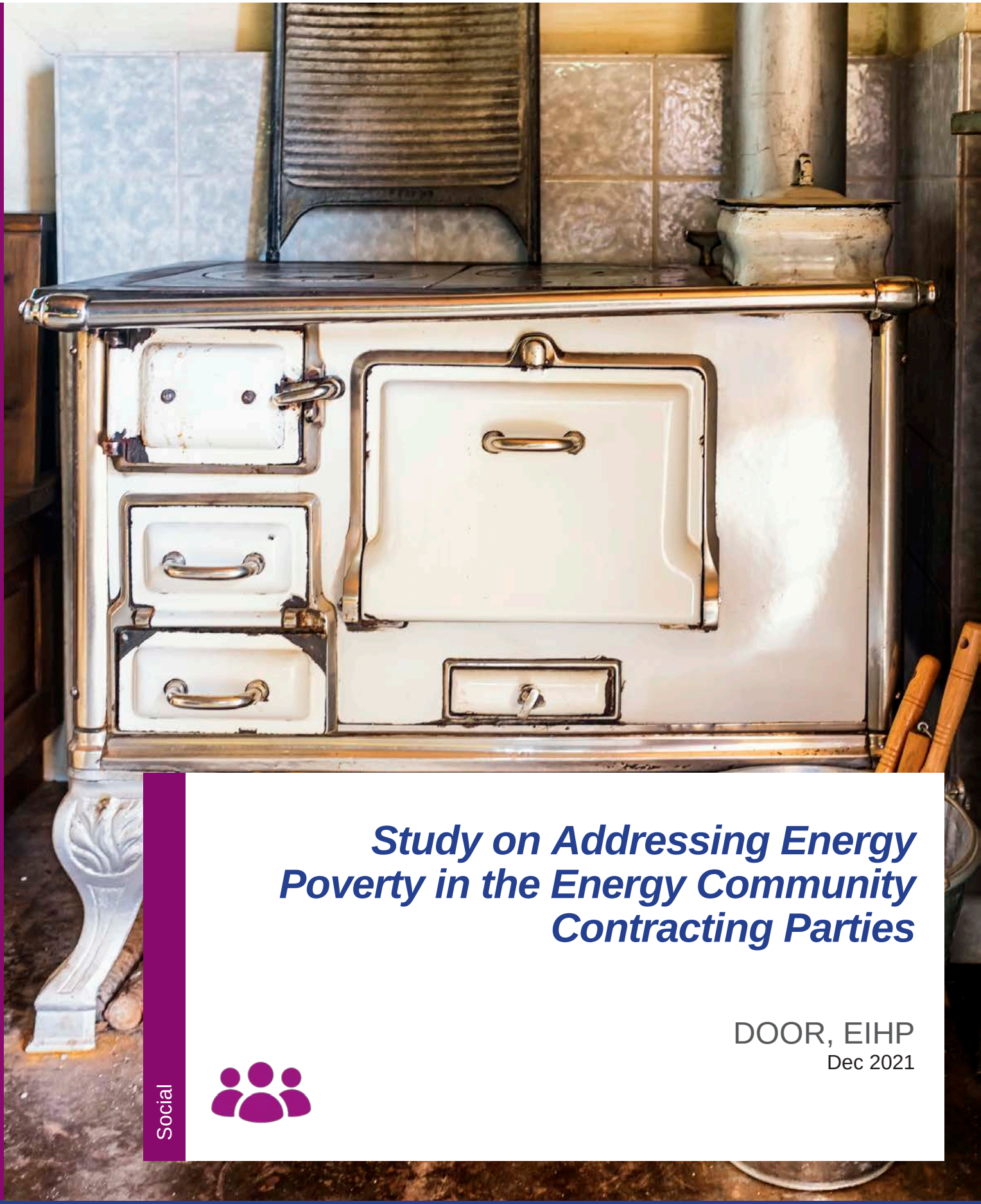
Energy Community



Study on Addressing Energy Poverty in the Energy Community Contracting Parties

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Final Report

Study on Addressing Energy Poverty in the Energy Community Contracting Parties

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List of abbreviations

Acronym	Meaning
AC	Air conditioner
AHP	Analytic hierarchy process
AL	Albania
ANRE	The National Agenci for Energy Regulation for the Republic of Moldova
ASK	Agjencia e Statistikave të Kosovës/ Kosovo Statistics Agency
BAM	Bosnian Mark (currency)
BiH	Bosnia and Herzegovina
BPMSG software	Business Performance Management Singapore
CDD	Cooling degree day
CFL	Compact fluorescent light
cm	Centimeter
Database	Unified Database of the Socially and Economically Disadvantaged (Vulnerable) Families (Georgia)
DH	District Heating
DHW	Domestic hot water
EEEA	Energy efficiency with energy advice
EEF	Energy Efficiency Funds
EnC	Energy Community
EPS	Serbian electric power
ERO	Energy Regulatory Office of Kosovo
ESCO	Energy Services Company
ESPN	European Social Policy Network
EU SILC	Survey on Living and Income Conditions
EUR	euro
GE	Georgia
GNERC	Georgian National Energy and Water Supply Regulatory Commission
HBS	Household Budget Survey
HDD	Heating degree day
HIS	Heating system improvements
INSTAT	The Institute of Statistics of Albania
kW	Kilowatt
kWh	Kilowatt hours
LED	Light Emitting Diode
LPG	Liquefied petroleum gas
LT	Low temperature
LTRS	Long-term renovation strategies
m^2	Square meter
MD	Moldova
ME	Montenegro
MFH	Multifamily house
MK	Macedonia
MKD	Macedonian denar
MoESD	Ministry of Economy and Sustainable Development
MoLHSP	Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health and Social Affairs of Georgia
MONSTAT	Statistics Office of Montenegro

NBS	National Bureau of Statistics of the Republic of Moldova
NECP	National energy and climate plan
NEEAP	National energy efficiency action plan
NEEAP	National Energy Efficiency Action Plan
PSO	Public Service Obligation
REACH	Reduce Energy Use and Change Habits
RES	Renewable energy sources
RS	Serbia
RZS	Republic of Serbia
SCOP	Seasonal Coefficient of Performance
SEE	Southeastern European
SFH	Single family house
TEP	Third Energy Package
TRV	Thermostatic regulation valve or Thermostatic radiator valves, cos I found the later as the meaning of the abbreviation
UA	Ukraine
UAH	Ukrainian Hryvnia
VSD pump	Variable Speed Drives pump

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1. INTRODUCTION

This report seeks to address the current state of complex energy poverty challenges faced by the Energy Community Contracting Parties: Albania, Bosnia and Herzegovina, Georgia, Kosovo*[1], Moldova, Montenegro, North Macedonia, Serbia and Ukraine (hereinafter 'EnC region' or 'Contracting Parties'). One of the starting points for the report is the fact that energy poverty rates in the EnC region are among the highest in Europe, due to a combination of historical, economic, and infrastructural factors, in addition to social and energy sector reforms during the post-communist transition. The extent of energy poverty in the EnC region has been exacerbated further by the COVID-19 pandemic, leading to increased unemployment, reduced household incomes, and rising energy demand – all factors contributing to energy poverty. In the EnC region, the pandemic has caused some of the highest mortality and morbidity rates in the world, which in turn amplifies both the causes and consequences of energy poverty due to a close association between domestic energy deprivation and health.[2]

The report begins with a review of current legislative approaches to address energy poverty, highlighting differences between EU and EnC relevant regulatory provisions. The report then discusses the status of current legal and policy provisions in addressing energy poverty among Contracting Parties, before elaborating on the definition, drivers, and indicators relevant to the energy poverty issue across the EnC region.

Following, the report provides a preliminary assessment of the number of households living in energy poverty among the Contracting Parties. The assessment of the number of energy-poor households is based on the statistical data provided by the CPs and analyzed by the Consultant. Next, the report gives recommendations for implementing measures and policies to address the energy poverty issue. It provided a portfolio of measures that seem appropriate for each CPs. The measures are comprehensive and include short- and long-term measures. The last section concludes.

[1] Throughout this document, the symbol * refers to the following statement: This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Advisory Opinion on the Kosovo declaration of independence.

[2] The measure used to further explain high morbidity and mortality rates is the crude death rate. The OECD defines the crude death rate as the number of deaths occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population. Based on the Eurostat database set: Population change - Demographic balance and crude rates at national level, if comparing the average for the 27 EU member states, the percentage change between 2019 and 2020 for the death crude rate was 12%. Going forward, for the same period we can see that the percentage change for countries like North Macedonia, Albania and Serbia was much higher. In North Macedonia the change was 27%, in Albania 26% and in Serbia 16%.

2. CURRENT LEGISLATIVE FRAMEWORK IN THE EUROPEAN UNION AND ENERGY COMMUNITY CONTRACTING PARTIES

2.1 Review of relevant regulation concerning the issue of energy vulnerability and energy poverty in the European Union and Energy Community

Issues regarding energy vulnerability and energy poverty are covered in various energy-related legislation. One of the first instances addressing energy poverty is **Directive 2009/72/EC** of 13 July 2009 on common rules for the internal market for electricity [1]. and **Directive 2009/73/EC** of 13 July 2009 on common rules for the internal market for gas [2]. Both Directives require Member States (MS) and Contracting Parties (CP) to ensure adequate safeguards for **vulnerable consumers**. Accordingly, each MS and CP "*shall define the concept of vulnerable consumers which may refer to energy poverty and, inter alia, to the prohibition of disconnection of electricity/gas to such consumers in critical times*". Also, MS and CP "*shall take appropriate measures to protect final consumers in remote areas who are connected to the electricity/gas system.*" The legislation requires that MS and CP "*take appropriate measures, such as formulating national energy action plans, providing benefits in social security systems to ensure the necessary electricity/gas supply to vulnerable consumers, or providing for support for energy efficiency improvements, to address energy poverty where identified, including in the broader context of poverty.*" These measures should "*not impede the effective opening of the market*".

Directive 2019/944/EU of 5 June 2019 on common rules for the internal market for electricity [3] in Article 28 expands definition of **vulnerable consumers**. According to the Directive, the concept of vulnerable consumers may include "*income levels, the share of energy expenditure of disposable income, the energy efficiency of homes, critical dependence on electrical equipment for health reasons, age or other criteria*." Also, Article 29 of the Directive requires that the Member States and Contracting Parties "*establish and publish a set of criteria, which may include low income, high expenditure of disposable income on energy and poor energy efficiency*" that define **energy poverty**.

The Governance Regulation from 2018 [4] requires all Member States (MS) and Contracting Parties (CP) to develop an integrated national energy and climate plan. The Regulation (Article 3) requires that MS "*assess the number of households in **energy poverty** taking into account the necessary domestic energy services needed to guarantee basic standards of living in the relevant national context, existing social policy and other relevant policies, as well as indicative Commission guidance on relevant indicators for energy poverty*". In the same article, the Regulation stipulates that if an MS/CP has a significant number of energy poor households, the MS/CP should develop "*a national indicative objective to reduce energy poverty*". Such Member States and Contracting Parties are to "*outline in their integrated national energy and climate plans, the policies and measures, which address energy poverty, …., including social policy measures and other relevant national programs*." Finally, Article 24 requires that MS and CP include in their integrated national energy and climate progress report the following: (a) information on progress towards the national indicative objective to reduce the number of households in energy poverty; and (b) quantitative information on the number of households in energy poverty, and, where available, information on policies and measures addressing energy poverty.

Directive 2018/844 amends Directive 2010/31/EU on the energy performance of buildings [5] and in the new Article 2a details that Member States must establish a long-term renovation

strategies and outline "*relevant national actions that contribute to the alleviation of energy poverty*".[3]

The Energy Efficiency Directive 2012/27/EU [6] in Article 7 stipulates that "*within the energy efficiency obligation scheme, including …. a share of energy efficiency measures [are] to be implemented as a priority in households affected by energy poverty or in social housing*". The issue of energy poverty is further highlighted in Article 7 (11) of Directive 2018/2002 amending Directive 2012/27/EU on energy efficiency [7].

The Outline of the Social Strategy in the Energy Community [8] proposes a definition of socially vulnerable consumers and identifies certain protective measures. According to the Outline, a socially vulnerable consumer is an electricity consumer:

- using energy for supplying the consumer's permanent housing;
- not exceeding maximum energy consumption per person, i.e., in defining the level of electricity consumption per person, countries shall only consider total consumption of up to 200 kWh/month for a family with up to 4 members while also considering seasonal usage;
- belonging to the category of citizens with the lowest income, i.e., the definition of low income, besides income, also takes into consideration all available assets;
- having her or his electricity supplied through a single-phase meter with a connection not exceeding maximum power. In defining the power of a mono phase meter, Contracting Parties shall consider a power rating of up to 16 ampere.

The Outline also states that the "*definition shall not include more than a minority of the population*", and "*consumption of vulnerable consumers should be financed by social allowances*."

A socially vulnerable consumer is also a gas consumer:

- using gas for supplying the consumer's permanent housing;
- not exceeding maximum gas consumption per person, i.e., in defining the level of gas consumption per person, Contracting Parties shall only take into consideration total consumption of up to 70 cubic meters/month for a family with up to 4 members while also considering seasonal usage;
- belonging to a category of citizens with the lowest income, i.e., the definition of low income, besides income, also takes into consideration all available assets.

The document also states that support schemes offered to socially vulnerable gas consumers shall not apply if the same consumer receives benefits from the support mechanism for socially vulnerable electricity consumers.

2.2 Recommendations of the European Commission on energy poverty

The most recent addition from EU documentation on energy poverty came in the form of the European Commission Recommendation on energy poverty (**SWD(2020) 960 final**) in October 2020. The Recommendation states that *"energy poverty is a situation in which households are unable to access essential energy services, where adequate warmth, cooling, lighting, and energy to*

[3] Though Contracting Parties are obliged to implement Directive 2010/31/EU (without specific provision related to energy poverty), this should become an obligation in the course of 2022. In signing 2020 Sofia Declaration on the Green Agenda for the Western Balkans, WB6 leaders have agreed to "*Develop programmes for addressing energy poverty and financing schemes for household renovation and providing basic standards of living*".

power appliances are essential services that underpin a decent standard of living and health." These services are considered necessary as they are essential for social inclusion.

In its Recommendations, the EC further states that tackling energy poverty offers multiple benefits, including lower spending on health, reduced air pollution (by replacing heating sources that are not fit for purpose), improved comfort and wellbeing, and improved household budgets. Taken together, these benefits will directly boost economic growth and prosperity.

The just transition towards a climate-neutral EU by 2050 is the backbone of the European Green Deal which is built around the Renovation Wave. The Renovation Wave is a comprehensive initiative with the goal of encouraging structural energy renovations in the private and public sectors and aiming to decrease GHG emissions and reduce energy poverty. The Commission proposes expanding the EU Renovation Wave to the Western Balkans, as the Flagship 6 initiative under the 2020 Economic and Investment Plan for the Western Balkans.

The European Commission had also noted that the COVID-19 pandemic-triggered crisis has shown urgency in tackling energy poverty. With the increasing unemployment rates, the expectation is that the energy poverty problem will further worsen, hence the importance of achieving the Green Deal goals.

National long-term renovation strategies and other instruments aimed at achieving 2030 and 2050 targets must be directed towards protecting households and empowering vulnerable consumers by helping citizens spend less on energy bills, and providing them with healthier living conditions, as well as reducing energy poverty.

Along these lines, the European Commission thus recommends that Member States do the following:

1. Develop a systematic approach to liberalizing energy markets, sharing benefits with all segments of society, particularly those most in need.
2. Take particular account of the respective staff working document that provides guidance on energy poverty indicators as well as on defining as to what constitutes a significant number of energy poor households. Importantly, Member States should rely on guidance from the Commission in implementing and updating their current national energy and climate plans in accordance with Article 14 of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.
3. Use the indicators outlined in the Annex (of the Guidance issued by the European Commission) in their energy poverty assessments.
4. In line with Recital 60 of the recast Electricity Directive, produce integrated policy solutions as part of the energy and social policy. These should include social policy measures and energy efficiency improvements that reinforce each other, especially in housing.
5. Assess the distributional effects of energy transition, in particular, energy efficiency measures in a national context, as well as define and implement policies that address related concerns. Proper attention should be given to obstacles hindering investments in energy-efficient housing and the type of dwellings in most need of renovation, all in line with national long-term renovation strategies.
6. Develop all necessary policies to tackle energy poverty based on meaningful and accountable processes through public participation and broad stakeholder engagement.
7. Develop measures to address energy poverty that build on close cooperation between all levels of administration, enabling close cooperation between regional and local authorities on the one hand, and civil society organizations and private sector entities on the other.

8. Take full advantage of the potential to deploy Union funding programs, including cohesion policy, tackle energy poverty by analyzing the distributional effects of energy transition projects and prioritizing measures targeting vulnerable groups to ensure access to support.

3. STATUS REVIEW

3.1 Albania

3.1.1 Summary

The primary legislation (the Power Sector Act and the Natural Gas Sector Act*)* provides criteria for consideration when defining vulnerable consumers (VC). Articles 95 and 97 of the Power Sector Act and the Natural Gas Sector Act, respectively, state that the ministry in charge of social affairs, in cooperation with the ministry responsible for energy, the Ministry of Finance and in consultation with the national Energy Regulatory Authority (ERE) and stakeholders, will *draft* the criteria, and procedures for those who qualify as gaining vulnerable customers status. The Articles also define the approach to handling vulnerable consumers, which in turn is to be approved upon the decision of the Council of Ministers. The actual definition of VC has been adopted in Government Decision No. 8 from 2015.

3.1.2 Strategic documents

There are no relevant strategic documents that address the issue of energy poverty.

3.1.3 Legal and legislative framework

Legal support for protection of vulnerable consumers is based on three legislative acts: the Power Sector Act, Natural Gas Sector Act, and the Social Insurance Act. Currently, vulnerable consumers are recognized only conceptually at the primary legislation level. Government decision No. 8 from 2015 defines criteria for persons to qualify as vulnerable consumers.

3.1.3.1 Power Sector Act

The Power Sector Act (No. 7/2018), in Article 95, introduces the definition of the *vulnerable consumer*. The Act also defines that the Albanian Energy Regulatory Authority (ERE) is responsible for protecting vulnerable consumers (Article 18 (e)).

Paragraphs 1 and 2 of Article 95 state the following:

1. The ministry in charge of social affairs, in cooperation with the ministry responsible for energy, the Ministry of Finance, and in consultation with national Energy Regulatory Authority (ERE) including stakeholders, will *draft* the criteria, and procedures for those who qualify as gaining vulnerable customers status. The Articles also define the approach to handling vulnerable consumers, which in turn is to be approved upon the decision of Council of Ministers.
2. The criteria for qualifying persons as vulnerable customers shall consider the following:
    a. Customers with low income, using electricity to supply their permanent residence;
    b. Customers whose electricity consumption is connected to the single-phase grid with a maximum power of about 16 ampere;
    c. Maximum level of energy consumption per person, depending on the season;
    d. Direct support from the State Budget.

All vulnerable consumers who receive financial support from the state budget are recorded in a special register maintained by the ministry responsible for well-being (Ministry of Social Affairs) which is responsible for informing the first electricity system operator and then electricity supplier of the status of household consumers.

In addition to fulfilling conditions for obtaining status as a vulnerable consumer, the Power Sector Act, Article 96, defines the rules for delivering energy to socially vulnerable consumers. Household

consumers, who received the status of vulnerable consumer, are entitled to a universal supply service according to the provisions of the mentioned act.

3.1.3.2 Natural Gas Sector Act

The Natural Gas Sector Act (No. 102/2015), in Article 97 states that the ministry responsible for social affairs shall develop, in cooperation with the ministry responsible for energy and the Ministry of Finance, in consultation with the ERE as well as other stakeholders and entities, a detailed procedure for establishing the status of socially vulnerable consumers that will be subsequently approved by the Council of Ministers.

Paragraphs 1 – 3 of Article 97 state:

1. The ministry responsible for social affairs shall, within one year of this law entering into force, in cooperation with the ministry responsible for energy and Ministry of finance, and in consultation with the ERE and other stakeholders and entities, develop a detailed procedure for establishing the status of socially vulnerable customers. The procedure requires approved from the Council of Ministers.

2. The criteria on benefiting from vulnerable customer status shall take into consideration the following:

a) Customers with lower incomes, who use natural gas for their permanent residence.

b) Maximum level of gas consumption per person reflecting seasonal usage and total consumption of up to 30 cubic meters/month for a family with up to 4 members.

c) Manner of direct support from the state budget.

3. Household consumers receiving support from the Council of Ministers for subsidizing the gas supply service shall not be permitted to use the funds for other purposes.

If a consumer loses status as a socially vulnerable consumer, he or she will be removed from the respective register. However, data on the person remains in the register for a subsequent five-year period. Distribution system operators (DSO) maintain a register of socially vulnerable consumers.

The supply contract for vulnerable consumers expires two months after deregistering the consumer as a vulnerable consumer with the DSO.

Given that Albania does not have a gas market in place, provision for protecting gas consumers have not practical effect.

3.1.3.3 Social Insurance Act

The Social Insurance Act (10070/2009) regulates the system and organization of social protection, financing, and procedural fulfillment of social protection. Under the mentioned Act, the Republic of Albania provides social protection to citizens under the concept of social justice, establishes social protection system and enables its functioning, providing conditions and measures for social protection activities. The Albanian Government adopts the National Program for Financial Programs for Social Insurance Schemes on a yearly basis, which sets goals, priorities, and directions for the development of social protection.

3.1.3.4 Government Decision No. 8 on the protection of vulnerable groups, mitigating the effects of the abolishment of the monthly band of the consumption of the electric energy, of 300 kWh/month

To protect temporarily vulnerable households which consume up to 300 kWh per month, in 2015 the Government approved an additional subsidized cash benefit of 648 ALL (EUR5.23) per month. Those vulnerable consumers eligible for applying for the cash benefit include:

a. Families who receive financial assistance and families with members who are declared disabled by decision of the KMCAP (Application for reassessment of the disability pension measure), according to paragraph 3, Article 7 of Act No. 9355 from 2005
b. Households where a person with disabilities is head of the household and in which there are no other employed family members;
c. Heads of household who receive minimum or old-age pensions, live alone or with dependent children and have no income;
d. Heads of household who receive a disability pension and do not have family members who are employed or self-employed;
e. Households headed by a public employee with a gross monthly salary below 35,000 ALL (EUR284), and which have no other employed or self-employed family members;
f. Blind people;
g. Paraplegic and tetraplegic persons.

3.1.3.5 Energy efficiency

Legal support to low-income and vulnerable consumers is indirectly covered by other legislative acts. In 2015, the Albanian Government adopted the Energy Efficiency Act (No. 124/2015), amended in 2021 (No. 28/2021), and which sets rules and national policies to support, promote and improve energy efficiency. In 2016, the Energy Efficiency Agency was established and the Second and third National Action Plan on Energy Efficiency was approved.

The latest in a row of acts related to development of the energy sector of Albania is the Energy Performance Act of Buildings (No. 116/2016), where **low-income households** are recognized as a special category of energy users and deserving a special approach.

3.1.4 Institutional framework

The key stakeholders in the institutional framework in Albania concerning vulnerable consumers include:

- The Ministry of Infrastructure and Energy, which is responsible for implementation of energy policy and consequently for managing issues related to vulnerable consumers (Article 4 (dh) of the Natural Gas Act and Article 3 of the Power Sector Act).
- The ministry responsible for social affairs, as the main governmental body for social care and welfare, and currently this institution is the only state institution that provides support to low-income households for energy consumption costs (Article 95 (a) of Power Market Act).
- The Albanian Energy Regulatory Authority (ERE). The ERE undertakes measures ensuring that customers benefit from internal market operation promoting competition and customer protection. Furthermore, the measures guarantee high standards for the compliance of public service obligations in electricity supply and protection of vulnerable customers (Article 18 (dh) and (e), as well as Article 95 of the Power Sector Act; Article 15 (dh) and (ë), as well as Article 97 of the Natural Gas Sector Act).
- The Agency for Energy Efficiency (AEE) is a public, budgetary legal entity under the responsibility of the Ministry of Infrastructure and Energy. The AEE is responsible for improving and promoting energy efficiency throughout the energy cycle, in all economic sectors, enabling consumers to reduce their energy supply costs and reduce the negative impact on environmental pollution and climate change. Although the Agency is not directly involved in alleviating energy poverty, AEE undertakes a series of activities, such as the preparation of secondary legislation and its implementation, setting minimum requirements for energy performance in buildings, professional training on energy efficiency, issuing certificates to energy auditors and energy managers, concluding voluntary agreements.
- Although there is no energy efficiency Fund, according to the Energy Efficiency Act (No. 124/2015), the plan is to set up an energy efficiency fund as an independent organization

governed by a government-appointed board of governors or board of trustees comprising both members from the public and private sectors.

3.1.5 Current schemes in place to protect vulnerable consumers

3.1.5.1 Description

A compensation scheme for electricity consumers has been in place since 2006, in the form of a cash benefit of 640 ALL (EUR 5.17) for all those recognized as consumers in need who reach a monthly consumption threshold of 200 kWh. This measure is still in force. Prior to 2014, a lower tariff of 7.70 ALL/kWh (EUR 0.06) was charged to households for consumption up to 300 kWh per month, whereas the price of electricity increased to 13.50 ALL/kWh (EUR 0.11) for all consumption exceeding 300 kWh. About 30 percent of low-income households benefited from this social scheme. However, given that its implementation was problematic, the scheme was discontinued in favor of a unified price of 9.5 ALL (EUR 0.07) per kWh for all consumers.

After discontinuing the lower-tariff measure in 2014, the following year in 2015 the Government approved an additional subsidized cash benefit of 648 ALL (EUR 5.23) per month to protect temporarily vulnerable households which consume up to 300 kWh per month. Total cash benefits, if both measures are applied, stand at 1,288 ALL (EUR 10.40) per month (consumers that consume up to 300 kWh/month are entitled to both measures). These measures provide direct support to 213,000 households. The cost to the state budget amounts to 1.76 billion ALL (EUR 14.22 million) a year.

3.1.5.2 Assessment

Two types of financial measures at the national level are offered to vulnerable consumers (households in need) related to electricity expenses. Target groups for both measures are families receiving social assistance (social payments), disability allowance beneficiaries, old-age pensioners, paraplegics and tetraplegics, and low-income families with a monthly income below 35,000 ALL (EUR 283) per month. The measures are general, and gender is not considered.

Both measures are not expected to tackle behavioral change or small investments from beneficiaries, an approach that would increase energy efficiency, while decreasing energy consumption and subsequent greenhouse emissions from energy sources. Current measures represent short-term aid to energy-poor households and are not considered a possible solution to alleviating energy poverty. The total amount of financial support provided to applicants in the implementation interval from 2006 to today is EUR 15 million.

Table 3-1. Summary of the measure Compensation for Increases in Electricity Prices

no.	Item	Measure 1
1	Name of the measure in English	Compensation for Increases in Electricity Prices
2	Eligibility criteria	The beneficiaries entitled to energy bill subsidies are families receiving social assistance (social payments), disability allowance beneficiaries, old-age pensioners, paraplegics and tetraplegics, and low-income families with a monthly income below ALL 35,000 (EUR 283) per month from the state budget, and who achieve a monthly consumption threshold of 200 kWh.
3	Number of eligible households / individuals	213,000 people
4	Is the measure gender sensitive	No

5	Description of the measure	The compensation scheme has been in place since 2006 in the form of a cash benefit of 640 ALL (EUR 5.17) for all those recognized as consumers in need who achieve a monthly consumption threshold of 200 kWh.
6	Period during which the measure has been in force	Since 2006
7	Implementation interval	Monthly
8	Maximum amount of financial support per beneficiary in the implementation interval	ALL 640 (EUR 5.17)
9	Total amount of financial support provided to applicants in the implementation interval	ALL 874 million (EUR 7.205 million)
10	Year of incurred financial costs	2020
11	Administrative level	National level
12	Financing source	State budget
13	Energy source covered	Electricity

Table 3-2. Summary of the measure Compensation for Removal of the Protected Threshold for Energy Consumption Below 300 kWh/Month

no.	**Item:**	**Measure 2**
1	Name of the measure in English	Compensation for Removal of the Protected Threshold of Energy Consumption Below 300 kWh/month
2	Eligibility criteria	The beneficiaries entitled to energy bill subsidies are families receiving social assistance (social payments), disability allowance beneficiaries, old-age pensioners, paraplegics and tetraplegics, and low-income families with a monthly income below ALL 35,000 (EUR 283) per month from the state budget.
3	Number of eligible households / individuals	213,000 people
4	Is the measure gender sensitive	No
5	Description of the measure	Until 2014, a lower tariff of 7.70 ALL/kWh (EUR 0.06) was charged to households with a consumption below 300 kWh per month. Above this level, the tariff increased to 13.50 ALL/kWh (EUR 0.11). However, its implementation turned out to be problematic, and at the start of 2015 a single unified price of 9.50 ALL/kWh (ALL 11.40 including VAT) – EUR 0.08/kWh was set for all households. To protect vulnerable consumers, the government

		approved an additional cash benefit of ALL 648 (EUR 5.30) per month.
6	Period during which the measure has been in force	Since 2015
7	Implementation interval	Monthly
8	Maximum amount of financial support per beneficiary in the implementation interval	ALL 648 (EUR 5.30)
9	Total amount of financial support provided to applicants in the implementation interval	ALL 1.76 billion (EUR 15 million)
10	Year of incurred financial costs	2020
11	Administrative level	National level
12	Financing source	State Budget
13	Energy source covered	Electricity

3.1.6 List of analyzed legislative acts

1. Natural Gas Sector Act (No. 102/2015)
2. Power Sector Act (No. 7/2018)
3. Social Insurance Act (No. 10070/2009)

3.2 Bosnia and Herzegovina

3.2.1 Summary

Bosnia and Herzegovina (BiH) exists in line with its legal status according to international law as a state made up of two entities, the Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS). The Brčko District is under the direct jurisdiction of State Administration. Governments of both entities and Brčko District play a crucial role in setting up mechanisms for protecting vulnerable consumers. Energy prices were traditionally set by the government and kept artificially low, especially for households for welfare reasons. This approach has undergone changes in the past years.

The Bosnia and Herzegovina administration has undertaken some attempts in protecting vulnerable groups, however, the complex administrative constitution coupled with economic difficulties has led to slow adaptation of national legislation in many segments, and it is still far behind schedule. Some progress has been made regarding the protection of vulnerable energy consumers in the most recent versions of the Republika Srpska Electricity Act from 2020 and the Federation of Bosnia and Herzegovina Electricity Act from 2014. However, in both cases, relevant bylaws, programs, and regulations are yet to be established. The Brčko District Electricity Act from 2018 does not mention vulnerable consumers. However according to the State Electricity Regulatory Commission, over the past few years and including 2020, determining tariffs for end consumers from the household category was tied to implementing the **Brčko District Bosnia and Herzegovina Government Program**[4] which establishes conditions for providing subsidies to vulnerable consumers for covering a proportion of electricity costs. The scheme provides subsidies to over **30% of households in the Brčko District to cover electricity bills.**

Certain improvements in overall alignment of legislation in Bosnia and Herzegovina and its entities with the EU acquis have been made in recent years. Terms like energy vulnerable and energy protected consumer are used interchangeably in the documents and differ in meaning amongst entities, which is likely to make implementing the measures more complex. On a state level, energy poverty and energy vulnerability are recognized in the 2035 Energy Strategy; however, further improvements and a more direct approach in terms of laws and bylaws are still necessary.

The term energy poverty is still not widely used in the legal and strategic frameworks of Bosnia and Herzegovina. It is only sporadically mentioned in some strategic documents, however, no definition of the term or its applicability or its relation to the defined terms of energy vulnerable and protected consumers is given. Though not providing a strict definition of energy poverty, the new 2021-2027 Development Strategy for Federation of Bosnia and Herzegovina recognizes energy poverty as an issue that needs to be addressed and notes that energy efficiency is a key tool for eradicating energy poverty.

In terms of gas and thermal energy, Federation of Bosnia and Herzegovina and RS continue to not have an organized program or measures in place for protecting natural gas and thermal energy consumers. Nonetheless, the Sarajevo Canton introduced natural gas subsidies in 2019 to mitigate the impact of increased gas prices and maintain the same prices for end-users.

In conclusion, Federation of Bosnia and Herzegovina does not explicitly recognize the concept of the vulnerable consumer, neither in primary nor secondary legislation, while Republika Srpska provides a broad definition in its primary legislation, though exact criteria in secondary legislation are yet to be defined and wide implementation of measures remains to be done.

[4] https://www.derk.ba/ba/component/content/article/512-saoptenje-za-javnost-derk-donio-odluke-o-tarifama-za-distribuciju-i-snabdijevanje-u-brko-distriktu-bih

3.2.2 Strategic documents

3.2.2.1 Bosnia and Herzegovina Framework Energy Strategy by 2035

The Energy Strategy 2035 (OG 70/18) foresees the need to protect vulnerable energy consumers. Strategic guidelines (5.2.10) also envisage developing the *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category*. The need for setting up the program is deemed necessary as it will enable defining activities related to protection mechanisms against disconnecting vulnerable consumers from the grid and protecting consumers in remote areas. The Strategy also recognizes the need for developing the *Program for Assisting Consumers from Socially Vulnerable Categories to Pay Bills*. Instead of price regulation, the strategy aims to adopt market-oriented pricing mechanisms and deemed necessary in protecting the socially vulnerable.

A section of the Strategy (5.7.4.3) also addresses **energy poverty** in terms of building heating systems. It identifies the need to reduce energy poverty caused by the widespread use of inefficient building heating systems which are typically coupled with the inefficient and expensive use of fuelwood and coal burning furnaces. This is further exasperated due to indoor and outdoor air pollution. The Strategy notes decreasing energy poverty requires promoting district heating systems by introducing pricing reductions and expansion of the district heating networks, as well as increasing the energy efficiency of building heating systems. Despite efforts in expanding district heating systems as well as the shift to gas heating and solar systems where possible, the expectation is that fuelwood stoves will remain a primary source of heating in rural areas.

3.2.2.2 Federation of Bosnia and Herzegovina Development Strategy 2021-2027 (draft version)

The Federation of Bosnia and Herzegovina Development Strategy for the period 2021 to 2027[5] (in the process of a public debate as of March 2021) recognizes energy poverty as a problem that needs to be addressed. Chapter 2.5.9 of the Strategy dedicated to providing social support for energy transition, notes the need to plan and implement social protection programs for vulnerable consumers as a way of reducing energy poverty. Key tools in the Strategy to protect the energy vulnerable and alleviate energy poverty is the implementation of energy efficiency measures and a social action plan.

Alleviating energy poverty requires identifying energy-poor households and those at risk of energy poverty, and then provide the necessary funding for energy efficiency projects for the benefit of the energy vulnerable, such as building retrofits and heating system improvements. Special attention is given to the role of local authorities and community involvement, as well as raising awareness.

3.2.2.3 Republika Srpska Energy Sector Development Strategy 2035

The Energy Sector Development Strategy (adopted 06/2018) has the primary goal of providing an adequate quantity and ensuring the delivery of all necessary energy services, while taking into consideration the protection of **vulnerable consumers**. The second goal is to increase energy efficiency across all segments of the energy sector, especially in buildings.

3.2.2.4 Brčko District Development Strategy 2021-2027

The Brčko District Development Strategy for the period 2021-2027 (draft version, October 2020) addresses **energy poverty** in its third strategic goal titled "*Sustainable management of the natural living environment, natural and communal infrastructure resources*". Reducing energy poverty is seen as a driver of "*Green growth and clean energy accelerator*".

[5] http://fzzpr.gov.ba/bs/pages/48/16/strategija-razvoja-federacije-bih-2021-2027

3.2.3 Legal and legislative framework

3.2.3.1 The Federation of Bosnia and Herzegovina Electricity Act

The Electricity Act of the Federation of Bosnia and Herzegovina (OG 66/2013, 94/2015, 54/2019) in Article 5 covering Energy Sector Politics states that energy sector politics ensures that the Federation government will devise and adopt the *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category*. Article 13 (5) of the Act explains that the Program defines activities aimed at protecting **vulnerable consumers** while preventing the possibility of disconnecting them from the grid, and also mentions the **protection of consumers in remote areas**. The same article (6) also states that the Program for the Protection of Vulnerable Electricity Consumers in the Household Category is an integral part of the overall energy system policy, and until the policy is adopted, it forms an integral part of the Temporary Guidelines for Energy Sector Policy.

Preparation of the mentioned *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category* commenced in 2005 but was never finalized because, as explained by the responsible bodies, there was no basis for creating the document in the absence of a demographic social map. According to the Federation of Bosnia and Herzegovina government program for 2020 (p. 74), the development of this program is, nonetheless, scheduled to proceed.

In the absence of the Program, the Federation of Bosnia and Herzegovina government has adopted the *Decision on Implementation of Measures for Reducing Household Electricity Costs and Stimulating Energy Efficiency Measures*.

3.2.3.2 The Decision on Implementation of Measures for Reducing Household Electricity Costs and Stimulating Energy Efficiency Measures

The *Decision on Implementation of Measures for Reducing Household Electricity Costs and Stimulating Energy Efficiency Measures* (44/11, 8/12, 96/12, 100/13, 75/14, 101/15, 52/16, 01/2017) has been active in Federation of Bosnia and Herzegovina since 2011 and is used as a temporary measure while waiting for the *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category* to be drafted and adopted.

The Decision supports categories of electricity consumers by subsidizing below-average consumption. The consumption threshold is set to 268 kWh for consumers receiving electricity from the Bosnia and Herzegovina electrical power utility, i.e., Elektroprivreda BIH d.d. with headquarters in Sarajevo, and a threshold of 348 kWh for consumers receiving electricity from electrical power utilities belonging to HZHB -Elektroprivreda HZHB d.d. located in Mostar, with subsidies equivalent to BAM 5.5 (EUR 2.75) and BAM 7 (EUR 3.5), respectively. The following consumers are eligible for the subsidies:

- Consumers who spend their pensions up to and including the guaranteed amount (as determined and paid for by the Federal Pension and Disability Insurance Institute according to the Act on Pension and Disability Insurance of Federation of Bosnia and Herzegovina (OG 12/2018), and
- Recipients of permanent financial assistance.

The government subsidizes the necessary funding through a reallocation of profits from the above-mentioned utility companies based on the government's profit-sharing policy.

The minimum pension in February 2021 was BAM 382.18 (EUR 191.09) and the guaranteed pension was BAM 478.91 (EUR 239.45).[6]

[6] https://ww.fzmiopio.ba/index.php?option=com_content&view=category&layout=blog&id=35&Itemid=64&lang=ba

3.2.3.3 Temporary guidelines for energy sector policy

The guidelines state that the Ministry of Energy, Mining, and Industry, upon the adoption of the Energy Efficiency Act, will prepare the Energy Efficiency Action Plan and subsequently deliver it to the Federation government to protect the rights and interests of all energy sector participants and for the purpose of adopting the *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category*. Throughout the entire reform timeframe, and until the complete opening up of the energy market, all rights of energy sector actors must be protected by laws and bylaws. Bearing that in mind, the Federation will make use of Parliament, the Government, government ministries, the regulatory commission, and electricity utilities in the Federation to achieve the following:

a) Develop the *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category* in order to ensure protection of the most vulnerable consumers in the Federation throughout the duration of opening up of the electricity market;
b) Ensure that the requirements of the Third Energy Package of EU directives are transposed into primary legislation and bylaws;

According to the Temporary guidelines, the *Program for the Protection of (Socially) Vulnerable Energy Consumers Belonging to the Household Category*, is to be prepared by end of 2014, but still does not exist.

3.2.3.4 Program for Restructuring the Energy Sector

The Program for Restructuring of the Energy Sector in Federation of Bosnia and Herzegovina (2019)[7], and those already mentioned acts and guidelines, states that adoption of the Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category is one of the short-term planned activities for the Government.

3.2.3.5 Energy Efficiency Act and the Energy Efficiency Action Plan

The Energy Efficiency Act of the Federation of Bosnia and Herzegovina (OG No. 22, 24/03/2017) does not mention vulnerable consumers; however, they are mentioned in the Federation of Bosnia and Herzegovina National Energy Efficiency Action Plan (NEEAP) for 2016-2018 (OG 40/18) in the Financing Section (5.2.1.1.1) which states that one of the planned improvements in the energy taxation system (taxes and levies) in the first year is measure *FS1.1. Introduction of Levies for Electricity Consumption in Households*, however, this is to be in combination with assistance to socially vulnerable categories. The measure is to be combined with assistance for socially vulnerable households in order to ensure that price increases are done with consideration given to the potential adverse impact on vulnerable consumers. Based on annual reporting to ECS, there has been no progress in this activity.

The section titled 4.2.2 Measures for Development and Adoption of the Building Renovation Strategy in Bosnia and Herzegovina, lists Activity 2.3 *Development of the Strategy Implementation Policy*, in which the plan is to improve the legislative framework concerning incentives to social categories which in turn is aimed at improving the energy performance of residential buildings.

3.2.3.6 Ordinance on Organization and Regulation of the Gas Sector

The Federation of Bosnia and Herzegovina Ordinance on the Organization and Regulation of the Gas Sector (83/07) defines a **protected consumer** as a consumer entitled to a sufficient quantity of gas supply in the event of accidental disruption to gas supplies, as well as in the event of

[7] https://parlamentfbih.gov.ba/v2/userfiles/file/Materijali%20u%20proceduri_2019/Program%20EE%20sektor_bos.pdf

extremely low daily average air temperatures, but only if there is no available alternative source of energy supply.

3.2.3.7 Republika Srpska Electricity Act

The Electricity Act of Republika Srpska (OG 68/20) ensures alignment of this entity's legislation with the Third Energy Package of EU acquis. It **defines energy-protected consumers** in Article 111 of the Act as a **socially vulnerable end-user belonging to the household category and whose status is recognized based on obtained social welfare rights**. Powers for this approach are given to local level governments which determine a consumer's ability to qualify for protected status based on the local government's social protection responsibilities. The Act also states that energy consumers with protection rights are supplied electricity by the distributer which falls under a public service obligation, while also noting that energy consumers with protected rights are households in which a member, due to an existing health condition, according to the temporary guidelines, requires a permanent energy supply. Entitlement to the status of an energy consumer with protection rights is to be defined in the Ordinance on Requirements for Obtaining Status as an Energy Consumer with Protected Rights. The funds needed for ensuring the protected rights of particular energy consumers come from the state budget of Republika Srpska, or from some other source. The Ordinance will be defined by the Republika Srpska government based on recommendations from the Ministry of Health and Social Protection.

3.2.3.8 Other relevant information for Brčko district

The Brčko District Electricity Act (OG 27/2018) does not mention vulnerable energy consumers. The Brčko District government has adopted (2020) a program for providing financial support to socially vulnerable consumers for paying utility bills.

3.2.3.9 Subsidy for electricity, natural gas, and district heating in the Sarajevo Canton

The Sarajevo Canton has had measures for protecting vulnerable consumers since 2014. Eligible consumers must meet the following criteria:

- Total income per household member must not exceed 70 BAM/month (EUR 35).
- The monthly income of single-person pensioner households may not exceed BAM 165 (EUR 82.5).
- A two-member pensioner household with a total monthly income not exceeding BAM 220 (EUR 110).
- Households that have members who are beneficiaries of financial home care support whose total monthly income does not exceed BAM 120 (EUR 60).
- The total dwelling area for a single-person household may not be greater than 44 square meters, with an additional 10 square meters for each additional member.
- An eligible consumer must have been residing in the Sarajevo Canton for at least 12 months, any may not own and run a business, or rent out apartments.
- Exceptionally, households that have a member with a 100% disability, i.e., a quadriplegic or tetraplegic, are entitled regardless of their total income or size of dwelling area.

3.2.4 Institutional framework

As noted in the introduction to the chapter, due to the complexity of the governmental system, the jurisdiction of the institutional framework is dispersed either on a state, entity, cantonal or local level. Energy poverty and energy vulnerability are still mostly seen as issues related to energy, and are not formally tackled through social-focused strategies and legislation, hence such competences mostly belong to authorities in charge of energy issues. However, energy

vulnerability remains closely linked to social vulnerability, hence this challenge is transferred to and linked with institutions in charge of social welfare, and also the ministry of health and in the context of protected consumers. Both entities have set up energy efficiency funds to finance energy efficiency measures and organize calls for applications, as well as overseeing the results of implementation. In the future, these entities will fulfill a role as providers of energy efficiency measures for vulnerable consumers.

3.2.5 Current schemes in place to protect vulnerable consumers

3.2.5.1 Description

The current scheme in Bosnia and Herzegovina is complex, primarily due to the governmental system and the many relevant bodies, making the challenge of alleviating energy poverty even more difficult. This means that the current system does not address energy poverty and energy vulnerability systematically and thoroughly.

At the entity level, Federation of Bosnia and Herzegovina will develop and adopt the *Program for the Protection of Vulnerable Electricity Consumers Belonging to the Household Category*. Though preparation of the Program began in 2005, it is yet to be finalized. In its absence, the *Decision on Implementation of Measures for Reducing Household Electricity Costs and Stimulating Energy Efficiency Measures* will be implemented, which supports two categories of electricity consumers through the subsidization of below-average consumption, i.e., 268 kWh from Elektroprivreda BiH (EP BIH), and 348 kWh from Elektroprivreda HZHB (EP HZBH), amounting to BAM 5.5 (EUR 2.75) and BAM 7 (EUR 3.5), respectively.

The average annual number of consumers receiving this subsidy in the period from 2011 to 2019 was 67,936 and total expenditure in that period amounted to BAM 24,126,224 (EUR 12,063,112). According to the latest available information, this specific Decision has meant that two public electricity companies subsidize the consumer protection scheme (EP BiH and EP HZHB). Republika Srpska is not included in the scheme.

Republika Srpska (RS) does not apply any measures to protect those belonging to vulnerable categories given that such categories were only included in the most recent version of the Electricity Act from 2020, and the related secondary legislation does still not exist.[8]

The measure in the Sarajevo Canton for subsidization of electricity, natural gas, and district heating in 2018 was applicable to 869 consumers (1,718 in 2014, 1,514 in 2015, 1,345 in 2016, 1,214 in 2017). A total of BAM 2,602,740 (EUR 1,301,370) was spent on this measure in the period from 2014 to the end of 2018.

3.2.5.2 Assessment

Direct financial support in Federation of Bosnia and Herzegovina is provided to households for the purpose of reducing household electricity costs. Eligibility criteria include the amount of monthly electricity consumption and whether the person is a beneficiary of the minimum guaranteed financial support. The total number of beneficiaries from 2011-2019 was 67,936. This measure provides financial relief to vulnerable households, but does not contribute to energy efficiency improvements and, therefore, does not eliminate the major causes of energy poverty.

The second measure, available only to the population residing in the capital of Bosnia and Herzegovina, subsidizes electricity, natural gas, and district heating in the Sarajevo Canton, therefore, it only has a local impact. Target groups for this measure are beneficiaries with limited total income per household including single households, i.e., retired persons, households with

[8] The Government of RS implemented Program of protection for vulnerable categories of electricity consumers in the period 2008-2010 and in 2012. The program covered around 50,000 consumers.

members who are beneficiaries of financial home care support, households with a limited dwelling area per single person, excluding business, rentals, and exceptionally households with individuals possessing a 100% disability such as quadriplegic/tetraplegic persons.

As with the first measure, the second measure does not improve energy efficiency, but provides some relief for the financial burden of household energy consumption.

In conclusion, current measures are limited in scope to location (not available at the national level) and target group (targeting only the most vulnerable groups), as well as insufficient in alleviating energy poverty in Bosnia and Herzegovina. Currently available measures are aimed at providing direct financial support to the most vulnerable households, by easing the burden of energy costs. Nonetheless, they do not contribute to eliminating the effects of living in inadequate dwellings nor using inadequate and often insufficient energy services. The measures provide a good start by recognizing the problem of energy poverty and energy vulnerability; however, financial support in reducing monthly energy bills alone is not likely to provide the final and necessary solution for energy poverty.

Table 3-3. Summary of the measure Reducing Household Electricity Costs and stimulating Energy Efficiency

no.	Item:	Measure 1
1	Name of the measure in English	Reducing Household Electricity Costs and stimulating Energy Efficiency (*Decision on Implementation of Measures for Reducing Household Electricity Costs and Stimulating Energy Efficiency Measures*)
2	Eligibility criteria	Consumers who use pensions up to and including the minimum guaranteed amount, and recipients of permanent financial assistance with below-average consumption, i.e., up to 268 kWh of electricity from the EP BiH and 348 kWh from the HZHB electricity utility
3	Number of eligible households / individuals	On average, 67,936 consumers from 2011-2019
4	Is the measure gender sensitive	No
5	Description of the measure	Supports two categories of electricity consumers by subsidizing below-average consumption, i.e., 268 kWh for EP BiH and 348 kWh from the EP HZHB, at BAM 5.5 (EUR 2.75) and BAM 7 BAM (EU 3.5), respectively.
6	Period during which the measure has been in force	2011-now
7	Implementation interval	Monthly with eligibility lists edited yearly
8	Maximum amount of financial support per beneficiary in the implementation interval	BAM 5.5 (EUR 2.75) for consumers of electricity from the Bosnia and Herzegovina electricity utility and BAM 7 (EUR 3.5) from the HZHB electricity utility
9	Total amount of financial support provided to applicants in the implementation interval	BAM 24,126,224 (EUR 12,063,112)

10	Year of incurred financial costs	Entire period of 2011-2019
11	Administrative level	Entity (Federation of Bosnia and Herzegovina)
12	Financing source	Energy Market Company
13	Energy source covered	Electricity

Table 3-4. Summary of the measure Subsidies for Electricity, Natural Gas and District Heating in the Sarajevo Canton

no.	Item:	Measure 2
1	Name of the measure in English	Subsidies for Electricity, Natural Gas and District Heating in the Sarajevo Canton
2	Eligibility criteria	Consumers with a total income per household member not exceeding 70 BAM/month (EUR 35); single-person pensioner households with a monthly income not exceeding BAM 165 BAM (EUR 82.5); two-member pensioner households with a total monthly income not exceeding BAM 220 (EUR 110); households with members who are beneficiaries of financial home care support and whose total monthly income does not exceed BAM 120 (EUR 60); total dwelling area for single person households does not exceed 44 square meters, with an additional 10 square meters for each additional household member; they must be residing in the Sarajevo Canton for at least 12 months, not have a business, rentals; exceptionally households with a member possessing a 100% disability such as quadriplegic/tetraplegic individuals are entitled to the subsidy regardless of their total income or total dwelling area
3	Number of eligible households / individuals	2014: 1,718 2015: 1,514 2016: 1,345 2017:1,214 2018: 869
4	Is the measure gender sensitive	No
5	Description of the measure	The measure for assistance given to vulnerable consumers in the Sarajevo Canton for paying energy bills was developed as a mechanism for offsetting price increases. For electricity, gas, and district heating, payments are transferred to service providers (suppliers) who then reduce billed amounts to eligible consumers, while those who use fuelwood receive payments directly on their bank accounts
6	Period during which the measure has been in force	2014 onwards

7	Implementation interval	January, February, March, November, December – payments made twice a year
8	Maximum amount of financial support per beneficiary in the implementation interval	100 BAM/month
9	Total amount of financial support provided to applicants in the implementation interval	2014: BAM 602,070 (EUR 301,035) 2015: BAM 539,560 (EUR 269,780) 2016: BAM 476,070 (EUR 238,035) 2017: BAM 509,120 (EUR 524,560) 2018: BAM 475,920 (EUR 237,960)
10	Year in which financial costs are based	Annually from 2014 to 2018
11	Administrative level	Local
12	Financing source	Not clear
13	Energy source covered	Electricity, natural gas, district heating

3.2.6 List of analyzed legislative acts

1. 2035 Framework Energy Strategy of BiH (OG 70/18)
2. FBiH Development Strategy 2021-2027 (in draft) http://fzzpr.gov.ba/bs/pages/48/16/strategija-razvoja-federacije-bih-2021-2027
3. 2035 Energy Sector Development Strategy of Republika Srpska (06/2018)
4. Brčko District Development Strategy 2021-2027 (draft version) http://www.vlada.bdcentral.net/Publication/Read/predstavljen-nacrt-strategije-razvoja-brcko-distrikta-bih-za-period-2021%E2%80%932027?lang=hr
5. Electricity Act of FBiH (OG 66/2013, 94/2015, 54/2019)
6. Decision on Implementation of Measures for Reducing Household Electricity Costs and Stimulating Energy Efficiency Measures (OG 44/11, 8/12, 96/12, 100/13, 75/14, 101/15, 52/16, 01/2017)
7. Temporary Guidelines for Energy Sector Policy: https://predstavnickidom-pfbih.gov.ba/upload/file/sjednice/31_sjednica/24_a.pdf
8. Energy Sector Restructuring Program (2019) https://parlamentfbih.gov.ba/v2/userfiles/file/Materijali%20u%20proceduri_2019/Program%20EE%20sektor_bos.pdf
9. Energy Efficiency Act of the Federation of Bosnia and Herzegovina (OG No. 22, 24/03/2017)
10. FBiH National Energy Efficiency Action Plan (NEEAP) for 2016 to 2018 (OG 40/18)
11. Ordinance on the Organization and Regulation of the Gas Sector (OG 83/07)
12. Republika Srpska Electricity Act (OG 68/20)
13. Brčko District Electricity Act (OG 27/2018)
14. Subsidy for Electricity, Natural Gas, and District Heating in the Sarajevo Canton (OG 75/20)

3.3 Georgia

3.3.1 Summary

The legal framework for energy poverty in Georgia is currently divided between energy and social assistance legislation. The Georgian Energy and Water Supply Act identifies vulnerable consumers and stipulates that the Ministry of Economy and Sustainable Development (MoESD) shall develop, in cooperation with the government, Georgia National Energy and Water Supply Regulatory Commission (GNERC) and other relevant parties, the State Energy Policy to protect vulnerable consumers and set measures enabling consumers to gradually overcome energy poverty. At the same time, the Georgian Social Assistance Act defines certain categories of socially vulnerable persons that fulfill conditions for receiving financial support.

The term **energy poverty is still not recognized** in Georgia and there is no general definition in legal and strategic frameworks of Georgia, nor its applicability or are references to a definition of vulnerable consumers. In terms of electricity and gas, Georgia has an organized program and measures for protecting consumers and is still implementing new COVID-19 measures.

We conclude that Georgia has a general definition of a vulnerable consumer in its primary legislation, along with exact criteria and wide implementation of measures in secondary legislation.

3.3.2 Strategic documents

Currently, there are no documents of strategic importance that address the issue of vulnerable consumers.

3.3.3 Legal and legislative framework

3.3.3.1 National Energy and Climate Plan (NECP) (draft version)

The NECP should be an annex to the Energy Policy, according to the Georgian Energy and Water Supply Act. Georgia has set up a core team for NECP development and sent draft chapters of the NECP to the Secretariat for informal comments in August 2020.

3.3.3.2 National Energy Efficiency Action Plan (NEEAP) (2019–2020)

Georgia's first National Energy Efficiency Action Plan (NEEAP) sets investment and policy measures to be carried out in the period 2019- 2020 and may be carried on until 2022. The NEEAP aims to optimize and reduce the use of energy resources as compared to a business-as-usual scenario. It lays out targets for making savings in primary energy consumption as well as setting policy and investment measures to achieve these targets. Although the first Georgian NEEAP does not specifically mention energy poverty or energy vulnerability, it does, however, foresee certain measures to tackle such issues in the future. Specifically, energy efficiency measures for buildings, i.e., B-1 Regulations Leading to Improved Efficiency of Lighting Systems in Residential and Commercial Buildings. Another measure called Improvement of Energy Efficiency in Existing Private Houses, has also been envisaged in the NEEAP but no implementation details are provided.

3.3.3.3 Energy Efficiency Act

Although the Georgian Energy Efficiency Act does not specifically mention energy poverty or energy vulnerability, it is mentioned in Article 13 of the Energy Performance Contract and may possibly provide a way of tackling energy poverty in the future. According to Article 13 of the Energy Performance Contract, acting as an energy saving tool, it shall be applied by companies by investing in high technical and economic capacities in the field of energy saving. According to the Energy Performance Contract, energy saving is an energy service provided by an energy service provider to an energy service recipient without imposing additional fees on the recipient.

3.3.3.4 Social Assistance Act

The Social Assistance Act adopted by the Georgian Parliament in 2006 envisages certain categories of socially vulnerable persons that receive some form of financial supports or aid from the Government. According to Article 2, the Act applies to persons who require special care and are legal residents of Georgia, such as deprived families or homeless persons. Article 4 of the Act applies to orphans and children without parental care, persons with disabilities, persons of full legal age with limited capabilities[9] and without family care, persons without a breadwinner (a child or children younger than 18 years of where one or both parents are deceased), and homeless children. In regard to deprived families, the Act states that a deprived family is a person or group of persons permanently residing in a separate place of residence, who undertake common household activities, and whose social and economic conditions fall below the level determined by the Georgian Government.

According to Article 17c of the Social Assistance Act, the main assistance program directed to the socially unprotected population is the Pecuniary Social Assistance (subsistence allowance). According to the latest available data on amendments to Ordinance №758 of the Georgian Government of 31 December 2014 "On Approval of the Methodology for Assessing the Socio-Economic Situation of Socially Vulnerable Families (Households)" the last renewal of the support scheme and methodology took place on 5 June 2018, and the current support scheme is as follows:[10]

- Households with a rated score below 30,001: EUR 15 (GEL 60) for each family member.
- Households with a rated score between 30,001 and 57,001: EUR 12.5 (GEL 50) for each family member.
- Households with a rated score between 57,001 and 60,001: EUR 10 (GEL 40) for each family member.
- Households with a rated score between 60,001 and 65,001: EUR 7.5 (GEL 30) for each family member.
- Households with a rated score less than 100,001: EUR 12.5 (GEL 50) for each family member under the age of 16.

In some municipalities, the subsistence allowance is EUR 12.5 (GEL 50 at the exchange rate from 22/12/2020) for a family member under 16 years of age, of which 20 GEL is transferred to the family bank account (family is fully entitled to make withdrawals), and the remaining 30 GEL to the child food account (not entitled to make withdrawals from the account). Families receive 50 GEL for each member under 16 years of age and is applicable for all rated scores.[11] As of July 2019, 315,970 families (949,263 persons) were registered in the Agency database.

3.3.3.5 Energy and Water Supply act

The Energy and Water Supply act, adopted on 20 December 2019 by the Georgian Parliament, defines *vulnerable consumer* in Article 3, as a household consumer that **due to his or her status**

[9] Persons of full legal age with limited capabilities are young people and/or adults with or without disabilities living in shelters. Even after reaching adulthood, they often remain homeless and are not able to take care of themselves.

[10] Conversions from GEL to EUR are based on exchange rate of 22 December 2020.

[11] Source: http://ssa.gov.ge/index.php?lang_id=GEO&sec_id=35

or health condition and following applicable legal acts is granted the right to utilize and/or receive supply of **electricity** and/or natural **gas** and/or **water under special conditions**.

According to Article 7, in cooperation with the GNERC and other relevant parties, the MoESD will prepare the State Energy Policy for at least ten years ahead. The State Energy Policy[12] protects the rights and interests of all parties in the energy sector, including vulnerable consumers. It sets measures to ensure the physical availability and **affordability of electricity and natural gas** for the benefit of consumers residing and operating in Georgia, in order to gradually overcome energy poverty.

According to Article 28, one of the objectives of the GNERC is to undertake all reasonable measures in ensuring a high standard of public services within the delivery of electricity and natural gas sectors, **contributing to the protection of vulnerable consumers**, and facilitating compatibility in exchanging necessary data when switching suppliers.

With the aim of protecting vulnerable consumers, Article 112 stipulates that state, and local governmental bodies, in consultation with the GNERC and other stakeholders, shall develop specific programs and measures to meet demand and/or improve affordability of electricity and natural gas and **define vulnerable consumers** who are to benefit from these programs and measures.

3.3.3.6 Act on the Structure, Authority, and Rules of Operation of the Georgian Government

Based on sub-paragraph n of Article 5 the Government of Georgia shall provide social protection to citizens.

3.3.3.7 Decree of the Government of Georgia (#758, 31December 2014) on Approval of the Methodology for Assessing the Socioeconomic State of Socially and Economically Disadvantaged/Vulnerable Families/Households

In 2014, the Government of Georgia adopted Decree #758 on Approving the Methodology of Assessing Socioeconomic Conditions of Socially Unprotected Families/Households based upon which families are recognized as unprotected and are recipients of financial support from the government. The decree imposes an obligation on the Public Services Development Agency and National Agency of the Public Registry under the Georgian Ministry of Justice, Revenue Service under the Georgian Ministry of Finance, Georgian Ministry of Internal Affairs, and Ministry of Environmental Protection and Agriculture to provide databases and other necessary information obtained and stored by them on a regular basis to the Social Service Agency operating under the Georgian Ministry of Internally Displaced Persons from Occupied Territories, Labor, Health and Social Affairs.

Annex 1 of the Decree describes the exact methodology. The social rated score is calculated using a wide range of factors relating living conditions of households, including electronic, household, agricultural and unmovable property in the household, including energy, gas, and water consumption in the previous 12 months, as well as the condition of dwelling, its location (capital city, large city, small city or rural settlement), number and age of household members, and health of household members. These factors are assigned scores and weights, which are then transposed into rated score using formulas.

The Georgian Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health and Social Affairs (MoLHSP) is obliged to prepare and issue administrative-legislative acts for the purpose of implementing the methodology on assessing the socioeconomic state of **socially and economically disadvantaged** (vulnerable) families (households).

[12] The State Energy Policy has not been adopted yet.

3.3.3.8 Decree of the Government of Georgia (#517, 31 October 2018)

According to Decree of Georgian Government #517, of 31 October 2018, families having 4 children are entitled to a subsidy of EUR 5 (GEL 20, exchange rate of 22/12/2020) and additionally EUR 2.50 (GEL 10, exchange rate of 22/12/2020) monthly, for each additional child, for electricity consumption. The decree has been in force since 1 January 2019 but does not cover the municipality of Tbilisi and socially vulnerable families in Georgia which fall under a support scheme to help vulnerable households cover the costs of electricity supply during the winter period.

3.3.3.9 Decree of the Government of Georgia (#381, 30 July 2015) on Partially Subsidizing the Cost of Electricity Consumed by Socially and Economically Disadvantaged/Vulnerable Consumers

According to Article 3, data on socially and economically disadvantaged families are submitted to relevant electricity suppliers, which are given the task of calculating the subsidy amount and subsequently submitting a request for reimbursement of the respective (subsidy) amount to the Agency. The Agency is not obligated to verify accuracy of or correct the data (reimbursable amount) submitted to it.

Article 6 obliges the Georgian Ministry of Finance to undertake all necessary activities to allocate financial resources required for the partial subsidization of electricity costs for socially and economically disadvantaged (vulnerable) consumers.

3.3.3.10 Decree of the Government of Georgia (#73, 11 February 2016) on Amendments to the Decree of the Government of Georgia #381

Article 1 defines the electricity tariff subsidy of amounting to 0.0097 EUR/kWh (0.039 GEL/kWh, based on the exchange rate on 22/12/2020) to assist families registered in the Unified Database of Socially and Economically Disadvantaged/Vulnerable Families (Database), and administrated by the Agency (excluding Tbilisi Municipality), along with rated score indicating their social-economic status equivalent to or less than 70,000 (socially and economically disadvantaged families), and those with a consumption (over a 30-calendar-day period) not exceeding 301 kWh.

3.3.3.11 The Rule on Implementation of Communal Subsidies Allocated under the 2019 Tbilisi Municipality Budget (Ordinance N 20.1632.1961, 29 December 2020)

The Rule defines terms and conditions for subsidies. Users of the program are families which, according to the common database maintained by the Agency, are registered in Tbilisi Municipality, and whose rated score does not exceed 200,000.

For socially vulnerable families in Tbilisi Municipality whose rated score does not exceed 70,000, the total monthly subsidy is EUR 26.50 (GEL 106, exchange rate on 22/12/2020), while those families whose rated score exceeds 70.000 but less than 200,000, the total subsidy is a maximum of EUR 5 per month (GEL 20, exchange rate on 22/12/2020). The subsidy may be used for waste disposal and cleaning service,[13] water supply, and electricity supply as listed by priority.

According to the annual list of programs from the Municipal Service of Health and Social Services of Tbilisi Municipality[14] for the period 2016 to 2021, a sub-program Communal Subsidy is implemented each year and can be allocated for five months, i.e., in the months of January,

[13] The cleaning fee in Tbilisi has been set in the resolution of Tbilisi Municipality (#17, 12 December 2014) where the fee for cleaning the populated area of Tbilisi was set at GEL 2.50 per month per person, with the maximum being four persons, i.e., 10 GEL per month.

Source: http://tbilisi.gov.ge/img/original/2019/2/3/komunaluri_subsidireba.pdf

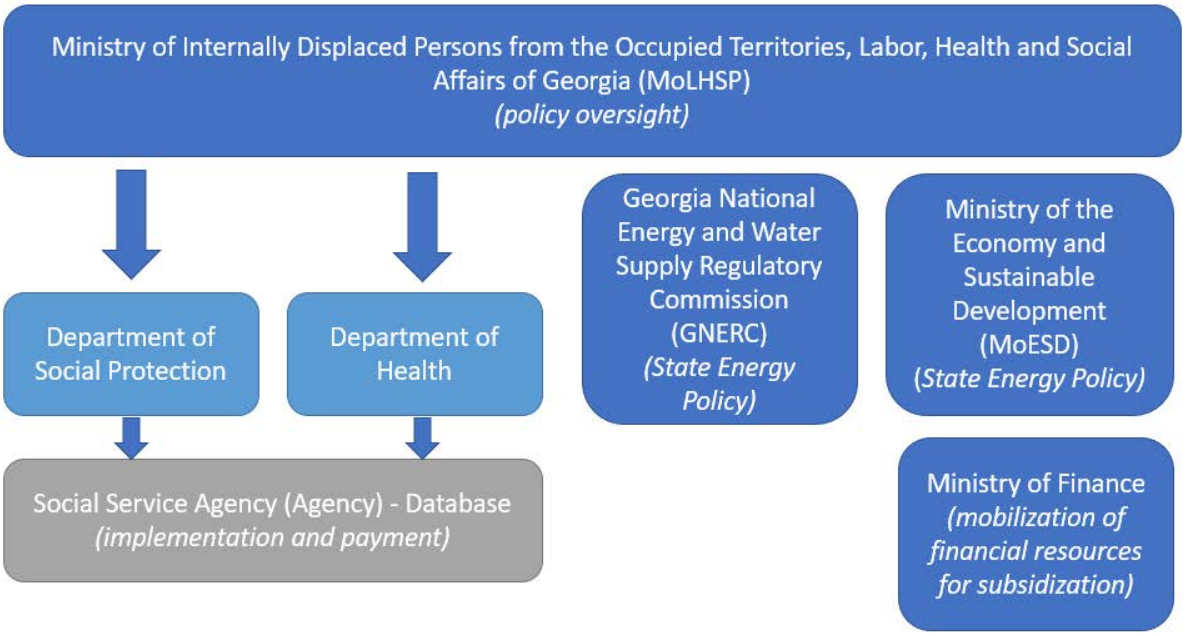
[14] Source: http://tbilisi.gov.ge/page/292

February, March, April, and December, based on information provided in the Database valid on the twentieth calendar day of the previous month.

3.3.4 Institutional framework

The key stakeholders of the institutional framework in Georgia concerning vulnerable consumers are the Ministry of Internally Displaced Persons from the Occupied Territories, Labor, Health and Social Affairs of Georgia (MoLHSP), Ministry of Economy and Sustainable Development (MoESD), Social Service Agency (Agency), Georgia National Energy and Water Supply Regulatory Commission (GNERC) and municipalities in Georgia.

The following chart shows the governance and administrative structure of Georgia's social protection system.



Georgia has invested in building a relatively strong state administrative apparatus. Over the past 10 years, nearly all social protection income transfers and state health insurance subsidies have fallen under the administration of the Agency through its 72 branches (including 5 in Tbilisi and 67 around the country). The Agency also administers several social services, including social care and rehabilitation programs, employment services, certain medical benefits, and limited childcare services. The Agency has utilized improvements in data and information management in recent years, including better connected databases between national and local offices.

The database maintained by the Agency was set up to achieve better targeting and efficiency of social assistance. State and local self-government bodies used the database, including other organizations providing social assistance, in order to rapidly search information necessary for planning social assistance and selecting participants for social assistance programs. The MoLHSP provides approval for scheduling audits of families registered in the database.

A family wishing to receive social assistance must be registered in the database and send an application within the Agency's respective territorial branch, which is based on place of residence, complete the prescribed application form, where the procedure for completing and submitting it is determined by the MoLHSP. After receiving the application, an Agency representative visits the family and assesses the family's socioeconomic situation.

During the visit by the Agency representative to the family, information from the authorized representative of the family is used to complete a so-called *family declaration*. Upon entering the information into the database and processing it in line with established methodologies, the family

is assigned rated points which determines the kind of benefits (cash, social assistance, etc.) to which the family is entitled. A lower rated score indicates a more socially vulnerable household.

3.3.5 Current schemes to protect vulnerable consumers

3.3.5.1 Description

In Georgia, several mechanisms provide financial support to households. Several electricity utility subsidy programs exist in Georgia and financed by the MoLHSA or local municipalities. The subsidies come from the national budget and/or municipal budgets. The main subsidy schemes include:

- **Socially vulnerable families in Georgia (excluding Tbilisi Municipality)** achieving a rated score below 70,000 receive a electricity subsidy amounting to 0.039 GEL/kWh (0.015 EUR/kWh). The program is financed by MoLHSA. According to the Decree of the Government of Georgia (#381, 30 July 2015) on Partial Subsidization of the cost of Electricity Consumed by Socially and Economically Disadvantaged/Vulnerable Consumers, the subsidy is transferred to the supplier which also receives a list of families eligible for the subsidy from the MoLHSP.
- **Socially vulnerable families in Tbilisi Municipality** with a maximum rated score of 70,000 receive GEL 106 (EUR 33.13) per family in the period from November to March. Families with a rated score between 70,001-200,000 receive GEL 20 (EUR 6.25) per month (i.e., 5 months in total). The subsidy covers electricity supply, waste disposal, cleaning service, and water supply. In 2019, the number of beneficiaries was 45,000 families, and the total amount of financial support provided was GEL 7,338,420 (EUR 2,293,256). The program is financed from the Tbilisi Municipality budget.
- **High Mountainous Settlements** refers to households living in the high mountain regions and from have been receive a 50% discount on electricity tariffs up to a maximum consumption of 200 kWh. If a family lives in a mountainous area and is also registered in the Agency database as a socially unprotected household, it does not receive both subsidies. Such a family receives a mountainous settlement subsidy. In 2019, the number of beneficiaries was 80,256 households receiving a subsidy of EUR 3.31 per month. Financial support provided in 2018 amounted to EUR 3,562,493. The program is financed by MoLHSA.
- **Families with 4 or more children** with a maximum rated score of 300,000 have since July 2019 been receiving GEL 20 (EUR 6.56) if registered in the Agency database, where each extra child increases the subsidy by GEL 10 (EUR 3.28). In 2019, the number of such families was 270. In the same year, the total budget for this scheme was GEL 3.5 million (EUR 1.1 million). The program is financed by MoLHSA.

As for natural gas, there are no similar unified schemes; however, two support mechanisms in line with Article 4 of the Act on Development of High Mountainous Regions and financed from the national state budget are as follows:

- **Mountainous settlements in the Kazbegi and Dusheti Municipality.** The total number of eligible households is 3,600, each receiving 700 cubic meters of free gas per month from October 15 until May 15. The total amount of provided financial support in 2018 was EUR 2,807,761.
- **Residents living in villages near occupied area (cash payment).** The total number of eligible households is 13,000, each receiving a subsidy from the Government of Georgia in winter as a heating allowance amounting to 61 EUR/year. The total amount of provided financial support in 2018 was 994,630 EUR.

According to Article 3 of the Decree of the Government of Georgia (#655, 30 October 2020) on utility tax subsidy rules and conditions, due to **special situation caused by the COVID-19 pandemic**, subsidies are granted for electricity, natural gas, drinking water and sewage in order to help the population. This specifically refers to households that consume 200 kWh or less electricity per month and 200 cubic meters or less of natural gas per reporting month. The implementation interval is from November 2020 to February 2021 (for each month).

3.3.5.2 Assessment

In Georgia total of 7 measures are identified as an aid to households in need related to energy expenses.

Two measures are aiming specifically at the reduction of household electricity costs through direct subsidy to the beneficiaries in the form of a tariff subsidy. Other measures include subsidies to socially vulnerable households and they cover electricity, waste disposal, communal service, and water supply costs.

Criteria for all measures are set using the rating score. Some measures are targeting specific groups such as households in the high mountainous regions, residents living in the villages near the occupied area, or families with 4 or more children.

Due to special situation caused by a coronavirus, and to help the population, subsidies for electricity, natural gas, drinking water, and sewage are implemented for households that consume 200 kWh or less electricity per month and 200 m^3 or less natural gas per reporting month.

Although some measures stimulate an energy consumption decrease, they are not expected to directly stimulate energy efficiency. All the measures represent short-term aid to energy-poor households and are not considered a possible solution to alleviate energy poverty.

Table 3-5. Summary of the measure Socially Vulnerable Families in Georgia (excluding Tbilisi Municipality) - Resolution №381 of the Government of Georgia of 30 July 2015

no.	Item:	Measure 1
1	Name of the measure in English	Socially vulnerable families in Georgia (excluding Tbilisi) - Resolution №381 of the Government of Georgia of 30 July 2015
2	Eligibility criteria	below a rated score of 70,000
3	Number of eligible households / individuals	65,907
4	Is the measure gender sensitive	No
5	Description of the measure	Households below a rated score of 70,000 – receive 0.039 GEL/kWh (0.015 EUR/kWh) of electricity tariff subsidies
6	Period during which the measure has been in force	from July 2015
7	Implementation interval	N/A
8	Maximum amount of financial support per beneficiary in the implementation interval	N/A

9	Total amount of financial support provided to applicants in the implementation interval	GEL 3,158,240 = EUR 1,044,341
10	Year in which financial costs are based	2018
11	Administrative level	National
12	Financing source	National - financed by the MoLHSA
13	Energy source covered	Electricity

Table 3-6. Summary of the measure Socially Vulnerable Families in Tbilisi Municipality

no.	Item:	Measure 2 A	Measure 2 B
1	Name of the measure in English	Socially vulnerable families in Tbilisi Municipality	Socially vulnerable families in Tbilisi Municipality
2	Eligibility criteria	below a rated score of 70,000	households with a rated score between 70,001 – 200,000
3	Number of eligible households / individuals	45,000	
4	Is the measure gender sensitive	no	No
5	Description of the measure	Households below a rated score of 70,000 – receive GEL 106 per family in Nov, Dec, Jan, Feb and March, where the subsidy covers electricity supply, waste disposal and cleaning service, and water supply	Households with a rated score between 70,001 - 200.000 – receive 20 GEL per month (5 months in total), where the subsidy covers electricity supply, waste disposal, and cleaning service and water supply
6	Period during which the measure has been in force	N/A	
7	Implementation interval	winter: Nov - March	
8	Maximum amount of financial support per beneficiary in the implementation interval	GEL 106 = EUR 33.13	GEL 20 = EUR 6.25
9	Total amount of financial support provided to applicants in the implementation interval	GEL 7,338,420 = EUR 2,293,256	
10	Year in which financial costs are based	2019	
11	Administrative level	Local	Local
12	Financing source	Municipality	Municipality

13	Energy source covered	Electricity	Electricity

Table 3-7. Summary of the measure High Mountainous Settlements

no.	Item:	Measure 3
1	Name of the measure in English	High Mountainous Settlements - Resolution №418 of the Government of Georgia dated 25 August 2016
2	Eligibility criteria	Households living in high mountain regions
3	Number of eligible households / individuals	80,256
4	Is the measure gender sensitive	No
5	Description of the measure	Households living in high mountain regions receive a 50% tariff discount for maximum electricity consumption of 200 kWh. A family does not receive both subsidies if living in a mountainous area and also registered in the SSA database as socially unprotected household. Such families receive only the mountainous settlement subsidy.
6	Period during which the measure has been in force	from 2016
7	Implementation interval	N/A
8	Maximum amount of financial support per beneficiary in the implementation interval	EUR 3.31 subsidy per month
9	Total amount of financial support provided to applicants in the implementation interval	GEL 10,865,603 = EUR 3,562,493 for the year 2018
10	Year on which financial costs are based	2019
11	Administrative level	National
12	Financing source	National - financed by MoLHSA
13	Energy source covered	Electricity

Table 3-8. Summary of the measure Families with Four or More Children Below a Rated Score of 300,000

no.	Item:	Measure 4
1	Name of the measure in English	Families with 4 or more children below a rated score of 300,000 - Resolution № 517 of the Government of Georgia of 31 October 2018
2	Eligibility criteria	The eligible family should be registered in the SSA database, have a rated score below 300,000 and have 4 children
3	Number of eligible households / individuals	270
4	Is the measure gender sensitive	No

5	Description of the measure	Families with 4 or more children below a rated score 300,000
6	Period during which the measure has been in force	from 2018
7	Implementation interval	N/A
8	Maximum amount of financial support per beneficiary in the implementation interval	GEL 20 = EUR 6.56 per family, and the fee increases by GEL 10 = EUR 3.28 for each additional child
9	Total amount of financial support provided to applicants in the implementation interval	GEL 3.5 million = EUR 1.1 million
10	Year on which financial costs are based	2019
11	Administrative level	National level
12	Financing source	National level - Financed by MoLHSA
13	Energy source covered	Electricity

Table 3-9. Summary of the measure Kazbegi-Dusheti Municipality Gas Subsidy

No.	**Item:**	**Measure 5**
1	Name of the measure in English	Reimbursement of costs of gas supplied to households in the highland villages of the Kazbegi and Dusheti Municipality
2	Eligibility criteria	Mountainous Settlements in Kazbegi and Dusheti Municipality
3	Number of eligible households / individuals	About 3,600 households of the Kazbegi and Dusheti Municipality
4	Is the measure gender sensitive	No
5	Description of the measure	Receive 700 m^3 gas for free per month from October 15 till May 15
6	Period during which the measure has been in force	From 1990s to the present
7	Implementation interval	October 15 till May 15
8	Maximum amount of financial support per beneficiary in the implementation interval	700 m^3 gas
9	Total amount of financial support provided to applicants in the implementation interval	8,563,670 GEL = 2,807,761 EUR
10	Year on which financial costs are based	2018
11	Administrative level	National level
12	Financing source	National level – Government of Georgia
13	Energy source covered	Gas (gas subsidy)

Table 3-10. Summary of the measure "Villages near the occupied area"

no.	Item:	Measure 6
1	Name of the measure in English	Villages near the occupied area (cash payment) – Act on Development of High Mountainous Regions
2	Eligibility criteria	Residents living in villages near the occupied area
3	Number of eligible households/individuals	13,000
4	Is the measure gender sensitive	no
5	Description of the measure	Residents living in villages near the occupation border line receive a subsidy of USD 70 from the Georgian Government in winter in the form of a heating allowance
6	Period during which the measure has been in force	NA
7	Implementation interval	Winter
8	Maximum amount of financial support per beneficiary in the implementation interval	61 EUR/year
9	Total amount of financial support provided to applicants in the implementation interval	GEL 3,033,623 = EUR 994,630
10	Year on which financial costs are based	2018
11	Administrative level	National
12	Financing source	National – Government of Georgia
13	Energy source covered	Gas (cash payment)

Table 3-11. Summary of the measure Approval of Rules and Conditions for Subsidizing Utility Bills "

no.	Item:	Measure 7
1	Name of the measure in English	Approval of Rules and Conditions for Subsidizing Utility bills - Government of Georgia, 30 October 2020 № 655 Resolution
2	Eligibility criteria	Households that consume a maximum of 200 kWh of electricity per month and a maximum of 200 cubic of natural gas per reporting month
3	Number of eligible households / individuals	N/A
4	Is the measure gender sensitive	No
5	Description of the measure	Due to extraordinary special brough on by the COVID-19 pandemic, there is a need to help the

		population through subsidies for electricity, natural gas, drinking water, and sewage. This is specifically aimed at households that consume a maximum of 200 kWh of electricity per month and a maximum of 200 cubic meters of natural gas per reporting month.
6	Period during which the measure has been in force	
7	Implementation interval	From November 2020 to February 2021 (each month)
8	Maximum amount of financial support per beneficiary in the implementation interval	N/A
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year in which financial costs are based	N/A
11	Administrative level	NA
12	Financing source	NA
13	Energy source covered	Electricity, gas, water, sewage

3.3.6 List of analyzed legislative acts

1. Energy Efficiency Act N5898-სს,
2. Social Assistance Act N4289,
3. Energy and Water Supply Act N5646-რს,
4. Act on the Structure, Authority, and Rules of Operation of the Government of Georgia, # 3277-IIs
5. Decree of the Government of Georgia (#758, 31 December 2014) on Approval of the Methodology for Assessing the Socioeconomic State of Socially and Economically Disadvantaged/Vulnerable Families/Households
6. Decree of the Government of Georgia (#517, 31 October 2018)
7. Decree of the Government of Georgia (#381, 30 July 2015) on Partially Subsidizing the Cost of Electricity Consumed by Socially and Economically Disadvantaged/Vulnerable Consumers
8. Decree of the Government of Georgia (#73, 11 February 2016) on Amendments to the Decree of the Government of Georgia #381
9. Rule on the Implementation of Communal Subsidy Allocated Under the 2019 Tbilisi Municipality Budget (Ordinance N 20.1632.1961, 29 December 2020)

3.4 Kosovo*

3.4.1 Summary

The Energy Strategy of Kosovo* identifies vulnerable consumers and obliges the Government to define a program for their protection. The Electricity Act and the Natural Gas Act use the term *consumers in need* stipulating that the relevant ministry for social policy develop criteria for identifying consumers in need as well as the scope of rights and measures aimed at protecting such consumers in meeting their electricity and gas demands. Nevertheless, **the actual definition and criteria have not been drafted yet** and there are no measures in place to protect consumers in need. At the same time, the Social Policy Act identifies several consumer groups who are entitled to reduced rates for electricity consumption only. **We can conclude that Kosovo* only has a general definition of consumers in need without precise criteria and measures in place.**

3.4.2 Strategic documents

3.4.2.1 Energy Strategy of Kosovo* 2017-2026

In terms of strategic documents, the term **vulnerable consumer** is identified in the Energy Strategy of Kosovo* 2017-2026.[15] It is the only document referring to the term vulnerable consumer, whereas all other relevant legislative acts and documents refer to *consumers in need*. The Strategy states that "*In order to mitigate the upward pressure on prices that will occur as a result of generation capacity construction or rehabilitation with clean coal technology, the **Government will develop a program for the protection of vulnerable consumers** based on a detailed study and in line with Energy Community requirements*."

3.4.3 Legal and legislative framework

3.4.3.1 Energy Regulator Act (OG 05/L–084)

Article 50 of the Act **prescribes subsidies for consumers in need**. Therefore, when it is necessary to provide financial support to consumers in need (as prescribed in detail in the Electricity Act and Natural Gas Act), the Government implements such support strictly and transparently, based on the Electricity Act and the Natural Gas Act, and in a way that is least likely to restrict competition in supplying energy. Moreover, all subsidies for the energy sector are subject to the provisions of applicable legislation on state aid and monitoring procedures. In line with its general program for social categories, the Government shall address social categories of energy consumers. The program shall be implemented by the Ministry responsible for social welfare.

3.4.3.2 Electricity Act

The Electricity Act (OG 05/L-085) in Article 3, paragraph 1, subparagraph 1.29 prescribes that a consumer in need is a household consumer who, due to **social status,** enjoys special rights regarding the supply of electricity in exceptional cases.

Article 49 prescribes protection of consumers in need. Paragraph 1 of the Article obliges the Ministry in charge of social welfare to develop, in cooperation with the ministry in charge of energy, Ministry of Finance, and in consultation with the regulatory and other stakeholders of the electricity sector, a **detailed program** for establishing the status of consumers in need, the scope of rights, as well as measures aimed at protecting consumers in need in order to meet their electricity demands.

[15] https://rise.esmap.org/data/files/library/kosovo/Renewable%20Energy/Kosovo_Energy_Strategy.pdf, page 36.

Paragraph 2 of the same article prescribes that the program shall be approved by the Government and include at least the following elements:

- Definition of consumers in need benefiting from the above-established program defined as not including more than a minority of electricity consumers in Kosovo* and limited to electricity consumers with the lowest income who use electricity for supplying permanent housing where the definition of low income, in addition to income, includes all available assets.
- Maximum electricity consumption per person reflecting seasonal usage is used when defining electricity consumption per person, subject to a maximum consumption of three hundred (300) KWh/month for a family with up to four members.
- The manner of direct support from the Government to consumers in need from revenue sources other than tariff charges by licensees, in order to avoid cross-subsidies and price distortion, and
- Funding support for consumers in need should be accomplished in a non-discriminatory manner and not be funded by electricity consumers.

Household consumers benefiting from financial support for the cost of electricity supply services are not permitted to use the funds for other purposes. Household consumers who have obtained an official positive decision on their status as a consumer in need are entitled to special protection under this Act and the program mentioned in paragraph 1 of Article 49.

Consumers in need are entitled to receive supply services according to Article 49 if the conditions in paragraph 1 of Article 49 are fulfilled, and which will be verified at least every six months by the authority responsible for social welfare.

Distribution System Operators (DSOs) shall establish and maintain a register of consumers in need. The rights and obligations of consumers in need, based on paragraphs 1 and 2 of Article 49, shall be duly applied and implemented by the DSO. In particular, the DSO shall take appropriate measures to protect final consumers in remote areas connected to the electricity grid. The supplier supplying electricity to consumers in need shall set up mechanisms for assisting consumers in need in order to avoid disconnecting them in the event of unpaid electricity bills.

Based on applicable legal acts, appropriate measures, such as formulating national energy plans, shall be taken into consideration when providing social security benefits to ensure necessary electricity supplies to consumers in need. Also, these measures will provide support for energy efficiency improvements, to address energy poverty where identified, and the broader context of poverty. Such measures shall not impede creating an effective open market and its functioning, as regulated by this law, and the Energy Community Secretariat will be notified of such matters. Such notifications shall not include measures taken within the general social security system.

3.4.3.3 Rule on General Conditions for Energy Supply

The Rule on General Conditions for Energy Supply adopted on 13 April 2017 in Article 20 paragraph 3 prescribes that *"suppliers with public service obligations supply final consumers who enjoy the right of universal service."* It also prescribes that *"they shall establish mechanisms necessary to support consumers in need, upon consultation with the Regulator, to avoid* ***disconnection*** *due to the non-payment of* ***electricity bills****."*

Article 24, paragraph 5 prescribes that rights and obligations referring to consumers in need, set out in paragraphs 1 and 2 of Article 49 of Electricity Act, shall be duly applied and implemented by the DSO. In particular, the DSO shall take appropriate measures to protect final consumers in remote areas who are connected to the electricity network.

Moreover, paragraph 6 of the same article prescribes that the supplier supplying electricity to consumers in need shall set up mechanisms for assisting consumers in need aimed at avoiding disconnecting from the power grid due to unpaid bills.

3.4.3.4 Rule on Disconnection and Reconnection of Consumers in the Energy Sector

The Rule on Disconnection and Reconnection of Consumers in Energy Sector adopted on 30 March 2017, prescribes in Article 7 that a supplier obliged to provide a public service in supplying final consumers who enjoy the right to a universal service shall establish mechanisms necessary to assist consumers in need, upon consultation with the Regulator, in order to avoid disconnecting them from the power grid due to unpaid electricity bills. The Ministry of Social Welfare, in cooperation with the relevant ministry of energy, Ministry of Finances, and in consultation with the Regulator and other market participants, shall develop a detailed program for determining the status of consumers in need, the scope of their rights as well as measures aimed at protecting the consumers in need and covering their electricity demands.

3.4.3.5 Natural Gas Act

Kosovo* does not have a physical gas infrastructure and no widespread consumption of natural gas. The Natural Gas Act (OG 05/L – 082) in Article 3, paragraph 1, subparagraph 1.10 defines that a consumer in need is a household consumer who qualifies for protection or assistance according to rules set by the ministry in charge of social welfare based on Article 10 of this Act which in turn prescribes protection for consumers in need.

Paragraph 1 of Article 10 prescribes that the ministry in charge of social welfare shall develop, in cooperation with the ministry in charge of energy, the Ministry of Finance, and in consultation with the Regulator and other stakeholders in the natural gas sector, a detailed program for determining the status of consumers in need, the scope of their rights, as well as measures aimed at protecting consumers in need in order that their gas demands are met. Paragraph 2 of the same article prescribes that the program detailing treatment of consumers in need shall be approved by the Government and include the following elements:

- Definition of consumers in need benefiting from the above-established program is to be limited to natural gas consumers with the lowest income and who use gas for supplying their permanent residence where the definition of low income, in addition to income, includes all available assets.
- Maximum gas consumption per person and reflecting seasonal usage is used in defining gas consumption levels per person, where total maximum consumption of 70 cubic meters/month for a family with up to four members shall be considered.
- The manner of direct support by the Government to consumers in need from revenue sources other than tariff charges by licensees, in order to avoid cross-subsidies and price distortion, and
- Funding support for consumers in need should be accomplished in a non-discriminatory manner and not be funded from gas consumers.

Household consumers benefiting from financial support for costs of natural gas supply services shall not be permitted to use the funds for other purposes. Household consumers who have obtained an official decision on their status as a consumer in need are entitled to special protection in accordance with this Act and the program developed under paragraph 1 of Article 10.

Consumers in need are entitled to receive supply services pursuant to Article 10 as long as the conditions from paragraph 1 of Article 10 are fulfilled, and which will be verified at least every six months by the authority responsible for social welfare.

The program defining treatment of consumers in need as referred to in paragraph 1 of Article 10 shall be implemented in a way that least likely distorts competition in supplying natural gas. The difference between costs and revenues stemming from a supplier's business activity for gas consumers in need shall be covered by the Government.

A supplier obliged to provide a public service shall offer a supply contract to all gas consumers in need and begin supplying without delay after the consumer in need submits a request

accompanied by evidence on meeting the requirements in paragraph 1 of Article 10. Distribution System Operators (DSO) shall establish and maintain a register of consumers in need.

The rights and obligations of consumers in need, based on paragraphs 1 and 2 of Article 10, shall be duly applied and implemented by the DSO. In particular, the DSO shall take appropriate measures to protect final consumers in remote areas connected to the natural gas system. The supplier supplying gas to consumers in need shall set up mechanisms for assisting consumers in need aimed at avoiding disconnecting such consumers from the natural gas network due to unpaid bills. All subsidies to the energy sector shall be subject to the provisions of all applicable state aid legislation and monitoring procedures provided therein. Based on applicable legal acts, appropriate measures, such as formulating national energy plans, shall be taken into consideration when providing social security benefits to ensure necessary gas supplies to consumers in need and support for energy efficiency improvements, while addressing energy poverty where identified, and the broader context of poverty. Such measures shall not impede creating an effective open market and its functioning, as regulated by this Act, and the Energy Community Secretariat will be notified of such matters. Such notifications shall not include measures taken within the general social security system.

3.4.3.6 Act on the Status and Rights of the Martyrs, Invalids, Veterans, Members of the Kosova Liberation Army (KLA), Civilian Victims of War and their Families

The Act on the Status and Rights of the Martyrs, Invalids, Veterans, Members of the Kosova Liberation Army (KLA), Civilian Victims of War and their Families (OG 04/L-054) prescribes rights for such persons to lower electricity tariffs for personal use of electricity and for certain consumers in case of difficult economic conditions when criteria set up in the scheme of social assistance are met (Article 6, paragraph 3; Article 8, paragraph 1, subparagraph 1.7; Article 9, paragraph 1, subparagraph 1.14 and Article 13, paragraph 1, subparagraph 1.4).

3.4.3.7 Act on the Social Assistance Scheme (OG 2003/15) (amended by Act no. 04/L-096 on Amending and Supplementing Act No. 2003/15 on Social Assistance Scheme in Kosovo*)

The Social Assistance Scheme shall provide financial support to eligible families according to financial and non-financial criteria outlined in the Act on the Social Assistance Scheme and based on resources allocated for this purpose in the Kosovo* Consolidated Budget.

3.4.4 Institutional framework

The Energy Regulatory Office (ERO) is responsible for monitoring development of the energy market and ensuring protection of consumers especially vulnerable consumers.

Article 49 paragraph 1 of the Electricity Act and Article 10 paragraph 1 of the Natural Gas Act stipulates that the ministry in charge of social welfare shall develop, in cooperation with the ministry in charge of energy, Ministry of Finance, in consultation with the Energy Regulatory Office and other stakeholders of the electricity sector and natural gas sector, a detailed program for establishing the status of consumers in need, their scope of rights, as well as measures aimed at protecting consumers in need in order to meet their electricity and/or gas demands.

The Kosovo* Energy Efficiency Fund was established at the beginning of 2019 upon passing Act No. 06/L-079 on Energy Efficiency as an important independent, autonomous, and sustainable entity, in order to achieve the objectives of Kosovo* in the domain of energy efficiency by promoting, supporting and implementing energy efficiency measures, as well as attracting and managing financial resources for financing and implementing investment projects in the area of sustainable energy efficiency. Current EU and World Bank investments in energy efficiency focus on public buildings, and in the future the plan is to move into the private sector level.

3.4.5 Current schemes in protecting vulnerable consumers

3.4.5.1 Description

A cooperation agreement was established between the Ministry of Finance, the Kosovo* Electricity Distribution and Supply Company (KEDS) and the Kosovo* Electricity Supply Company (KESCO), in order to subsidize electricity for families benefiting from the Social Assistance Scheme (SNS), Martyrs' Families and War Invalids Scheme (FDIL), Blind Persons Scheme (SPV) and the Paraplegic and Tetraplegic Scheme (SPPT) for 2019. The agreement was reached on 2 June 2020. The amount of funds allocated for this Agreement is EUR 4.5 million. The number of beneficiaries in this agreement include 36,648 families, with 23,316 families from the SNS, 10,314 families from the FDIL scheme, 967 families from the SPV scheme and 1,953 families from the SPPT scheme. The total budgeted amount spent was EUR 4.5 million (EUR 4,470,619.35 were spent for the first part, and the remaining EUR 29,380.65 for complaints). This activity has been completed.

3.4.5.2 Assessment

There was only one measure in Kosovo* aimed at supporting the vulnerable consumers which aims at subsidizing the cost of electricity.

The identified measure is not expected to tackle behavioral change or small investments by beneficiaries, which would otherwise increase energy efficiency and decrease energy consumption, and subsequently greenhouse emissions from energy sources. The measure represent short-term aid to energy-poor households and are not considered a possible solution to alleviating energy poverty.

Table 3-12. Summary of the measure Subsidizing Consumed Electricity for Families Benefiting from the Social Assistance Scheme (SNS), Martyrs' Families and War Invalids Scheme (FDIL), Blind Persons Scheme (SPV) and the Paraplegic and Tetraplegic Scheme (SPPT) for 2019.

no.	Name:	Measure 1
1	Name of the measure in English	Subsidizing consumed electricity for families benefiting from the Social Assistance Scheme (SNS), Martyrs' Families and War Invalids Scheme (FDIL), Blind Persons Scheme (SPV) and the Paraplegic and Tetraplegic Scheme (SPPT) for 2019.
2	Eligibility criteria	Families benefiting from the Social Assistance Scheme (SNS), Martyrs' Families and War Invalids Scheme (FDIL), Blind Persons Scheme (SPV) and the Paraplegic and Tetraplegic Scheme (SPPT)
3	Number of eligible households / individuals	36,648 families, of which 23,316 families fall under the SNS, 10,314 families come under the FDIL scheme, 967 families belong to the SPV scheme and 1,953 families to the SPPT scheme
4	Is the measure gender sensitive	No
5	Description of the measure	Subsidy of electricity costs.
6	Period during which the measure has been in force	Since 2 June 2020, the measure has been completed.
7	Implementation interval	Yearly.
8	Maximum amount of financial support per beneficiary in the implementation interval	Approximate EUR 120 per family.

9	Total amount of financial support provided to applicants in the implementation interval	EUR 4.5 million
10	Year on which financial costs are based	2019
11	Administrative level	National
12	Financing source	National
13	Energy source covered	Electricity

3.4.6 List of analyzed legislative acts

1. Energy Strategy of Kosovo* 2017-2026: https://rise.esmap.org/data/files/library/kosovo/Renewable%20Energy/Kosovo_Energy_Strategy.pdf

2. Energy Regulator Act (OG 05/L–084)

3. Electricity Act (OG 05/L-085)

4. Rule on General Conditions for Energy Supply (ERO/Rule No.12/2017)

5. Rule on Disconnection and Reconnection of Consumers in the Energy Sector (ERO/Rule No. 09/2017)

6. Natural Gas Act (OG 05/L – 082)

7. Act on the Status and the Rights of the Martyrs, Invalids, Veterans, Members of Kosova Liberation Army (KLA), Civilian Victims of War and their Families (OG 04/L-054) (amended by Act no. 04/L-172 on amending and supplementing Act no. 04/L-054 on the Status and Rights of the Martyrs, Invalids, Veterans, Members of Kosovo* Liberation Army, Sexual Violence Victims of the War, Civilian Victims and their Families)

8. Social Assistance Scheme Act (OG 2003/15) (amended by Act No. 04/L-096 on amending and supplementing Act no. 2003/15 on the Social Assistance Scheme in Kosovo*)

3.5 Moldova

3.5.1 Summary

The strategic documents drafted and updated within the framework of Moldova's international commitments perceive energy poverty issues without further elaboration of criteria, measures, and responsibilities for its alleviation.

Legal aspects of the issue of energy poverty are currently covered by energy and social assistance legislation. Legislation on the energy sector (Energy Act, Natural Gas Act, Electricity Act) recognizes categories of vulnerable consumers as socially disadvantaged categories, according to social assistance legislation, and is handled by specific support schemes within the social protection system. A definition of energy poverty is provided in the Energy Efficiency act.

3.5.2 Strategic planning documents

3.5.2.1 2030 Agenda for Sustainable Development (DSA)

In September 2015, as a member of the UN, the Republic of Moldova made commitments to implementing the 2030 Development Sustainable Agenda (DSA), by adopting the Declaration of the Summit on Sustainable Development, announcing that by 2030 key actors in society will make common cause to eliminate all forms of poverty, combat inequalities and address environmental and climate change issues.[16] One of the DSA goals is the reduction of poverty and ensuring access to affordable, reliable, sustainable, and modern energy for all citizens. The SDA goal of energy poverty reduction is intended to be achieved by means of an increasingly strong social protection system and by integrating an inclusive development perspective into all sector policies. Under the 2020 Voluntary National Review Progress Report,[17] the Moldova 2030 National Development Strategy as well as the 2030 Moldova Energy Strategy emphasize the goal of affordable, reliable, and sustainable energy.

3.5.2.2 The 2030 Moldova National Development Strategy (NDS)

In September 2017, the Moldovan Government commenced development of a new long-term national strategy for the period leading up to 2030, that covers Moldovan international commitments including DSA 2030, and secondly the Association Agreement between the Republic of Moldova, as one of the parties, and the European Union and European Atomic Energy Community with their Member States, as the other party (signed in 2014).

The main strategic planning document is the 2030 Moldova National Development Strategy (NDS).[18] The strategy sets long-term sectoral development priorities, focusing on improving the quality of citizens' lives. The 2030 Moldova NDS sets the four basic pillars of sustainable development with ten long-term objectives. The first pillar is a sustainable and inclusive economy and aims to increase people's access to infrastructure, public utilities, and living conditions, as well as increasing income from sustainable sources and mitigating economic inequalities. Another pillar of the NDS is to guarantee citizens the fundamental right of access to a healthy and safe environment.

[16] https://www.md.undp.org/content/moldova/en/home/sustainable-development-goals.html

[17] https://sustainabledevelopment.un.org/content/documents/26346VNR_2020_Moldova_Report_English.pdf

[18] https://mei.gov.md/en/content/national-development-strategy-moldova-2030

3.5.3 Legal documents

3.5.3.1 Energy-related legislation

3.5.3.1.1 2030 Moldovan Energy Strategy (ES)

The 2030 Moldovan Energy Strategy (ES) adopted by Government Decision No. 102 of 5 February 2013,[19] provides guidelines for development of the national energy sector and ensures the necessary grounds for economic growth and social welfare. The ES aims to create a strong legal, institutional, and operational framework for a competitive, effectively open market, setting up energy prices transparently and fairly, and integrating the Moldovan energy market into the EU internal market. According to the ES, the national priority is to ensure affordable and clean energy. Given the lack of proprietary energy resources, promoting energy efficiency and using renewable energy reduces dependency on external sources and is prerequisite for sustainable economic development.

3.5.3.1.2 National Integrated Energy and Climate Action Plan (NEACP)

The NEACP is to be prepared by line ministries and approved by the end of 2021. It will present the Moldovan Government's vision on how to achieve its environmental and energy goals by 2030.

3.5.3.1.3 2011-2030 National Energy Efficiency Program (NEEP)

The 2011-2020 National Energy Efficiency Program (NEEP), adopted by Government Decision No. 833 of 10 November 2011[20] sets prioritized policies and actions for implementation in the period 2011-2020 in meeting challenges resulting from energy prices increases, a dependency on imported energy, and impact of the energy sector on climate change. Implementation of the NEEP is ensured through the National Energy Efficiency Action Plan (NEEAP) and National Renewable Energy Action Plan (NREAP).

3.5.3.1.4 2019-2021 National Energy Efficiency Action Plan (NEEAP)

The NEEAP for the period 2019-2021 was approved by Government Decision No. 698 in December 2019.[21] The Energy Efficiency Agency is responsible for implementation of the NEEAP. In the summer of 2020, Moldova submitted the fourth Annual Progress Report to the EnC in line with the Energy Efficiency Directive. The NEEAP identifies measures for increasing efficiency in the residential sector but fails to specify direct measures in alleviating energy poverty.

3.5.3.1.5 Long-Term Renovation Strategy (LTRS)

Moldova has drafted the LTRS for mobilizing investments for the purpose of renovating the national stock of residential and commercial buildings, both public and private. The strategy and roadmap is to include national policies, actions, and measures in alleviating energy poverty.

3.5.3.1.6 National Renewable Action Plan (NREAP)

NREAP[22] is a key document for the Republic of Moldova regarding energy policies for utilizing renewable energy sources (RES) and aims to fulfil the main strategic objectives such as increasing

[19] Government decision No. 102 from 05.02.2013 on the Energy Strategy of the Republic of Moldova until 2030 art Nr: 146 (http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=346670)

[20] Government decision No. 833 of 10.11.2011 on the National Energy Efficiency Program 2011-2020 (http://lex.justice.md/viewdoc.php?action=view&view=doc&id=340940&lang=1)

[21] Government Decision no. 698 of 27.12.2019 on the National Action Plan in the field of energy efficiency for the years 2019-2021 (https://www.legis.md/cautare/getResults?doc_id=119890&lang=ro)

[22] Government Decision No. 1073 dated 27 December 2013 on the National Renewable Energy Action Plan of the Republic ff Moldova for 2013-2020 (https://www.legis.md/cautare/getResults?doc_id=103148&lang=ro)

security of supply, sustainable development, and mitigating climate change. The NREAP defines sectoral targets aimed at achieving 20% of RES in 2020, defining required legislative, regulatory administrative actions to achieve the targets.

Small-scale cogeneration and heating projects in small towns and villages are a critical issue on the Government's policy agenda. Priority will be given to vulnerable groups in poor rural and urban areas to take advantage of sustainable socioeconomic development opportunities based on adequate regional and local policies.

3.5.3.1.7 Energy Act

The purpose of the Energy Act (No. 174 of 21 September 2017)[23] is to establish basic principles for providing consumers with quality energy in a fair, transparent, and non-discriminatory manner as well as ensuring consumer protection (Article 2, paragraph e and f). Article 6 outlines that local public administration authorities are to contribute to establishing a reliable and efficient energy supply for local consumers. They are responsible for allocation of financial resources, within the constraints of local budgets and the granting of subsidies **for energy bills**. In a wider context of protection of consumers including vulnerable consumers, the responsibilities of the regulatory agency for tariff regulation, ensures protection of consumer rights and consideration of quality of supply services supply (Article 12).

3.5.3.1.8 Natural Gas Act

The Natural Gas Act (No. 108 of 27 May 2016)[24] defines a **vulnerable consumer** as a household consumer who, based on normative acts for social protection, is defined as a disadvantaged person or member of a disadvantaged family (Article 2). Article 84 regulates the protection of vulnerable consumers. It states that vulnerable consumers receive protection from social protection policies and benefits from special social protection measures, all of which does not prevent the effective opening and functioning of the natural gas market. Furthermore, the article stipulates that suppliers may apply assistance mechanisms to avoid interruption of natural gas supplies to vulnerable consumers, including in the event of overdue payments by consumers.

3.5.3.1.9 Electricity Act

The Electricity Act (No.107 of 27 May 2016)[25] defines a **vulnerable consumer** as a household consumer who, in line with normative acts for social protection, is a disadvantaged person or member of a disadvantaged family (Article 2). Furthermore, Article 67 regulates the protection of vulnerable consumers and affording protection to vulnerable consumers based on social protection policies and benefit from special social protection measures, where such policies do not prevent the effective opening and functioning of the electricity market. Electricity suppliers may apply assistance mechanisms for vulnerable consumers to prevent interruption to electricity supply to this category of consumers, even in the event of overdue payments.

3.5.3.1.10 Act on Heat and Promotion of Cogeneration

The Act on Heat and Promotion of Cogeneration (No. 92 of 29 September 2014)[26] declares consumer protection as its objective, as well as ensuring the quality, reliability, and continuity of

[23] http://lex.justice.md/md/371969/

[24] http://lex.justice.md/md/ 365664/ as amended on 26-07-2018

[25] http://lex.justice.md/md/365659%20/ as amended on 26-07-2018

[26] http://lex.justice.md/viewdoc.php?action=view&view=doc&id=353698&lang=1

heat supplies, affordability of tariffs for heat consumers, and protecting the rights of heat consumers (Articles 3 4).

3.5.3.1.11 Energy Efficiency Act

The Energy Efficiency Act (No. 139. of 19 July 2018)[27] specifically defines **energy poverty** as a situation characterized by the final consumer's lack of access to modern sources of energy and technologies, and also a decrease in purchasing power concerning energy resources, in particular fuels for preparing food, electricity and heat, as well as a lack of thermal comfort in homes or buildings (Article 3). Energy efficiency schemes give priority to energy efficiency measures with a social dimension, including **measures aimed at reducing energy poverty** and **improving the living conditions of vulnerable consumers** (Article 8).

3.5.3.1.12 Amendments of legislation

The Electricity Act and Natural Gas Act are currently being amended. Provisions on energy poverty will either be introduced in these two acts or the Energy Act.

3.5.3.2 Non energy related legislation

3.5.3.2.1 Social Assistance Act

The Social Assistance Act (No. 133 of 13 June 2008)[28] provides specific eligibility criteria for the disadvantaged families entitled to state assistance during the five cold months from November to March. The social benefits are calculated by comparing a family's total income and the monthly guaranteed income per family member. More detailed provisions regarding the benefits paid out during the cold period are provided in the Regulation on Modality of Establishing and Paying Social Assistance (No. 1167 of 16 October 2008).[29]

The right to receiving social benefits as assistance for the cold months requires either submitting the application individually by filling in the special request form or requesting assistance from a social protection unit at the local public administration. Assessment of requests is conducted using an automated information system called Social Assistance, run by the Ministry of Health, Labor, and Social Protection, which corroborates data and identifies possible inconsistencies. Social workers use this electronic platform to determine status eligibility. The heads of social assistance units authorize social assistance payments every month, which can also take place retroactively. The National House of Social Insurance executes the payments, based on annual financing programs and transfers from the Ministry of Finance. Importantly, social assistance or, as the case may be, financial assistance for the cold period of the year, is granted in the month in which the grant request is officially received on the territory of the state institution providing social assistance. These benefits are not granted retroactively.

3.5.3.2.2 Local Public Administration Act

The Local Public Administration Act (No. 436 of 28 December 2006)[30] sets out the competencies of local authorities (councils and mayors) regarding the provision of social protection (Article 14 and Article 29).

[27] https://www.legis.md/cautare/getResults?doc_id=105498&lang=ro

[28] http://lex.justice.md/viewdoc.php?id=329197&lang=1

[29] http://lex.justice.md/md/329399/

[30] http://lex.justice.md/document_rom.php?id=C8E304A4:037190E8

3.5.3.2.3 The Housing Act

The Housing Act (No. 75 of 30 April 2015)[31] stipulates that social housing is provided only to those families whose monthly income per family member does not exceed the set threshold (Article10). Socially vulnerable groups are obliged to update the mayor's office of any changes in income and may payments for bills including energy bills may be delayed (Article 17).

3.5.4 Institutional framework

At the state level, responsibilities are currently divided between the Ministry of Health, Labor and Social Protection, National Social Insurance House (NSIH), and the National Statistics Office. At the local level, involvement comes from the mayor's office, social protection unit, and service suppliers. In the energy sector, the Ministry of Economy and Infrastructure is responsible for energy sector policies and legislation. In the wider context of energy consumer protection, including vulnerable consumers, importance is also placed on the responsibilities of the National Agency for Energy Regulation (ANRE) for tariff regulation which ensures protection of consumer rights and quality of service for supplies. Given the importance of improving energy efficiency in households which in turn contributes to reducing energy poverty, activities and programs implemented by the Agency for Energy Efficiency (AEE) are also important. The AEE has administrative powers and falls under the Ministry of Economy and Infrastructure, which has the mission of implementing state policy in the field of energy efficiency, energy performance of buildings and the use of renewable energy sources, including attracting and managing financial resources in order to finance projects in those areas.

3.5.5 Current schemes to protect vulnerable consumers

3.5.5.1 Description

In Moldova, there are two mechanisms for providing support to vulnerable consumers: 1) at the state level through two targeted social assistance programs, and 2) at the local level, in the municipalities of Chisinau and Balti in the national capital.

3.5.5.1.1.1 State assistance

The Social Assistance Program aims to guarantee a minimum monthly income for disadvantaged families through social assistance grants based on assessments of a family's average monthly global income and need for social assistance.

At present, this national program has two basic components, i.e., social assistance and assistance for the cold period of the year (*Ajutor pentru Perioada Rece a Anulu,* APRA).

The holder of social assistance or assistance for the cold period of the year, is the applicant whereas the family is the beneficiary. In terms of the Social Assistance Act No. 133/2008,[32] the family is defined as consisting of two or more persons living in the same residence and supported by a common budget.

The mechanism for social assistance and assistance for the cold period of the year is based on a number of basic elements. To become a beneficiary of social assistance or aid for the cold period of the year, a family must fulfil the following conditions:

- Earn a monthly income below the minimum monthly income guaranteed by the state, and calculated for families in accordance with Article 7 of the Social Assistance Act,

[31] http://lex.justice.md/md/358764/

[32] http://lex.justice.md/viewdoc.php?id=329197&lang=1

- The occupational status of adult family members must comply with Article 5 of the Social Assistance Act, and
- The score calculated from indicators for family well-being and family characteristics (proxy test) must be less than or equal to 91.28 (the threshold set in the Regulation on the Method of Determining and Paying Social Assistance, as approved by Government Decision no. 1167/2008).[33] The list of characteristics and related score for assessment of family welfare is reflected in Annex No. 5 to mentioned Regulation.

Only if fulfilling these qualification conditions across all aspects, will the household be granted social assistance or assistance for the cold period of the year, based on its application submitted along with the required documents.

The monthly amount of social assistance is set as the difference between the family's guaranteed minimum monthly income (*venitului lunar minim garantat*, VLMG) and its total earned income.

After indexation, the amount of the guaranteed minimum monthly income, used to calculate entitlement to social assistance, as of 1 April 2021, constitutes MDL 1151 (after indexation as of 1 April 2020, it amounts to MDL 1107, and during the state of emergency from April to May 2020 it amounted to MDL 1300).

An important consideration to make is that the right to assistance for the cold period of the year is based on calculating a family's minimum guaranteed monthly income from the guaranteed minimum monthly income increased by a factor of 2.2 (i.e., MDL 1151 * 2.2 = MDL 2,532.20).

Assistance for the cold period of the year was introduced in the National Social Assistance Program in 2011. It is a fixed monthly cash payment, granted to disadvantaged families for the period from January to March and November to December. It currently amounts to 500 lei/per month.

According to Article 9 of the Social Assistance Act, social assistance and assistance for the cold period of the year are defined by the Social Assistance Policy Directorate for low-income families, the elderly and veterans at the Ministry of Health, Labor and Social Protection.[34]

Regarding the number of social assistance beneficiaries, in all 96,067 disadvantaged families have benefited from at least one social assistance payment in 2020 and 245,425 disadvantaged families have benefited from assistance for the cold period of the year. The average payment of the social assistance benefit in 2020 was MDL 1060.

3.5.5.1.1.2 Local assistance in Chisinau

In line with the Regulation on Subsidies for Household and Energy Services,[35] certain socially vulnerable families in Chisinau such as low-income families (with a total income less than MDL 3,000, or approx. EUR 150) and additionally includes (based on amendments to the Regulation in December 2019) young families with a maximum total average income of MDL 5000 (approx. EUR 250), are entitled to subsidies for heating costs in the cold period of the year. The amount of aid

[33] http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=329399

[34] http://www.msmps.gov.md

[35] Decision no. 22/1 of December 22, 2020 "On the operation of amendments in the Decision of the Chisinau Municipal Council no. 15/6 of 22.12.2017, "On the approval of the Regulation on the compensation of expenses for disadvantaged persons in Chisinau municipality when making payments for communal services and energy resources" https://www.chisinau.md/doc.php?l=ro&id=32264&idc=408&t=/Consiliul/Activitatea-Consiliului/Decizii-CMC/Decizia-nr-221-din-22-decembrie-2020-Despre-operarea-de-modificari-in-Decizia-Consiliului-municipal-Chiinau-nr-156-din-22122017-Cu-privire-la-aprobarea-Regulamentului-privind-compensarea-cheltuielilor-pentru-persoanele-defavorizate-din-municipiul-Chiinau-la-efectuarea-platilor-pentru-serviciile-comunale-i-resursele-energetice/

granted for covering energy costs during the cold months of 2018-2019 was 40% of energy payment costs.[36]

Payments from Chisinau City Hall are transferred directly to the bank account of Termoelectrica as the heating energy provider, thus avoiding any risks of failing to purposefully use the financial assistance [9].

3.5.5.2 Assessment

In Moldova, two types of national measures and a local measure are offered to households in need for the purpose of subsidizing energy expenses.

National measures are described as social assistance programs and cover the poorest families using income as a criterion and heating-related social programs as complementary to social assistance. The local measure is a subsidy for heating costs in Chisinau and Balti.

The identified measures are not expected to tackle behavioral change or small investments by beneficiaries, which would otherwise increase energy efficiency and decrease energy consumption, and subsequently greenhouse emissions from energy sources. Current measures represent short-term aid to energy-poor households and are not considered a possible solution to alleviating energy poverty.

Table 3-13. Summary of the measure Ajutor Social (AS)

no.	Item:	Measure 1
1	Name of the measure in English	Social Assistance (SA)
2	Eligibility criteria	Low-income households
3	Number of eligible households / individuals	96,067 households
4	Is the measure gender sensitive	No
5	Description of the measure	Monthly payment in cash granted to a disadvantaged family – based on the difference between a family's guaranteed minimum monthly income (venitului lunar minim garantat, VLMG) and its total income, contributing to a score from welfare indicators lower than that established for assessing family welfare (social assistance eligibility requires that this indicator be less than 91.28)
6	Period during which the measure has been in force	For 12 calendar months
7	Implementation interval	Monthly
8	Maximum amount of financial support per beneficiary in the implementation interval	The monthly amount of social assistance is established as the difference between a family's minimum guaranteed monthly income (from 1 April 2021 and is equivalent to MDL 1151 (after the indexation from 1 April 2020 it is amounts

[36]https://www.chisinau.md/libview.php?l=ro&idc=403&id=27801&t=/Presa/Comunicate-de-presa/Compensarea-cheltuielilor-familiilor-defavorizate-la-efectuarea-platilor-pentru-serviciile-comunale-i-resursele-energetice-in-sezonul-rece-2019-2020

		to MDL 1107, and during the state of emergency from April to May 2020 it was MDL 1300).
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year in which financial costs are based	2020
11	Administrative level	State
12	Financing source	State
13	Energy source covered	General purpose assistance

Table 3-14. Summary of the measure Heating Assistance (HS)

no.	**Item:**	**Measure 2**
1	Name of the measure in English	Social assistance (Heating Assistance - HS) or assistance for the cold period of the year
2	Eligibility criteria	All recipients of AS and households with income below 2.2 times the Guaranteed Minimum Income
3	Number of eligible households / individuals	245,425 beneficiary households
4	Is the measure gender sensitive	No
5	Description of the measure	HA complements AS in order to subsidize the poor for the increased cost of living during the cold period of year
6	Period during which the measure has been in force	For the period from January to March and November to December
7	Implementation interval	Fixed monthly payment
8	Maximum amount of financial support per beneficiary in the implementation interval	MDL 500
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year on which financial costs are based	2020
11	Administrative level	State
12	Financing source	State
13	Energy source covered	Heating

Table 3-15. Summary of the measure Local Assistance in Chisinau and Balti

no.	Item:	Measure 3
1	Name of the measure in English	Local assistance in Chisinau and Balti
2	Eligibility criteria	Socially vulnerable families (low-income families with incomes below MDL 3,000 and young families with incomes below MDL 5000)
3	Number of eligible households / individuals	30,000 – 40,000
4	Is the measure gender sensitive	No
5	Description of the measure	Payments from Chisinau City Hall are transferred directly to the bank account of the heating energy provider
6	Period during which the measure has been in force	During cold months
7	Implementation interval	Cold period of year
8	Maximum amount of financial support per beneficiary in the implementation interval	450 lei
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year in which financial costs are based	2018-2019
11	Administrative level	Municipality
12	Financing source	Municipality
13	Energy source covered	District heating

3.5.6 List of analyzed legislative acts

1. 2030 Agenda for Sustainable Development (DSA) (www.md.undp.org/content/moldova/en/home/sustainable-development-goals.html
2. 2020 Voluntary National Review Progress Report (https://sustainabledevelopment.un.org/content/documents/26346VNR_2020_Moldova_Report_English.pdf)
3. 2030 Moldova National Development Strategy (NDS) (https://mei.gov.md/en/content/national-development-strategy-moldova-2030)
4. 2030 Moldovan Energy Strategy (ES) (http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=346670)
5. 2011-2020 National Energy Efficiency Program (NEEP) (http://lex.justice.md/viewdoc.php?action=view&view=doc&id=340940&lang=1)
6. 2019-2021 National Energy Efficiency Action Plan (NEEAP) (https://www.legis.md/cautare/getResults?doc_id=119890&lang=ro)

7. National Renewable Action Plan (NREAP) (https://www.legis.md/cautare/getResults?doc_id=103148&lang=ro)
8. Regulation on Modality of Establishing and Paying Social Assistance (No. 1167 of 16 October 2008) (https://www.legis.md/cautare/getResults?doc_id=125906&lang=ro)
9. Local Public Administration Act (No. 436 of 28 December 2006) (http://lex.justice.md/document_rom.php?id=C8E304A4:037190E8)
10. Social Assistance Act (No. 133 of 13 June 2008) (http://lex.justice.md/viewdoc.php?id=329197&lang=1)
11. Housing Act (No. 75 of 30 April 2015) (http://lex.justice.md/md/358764/)
12. Electricity Act (No.107 of 27 May 2016) (http://lex.justice.md/md/365659%20/ as amended on 26-07-2018)
13. Natural Gas Act (No. 108 of 27 May 2016) (http://lex.justice.md/md/365664/ as amended on 26-07-2018)
14. Energy Act (No. 174 of 21 September 2017) (http://lex.justice.md/md/371969/)
15. Energy Efficiency Act (No. 139. of 19 July 2018) (https://www.legis.md/cautare/getResults?doc_id=105498&lang=ro)
16. Act on Heat and the Promotion of Cogeneration (No. 92 of 29 May 2014) (http://lex.justice.md/viewdoc.php?action=view&view=doc&id=353698&lang=1)
17. Regulation on the Method of Determining Social Assistance Payments, as approved by Government Decision No. 1167/2008 (http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=329399)

3.6 Montenegro

3.6.1 Summary

In 2018, the Montenegrin Government adopted the Ordinance on Supplying Electricity to Vulnerable Consumers, as proposed by the Ministry of Economy, in line with the Energy Act, providing formal recognition of energy vulnerability. Current legislation does not formally tackle energy poverty, as the term is only mentioned in certain strategic documents and action plans.

More improvements are needed in widening the definitions of energy vulnerability by widening the scope of vulnerable groups, as well as developing secondary legislation to enable better and wider implementation. A **national definition of energy poverty is also needed** to enable statistical monitoring of its prevalence as well as providing the basis for better targeting of measures. Greater focus should be placed on alleviating causes of energy poverty by providing support for various energy efficiency improvements among vulnerable groups. A key document for planned energy efficiency improvements is the fourth National Energy Efficiency Action Plan (NEEAP) for the period 2019-2021, which does not specify any particular measures for alleviating energy poverty or protecting the vulnerable consumers.

The 2021-2030 National Energy and Climate Action Plan (NECP) is currently being drafted and will include energy poverty as a key dimension.

3.6.2 Strategic documents

The Montenegrin 2030 Energy Development Strategy (May 2014) notes that the energy regulatory agency will become more involved in consumer protection, including collaboration with the competent social welfare authority, on matters concerning the delivery and implementation of legislation for protecting vulnerable energy consumers, according to the Energy Act. The 2016-2020 Action plan for Energy Development Strategy lists **protection of the vulnerable consumers** as one of the main strategic aims and recommendations upon which Montenegrin energy policy for the social protection of vulnerable energy consumers is based, as well as providing of social protection for redundant members of the workforce (unemployed) which might occur during transformation of the energy sector (Goal 17).

3.6.3 Legal and legislative framework

3.6.3.1 Energy Act

The Energy Act (OG 5/16, 51/17, and 82/20), in Article 196, defines obligations of the supplier of last resort and vulnerable consumers. It applies to both those supplying electricity and gas , whereas Article 198 defines **vulnerable consumers as those experiencing health and social vulnerability** if household has a member with a disability, special needs, or poor health status, which are life threatening or bring on poor health due to limited or the halting of energy supplies, or those with a status of **needing welfare,** as determined by the competent social welfare authority.

3.6.3.2 Energy Efficiency Act

The Energy Efficiency Act (OG 057/14, 003/15, 025/19) does not specifically mention energy poverty or energy vulnerability. It does, however, impose the obligation of improving energy efficiency in households, and delivering national energy efficiency action plans to tackle such issues.

3.6.3.3 2019-2021 National Energy Efficiency Action Plan

The 4th National Energy Efficiency Action plan mentions energy poverty within the measure E.7, Development of decentralized energy production on buyer side (prosumers). The measure plans

to contribute to energy poverty reduction by reducing overall energy burden by empowering consumers to become prosumers.

3.6.3.4 2019-2021 National Program for Consumer Protection

The National Program for Consumer Protection (December 2018) defines all legislation related to consumer protection, as well as energy. It states that the national energy regulatory agency is the key body delivering and monitoring implementation of legislation aimed at protecting **vulnerable energy consumers**. In addition to basic consumer rights, the Energy Act also defines additional protective measures for vulnerable consumers who are **socially vulnerable or of poor health.** The program also states that plans covering the period 2019-2021 places an emphasis, among other things, on **protecting vulnerable groups**.

3.6.3.5 Ordinance on Supplying Electricity to Vulnerable Consumers

The Ordinance on Supplying Electricity to Vulnerable Consumers (OG 81/2018) defines eligibility criteria for acquiring the status of a vulnerable consumer based on the social and health status of household members, where obtained rights are used for:

- Securing material support, domestic care and assistance allowance, as well as disability allowance (first group)
- Socially vulnerable households which utilize their right in securing material support are also considered vulnerable consumers (second group).

Vulnerable consumers from the first group are entitled to a subsidy covering 50% of their total monthly electricity bill up to a maximum of 600 kWh/month, however if they exceed 600 kWh per month, they are still entitled to a subsidy for a maximum of 300 kWh. **Households from the second group are not entitled to any financial support**.

3.6.4 Institutional framework

The competent authority for most energy-related issues is the Ministry of Capital Investments as well as the National Energy Regulatory Agency. Under the scope of those designated as socially vulnerable, the competent authority is the Ministry of Finance and Social Welfare. In addition, the Eco Fund was established by Decision of the Montenegrin Government in November 2018 for the purpose of becoming the central national institution for financing and providing technical support for projects and programs relating to the environment, climate change and energy. The "polluter pays" principle is one of the economic instruments according to which the Eco Fund collects funds and promotes reducing adverse environmental effects.

3.6.5 Current schemes to protect vulnerable consumers

3.6.5.1 Description

The Energy Act views vulnerability in broader terms than does secondary legislation. According to the Ordinance on Supplying Electricity to Vulnerable Consumers, only about 400-700 households (vulnerable consumers requiring health and social care) were entitled to a subsidy covering 50% of their monthly electricity bills for up to 600 kWh of consumed electricity. If a vulnerable customer requiring health and social care has a monthly consumption exceeding 600 kWh, the subsidy covers 50% of the monthly electricity bill up to 600 kWh. The Energy Act completely prohibits suspending electricity supplies to vulnerable consumers who require health and social care, while for vulnerable consumers requiring social care, the suspension is prohibited from the beginning of October to the end of April, regardless of possible overdue bills for consumed electricity.

The Energy Act and the Ordinance on Supplying Electricity to Vulnerable Consumers stipulate that only those individuals who are socially vulnerable and of poor health are entitled to subsidies.

This is more restrictive than the framework in place since 2007 and prior to the adoption of the Ordinance. Consequently, the former Ministry of Work and Social Care has suggested that the Montenegrin Government continue subsidizing electricity bills under the Guidance on the Procedure and Manner of Implementing the Electricity Bill Subsidization Program. The application of this Guidance will continue in 2021. The subsidy amounts are as follows:

- 40% of the final bill up to a total of EU 60, and for bills higher than EUR 60, the proposal is to provide a subsidy equivalent to EUR 24. Eligible consumers for this scheme include:
    - Beneficiaries of material social welfare support and users of social housing in line with the Act on Social Protection and Child Protection
    - Beneficiaries of material social welfare support for war veterans
- Beneficiaries receiving disability support are eligible to receive a 30% subsidy on bills up to 60 EUR, and EUR 18 for bills exceeding 60 EUR.

3.6.5.2 Assessment

There are two identified financial measures at the national level offered to socially vulnerable households for electricity expenses. Both are based on subsidies for electricity bills with eligibility criteria for 2 groups of consumers: health and social status

a) First group: Vulnerable consumers based on the social and health status of household members who exercise their right to receive material welfare support and assistance for domestic care and support, or disability support are entitled to a subsidy covering 50% of their electricity bill for a maximum of 600 kWh of consumed electricity.
b) Second group: Socially vulnerable households that exercise their right to receive material welfare support are also considered vulnerable consumers and are eligible for a subsidy covering 40% their electricity bill for bills up to 60 EUR. For bills higher than 60 EUR, the subsidy is 24 EUR. Beneficiaries receiving disability support are eligible for a subsidy covering 30% of their bills up to 60 EUR, whereas bills higher than 60 EUR means that the subsidy is 18 EUR.

Measures for protecting energy vulnerable consumers in Montenegro are currently limited to direct financial support and prohibiting the halting of electricity supplies to vulnerable customers. Though these measures do offer some financial relief to the most vulnerable groups, they are exceptionally limited in alleviating the main effects of energy poverty. Such measures do not contribute to improving the quality of energy services, and do not contribute to reducing CO_2 emissions and protecting the environment. The eligibility criteria currently set up offer a good starting point in alleviating energy poverty; however, such criteria are narrow and limited only to the most vulnerable groups. The current eligibility criteria do not take into consideration gender factors.

Table 3-16. Summary of the measure Subsidy for Electricity Bills

no.	Item:	Measure 1
1	Name of the measure in English	Subsidy for Electricity Bills (Ordinance on Supplying Electricity to Vulnerable Consumers)
2	Eligibility criteria	Vulnerable consumers based on the social and health status of household members, and who exercise the right to receiving (in the first group): • Material support, domestic care and assistance allowance, and disability allowance.

3	Number of eligible households / individuals	approx. 400-700
4	Is the measure gender sensitive	No
5	Description of the measure	Vulnerable consumers are entitled to a subsidy covering 50% of their electricity bills up to a maximum of 600 kWh of consumed electricity (if exceeding 600kWh, they are still entitled to a 50% subsidy, i.e., for a maximum of 300kWh of consumed electricity).
6	Period during which the measure has been in force	Since 2019
7	Implementation interval	Monthly (requests and rules edited yearly)
8	Maximum amount of financial support per beneficiary in the implementation interval	50% of monthly electricity bills, for a maximum of 600 kWh of consumed electricity (300 kWh paid according to current pricing)
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year in which financial costs are based	N/A
11	Administrative level	National
12	Financing source	National
13	Energy source covered	Electricity

Table 3-17. Summary of the measure Subsidy for Electricity Bills According to the Guidance Issued by the Government

no.	**Item:**	**Measure 2**
1	Name of the measure in English	Subsidy for Electricity Bill (Guidance on the Procedure and Manner of Implementing the Electricity Bill Subsidization Program)
2	Eligibility criteria	Beneficiaries of material social welfare support and users of social housing according to the Act on Social Protection and Child Protection Beneficiaries of material social welfare support for war veterans Beneficiaries of disability support
3	Number of eligible households / individuals	17,000 – 21,000
4	Is the measure gender sensitive	No
5	Description of the measure	Beneficiaries of material social welfare support for war veterans and beneficiaries of material social welfare support and users of social

		housing in accordance with the Act on Social Protection and Child Protection: subsidy covering 40% of bills up to EUR 60, whereas for bills higher than EUR 60, the subsidy is EUR 24. Beneficiaries of disability support: subsidy covers 30% of bills up to 60 EUR, and the subsidy is EUR 18 for bills higher than 60 EUR.
6	Period during which the measure has been in force	Since 2019 (a similar measure was implemented prior to the Ordinance on Supplying Electricity to Vulnerable Consumers was put into effect, this measure was introduced as a supplementary step given that the Ordinance came into force to ensure wider reach)
7	Implementation interval	Monthly (requests and rules edited yearly)
8	Maximum amount of financial support per beneficiary in the implementation interval	24 EUR (amounts differ for the category and amount of electricity used)
9	Total amount of financial support provided to applicants in the implementation interval	EUR 2,707,412.21
10	Year in which financial costs are based	2018
11	Administrative level	National
12	Financing source	National
13	Energy source covered	Electricity

3.6.6 List of analyzed legislative acts

1. 2030 Energy Development Strategy for Montenegro https://mek.gov.me/ResourceManager/FileDownload.aspx?rid=186208&rType=2&file=Energetska%20politika%20Crne%20Gore%20do%202030.%20godine.pdf
2. 2016-2020 Action plan for Energy Development Strategy https://mek.gov.me/ResourceManager/FileDownload.aspx?rid=227342&rType=2&file=Predlog%20akcionog%20plana%20za%20sprovo%C4%91enje%20Strategije%20razvoja%20energetike%20Crne%20Gore%2031.pdf
3. Energy Act (OG 5/16, 51/17 and 82/20)
4. Energy Efficiency Act (OG 057/14 od 26.12.2014, 003/15, 025/19)
5. 2019-2021 National Energy Efficiency Action Plan https://www.klimatskepromjene.me/wp-content/uploads/2019/08/Akcioni-plan-energetske-efikasnosti-za-period-2019-2021.-godina-4.-APEE.pdf
6. 2019-2021 National Consumer Protection Program https://www.gov.me/ResourceManager/FileDownload.aspx?rId=344503&rType=2&alphabet=cyr

7. Ordinance on Supplying Electricity to Vulnerable Consumers (OG 81/2018) https://www.gov.me/ResourceManager/FileDownload.aspx?rId=339777&rType=2

3.7 North Macedonia

3.7.1 Summary

North Macedonia recognizes vulnerable consumers in its laws and other official documents. The Strategy for Energy Development of the Republic of North Macedonia until 2040 obliges the Government to define programs for the protection of vulnerable consumers. The Energy Act and the Social Protection Act provide the legal basis for the annual Program for the Protection of Vulnerable Energy Consumers, which defines vulnerable consumers and conditions for utilizing funds targeting vulnerable energy consumers. It also defines Electricity Supply Rules obliging energy suppliers to supply energy (electricity and natural gas) to vulnerable consumers. According to the current 2021 Program for Protection of Vulnerable Energy Consumers, the government is expected to provide a total of MKD 8,000,000 (EUR 131,000) for vulnerable consumers via the Program.

Another step is the 2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households, defines various measures for promoting energy efficiency and renewable energy. Program funds amount to MKD 46,000,000 (EUR 842,606) and are aimed at both the entire population and socially vulnerable groups (EUR 131,000 mentioned in the 2021 Program for Protection of Energy Vulnerable Consumers).

3.7.2 Strategic documents

3.7.2.1 The Strategy for Energy Development of the Republic of North Macedonia until 2040

The draft of the Strategy for Energy Development of the Republic of North Macedonia until 2040 (the Strategy) relies on relevant global, EU energy policies and trends, and particularly Energy Community acquis. The Strategy envisages adopting a **program for vulnerable consumers**. The program should define categories of vulnerable consumers and associated measures, including financial assistance and institutions responsible for implementing the program.

3.7.2.2 2021-2023 Economic Reform Program

The draft of the 2021-2023 Economic Reform Program mentions the 2020 Program for Protecting Vulnerable Energy Consumers and envisages a new similar program for 2021. The government is expected to provide a total of MKD 8,000,000 (EUR 131,000) through the 2021 Program for Protecting Vulnerable Energy Consumers, i.e., assistance against energy poverty.

3.7.3 Legal and legislative framework

Legal support for protecting vulnerable consumers includes two main laws: the Energy Act and the Social Protection Act.

3.7.3.1 Energy Act

The 2018 Energy Act (Official Gazette No. 08-3424/1) stipulates that the Government shall, having received opinion from the Energy Regulatory Commission, adopt the annual Program for Protecting Vulnerable Energy Consumers for the coming year. The annual Program determines the following:

- Consumers belonging to the category of vulnerable consumers,
- Measures for protecting vulnerable energy consumers, including energy consumption subsidies intended for households otherwise not envisaged in the energy subsidy program according to social security regulations,
- Measures for energy savings and energy efficiency improvements,

- Manner of implementing measures and the competent authorities responsible for such implementation,
- Measures to be undertaken by the energy distribution systems operators,
- Measures to be undertaken by suppliers obliged with providing a public service i.e., a universal energy supply service, and
- Necessary funds and financing sources.

The Program measures must not distort competition and impede efficient functioning of the electricity, natural gas, and heat energy markets, nor lead to cross-subsidization of certain categories of consumers. Every two years, the Government must notify the Energy Community Secretariat concerning the progress in implementing measures from the annual Program.

Furthermore, the Act anticipates an active role by the Ombudsman in protecting the rights of vulnerable customers under Article 15, paragraph 4 of the Energy Act.

3.7.3.2 Social Protection Act

The Social Protection Act from 2015 (33/15), the Act Amending the Social Protection Act of 2019 (No. 08-4015/1), including the Act Amending the Social Protection Act of 2019 (No. 08-7145/1) define that the Social Welfare Centre is to verify household conditions of persons possessing the right to guaranteed minimum assistance and all adult household members, by providing data on monthly revenues from official records at competent public body, which is the Public Revenue Office under the Ministry of Finance.

The amount of financial social assistance for households is MKD 2,334 (EUR 37.90) and increases by a factor of 0.37 for each additional household member. The right to financial social assistance is paid as the difference between the established amount of financial social assistance and total income achieved by all household members. This financial social assistance is adjusted each year.

3.7.3.3 2021 Program for Protecting Vulnerable Energy Consumers

The Program describes a vulnerable energy consumer as a household fulfilling the following conditions:

a) Receives guaranteed minimum assistance and a cash benefit to cover part of energy consumption costs as stated in Article 7 of the Act on Social Security for the Elderly, and
b) Has a person living in a state of social risk (motherhood, illness, old age, injury, and disability) for which supplying energy and/or the utilizing the network falls under special conditions.

For a household to become eligible as a vulnerable consumer of electricity and natural gas, certain additional conditions must be met. The following conditions for electricity apply:

a) Electricity must be supplied by a universal electricity supplier,
b) The household must have a maximum yearly electricity consumption of 3600 kWh, and
c) The household must have electricity consumption which is measured through a single-phase meter with a rated current of a 25A connecting line or three-phase with the rated current at a 16A fuse.

For natural gas, the household must meet the following conditions:

a) The household must be supplied with gas from a supplier obliged to supply natural gas as a public service, and
b) Annual consumption of natural gas for October to March must not exceed 70 normal cubic meters (from October to March, annually).

Rules for supplying electricity define that the energy supplier is obliged to provide the following to a vulnerable consumer:

1. Information on their right to utilize one or several protection measures,

2. Information on planned disconnection from the grid due to an unpaid invoice at least 40 days prior to disconnection,
3. Delivering energy to vulnerable consumers during December, January, and February, despite an unpaid invoice for previously delivered energy,
4. Delivering energy to vulnerable consumers, despite an unpaid invoice for delivered energy, if no more than 60 days have passed from the due date of the invoice, and
5. Possibility of deferring payments or instalments for the matured debt, where payment of the debt shall be made in at least six equal instalments, requiring an agreement with the vulnerable consumer.

3.7.3.4 2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households

This program envisages various measures for promoting energy efficiency and renewable energy sources. Program funds amount to MKD 52,000,000 (EUR 842,606), come from the national budget and are allocated by the Ministry of Economy.

3.7.3.5 2019 Program for Construction, Sale, and Maintenance of Residential Property Owned by the Republic of North Macedonia

The Program regulates the construction, sale, and maintenance of residential property owned by the Republic of North Macedonia for 2019, by determining the global goal and specific objectives of the program, physical and financial indicators for housing construction, sources of funding, housing sales, management of residential space, maintenance, improvements to housing conditions, determining the lease amount, as well as recording, organization and constructing the residential and business space where the investor is the Republic of North Macedonia.

The purpose of the Program is to continue activities in constructing apartment buildings for people at social risk and other vulnerable groups and includes 32 buildings with 1,725 apartments covering a total area of 72,329.41 square meters, including office space amounting to a total area of 2,121.72 square meters, garages with a total area of 353,97 square meters and 1,681 basements with a total area of 10,651.72 square meters. The business space will be leased, and maintenance funds will be allocated from the lease based on a previously prepared program. Construction of the facilities will be realized in the period 2007-2021[37].

The average cost of construction is 34,941 denars/square meter (567 euros per square meter) excluding VAT. The distribution of these leased apartments is done in line with the Decision on the Distribution of Social Housing as well as the conditions for their use as built according to the program for construction and maintenance of apartments owned by the Republic of North Macedonia. The entire project is to date 45.2% complete, with 9.45% of the project realized in 2019, while the remaining 45.23% will be realized in 2020-2021.

[37] So far, 18 buildings containing 842 apartments have been built, and include a building in Makedonska Kamenica with 29 apartments, two buildings in Skopje (building 3.1 and 3.2) in Gjorce Petrov Jurija with a total of 102 apartments, a building in Kavadarci with 30 apartments, a building in Ohrid with 71 apartments, a building in Kicevo with 32 apartments, two buildings in Kocani with 72 apartments, a building in Kriva Palanka with 46 apartments, a building in Bitola with 78 apartments, a building in Stip with 91 apartments, a building in Berovo with 51 apartments, a building in Resen with 18 apartments, a building in Demir Hisar with 25 apartments, a building in Makedonski Brod with 10 apartments, a building in Prilep with 76 apartments, a building in Strumica with 41 apartments and a building in Gostivar with 70 apartments. In 2019, construction on 10 buildings with 722 apartments will begin, i.e., a building in Pehchevo with 34 apartments, a building in Vinica with 36 apartments, a building in Sveti Nikole with 48 apartments, a building in Skopje (building GP 2.02 from the DUP Gradska Chetvrt S 16 in the Municipality of Butel – previously designated as Bosnia and Herzegovina B 9.3. O-4) with 312 apartments, a building in Probistip with 48 apartments, a building in Negotino with 62 apartments, a building in Saraj with 58 apartments, a building in Debar with 46 apartments and a building in Veles with 29 apartments. The remaining 161 apartments in Suto Orizari, Kumanovo, and Tetovo will be constructed in the period 2020-2021.

In 2019, funds amounting to MKD 310,000,000 (EUR 5,030,457) were allocated for construction of social housing from the budget of the Republic of North Macedonia for 2019, which are in the form of loans, i.e., a loan from the Council of Europe Development Bank.

3.7.3.6 National Energy and Climate Plan of the Republic of North Macedonia

The draft National Energy and Climate Plan of the Republic of North Macedonia (NECP) also envisages development of an annual program for vulnerable consumers ensuring their protection from future price shocks. One of the key targets concerning the internal energy market is implementing annual programs for the benefit of vulnerable consumers, with an appropriate increase in intensity of measures, based on annual needs. The document also lists supply rules adopted by the Energy Regulatory Commission. These are the same rules as those provided in the description of the 2021 Program for Protecting Vulnerable Energy Consumers.

3.7.4 Institutional framework

Institutions that can at the moment make a contribution in the planning stage of implementing and monitoring the effects of the measures are the Ministry of Labor and Social Policy, Ministry of Economy, Energy Agency, Energy Regulatory Commission, various energy companies, Ministry of Finance, Ministry for Transport and Communications, and State Statistical Office.

3.7.5 Current schemes to protect vulnerable consumers

3.7.5.1 Description

Currently, an energy subsidy is granted to beneficiaries of social and permanent social assistance, amounting to MKD 1,000 or EUR 16 per month; however, only one-third of all eligible households have obtained this subsidy, due to requirement to provide official receipts for utility bills.

In 2019, the Strategy for Energy Development of the Republic of North Macedonia until 2040 was adopted, which anticipates adoption of a program specific for vulnerable consumers. The current 2021 Program for Protecting Vulnerable Energy Consumers states that part of the funds, MKD 8,000,000 (EUR 131,000), have been allocated from the national budget of the Republic of North Macedonia for 2021.

In January 2021, the Macedonian Government adopted the Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households for 2021. The funds for the program totaling MKD 52,000,000 (EUR 842,606) are to be used for the following measures:

1. Reimbursement of up to 30% of costs of purchasing and installing solar thermal collector systems in households, but to a maximum of MKD 10,000 (EUR 162) per household in 2021 and totaling overall MKD 6,000,000 (EUR 97,224).
2. Reimbursement of up to 70% of costs for purchasing and installing solar thermal collector systems in households, but to a maximum of MKD 15,000 (EUR 243) per household in 2021 and totaling overall MKD 2,000,000 (EUR 32,408) for low-income persons.
3. Reimbursement of up to 50% of costs for purchasing and installing PVC or aluminium windows in households, but to a maximum of MKD 20,000 MKD (EUR 324) per household in 2021 and totaling overall MKD 19,000,000 (EUR 307,875).
4. Reimbursement of up to 70% of costs for purchasing and installing PVC or aluminium windows in households, but to a maximum of MKD 25,000 (EUR 405) per household in 2021 and totaling overall MKD 3,000,000 (EUR 48,612) for the category of low-income persons.
5. Reimbursement of up to 50% of costs for purchasing and installing pellet stoves in households but to a maximum of MKD 20,000 (EUR 324) per household in 2021 and totaling overall MKD 11,000,000 (EUR 178,244).

6. Reimbursement of up to 70% of costs for purchasing pellet stoves in households, but to a maximum of MKD 25,000 (EUR 405) per household in 2021 and totaling overall MKD 3,000,000 MKD (EUR 48,612) for the category of low-income persons.
7. Reimbursement of up to 30% of costs for purchasing and installing photovoltaic panels for producing up to 4 kW of electricity for one's own household consumption, on a building on which the person has right of ownership or use, but to a maxim of MKD 62,000 (EUR 1004) per household in 2021, and totalling overall MKD 8,000,000 (EUR 129,631).

Funds allocated from the budget of the Republic of North Macedonia have been directed to the Program by the Ministry of Economy and are categorized by regions according to the regional development approach.

The beneficiaries of this program in the category of low-income people include:

1. Low-income persons who are employed or one of the spouses is employed and their combined monthly family income does not exceed a net income of MKD 30,000 (EUR 486).
2. Low-income persons who are retired or one of the spouses is retired and their monthly family income does not exceed a net income of MKD 20,000 (EUR 324).
3. Vulnerable consumers as defined in the Program for Protecting Vulnerable Energy Consumers for 2021.

The total budget and number of applications for the Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households for each year since 2007 are shown in the tables below.

Table 3-18. Total number of submitted and approved applications for the Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households from 2007

Number of applications						
	Solar thermal collector systems		PVC or aluminum windows		Pellet stoves	
Year	Submitted	Approved	Submitted	Approved	Submitted	Approved
2007	500	500				
2008						
2009	500	500				
2011	420	420				
2012	2030	481				
2013	3000	514				
2014		606				
2015	2484	591				
2016	3126	625				
2017	2472	1794	2401	1327		
2018	1597	517	1879	1005	2158	642
2019	1306	759	2471	1521	2392	1386
2020						
2021	ongoing	ongoing	ongoing	ongoing	ongoing	ongoing

Table 3-19. Total funds for the Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households from 2007

	Budget (MKD)			
	Solar thermal collector systems	**PVC or aluminium windows**	**Pellet stoves**	**Total per year**
2007	6 000 000			6 000 000
2009	6 000 000			6 000 000
2011	6 000 000			6 000 000
2012	6 000 000			6 000 000
2013	6 000 000			6 000 000
2014	6 000 000			6 000 000
2015	6 000 000			6 000 000
2016	6 000 000			6 000 000
2017	16 000 000	36 000 000		52 000 000
2018	6 000 000	30 000 000	21 000 000	57 000 000
2019	5 000 000	25 000 000	20 000 000	50 000 000
2020	5 000 000	25 000 000	20 000 000	50 000 000

3.7.6 Assessment

In North Macedonia, three types of measures cover energy-poor and vulnerable households. The first measure is a subsidy for households with vulnerable electricity and natural gas consumer(s) fulfilling the following criteria:

1. Users of guaranteed minimum assistance earning a cash benefit to cover part of household energy consumption costs (in line with Article 42 of the Social Protection and Elderly Act and under Article 7 of the Act on Social Security for the Elderly), and
2. Persons facing social risk (motherhood, illness, old age, injury, and disability).

Furthermore, another condition includes meeting electricity consumption limit (maximum of 3600 kW), connection power, and supply by the universal supplier.

Regarding natural gas, a household must meet the following conditions:

1. Gas is to be supplied from a supplier obliged to supply natural gas as a public service, and
2. Annual natural gas consumption for the period October-March must not exceed 70 cubic meters.

The energy consumption limit in the measure stimulates energy consumption savings but does not directly stimulate energy efficiency.

The second measures involve co-financing energy efficiency and small renewable energy applications, such as solar thermal collector systems, energy-efficient windows and doors, biomass pellet stoves, and small roof-integrated PV powerplants. The criteria for beneficiaries of this measure are vulnerable consumers and particularly the following categories:

1. Employed low-income persons or an employed spouse where the monthly family income does not exceed a net income of 486 EUR.

2. Retired low-income persons or a retired spouse where their monthly family income does not exceed a net income of 324 EUR.
3. Vulnerable consumers as defined in the 2021 Program for Protecting vulnerable energy consumers.

These measures contribute directly to energy efficiency and alleviation of long-term energy poverty. They also mitigate climate change by reducing CO_2 emissions from household energy consumption.

The third type of measure is defined in the obligations of energy suppliers toward vulnerable consumers such as their right to utilize some of the protection measures; notice of planned disconnection from the grid due to unpaid invoices, at least 40 days before the actual disconnection; supplying natural gas to vulnerable consumers during December, January, and February, despite unpaid invoices for delivered natural gas; supplying natural gas to vulnerable consumers, despite unpaid invoices for delivered energy, if no more than 60 days have passed from the invoice maturity date and the possibility of delayed payment or payment of the debt in instalments, where debt repayment shall be made in at least six equal instalments, for which a settlement is concluded with the vulnerable consumer.

Table 3-20. Summary of the measure Energy Subsidy

no.	Item:	Measure 1
1	Name of the measure in English	Energy Subsidy (2021 Program for Protecting Vulnerable Energy Consumers 2021)
2	Eligibility criteria	1. A household that utilizes the guaranteed minimum assistance and earns a cash benefit to cover part of the household energy consumption cost in accordance with Article 7 of the Act on Social Security of the Elderly. 2. A household with a person living in social risk (motherhood, illness, old age, injury, and disability) in which energy supply and law for utilizing the grid comes under special conditions. For a household to become a vulnerable electricity and natural gas consumer, additional conditions must be met. The household must meet the following conditions for electricity: 1. Electricity must be supplied by a supplier obliged to supply electricity as a universal service. 2. The household must have a maximum yearly electricity consumption of 3600 kWh. 3. The household must have electricity consumption measured through a single-phase meter with rated current of 25A connecting line or three-phase line and fuse with 16A rated current. For natural gas, the household must meet the following conditions:

		4. The gas must be supplied by a supplier obliged to supply natural gas as a public service, and 5. Natural gas consumption for the months from October to and including March annually must not exceed 70 cubic meters.
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes
5	Description of the measure	In 2009, the Government of the Republic of North Macedonia adopted the Program for Subsidizing Energy Consumption in Households as the first measure combating energy poverty. Program beneficiaries are households entitled to social welfare and permanent financial support. The subsidies cover consumption of different energy forms in households, such as electricity, fuelwood, coal, light heating oil, and district heating. The current 2021 Program for Protecting Vulnerable Energy Consumers states that part of the funds for 2021 totaling MKD 8,000,000 (EUR 131,000), are allocated from the national budget of the Republic of North Macedonia.
6	Period during which the measure has been in force	Since 2009
7	Implementation interval	Monthly
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 1,000 MKD (EUR 16)
9	Total amount of financial support provided to applicants in the implementation interval	The government is expected to provide a total of MKD 8,000,000 (EUR 131,000) from the Program for Protecting Vulnerable Energy Consumers.
10	Year in which financial costs are based	2020
11	Administrative level	National
12	Financing source	Ministry of Labor and Social Policy Ministry of Economy
13	Energy source covered	Electricity and gas

Table 3-21. Summary of the measure Rules for Suppliers of Vulnerable Consumers

no.	**Item:**	**Measure 2**

1	Name of the measure in English	Rules for Suppliers of Vulnerable Consumers (2021 Program for Protecting Vulnerable Energy Consumers)
2	Eligibility criteria	A household that: - receives guaranteed minimum assistance and a cash benefit to cover part of household energy consumption costs in line with the Act on Social Protection of the elderly and Article 7 of the Act on Social Security of the Elderly. - has a person living in social risk (motherhood, illness, old age, injury, and disability) and to whom energy is supplied and/or the law for use of the grid provided under special conditions. Additional conditions must be met for a household to quality as a vulnerable electricity and natural gas consumer. The conditions for electricity are as follows: - Electricity must be supplied by a supplier obliged to supply electricity as a universal service. - The household must have a maximum yearly electricity consumption of 3600 kWh. - Electricity consumption must be measured via a single-phase meter with a rated current for the insurance feeder or a 25A connecting line or three-phase with a 16A rated current fuse. The household must fulfil specific conditions for natural gas: - The gas must be supplied from a supplier obliged to supply natural gas as a public service, and - Annual natural gas consumption from October to March inclusively must not exceed 70 cubic meters.
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes
5	Description of the measure	Supply rules state that the supplier is obliged to provide vulnerable consumers with the following: - Information on their right to use certain protection measures. - To be notified of planned disconnection from the grid to unpaid invoices, at least 40 days before the actual disconnection,

		- Delivery of natural gas to vulnerable consumers during December, January, and February, despite unpaid invoices for already delivered natural gas. - Delivery of natural gas to vulnerable consumers, despite unpaid invoice for delivered energy, if no more than 60 days have passed from the invoice maturity date, and - The possibility of deferred payments or payments in instalments of debt, where the repayment of debt shall be made in at least six equal instalments, for which a settlement is concluded with the vulnerable consumer.
6	Period during which the measure has been in force	2021
7	Implementation interval	Continuous
8	Maximum amount of financial support per beneficiary in the implementation interval	/
9	Total amount of financial support provided to applicants in the implementation interval	/
10	Year in which financial costs are based	2021
11	Administrative level	National
12	Financing source	Ministry of Labor and Social Policy Ministry of Economy
13	Energy source covered	Electricity and gas

Table 3-22. Summary of the measure Reimbursement of up to 30% of Costs for Purchased and Installed Solar Thermal Collector Systems

no.	**Item:**	**Measure 3**
1	Name of the measure in English	Reimbursement of up to 30% of Costs for Purchased and Installed Solar thermal collector systems (2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	All households
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes (single mothers)
5	Description of the measure	Reimbursement of up to 30% of costs for purchased and installed solar thermal collector systems in households, with a maximum

		reimbursement of MKD 10,000 MKD (EUR 162) per household for 2021, and total maximum reimbursement of MKD 6,000,000 (EUR 97,224);
6	Period during which the measure has been in force	2021
7	Implementation interval	One-time payment
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 10,000 (EUR 162)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 6,000,000 (EUR 97,224)
10	Year on which financial costs are based	2021
11	Administrative level	National
12	Financing source	Ministry of Economy
13	Energy source covered	Solar thermal collector systems

Table 3-23. Summary of the measure Reimbursement of up to 70% of Costs for Purchased and Installed Solar Thermal Collector Systems

no.	**Item:**	**Measure 4**
1	Name of the measure in English	Reimbursement of up to 70% of Costs for Purchased and Installed Solar Thermal Collector Systems (2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	Beneficiaries of this program in the low-income category include: - Employed low-income persons or an employed spouse where their monthly family income does not exceed a net income of MKD 30,000 (EUR 486), - Low-income retirees or a retired spouse is with a maximum monthly family net income of MKD 20,000 (EUR 324), and - Vulnerable consumers as defined in the 2021 Program for Protecting Vulnerable Energy Consumers.
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes (single mothers)
5	Description of the measure	Reimbursement of up to 70% of costs for purchased and installed solar thermal collector

		systems in households, with a maximum reimbursement of MKD 15,000 (EUR 243) per household for 2021, and an overall maximum total amount of MKD 2,000,000 (EUR 32,408) for low-income persons;
6	Period during which the measure has been in force	2021
7	Implementation interval	One-time payment
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 15,000 (EUR 243)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 2,000,000 (EUR 32,408)
10	Year on which financial costs are based	2021
11	Administrative level	National
12	Financing source	Ministry of Economy
13	Energy source covered	Solar thermal collector systems

Table 3-24. Summary of the measure Reimbursement of up to 50% of Costs for Purchased and Installed PVC or Aluminum Windows

no.	**Item:**	**Measure 5**
1	Name of the measure in English	Reimbursement of up to 50% of Costs for Purchased and Installed PVC or Aluminum Windows (2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	All households
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes (single mothers)
5	Description of the measure	Reimbursement of up to 50% of costs for purchased and installed PVC or aluminum windows in households, to a maximum reimbursement of MKD 20,000 MKD (EUR 324) per household for 2021, and an absolute maximum of MKD 19,000,000 (EUR 307,875);
6	Period during which the measure has been in force	2021
7	Implementation interval	One-time payment

8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 20,000 (EUR 324)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 19,000,000 (EUR 307,875)
10	Year on which financial costs are based	2021
11	Administrative level	National
12	Financing source	Ministry of Economy
13	Energy source covered	PVC or aluminum windows

Table 3-25. Summary of the measure Reimbursement of up to 70% of Costs for Purchased and Installed PVC or Aluminum Windows

no.	**Item:**	**Measure 6**
1	Name of the measure in English	Reimbursement of up to 70% of Costs for Purchased and Installed PVC or Aluminum Windows (2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	Beneficiaries belonging to the category of low-income persons include: - Employed low-income persons or an employed spouse with a maximum net monthly income in the family of MKD 30,000 (EUR 486), - Retired low-income persons or a retired spouse with a maximum net monthly income in the family of MKD 20,000 (EUR 324), - Vulnerable consumers as defined in the 2021 Program for Protecting Vulnerable Energy Consumers.
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes
5	Description of the measure	Reimbursement of up to 70% of costs for purchased and installed PVC or aluminium windows in households, to a maximum reimbursement of MKD 25,000 (EUR 405) per household for 2021, and a maximum total amount of MKD 3,000,000 (EUR 48,612) for the entire category of low-income persons;
6	Period during which the measure has been in force	2021

7	Implementation interval	One-time payment
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 25,000 (EUR 405)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 3,000,000 (EUR 48,612)
10	Year in which financial costs are based	2021
11	Administrative level	National
12	Financing source	Ministry of Economy
13	Energy source covered	PVC or aluminum windows

Table 3-26. Summary of the measure Reimbursement of up to 50% of Costs for Purchased and Installed Pellet Stoves

no.	**Item:**	**Measure 7**
1	Name of the measure in English	Reimbursement of up to 50% of Costs for Purchased and Installed Pellet Stoves (2021 Program for Promoting Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	All households
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes
5	Description of the measure	Reimbursement of up to 50% of costs for purchased and installed pellet stoves in households, where the maximum reimbursement is MKD 20,000 (EUR 324) per household for 2021, and a maximum total reimbursement MKD 11,000,000 (EUR 178,244);
6	Period during which the measure has been in force	2021
7	Implementation interval	One-time payment
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 20,000 (EUR 324)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 11,000,000 (EUR 178,244)
10	Year on which financial costs are based	2021

11	Administrative level	National
12	Financing source	Ministry of Economy
13	Energy source covered	Purchase and installation of pellet stoves

Table 3-27. Summary of the measure Reimbursement of up to 70% of Costs for Purchased and Installed Pellet Stoves

no.	Item:	Measure 8
1	Name of the measure in English	Reimbursement of up to 70% of Costs for Purchased and Installed Pellet Stoves (2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	Program beneficiaries belonging to the low-income category include: - Employed low-income persons or an employed spouse where their maximum net monthly income in the family is MKD 30,000 (EUR 486); - Retired low-income persons or a retired spouse where their maximum net monthly income in the family is MKD 20,000 (EUR 324), - Vulnerable consumers as defined in the 2021 Program for Protecting Vulnerable Energy Consumers.
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes
5	Description of the measure	Reimbursement of 70% of costs for purchasing pellet stoves in households, where the maximum reimbursement is MKD 25,000 (EUR 405) per household for 2021, and a maximum total reimbursement of MKD 3,000,000 (EUR 48,612) for the category of low-income persons;
6	Period during which the measure has been in force	2021
7	Implementation interval	One-time payment
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 25,000 (EUR 405)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 3,000,000 (EUR 48,612)
10	Year in which financial costs are based	2021
11	Administrative level	National

12	Financing source	Ministry of Economy
13	Energy source covered	Purchase and installation of pellet stoves

Table 3-28. Summary of the measure Reimbursement of up to 30% of Costs for Purchased and Installed of Photovoltaic Panels for the Production of Electricity up to 4 kW for Personal Household Consumption, Installed on a Building for Which the Consumer has Right of Ownership or Use

no.	Item:	Measure 9
1	Name of the measure in English	Reimbursement of up to 30% of Costs for Purchased and Installed of Photovoltaic Panels for the Production of Electricity up to 4 kW for Personal Household Consumption, Installed on a Building for Which the Consumer has Right of Ownership or Use (2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households)
2	Eligibility criteria	All households
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	Yes
5	Description of the measure	Reimbursement of up to 30% of costs for purchased and installed of photovoltaic panels for the production of electricity up to 4 kw for personal household consumption, installed on a building for which the consumer has right of ownership or use, to a maximum of MKD 62,000 (EUR 1004) per household for 2021, and a maximum total of MKD 8,000,000 (EUR 129,631).
6	Period during which the measure has been in force	2021
7	Implementation interval	One-time
8	Maximum amount of financial support per beneficiary in the implementation interval	MKD 62,000 (EUR 1004)
9	Total amount of financial support provided to applicants in the implementation interval	MKD 8,000,000 (EUR 129,631)
10	Year in which financial costs are based	2021
11	Administrative level	National
12	Financing source	Ministry of Economy

13	Energy source covered	Purchase and installation of photovoltaic panels for producing up to 4 kW of electricity

3.7.7 List of analyzed legislative acts

1. Energy Act 2018 (Official Gazette of the Republic of North Macedonia No. 08 3424/1)
2. Social Protection Act of 2015 (33/15), Act Amending the Social Protection Act of 2019 (No. 08-4015/1), and the Act Amending the Social Protection Act of 2019 (No. 08-7145/1)
3. 2021-2023 Economic Reform Program[38]
4. National Energy and Climate Plan of the Republic of North Macedonia[39]
5. 2021 Program for Promotion of Renewable Energy Sources and Encouraging Energy Efficiency in Households[40]
6. 2021 Program for Protecting Vulnerable Energy Consumers[41]
7. Strategy for Energy Development of the Republic of North Macedonia until 2040[42]

[38] https://finance.gov.mk/economic-reform-programme-2018-2020/?lang=en

[39] https://www.energy-community.org/regionalinitiatives/NECP.html

[40] https://dejure.mk/zakon/programa-za-promocija-na-obnovlivi-izvori-na-energija-i-pottiknuvanje-na-energetska-efikasnost-vo-domakjinstvata-za-2021-godina

[41] https://dejure.mk/zakon/programa-za-zashtita-na-ranlivi-potroshuvachi-na-energija-za-2021-godina

[42] https://bankwatch.org/press_release/north-macedonia-government-contemplates-prompt-coal-exit

3.8 Serbia

3.8.1 Summary

Serbia has aligned its energy acquis with the requirements of the third EU Energy Package in terms of protecting the vulnerable energy consumers. The country has for several years been implementing a protection scheme focused on both electricity and gas consumers, providing financial assistance to the most vulnerable in terms of electricity and as bill deductions. However, national legislation, has still not provided schemes and protection mechanisms to alleviate the causes of energy poverty, such as energy efficiency retrofits to dwellings used by vulnerable groups, and its National Energy Efficiency Action Plan (NEEAP) for the most recent period is developed with delay, it is yet to develop the National Energy and Climate Action Plan or finalize the Building Renovation Strategy.[43] These are obligations which stem from aligning with the EU acquis, and place more emphasis on both alleviating energy poverty and protecting energy vulnerable groups

3.8.2 Strategic documents

3.8.2.1 Energy Sector Development Strategy by 2025 with Projections by 2030 for the Republic of Serbia

The Energy Sector Development Strategy (OG 101/2015) outlines that Serbia plans to continue protecting vulnerable and socially vulnerable consumer categories by further developing protection mechanisms already in place.

3.8.3 Legal and legislative framework

3.8.3.1 National Energy Efficiency Action Plan (NEEAP)

The third Serbian NEEAP mentions vulnerable energy consumers within Measure D3 Promotion of Energy-Efficient Lighting and Electric Appliances, and states that promoting energy-efficient lighting can be done by providing free-of-charge LED light bulbs to the socially vulnerable electricity consumers. The suggested approach is that this should be organized by the EPS (Serbian national public electric utility company) which has already organized similar campaigns in the past such as the distribution of compact fluorescent light (CFL) lightbulbs in 2010-2012. The adoption of the fourth NEEAP (covering the period to 2021) has been delayed.

3.8.3.2 2019-2025 Social Protection Strategy

The Social Protection Strategy (dated 27/03/2019) recognizes energy vulnerable consumers, given that the status is automatically granted to beneficiaries receiving social financial support, while also mentioning that such beneficiaries are also usually entitled to additional support mechanisms from local authorities where they reside, and which includes one-time financial support on request, and in some cases assistance in paying utility bills.

3.8.3.3 Consumer Protection Act

The Consumer Protection Act (OG 62/2014, 6/2016, 44/2018), in Article 84, **defines a vulnerable consumer** as a consumer who, due to economic or social position, living conditions, special needs, or other difficult personal circumstances, procures goods or uses a service under particularly difficult conditions, or is disabled. The law also states that programs in certain areas where services of general economic interest are provided, determine measures and instruments to ensure effective protection of vulnerable consumers, especially in terms of access, availability,

[43] https://www.energy-community.org/dam/jcr:b6fa7a79-88dd-4204-900b-68110261415f/EECG_Serbia_LTRS_032021.pdf

disconnection from the distribution network or denial of services, pricing, information, counselling, and assistance to consumers in resolving consumer problems. At the proposal of the minister responsible for the relevant area, the Government will adopt a program for the protection of vulnerable consumers for certain services of general economic interest.

3.8.3.4 The Energy Act

The Energy Act (OG 145/14, 95/2018, 40/21) of Serbia **defines energy vulnerable consumers** in Article 10. A vulnerable electricity or natural gas consumer is an energy consumer belonging to the household category (families comprising one or several members) who lives in one housing unit with a single metering point measuring electricity or natural gas consumption, and who consumes the maximum set amount of electricity or natural gas. An energy vulnerable consumer can also be a household (comprising of one or several members) living in one housing unit and supplied with thermal energy. Eligibility criteria for acquiring the status of an energy vulnerable consumer are defined by the government (Ordinance on Energy Vulnerable Consumers). The status is acquired based on the act defined by the competent welfare body. A household may acquire the energy vulnerable status under the following conditions:

- The household belongs to the category lowest income earners on a per household member basis [44] and which is determined by the relevant Ministry, while taking into consideration all household members and property owned, and
- The household does not possess or use other housing, other than housing which, according to its structure and total floor area, meets the needs of the household in line with the law regulating social housing.

This status may also be acquired by a household which has a member requiring a permanent electricity or gas supply due to health issues.

3.8.3.5 Ordinance on Energy Vulnerable Consumers

The Ordinance on Energy Vulnerable Consumers (OG 113/2015, 48/2016 88/2016, 49/2017, 104/2017, 36/2018, 59/2018, 88/2018, 34/2019, 82/2019, 76/2020, 144/2020) defines an energy vulnerable consumer as an electricity or natural gas consumer belonging to the household category residing in a single dwelling with one measuring location for electricity or natural gas, and which consumes the maximum quantity of electricity or gas as prescribed in the Ordinance. An energy vulnerable consumer may also be a household that has a household member whose health depends on an uninterrupted supply of electricity or natural gas.

The criteria for acquiring status as an energy vulnerable consumer are as follows:

- Total household income (including all income sources taken into consideration when acquiring rights for social welfare support)
- Total number of household members
- In terms of property status and ownership when being considered for receiving status as energy vulnerable consumer, a household may not own other residential dwellings other than the dwelling which meets social housing criteria according to the Ordinance on Standards and Norms for Planning, Construction as well as Conditions for Use and Maintenance of Social Housing Apartments (OG 26/2013) as shown in the table below.

[44] The law does not define the lowest income per household, which is defined in the Ordinance on Energy Vulnerable Consumers.

Size of household[45]	Housing floor area per household	House floor area per household member
1 person	22-30 m^2	22-30 m^2
2 persons	30-42 m^2	15-21 m^2
3 persons	40-55 m^2	13.3-18.3 m^2
4 persons	50-65 m^2	12.5-16.2 m^2
5 persons	62-72 m^2	12.4-15 m^2
6 persons	75-85 m^2	12.5-14.2 m^2

Acquiring status as a vulnerable energy consumer is based on total monthly household income and depends on the following criteria:

- Up to RSD 14,848.60 (approx. EUR 126) for a one person household
- Up to RSD 21,619.25 (approx. EUR 184) for a 2- to 3-person household
- Up to RSD 28,385.45 (approx. EUR 241) for a 4- to 5-person household
- Up to 35,696.30 RSD (approx. EUR 304) for a household with 6 or more members

These amounts are adjusted twice a year to the consumer price index for the previous 6 months. The application for acquiring status as a vulnerable energy consume is submitted to and assessed by the local authority.

A vulnerable consumer is entitled to subsidized monthly costs for specific amounts of spent electricity and/or natural gas as follows:

- Electricity all year round:
  - Single-person household, up to 120 kWh per month
  - Household with 2 or 3 members, up to 160 kWh per month
  - Household with 4 or 5 members, up to 200 kWh per month
  - Household with 6 or more members, up to of 250 kWh per month
- Natural gas in January, February, March, October, November, and December:
  - Single-person household, up to 35 cubic meters of gas per month
  - Household with 2 or 3 members, up to 45 cubic meters of gas per month
  - Household with 4 or 5 members, up to 60 cubic meters of gas per month
  - Household with 6 or more members, up to 75 cubic meters of gas per month

The subsidy on monthly payments is achieved by deducting from the monthly electricity bill the amount equivalent to multiplying the quantity to which a vulnerable consumer has a right to reduction by the higher daily tariff from the green zone for consumers belonging to the double-tariff category, and then increasing that amount by 10%, as stipulated in the Decision on Regulated Electricity Price for Guaranteed Supplies.

[45] For each additional person in six-member household, floor areas provided in the table are increased by an additional 6 square meters.

Gas bill deductions are determined by multiplying the quantity to which a vulnerable consumer is entitled by the *energy* tariff for consumers belonging to the household category as supplied by the public gas utility Srbijagas (located in Novi Sad), and then increasing the amount by 5%.

In case the vulnerable consumer has a total monthly electricity consumption 6.5 times higher than the aforementioned quantities for electricity, or 2.5 times higher than those for gas, they are not entitled to monthly bill deduction.

The Ordinance also defines protection against disconnecting vulnerable consumers from the grid, specifically those household members who possess medical support appliances requiring electricity for operation.

Financial support stipulated in this Ordinance is allocated from the state budget and transferred to electricity and gas utilities in the public and private sector.

3.8.3.6 Decree on Energy Vulnerable Consumers

The Decree on Energy Vulnerable Consumers, i.e., vulnerable heat consumers (Official Gazette of RS, No. 90/13) was in force for only one year (the 2013/2014 heating season) and prescribed in more detail the criteria, manner of protection, conditions, deadlines, and procedure for determining the status of an energy-protected consumer, as well as vulnerable consumers for thermal energy. Since 2014, only the acts of local self-governments have remained valid for end consumers of thermal energy supplied from the district heating system.

3.8.3.7 Act on Energy Efficiency and Rational Use of Energy

The recently adopted Act on Energy Efficiency and Rational Use of Energy (OG 40/2021), introduces definition of energy poverty and establishes (within Ministry in charge of energy matters) the new Directorate for financing and promoting energy efficiency. The Directorate has a task (beside others) to prepare specific programs for the implementation of energy efficiency measures with vulnerable energy customers and other customers with a view to reducing energy poverty (Art 73). The Law also has energy poverty mitigation listed as one of its key areas and it defines it as a combination of household's low income, large expenditure of available income on energy and low energy efficiency.

3.8.4 Institutional framework

The current institutional framework is aligned primarily vertically, hence the funds necessary for implementing the main protection scheme for energy vulnerable consumers according to the Energy Act and related Ordinance are allocated from the state budget. The status of consumer vulnerability is determined by the local authority on the territory of which the consumer resides and is based on criteria stipulated by the ministry competent for energy and welfare issues. The list of eligible applicants is delivered to gas and electric utilities which then approve adequate deductions on monthly bills, in line with the Ordinance on Vulnerable Energy Consumers.

The Energy Efficiency Improvement Fund is the fund budgeted by the Republic of Serbia and provided by the Energy Efficiency Act. The Fund was started in 2014. Financial resources from the Fund are intended for projects aimed to increase energy efficiency in the public sector, but the Funds is also intended for projects initiated by citizens and the private sector in the same area of interest.

The Fund was established to absorb financial resources intended for financing energy efficiency project financed in line with the Energy Efficiency Act and also regulations stemming from the Act. The Fund is managed by the Ministry of Mining and Energy. Although no budgets have been allocated to date for alleviating energy poverty, such measures should be financed from the respective Fund.

3.8.5 Current schemes to protect vulnerable consumers

3.8.5.1 Description

Serbia has invested significant effort in protecting vulnerable energy consumers, focusing not only on electricity but also on gas, while considering guidelines on vulnerable consumers as provided by the Energy Community Secretariat in the Outline of the Social Strategy in the Energy Community. In 2019, approx. 76,900 citizens in Serbia acquired status as a vulnerable energy consumer according to information provided by the national Serbian electric power utility (EPS). The status is determined by the local authority where the consumer applies for such status. The expectation is that the number of vulnerable energy consumers will continue to increase in 2021 due to expanding income qualification criteria.

This criterion, though tightly aligned with EnCS recommendations, remains rather narrow and legislation still lacks extensive protection mechanisms and energy poverty alleviating tools compared to most recent developments in EU acquis. Further efforts are needed, primarily the development and adoption of the National Energy and Climate Action Plan which should include measures for assessing and mitigating energy poverty as well as providing extensive protection for vulnerable energy consumers.

3.8.5.2 Assessment

There are two direct financial support measures on a national level for socially vulnerable households in terms of energy expenses (electricity and gas) and two local measures, and in the form of direct financial support, implemented in Belgrade and Novi Sad.

Eligibility criteria for coverage by national measures are based on total household income, medical conditions of household members, and situations where a household member's life or health is at risk due to possibly halting electricity supplies. Measures at the national level provide a deduction for certain quantities of consumed energy depending on the number of household members (consumed 120 to 250 kWh of electricity and 35 to 75 cubic meters of gas). A limit has been set for the maximum subsidized quantity of both electricity and gas.

Eligibility criteria for local measures in Belgrade include the number of children in a family, the territory where a person is registered, regularly paying utility bill, pensioners receiving the lowest tier of pension payments, low-income households depending on the number of family members, war veterans including those with war disabilities and families of deceased, beneficiaries receiving secured material support and home care meals, as well as households with severe disability and severely ill members. In Novi Sad, the local measure is available to families with three or more children until completing regular education, but not longer than 26 years of age whose members are registered on the territory of Novi Sad, and under the condition of previously regularly paying monthly utility bills issued in their name.

The local level measure stipulates bill subsidies of up to 30% of utility bills up to a maximum of RSD 2,400 in Belgrade, and up to 50% of monthly utility bills in Novi Sad.

These measures provide relief to financial burdens incurred by households for their energy needs, but the measures do not contribute to improving energy efficiency. Current measures represent short-term aid to energy-poor households and are not considered a definite solution to alleviating energy poverty, rather they provide a solid first step in alleviating energy poverty and recognizing energy vulnerability as a problem.

Table 3-29. Summary of the measure Deductions for Monthly Electricity Bills

no.	Item:	Measure 1
1	Name of the measure in English	Deductions for Monthly Electricity Bills (Ordinance on Energy Vulnerable Consumers)

2	Eligibility criteria	The measure is available to all vulnerable energy consumers, and the criteria for acquiring status as a vulnerable energy consumer is total household income as follows: • Up to RSD 14,848.60 (approx. EUR 126) for a single-person household • Up to RSD 21,619.25 (approx. EUR 184) for a 2- and 3-person household • Up to RSD 28,385.45 (approx. 241 EUR) for a 4- and 5-person household Up to RSD 35,696.30 (approx. EUR 304) for households with 6 or more members.
3	Number of eligible households / individuals	67,735 in 2017, 73,148 in 2018 and 74,615 in 2019
4	Is the measure gender sensitive	No
5	Description of the measure	Consumers who meet eligibility criteria as vulnerable consumers are entitled to the following deductions: • A single-person household, up to 120 kWh per month • Household with 2 or 3 members, up to 160 kWh per month • Household with 4 or 5 members, up to 200 kWh per month • Household with 6 or more members, up to 250 kWh per month • Should a vulnerable consumer consume total monthly electricity 6.5 more than the above-mentioned electricity quantities, they are not entitled to a deduction on their monthly bill. The deduction on monthly bills is achieved such that the monthly electricity bill is reduced by multiplying the quantity to which a vulnerable consumer is entitled for reduction by the higher daily tariff for the green zone for consumers belonging to the double-tariff category, and then increased by 10%, all in line with the Decision on Regulated Electricity Prices for Guaranteed Supplies
6	Period during which the measure has been in force	2015 and onwards
7	Implementation interval	Payments made monthly. Requests are made yearly and adjusting the price index twice a year (Twice a year, the Ministry of Mining and Energy adjusts the eligible total monthly household income with the consumer price index for the previous six months based on data

		from the Republic Statistical Office, as follows: 1st April and 1st October in the current year.)
8	Maximum amount of financial support per beneficiary in the implementation interval	Deduction on monthly electricity bills for quantities up to 250 kWh
9	Total amount of financial support provided to applicants in the implementation interval	RSD 1,086,667,083 (EUR 8,476,003) in 2017, RSD 1,220,610,617 (EUR 9,520,763) in 2018, RSD 1,251,483,868 (EUR 9,761,574) in 2019.
10	Year in which financial costs are based	2017, 2018 and 2019
11	Administrative level	National
12	Financing source	National
13	Energy source covered	Electricity

Table 3-30. Summary of the measure Deductions for Monthly Gas Bills

no.	**Item:**	**Measure 2**
1	Name of the measure in English	Deductions for Monthly Gas Bills (Ordinance on Energy Vulnerable Consumers)
2	Eligibility criteria	The measure is available to all vulnerable energy consumers while the criteria for acquiring status as an vulnerable energy consumer based on total household income is as follows: • Up to RSD 14,848.60 (approx. EUR 126) for a single-person household • Up to RSD 21,619.25 (approx. EUR 184) for a 2- and 3-person household • Up to RSD 28,385.45 (approx. EUR 241) for a 4- and 5-person household Up to RSD 35,696.30 (approx. EUR 304) for a household with 6 or more members
3	Number of eligible households / individuals	• 60 in 2017, 49 in 2018, and 50 in 2019
4	Is the measure gender sensitive	No
5	Description of the measure	Consumers are entitled to deductions if fulfilling the following vulnerability criteria: • A single-person household spending 35 cubic meters of gas per month • A 2- or 3-member household spending 45 cubic meters of gas per month • A 4- to 5-member household spending 60 cubic meters per month

		• A household with 6 or more members spending 75 cubic meters of gas per month • If a vulnerable consumer has a total monthly gas consumption between 2 2.5 times that of gas, they are entitled to a 50% deduction on their monthly bills. • If a vulnerable consumer consumes 2.5 times more gas per month than the mentioned quantities, the consumer is not entitled to a deduction on the monthly bill Deductions for gas bills are determined by multiplying the quantity to which a vulnerable consumer is entitled by the energy tariff for consumers belonging to the household category and supplied by the public gas utility Srbijagas (located in Novi Sad) and increased by 5%.
6	Period during which the measure has been in force	2015 - onwards
7	Implementation interval	For January, February, March, October, November, and December
8	Maximum amount of financial support per beneficiary in the implementation interval	Deduction of monthly gas bills for 75 cubic meters of gas
9	Total amount of financial support provided to applicants in the implementation interval	RSD 79,030 (ERU 672) in 2017, RSD 63,907 (EUR 543) in 2018, RSD 63,667 (EUR 541) in 2020
10	Year in which financial costs are based	2017, 2018 and 2019
11	Administrative level	National
12	Financing source	National
13	Energy source covered	Gas

Table 3-31. Summary of the measure Deduction on Utilities Fees in Novi Sad

no.	**Name:**	**Measure 3**
1	Name of the measure in English	Deduction on Utility Fees in Novi Sad (Decision on Determining Criteria for Deductions on Utility Bills for Families with Three or More Children in 2020 (OG of the City of Novi Sad", No. 55, 27 November 2019)
2	Eligibility criteria	Families with three or more children until completing regular education, and expiring for those 26 years of age and older and whose members are registered on the

		territory of Novi Sad, under the precondition that utility bills issued in their names have previously been regularly settled
3	Number of eligible households / individuals	N/A
4	Is the measure gender sensitive	No
5	Description of the measure	Deductions on monthly utility bills amounting up to 30% for families with 3-5 children, up to 40% for families with 6-8 children, and 50% for families with 9 or more children. Utilities within the scope of the measure include district heating
6	Period during which the measure has been in force	Since 2013
7	Implementation interval	Monthly deductions on bills. Yearly requests
8	The maximum amount of financial support per beneficiary in the implementation interval	Up to 50% of monthly bills
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year in which financial costs are based	N/A
11	Administrative level	Local
12	Financing source	Local
13	Energy source covered	Electricity, gas, district heating

Table 3-32. Summary of the measure Subsidy for Utility Products and Services in Belgrade

no.	**Name:**	**Measure 4**
1	Name of the measure in English	Subsidy for Utility Products and Services in Belgrade (Intervention Measures for Protecting the Most Vulnerable Consumers[46] and the Decision on Determining the Category of Users Eligible for Utility Bill Subsidies[47])
2	Eligibility criteria	Categories 1: 1) Pensioners with the lowest tier of pensions 2) Households with monthly incomes fulfilling the following criteria: a) Single-person households RSD 8,000-

[46] https://www.infostan.rs/files/Interventnemere.pdf

[47] https://www.infostan.rs/files/Odluka_o_izmenama_i_dopunama_odluke_o_utvrdjivanju_kategorije_korisnika_koji_placaju_subvencionisanu_cenu_komunalnih_usluga.pdf

		23,000 (EUR 68 - 196) b) Two-person household RSD 10,000 - 31,000 (EUR 85 - 196) c) Three-person household RSD 12,000-40,000 (EUR 102 – 340) d) Four-person household RSD 13,000-43,000 (EUR 111 -366) e) Five or more person household RSD 15,000-46,000 (EUR 128 – 391) Category 2: War veterans including those with war disabilities, and families of the deceased Category 3: Beneficiaries receiving ensured material support and home care meals, households with severe disability and severely ill members
3	Number of eligible households / individuals	N/A
4	Is the measure gender sensitive	No
5	Description of the measure	30% deductions on monthly bills for Category 1 beneficiaries, 10-30% deductions for Category 2 beneficiaries (depending on the maximum household income, the deduction can be 10, 15, 20, 25, or 30%), and 30% for Category 3. In all categories, the deduction applies to the total of RSD 8,000 (EUR 68) for utility bills. If the total sum of all utility bills exceeds RSD 8,000 (EUR 68), the beneficiaries are entitled to the maximum approved deduction of RSD 8,000 EUR 68).
6	Period during which the measure has been in force	N/A
7	Implementation interval	Monthly deductions. Yearly requests
8	Maximum amount of financial support per beneficiary in the implementation interval	Up to 30% of utility bills and a maximum total deduction of RSD 2,400 (EUR 20)
9	Total amount of financial support provided to applicants in the implementation interval	N/A
10	Year in which financial costs are based	N/A
11	Administrative level	Local
12	Financing source	Local
13	Energy source covered	Electricity, gas, district heating

3.8.6 List of analyzed legislative acts

1. Energy Sector Development Strategy by 2025 with Projections by 2030 (OG 101/2015) for the Republic of Serbia
2. Third National Energy Efficiency Action Plan (NEEAP) http://www.mre.gov.rs/doc/efikasnost-izvori/efikasnost/Treci_akcioni_plan_za_energetsku_efikasnost_Republike_Srbije_za_period_do_2018_godine.pdf
3. Social Protection Strategy (draft as of 27 March 2019) http://www.udruzenjesz.rs/images/PDF/nacrt-strategije-socijalne-zastite-2019-2025-27032019.pdf
4. Consumer Protection Act (OG 62/2014, 6/2016, 44/2018)
5. Energy Act (OG 145/14, 95/2018)
6. Ordinance on Vulnerable Energy Consumers (OG 113/2015, 48/2016 88/2016, 49/2017, 104/2017, 36/, 59/2018, 88/2018, 34/2019, 82/2019, 76/2020, 144/2020)
7. Decree on Vulnerable Energy Consumers, i.e., Heat Vulnerable Consumer (Official Gazette of RS, No. 90/13)

3.9 Ukraine

3.9.1 Summary

Although several strategic documents address poverty reduction, a dedicated policy does not exist, one that focuses on reducing energy poverty. Moreover, there is no universal legal definition of vulnerable consumers in the energy market. Laws do not provide a definition of energy poverty but do recognize certain aspects in alleviating it.

3.9.2 Strategic documents

3.9.2.1 Sustainable Development Goals (SDG)

Adopted in 2000 by 189 nations at the UN Millennium Summit, the UN Millennium Declaration identified the Millennium Development Goals (MDGs), a comprehensive framework of core values, principles, and key drivers through to 2015. The final document from the summit titled *Transforming our World: The 2030 Agenda for Sustainable Development*[48] identified 17 Sustainable Development Goals (SDGs) and 169 supporting targets. Like other UN Member States, Ukraine also joined the global process of sustainable development. During 2016 and 2017, a participatory and inclusive process of adapting the SDGs to the Ukrainian context took place. Every global target was reviewed, taking into consideration the specifics of the national context. This process resulted in establishing a national system consisting of 86 national development targets. National targets and indicators for monitoring the achievement of targets are reflected in the national baseline report *Sustainable Development Goals: Ukraine* (prepared by the Ministry of Economic Development and Trade of Ukraine). Goal 1 and Goal 7 are **dedicated to ending poverty in all its forms** everywhere and to **ensure affordable and clean energy**.[49] The commitment to SDGs was reinforced by the President's Decree 722/2019 (30 September 2019) on Sustainable Development Goals of Ukraine for the period up to 2030.[50]

3.9.2.2 Concept of State Policy on the Consumer Rights Protection prior to 2020

The Ministry of Economic Development and Trade prepared and subsequently the Government approved the Concept of the State Policy in the Field of Consumer Rights Protection for the Period up to 2020, the purpose of which is to create and implement an effective system of consumer rights protection in Ukraine based on EU legislation, while weighing best practices from the countries in the European Union (Decree of the Cabinet of Ministers of Ukraine, 2017).[51] The Concept recognizes vulnerable consumers as consumers who have become vulnerable due to the changes in market conditions that prevail in monopolized markets, and those consumers who are users of district heating and water supply systems.

3.9.2.3 Strategy for Overcoming Poverty

Strategy for Overcoming Poverty adopted by the Government in 2016 envisages improving the quality and accessibility of social services for vulnerable groups. The strategy does not contain a detailed action plan to fight poverty in the energy industry but touches upon the accessibility

[48] http://sdg.org.ua/images/Agenda2030.pdf

[49] https://www.kmu.gov.ua/en/cili-stalogo-rozvitku-ta-ukrayina-eu

[50] https://zakon.rada.gov.ua/laws/show/722/2019#Text

[51] The Cabinet of Ministers of Ukraine Decree dated 29 March 2017 o. 217-R on approval of the Concept of state policy in the field of consumer protection for the period up to 2020, https://zakon.rada.gov.ua/laws/show/217-2017-%D1%80#Text

aspect while avoiding the issue of affordability.[52] In particular, the Strategy mentions the need to restore and upgrade networks, and to ensure development of social infrastructure. The 2020 Action Plan on the implementation of the Poverty Reduction Strategy (Point 31) was approved by Decree of Cabinet of Ministers of Ukraine No. 202-r of March 3, 2020.[53]

3.9.2.4 Energy Strategy of Ukraine up to 2035: "Security, energy efficiency, competitiveness"

In 2017, the Government adopted the Energy Strategy of Ukraine until 2035 (ESU 2035)[54] as part of its efforts to promote a more systematic and holistic approach to energy sector reform. The strategy envisions a sectoral transformation that will improve Ukraine's energy efficiency, security, competitiveness, vulnerable consumer protection**,** and integration with the EU energy space. The 2020 Action Plan was also drawn up for the first phase of energy strategy delivery (2017- 2020).

3.9.2.5 National Economic Strategy for the period up to 2030

The National Economic Strategy for the period up to 2030 has been approved by Decree of the Cabinet of Ministers of Ukraine on 3 March 2021, № 179.[55] The strategy includes an analysis of the situation and problems on the energy market and in the utility sphere and defines goals and targets for, inter alia, functioning of free, efficient, and competitive energy sector and increasing energy efficiency of the economy.

3.9.2.6 Program of Activities of the Cabinet of Ministers (2020-2023)

The Activities program includes several short and medium-term measures for priority sectors of the Ukrainian economy in the period 2020-2023, including energy efficiency measures in buildings to overcome energy poverty. It has been approved by Decree of the Cabinet of Ministers of Ukraine on 12 June 2021, № 471.[56]

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[52] The Cabinet of Ministers of Ukraine Decree dated 16 March 2016 No. 161-R on approval of the Strategy for overcoming poverty.

[53] https://zakon.rada.gov.ua/laws/show/202-2020-%D1%80#Text/

[54] Energy Strategy of Ukraine for the period up to 2035 "Security, Energy Efficiency, Competitiveness", approved by Resolution of the Cabinet of Ministers of Ukraine dated 18 August 2017 No. 605-p https://razumkov.org.ua/uploads/article/2018_Energy_Strategy_2035.pdf

[55] National Economic Strategy for the period up to 2030 https://www.kmu.gov.ua/npas/pro-zatverdzhennya-nacionalnoyi-eko-a179

[56]Activities Program for the Period 2020-2023 https://www.kmu.gov.ua/diyalnist/programa-diyalnosti-uryadu

3.9.3 Legislative documents

3.9.3.1 Energy sector related documents

3.9.3.1.1 National Energy and Climate Plan (NECP) (draft)

The draft of National Energy and Climate Plan was prepared with technical assistance of the Low Carbon Ukraine project. The Ministry of Energy shall proceed with inter-ministerial and stakeholder consultations. Possible delays with its adoption may be due to frequent changes in the leadership at the ministry and to its close integration with the updating of the NDC.[57]

3.9.3.1.2 National Energy Efficiency Action Plan for 2019-2030 (draft NEEAP 2030)

The NEEAP 2030 was drafted with the assistance of the EU4Energy Governance project and submitted to the competent ministries.

3.9.3.2 Long -Term Buildings Renovation Strategy (draft)

A long-term strategy for mobilizing investment in renovating the national stock of residential and commercial buildings is currently being drafted with the support of the EU4Energy Governance project. Finalization of the Strategy and a detailed Roadmap for its implementation is expected.[58]

3.9.3.3 Fourth Annual Report under the Energy Efficiency Directive

The Fourth Annual Report under the Energy Efficiency Directive (September 2020) was prepared by the Ukrainian State Agency on Energy Efficiency and Energy Savings (SAEE). The report presents an overview of progress achieved towards national energy efficiency targets in Ukraine. It describes tendencies in energy consumption by sector that occurred in 2018, presents energy efficiency targets which Ukraine has established by 2020, and provides an overview of the main legislative and non-legislative measures, including those which update the mechanisms for calculating cash subsidies for vulnerable consumers.[59]

3.9.3.4 Thermal Modernization of Buildings Strategy (draft)

The draft Strategy for Thermal Modernization of Buildings and Concept of the State Program for Thermal Modernization of Buildings are under development at the Ministry for Communities and Territories Development of Ukraine (Minregion) whilst still considering proposals from the Energy Community Secretariat set out in the final report on the draft Long-Term Buildings Renovation Strategy.

3.9.3.4.1 Natural Gas Market Act

The Natural Gas Market Act (2015) and its amendment (19 December 2019)[60] **introduced the definition of vulnerable consumer** (Art. 1). Vulnerable consumers are household consumers entitled to state assistance using the procedure established by the Cabinet of Ministers of Ukraine. The protection of vulnerable consumers is defined by law as one of the main tasks of the natural gas market regulator (Art. 4). Furthermore, Article 16 is entirely dedicated to the protection of vulnerable consumers. Vulnerable consumers are entitled to receive subsidies as reimbursement

[57] Ukraine's Nationally Determined Contribution (NDC) under the Paris Agreement includes a target of reducing greenhouse gas (GHG) emissions by at least 40% below 1990 levels by 2030. The second NDC is under preparation.

[58] https://energy-community.org/dam/jcr:7fcfd76d-b85f-4ac0-a1af-7e03d1b3618c/EECG_LDK_032020.pdf

[59] https://www.euneighbours.eu/sites/default/files/publications/2020-09/NEEAP_AR_UE_092020%2B.pdf

[60] https://zakon.rada.gov.ua/laws/show/329-19#Text

of expenses for natural gas and other types of targeted support as determined by the Cabinet of Ministers of Ukraine. The Order of Protection of Vulnerable Consumers determines categories of vulnerable consumers, prioritizing order when giving consideration to vulnerable consumers, determines measures regarding monitoring and state control over assigning persons to the category of vulnerable consumers, contains special measures for protecting vulnerable consumers regarding disconnecting from the grid in critical times and intends to ensure natural gas needs of such consumers and also guarantees the scope of targeted support for vulnerable consumers. Targeted support shall be provided to vulnerable consumers in a manner that must ensure its purposeful use.

3.9.3.4.2 Electricity Market Act

The Electricity Market Act (2017, No. 27-28) and its amendments,[61] **defines vulnerable consumers** as household consumers who are entitled to reimbursements of costs for electricity consumption and/or protection against power outages in certain periods (Art.1).

Article 57 of the Act foresees certain remedies available to vulnerable electricity consumers, such as prohibiting electricity suppliers cutting off power supply to vulnerable consumers. Article 61 of the Act, which is entirely devoted to the protection of vulnerable consumers, specifies that supplying electricity to vulnerable consumers is carried out by a universal service supplier (USS) in adherence to this Act and rules of the retail market.

The stability, proper quality, and availability of electricity supply to consumers, including vulnerable ones, is in the public interest. The Cabinet of Ministers of Ukraine may guarantee it by imposing Public Service Obligations (PSOs) on market participants (Art. 62) The service supplier is obliged to keep track of consumers who are provided with such services, including vulnerable consumers. At the same time, service suppliers are entitled to compensation for the costs of providing such services to vulnerable consumers.

3.9.3.4.3 Act on the NEURC (energy regulator)

The Act on the NEURC[62] addresses the issue of lack of access to energy (natural gas and electricity) as part of the energy poverty problem. NEURC is the only government body that is directly obliged to ensure unhindered access of all consumers to modern energy sources (natural gas and electricity).

Government powers in setting tariffs for district heating, water supply, and sewerage are divided between the NEURC and municipalities. Municipalities set tariffs for the production of thermal energy (up to 170 thousand Gcal), distribution and supply of thermal energy (up to 145 thousand Gcal) and supply of thermal energy (less than 90% of consumers are provided with heat metering devices.[63] Following the process of decentralization reform and deregulation of the state's powers in the field of heat supply, NEURC in July 2021 adopted resolution which provides further transfer of NEURC's powers in terms of regulation in the field of heat supply on local (regional) level[64].

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[61] https://zakon.rada.gov.ua/laws/show/2019-19#Text

[62] Act on the National Commission for State Regulation of Energy and Utilities, 2016, No. 1540-VIII, Decision of the Constitutional Court № 5-r / 2019 of 13 June 2019 and Act on Amendments https://zakon.rada.gov.ua/laws/show/1540-19#Text

[63] Resolution of the National Commission for State Regulation of Energy and Utilities of 22 March 2017, No308 on approval of license conditions for economic activity in the field of heat supply, https://zakon.rada.gov.ua/laws/show/v0308874-17#Text

[64] Resolution of National Commission for State Regulation of Energy and Utilities of 07.07.2021. No 1085 "About the statement of Changes to Licensing conditions of carrying out economic activity in the field of heat supply" https://www.nerc.gov.ua/index.php?id=62679

3.9.3.4.4 Energy Efficiency of Buildings

The poor energy performance of building stock is a main cause of energy poverty. The Energy Efficiency Fund Act (2017, No. 32)[65] promotes implementation of incentives and assistance measures for improving the energy efficiency of multi-apartment buildings. The Fund does not provide grants or other types of support for renovating individual houses or multi-apartment buildings if a homeowners' association has not been established.[66]

Article 16, paragraph 2, subparagraph 8 of this Act introduces mechanisms to incentivize recipients of social assistance, subsidies for housing and communal services in order to implement measures to ensure (increase) the energy efficiency of buildings.

The Decree of the Cabinet of Ministers of Ukraine dated 01 March 2010 No. 243 was enacted by the State to devise an economic program on energy efficiency and further develop space for energy carriers from renewable energy sources and alternative fuels for 2010-2021.[67] Under the Decree, a "warm loans" energy efficiency program was launched providing partial compensation for energy efficiency measures undertaken in individual houses or multi-apartment buildings where a homeowner's association or a housing construction cooperative has been established.

By 2020, the program stipulated that if condominiums included families receiving the subsidy, such condominiums receive a weighted average reimbursement of between 40% and 70%, depending on the number of subsidized apartments. In 2021, the program will provide loans only to residents of individual houses and provide funding from the state budget amounting to UAH 150 million. During the entire period of the program, approx. 854,000 households participated in the program, drawing more than UAH 9.5 billion for energy efficiency measures, of which approx. UAH 3.3 billion has been reimbursed by the Government.[68]

Ukraine passed the Resolution of the Cabinet of Ministers dated 27 December 2018, No. 1170 "On approval of the Procedure for determining the amount of savings on housing subsidies to pay for electricity, natural gas, water supply and sewerage, rent (maintenance of buildings and structures and adjacent areas), removal of household waste and liquid sewage."[69] The Procedure establishes a mechanism for determining the amount of cost savings in financing housing subsidies for the population resulting from the implementation of measures for energy efficiency.

3.9.4 Documents on the non-energy sector

The Ukrainian Act on the Status of War Veterans, Guaranteeing and Strengthening their Social Protection (enacted on 24 February 2018) regulates the status of victims of the Revolution of Dignity. According to its norms, such persons are now eligible to enjoy privileges as stipulated in Article 12 of the Act, namely a 75% discount on payments for use of electric and thermal energy within the limits stipulated by current legislation (see the Annex for details).

[65] https://eefund.org.ua/sites/default/files/legislation/1.%20Law%20on%20EEF.pdf

[66] https://energodim.org/detalna-informatsiia/

[67] Decree of the Cabinet of Ministers of Ukraine of 01.03.2010 No. 243 On approval of the State target economic program of energy efficiency and development of the sphere of production of energy carriers from renewable energy sources and alternative fuels for 2010-2021, https://zakon.rada.gov.ua/laws/show/243-2010-%D0%BF#Text

[68] https://www.msp.gov.ua/en/

[69] https://www.oblenergo.kharkov.ua/sites/default/files/pdf/consumer/normdoc/1070.pdf

3.9.5 Institutional framework

At the state level, responsibilities for vulnerable consumers are divided between the Cabinet of Ministers, Ministry of Finance, Ukrainian State Treasury Service, Ministry of Social Policy, Pension Fund of Ukraine, and the NEURC.[70]

At the local level, local offices of the Labor and Social Protection Service and service suppliers are involved.

In terms of the energy efficiency policy and measures as well as their contribution to reducing energy poverty, the role of the Energy Efficiency Fund (EEF) and State Agency for Energy Efficiency and Energy Saving (SAEE) is also important. The EEF was created to support energy efficiency initiatives, implement incentive tools and support measures aimed at increasing energy efficiency in buildings and energy efficiency measures in the residential sector. The programs implemented by EEF contribute to reducing utilities costs, better energy efficiency, and combating energy poverty. The SAEE is the central executive body implementing state policy in the efficient use of fuel and energy resources, energy savings, renewable energy sources and alternative fuels.

3.9.6 Current schemes protecting vulnerable consumers

3.9.6.1 Description

In Ukraine, there are two main forms of direct assistance granted to vulnerable consumers, i.e., **subsidies and abatements**. As of January 2021, more than 3.1 million households in Ukraine receive housing subsidies, and additional 1.8 million families receive abatements of 25 to 100%, depending on the category of beneficiary.[71] Non-financial support mechanisms include prohibiting disconnecting vulnerable consumers from heating systems during the heating season.

3.9.6.1.1 Subsidies

3.9.6.1.1.1 Definition and development[72]

The subsidy is non-refundable cash assistance for the purpose of supporting low-income families, that compensates part of the cost of housing and utility services.

Housing subsidies were introduced in Ukraine in the mid-1990s. At the beginning of the 1990s, the population paid only about 4% of the real cost of housing and communal services.[73] In 1995, reforms were launched to increase this from 4% to 80% and, due to the significant increase in tariffs, a system of subsidies was created. Subsidies were provided as non-cash accruals so that

[70] State Statistics Service stopped collecting information on subsidies as of 1 February 2020 https://zakon.rada.gov.ua/rada/show/v0349832-19?fbclid=IwAR34UbUzxPHyajoS-YbMl0dzH_qNFdPzVi3hVl8pnahYJjILHA15s9ULvs#Text

[71] The subsidy program is the main mechanism of social protection for people when housing and communal prices as well as tariffs increase, https://www.kmu.gov.ua/news/programa-subsidij-golovnij-mehanizm-socialnogo-zahistu-lyudej-v-umovah-pidvishchennya-cin-i-tarifiv-na-zhitlovo-komunalni-poslugi. Note that the total number of households is 14.9 million. Social and Demographic Characteristics of Households of Ukraine, https://ukrstat.org/uk/druk/publicat/kat_u/2019/zb/07/zb_sdhdu2019.pdf

[72] According to subparagraph 7 of paragraph 1, Article 4 of Act No. 2189, the powers of the Cabinet of Ministers of Ukraine cover establishing the procedure for providing benefits and housing subsidies to the population in the form housing subsidies as a share of costs of housing and communal services.

[73] Regarding the formation of economically justified tariffs for housing and communal services, Matveeva http://eprints.kname.edu.ua/3593/1/115-122_Матвеева.pdf

households did not have to pay more than 15% of their income for housing and communal services.[74] This share at 15% has been preserved in the current legislation.

The subsidy system has undergone numerous changes. Here we will outline some of the main ones. Resolution of the Cabinet of Ministers of Ukraine dated 27 December 2001 No. 1763 on providing cash subsidies to the population to reimburse the costs of liquefied gas, solid and liquid household fuel for the first-time monetized subsidies for certain types of fuel and energy resources.

In March 2015, the NEURC raised the price of natural gas for the population by an average of 285%. To mitigate the price shock, two main measures were undertaken: 1) application and selection procedures for obtaining housing subsidies were significantly simplified; 2) Naftogaz was obliged to supply natural gas for the needs of the population and district heating at a price no higher than that set by the government under the Public Service Obligation.[75] A higher number of households receiving subsidies was reached in December 2016 - 7.5 million households.

Resolution of the Cabinet of Ministers of Ukraine of 08.11.2017 No. 951[76] made a shift from the clearing settlement system to the monetization of subsidies (granting subsidies in cash) **at the level of service providers**.

3.9.6.1.1.2 Subsidy amount

According to the Regulation on the Procedure for Allocating Housing Subsidies, approved by the Cabinet of Ministers of Ukraine dated 21 October 1995 No. 848 (as amended), the housing subsidy is calculated as the difference between the cost of housing and communal services subject to social housing norms, social standards for use of housing and communal services and the obligatory payment amount determined in accordance with the procedure established by the Cabinet of Ministers of Ukraine. According to the Resolution of the Cabinet of Ministers of Ukraine dated 27 July 1998 No. 1156 "on the new amount of costs for housing and communal services, purchase of liquefied gas, solid and liquid household fuel in case of housing subsidy" (as amended), the mandatory proportion paid for housing and communal services is determined for each household individually according to a single formula and depends solely on the average total monthly household income based on the number of household members. This approach guarantees the principle of social justice, i.e., a lower household income means a lower mandatory proportion is paid for housing and communal services. At the same time, the housing subsidy increases with increasing prices and tariffs for housing and communal services. The procedure for calculating the average total monthly family/household income for all types of state social assistance was approved by the Resolution of the Cabinet of Ministers of Ukraine dated 22 July 2020 No. 632 "Some issues of payment of state social assistance" (as amended).

3.9.6.1.1.3 The application process and grounds for rejection

Housing subsidies are assigned from the month of the respective application until the end of the heating season and are calculated separately for the heating season and non-heating season. The tenants of a dwelling (house) are granted a housing subsidy based on a rental agreement from the

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[74] Unforgotten reforms in Ukraine, Gaidutsky, https://books.google.com.ua/books/about/%D0%9D%D0%B5%D0%97%D0%B0%D0%B1%D1%83%D1%82%D1%96_%D1%80%D0%B5%D1%84%D0%BE%D1%80%D0%BC%D0%B8_%D0%B2_%D0%A3%D0%BA.html?id=9Uj-swEACAAJ&hl=en&output=html_text&redir_esc=y

[75] The PSO for gas supplied to households was cancelled on 1 August 2020. However, the Government approved in January 2021 a price cap for a final gas price for households at 6.99 UAH per cubic meter. As for electricity, the PSO was introduced on 5 June 2019 by the Decree of the Cabinet of Ministries #483/2019, setting fixed final electricity prices for households.

[76] The Resolution of the Cabinet of Ministers of Ukraine dated 8 November 2017 No. 951 "On amendments and the repeal of certain resolutions of the Cabinet of Ministers of Ukraine, https://zakon.rada.gov.ua/laws/show/951-2017-%D0%BF/ed20171108#Text

month of the application to the end of the heating season, and not extending beyond expiration of the month in which the rental agreement expires. A lease agreement is not a requirement for internally displaced persons. Housing subsidies for purchasing liquefied gas, solid and liquid furnace fuel for households are assigned once a year at the request of beneficiaries.

3.9.6.1.1.4 Payments

Since the beginning of 2019 and in line with Act No. 2189, housing subsidies and cash benefits for housing and communal services were introduced as stipulated in Regulations and the Procedure for Providing Benefits for Housing and Communal Services, Purchasing Solid Fuel and Liquefied Gas in Cash, as approved by the Resolution of the Cabinet of Ministers of Ukraine dated 27 April 2019 No. 373 (as amended).

According to the above Regulations and Procedure, two monetary forms of benefits and subsidies exist: 1) non-cash payments, in which funds are transferred to the account of the Ministry of Social Policy held at Oschadbank JSC bank and then to the accounts of housing and communal services providers (legal entities), and 2) cash payments - cash is paid directly to the recipient's account held at a banking institution or through a branch of JSC Ukrposhta.

In February 2021, a total of 2.8 million households received a subsidy covering housing and communal services. The average subsidy for housing and communal services was UAH 1,740. Legal rights to payment benefits for covering housing and communal services are provided in several legislative acts for specific categories of citizens. They provide discounted fees for services ranging from 25 to 100% (depending on the beneficiary category) within established social standards for use of services. War veterans, Chernobyl disaster victims, Nazi persecution victims, children of war, large families, military service veterans enjoy benefits for housing and communal services.

3.9.6.1.1.5 Subsidies during the COVID-19 pandemic

The Resolution of the Cabinet of Ministers of Ukraine dated 25 March 2020 No. 247 "on the peculiarities of housing subsidies" for the quarantine period set by the Cabinet of Ministers of Ukraine to prevent the spread of the COVID-19 virus established the following:

- A ban on terminating transfers of assigned housing subsidies, except in cases where it is impossible to provide them (in particular, when a household relocates to another dwelling or the death of a single-person household);
- Housing subsidies were reassigned for the coming period to all households that had received the subsidies in the 2019-2020 heating period;
- A 50% increase of social standards in using electricity, natural gas for cooking and water heating, hot and cold water, drainage services due to enforced permanent home stays and an increased consumption of relevant services;
- Postponement of changes to the basic rate of payments for housing and communal services for housing subsidy recipients ranging from 15% to 20%, which was planned for in May 2020 in line with the Resolution of the Cabinet of Ministers of Ukraine date 20 October 2019 No. 878, "on Amendments to Resolutions of the Cabinet of Ministers of Ukraine of 21 October 1995 No. 848 and of 27 July 1998 No. 1156."

Furthermore, the Resolution of the Cabinet of Ministers of 23 December 2020 No. 1324 stipulates allocation of housing subsidies to households whose members are employed with employers that receive partial unemployment benefits for the quarantine period (Article 471 of the Ukrainian Employment Act). At the same time, when calculating housing subsidies with respect to the average total monthly income of these persons, the income earned by them is considered.

Also, the Resolution of the Cabinet of Ministers of Ukraine dated 1 February 2021 No. 64 "on the Issues of Providing Compensation to Certain Categories of Electricity Consumers" regulates

reimbursements of additional costs for increases in electricity tariffs to electricity consumers who use electricity for heating and family-type orphanages, as well as large and foster families (except those who receive a housing subsidy).

3.9.6.1.1.6 Finance

According to the Ukrainian Budget Code[77], starting from 1 January 2020, **expenditures on all housing subsidies and abatements are allocated from the state budget**. These expenditures were previously allocated from local budgets.

3.9.6.1.2 Abatements

3.9.6.1.2.1 Definition and development

The law envisages the possibility of awarding an abatement to the specific categories of citizens on an individual basis as a discounted payment for actual use of the utility services. It is **applied to the volume** within the established consumption norms (if consumption is metered) or for the entire volume of such norms (if no metering equipment is installed) (full list given in Annex 11.2.2).

The largest categories enjoying abatements are war veterans, labor veterans, citizens affected by the Chernobyl disaster, military service veterans and law enforcement agency veterans, children of war, disabled people, and rehabilitated persons. Persons entitled to benefits under several existing Ukrainian laws enjoy a specific abatement under any one of such laws by their choosing [10].

The abatement system is cumbersome and intricate, regulated by approximately twenty laws (full list given in Annex 11.2.2). Many discussions have taken place addressing possible reforms in the system. A key development in reforming abatements was their monetization in October 2019, similarly to subsidies. Two models exist - cash and non-cash payments. Non-cash abatements are granted to all beneficiaries automatically through Oschadbank. Cash abatements are provided to interested beneficiaries based on submitted applications. Accordingly, funds are transferred to the accounts of beneficiaries, who are then able to withdraw them at any time and pay utility fees.

The basis behind granting benefits for paying housing and communal services is an issued certificate indicating the privileged category of the person, the type of discount for paying housing and communal services.

3.9.6.2 Assessments

Three identified measures for energy expenses are offered to socially vulnerable households.

The measures covering housing subsidies, various subsidies during the COVID-19 crisis, and abatements are subject to the following criteria: income census, previous subsidies, unemployment, war veterans, labor veterans, citizens affected by the Chernobyl disaster, military service veterans, law enforcement agency veterans, children of war, disabled people, and rehabilitated persons.

The measures provide financial aid or discounts for the above-mentioned categories of people, reimbursement of housing costs and costs of utility services.

Such measures are not expected to tackle behavioral change or small investments from beneficiaries, which would otherwise increase energy efficiency and decrease energy consumption, and subsequently greenhouse emissions from energy sources. Current measures represent short-term aid to energy-poor households and are not considered a possible solution to alleviating energy poverty.

[77] Article 87 of the Ukrainian Budgetary Code, https://zakon.rada.gov.ua/laws/show/2456-17#Text

Table 3-33. Summary of the measure Housing Subsidies

no.	Item:	Measure 1
1	Name of the measure in English	Housing Subsidies (Regulation on the Procedure for Allocating Housing Subsidies, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 21 October 1995 No 848)
2	Eligibility criteria	Low income
3	Number of eligible households / individuals	3.1 million
4	Is the measure gender sensitive	No
5	Description of the measure	Non-refundable monetary aid aimed at supporting low-income families, compensates some of the cost of housing and utility services
6	Period during which the measure has been in force	During the year
7	Implementation interval	Related to bill payment
8	Maximum amount of financial support per beneficiary in the implementation interval	/
9	Total amount of financial support provided to applicants in the implementation interval	/
10	Year in which financial costs are based	2019
11	Administrative level	State
12	Financing source	State
13	Energy source covered	Consumption of electricity, cold and hot water, sewage, and natural gas for cooking and heating purposes

Table 3-34. Summary of the measure Subsidies During the COVID-19 Crisis

no.	Item:	Measure 2
1	Name of the measure in English	Additional Subsidies During the COVID-19 Crisis (Resolution of the Cabinet of Ministers of Ukraine dated 25 March 2020 No 247 "On the Peculiarities of Housing Subsidies")
2	Eligibility criteria	Received a housing subsidy in the 2019-2020 heating period, persons how have lost their jobs
3	Number of eligible households / individuals	Over 3 million households
4	Is the measure gender sensitive	No

5	Description of the measure	1. Prohibiting termination of assigned housing subsidies for the quarantine period. 2. Assigning housing subsidies for the next period to all households that received a housing subsidy in the 2019-2020 heating period, without receiving their applications. 3. Assigning housing subsidies to citizens who were laid off during the quarantine period and registered as unemployed. 4. A 50% increase in social norms for use of certain utilities (centralized water supply and sewerage, hot water supply, gas supply for cooking and water heating, electricity supply) in the months of the quarantine, starting from March 2020. 5. Postponing increasing the basic payment rate for housing and communal services by recipients of housing subsidies.
6	Period during which the measure has been in force	Quarantine period
7	Implementation interval	Monthly
8	Maximum amount of financial support per beneficiary in the implementation interval	Average UAH 300 per each household
9	Total amount of financial support provided to applicants in the implementation interval	UAH 1.4 billion
10	Year in which financial costs are based	2020
11	Administrative level	State
12	Financing source	State
13	Energy source covered	Consumption of electricity, cold and hot water, sewage, and natural gas for cooking and heating purposes

Table 3-35. Summary of the measure Subsidies During the COVID-19 Crisis – Deductions for Electricity Payments

no.	**Item:**	**Measure 3**
1	Name of the measure in English	Deductions for Electricity Payment in the First Quarter of 2021 due to Abolishment of Specific Reduced Tariffs to Specific Categories of Consumers (Cabinet of Ministers of Ukraine Resolution dated 1 February 2021, No. 64 "The Issue of Providing Compensation to Certain Categories of Electricity Consumers")
2	Eligibility criteria	1. Persons living in residential buildings (including residential buildings such as hotels, apartments, and dormitories) equipped in the prescribed manner with

		electric heating units (including rural areas) and were entitled to a reduced tariff as of 31 December 2020. 2. Persons living in apartment buildings not connected to natural gas and in which there are no functioning district heating systems (including rural areas) and were entitled to a reduced tariff as of 31 December 31 2020. 3. Large, foster families and family-type orphanage
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	No
5	Description of the measure	Deductions cover the cost difference for electricity used as a result of the abolition of reduced tariffs and the setting of fixed prices for household consumers (except those receiving housing subsidies) established since 1 January 2021. Deductions are provided by allocating budgeted funds to universal service providers, followed by their enrollment, as a partial payment for electricity consumed in the first quarter of 2021, to the personal bank accounts of consumers.
6	Period during which the measure has been in force	The first quarter of 2021
7	Implementation interval	Monthly
8	Maximum amount of financial support per beneficiary in the implementation interval	/
9	Total amount of financial support provided to applicants in the implementation interval	/
10	Year in which financial costs are based	2020
11	Administrative level	State
12	Financing source	State
13	Energy source covered	Electricity

Table 3-36. Summary of the measure Energy Efficiency Fund

no.	**Item:**	**Measure 4**
1	Name of the measure in English	Energodim Program
2	Eligibility criteria	Minimum energy efficiency requirements, form of management - condominiums, applications of condominiums with the necessary documents
3	Number of eligible households / individuals	More than 35 thousand
4	Is the measure gender sensitive	No

5	Description of the measure	Energy efficiency measure ENERGODIM is a program to partially reimburse the costs of energy efficiency measures in apartment building by state institution Energy Efficiency Fund
6	Period during which the measure has been in force	Since September 2019
7	Medium amount of financial support per beneficiary in the implementation interval	UAH 7 million
8	Implementation period	EE project implementation period (successive and partial reimbursement of expenses paid by condominiums in the process of implementing eligible EE activities)
9	Total amount of financial support provided to applicants in the implementation interval	UAH 41.8 million (UAH 2.5 million still available)
10	Year in which financial costs are based	2019
11	Administrative level	State, local
12	Financing source	State, local
13	Energy source covered	Consumption of electricity, thermal energy, and natural gas for heating

Table 3-37. Summary of the measure Warm loans Program

1	Name of the measure in English	Warm Loans Program
2	Eligibility criteria	Population living in individual houses (2014-2021); Population living in multi-residential buildings where a homeowner's association or a housing construction cooperative has been established (the Program measures is not covered by budget funds for 2021, and thus temporarily is being not realized) (2015-2020)
3	Number of eligible households / individuals	/
4	Is the measure gender sensitive	No
5	Description of the measure	Energy efficiency measures
6	Period during which the measure has been in force	During the year (2014-2021)
7	Medium amount of financial support per beneficiary in the implementation interval	UAH 7,800 (for replacement of heater boilers in houses) UAH 12,300 (for other energy efficiency measures in houses) UAH 146,800 (other energy efficiency measures in houses)
8	Implementation period	Annually
9	Total amount of financial support	UAH 3.3 billion

	provided to applicants in the implementation interval	
10	Year in which financial costs are based	2014-2021
11	Administrative level	State
12	Financing source	State
13	Energy source covered	Consumption of electricity, thermal energy, and natural gas

3.9.7 List of analyzed legislative acts

1. Sustainable Development Goals by Decree of the Ukrainian President No. 722/2019 (30 September 2019) "On Sustainable Development Goals in Ukraine for the Period up to 2030
2. The Concept of State Policy on Consumer Rights Protection Until 2020
3. Strategy for Overcoming Poverty
4. Energy Strategy of Ukraine up to 2035 "Security, energy efficiency, competitiveness "
5. National Economic Strategy for the Period up to 2030
6. Fourth Annual Report under the Energy Efficiency Directive
7. Budget Code of Ukraine
8. Decree of the Cabinet of Ministers of Ukraine Decree dated 1 March 2010 No. 243
9. Ukrainian Act on Housing and Communal Services of 7 June 2018 No. 2189-VIII
10. Ukrainian Act on the Status of War Veterans, Guarantees for their Social Protection on Strengthening Social Protection (came into force on 24 February 2018)
11. Act on Commercial Metering of Thermal Energy and Hot Water Supply 2017 No. 2119-VIII (as amended 2018, No. 2454-VIII)
12. Electricity Market Act of 13 April 2017 No. 2019-VIII (amended on 1 September 2020)
13. Act on Energy Efficiency of Buildings (2017, No. 2118-VIII (amended on 2019, No. 199-IX)
14. Natural Gas Market Act of 9 April 2015 No. 329-VIII (amended on 20 September 2019)
15. Energy Efficiency Fund Act (2017, No. 32)
16. Act on the National Commission for State Regulation of Energy and Utilities, 2016, No. 1540-VIII
17. Regulation on the Procedure for Allocating Housing Subsidies, approved by the Cabinet of Ministers of Ukraine dated 21 October 1995 No. 848 (as amended)
18. Regulations and Procedure for Providing Benefits for Housing and Communal Services, Purchasing of Solid Fuel and Liquefied Gas in Cash, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 27 April 2019 No. 373 (as amended)
19. Resolution of the Cabinet of Ministers dated 23 December 2020 No. 1324 (Article 471 of the Ukrainian Act on Employment)
20. Resolution of the Cabinet of Ministers of Ukraine dated 1 February 2021 No. 64 Regarding Issues of Providing Compensation to Certain Categories of Electricity Consumers
21. Resolution of the Cabinet of Ministers of Ukraine dated 22 July 2020 No. 632 "On Some Issues of Payment of State Social Assistance" (as amended)

22. Resolution of the Cabinet of Ministers of Ukraine dated 27 July 1998 No. 1156 "On the New Amount of Costs for Housing and Communal Services, Purchasing of Liquefied Gas, Solid and Liquid Household Fuel in Case of Housing Subsidy"
23. Resolution of the Cabinet of Ministers of Ukraine dated 27 December 2001 No. 1763 "On Providing Cash Subsidies to the Population to Reimburse the Costs of Liquefied Gas, Solid and Liquid Household Fuel"
24. Resolution of the Cabinet of Ministers of Ukraine dated 20 October 2019 No. 878 "On Amendments to Resolutions of the Cabinet of Ministers of Ukraine dated 21 October 1995 No. 848 and dated 27 July 1998 No. 1156".
25. Resolution of the Cabinet of Ministers of Ukraine dated 25 March 2020 No. 247 "On the Peculiarities of Housing Subsidies"
26. Resolution of the Cabinet of Ministers of Ukraine dated of 27 December 2018 No. 1170 "On Approval of the Procedure for Determining the Amount of Savings on Housing Subsidies to Pay for Electricity, Natural Gas, Water Supply and Sewerage, Rent (Maintenance of Buildings and Structures and Adjacent Areas), Removal of Household Waste and Liquid Sewage"

3.10 Comparing the current definitions of a vulnerable consumer in the Contracting Parties with the definition of a socially vulnerable consumer as recommended in the Outline of the Social Strategy in the Energy Community

As indicated in Chapter 2.1, the Energy Community has adopted the Outline of Social Strategy in the Energy Community [8] which provides definitions of electricity and gas vulnerable consumers. The document states that a socially vulnerable consumer is an **electricity consumer who**:

a. Uses energy for supplying their permanent housing.

b. Does not exceeding maximum energy consumption on a per person basis. When defining electricity consumption on a per person basis, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family with up to 4 members and reflecting seasonal usage.

c. Belongs to the category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.

d. Receives electricity through a single-phase meter with the connection not exceeding maximum power. When defining the power of a monophase meter, the Contracting Parties shall take into consideration up to 16A of power.

The definition does not cover more than a **minority of the population**. Market prices for electricity should be cost-reflective, and energy use by vulnerable consumers should be financed through social allowances.

Furthermore, the Strategy defines a socially vulnerable **gas consumer** as a consumer who:

a. Uses gas for supplying their permanent housing.

b. Does not exceed maximum gas consumption on a per person basis. When defining gas consumption on a per person basis, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family with up to 4 members and reflecting seasonal usage.

c. Belongs to the category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.

Moreover, the document states that:

- The definition shall not include more than a minority of consumers.
- Reflecting the possibility of switch from a gas to electricity supply, support schemes granted to socially vulnerable gas consumers shall not apply in event the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.

In what follows, we compare national definitions of vulnerable consumers with the above proposed definition from the EnCS. The comparison is done using the following criteria:

a. Does the national legislation provide a definition of socially vulnerable electricity consumers?
    a. Is the support limited only to households?
    b. Are there criteria related to the amount of electricity consumed?
    c. Are the criteria related to the income level as well as other assets of the household?
    d. Is there a limitation on the installed power?

b. Does the national legislation contain a definition of socially vulnerable gas consumers?

a. Is the support limited only to households?

b. Are there criteria related to the amount of electricity consumed?

c. Are the criteria related to the income level as well as other assets of the household?

We can conclude that most of the countries have, to a certain extent, formulated definitions of vulnerable consumers.

3.10.1 Albania

EnC Outline of the Social Strategy Definition	**Albania**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes Power Sector Act
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	A threshold of 200 kWh is defined for a household without specifying the number of household members. Power Sector Act
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes Power Sector Act
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	Yes Power Sector Act
Does not include more than a minority of the population.	Yes. Current definition covers only a minority of the population
Consumption by vulnerable consumers should be financed from social allowances.	Yes Power Sector Act
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes Natural Gas Sector Act
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	Not exceeding maximum gas consumption of up to 30 cubic meters/month for a family with up to four members. Natural Gas Sector Act

Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes Natural Gas Sector Act
Does not include more than a minority of population	Yes. Current definition covers only minority of the population
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	No

3.10.2 Bosnia and Herzegovina

EnC Outline of the Social Strategy Definition	**Bosnia and Herzegovina**
Electricity: socially vulnerable customer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Partially implemented in Federation of Bosnia and Herzegovina. The Decision on Implementation of Measures for Reduction of Household Electricity Costs and Stimulation of Energy Efficiency Measures (44/11, 8/12, 96/12, 100/13, 75/14, 101/15, 52/16, 01/2017) only relating to electricity. The Federation of Bosnia and Herzegovina Ordinance on Organization and Regulation of the Gas Sector (83/07) defines a protected customer as a consumer entitled to access to sufficient quantities of gas supplies in case of accidental disruption in gas supplies. Partially implemented in Republika Srpska: The Electricity Act of Republika Srpska (OG 68/20) defines energy-protected consumers in Article 111 as a socially vulnerable end-user belonging to the household category.
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	Partially implemented in Federation of Bosnia and Herzegovina, where assistance is given to vulnerable electricity customers by subsidizing below-average consumption (268 kWh from EP Bosnia and Herzegovina and 348 kWh from EP HZHB) and is not related to the number of family members and nor does it reflect seasonal usage Not implemented in RS.

Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Partially implemented in FBiH, where customers who spend pensions up to and including the minimum guaranteed amount and recipients of permanent financial assistance are eligible but the measure does not take into consideration all available assets. Partially implemented in RS: The Electricity Act of Republika Srpska (OG 68/20) defines energy protected customers in Article 111 as socially vulnerable end users belonging to the household category and this status is recognized based on acquiring social welfare rights; however, secondary legislation regulating this issue is still absent.
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No mention of maximum power.
Does not include more than a minority of the population.	Yes. Current definition covers only a minority of the population.
Consumption by vulnerable consumers should be financed from social allowances.	No.
Gas: a socially vulnerable customer is also a gas consumer	
Using gas for supplying her/his permanent housing	Partially implemented in Federation of Bosnia and Herzegovina, where the Ordinance on Organization and Regulation of the Gas Sector (83/07) provides a definition of what is a protected customer.
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	Not defined.
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	No.
Does not include more than a minority of the population	Yes. Current definition covers only a minority of the population.
Support schemes granted to socially vulnerable gas consumers shall not apply	No.

in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers	

3.10.3 Georgia

EnC Outline of the Social Strategy Definition	**Georgia**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Energy and Water Supply Act
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	Yes, with higher limits. Decree of the Government of Georgia: • A rated score indicates social-economic status for a maximum of 70,000 (socially and economically disadvantaged families), and those with a consumption (over a 30-day period) not exceeding 301 kWh.
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Partially implemented Georgian Social Assistance Act Orphans and children without parental care, persons with disabilities, persons of full legal age with limited capabilities[78] and without family care, persons without a breadwinner and homeless children. As is the case for deprived families, the Act states that a deprived family is a person or group of persons permanently residing in a separate place of residence, who run joint household activities and whose social and economic conditions are below the threshold determined by the Georgian Government.
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No
Does not include more than a minority of the population.	Yes. Current definition covers only a minority of the population

[78] Persons of full legal age with limited capabilities refers to young people and/or adults with or without disabilities living in shelters. Often, even after reaching adulthood, they remain homeless and do not have the ability to take care of themselves independently.

Consumption by vulnerable consumers should be financed from social allowances.	Yes Social Assistance Act Energy and Water Supply Act Decree of the Government of Georgia (#73, 11 February 2016) The Rule on Implementation of Communal Subsidies allocated under the 2019 Tbilisi Municipality Budget
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes Act on Development of High Mountainous Regions
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	Yes, with higher limits. Act on Development of High Mountainous Regions 1. Mountainous Settlements in the Kazbegi and Dusheti Municipality, each receiving 700 cubic meters of gas for free monthly from October 15 till May 15. 2. Residents living in rural settlements near occupied territory each receiving a subsidy from Georgian Government in winter in the form of a heating allowance amounting to 70 USD/year
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	No
Does not include more than a minority of the population	Yes. Current definition covers only a minority of the population
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	No

3.10.4 Kosovo*

EnC Outline of the Social Strategy Definition	Kosovo*
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes Electricity Act
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	Partially implemented When defining electricity consumption level per person, total consumption of up to three hundred (300) KWh/month for a family of up to four (4) members shall be considered. Electricity Act
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes The definition of low income, in addition to actual income, includes all available assets. Electricity Act
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No.
Does not include more than a minority of population.	Yes. Current definition covers only a minority of the population
Consumption by vulnerable consumers should be financed from social allowances.	Yes Electricity Act
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes. Natural Gas Act
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	Yes When defining the gas consumption level per person, the total maximum consumption is seventy (70) cubic meters/month for a family of up to four (4) members. Natural Gas Act
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes The definition of low income, in addition to actual income, includes all available assets.

	Natural Gas Act
Does not include more than a minority of population	Yes. Current definition covers only a minority of the population
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	Yes Household consumers receiving financial support for payments for a natural gas supply service shall not be allowed to use such funds for other purposes. Natural Gas Act

3.10.5 Moldova

EnC Outline of the Social Strategy Definition	**Moldova**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes Electricity Act
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	No
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Partially implemented Other categories of the population are also included (disabled, elderly, children) regardless of their welfare status. Electricity Act
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No
Does not include more than a minority of population.	Yes. Current definition covers only a minority of the population.
Consumption by vulnerable consumers should be financed from social allowances.	Yes Social Assistance Act
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes Natural Gas Act

Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	No differentiation in terms of volumes Regulated gas tariffs: regulated prices for natural gas at the points of exit from the low-pressure natural gas distribution networks is 4298 lei per 1000 cubic meters (excluding VAT), without any differentiated by volume). The Regulation of ANRE No. 396/2020 of 28 October 2020 on Approval of Regulated Prices for Natural Gas Supplies by S.A. Moldovagaz in the Context of its Public Service Obligation
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Partially implemented Other categories of the population included (disabled, elderly, children) regardless of their welfare status. Natural Gas Act
Does not include more than a minority of population	Yes. Current definition covers only a minority of the population.
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	No.

3.10.6 Montenegro

EnC Outline of the Social Strategy Definition	**Montenegro**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes. Energy Act (OG 5/16, 51/17 and 82/20),
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	Partially implemented Eligible consumers are entitled to a 50% deduction on monthly electricity bills for a maximum electricity consumption of 600 kWh/month (if exceeding 600 kWh/per month, they are still entitled to a deduction for 50% of 600 kWh) according to the Ordinance on Supplying Electricity to Vulnerable Electricity Consumers (OG 81/2018).
Belonging to a category of citizens with the lowest income, where the definition of low	Yes.

income, in addition to actual income, includes all available assets.	The Ordinance on Supplying Electricity to Vulnerable Consumers (OG 81/2018)
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No
Does not include more than a minority of population.	Yes. Current definition covers only a minority of the population.
Consumption by vulnerable consumers should be financed from social allowances.	No
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes. Energy Act (OG 5/16, 51/17 and 82/20),
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	No
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes Energy Act (OG 5/16, 51/17 and 82/20) The Ordinance on Supplying Electricity to Vulnerable Consumers (OG 81/2018)
Does not include more than a minority of population	Yes. Current definition covers only a minority of the population.
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	No

3.10.7 North Macedonia

EnC Outline of the Social Strategy Definition	**North Macedonia**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes Energy Act
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per	Partially implemented

person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	The following conditions for electricity apply for a household: • It must be supplied by a universal electricity supplier • The maximum yearly electricity consumption must not exceed 3600 kWh. • It's electricity consumption must be measured through a single-phase meter with rated current of insurance feeder or on a 25A connecting line or three-phase with a 16A rated current fuse 2021 Program for Protection of Vulnerable Energy Consumers
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes Other social groups may be included (defined as "a household with a person that lives in social risk (motherhood, illness, old age, injury and disability) to whom energy is supplied and/or the network used under special conditions") Energy Act 2021 Program for Protection of Vulnerable Energy Consumers
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	Yes 2021 Program for Protection of Vulnerable Energy Consumers
Does not include more than a minority of population.	Yes. Current definition covers only a minority of the population
Consumption by vulnerable consumers should be financed from social allowances.	Yes 2021 Program for Protection of Vulnerable Energy Consumers
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes Energy Act
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	The household must meet the following conditions for natural gas: • It must be supplied by a supplier obliged to supply natural gas as a public service, and • Annual consumption of natural gas for the months of October to March

	annually must not exceed 70 normal cubic meters. 2021 Program for Protection of Vulnerable Energy Consumers
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes Other social groups may be included (defined as "a household with a person that lives in social risk (motherhood, illness, old age, injury and disability) to whom energy is supplied and/or the network used under special conditions") Energy Act 2021 Programme for Protection of Vulnerable Energy Consumers
Does not include more than a minority of population	Yes. Current definition covers only a minority of the population.
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	No

3.10.8 Serbia

EnC Outline of the Social Strategy Definition	**Country**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes. Energy Act (OG 145/14, 95/2018)
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	Yes. For electricity, all year round: • A single-person household, 120 kWh a month • Household with 2 or 3 members, 160 kWh a month • Household with 4 or 5 members, 200 kWh a month • Household with 6 or more members, 250 kWh monthly
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes. Energy Act (OG 145/14, 95/2018) Ordinance on Vulnerable Energy Consumers (OG 113/2015, 48/2016

	88/2016, 49/2017, 104/2017, 36/2018, 59/2018, 88/2018, 34/2019, 82/2019, 76/2020, 144/2020) Deductions on utility payments in Novi Sad (Decision on Determining Criteria for Deductions on Utility Payments for Families with Three or More Children in 2020 (OG of the City of Novi Sad, No. 55, 27 November 2019) Subsidy for utility products and services in Belgrade (Intervention Measures for Protection of the Most Vulnerable Consumers[79] and Decision on Determining the Category of Users Eligible for Utility Bills Subsidies[80])
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No mention of metering specificities or maximum power.
Does not include more than a minority of population.	Yes. Current definition covers only a minority of the population.
Consumption by vulnerable consumers should be financed from social allowances.	No.
Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes. Energy Act (OG 145/14, 95/2018)
Not exceeding maximum gas consumption per person: when defining gas consumption level per person, Contracting Parties shall consider total consumption of up to 70 cubic meters/month for a family with up to 4 members and reflect seasonality.	Yes. Natural gas for the months of January, February, March, October, November, and December: • Single person household, 32 cubic meters a month • Household with 2 or 3 members, 45 cubic meters a month • Household with 4 or 5 members, 60 cubic meters a month

[79] https://www.infostan.rs/files/Interventnemere.pdf

[80] https://www.infostan.rs/files/Odluka_o_izmenama_i_dopunama_odluke_o_utvrdjivanju_kategorije_korisnika_koji_placaju_subvencionisanu_cenu_komunalnih_usluga.pdf

	• Household with 6 or more members, 75 cubic meters a month
Belonging to a category of citizens with lowest income: for the definition of low income, besides the income all available assets shall be considered.	Yes. Energy Act (OG 145/14, 95/2018)
Not include more than a minority of the population	Yes. Current definition covers only a minority of the population.
Support schemes granted to socially vulnerable gas consumers shall not apply in case the same consumer benefits from support mechanism for socially vulnerable electricity consumers.	No.

3.10.9 Ukraine

EnC Outline of the Social Strategy Definition	**Ukraine**
Electricity: socially vulnerable consumer is an electricity consumer:	
Using energy for supplying her/his permanent housing	Yes Electricity Market Act Ukrainian Act on State Social Standards and State Social Guarantees Ukrainian Resolution of the Cabinet of Ministers of 6 August 2014 № 409 Ukrainian Resolution of the Cabinet of Ministers of 21 August 2019 № 808
Not exceeding maximum energy consumption per person: when defining the electricity consumption level per person, Contracting Parties shall consider a total maximum consumption of 200 kWh/month for a family of up to 4 members and reflect seasonal usage.	Ukrainian Resolution of the Cabinet of Ministers of 6 August 2014 № 409 **If using electricity for individual heating** 30 kWh per one square meter of heated area per month during the heating period. **If using electricity services in residential premises (houses):** 110 kWh per month per family (household) which consists of 1 person and additionally 30 kWh for each additional family member (in the household), but not exceeding 230 kW (electricity supply for residential

	buildings, with a stationary electric stove, centralized hot water system) 130 kWh per month per family (household) which consists of 1 person and additionally 30 kWh for each additional family member (in the household), but not exceeding 250 kWh (electricity supply for residential buildings: with stationary electric stove, no centralized hot water supply;) 100 kWh per month per family (household) which consists of 1 person and another 30 kWh for each additional family member (in the household), but not exceeding 220 kWh (without stationary electric stoves, but with a centralized cold water supply, no centralized hot water supply and gas water heaters) 30 kWh per person per month (in rural areas, for persons who are entitled to a 100% discount for lightning) 70 kWh per month per family (household) which consists of 1 person and another 30 kWh for each additional family member (in the household), but not exceeding 190 kWh (other types of buildings, not specified)
Belonging to a category of citizens with the lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Yes Ukrainian Act on Housing and Communal Services dated 7 June 2018 No. 2189 Prior to assigning a housing subsidy to a person, different types of income are considered. Other categories of citizens, not just those with the lowest income, are also entitled to support.
Consumed electricity is supplied through a single-phase meter with a connection not exceeding maximum power. When defining the power of a monophase meter, Contracting Parties shall consider a maximum power of 16 ampere.	No.
Does not include more than a minority of population.	Yes. Current definition covers only a minority of the population.
Consumption by vulnerable consumers should be financed from social allowances.	Yes Ukrainian Act on Housing and Communal Services dated 7 June 2018 No. 2189

Gas: a socially vulnerable consumer is also a gas consumer	
Using gas for supplying her/his permanent housing	Yes, Natural Gas Market Act Ukrainian Act on State Social Standards and State Social Guarantees Resolution of the Cabinet of Ministers of Ukraine dated 6 August 2014 № 409 Resolution of the Cabinet of Ministers of Ukraine dated 21 August 2019 № 808 Resolution of the Cabinet of Ministers of Ukraine On Providing Cash Subsidies to the Population to Reimburse the Costs of Liquefied Gas, Solid and Liquid Household Fuel
Not exceeding maximum gas consumption per person: when defining gas consumption per person, Contracting Parties shall consider a total maximum consumption of 70 cubic meters/month for a family of up to 4 members and reflecting seasonal usage.	In the event of using of natural gas for individual heating, 4 cubic meters of natural gas per 1 square meter of heated area per month during the heating period
Belonging to a category of citizens with lowest income, where the definition of low income, in addition to actual income, includes all available assets.	Partially implemented Ukrainian Act On Housing and Communal Services dated 7 June 2018 No. 2189 When assigning a housing subsidy, different types of income are considered. Other categories of citizens, not just those with the lowest income, are also entitled to support.
Does not include more than a minority of population	Yes. Current definition covers only a minority of the population.
Support schemes granted to socially vulnerable gas consumers shall not apply in the event that the same consumer benefits from a support mechanism for socially vulnerable electricity consumers.	Partial implementation Resolution of the Cabinet of Ministers on Providing Cash Subsidies to the Population to Reimburse the Costs of Liquefied Gas, Solid and Liquid Household Fuel (If heat energy, natural gas or electricity are simultaneously used for heating a dwelling (house), social standards for heating (heat supply) of a room (in a house) when calculating housing subsidies will apply only to one utility service.)

4. DEFINITION OF ENERGY POVERTY

4.1 Introduction

Energy poverty is a situation when a person struggles to keep their home adequately warm in winter and cool in summer. They struggle to pay electricity bills, usually live in poorly lit homes, or are unable to use domestic appliances as needed. They may lack – in part or fully – access to the power grid, becoming socially excluded and suffering negative consequences as a result [11].

Behind these relatively easy to describe circumstances, however, lie a series of complex questions. Why is energy poverty not just called 'income poverty'? Who is most affected by this condition and how? Are urban or rural dwellers more vulnerable, and in what manner does it vary across different regions and countries? What are the best ways to detect, measure, monitor, and address the problem? In this section, we offer answers to some of these questions with reference to the latest publications on the subject. We discuss them within the Southeastern European (SEE) context.

4.2 Definition of energy poverty

Energy poverty is commonly defined as the inability to secure adequate levels of energy services in the home [12]. This definition has three interlinked elements that need further explanation.

First, **secure** means that there may be multiple reasons why a household cannot attain the energy it needs. This may involve not being able to pay for the required energy (energy affordability) or lacking the necessary supply infrastructure (energy access). Energy affordability challenges are more common in developed countries, whereas energy access is frequently an issue in the developing world. In SEE countries, the two issues overlap. Many households have low incomes to afford energy prices but also, in some remote areas, infrastructure is poorly developed or access to energy grids is intermittent, putting them at a disadvantage. The access element involves not only electricity grids but also district heating and gas mains which is generally underdeveloped in the SEE region.

Second, the **adequate** level of domestic energy involves both a material and social minimum. The material minimum is a level of domestic energy services below which living in a home is unhealthy, as cited in most academic papers on the subject, which generally accepted as a temperature of 21°C in occupied rooms, and 18 °C in bedrooms. The social minimum is a level of domestic energy below which a household undertake customs and practices that define membership in a society, i.e., living in a home that is too cold, too warm, inadequately lit, or imposing limitations on appliance use has well-known negative effects on personal wellbeing and social participation.

Third, **energy services** delivered to home are benefits contributing to human wellbeing [13]. Energy services include activities such as heat and cooling of living spaces, water heating, lighting, and powering of appliances. Energy services normally satisfy specific human needs, require human involvement for utilization, and rely on energy conversion inside the boundaries of the home. All this depends on the energy efficiency of domestic installations and infrastructure, such as the building envelope (walls, windows, doors, roofs), heating systems, and appliances [14].

This is not the only way energy poverty is defined. In various European countries, particularly the UK, where it is known as 'fuel poverty', the phenomenon is often interpreted as the inability to *afford* required levels of energy. However, where domestic energy deprivation has an infrastructural provision element – such as SEE – a wider understanding is necessary. This approach is already present at the ***EU level***: the official website of the European Commission (EC) points to the French definition within the Grenelle II Act, in which energy poverty is defined "as a

situation in which a person has difficulty obtaining the necessary energy in their home to meet their basic needs because of inadequate resources or living conditions"[15].

Moreover, Article 26 of Regulation on the Governance of the Energy Union and Climate Action interprets energy poverty as a form of "necessary domestic energy services needed to guarantee basic standards of living in the relevant national context" [4]. The EU Energy Poverty Observatory (https://www.energypoverty.eu) states that energy poverty occurs when a household suffers from a lack of adequate energy services in the home. In its recent recommendation on the measurement against energy poverty, the EC operates with similar understandings. Together with the staff working document, the recommendation provides guidance on the indicators for measuring energy poverty, while identifying significant aspects of the problem. The recommendation also contributes to sharing of best practices among Member States, while pinpointing funding sources to tackle energy poverty.

Importantly, the main organizations relevant to the development of energy poverty policies at the EU level have been the EC and its agencies (particularly DG ENER) and the European Parliament. Eurostat has played an important role in generating statistics on energy poverty. The European Economic and Social Committee, as well as the European Committee of the Regions, have often provided an impetus for public policy action and discussion on these challenges. Definitions of energy poverty can be found in a majority of National Energy and Climate Plans – documents prepared by EU member states in response to recently-introduced pan-EU energy legislation [16].

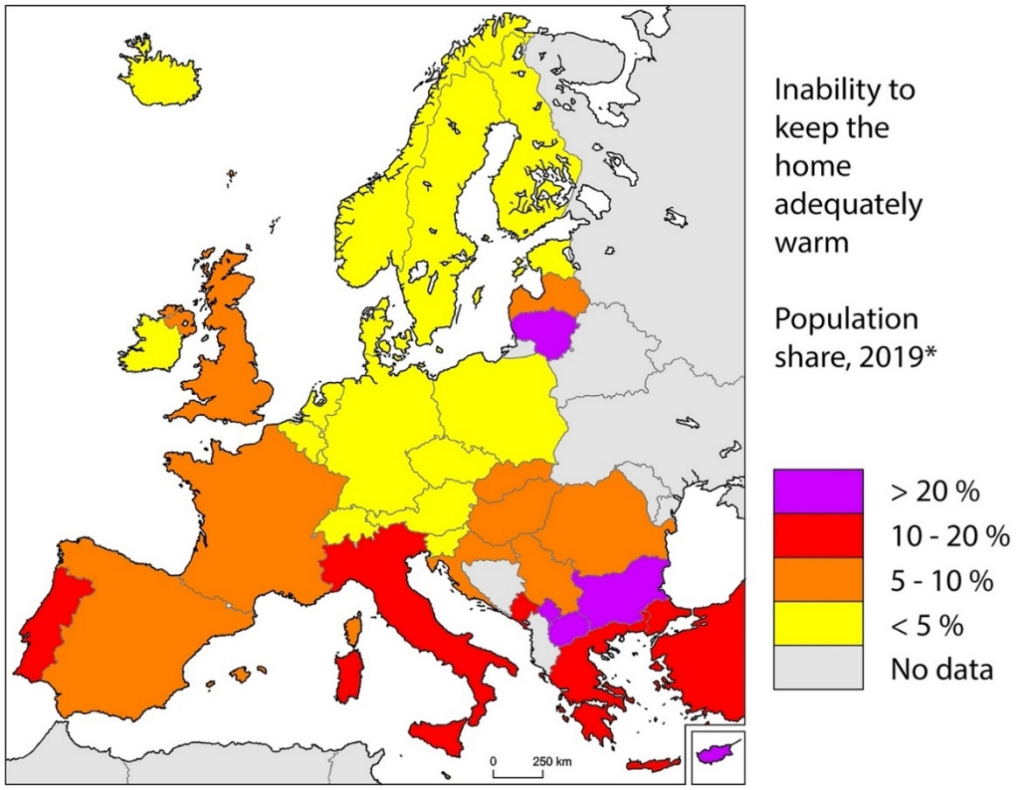
There is a consensus in relevant literature regarding the additionality and distinctiveness of energy poverty with respect to income poverty. Energy poverty involves dimensions beyond just having low income – the infrastructural provision of energy, the nature of housing stock, nature of energy use in the home, and particularly the efficiency of domestic energy installations. While there is an overlap between income poverty and energy poverty, *the latter is not entirely a subset of the former*.

4.3 Causes, consequences, and patterns of energy poverty

Despite being dependent on local situations, the **causes** of energy poverty are relatively well known. In developed countries, a household is more likely to be energy poor if it has a lower-than-average income, lives in an energy inefficient home, has higher-than-average energy needs (e.g., due to old age, disability, small children in the home), and is unable to use forms of energy best suited to its needs due to technical, legal, or economic barriers.

The **consequences** of energy poverty are primarily poor health outcomes: prolonged exposure to cold air, mold or condensation leads to adverse consequences on respiratory and circulatory systems and in turn leading to increased mortality and morbidity during winter (as well as summer heatwaves in some situations). Energy poverty also has s severe impact on mental health, and limiting educational and economic outcomes. The use of polluting fuels among energy-poor households is also associated with **air pollution** – otherwise one of the most tangible consequences of energy poverty in many SEE countries.

Energy poverty occupies a specific geographical region in Europe and beyond. The values for some of the most common indicators used to detect these problems are highest in SEE states, as well as several other Southern, Central, and Eastern European states (Figure 4-1). In essence, an energy poverty 'divide' exists between this group of countries, on the one hand, and Northern and Western European states, on the other [17]. In countries where energy poverty rates are higher, this is due to a combination of circumstances: increases in energy prices, high levels of income poverty, low quality and inefficient housing, lack of necessary energy infrastructure, and additional social vulnerabilities (gender, disability, ethnicity) ([16], [18], [19], [20], [21]).



** Kosovo*, UK, and Iceland data from 2018.*

Figure 4-1. The energy poverty divide in Europe (Source: [16])

In SEE itself, there are also differences among and within countries. Rural areas are particularly vulnerable as people living there usually inhabit lower-quality housing and are often forced to rely on polluting fossil fuels (such as fuelwood and coal) for heating. In urban areas, residents of large housing estates equipped with district heating may often find it expensive to pay for heating and hot water. Informal settlements at the urban fringe, present in many SEE cities, are among the most vulnerable as people living there are vulnerable and discriminated against in multiple ways: housing, income, ethnicity, and social participation.

4.4 Reviewing existing definitions of the energy poor consumer in Europe

It seems that an agreed definition of energy poverty has proved elusive and is contested. Much of the early research into energy poverty within the EU has been aimed at providing a definition – with early papers using the term *fuel poverty* as opposed to *energy poverty*. These concepts have different origins and different focuses. Energy poverty has been largely explored in the context of the Global South where barriers to energy access are linked to poor infrastructure as well as low incomes resulting in households relying on wood and other forms of biomass which is strongly associated with health issues. Fuel poverty has been the term used in the United Kingdom and Ireland and is linked to specific causes – low incomes, poor energy efficiency of the housing stock. Table 4-1 gives an overview of definitions that have been developed for the European context.

Table 4-1. Definitions of energy poverty in selected Contracting Parties [22]

Member State	Definition	Supporting metric
Slovakia [official]	Energy poverty under Act No. 250/2012 is a status attributed to households when average monthly household expenditures on electricity, gas, heating, and hot water represent a substantial share of the average monthly household income.	N/A
France [official]	Energy poverty is attributed to people who encounter difficulties in getting adequate energy supply to satisfy basic needs in their dwellings. This is often due to insufficient resources or inadequate housing conditions.	Three indicators have been proposed but not operationalized: 1) the Energy Effort Rate (EER, or TEE in French) is the ratio between energy expenses and income of the household, which should not exceed 10%, and refers to the first three income deciles; 2) the LIHE (BRDE in French) is an indicator of energy poverty in a household if low income and high energy expenditures as conditions are met; 3) the so called *cold indicator* relies on testimonials regarding the level of thermal comfort and level of budget constraints
Ireland [official]	Energy poverty is a situation whereby a household is unable to attain an acceptable level of energy services (including heating, lighting, etc.) in the home due to an inability to meet these requirements at an affordable cost.	10% metric – but with higher thresholds to determine the severity
Belgium	Energy poverty is attributed to households that spend too high a proportion of their disposable income on energy costs.	Double the median expenditure threshold (equivalized income). Only the lower five income deciles are included. Complemented by depth/hidden poverty metrics.
	Hidden energy poverty is attributed to households which spend abnormally low amounts on energy services	Household expenditure is below the median expenditure of households of the same size and type.
England [official]	Fuel poverty is attributed to households for which 1) household incomes are below the poverty line (considering energy costs); and 2) their energy costs are higher than what is typical for their type of household.	LIHC + fuel poverty gap. Income is calculated on an 'after housing costs' basis (deducting mortgage, payments, rent) and equivalized to account for the household composition. The income threshold is below 60% of the net median income.

Austria	Energy poverty is attributed to households considered as energy poor if their income is below the at-risk-of-poverty threshold and, at the same time, it must cover above-average energy costs.	LIHC. The at-risk-of-poverty threshold is 60% or less of the median income (equivalized). Above-average costs - either 140% of the median expenses can be considered above average or fixed at 167% of the median costs.
Cyprus [official]	Energy poverty can refer to situations in which consumers find themselves in a difficult position due to their low income as indicated on their tax statements and in conjunction with their professional status, marital status, and specific health conditions and therefore, they are unable to cover the costs for adequate electricity supplies, given that these costs represent a significant proportion of their disposable income.	N/A
Scotland [official]	Fuel poverty is attributed to those households which, in order to maintain a satisfactory heating regime, are forced to spend more than 10% of their income (including the official Housing Benefit or Income Support for Mortgage Interest) on all household fuel use.	A satisfactory heating regime, as recommended by the World Health Organization, is 23°C in the living room and 18°C in other rooms, and is to be maintained for 16 hours over every 24-hour period in households with older people or people with disabilities or chronic illness, and at 21°C in the living room and 18°C in other rooms for a period of nine hours over every 24-hour period (or 16 hours over 24 hours on weekends) for other households.
Wales [official]	Fuel poverty is defined as having to spend more than 10% of income (including housing benefits) on all household fuel used to maintain a satisfactory heating regime. Expenditure on all household fuel exceeding 20% of income means that households are defined as suffering from severe fuel poverty.	10% metric. Satisfactory heating regime – as above
Northern Ireland [official]	A household experiences fuel poverty if, in order to maintain an acceptable temperature level throughout the home, the occupants are forced to spend more than 10% of their income on all household fuel use.	10% metric. Satisfactory heating regime – as above

4.5 Evaluating definitions of energy vulnerability among Contracting Parties

This section assesses the need of establishing a new definition of energy poverty among Contracting Parties (CPs). The analysis is based on results obtained in reviewing legislation among CPs in *Chapter 3: status review*.

4.5.1 Albania

The current legislative framework in Albania addresses the issue of vulnerable consumers who are entitled to support. Vulnerability in the current framework refers to a disability, health, and income status.

Though the current definition benefits the most vulnerable members of society, it still fails to capture the broader aspects of energy poverty. We propose adopting a new definition of energy poverty that will allow authorities to measure the energy poverty and pursue measures to alleviate it.

4.5.2 Bosnia and Herzegovina

Bosnia and Herzegovina has measures in place that are aimed at providing assistance in covering electricity and gas costs for the most vulnerable consumers. The current definition uses income and disability as the principal criteria for addressing the issue of energy vulnerability.

Current measures are targeted towards the most vulnerable members of society and as such, they do not address the broader issue of energy poverty. Therefore, our proposal involves Bosnia and Herzegovina adopting a definition of energy poverty that would allow the authorities to measure the extent of energy poverty, enabling it to pursue measures that resulting in long-term alleviation of energy poverty.

4.5.3 Georgia

Georgia has a general definition of vulnerability related primarily to household socioeconomic status. This allows the authorities to assist the most vulnerable members of society.

Our propose is that a definition of energy poverty should be developed for Georgia. The definition would allow the authorities to identify the extent of energy poverty in aspects that extend beyond only income and leading to the development of policies and measures to provide long-term support to households in alleviating energy poverty.

4.5.4 Kosovo*

Kosovo* has only a general definition of consumers in need without precise criteria and established measures. We propose adopting a definition of energy poverty that will allow the authorities to measure the extent of energy poverty and pursue measures to alleviate it.

4.5.5 Moldova

The current definition developed according to the Natural Gas and Electricity Act defines vulnerable consumers which are defined in the context of social policy. This definition targets the most vulnerable households but fails to identify energy-poor consumers.

We propose that the authorities adopt a definition of energy poverty which would allow for identification of energy-poor households and quantification of the issue. Subsequently, the authorities would then be able to develop policies and measures to aid those households that suffer from energy poverty but do not necessarily fall under the current policy framework.

4.5.6 Montenegro

A current definition of energy vulnerable consumers exists and refers to vulnerability stemming from the health and social status. This approach provides support to the most vulnerable members of society, nevertheless, it fails to capture the broader context of energy poverty.

We propose that authorities adopt a definition of energy poverty that enables it to measure energy poverty and pursue measures resulting in long-term alleviation of energy poverty.

4.5.7 North Macedonia

The current definition identifies energy vulnerable consumers on the basis of income and health criteria. It facilitates identification of the most vulnerable households but fails to cover other households that might be suffering from energy poverty due to other reasons.

We propose that the authorities adopt a definition of energy poverty and accompanying indicators that measures the extent of energy poverty and enables it to pursue measures resulting in long-term alleviation of energy poverty.

4.5.8 Serbia

Current definitions of vulnerable consumers given in several legislative acts rely primarily on factors such as health and income level. Though this approach does target the most vulnerable consumers, it still fails to capture other aspects of energy poverty, meaning that some households are not covered by the current definitions.

We propose that the authorities adopt a definition of energy poverty and accompanying indicators that measure energy poverty and enable it to pursue measures resulting in long-term alleviation of energy poverty.

4.5.9 Ukraine

Current definitions of vulnerability are very general and unlike other Contracting Parties (CPs), specific criteria are lacking.

We propose that the authorities a definition of energy poverty and accompanying indicators that measure energy poverty and enable it to pursue measures resulting in long-term alleviation of energy poverty.

4.5.10 Conclusion

As the analysis reveals, the CPs have defined energy vulnerability in such a way that it targets primarily individuals with health issues or those of low income. Other aspects and drivers of energy poverty, such as energy efficiency of homes, gender, energy needs, have not been considered. Consequently, a certain share of energy-poor households not meeting current criteria are not eligible for support. Therefore, we propose that all CPs adopt definitions of energy poverty as suggested in the following section.

4.6 A proposed definition of energy poverty for Contracting Parties

4.6.1 Introduction

When discussing energy poverty, another concept called **energy vulnerability** is frequently encountered. Energy vulnerability is a wider definition and encompasses energy poverty. Energy vulnerable consumers are consumers who are at a greater risk of becoming energy poor, due to various reasons such as income, health, disability, and gender. Energy vulnerable consumers do not necessarily need to be energy-poor. Therefore, energy-poor consumers are a subset of energy vulnerable consumers and are characterized as facing difficulties in securing adequate levels of energy services, again due to a multitude of reasons (income, health, and dwelling characteristics). For policy purposes, this report recommends the use of the term **energy poverty** rather than energy vulnerability. Energy poor households are a more distinctive group as opposed to those who are vulnerable, and as such can be targeted more directly with specific measures. What is more, challenges faced by energy-poor households can be addressed through a combination of energy, social, health, and housing measures, whereas vulnerability tends to be primarily a social phenomenon.

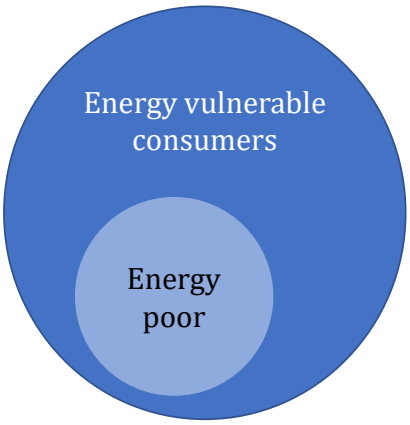


Figure 4-2. Theoretical relationship between vulnerable households and energy-poor households

Source: Author

Current measures protecting energy poor consumers tend to focus on low-income households. Nevertheless, the demographics of energy poverty are always broader than demographics of people with low incomes - mainly because energy poverty is not just caused by low incomes, but also depends on energy inefficient housing, energy needs, and energy supply. Generally, the greater the energy poverty problem in a country, the greater the number of households who are not income poor but maybe energy-poor.

Because energy poverty has many causes, addressing it using a single policy measure is difficult. Nevertheless, this is exactly the approach of most CPs. Most if not all Contracting Parties in the Energy Community region have relatively robust and extensive social support systems. In such contexts, the easiest measures to implement involve providing adding income support for energy-poor households to the existing social welfare system. Selecting energy-poor households based on their participation in the social welfare system of a country underestimates the extent of energy poverty: as already stated, energy poverty is caused by a plethora of reasons, income being just one of them. Therefore, current protection mechanisms for vulnerable consumers that rely only on protecting low-income consumers fail to capture all energy-poor consumers. Therefore, a policy goal should be to cover as many energy-poor consumers as possible by providing a broad definition of energy poverty that will encompass major drivers of energy poverty.

Due to the complex nature of energy poverty, more than one criterion needs to be evaluated in determining whether a consumer is energy poor. In the next section, we propose a definition of energy poverty.

4.6.2 Proposed definitions

We propose the following definition of energy-poor consumers and its implementation in the legislation of EnC CPs[81]:

> **An energy poor consumer** is a consumer who cannot secure adequate warmth, cooling, lighting, and energy to power appliances necessary for essential services that underpin a decent standard of living and health.

The proposed definition of energy poverty is general enough to ensure that it covers all relevant causes of energy poverty. Furthermore, by not explicitly including criteria for energy poverty, the definition is flexible enough to be applied to all CPs and can also address changes to drivers of energy poverty that may occur over time (such as changes in market structure, energy prices, and income levels).

Importantly, energy poverty can be measured based on **aggregate** and **individual levels**. An aggregate measurement of energy poverty means estimating the number of energy-poor households in a country, which is the focus of this study. Assessing aggregate energy poverty is based primarily on statistical data, as will be discussed in the following sections in which indicators for this purpose are proposed.

Assessing energy poverty at an individual level implies determining whether a household is energy poor. This is important when assessing whether households are eligible to participate in energy poverty alleviation programs. Determining whether a household is energy poor is also based on statistical indicators (share of energy-related expenditure in disposable income, as proposed in this study) and it should be supplemented with additional indicators to better target alleviation measures against energy poverty.

[81] As stated, energy poor consumers are a subset of energy vulnerable consumers. Energy vulnerable consumer can be defined as a consumer characterized by, inter alia, social, economic, or health conditions that render this consumer more likely to be energy poor.

5. ANALYSIS AND IDENTIFICATION OF THE MAIN DRIVERS OF ENERGY POVERTY

Energy poverty is driven by many factors such as low income, low energy efficiency of dwellings, climate, availability of energy sources and energy prices, to name just a few. This section presents the main drivers of energy poverty, which include:

- Macroeconomic development,
- Final energy consumption of households,
- The availability of different energy sources,
- Energy prices,
- Housing efficiency,
- Climate.

The first step involves assessing the above indicators across Contracting Parties (CPs), in other to determine differences and similarities among the CPs. Next, we analyze these drivers for each of the CPs to shed light on the most appropriate measures in addressing energy poverty.

5.1 Cross country comparison

The **macroeconomic development** of a country has a significant effect on the prevalence of general (income) poverty but also energy poverty. As a country develops, the number of affluent citizens increases, leading to a lower share of households that find it difficult to meeting consumption needs, including energy consumption. To gauge overall macro-economic development, we utilize four indicators: 1) level of gross domestic product (GDP) per capita, 2) unemployment level, 3) average net wage, and 4) number of households that live on less than USD 1.9 per day.

A low level of economic development measured by GDP per capita also implies low purchasing power of households. Figure 5-1 and Figure 5-2 show nominal gross domestic product (GDP[82]) per capita in US$ for 2020 and GDP per capita in purchasing power parity (PPP) for 2020, respectively.[83] The figures show significant differences in the level of GDP per capita in nominal and PPP terms. GDP differs by almost one hundred percent between the country with the lowest GDP per capita (Ukraine) and the country with the highest GDP per capita (Montenegro). When purchasing power parity is taken into consideration, the differences between CPs narrow, but still remain significant.

[82] Gross domestic product (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific period.

[83] Data for 2020 was not available.

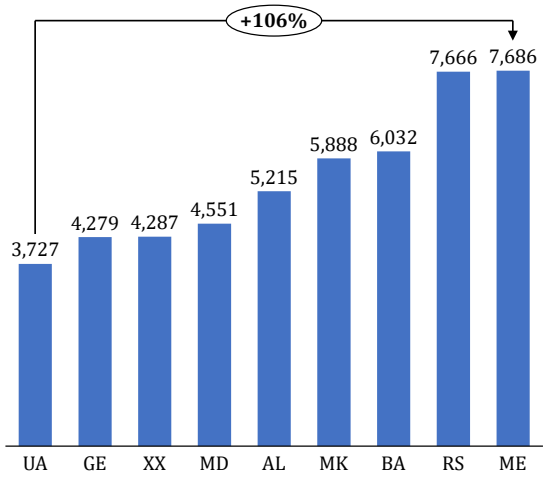


Figure 5-1. GDP per capita (current US$) for 2020

Source: World Bank

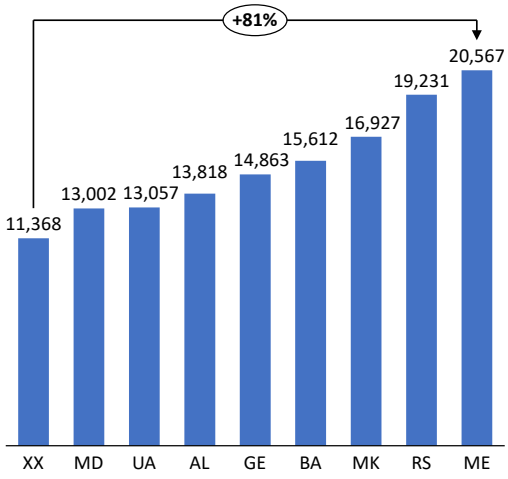


Figure 5-2. GDP per capita in USD for 2020, PPP (constant 2017 international USD)

Source: World Bank

Unemployment levels shows the share of the population willing to work but not able to find a job. The unemployment level negatively correlates to income and consequently energy poverty, which affects especially long-term unemployed. Unemployment levels vary significantly between CPs. As Figure 5-3 shows, the difference between Moldova with the lowest unemployment rate (5.47% in 2019) and Kosovo* with highest unemployment rate (25.7 in 2019) is almost five-fold. The average level of unemployment in 2019 when data for all CPs was available amounted to 14.5%, with a median of 14.4%. Also, there was no observed increases in unemployment among CPs during the COVID-19 pandemic in 2020.

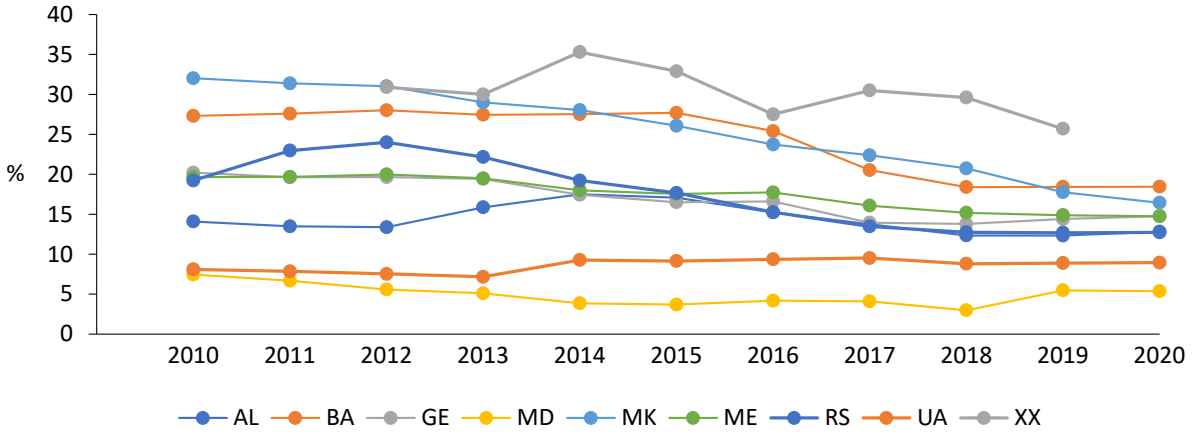


Figure 5-3. Unemployment rates, total (% of total labor force) (modeled ILO estimate)

Source: The World Bank[84]

In terms of the purchasing power of households, the following figures presents data on average monthly wages in CPs during 2019, the last year for which the data was available. As is the case with GDP per capita, there are significant differences among CPs, e.g., the difference between Montenegro with the highest average monthly salary and Georgia with the lowest monthly salary is 90%.

[84] https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS

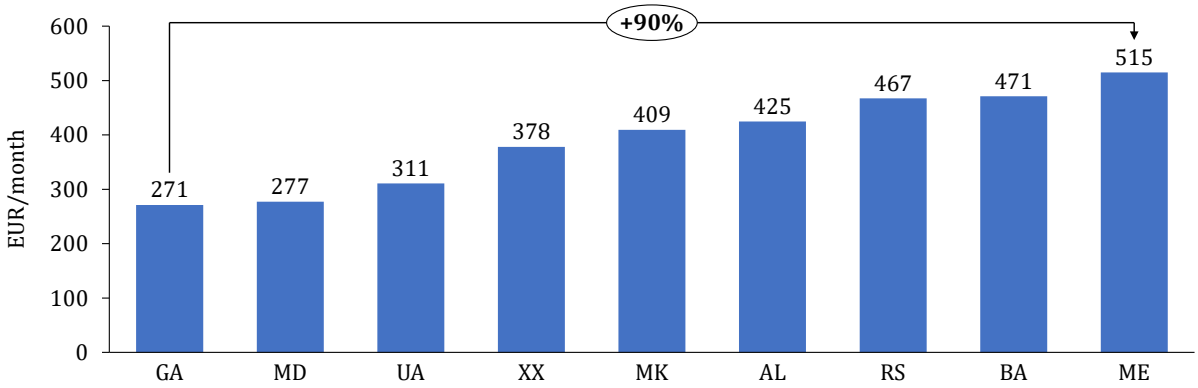


Figure 5-4. Average net monthly wages during 2019

Source: National statistics offices

All else being equal, countries with lower economic development as measured by GDP per capita, lower average monthly net wages or countries with higher unemployment rates are expected to have a higher level of energy poverty.

In addition, the poverty headcount ratio at USD 1.90 a day is used as an explanatory variable for energy poverty across various countries (data not available for Ukraine). The indicator is defined as the percentage of the population living on less than USD 1.9 a day at 2011 international prices in PPP terms. Reported statistics are based on consumption data, or when unavailable, on income.[85]

The figure below shows the percentage of populations below a pre-specified poverty line in the CPs in a certain period.[86] The observed data shows that the percentage of the population living on less than USD 1.90 a day is the highest in Serbia and Georgia compared to Moldova and Bosnia and Herzegovina which have the lowest ratios. The expectation is that CPs with a higher poverty headcount ratio have higher levels of energy poverty.

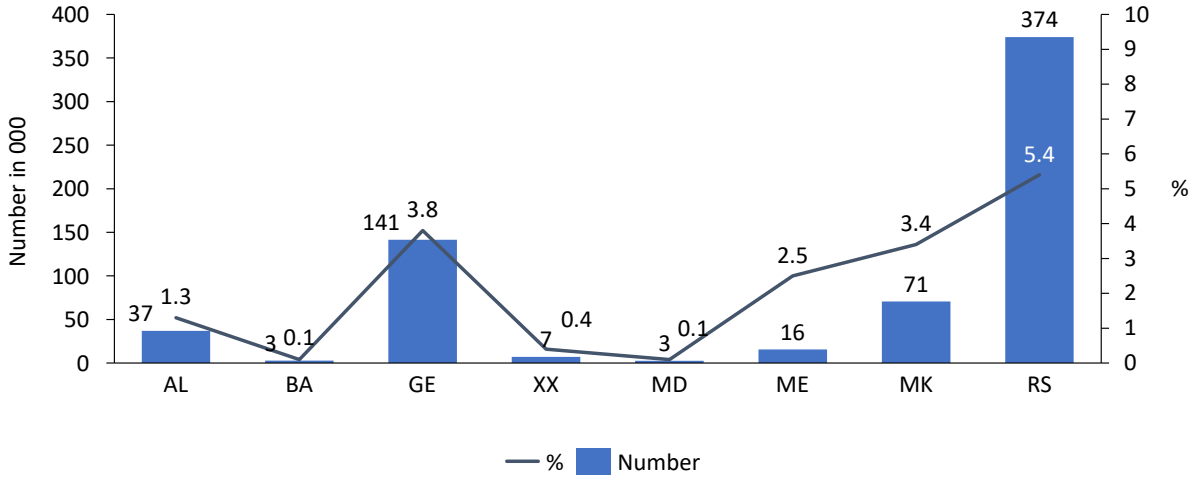


Figure 5-5. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: The World Bank

[85] Source: https://databank.worldbank.org/metadataglossary/millennium-development-goals/series/SI.POV.DDAY

[86] Data availability: Albania - 2017, Bosnia and Herzegovina - 2011, Georgia - 2019, Moldova - 2017, North Macedonia - 2018, Montenegro - 2016, Serbia - 2017, Kosovo* - 2017. There is no available data for Ukraine.

All else being equal, countries with lower economic development as measured by GDP per capita, lower average monthly net wages or countries with higher unemployment rates are expected to have a higher level of energy poverty.

Impact of COVID-19 on energy poverty

An important factor contributing to the issue of energy poverty in EnC CPs in recent times has been the COVID-19 pandemic. It has had a major global impact on human lives and economies since the beginning of 2020. Even though a major concern has been the health of the world population, consequences of the pandemic on economic activity are also important on policy agendas. The COVID-19 crisis has hit severely the EnC region too.[87]

GDP growth rate across the European Union as given by Eurostat in 2020 was -6.1%. The conclusion from the data is that the pandemic had the worst impact on countries largely dependent on tourism and lacking a diversification of its industry sectors.[88] On the other hand, based on data from the World Bank, four EnC CPs when compared to the EU overall, suffered a much larger decline in real GDP growth rates: Montenegro -15.2%, Moldova -7%, Kosovo -6.9%, and Georgia -6.2%.[89]

Besides the impact on the GDP growth rate, the pandemic also harmed the labor market. The data shows that in March 2021, the seasonally adjusted unemployment rate in the European Union was 7.3% compared to March 2020 when the rate was 6.4% (Eurostat). Going forward, Eurostat estimates that 15.52 million men and women in the EU were unemployed in March 2021. When comparing these values to March 2020, we see that unemployment rose in the EU by 2 million.[90] [91]Based on World Bank data, unemployment rates in EnC CPs were high even before the pandemic started, and continued rising further during the pandemic. Two CPs with the highest rates are Bosnia and Herzegovina (16.58%) and Montenegro (15.86%).[92]

To mitigate the impact of the COVID-19 pandemic, EU leaders endorsed at the beginning of Q2 2020, a €540 billion package for workers, businesses, and member states. The package consists of the following instruments:

- €100 billion - Support to Mitigate Unemployment Risks in an Emergency (SURE),
- €200 billion - Pan-European guarantee fund for loans to companies by the European Investment Bank, and
- €240 billion - Pandemic Crisis Support (PCS) for EU member states through the European Stability Mechanism (ESM).[93]

The EU also took action and redirected EU funds to help member states.

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[87] https://www.rcc.int/pubs/120/labour-markets-in-the-western-balkans-2019-and-2020;

[88] https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_GDP__custom_78848/bookmark/table?lang=en&bookmarkId=7681260e-2f75-4cd7-a153-02fc89543f2c

[89] https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=RS

[90] https://ec.europa.eu/eurostat/documents/2995521/11563067/3-30042021-CP-EN.pdf/5e5aae01-e15d-b8bd-71fb-4096b88f4120?t=1619705933576

[91] https://ec.europa.eu/eurostat/databrowser/view/UNE_RT_Q__custom_89634/bookmark/table?lang=en&bookmarkId=62b2a6e6-0d4c-4781-8e9a-c0ea54329d7b

[92] https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS?view=chart

[93] https://home.kpmg/xx/en/home/insights/2020/04/european-union-government-and-institution-measures-in-response-to-covid.html

Unfortunately, CPs have not received the support needed to soften the impact of the COVID-19 pandemic. When assessing the effects of the pandemic, we believe that the overall impact has not been fully captured and that due to economic differences between countries and lack of COVID-19 relief funds compared to EU countries, EnC Contracting Parties have been affected more adversely than their EU counterparts. This implies that more individuals and households find themselves unable to meet their energy needs, further exacerbating the issue of energy poverty.

Regarding **final energy consumption in households**, we analyze average annual final energy consumption in households. Households use energy for space heating and cooling, water heating, cooking, lighting, and appliance use. The following two figures show final energy consumption per household and per person in the CPs. A slight difference among the CPs is apparent primarily due to the average household sizes.[94] The only major difference between final energy consumption per person and final energy consumption per household occurs for Kosovo* which has significantly larger households compared to other CPs. Therefore, while Kosovo* has one of the largest final energy consumptions per household, its final energy consumption per person is at the lower end of the spectrum in the Energy Community.

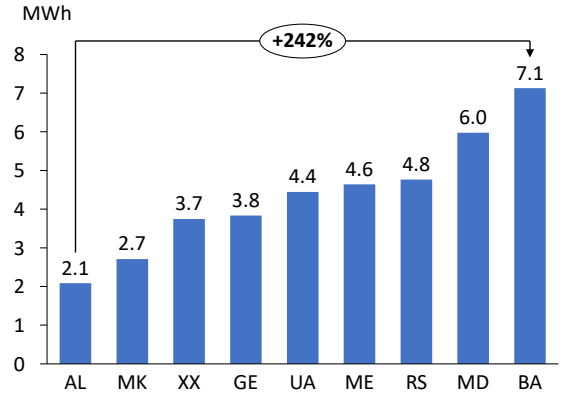


Figure 5-6. Total annual energy consumption, MWh per person

Source: EUROSTAT

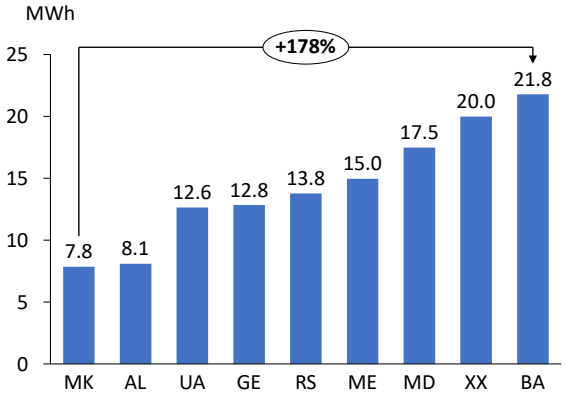


Figure 5-7. Total annual energy consumption, MWh per household

Source: EUROSTAT

In terms of **availability of energy sources**, we analyze the existence of different networks in CPs: electricity, gas and district heating given that the existence of different networks in CPs affects the choice of measures for mitigating energy poverty.

Not all energy networks are present in all CPs. With electricity as an exception, gas, and district heating (DH) are available only in some CPs. Currently, there is no gas network in Albania, Montenegro, and Kosovo* while DH is not available in Albania, Georgia, and Montenegro.

Table 5-1. Availability of electricity, gas, and district heating (DH) to household consumers in CPs

Country	Electricity	Gas	DH
Albania	✓	x	x
Bosnia and Herzegovina	✓	✓	✓
Georgia	✓	✓	x
Kosovo*	✓	x	✓

[94] To calculate total energy consumption per person and household we used data on total energy consumption in the household sector from the EURSOTAT database for 2018.

Moldova	✓	✓	✓
Montenegro	✓	x	x
North Macedonia	✓	✓	✓
Serbia	✓	✓	✓
Ukraine	✓	✓	✓

Source: author

Another important driver of energy poverty in CPs is **energy prices**. Higher energy prices means less affordable energy for household consumers. Figure 5-8 illustrates the structure of electricity prices in EUR/MWh for household consumers for the band DC (between 2,500 kWh and 5,000 kWh of electricity annually) while Figure 5-9 shows the share of taxes in household electricity prices.[95] For comparison purposes, the price of electricity in Croatia and Hungary is 103.7 EUR/MWh and 100.9 EUR/MWh, respectively. According to the data, the difference in prices between the country with the lowest prices (Ukraine) and the country with the highest prices (Montenegro) is 152%.

Figure 5-9 shows that in most CPs, the share of levies and taxes in electricity prices is relatively of the same order of magnitude. The exception is Moldova where electricity is tax (VAT) exempted.

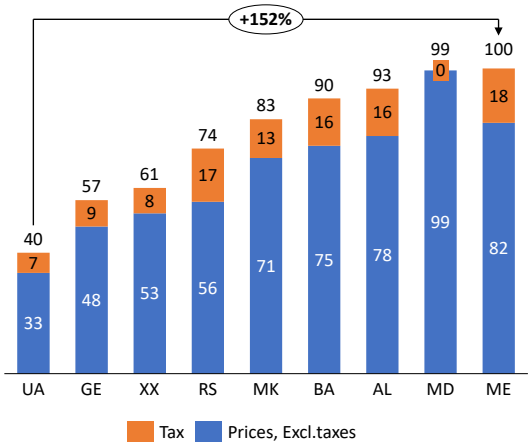


Figure 5-8. Structure of household electricity prices, EUR/MWh

Source: EUROSTAT

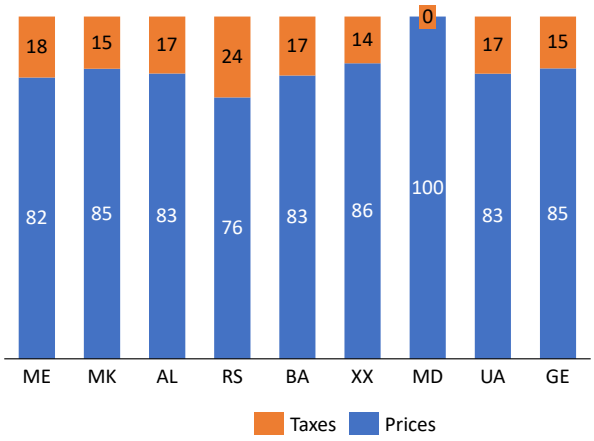


Figure 5-9. Share of taxes as a proportion of final household electricity prices

Source: EUROSTAT

Electricity prices are an important factor affecting energy poverty in any country. As the analysis of CPs shows, electricity is the only source of energy used by a large number of households. Given current electricity prices in CPs when compared to electricity prices in EU Member States, the expectation is that prices in CPs in the long run will probably increase in order to reach cost reflective levels. Another issue eventually placing upward pressures on electricity prices in CPs is the possible introduction of carbon pricing in CPs. Currently, electricity generated from fossil fuel technologies in CPs are not subject to carbon pricing, which is expected to change.

A recent report published by the EnC analyzes the future development of electricity prices in EnC CPs by assessing the impact of carbon pricing on retail electricity prices [23]. The analysis in the

[95] All data are bi-annual and refer to the second half of 2020, except for Albania where prices refer to second half of 2019.

report is carried out under different scenarios, which include (detailed description of scenarios is given in the section 11.3 of the Appendix):

1. Baseline scenario (BSL).
2. Baseline Scenario with a Cross-Border Adjustment Carbon Tax (BSL_CBAT).
3. Full Carbon Pricing and Market Fragmentation (Full_CP-M_Fr).
4. Gradual Carbon Pricing and Market Fragmentation Scenario (Gr_CP-M_Fr)
5. Full Carbon Pricing and Market Integration (Full_CP-M_In)
6. Gradual Carbon Pricing and Market Integration (Gr_CP-M_Int)

If carbon pricing is introduced, projections show that final electrify prices for household consumers will increase, except for Georgia and Albania which already have large share of RES. This increase will be felt even more in countries that are more reliant on coal as an energy source for electricity generation. The price rises largely depend on the level of market integration in the gas and electricity sectors.

Besides electricity, gas prices are another important driver of energy poverty. Households with access to a gas network use gas for space heating, and some also for hot water and cooking. Figure 5-10 shows the structure of gas prices in EUR/MWh for household consumers in the D2 band (between 20 GJ and 200 GJ of gas consumption annually), while Figure 5-11 shows the share of taxes in final household gas prices.[96] For illustrative purposes, gas prices in Croatia, Hungary, and Poland are 37.7 EUR/MWh, 30.8 EUR/MWh and 41.9 EUR/MWh, respectively. As the data shows, there are significant differences in gas prices for household consumers. The price difference between the country with the lowest prices (Georgia) and country with the highest prices (North Macedonia) is 196%.

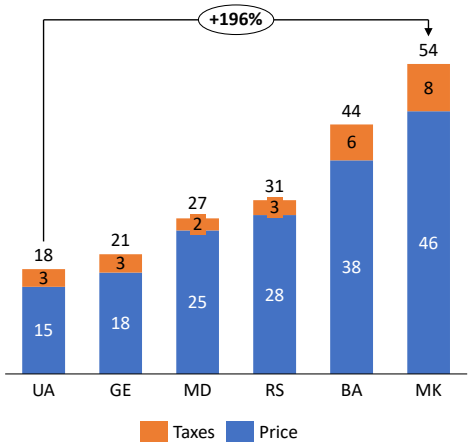


Figure 5-10. Structure of household gas prices, EUR/MWh

Source: EUROSTAT

Figure 5-11. Share of taxes in percentages in final household gas prices

Source: EUROSTAT

Though economic development and prices are reflected in energy affordability in CPs, another aspect is energy largely required for **space heating and cooling** and is attributed to a large proportion of total energy use. Measuring requirements for space heating and cooling relies on two variables: heating degree days (HDDs) and cooling degree days (CDDs). Both variables are derived from outside air temperature. Heating and cooling requirements for a given physical

[96] All data are bi-annual and refer to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

structure at a specific location are considered, and proportional to the number of HDDs and CDDs at the respective location.[97]

To assess whether there has been a statistically significant increase in CDD or decrease in HDD values due to for example climate change, a simple regression of the HDD and CDD is performed, each separately on a time trend, for each of the cities for which data is available. For most cities we do find statistical evidence of the decrease in the number of HDD at least at 10% significance level, while we fail to find statistical evidence of the increase in CDD. This result suggest that climate change may possibly have resulted in the reduced need for heating, but not so much for increase for cooling. Nevertheless, the result might be spurious and longer time series data might have given a different result.

A decrease in the demand for space heating can significantly decrease overall energy use, but this gain can be offset in part or completely by an increase in demand for cooling. Furthermore, heating is delivered to end-users in various ways (individual boilers fueled by oil, gas and coal, as well as electricity and district heating), whereas cooling is powered currently almost exclusively by electricity. As a result, a given change in demand for cooling is generally associated with greater costs, a larger change in primary energy demand and larger impacts on peak capacities on supply networks than the same change in heating demand.

The heating degree day (HDD) index is a weather-based technical index describing heating energy requirements of buildings. The cooling degree day (CDD) index is also a weather-based technical index but describes the need for cooling (air-conditioning) requirements in buildings. In this study, the HDD and CDD indexes are calculated according to Eurostat methods, the official Statistical Office of the European Union.[98] Details of calculating the HDD and CDD are provided in the Appendix (chapter 11.1).

To determine the HDD and CDD, hourly temperature series for 17 cities in 9 CPs in the region were analyzed, from the year 2000 to 2020, depending on the data availability.[99]

The annual average temperature in °C, average heating degree days, and average cooling degree days were calculated for each analyzed city, depending on available datasets. For some cities, hourly data was available for a twenty-year period, i.e., the year 2000-2020, whereas a limited dataset was available for others. The results are shown further below.

Figure 5-12 provides information on the average temperature in the selected cities. The lower the city temperature, the higher the need for heating, and vice versa. This is confirmed by the values of HDD which are higher for cities with lower average temperatures, as shown in Figure 5-13. Furthermore, the value of CDD is also higher in cities with higher average temperatures, as shown in Figure 5-14. Most of the CPs have regions with colder and also warmer temperatures. Therefore, information provided in the figures below provide only a partial illustration of heating and cooling requirements in CPs. Nevertheless, the information is sufficient to determine whether a particular CP is relatively cold or not.

Finally, it is worth noting that the report provides more detailed analysis of heating needs primarily due to the fact that data related to cooling needs are not readily available.

[97] However, they also depend on various other factors, such as building design and insulation, availability and type of heating and cooling systems, energy prices and income levels, as well as behavioral aspects.

[98] https://ec.europa.eu/eurostat/cache/metadata/en/nrg_chdd_esms.htm

[99] Hourly temperature data was obtained from the website: https://www.degreedays.net/.

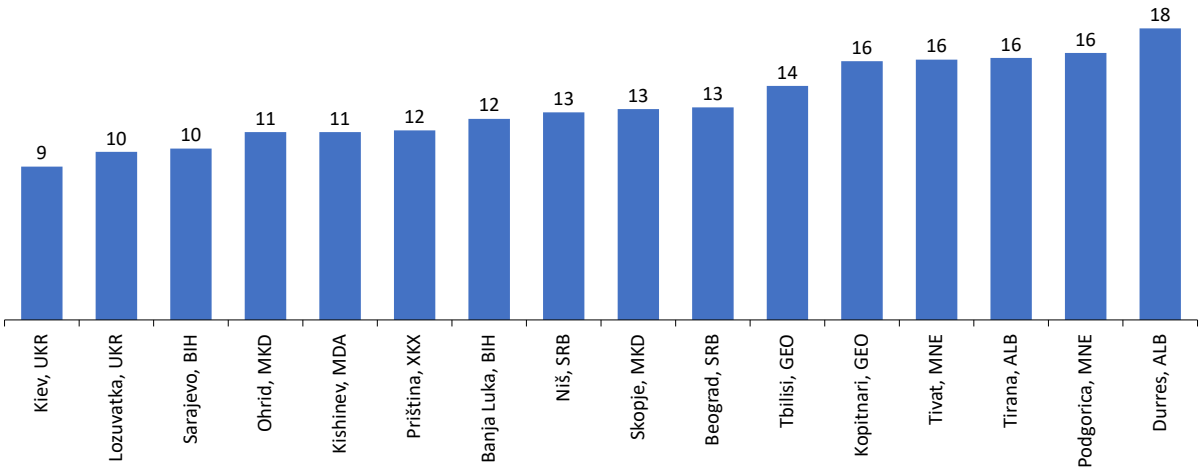


Figure 5-12. Annual average temperatures in °C in selected cities

Source: https://www.degreedays.net/

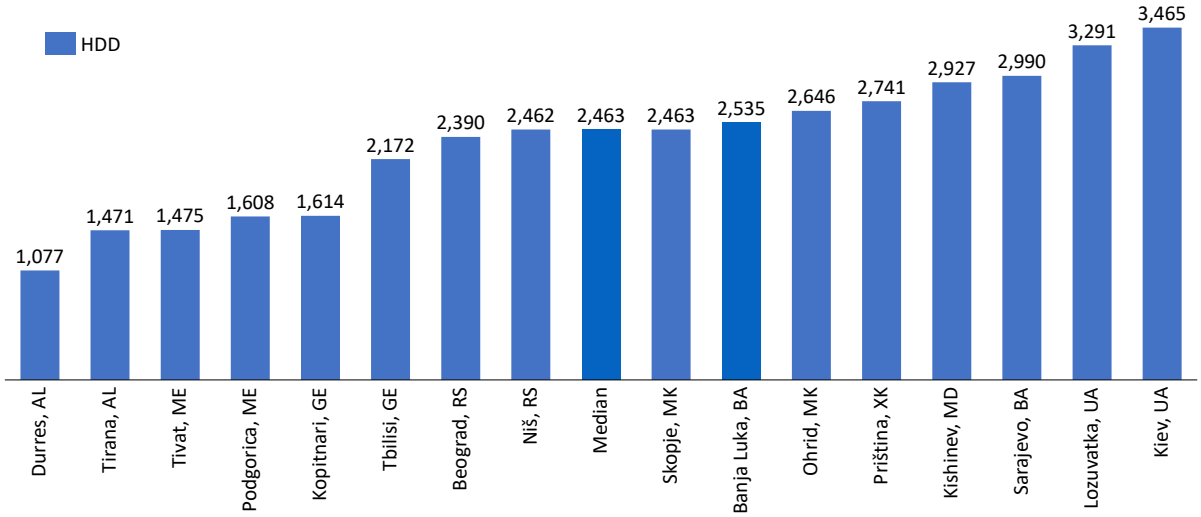


Figure 5-13. Average heating degree days in selected cities

Source: https://www.degreedays.net/

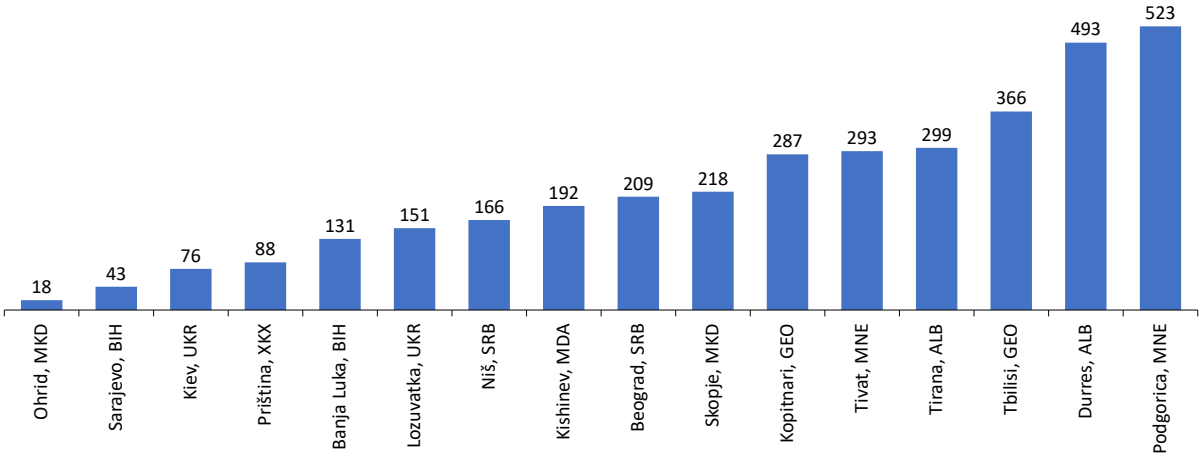


Figure 5-14. Average cooling degree days in selected cities

Source: https://www.degreedays.net/

The **housing situation** is the one of the most important factors contributing to energy poverty. Here we distinguish two phenomena:

- Low energy efficiency of dwellings defined as the average heat energy demand (kWh/m^2)
- Low energy efficiency of heating systems defined as system efficiency (%).

Most households falling into the energy poor category in CPs have low-efficiency dwellings, meaning excessive energy consumption. Analyzing the average heat energy demand in the housing sector for specific CPs shows that energy consumption for heating is 50% to 70% above the energy efficiency standard (Table 5-2). Hence, households incur high energy costs and are at risk of not unaffordable heat for the entire household area.

Use of heating systems varies between CPs. In rural households, heating is achieved by burning solid fuel, primary wood in mostly individual stoves with an efficiency of 50%. In Albania, Bosnia and Herzegovina, Montenegro, Kosovo*, Moldova, North Macedonia and Serbia, even in urban areas individual stoves fueled with wood dominate. In Ukraine and Georgia individual boilers with an efficiency of around 90% using natural gas account for the highest share amounting to 53%.

Table 5-2. Energy efficiency indicators in CPs

Country	Average energy demand for heating and DHW [kWh/m²]		Energy efficiency advanced improvement [kWh/m²]	
	Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Albania	Heating 191.31 DHW 18.0 Cooling 56.32	Heating 80.87 DHW 18.0 Cooling 27.94	Heating 26.20 DHW 18.04 Cooling 19.97	Heating 11.53 DHW 18.04 Cooling 19.04
BIH	Heating only 139.04	Heating only 137.40	Heating only 69.09	Heating only 70.46
Georgia	Heating 200	Heating 170	Not established	
Kosovo*	Heating 191.03	Heating 128.92	Heating 73	Heating 55.88
Moldova	Thermal energy 260 Electricity consumption 30[100]	Thermal energy 220 Electricity consumption 40	Thermal energy 136 Electricity consumption 0[101]	Thermal energy 97 Electricity consumption 13[102]
Montenegro	Heating 276.50 DHW 31.90 Cooling 74.00	Heating 286.99 DHW 31.90 Cooling 54.00	Heating 89.46 DHW 31.9 Cooling 27.00	Heating 104.65 DHW 31.9 Cooling 27.00
North Macedonia	Total energy demand 157.78		Heating 90 After 31/12/2020 all-new buildings should be nearly zero-energy buildings	
Serbia	283	207	Standard improvement 96.50 Advanced improvement 72.23	Standard improvement 111.62 Advanced improvement74.24
Ukraine	Heating 170 - 250		Temperature zone 1 Heating 140.48 – 174.01 Cooling 4.63 – 5.03 DHW 27.33 – 30.64 Temperature zone 2 Heating 122.82 – 153.68 Cooling 8.81– 9.02	Temperature zone 1 Heating 91.14 – 140.48 Cooling 3.58 – 3.69 DHW 29.83 – 37.31 Temperature zone 2 Heating 75.90 – 83.22 Cooling 6.83 – 6.89 DHW 37.16 – 37.28

[100] Given that minimum energy efficiency requirements have not been set in Moldova, standardized final energy demand is presented for relevant building typologies

[101] Given that minimum energy efficiency requirements have not been set in Moldova, standardized final energy demand is presented for a deep renovation scenario covering relevant building typologies

		DHW 29.32 – 30.62	

Source: Energy Community Contracting Parties' official documentation

In the following sections, we analyze key drivers in each of CP. The analysis will facilitate informed discussions on possible measures and policies to aid energy poor consumers in each CP.

5.2 Albania

5.2.1 Macroeconomic development

In terms of overall economic development measured by real GDP per capita, Albania fares worse than the average EnC CPs. During the 2010-2020 period, Albanian real GDP per capita grew by 24%, the equivalent to average growth in EnC CPs, albeit from the lower base. In 2020, Albanian GDP per capita was 2% lower than the average real GDP per capita in EnC CPs. Also noticeable is the impact of the COVID-19 pandemic, leading to a drop in GDP per capita in Albania but also in EnC CPs when comparing 2020 and 2019.

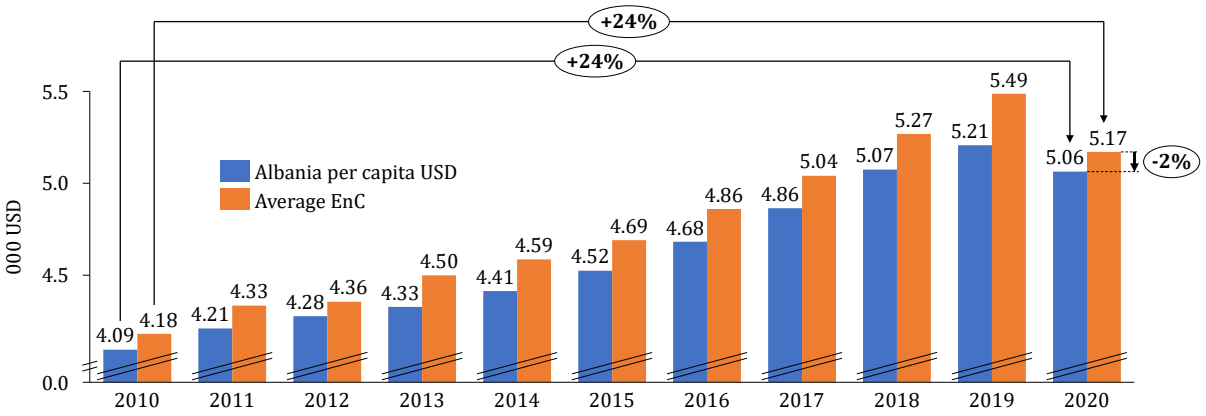


Figure 5-15. Real GDP per capita (constant 2010 US$) in Albania

Source: The World Bank

In terms of the unemployment rate, it has ranged from 10 to 15% for both male and females over the last ten years. According to the data, there is no permanent and significant difference between female and males in terms of the unemployment rate and has actually converged in recent years.

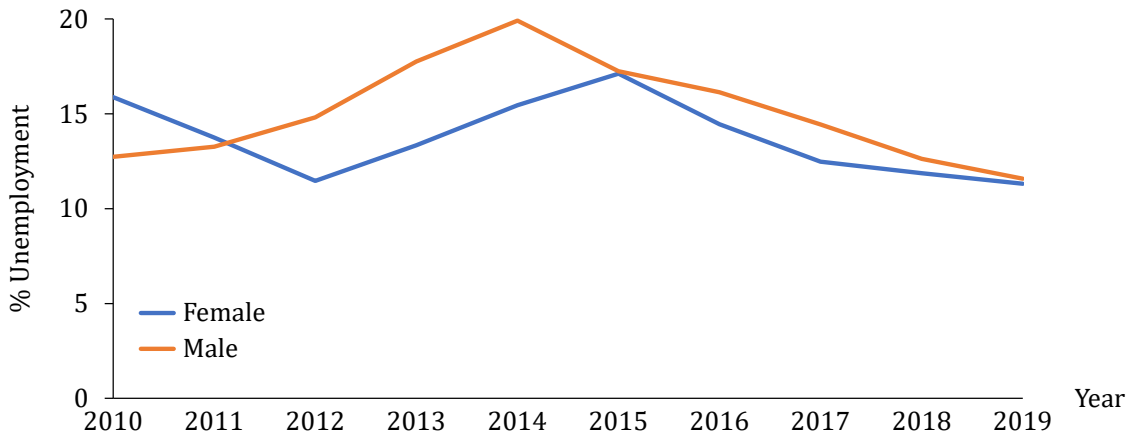


Figure 5-16. Level of employment by gender

Source: The World Bank

In the period 2014-2019, the average wage in Albania increased by only 15%, whereas it increased on average by 26% in the EnC CPs. At the end of 2019, the Albanian average monthly wage was by 8% higher than the monthly average for all CPs.

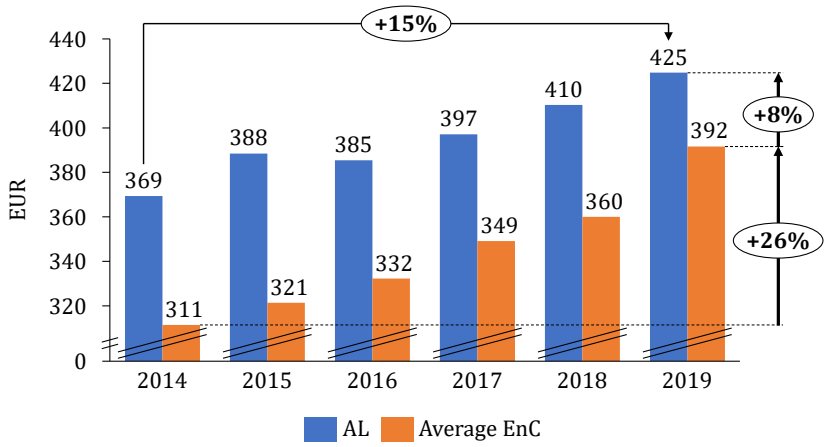


Figure 5-17. Trend showing average monthly wage in Albania and in the Energy Community

Source: EUROSTAT

The poverty headcount ratio in Albania is very volatile in the observed period based on available data. In the 2012-2017 period, the percentage of the population living under USD 1.90 was between 0.8% and 1.6% which corresponds to between 5.8 and 11.7 thousand individuals.

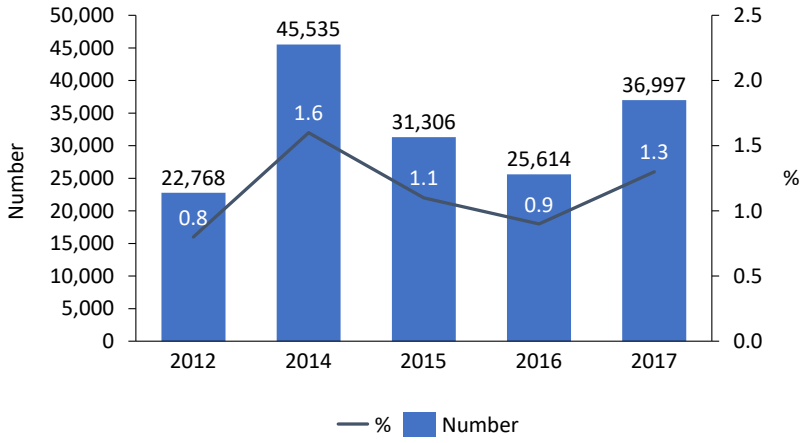


Figure 5-18. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.2.2 Availability of different energy sources

In Albania, electricity is the sole energy source available to household consumers. Natural gas networks are currently unavailable, but there are plans for developing a gas transmission and distribution network in the medium term. District heating systems are not available either. Given the reduced need for heating in Albania, the lack of DH and gas network should not be a contributing factor to energy poverty in Albania.

Table 5-3. Availability of different forms of energy sources in Albania

Country	Electricity	Gas	DH
Albania	✓	x	x

Source: author

5.2.3 Energy prices

Electricity prices in Albania for household consumers[103] inclusive of all taxes and levies were 93 EUR/MWh in second half of 2019. Only in Montenegro were prices significantly higher than in Albania. Compared to the EnC average, Albanian prices were 21% higher.

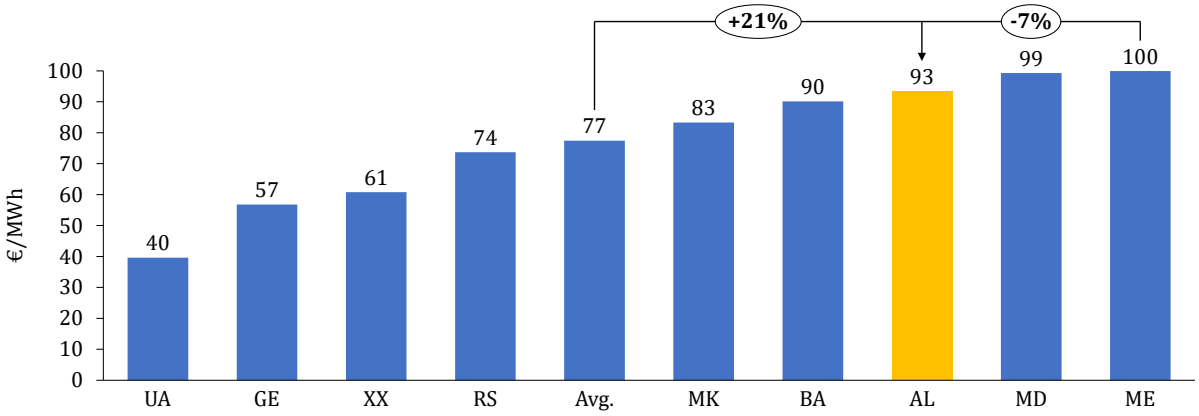


Figure 5-19. Electricity prices for household consumers in Albania, 2019

Source: EUROSTAT

Projections of future retail electricity prices in a recently published study by the Energy Community Secretariat [23] show that retail electricity prices are expected to follow downward trend in Albania across all scenarios given that the country's electricity production is predominantly based on hydropower. Therefore, the expected decarbonization of the electricity sector should not have a significantly negative impact on retail electricity prices in Albania.

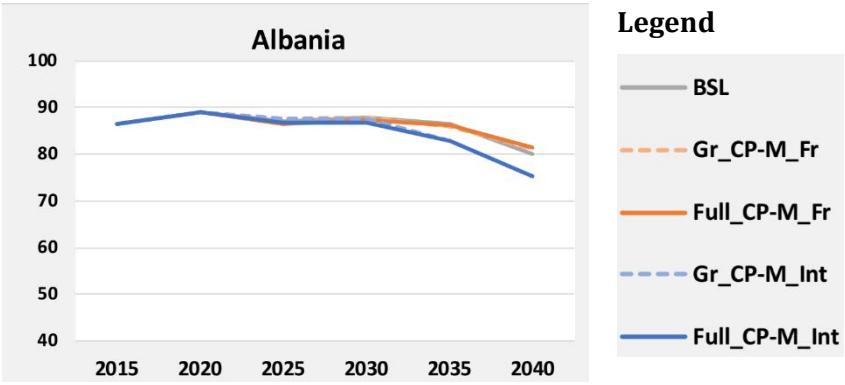


Figure 5-20. Projected retail electricity prices in Albania under different scenarios of carbon pricing and market integration

Source: Energy Community Secretariat [23]

[103] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for the second half of 2019. Data for all other CPs refer to second half of 2020.

5.2.4 Climate

According to the document *The Typology of the Residential Building Stock in Albania and the Modelling of its Low-Carbon Transformation* [24], territory of Albania is divided into three climatic zones (based on heating degree days for a base temperature of 17.5°C). The zones are:

- Zone A: degree days are fewer than 1,500. In this zone, a south-west subzone is distinguished with degree days fewer than 900.
- Zone B: degree days are between 1,501 and 2,300.
- Zone C: degree days are more than 2,300.

In terms of the share of dwellings in each zone, 36% of the dwellings are located in zone A, 48% in zone B and 16% in zone 3. Additionally, Figure 5-21 shows the number of HDD in Tirana and Durres in relation to HDD in other CPs. As the figure shows and considering the climatic zones in Albania as well as the number oof dwellings in each zone, the conclusion is that the need for heating in Albania is among the lowest in CPs.

To assess whether there has been a statistically significant increase in CDD or decrease in HDD values, we performed a simple regression of the HDD and CDD, each separately on a time trend. We found no statistical significance of the trend variable i.e., no statistical evidence that CDD has increased, or HDD decreased (at 10% significance level), i.e., there is no increase in CDD or decrease in HDD that is statistically significant.

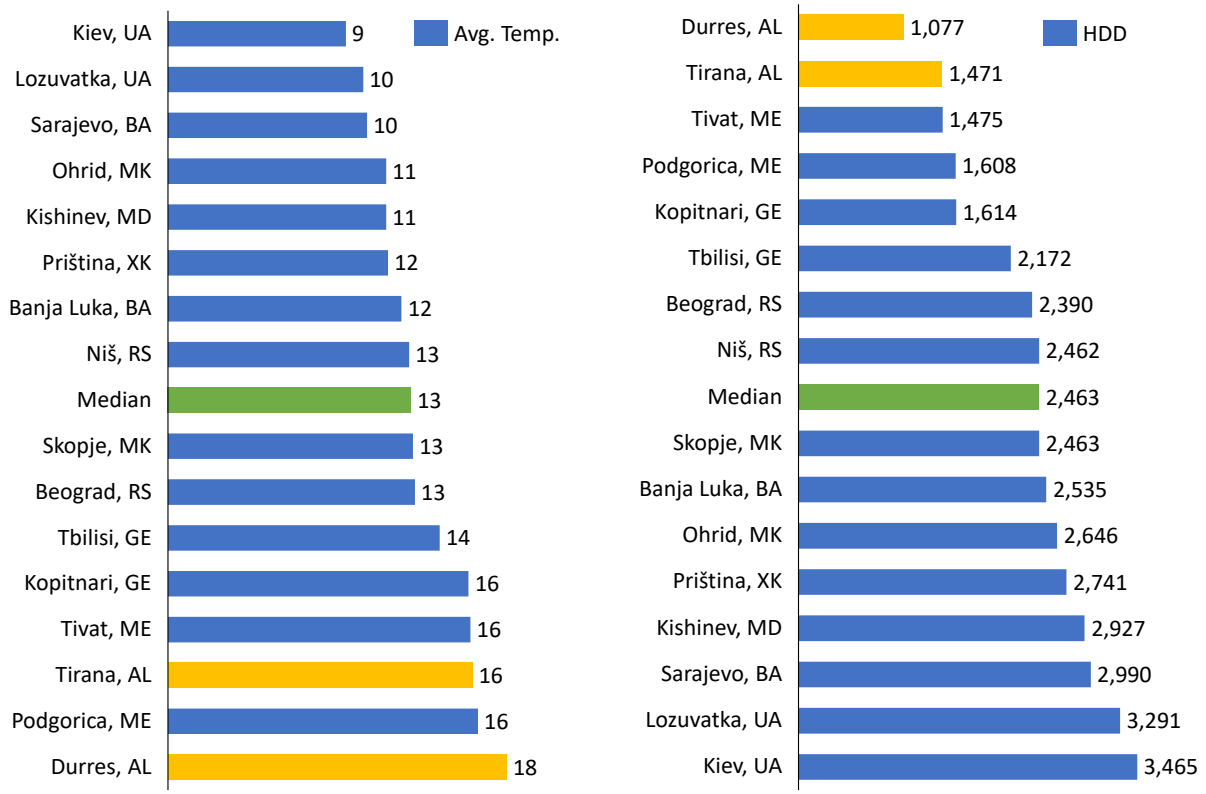


Figure 5-21. Average temperature in degrees Celsius and HDD in Tirana and Dures as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.2.5 Final energy consumption

Based on the data from the energy balance, Albanian households use primarily three energy sources: electricity, biomass, and liquefied petroleum gas (LPG).

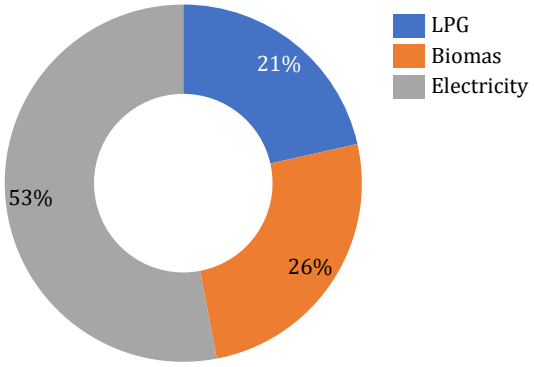


Figure 5-22. Structure of household energy consumption in Albania

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average household size of 3.8 members and consequently, the total number of households equivalent to 0.734 million, Figure 5-23 provides information on consumption of different fuels by an average household.

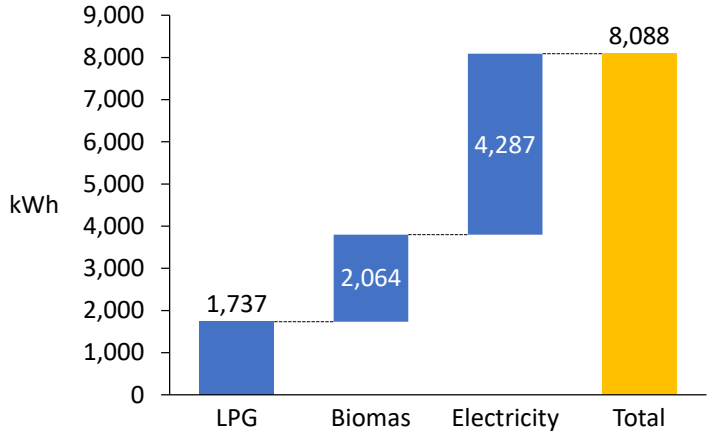


Figure 5-23. Structure of an average household energy consumption in Albania

Source: EUROSTAT Energy Balances (2018 data)

5.2.6 Energy efficiency

Individual stoves are the most typical heating systems (63.3%), followed by electric heaters (8.5 %) and air heat pumps (6%). About 9% of households have no heating. Often heat pumps are used as a secondary heat source. Only 3.2% of private households have central heating (building or dwelling heating), while 4.4% have a fireplace. Even where central heating systems exist, there is a lack of metering and controls for adjusting temperature levels. In rural households, wood is mostly used (85%). In urban areas, individual wood, electricity from grid and gas account for similar proportions. Air conditioners are used in 6% of households.

Water is heated for sanitary purposes using electric boilers (62%), wood (23%), LPG (10%) or centralized systems and solar systems (5%) [24].

Average heating demand is 191.31 kWh/m^2 for family houses and 80.87 kWh/m^2 for multi-apartment buildings. National energy efficiency standards are not defined but a study on low carbon transition of the national building stock indicates saving potentials of 80%. This may reduce heat energy demand to 26.20 kWh/m^2 for family houses and 11.53 kWh/m^2 for multi-apartment buildings. This ambitious scenario suggests an approach incorporating thermal insulation of the building envelope (wall 10 cm, roof 12 cm, floor 5 cm, triple glazed windows), the use of heat pumps SCOP 4, EER>3 and solar thermal collectors for DHW [24].

Table -5-4. Energy efficiency indicators for housing stock in Albania

Average energy demand for heating and DHW [kWh/m²]		Energy efficiency advanced improvement [kWh/m²]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Heating 191.31 DHW 18.0 Cooling 56.32	Heating 80.87 DHW 18.0 Cooling 27.94	Heating 26.20 DHW 18.04 Cooling 19.97	Heating 11.53 DHW 18.04 Cooling 19.04

Source: [24]

The surface of living space

Total housing building stock in Albania has a surface of 84,927,085 m². According to the Census data from 2011, the average surface of dwelling is 117.58 m² [24].

Most of the housing stock surface was built between 1991 and 2011 (56%), but only buildings built after the year 2000 (35%) are considered to be energy efficient [24].

Only 35% of living areas are heated in buildings on the coast, and about 70% in buildings in the mountains. In all, 50% of households cannot afford to heat the entire household area [24].

5.3 Bosnia and Herzegovina

5.3.1 Macroeconomic development

In terms of economic development as measured by GDP per capita, Bosnia and Herzegovina fares better on average than the EnC CPs. During the 2010-2020 period, real GDP per capita in Bosnia and Herzegovina rose by 31% while at the same time, the average GDP per capita in EnC CPs rose by 24%. At the end of 2020, real GDP per capita in Bosnia and Herzegovina was 18% higher than the average GDP per capita in EnC CPs. Also noticeable is the impact of the COVID–19 pandemic leading to a drop in GDP per capita in Bosnia and Herzegovina but also in EnC CPs in 2020 compared to 2019.

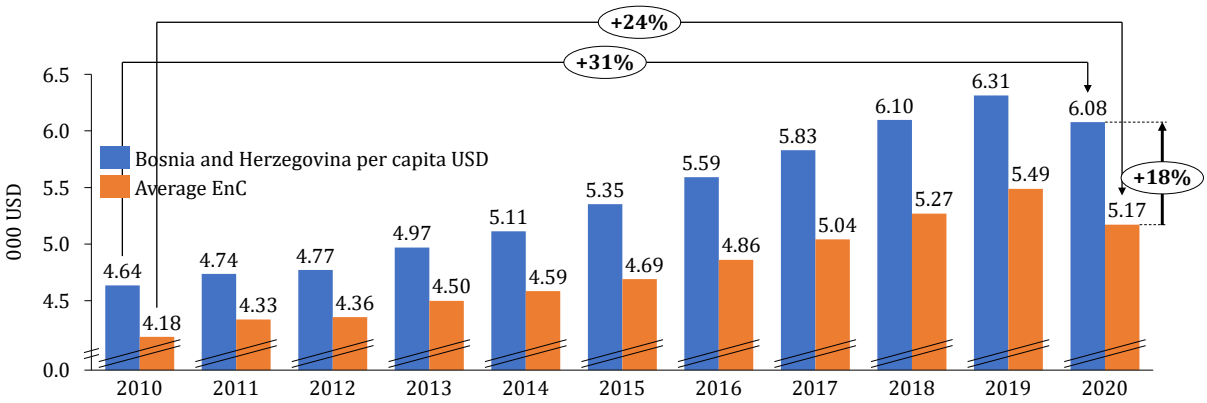


Figure 5-24. Real GDP per capita (constant 2010 US$) in BIH

Source: The World Bank

In terms of unemployment, the unemployment rate for women has been consistently above that of men. In recent years, the unemployment rate for both men and women has declined though the difference remains at roughly 5%.

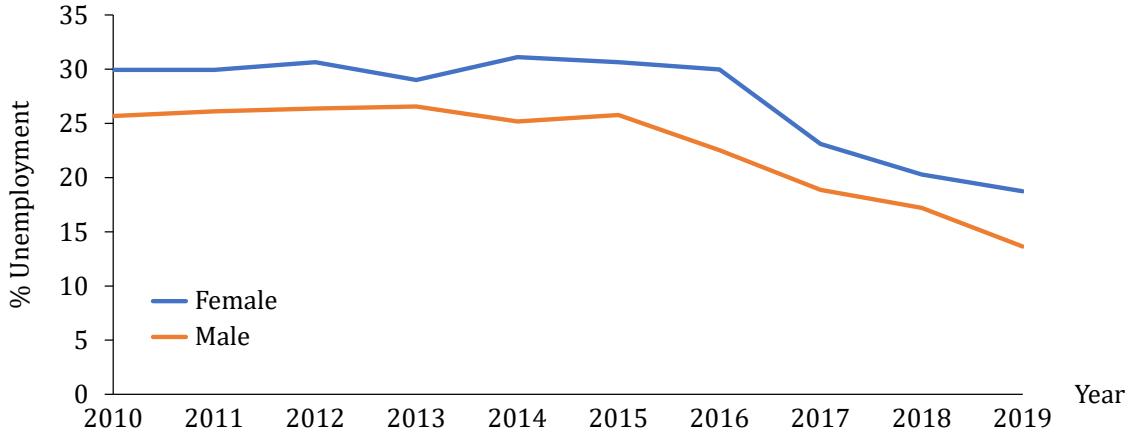


Figure 5-25. Employment rates by gender in BIH

Source: The World Bank

Regarding the purchasing power of BIH households, the average wage in Bosnia and Herzegovina grew by 11% during the 2014-2019 period. The average wage in EnC CPs increased slightly in the same period and amounted to 26%. At the end of 2019, the average wage in Bosnia and Herzegovina was EUR 471 compared to the average value in EnC CPs amounting to EUR 392, which is a difference of 20%.

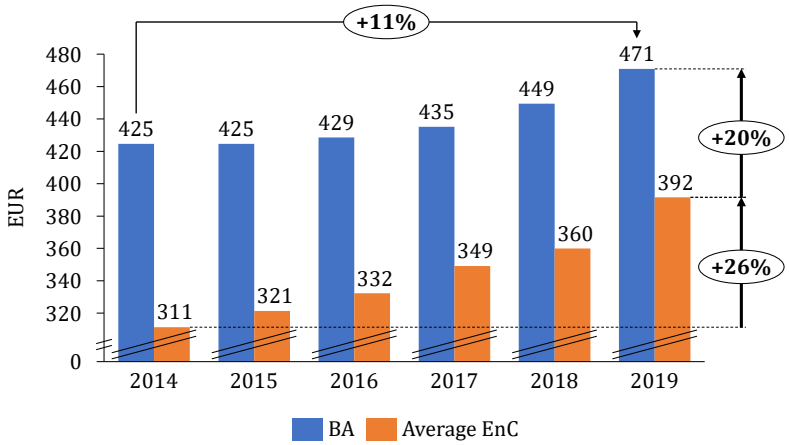


Figure 5-26. Trends of average monthly wages in BIH and the Energy Community

Source: EUROSTAT

Data on the poverty headcount ratio in Bosnia and Herzegovina was available only for the year 2011. Hence, it is not possible to comment changes to the ratio throughout the observed period. On the other hand, we do notice that the ratio is smallest among observed CPs for which data is available.

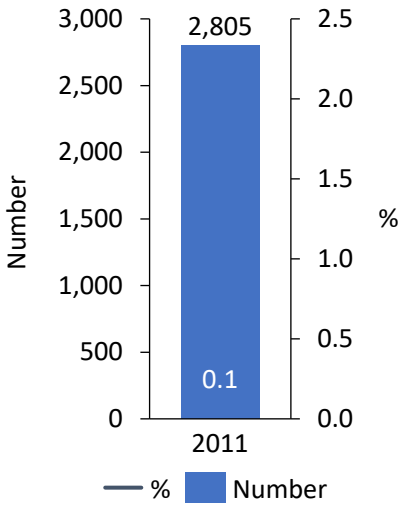


Figure 4- 27. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.3.2 Availability of different energy sources

Electricity, gas and district heating systems are available in Bosnia and Herzegovina to households for their energy needs. In 2017 there were in total 32 district heating systems (DHSs), with an overall one-way network length of 450 km [25]. The heat supplied from DHSs is used solely for space heating and not for domestic hot water (DHW). According to data from the Bosnia and Herzegovina energy balance for 2016, district heating in Republika Srpska heated about 2.3

million square meters of residential space, while in the Federation of Bosnia and Herzegovina there are about 970 thousand apartments heated by larger heating companies.[104]

In BiH there are two main natural gas distribution companies, KJKP Sarajevo Gas and Visoko Energija Ltd. According to the last available report (2018),[105] the number of customers in the household sector served by Sarajevo Gas was 52,755. According to the latest available data from Visoko Energija Ltd. (2017),[106] the number of consumers from the household sector and smaller commercial users was 2,100.

Table 5-5. Availability of different forms of energy sources in Bosnia and Herzegovina

Country	Electricity	Gas	DH
Bosnia and Herzegovina	✓	✓	✓

Source: author

5.3.3 Energy prices

The price of electricity in Bosnia and Herzegovina for household consumers[107] inclusive of all taxes and levies was 90 EUR/MWh in the second half of 2020, which is around 16% higher than the average price in EnC.

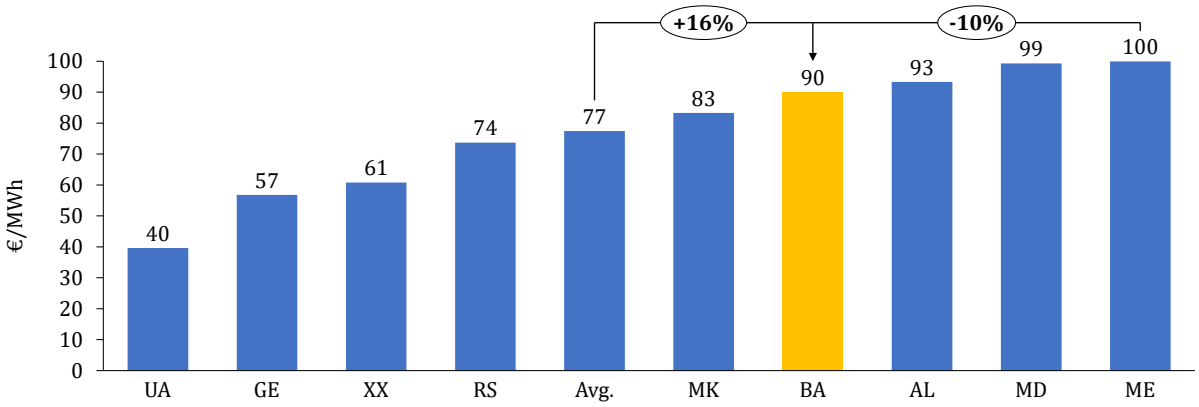


Figure 5-27. Electricity prices for household consumers in BIH

Source: EUROSTAT

Projections of future retail electricity prices carried out under the recently published study by Energy Community Secretariat [23], show an expected increase in retail electricity prices in BiH under all assumed scenarios, except for the baseline scenario. The introduction of carbon pricing renders coal fired power plants in Bosnia and Herzegovina uneconomical, and electricity demand will have to be met from RES and gas. Electricity market integration and development of gas infrastructure will play an important role in determining electricity prices in Bosnia and

[104] Framework Energy Strategy of Bosnia and Herzegovina until 2035,

http://www.mvteo.gov.ba/data/Home/Dokumenti/Energetika/Okvirna_energetska_strategija_Bosne_i_Hercegovine_do_2035._HR_FINALNA.PDF

[105] https://www.sarajevogas.ba/wp-content/uploads/2019/06/Godisnji-izvjestaj-za-2018-godinu.pdf

[106] http://www.visoko-ekoenergija.com.ba/

[107] Electricity prices for household consumers for band DC (between 2,500 kWh and 5,000 kWh of electricity annually) for second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

Herzegovina. The conclusion is that future decarbonization policies will significantly affect electricity prices in Bosnia and Herzegovina.

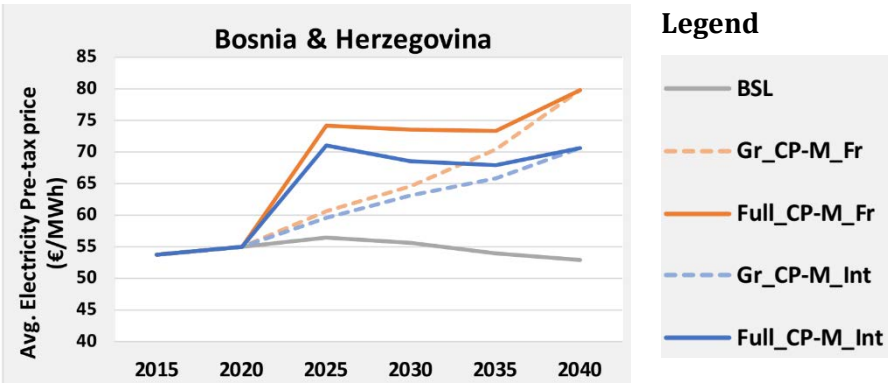


Figure 5-28. Trends for retail electricity prices in BiH under different scenarios of carbon pricing and market integration

Source: Energy Community Secretariat [23]

Gas prices[108] in the first half of 2020 in BIH were 34% above the average price in the EnC.

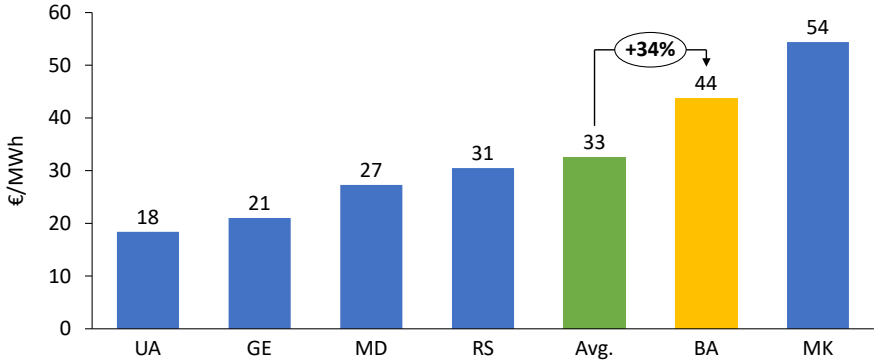


Figure 5-29. Gas prices for household consumers in BIH

Source: EUROSTAT

5.3.4 Climate

Using data on average daily temperatures for Sarajevo from 2005 and Banja Luka from 2009 until 2020 for both cities, the following two figures show average daily temperatures and average values of HDD. Based on the data, Sarajevo is one of the coldest cities in EnC while Banja Luka is colder than the average city. Based on the data, the conclusion is that the need for heating in BiH is in the upper half of heating needs in EnC CPs.

To assess whether there has been a statistically significant increase in values for cooling degree days (CDD) or decrease in heating degree days (HDD) due to for example climate change, we performed a simple regression on HDD and CDD, each separately on a time trend. We found no statistical significance of the trend variable i.e., no statistical evidence that CDD increased, nor a decrease in HDD (10% significance level) for Banja Luka. However, there is statistical evidence

[108] Gas prices for household consumers for the D2 band (between 20 GJ and 200 GJ of gas consumption annually) referring to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

that the number of HDD decreased over time (5% significance level) but did not find any statistical evidence that CDD increased in Sarajevo.

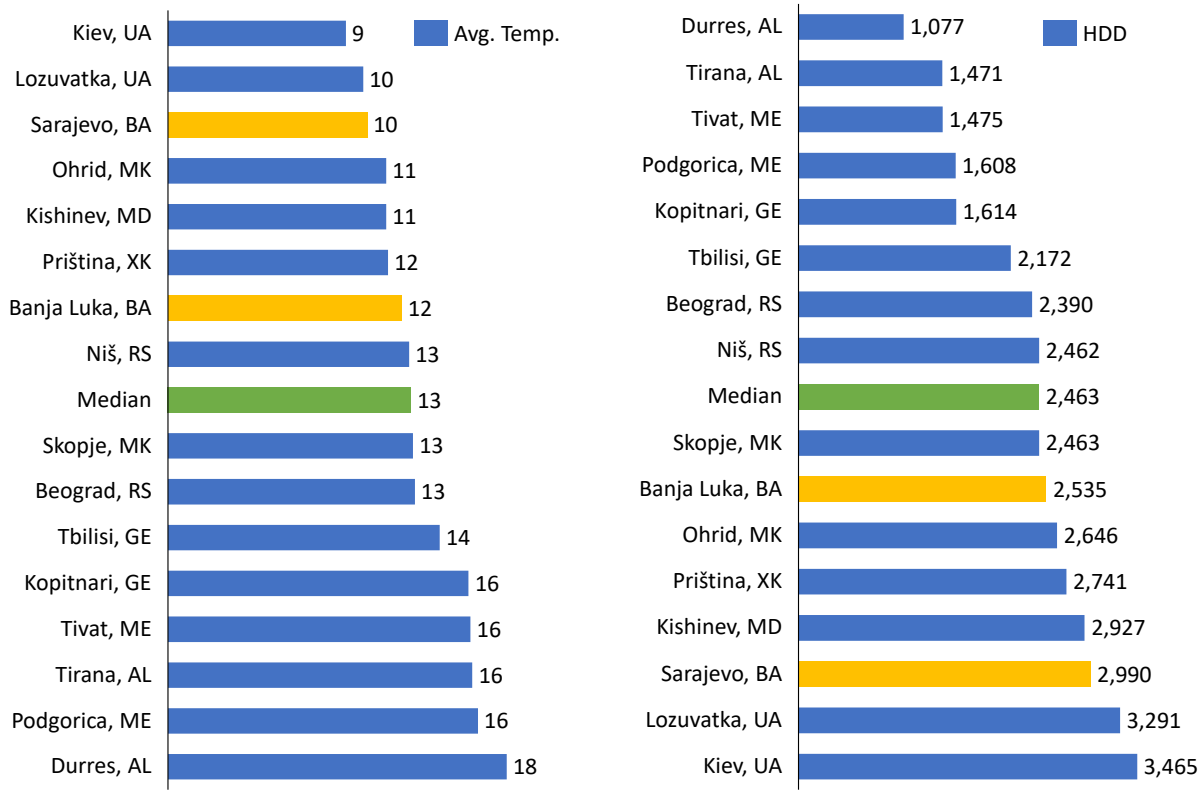


Figure 5-30. Average temperature in degrees Celsius and HDD in Sarajevo and Banja Luka as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.3.5 Final energy consumption

According to the energy balance, biomass represents the largest share in final energy consumption of households with a share of 63% followed by electricity with a share of 23%. The share of other energy sources is much lower: consumption of gas accounts for 2% of final energy consumption in households while the consumption of heat from district heating systems accounts for 6%. These two energy sources are used primarily in large urban areas. Also, oil derivatives (including LPG, gas oil, and diesel oil) represent an additional 2% of household energy consumption and lignite represents 4% of total household energy consumption.

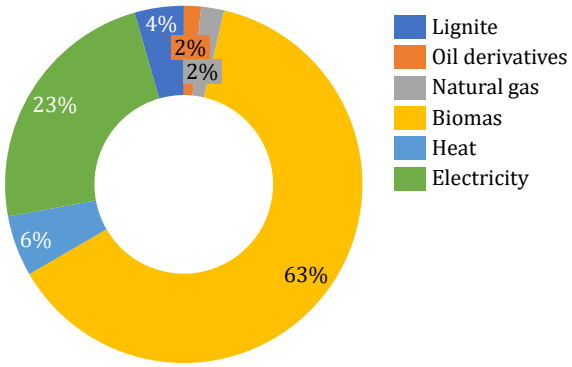


Figure 5-31. Structure of household energy consumption in Bosnia and Herzegovina

Source: EUROSTAT Energy Balances (2018 data)

Based on an average number of household members of 3.1 and consequently, a total number of households of 0.9 million, the following provides information on consumption of different fuels by the average household.

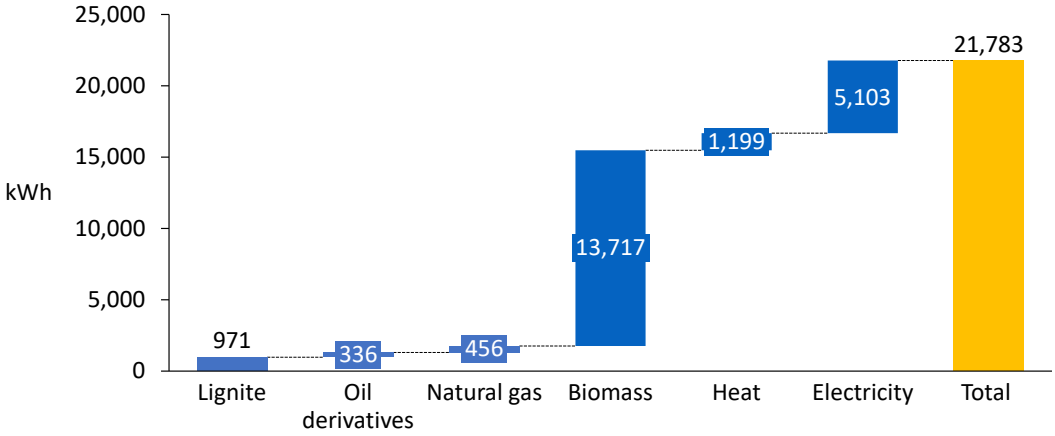


Figure 5-32. Structure of an average household energy consumption in Bosnia and Herzegovina

Source: EUROSTAT Energy Balances (2018 data)

5.3.6 Energy Efficiency

Regarding the heating systems used, most rural households (81.9%) and more than half of urban households (55.5%) use room heating systems. Installed central heating systems can be found in roughly a fifth of all households, while district heating is present in roughly a fifth of urban households.

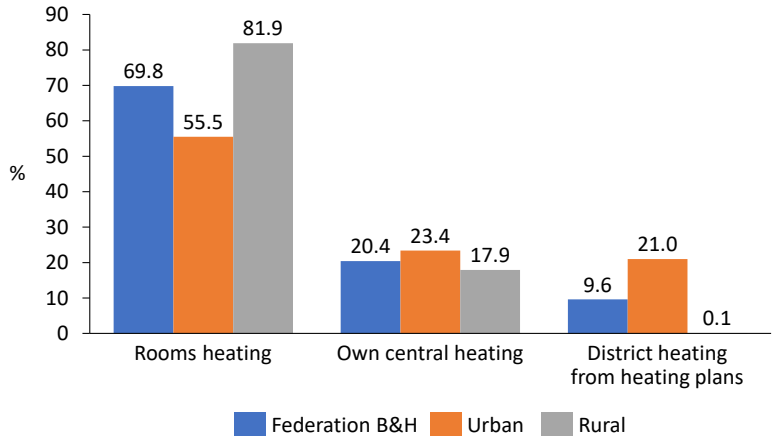


Figure 5-33. Households by type of heating (%)

Source: Survey on energy consumption in households in 2015 (FBIH) [26]

Concerning the type of heating fuel, wood is predominantly used in all households. Electricity has a relatively significant share in urban households (13.7%) while its share in rural households is rather insignificant (1.4%). Despite having a gas network, gas is used in only 3.9% of households. Finally, environmentally unfriendly coal is present in both urban (5.7%) and rural households (10.2%).

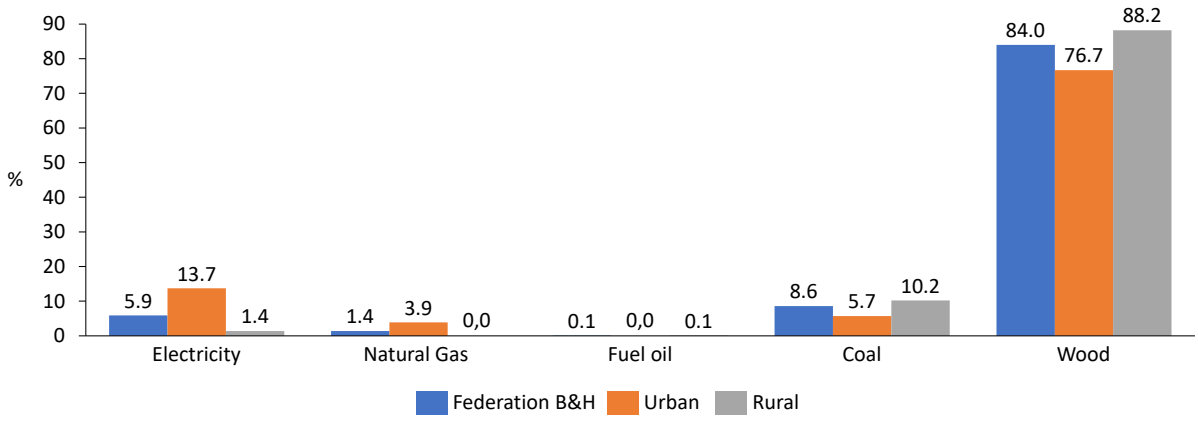


Figure 5-34. Households by use of different fuels for room heating

Source: Survey on energy consumption in households in 2015 (FBIH) [26]

Among households equipped with their own central heating systems, coal and biomass are the most prevalent energy sources. The only exception is gas, which is used by a quarter of urban households that have installed heating systems.

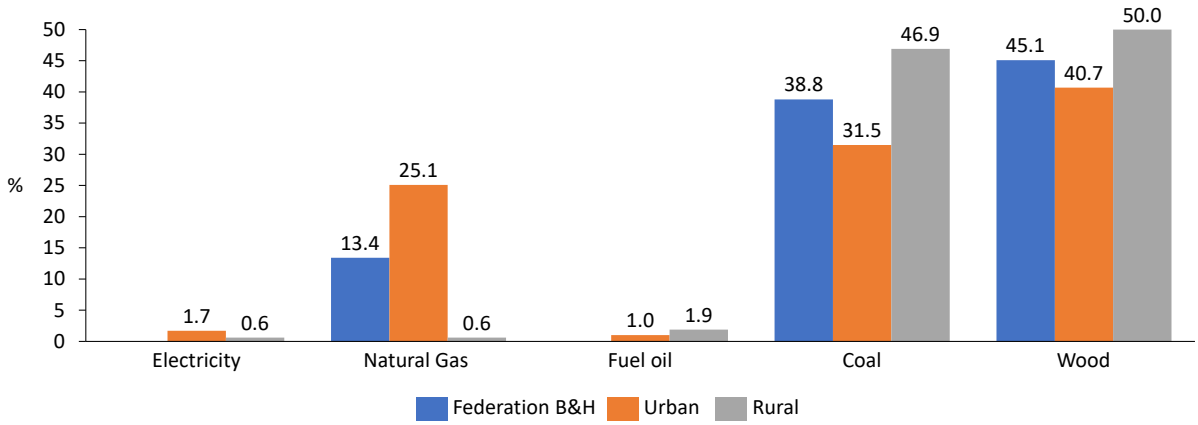


Figure 5-35. Households by use of different fuels for central heating

Source: Survey on energy consumption in households in 2015 (FBIH) [26]

Individual accumulation boilers are traditionally used as domestic hot water systems [27].

Average heating demand is 139.04 kWh/m² for family houses and 137.40 kWh/m² for multi-apartment buildings. The Typology of Residential Buildings in BIH [27] sets a saving potential of between 30% and 50%. This may reduce heat energy demand to 69.09 kWh/m² for family houses and 70.49 kWh/m² for multi-apartment buildings. Such an ambitious scenario recommends the use of thermal insulation in the building envelope (wall 20 cm, roof 30 cm, floor 10 cm, triple glazed windows), biomass-based central heating systems, improved DH substation and accumulation boilers combined with solar thermal systems for DHW.

Table 5-6. Energy efficiency indicators for housing stock in BIH

Average energy demand for heating and DHW [kWh/m²]		Energy efficiency improvement Scenario 2 [kWh/m²]	
family houses	multi-apartment buildings	family houses	multi-apartment buildings
Heating only 139.04	Heating only 137.40	Heating only 69.09	Heating only 70.46

Source: Typology of residential buildings in Bosnia and Herzegovina [27]

The surface of living space

Data indicates that the average floor area was 90 m^2 while the heated area was 55.8 m^2 or 62%, and the cooled floor area is 39.1 m^2 or 43% [26]. The heating area does not vary significantly between urban and rural households, where 81.4% accounts for family houses and 18.6% for multi-apartment buildings. Family houses account for 73.71% and have the highest share of surface in the entire housing building stock [27]. Most of the housing stock area was built between 1971 and 2014 (84.87%), with the highest proportion between 1992 and 2014 (32.25%).

5.4 Georgia

5.4.1 Macroeconomic development

In terms of Georgia's overall economic development, there have been significant advances during the last decade. Even though Georgia has a lower GDP per capita than the average for EnC CPs, the gap has narrowed. Whereas at the end of 2010, real GDP per capita in Georgia was 23% below the average of EnC CPs, the gap narrowed to 10% at the end of 2020. Also noticeable is the impact of the COVID-19 pandemic: Georgia underwent a drop in GDP per capita but this also occurred in EnC CPs in 2020 when compared to 2019.

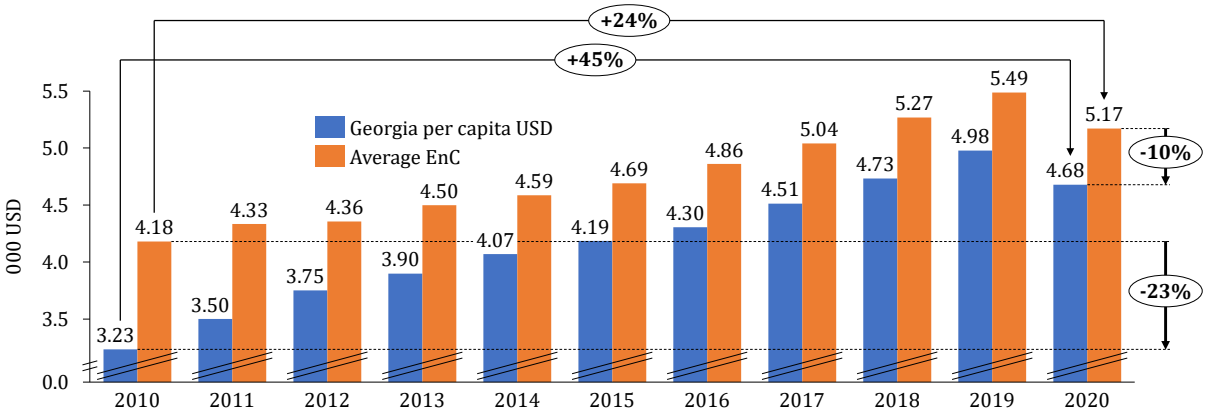


Figure 5-36. Real GDP per capita (constant 2010 USD) in Georgia

Source: The World Bank

The unemployment rate in Georgia has been declining over the last 10 years. Unemployment rates for men have constantly been higher than for women: the difference at the end of 2019 was 2.5%.

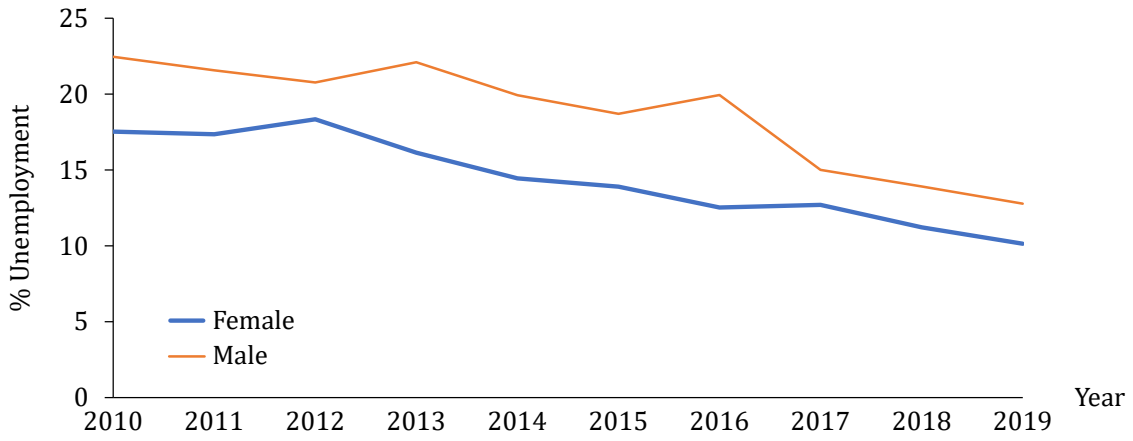


Figure 5-37. Level of employment by gender in Georgia

Source: The World Bank

Average wages in Georgia are significantly lower than the average in EnC CPs. The average wage in Georgia increased from EUR 196 in 2014 to EUR 271 in 2019. This was an average growth of 38% in net wages, and in the same period it was 26% in EnC CPs. Despite faster growth of nominal wages in Georgia compared to the average growth in EnC CPs, the gap between net wages in Georgia and average net wage in EnC CPs still remains at 31%.

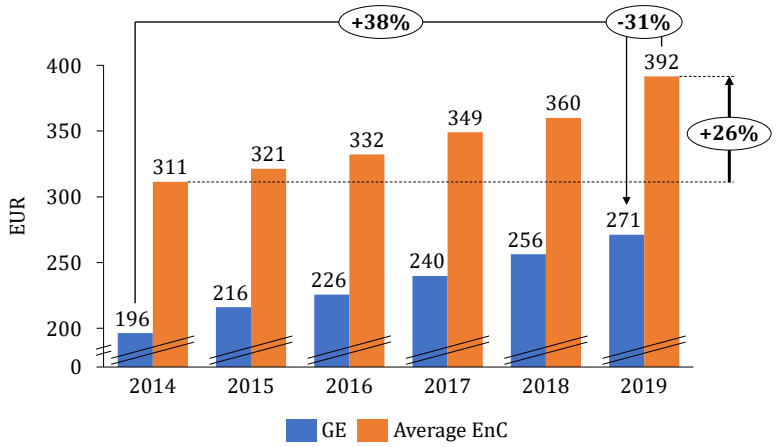


Figure 5-38. Trend of average monthly wages in Georgia and in Energy Community

Source: EUROSTAT

The poverty headcount ratio follows the same logic as the previously mentioned macroeconomic aggregates in Georgia. This ratio has declined by 69% between 2010 and 2015. A slight increase is evident in the later time series. The percentage change between 2015 and 2019 shows a 2.7% increase for the ratio.

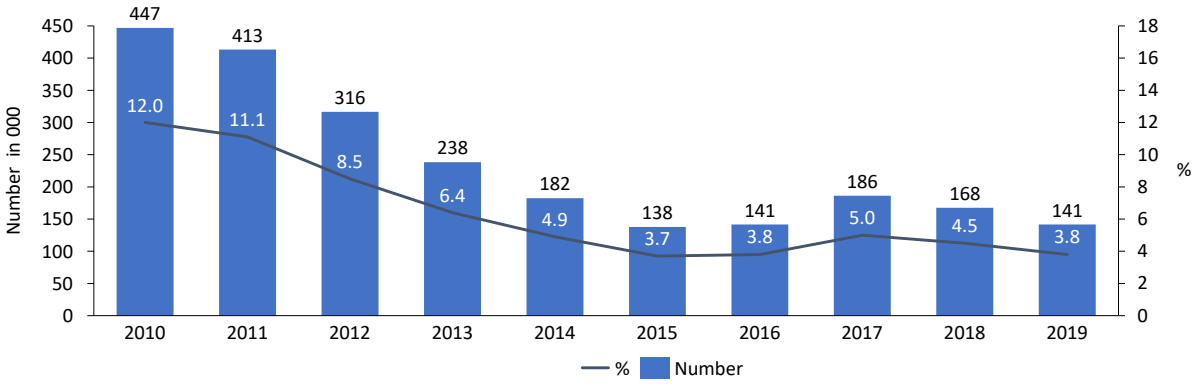


Figure 4- 40. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.4.2 Availability of different energy sources

In Georgia, electricity and gas are the two energy sources available to domestic consumers. Use of gas is widespread in Georgia and is available in both urban and rural areas. Due to the ongoing gasification of households, the number of household gas consumers in Georgia grew to 1.26 million in 2019 [28].

Table 5-7. Availability of different forms of energy sources in Georgia

Country	Electricity	Gas	DH
Georgia	✓	✓	x

Source: Author

5.4.3 Energy prices

Electricity prices in Georgia for household consumers[109] inclusive of all taxes and levies were significantly lower than the EnC average and stand at 57 EUR/MWh.

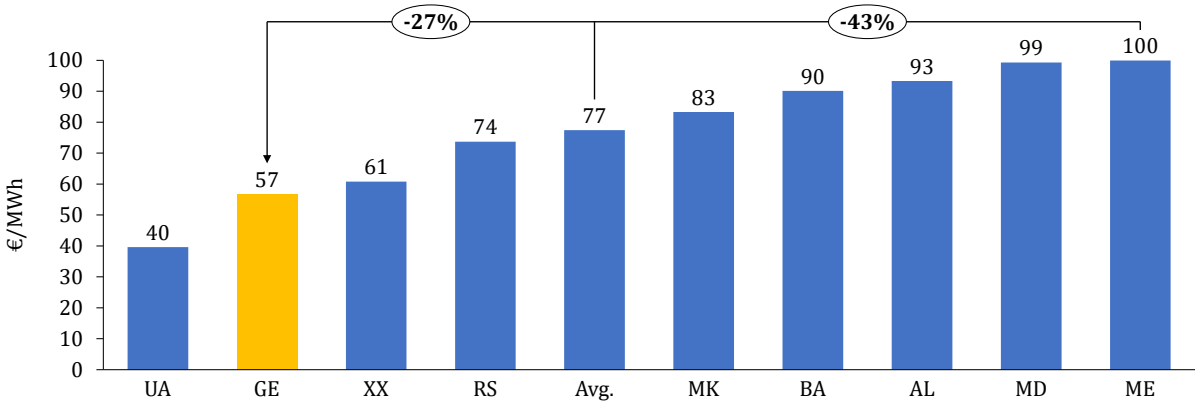


Figure 5-39. Electricity prices for household consumers in Georgia

Source: EUROSTAT

Projections of future retail electricity prices carried out in a recently published study by the Energy Community Secretariat [23] shows that, as is the case with Albania, retail electricity prices in Georgia are expected to decrease across all considered scenarios. The reason for the expected decrease in electricity prices lies in the fact that electricity production in Georgia is based predominantly on hydropower plants, hence the introduction of carbon pricing is not expected to lead to increasing retail electricity prices.

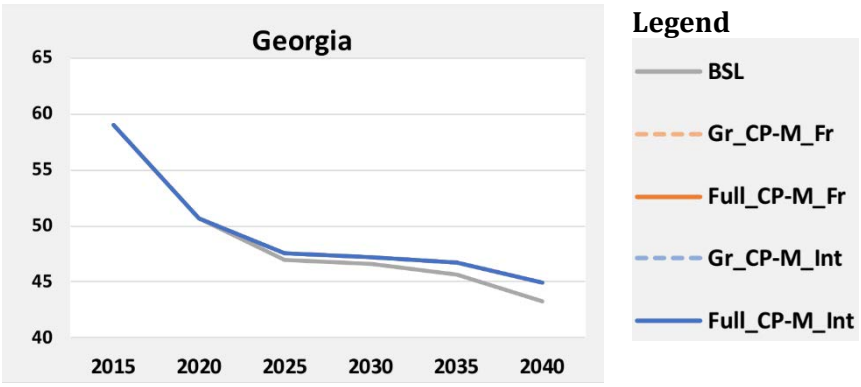


Figure 5-40. Projected trend in retail electricity prices in Georgia in different carbon pricing and market integration scenarios

Source: Energy Community Secretariat [23]

[109] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

In terms of gas, Georgia had the second lowest gas prices among all CPs.[110] Prices in Georgia were 36% lower than the average price in EnC. The reason for lower gas prices for household consumers is the government subsidization program (so called *social gas*) [28].

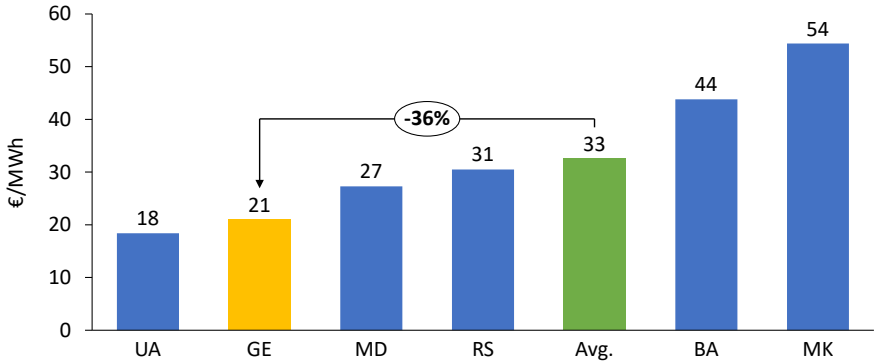


Figure 5-41. Gas prices for household consumers in Georgia

Source: EUROSTAT

5.4.4 Climate

Based on data for average daily temperatures in Kopitnari and Tbilisi from 2011 to 2020, the following two figures show the average daily temperature and HDD for the two cities. The data indicates that these two cities in Georgia are warmer on average when compared to other EnC CPs. The conclusion is that the heating needs in Georgia are less than the average in EnC CPs as indicated by HDD.

To assess whether there is a statistically significant increase in CDD or decrease in HDD values due to for example climate change, we performed a simple regression on the HDD and CDD, each separately on a time trend. We found statistical significance for the negative trend variable for HDD values at 10% for Kopitnari, and a 5% significance level for Tbilisi. This implies there is statistical evidence of a decrease in HDD. On the other hand, we found that the trend variable for CDD is not statistically significant (at 10% significance level), i.e., there is no increase in CDD that is statistically significant.

[110] Gas prices for household consumers for the D2 band (between 20 GJ and 200 GJ of gas consumption annually) refer to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

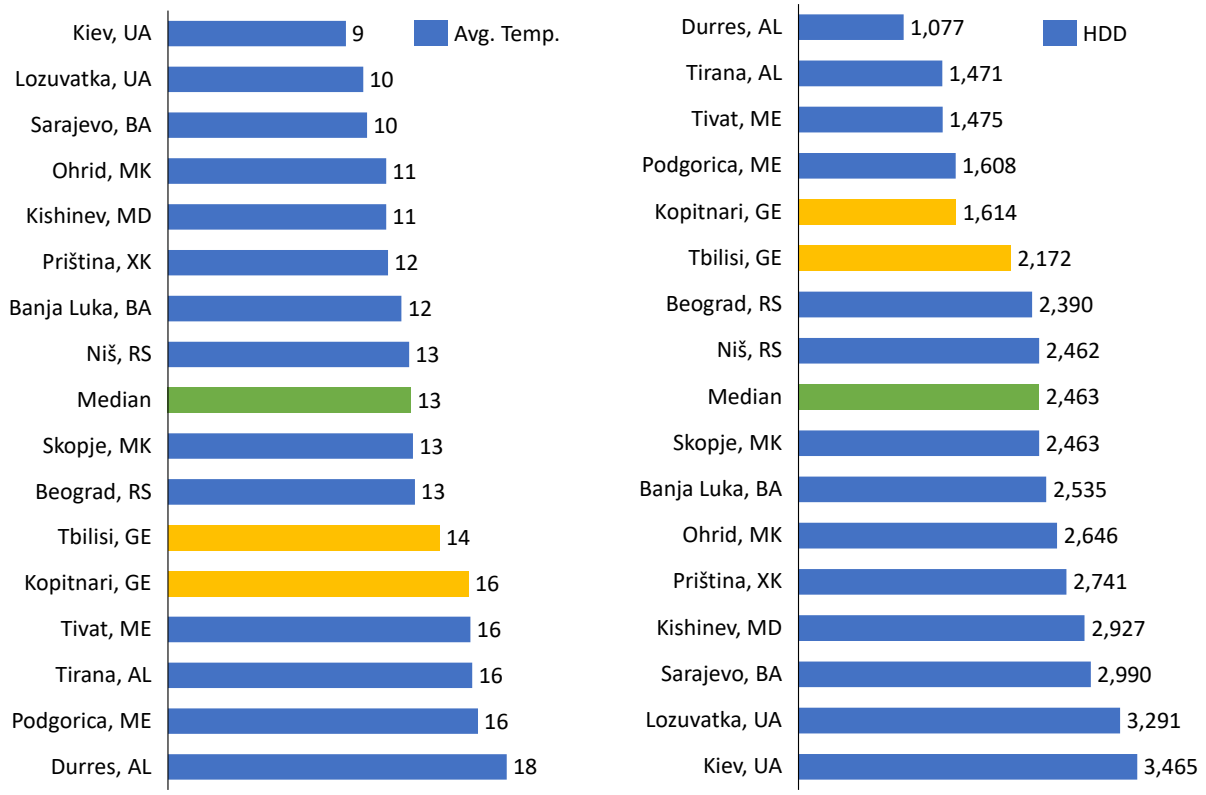


Figure 5-42. Average temperature in degrees Celsius and HDD in Tbilisi and Kopitnari as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.4.5 Final energy consumption

The dominant source of energy consumption in Georgia is gas which represents 59% of final energy consumption in households, making Georgia unique as this is the only CP where gas commands such a large share in household energy consumption. Following gas, the second most important energy source is biomass at 22% in final energy consumption followed by electricity at 17%. Oil derivatives (LPG) represent 2% of the final energy consumption by households, while the use of coal is almost nonexistent.

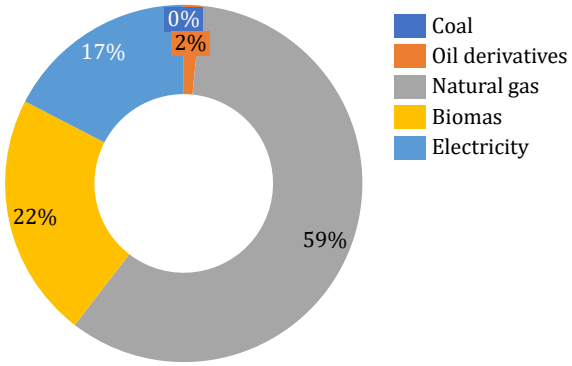


Figure 5-43. Structure of household energy consumption in Georgia

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 3.35 and consequently, the total number of households equivalent to 1.11 million, Figure 5-44 provides information on consumption of different fuels by the average household.

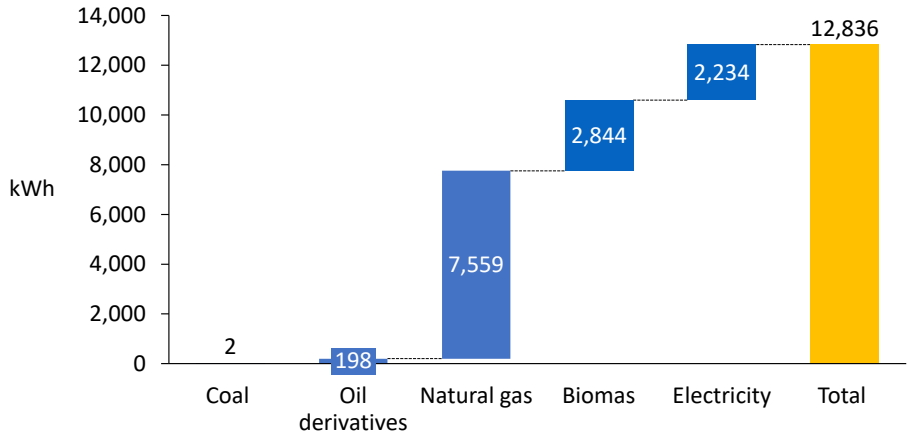


Figure 5-44. Structure of average household energy consumption in Georgia

Source: EUROSTAT Energy Balances (2018 data)

5.4.6 Energy Efficiency

In Georgia, natural gas is used in central heating systems in 10.5% of dwellings. Individual heating facilities are present in 88.3% of dwellings and are powered by natural gas (44.5%), firewood (45.8%) and electricity (6.4%). Individual boilers with an efficiency of around 90% using natural gas represent the highest share of 53%. Individual water heaters are used in 65.1% of dwellings. In all, 9.1% of dwellings are equipped with an air-conditioning system [29].

In terms of the energy sources, gas is the dominant source in urban households (70.7%), while biomass (firewood, agricultural waste, 78.3%) is the primary source used in rural households.

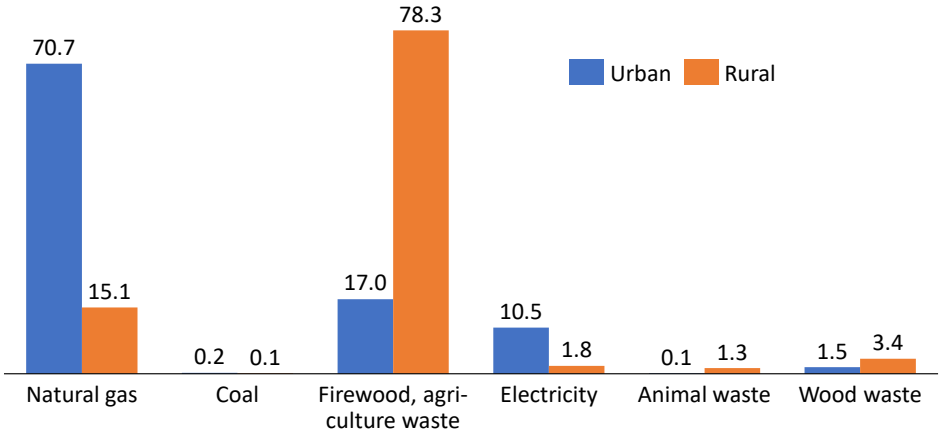


Figure 5-45. Forms of energy used for individual heating facilities

Source: Energy Consumption of Households in Georgia, 2017

Average heating demand is 200 kWh/m^2 for family houses and 170 kWh/m^2 for multi-apartment buildings. Energy efficiency requirements for heating and DHW, as well as the potential savings are not defined at the national level.

Table 5-8. Energy efficiency indicators for housing stock in Georgia

Average energy demand for heating and DHW [kWh/m²]		Energy efficiency requirement for heating and DHW [kWh/m²]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Heating 200	Heating 170	Unknown	

Source: Energy poverty - Guidance for state policy and public discourse in the time of reform for Georgia, Moldova and Ukraine [10]

Living space area

The average floor area (AFA) is 90 m² while the heated area is 55.8 m² (62% of AFA), and the cooled floor area is 39.1 m² (43% of AFA). The national building stock comprises 81.4% of family houses and 18.6% of multi-apartment buildings. Most of the housing stock area was built between 1951 and 1990 (76.7%).

Dwelling areas range mostly from 51 to 100 m² (42.1%) and over 100 m² (39.0%) while 50.5% of rural households and 35.6% of urban households heat only up to 20 m² of dwelling areas, while 41.2% of urban and 38.1%. of rural household heat up to 49 m² of dwelling areas. In all, 60.4% of the housing stock are family houses [29].

The figures below compare heated dwelling areas, and show that in more than half of households, less than 50 m² of living areas are heated.

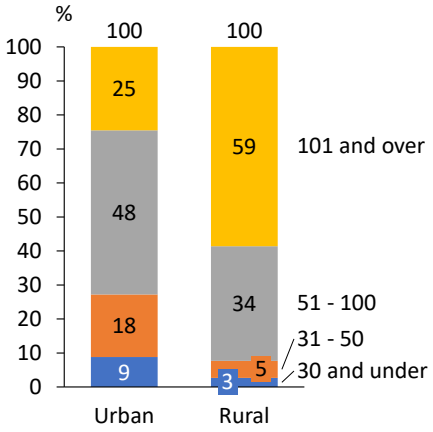


Figure 5-46. Distribution of dwellings by total area, m²

Source: Energy Consumption of Households in Georgia, 2017 [29]

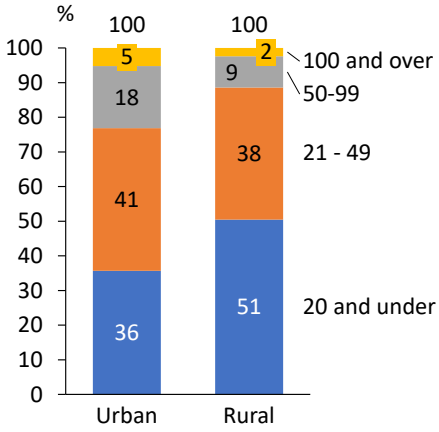


Figure 5-47. Structure of dwelling by heating space, m²

Source: Energy Consumption of Households in Georgia, 2017 [29]

5.5 Kosovo*

5.5.1 Macroeconomic development

In terms of the economic development as measured by real GDP per capita, Kosovo* trails behind the average of EnC CPs. The value of real GDP per capita in Kosovo* in 2010 was 21% lower than the average GDP per capita in EnC CPs. Even though the Kosovan* GDP per capita grew at a faster rate than the average GDP per capita in EnC CPs, it was still 18% below the average GDP per capita in EnC CPs at the end of 2020. Also noticeable is the impact of the COVID-19 pandemic, leading to a drop in GDP per capita in Kosovo* but also in EnC CPs in 2020 compared to 2019.

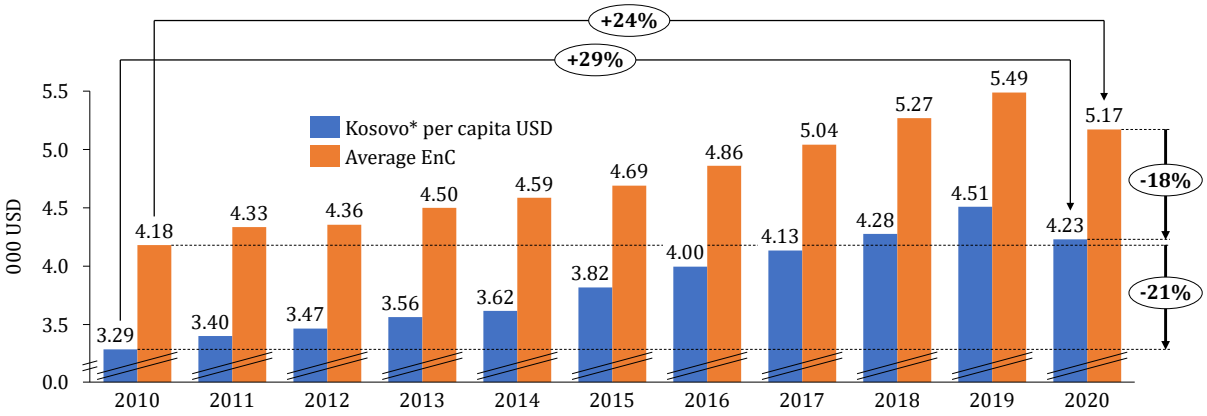


Figure 5-48. Real GDP per capita (constant 2010 US$) in Kosovo*

Source: The World Bank

Kosovo* has the highest unemployment rate among the EnC CPs. The unemployment rate among women has been consistently above unemployment rates for men, and at the end of 2019 was 12% higher.

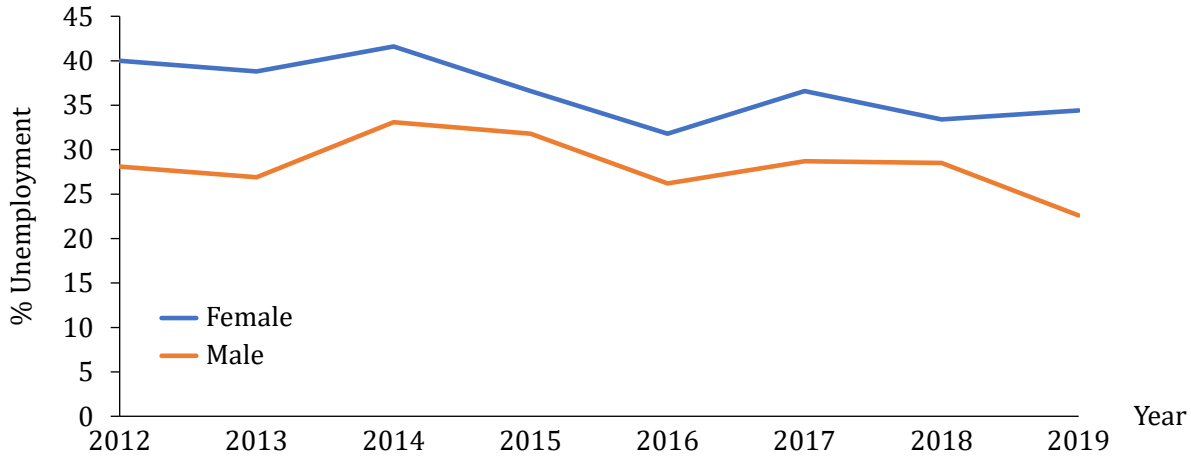


Figure 5-49. Unemployment rates by gender in Kosovo*

Source: The World Bank

Unlike GDP per capita which increased faster than the average GDP per capita in EnC CPs, net wages in Kosovo* increased at a slower rate than average net wage in EnC CPs. The average net wage in Kosovo* increased by 8% in the 2014-2019 period, from EUR 349 to EUR 370. At the same time, the average net wage in EnC CPs increased by 26%, from EUR 311 in 2014 to EUR 392 in 2019.

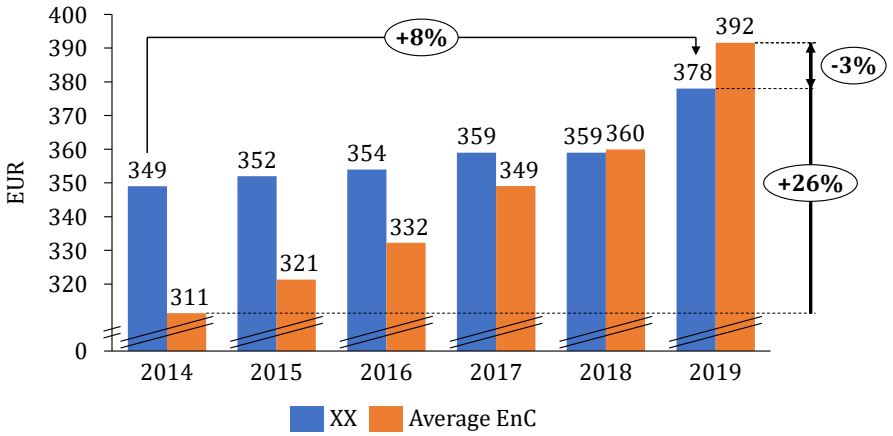


Figure 5-50. Trends for average monthly wages in Kosovo* and the Energy Community

Source: EUROSTAT

The poverty headcount ratio in Kosovo* in the 2010-2017 period declined by 84%. Among all the CPs in the observed period, Kosovo* has one of the lowest poverty headcount ratios.

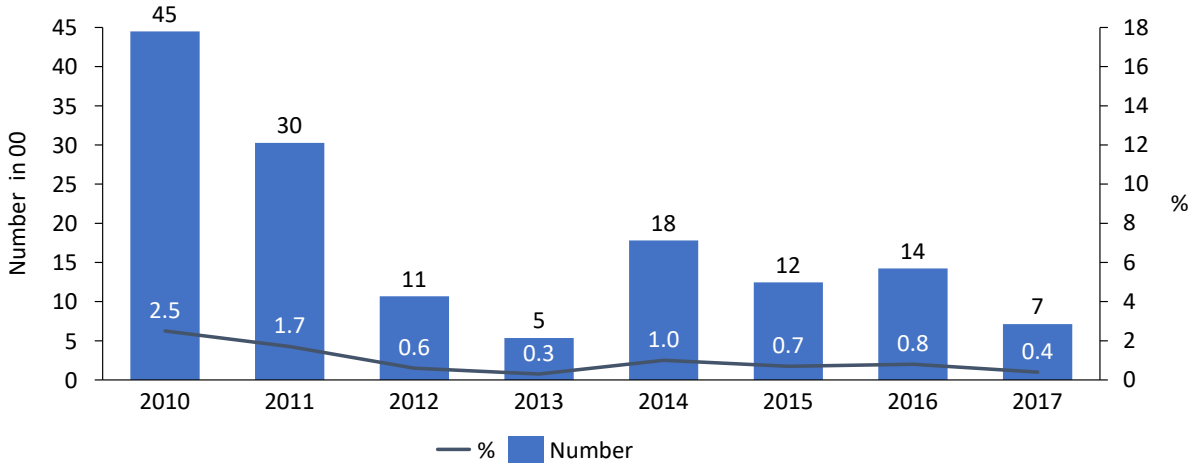


Figure 4- 53. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.5.2 Availability of different energy sources

In Kosovo*, households have access to electricity and district heating networks. Four cities have district heating systems: Prishtina, Gjakova, Mitrovica and Zveçan. Household consumers represent approximately 65% of all sales of energy in district heating systems (2015 data). Despite the four mentioned cities, district heating system meets only between 3% and 5% of thermal needs in Kosovo* [30].

Table 5-9. Availability of different forms of energy sources in Kosovo *

Country	Electricity	Gas	DH
Kosovo*	✓	x	✓

Source: author

5.5.3 Energy prices

Electricity prices in Kosovo* for household consumers[111] inclusive of all taxes and levies are among the lowest in the EnC CPs, i.e., 21% lower than the average in the EnC CPs.

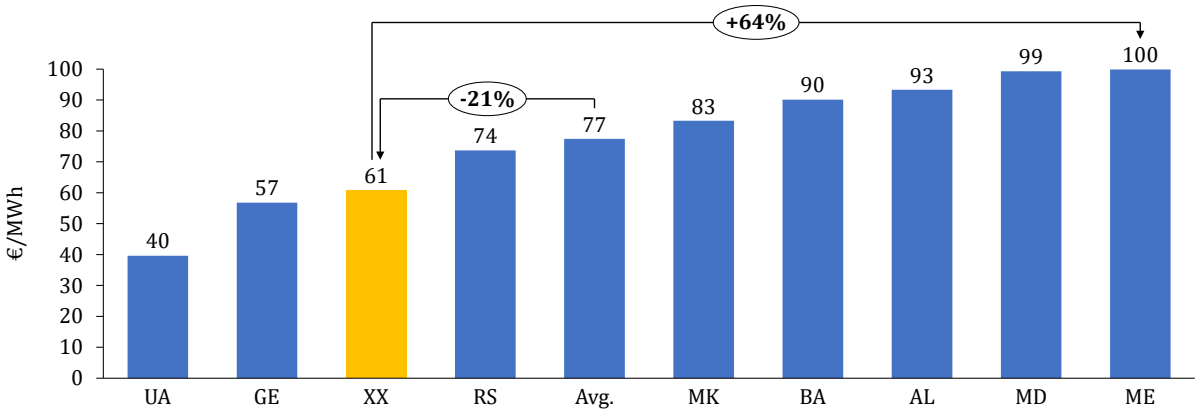


Figure 5-51. Electricity prices for household consumers in Kosovo*

Source: EUROSTAT

Electricity generation in Kosovo* is heavily dependent on lignite power plants. Projections of future retail electricity prices in the recently published study by the Energy Community Secretariat [23] show that the introduction of carbon pricing renders existing lignite power plants noneconomical, driving retail electricity prices up across all scenarios. The conclusion is that inevitable decarbonization policies will result in upward pressure on electricity prices in Kosovo*.

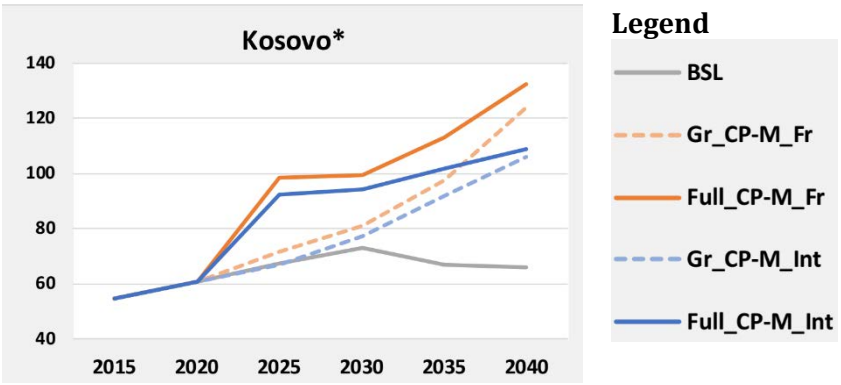


Figure 5-52. Projected trends for retail electricity prices in Kosovo* in different carbon pricing and market integration scenarios

Source: Energy Community Secretariat [23]

5.5.4 Climate

The figure below shows average temperature and HDD for Pristina based on data for the 2011-2020 period. It is evident that in terms of temperature, Pristina falls below the EnC CP median and above the EnC CP median for HDD, indicating above average heating energy needs.

In assessing the existence of a statistically significant increase in CDD or decrease in HDD values due to for example climate change, we performed a simple regression of HDD and CDD, each separately on a time trend. We found statistical significance of the negative trend variable for HDD values at 10% significance level. This implies statistical evidence of a decrease in HDD. On the

[111] Electricity prices for household consumers for band DC (between 2,500 kWh and 5,000 kWh of electricity annually) for second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

other hand, we found that the trend variable for CDD is not statistically significant (at 10% significance level), i.e., no statistically significant increase in CDD.

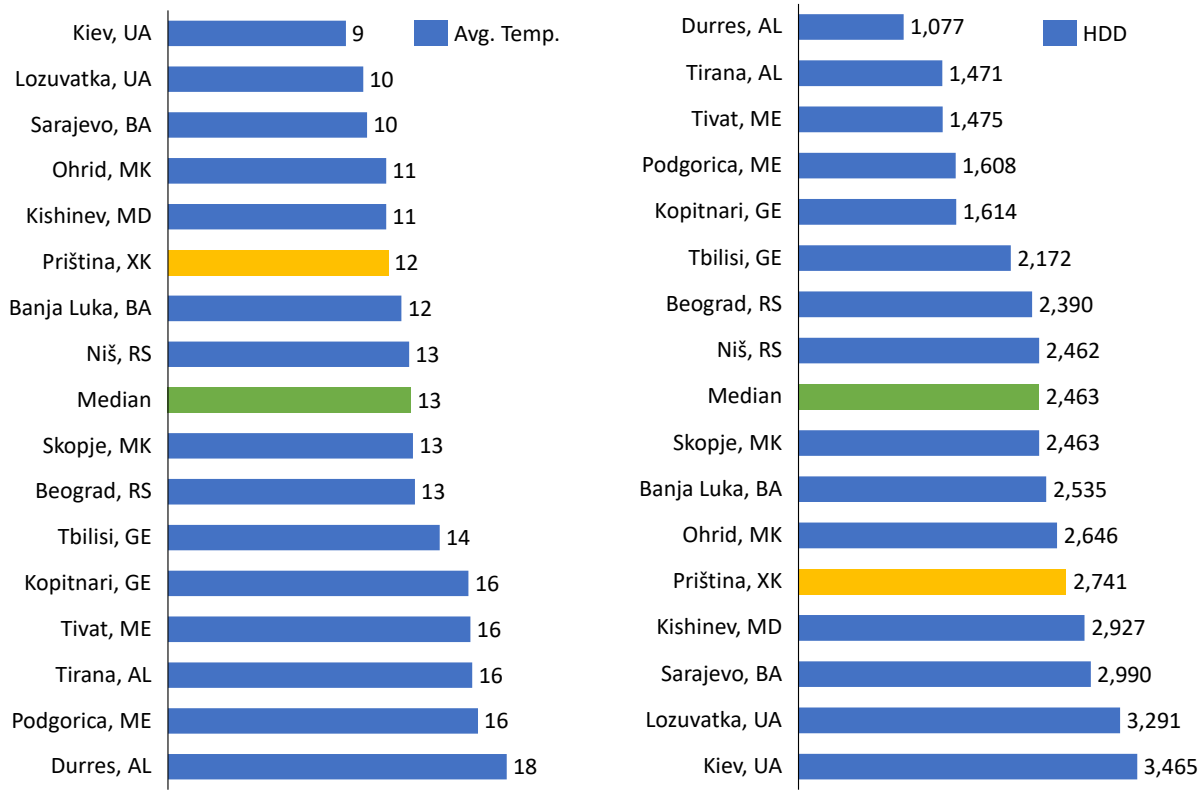


Figure 5-53. Average temperature in degrees Celsius and HDD in Priština as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.5.5 Final energy consumption

Biomass and electricity represent the largest share of final energy consumption in Kosovan households, i.e., 61% and 35% respectively. The heat derived from district heating and oil derivatives (LPG and gas and diesel oil) each represent 2% of final energy consumption in households. Finally, despite being rich in lignite, official statistics state that lignite represents a miniscule share of final energy consumption by Kosovo* households.

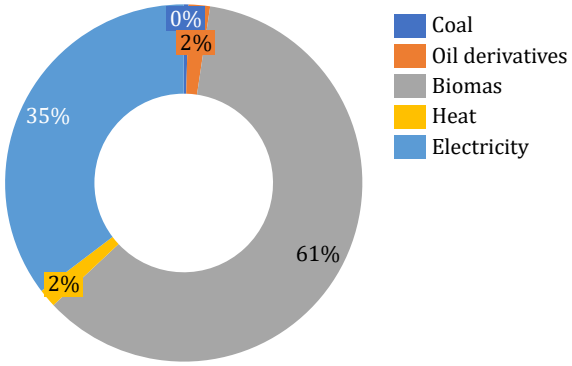


Figure 5-54. Structure of household energy consumption in Kosovo*

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 5.33, and consequently the total number of households equivalent to 0.33 million, Figure 5-55 provides data on consumption of different fuels by the average household.

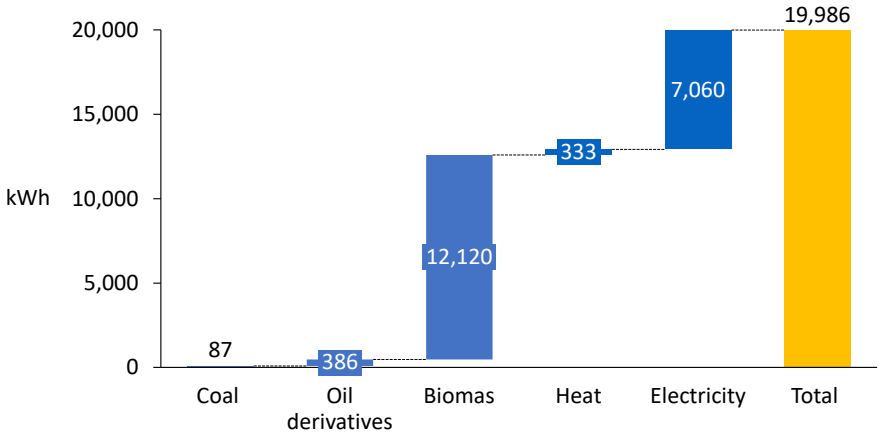


Figure 5-55. Structure of average household energy consumption in Kosovo*

Source: EUROSTAT Energy Balances (2018 data)

5.5.6 Energy Efficiency

In terms of the heating area, more than two-thirds of households heat only up to 50 square meters of their dwellings, and the difference does not vary much between urban and rural dwellings [31].

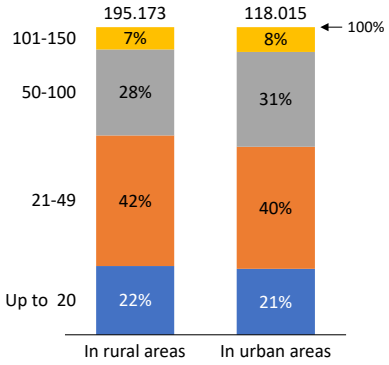


Figure 5-56. Number of households by heating area

Source: Energy Consumption in Households in 2015 [31]

In individual dwellings, fuel wood stoves for space heating, DHW and possibly cooking functions are the primary heating system. In collective housing, electrical heating is predominant while in the main cities (Prishtina, Prizren and Mitrovica), 1.7% of the residential area is connected to district heating system. Heating oil is seldom used, and natural gas is not available. Electricity is commonly used for DHW [32].

Buildings built before the year 2000 are not thermally insulated and account for 48% of the entire building stock surface. The housing stock is unusually 'young' by European standards, with over 52% of building areas built in the past 20 years and over one third built in the period from 2000 to 2009.

Average energy demand from the entire building stock for heating and DHW is 191.03 kWh/m^2 for family houses and 128.92 kWh/m^2 for multi-apartment buildings, of which DHW accounts for 10 kWh/m^2 in both cases. In the advanced improvement scenario, heat energy consumption can be reduced to one third of the current state. This requires thermal insulation of the building envelope (20 cm of thermal insulation and triple glazing) and efficient heating technologies (a

central heating system equipped with an electrical heat pump and floor heating system, central heating system using biomass, heat accumulator, VSD pump, hydraulic system balance and thermostatic valves).

Table 5-10. Energy efficiency indicators for the housing stock in Kosovo*

Average energy demand for heating and DHW [kWh/m²]		Energy efficiency of advanced improvement [kWh/m²]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
191.03	128.92	73	55.88

*Source: Draft Building Renovation Strategy for Kosovo** [32]

The surface of living space

The building stock consists of 300,000 buildings and 47 million m² of gross floor area, where residential buildings dominate the existing building stock at 73% or 34.42 million m² and 247,680 buildings. In all, 54.7% of population lives in urban areas. The average dwelling size is 83.3 m² [32].

Kosovo* is characterized by low existing comfort levels across its main cities. Energy consumption compared to calculated consumption in achieving the comfort level across the different regions is as follows: Pristina (66.8%), Prizren (63.9%), Mitrovica (89.0%) and 72.1% for the entire country. This is indicative of the consistent likelihood of energy poverty in the household sector.

Over 97% of housing units are owner occupied, with almost none occupied by tenants. However, there is a high number of illegal dwellings, hence the may exist deviations in data on owner structure [32].

5.6 Moldova

5.6.1 Macroeconomic development

In terms of the economic development as measured by real GDP per capita, Moldova fares worse than the average of EnC CPs. At the end of 2010, real GDP per capita in Moldova was 42% lower than the average GDP per capita of EnC CPs. Even though the Moldovan GDP per capita grew during the last decade by 44% compared to the 24% increase in the average of EnC CPs, at the end of 2020 the Moldovan GDP per capita was still 32% lower than the average GDP per capita in EnC CPs. Also noticeable is the impact of the COVID-19 pandemic leading to a drop in GDP per capita in Moldova but also in EnC CPs in 2020 compared to 2019.

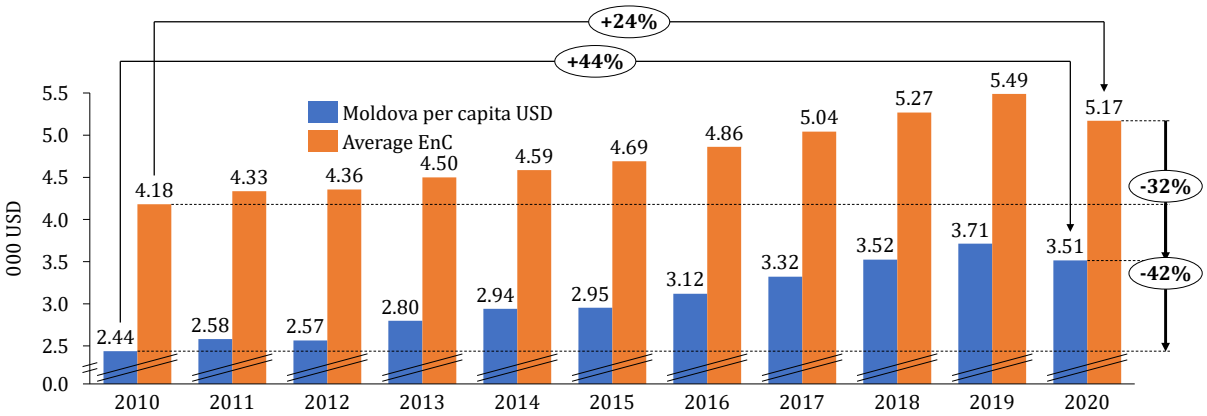


Figure 5-57. Real GDP per capita (constant 2010 US$) in Moldova

Source: EUROSTAT

The unemployment rate in Moldova has been declining over the last decade, though a slight increase in recent years is evident. The unemployment rate for men has consistently been higher than the unemployment rate for women and was 1.5% higher in 2019.

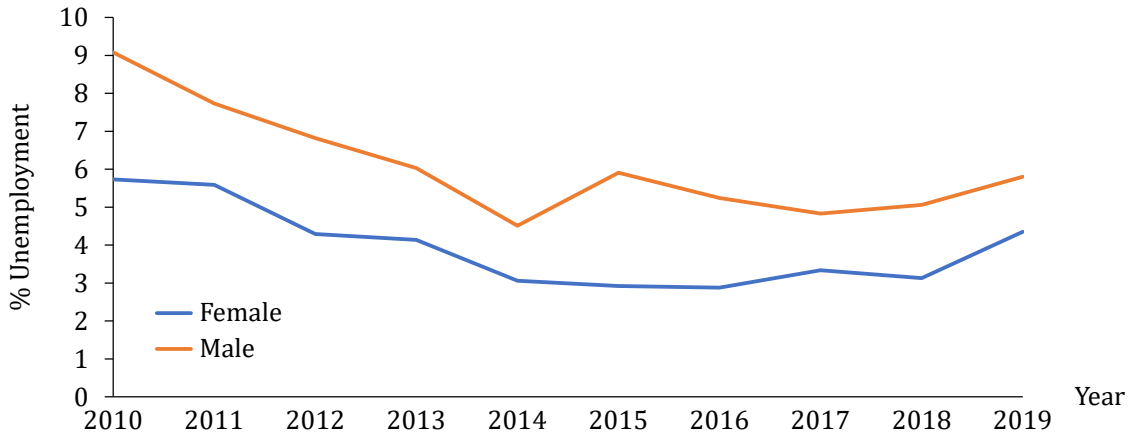


Figure 5-58. Unemployment rates by gender in Moldova

Source: The World Bank

The average wage in Moldova in the 2014-2019 period increased from EUR 157 to EUR 277, representing an increase of 77%. Though this growth was faster than that observed for the average wage in EnC, the average wage in Moldova remained 29% below the average wage in EnC CPs in 2019.

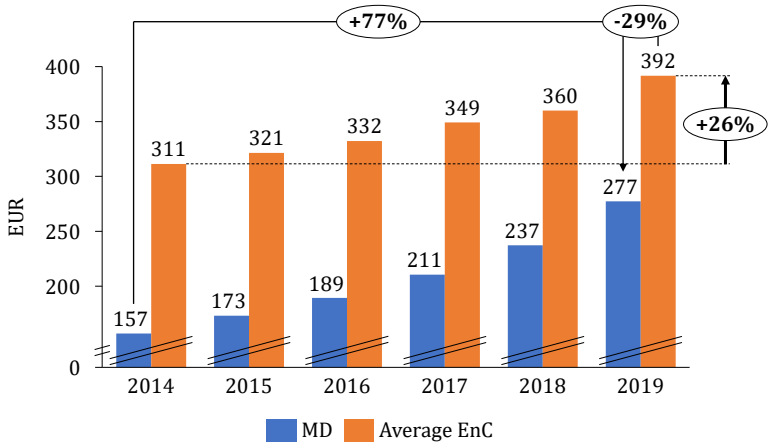


Figure 5-59. Trends for average monthly wages in Moldova and in the Energy Community

Source: EUROSTAT

The poverty headcount ratio in Moldova oscillated in the observed time period. A significant decline is evident between 2010-2017. Among the CPs, Moldova has one of the lowest poverty headcount ratios. The percentage of the population living under USD 1.9 was between 0.5% and 0.1%.

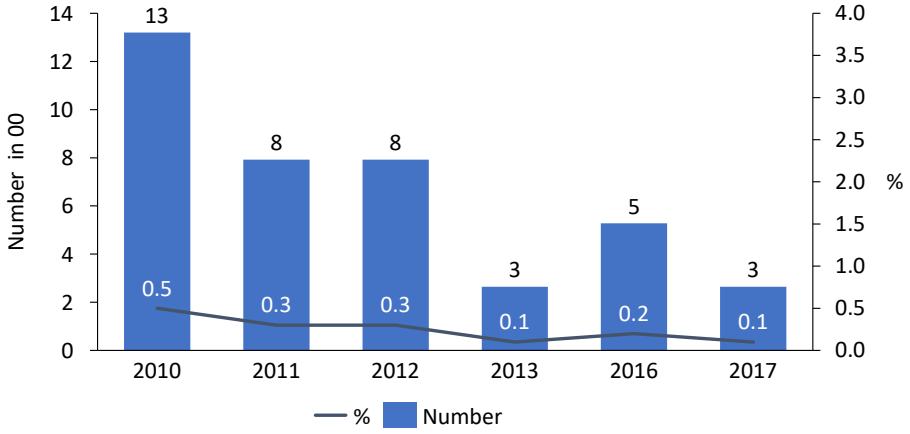


Figure 4- 63. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.6.2 Availability of different energy sources

In Moldova, consumers have access to electricity, DH and gas. There are 7 operators in the DH sector that are licensed for supplying heat. DH is primarily used in the city of Chisinau and Balti where 72% and 57% of households use DH, respectively.[112]

In the natural gas sector in Moldova, Moldovagaz JSC is the main supplier of natural gas which is delivered to approx. 700 thousand consumers (households and businesses).

[112] The World Bank. Republic of Moldova: District Heating and Electricity Tariff and Affordability Analysis. October 26, 2015

Table 5-11. Availability of different forms of energy sources in Moldova

Country	Electricity	Gas	DH
Moldova	✓	✓	✓

Source: author

5.6.3 Energy prices

Electricity prices in Moldova for household consumers[113] inclusive of all taxes and levies are among the highest in EnC CPs, i.e., only Montenegro has higher electricity prices for household consumers (1% higher). Compared to average electricity prices in the EnC, Moldova's electricity prices are 28% higher than the EnC average. It should be noted that Moldova is the only CP in which the VAT rate on electricity for household consumers is 0%.

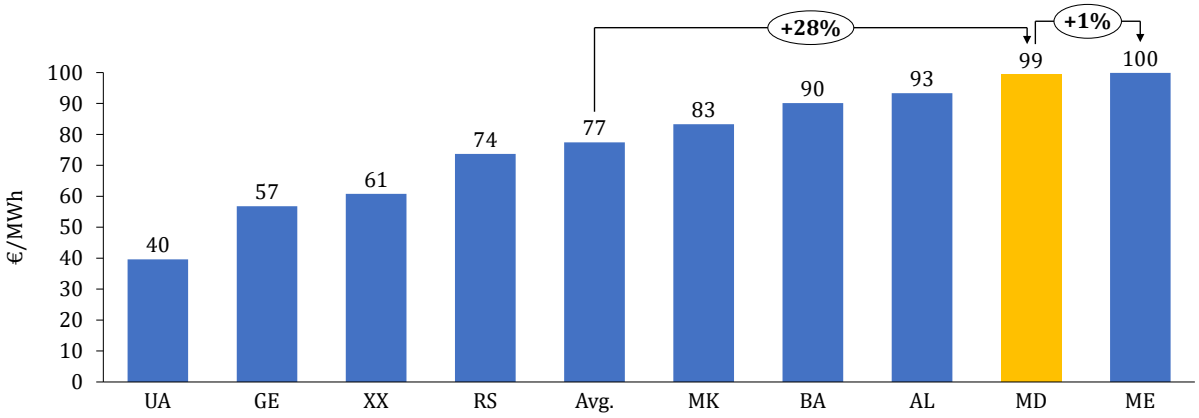


Figure 5-60. Electricity prices for household consumers in Moldova

Source: EUROSTAT

Electricity generation in Moldova is heavily dependent on imported fossil fuels. Projections of the future retail electricity prices in a recently published study by the Energy Community Secretariat [23] show that in period after 2030, electricity prices will increase across all considered scenarios. This means that household electricity prices are expected to increase in Moldova in the medium and long term.

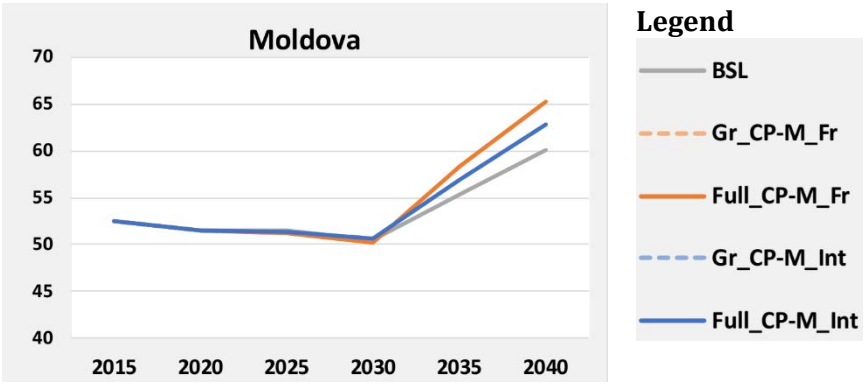


Figure 5-61. Projected trends for retail electricity prices in Moldova in different carbon pricing and market integration scenarios

[113] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for the second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

Source: Energy Community Secretariat [23]

In terms of gas prices,[114] Moldova was only slightly below the average gas price in EnC.

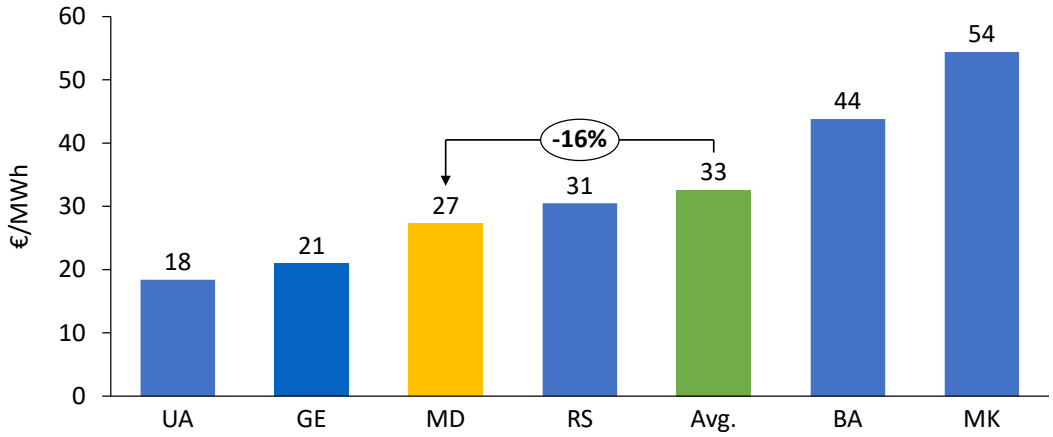


Figure 5-62. Gas prices for household consumers in Moldova

Source: EUROSTAT

5.6.4 Climate

The figure below shows the average daily temperature and number of HDD for Kishinev based on the temperature data for the 2010-2020 period. It shows that the average temperature in Kishinev is lower, and number of HDD higher compared to median values for EnC CPs. Given that the HDD value is slightly below 3000, there is a significant need for heating energy.

In assessing whether there is a statistically significant increase in CDD or decrease in HDD values due to for example climate change, we performed a simple regression of HDD and CDD each separately on a time trend. We found a statistical significance of the negative trend variable for HDD values at a 1% significance level. This implies statistical evidence of a decrease in HDD. On the other hand, we also found that the trend variable for CDD is not statistically significant (at 10% significance level) i.e., no increase in CDD is statistically significant.

[114] Gas prices for household consumers for the D2 band (between 20 GJ and 200 GJ of gas consumption annually) refer to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

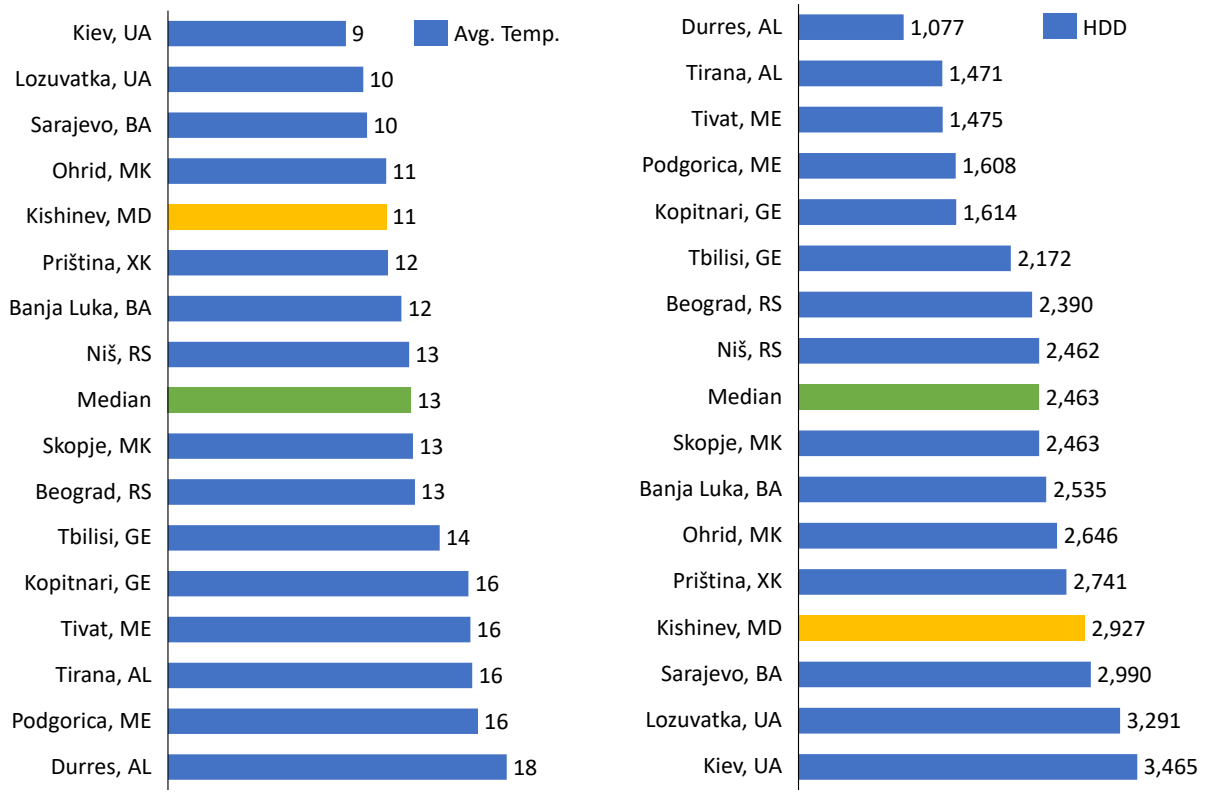


Figure 5-63. Average temperature in degrees Celsius and HDD in Kishinev as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.6.5 Final energy consumption

The most dominant source of energy in final energy consumption in Moldova is biomass, representing 54% of final energy consumption. Natural gas, electricity, and district heating represent 19%, 10%, and 9% respectively of final energy consumption. Oil derivatives (LPG) and coal (mostly anthracite) represent the remaining 5% and 3% respectively.

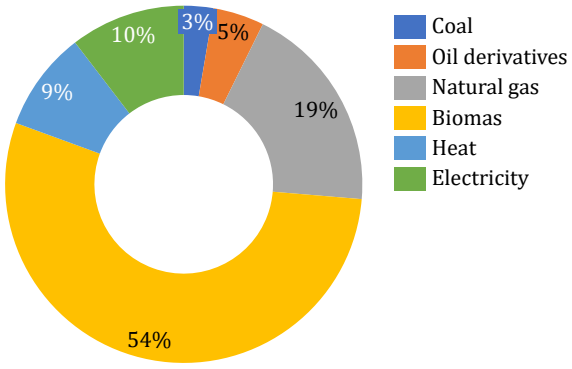


Figure 5-64. Structure of household energy consumption in Moldova

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 2.92 and consequently, the total number of households equivalent to 0.9 million, Figure 5-65 provides information on consumption of different fuels by the average household.

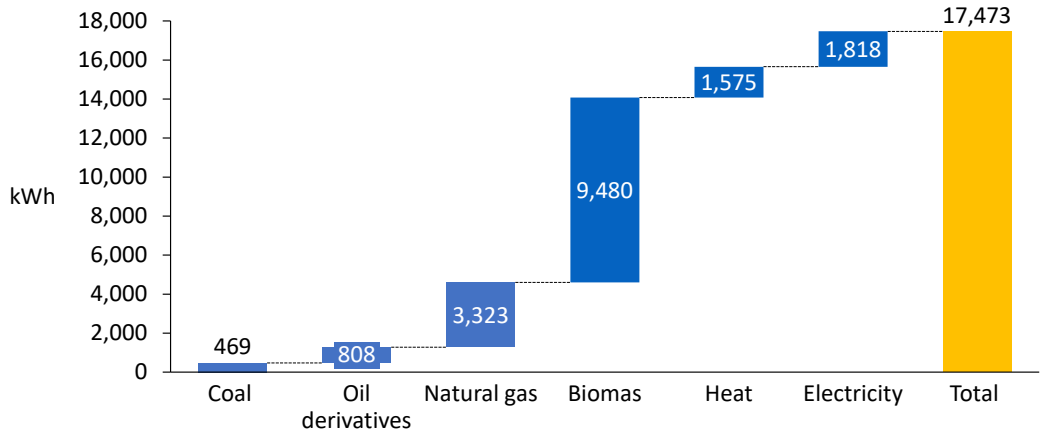


Figure 5-65. Structure of an average household energy consumption in Moldova

Source: EUROSTAT Energy Balances (2018 data)

5.6.6 Energy Efficiency

Wood is by far the most used fuel, especially in rural areas, and accounting for 47% of final energy consumption in the residential sector.

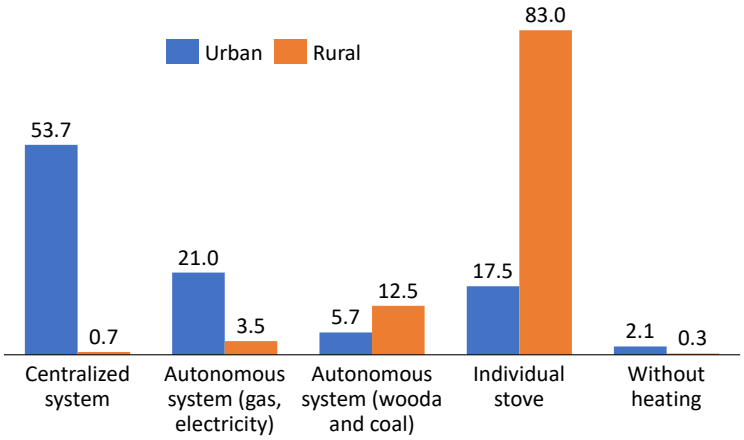


Figure 5-66. Distribution of dwellings by type of heating system and area

Source: Energy Consumption in Households 2016 [33]

In rural households, mostly individual stoves with an efficiency of 50% and solid fuels are used. Even in urban areas individual stoves are predominantly fueled by wood.

A majority of the building stock has no thermal insulation, with the average heating demand equivalent to 260 kWh/m² for family houses and 220 kWh/m² for multi-apartment buildings. In a deep energy retrofit scenario, energy demand can be reduced more than 50%. This requires thermal insulation of the building envelope as well as introducing individual heating substations and highly efficient heating technologies based on biomass and natural gas.

Table 5-12. Energy efficiency indicators for housing stock in Moldova

Average energy demand for thermal and electrical energy [kWh/m²]		Energy efficiency for thermal and electrical energy in deep retrofit scenario [kWh/m²]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Thermal energy 260 Electricity consumption 30[115]	Thermal energy 220 Electricity consumption 40	Thermal energy 136 Electricity consumption 0[116]	Thermal energy 97 Electricity consumption 13[117]

Source: EU4Energy Governance Support in the Development of the Long-term Strategy for Mobilizing Investment in the Renovation of the National Stock of Buildings in Moldova – to be adopted

The surface of living space

The total heated area of residential buildings is 86,265,231 m². Residential buildings represent 87% of the total surface area in the national building stock. In all, 59% of the dwellings are in urban areas and 41% in rural areas [33].

The existing building stock was mainly built between 1951 and the late 1980s, and together with buildings subsequently constructed but prior to 1990, represents 79.3% of total households [33].

In terms of the heating area, most rural and predominantly urban households heat only a fraction of their homes, i.e., most of the homes heat up to 50 m² of their dwelling area.

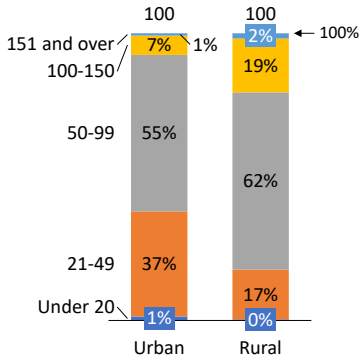


Figure 5-67. Distribution of dwellings by m²

Source: Energy Consumption in Households 2016 [33]

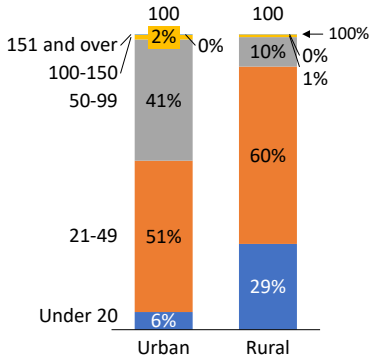


Figure 5-68. Heating dwelling space, m²

Source: Energy Consumption in Households 2016 [33]

In terms of heating sources, rural households mostly use individual stoves, which supports the fact that stoves are mostly used to heat part of their dwellings. More than half of urban households use centralized heating systems with a small share using utilizing systems and stoves.

The Housing Act specifies conditions under which social housing is allocated for poor categories of citizens and refers to restrictions that individuals encounter with regards to residential blocs. To be eligible for social housing, the monthly income of a family for each family member should

[115] As minimum energy efficiency requirements are not set in Moldova, standardized final energy demand is presented for the relevant building typologies

[116] [116] As minimum energy efficiency requirements are not set in Moldova, standardized final energy demand is presented for deep renovation scenario for the relevant building typologies

not exceed the defined living subsistence amount, i.e., approx. EUR 90 in 2018 (MDL 1891). Socially vulnerable groups are obliged to notify the mayor's office of any changes in income and are allowed to delay payments of bills (also includes energy bills) for no longer than six months. Regulations on rented housing does not give tenants the right to insulate rented flats.

5.7 Montenegro

5.7.1 Macroeconomic development

Real GDP per capita in Montenegro is the highest among EnC CPs. In 2010, the Montenegrin GDP per capita was 60% higher than the average GDP per capita in CPs. Though Montenegro recorded slightly slower growth in GDP per capita than the average of EnC CPs, i.e., 9% as opposed to 24% respectively, GDP per capita at the end of 2020 was nonetheless 41% higher than the average GDP per capita in EnC CPs. Also noticeable is the impact of the COVID-19 pandemic leading to a fall in GDP per capita in Montenegro but also in EnC CPs in 2020 compared to 2019.

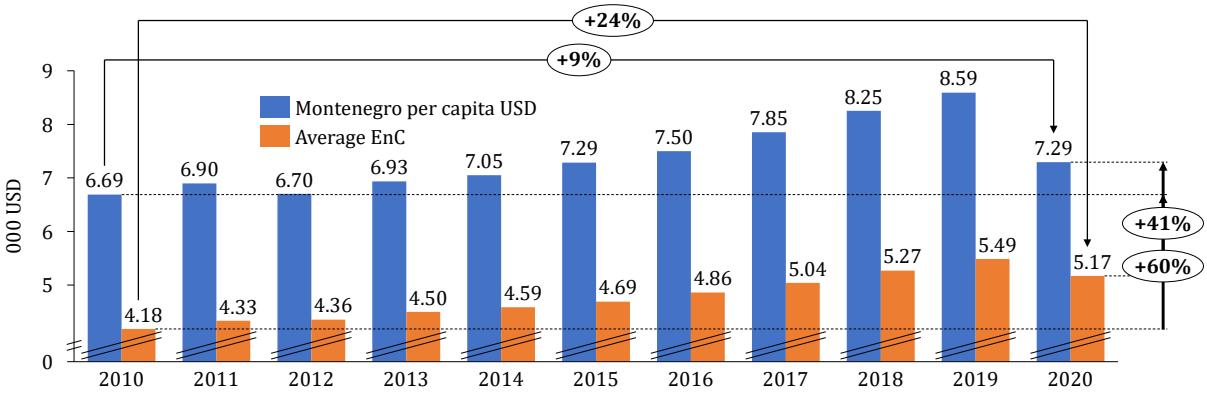


Figure 5-69. Real GDP per capita (constant 2010 US$) in Montenegro

Source: The World Bank

The unemployment rate in Montenegro has been declining over the last decade. There has been no persistent difference between the male and female unemployment rates in Montenegro.

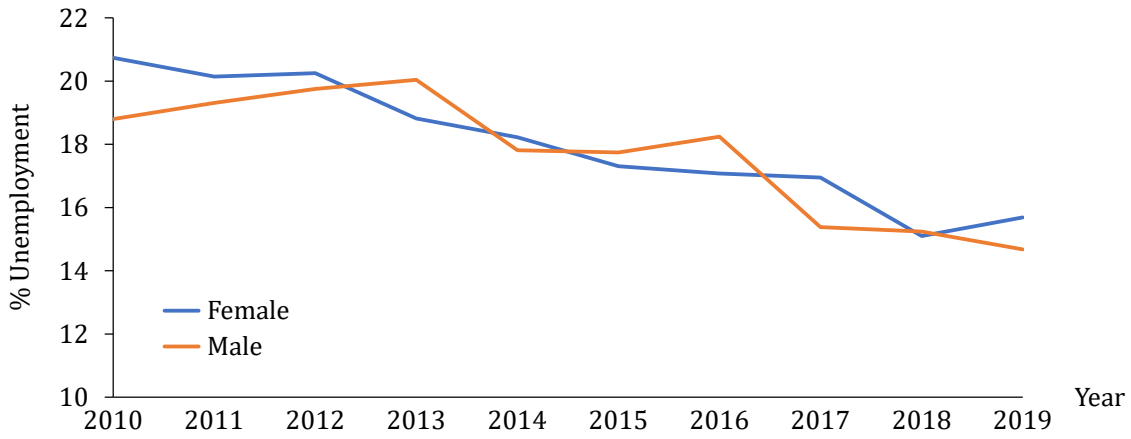


Figure 5-70. Level of employment by gender in Montenegro

Source: The World Bank

Regarding average wages, as is the case with GDP per capita, average wages in Montenegro are much higher than average wages in EnC CPs. During the 2014-2019 period, the average wage in EnC CPs grew by 26%, whereas the average wage in Montenegro grew by 8%. At the end of 2019, the average wage in Montenegro was 32% higher than the average wage in EnC CPs.

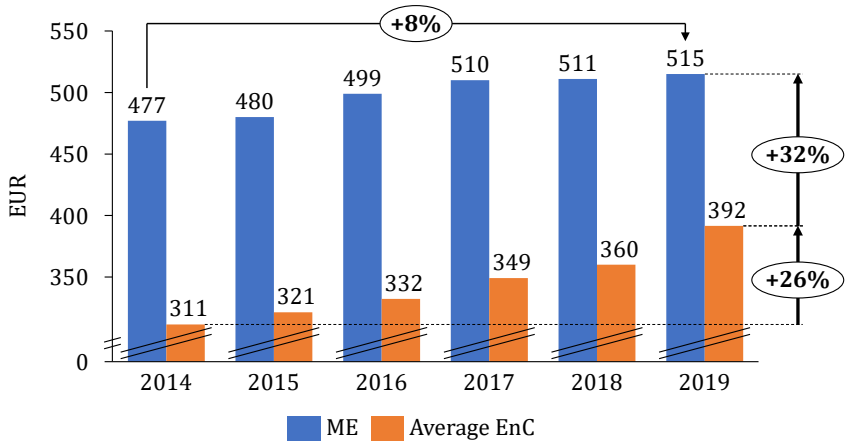


Figure 5-71. Trends for average monthly wages in Montenegro and the Energy Community

Source: EUROSTAT

The poverty headcount ratio in Montenegro declined in the 2012- 2016 period by 26%. If only taking into account the ratio difference over the last two available years (2015-2016), we see increase of 78%.

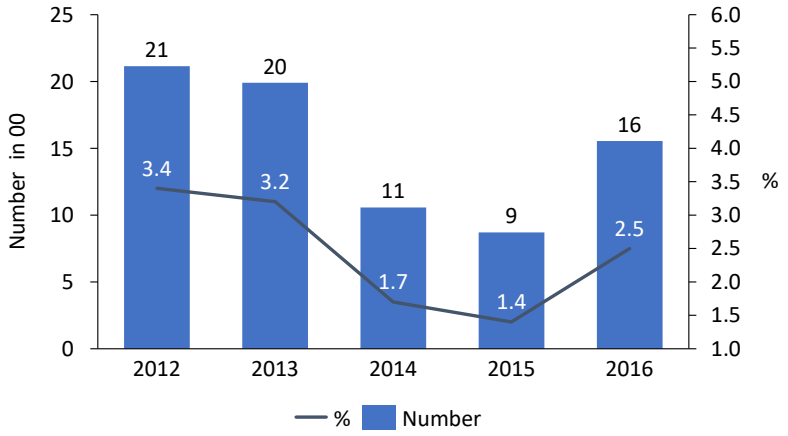


Figure 5-72. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.7.2 Availability of different energy sources

Montenegrin households can only connect to the electricity grid for their energy needs as there are no gas or district heating networks.

Table 5-13. Availability of different forms of energy sources in Montenegro

Country	Electricity	Gas	DH
Montenegro	✓	x	x

Source: author

5.7.3 Energy prices

Electricity prices in Montenegro for household consumers[118] inclusive of all taxes and levies are the highest in EnC CPs, i.e., 29% above the average electricity price in the EnC.

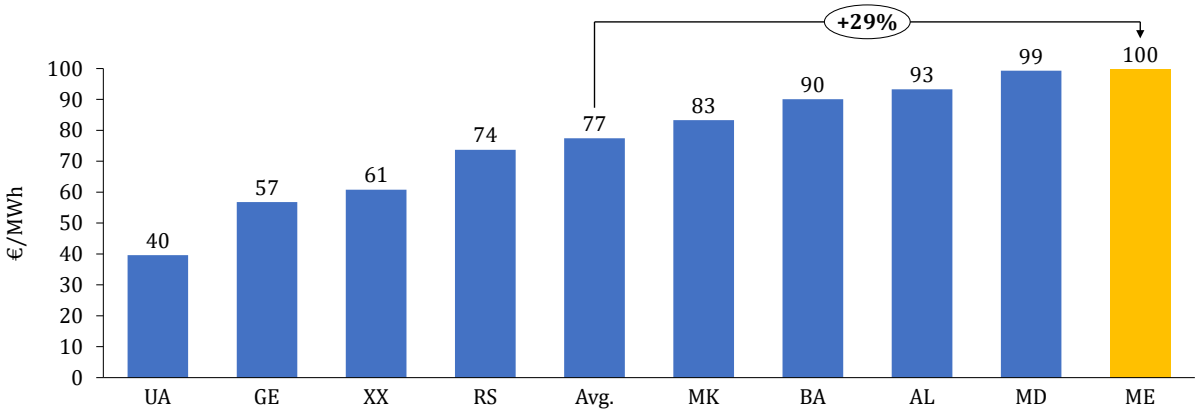


Figure 5-73. Electricity prices for household consumers in Montenegro

Source: EUROSTAT

Projections of future retail electricity prices in Montenegro in the recently published study by EnCS [23] show that electricity prices are expected to increase. Future price increases in the future are expected to be positively impacted by market integration as it will allow for cross border balancing of variable RES. A more fragmented regional market leads to higher expected prices. The conclusion is that household electricity prices in Montenegro are expected to rise in the medium and long term.

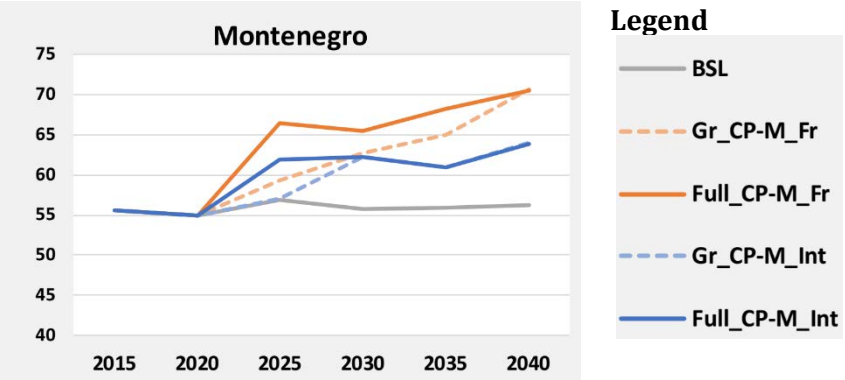


Figure 5-74. Projected trends for of retail electricity prices in Montenegro in different carbon pricing and market integration scenarios

Source: Energy Community Secretariat [23]

5.7.4 Climate

Even though Montenegro has a mild climate, nonetheless significant climate differences exist across the country. According to [34], Montenegro is divided in three climate zones where the average value of HDD is: 1623 for zone 1 (mild) (Bar, Budva, Danilograd, Herceg Novi, Kotor, Podgorica, Tivat, Ulicnj); 2525 for zone 2 (moderate) (Nikšić and Cetinje) , and 3388 for climate zone 3 (mountainous) (Andrijevica, Berane, Bijelo Polje, Žabljak, Kolašin, Mojkovac, Plav, Plužine,

[118] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for the second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

Pljevlja, Rožaje, Šavnik). In all, 64% of dwellings are located in zone 1, 11% in zone 2 and 25% in zone 3.

Based on temperature data for Podgorica and Tivat covering the 2000-2020 period, the figure below shows the average daily temperature and HDD for the two cities. It is evident that the average temperature in Podgorica and Tivat are among the highest observed in EnC CP selected cities. Given that 64% of dwellings are located in areas with temperatures similar to Tivat and Podgorica, heating requirements in Montenegro are among the lowest in EnC CPs.

To assess whether a statistically significant increase in CDD or decrease in HDD values due to for example climate change exists, we performed a simple regression of HDD and CDD, each separately on a time trend. We found a statistical significance of the negative trend variable for HDD values at a 5% significance level for Podgorica, but not for Tivat. This implies statistical evidence for a decrease in HDD in Podgorica. We also found that the trend variable for CDD is not statistically significant for either city (at 10% significance level) i.e., no statistically significant increase in CDD.

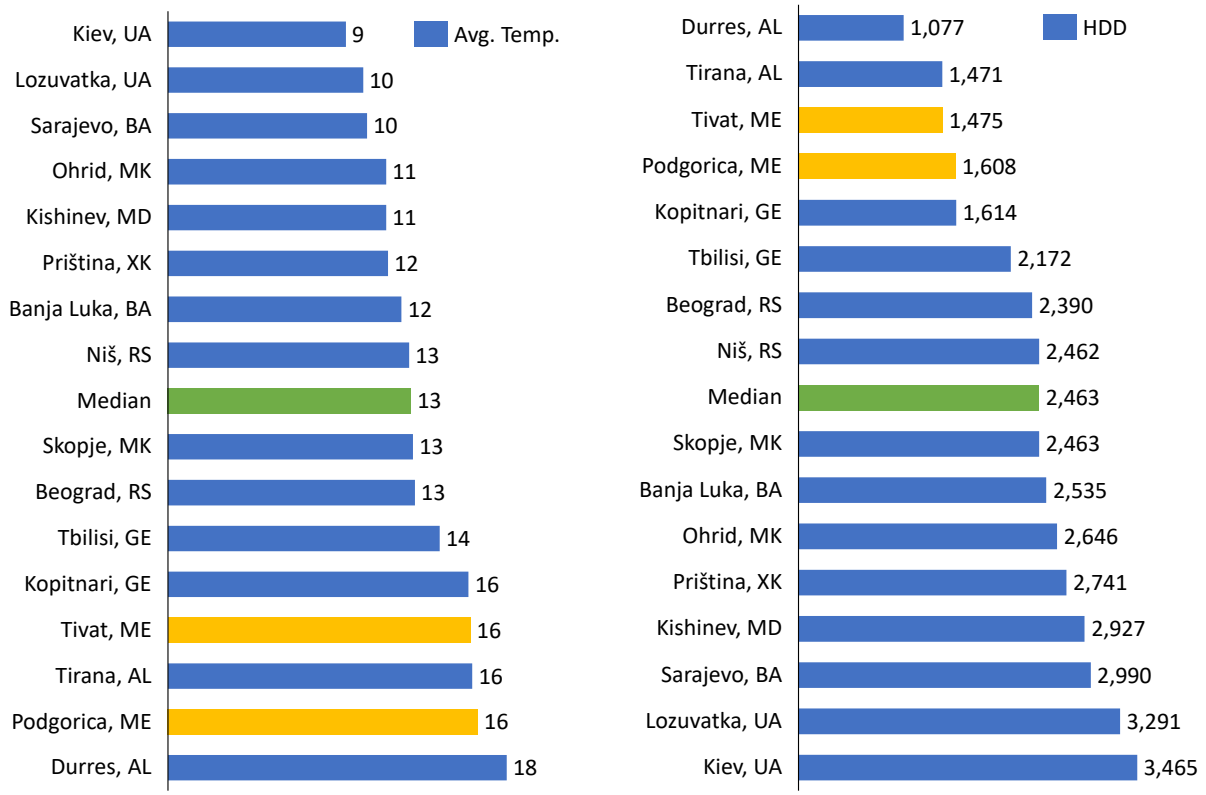


Figure 5-75. Average temperature in degrees Celsius and HDD in Tivat and Podgorica as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.7.5 Final energy consumption

In Montenegro, the dominant source of energy in the final energy consumption of households is biomass accounting for 54% followed by electricity at 44%. Coal (lignite) and oil derivatives (LPG) each represent approx. 1% of final energy consumption of households, and hence are considered insignificant.

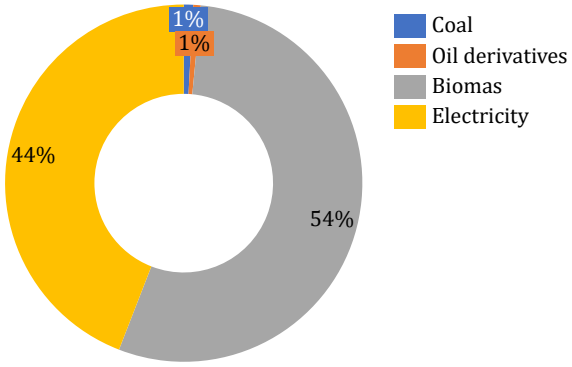


Figure 5-76. Structure of household energy consumption in Montenegro

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 3.23 and consequently, the total number of households equivalent to 0.19 million, Figure 5-77 provides consumption data for different fuels by the average household.

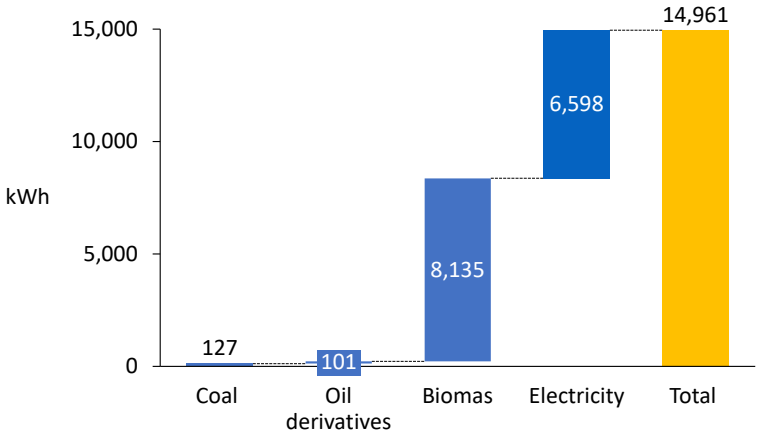


Figure 5-77. Structure of an average household energy consumption in Montenegro

Source: EUROSTAT Energy Balances (2018 data)

5.7.6 Energy Efficiency

The most common energy source is solid fuel (84%, mainly wood), followed by electricity (13,5%). Both conventional wood-burning stoves and low-efficiency electric air-to-air heat pumps are widely used. Solar heating and other energy sources, such as gas and oil, are negligible. About 1.6% of the total household area is not heated. In small houses and older, medium sized buildings, wood is dominant, while electricity is the dominant heat source in large buildings. Centralized heating systems represent anywhere from 1% to 7% of multi-apartment buildings. In all, 54% of dwellings are equipped with mechanical cooling systems. Most of the cooling units are reversible, meaning that can also be used for heating, although this is not supported by statistical data. Typically, hot water is produced using an electric boiler.[119]

[119] 2011 Household Census, Monstat

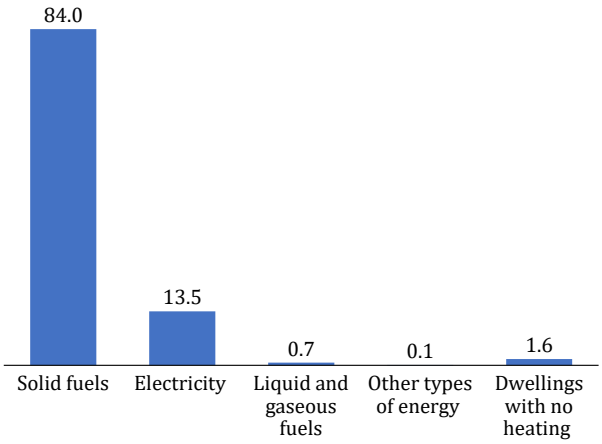


Figure 5-78. Share of fuels used for heating purposes

Source: Typology of the Residential Building Stock in Montenegro [34]

Detached houses and other types of residential building with up to two flats, built between 1971 and 1990, represent the biggest group, and account for 28% of the building stock area. Also, large apartment buildings built between 1970 and 1990 and after 2000 are a significant share accounting for 18% of the total building area [34].

Average heating demand is 276.50 kWh/m² for family houses and is similar for multi-apartment buildings at 286.99 kWh/m². DHW demand is 31.90 kWh/m² for both housing categories and cooling demand is 74 kWh/m² for family houses and 54 kWh/m² for multi-apartment buildings. An advanced improvement scenario can reduce heating demand by threefold, i.e., to 89.46 kWh/m² for family houses and 104.65 kWh/m² for multi-apartment buildings. The building envelope should adequate thermal insulation and triple glazed windows. This also requires introducing a centralized heating system equipped with a wood pellet boiler and automatic regulation of temperature and hot water preparation in family homes. Multi-residential buildings should include heat pumps with a SCOP of 4. Individual solar water heating systems or combined with heating systems are suggested for DHW [34].

Table 5-14. Energy efficiency indicators for housing stock in Montenegro

Average energy demand for heating and DHW [kWh/m²]		Energy efficiency of advanced improvement [kWh/m²]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Heating 276.50 DHW 31.90 Cooling 74.00	Heating 286.99 DHW 31.90 Cooling 54.00	Heating 89.46 DHW 31.9 Cooling 27.00	Heating 104.65 DHW 31.9 Cooling 27.00

Source: SLED report for Montenegro

Surface areas of living spaces

The total number of residential buildings in Montenegro is 171,676. The number of dwellings is 315,670 out of which only 188,376 are inhabited. There are 58,978 vacant dwellings (temporarily vacant or non-inhabited), although the figure is even higher (120,838) if dwellings for seasonal use (61,860) are also included which then accounts for 38.4% of dwellings.

In all, 64% of the population live in urban areas and 36% in rural areas. The average floor area of a dwelling was 65 m² in multi-residential buildings and 74 m² in private houses in the period between 2008 and 2013.

5.8 North Macedonia

5.8.1 Macroeconomic development

In terms of the economic development measured by real GDP per capita, the North Macedonian GDP per capita is higher than the average of EnC CPs. Nevertheless, over the last 10 years, the difference between the North Macedonian and EnC CPs real GDP per capita has declined. At the end of 2010, the North Macedonian real GDP per capita was higher by 9% than the average of EnC CPs, but at the end of 2020 the difference shrunk to only 4%. Noticeable is the impact of the COVID-19 pandemic leading to a drop in GDP per capita in North Macedonia but also in EnC CPs in 2020 compared to 2019.

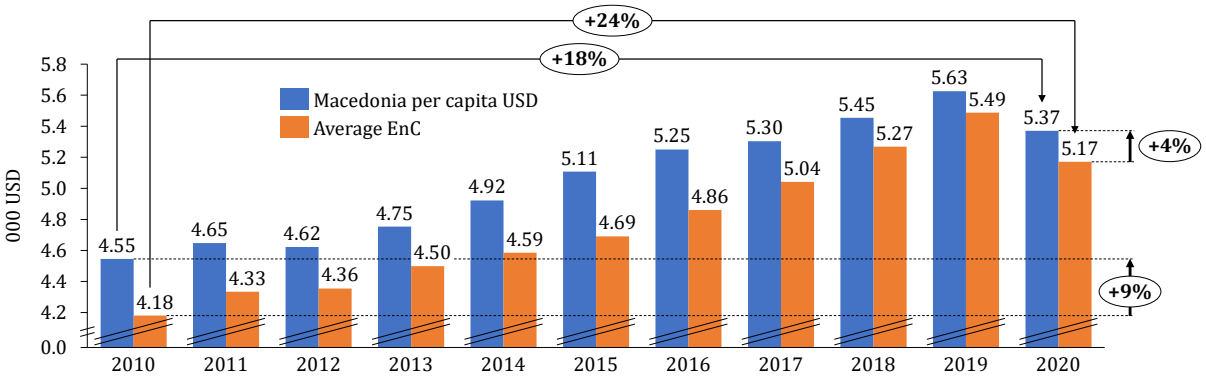


Figure 5-79. Real GDP per capita (constant 2010 US$) in North Macedonia

Source: The World Bank

The level of unemployment in North Macedonia has been declining over the last decade. For the most part of the previous decade the level of unemployment of male workers was higher than the level of unemployment of female workers, though the difference was not significant. Only in the last few years has the male unemployment fallen below the level of female unemployment.

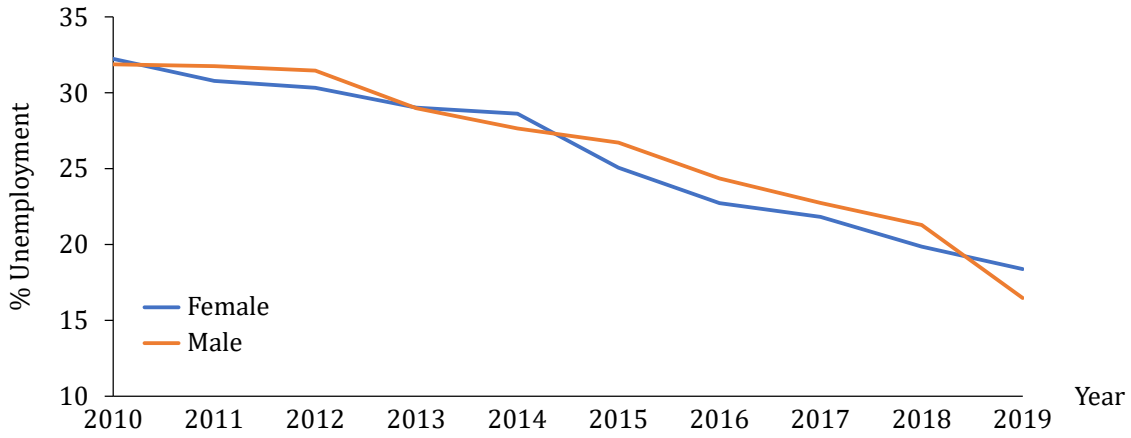


Figure 5-80. Level of employment by gender in North Macedonia

Source: The World Bank

Regarding average wages, net wages in North Macedonia are slightly higher than the average wage of EnC CPs. While the growth of average net wages in EnC CPs was 26% during the 2014-2019 period, growth in net wages in North Macedonia during the same period was 18%. Therefore, at the end of 2019, the net wage in North Macedonia was only 5% higher than the average net wage in EnC CPs.

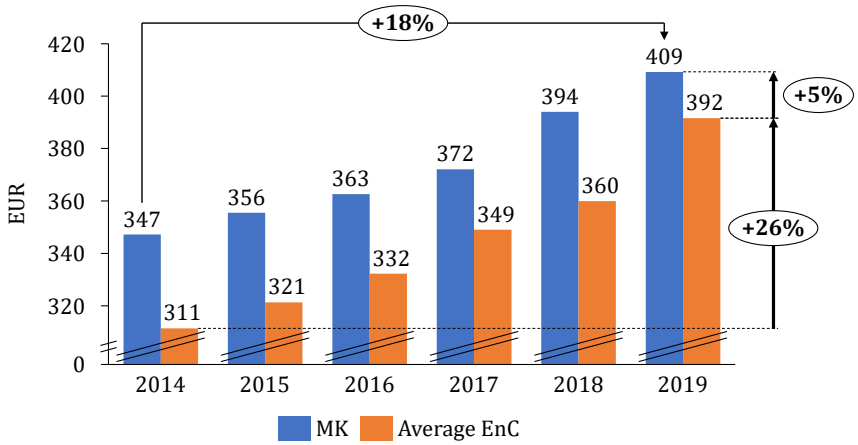


Figure 5-81. Trends for average monthly wages in North Macedonia and the Energy Community

Source: EUROSTAT

The poverty headcount ratio declined in the 2010- 2018 period by 67%. In the period 2017-2018, based on most recent available data for North Macedonia, the ratio continued declining. Between 2013- 2018, small volatility in the ratio is noticeable.

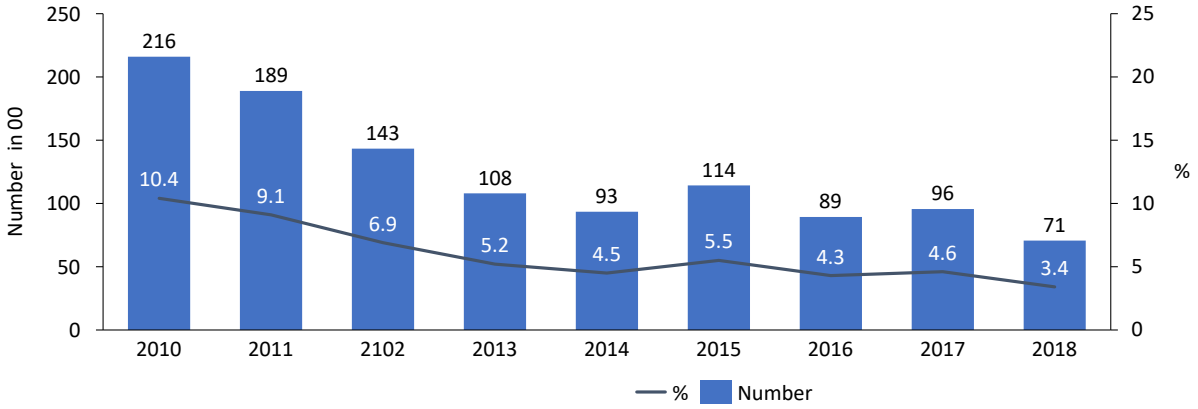


Figure 4- 86. Poverty headcount ratio at USD 1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.8.2 Availability of different energy sources

In North Macedonia, household consumers are connected to electricity, gas and district heating networks. The estimated total one-way length of the district heating network in 2017 was 194 km. In the same year, sales to household consumers represented approximately 75% of total energy sales. District heating serves the thermal needs of approximately 16,000 households, primarily in Skopje[25].[120]

The length of the main gas pipeline is approximately 98 km and extends from the border with Bulgaria to Skopje. The existing distribution network is 26 km long, and the length of the city network is 31.5 km. According to the annual report of the Energy and Water Services Regulatory Commission of the Republic of North Macedonia, the total number of gas customers is less than 500.

[120] According to EUROHEAT data, district heating serves 48,085 individuals. The number of households is based on an assumed average household size of 2.9 persons per household.

Table 5-15. Availability of different forms of energy sources in North Macedonia

Country	Electricity	Gas	DH
North Macedonia	✓	✓	✓

Source: author

5.8.3 Energy prices

Electricity prices in North Macedonia for household consumers[121] inclusive of all taxes and levies are marginally greater than average electricity prices in the EnC.

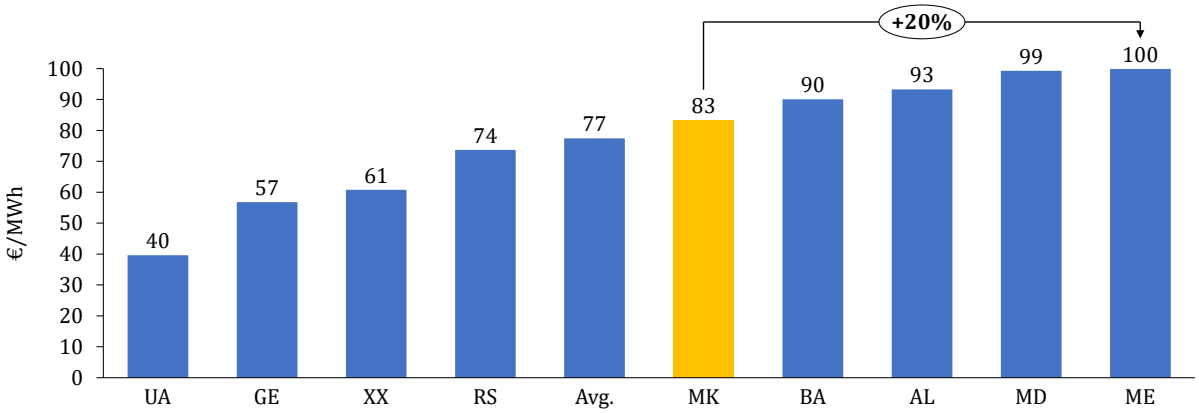


Figure 5-82. Electricity prices for household consumers in North Macedonia

Source: EUROSTAT

Projections of the future retail electricity prices in the recently published study by the Energy Community Secretariat [23] show that household electricity prices in North Macedonia will rise in the medium to short term.

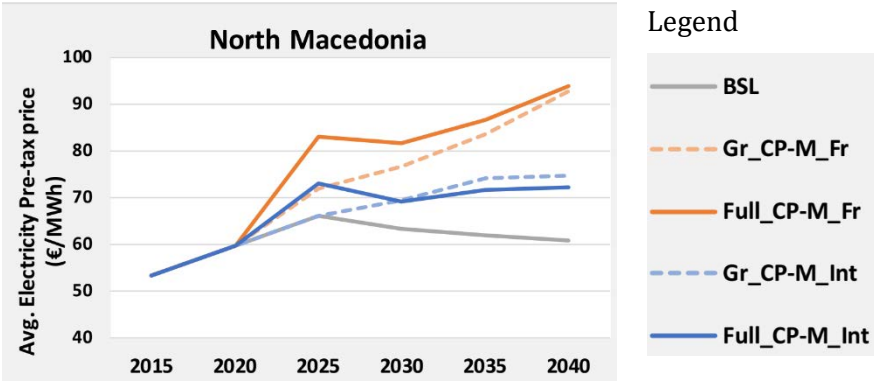


Figure 5-83. Projected trends for retail electricity prices in North Macedonia in different carbon pricing and market integration scenarios

Source: Energy Community Secretariat [23]

[121] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for the second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

Gas prices[122] in North Macedonia were the highest among all CPs. Compared to average gas prices in CPs, the prices in North Macedonia are 67% higher.

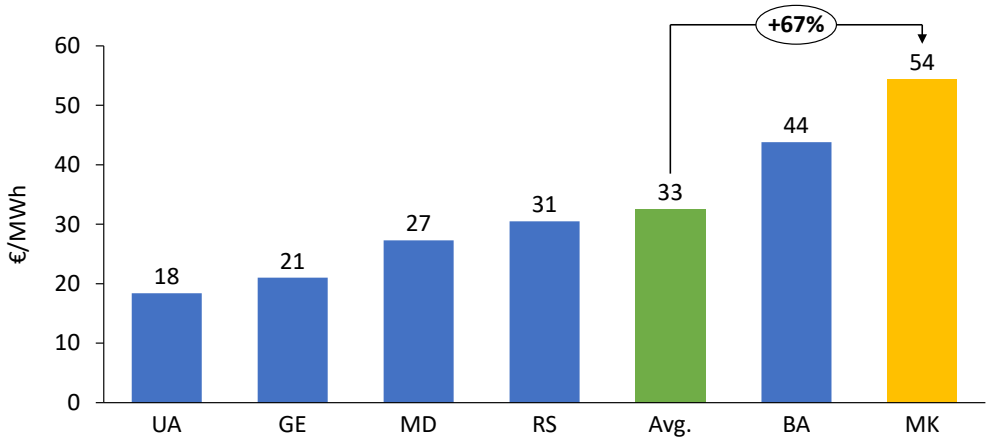


Figure 5-84. Gas prices for household consumers in North Macedonia

Source: EUROSTAT

5.8.4 Climate

Based on average temperature and HDD data in Skopje and Ohrid for the 2000-2020 period, it is evident that the need for heating in Macedonian cities is slightly above the median need in EnC CPs.

To assess whether a statistically significant increase in CDD or decrease in HDD values due to for example climate change exist, we performed a simple regression of HDD and CDD, each on a separate time trend. We found statistical significance for the negative trend variable for HDD values at a 1% significance level for both Ohrid and Skopje. This implies statistical evidence of a decrease in HDD in both cities. On the other hand, we found that the trend variable for CDD is statistically significant for Ohrid at 10% but not statistically significant for Skopje i.e., no statistically significant increase in CDD for Skopje.

[122] Gas prices for household consumers for the D2 band (between 20 GJ and 200 GJ of gas consumption annually) refer to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

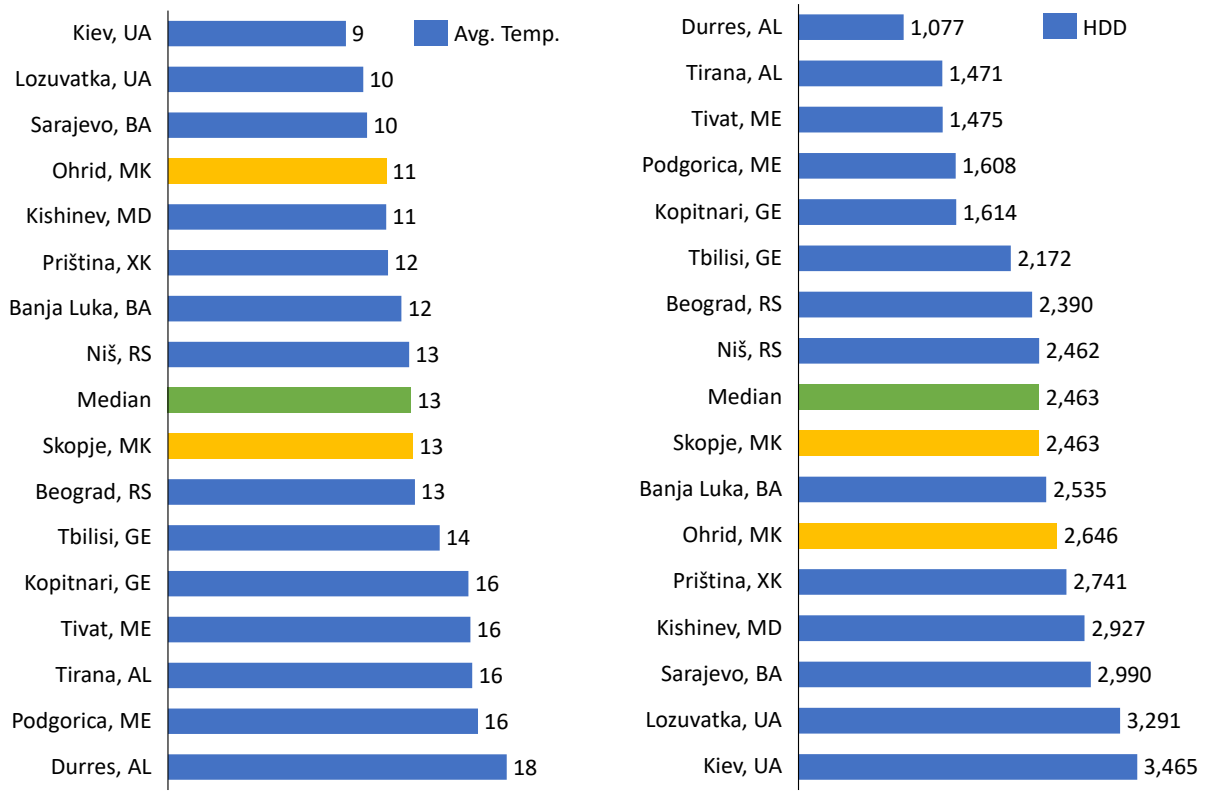


Figure 5-85. Average temperatures in degrees Celsius and HDD in Ohrid and Skopje as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.8.5 Final energy consumption

Electricity and biomass are the dominant energy sources for North Macedonian households and represent 53% and 37% of the final energy consumption in households, respectively. Heat accounts for 7% of final energy consumption, while coal (lignite) and oil derivatives (LPG and gas and diesel oil) each represent 1% of final energy consumption in households.

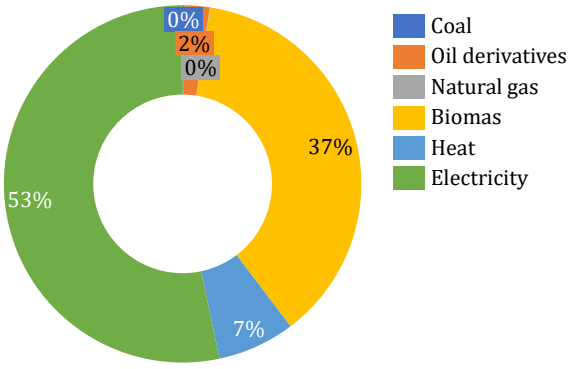


Figure 5-86. Structure of household energy consumption in North Macedonia

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 2.9 and consequently, the total number of households of 0.716 million, Figure 5-87 provides consumption information of different fuels by the average household.

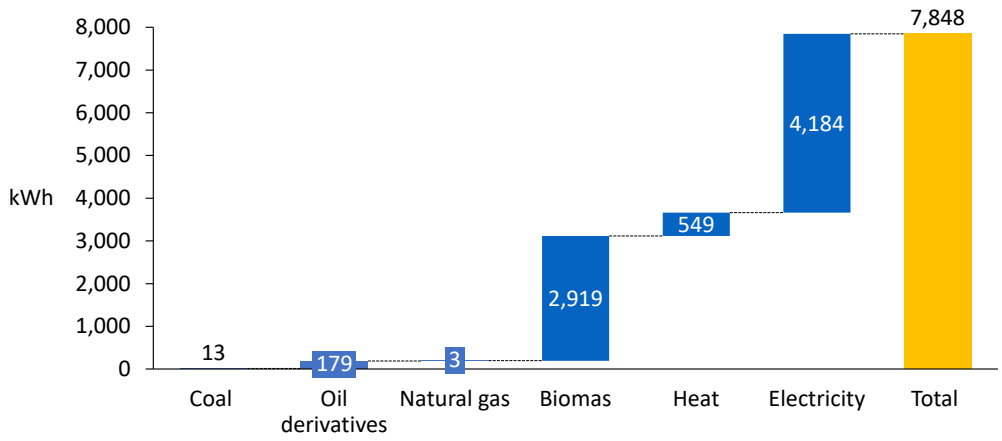


Figure 5-87. Structure of the average household energy consumption in North Macedonia

Source: EUROSTAT Energy Balances (2018 data)

5.8.6 Energy Efficiency

Households predominantly consume fuel wood (61.59%), followed by electricity (28.60%), district heating (8.33%) and other fuels (1.48%).[123]

Only 6% of households use a central heating system and 74.3% use solid fuel stoves in rural as well urban households [35]. These types of stoves cannot heat the entire living space as they are designed to heat only limited areas. Next, electric accumulation stoves are mostly used (33.79%), followed by electric heaters (31.35%), air conditioners (10.57%) and inverter conditioners (6.32%) [36].

In all, 81.96% of households were built before 1991, and only 17.78% of all households have thermal insulation in the building envelope [36].

The average heating energy demand in the residential sector is 157.78 kWh/m^2. According to national energy efficiency requirement, the heat demand should be 90 kWh/m^2.

Table -5-16. Energy efficiency indicators for housing stock in North Macedonia

Average energy demand for heating and DHW [kWh/m^2]		Energy efficiency requirement for heating and DHW [kWh/m^2]	
Family Houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Total energy demand 157.78		Heating 90 After 31.12.2020 all-new building should be nearly zero-energy buildings	

Source: Reach project report [35].and Draft NECP 2020 for North Macedonia

Areas of living spaces

[123] Energy consumption in households - Statistical Review, 2014

The average dwelling area is 82.87 m^2, where on average 37.41 m^2 is heated. On average, there are 3.69 household members [36]. There are mostly two, three and four room apartments.[124]

In all, 58.16% of households reside in detached single-family buildings and 95.10% of households own their dwelling.

The Government is constructing apartments with a minimum area of 30 m^2.[125] This appears to be a good step to potentially offering social housing to the energy poor.

[124] Based on households interviewed in the research project titled Reduce Energy Consumption and Change Habits, Mapping the National Situation on Energy Poverty in Macedonia, 2013

[125] Calculations are based on data from the Annual Program for Construction, Sale and Maintenance of Housing Units Owned by the Republic of North Macedonia for 2021.

5.9 Serbia

5.9.1 Macroeconomic development

In terms of the economic development as measured by real GDP per capita, the Serbian GDP per capita is higher than the average of EnC CPs. During the 2010 to 2020 period, the Serbian real GDP per capita grew by 25%, while the average real GDP per capita for of EnC CPs grew by 24%. Therefore, though at the end of 2010 the Serbian GDP per capita was 37% higher than the average of EnC CPs, at the end of 2020 the Serbian GDP per capita was higher by 39%. Also noticeable is the impact of the COVID-19 pandemic leading to a drop in GDP per capita in Serbia but also in EnC CPs in 2020 compared to 2019.

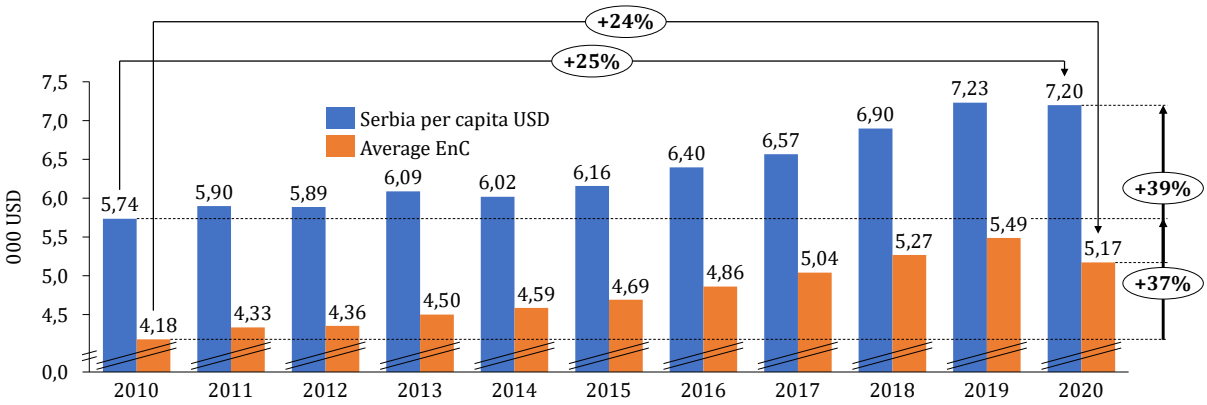


Figure 5-88. Real GDP per capita (constant 2010 US$) in Serbia

Source: The World Bank

The unemployment rate in Serbia over the last decade has been steadily declining. There has been a persistent difference in unemployment rates between women and men, where the unemployment rate for women is on average one percentage point higher than for men.

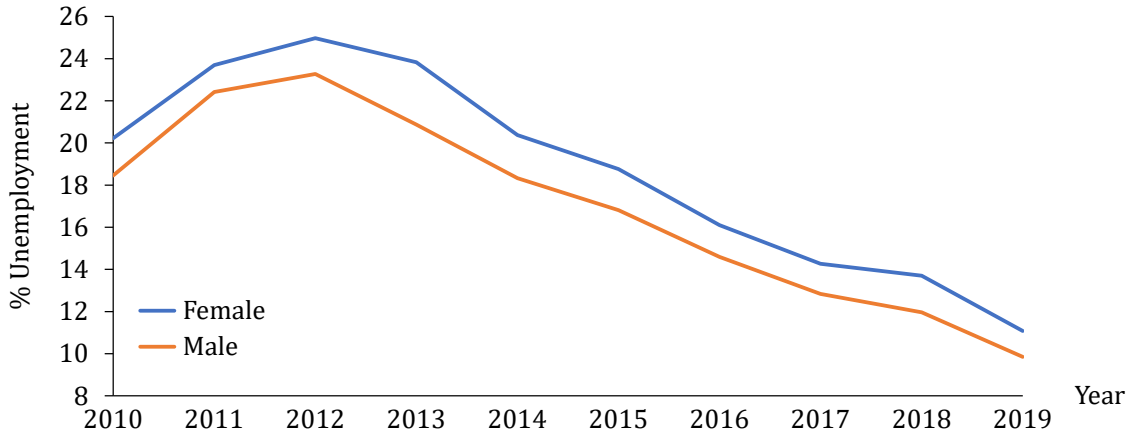


Figure 5-89. Unemployment rates by gender in Serbia

Source: The World Bank

Regarding the net wage, as is also the case with GDP per capita, Serbia has higher net wage than the average of EnC CPs. During the 2014-2019 period, the net wage in Serbia grew by 23% while the average net wage for EnC CPs grew by 26%. At the end of 2019, the average net wage in Serbia was 19% higher than the average net wage for EnC CPs.

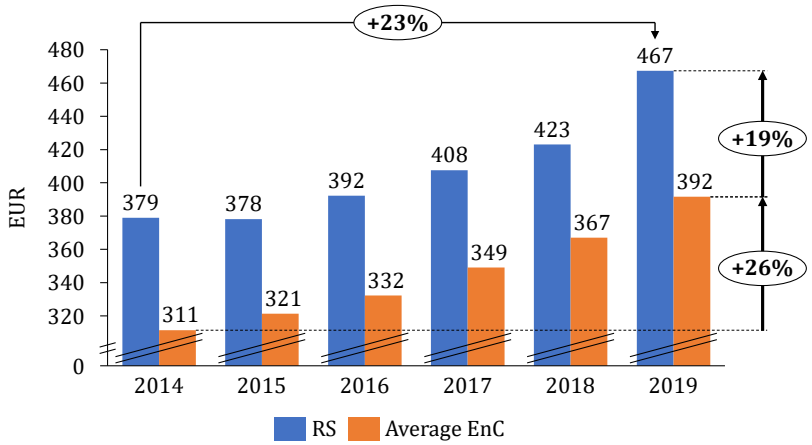


Figure 5-90. Trend for average monthly wages in Serbia and the Energy Community

Source: EUROSTAT

Among CPs, Serbia has the highest poverty headcount ratio. In the observed period, a declining trend where ratio declined by 15% between 2016-2017is noticeable.

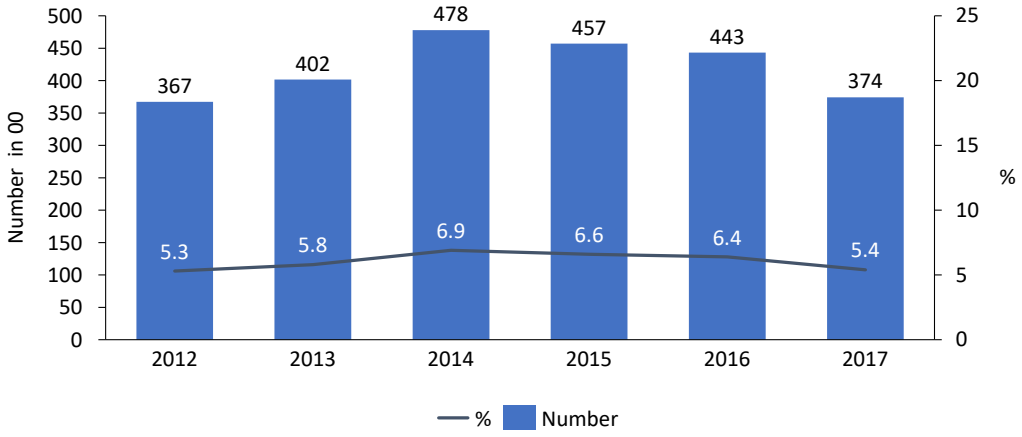


Figure 4- 96. Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)

Source: https://data.worldbank.org/indicator/SI.POV.GAPS

5.9.2 Availability of different energy sources

In Serbia, households can be connected to electricity, gas and district heating networks. In all, there are 59 district heating systems available. District heating systems supply primarily domestic consumers who represent approximately 80% of energy consumers. It is estimated that district heating serves the needs of approximately 540 thousand households.[126]

In terms of the gas network, According to the annual report of the Energy Agency of Republic Serbia, there were 282,997 delivery points on the distribution network at the end of 2019 with household constituting roughly 95% of all delivery points [37].

[126] According to EUROHEAT data, district heating serves 1,568,645 persons. The number of households is obtained by assuming an average household size of 2.89 persons per household.

Table 5-17. Availability of different forms of energy sources in Serbia

Country	Electricity	Gas	DH
Serbia	✓	✓	✓

Source: author

5.9.3 Energy prices

Electricity prices[127] in Serbia are at the lower end of the spectrum in the EnC. For comparison sake, average prices in the EnC are 5% higher than in Serbia. Also, Montenegro that has the highest electricity prices in the EnC, prices are 36% higher than in Serbia.

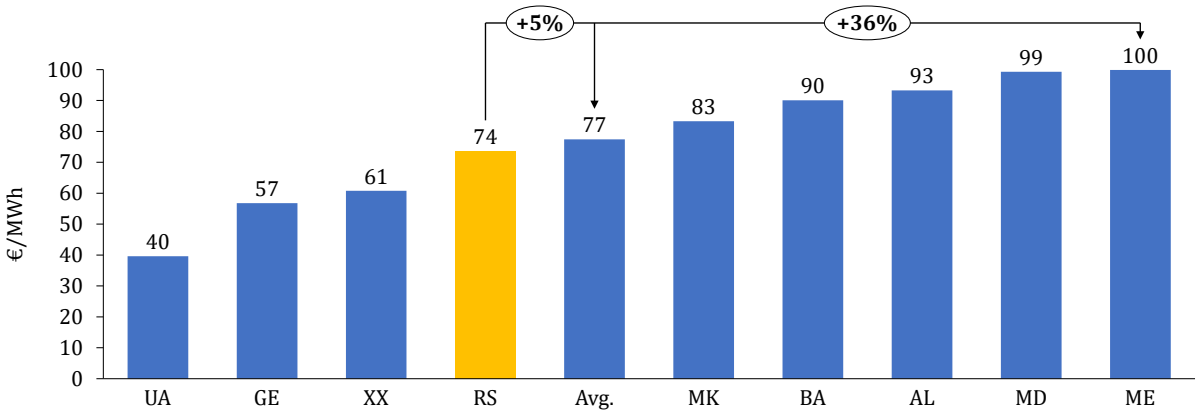


Figure 5-91. Electricity prices for household consumers in Serbia

Source: EUROSTAT

Projections of future retail electricity prices in a recently published study by the Energy Community Secretariat [23] show that the decarbonization agenda will drive retail electricity prices in Serbia upward in the medium to long term.

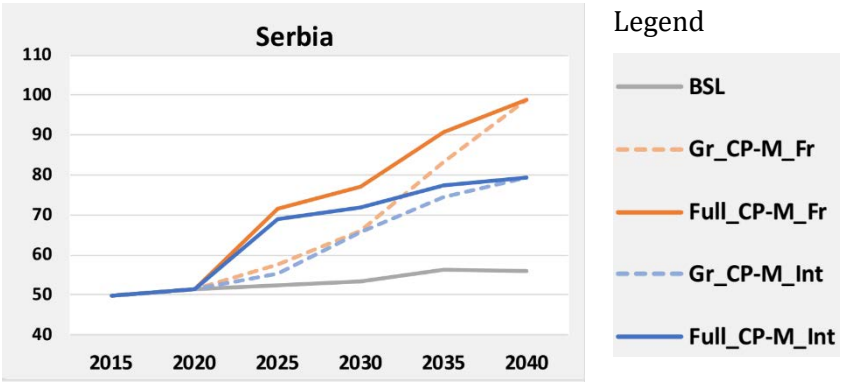


Figure 5-92. Projected trends for retail electricity prices in Serbia in different carbon pricing and market integration scenarios

Source: Energy Community Secretariat [23]

Gas prices[128] in Serbia were only marginally lower than average gas prices among CPs.

[127] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for the second half of 2020 for all CPs, except for Albania where the data refers to the seond half of 2019.

[128] Gas prices for household consumers for band D2 (between 20 GJ and 200 GJ of gas consumption annually) refer to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

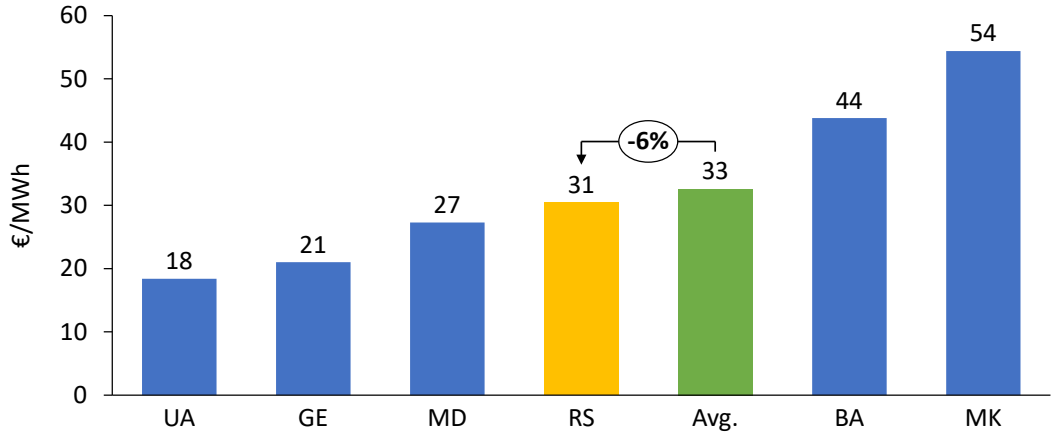


Figure 5-93. Gas prices for household consumers in North Macedonia

Source: EUROSTAT

5.9.4 Climate

Even though there are significant variations within the country regarding the value of HDD, no specific information is available on the distribution of dwellings according to climate zones. In fact, no climate zones are defined in Serbia. The average value of HDD in Serbia is 2,658.

Table 5-18. Average temperature, HDD and CDD for selected cities in Serbia

Location	HDD	Location	HDD	Location	HDD
Beograd	2520	Leskovac	2625	Valjevo	2784
Čačak	2755	Niš	2613	Zlatibor	3728
Kragujevac	2610	Novi Sad	2679	Zrenjanin	2748
Kruševac	2654	S. Mitrovica	2738		

Source: Typology of Building Stock in Serbia [38]

In comparing values of HDD for Beograd and Niš, it is evident that heating energy needs in Serbia are approximately equivalent to average needs in EnC CPs.

To assess whether there is a statistically significant increase in CDD or decrease in HDD values due to for example climate change, we performed a simple regression of HDD and CDD, each separately on a time trend. We found statistical significance of the negative trend variable for HDD values at a 10% for Nis and 5% significance level for Beograd. This implies there is statistical evidence of a decrease in HDD in both cities. On the other hand, we find no statistical evidence for an increase in CDD in either city.

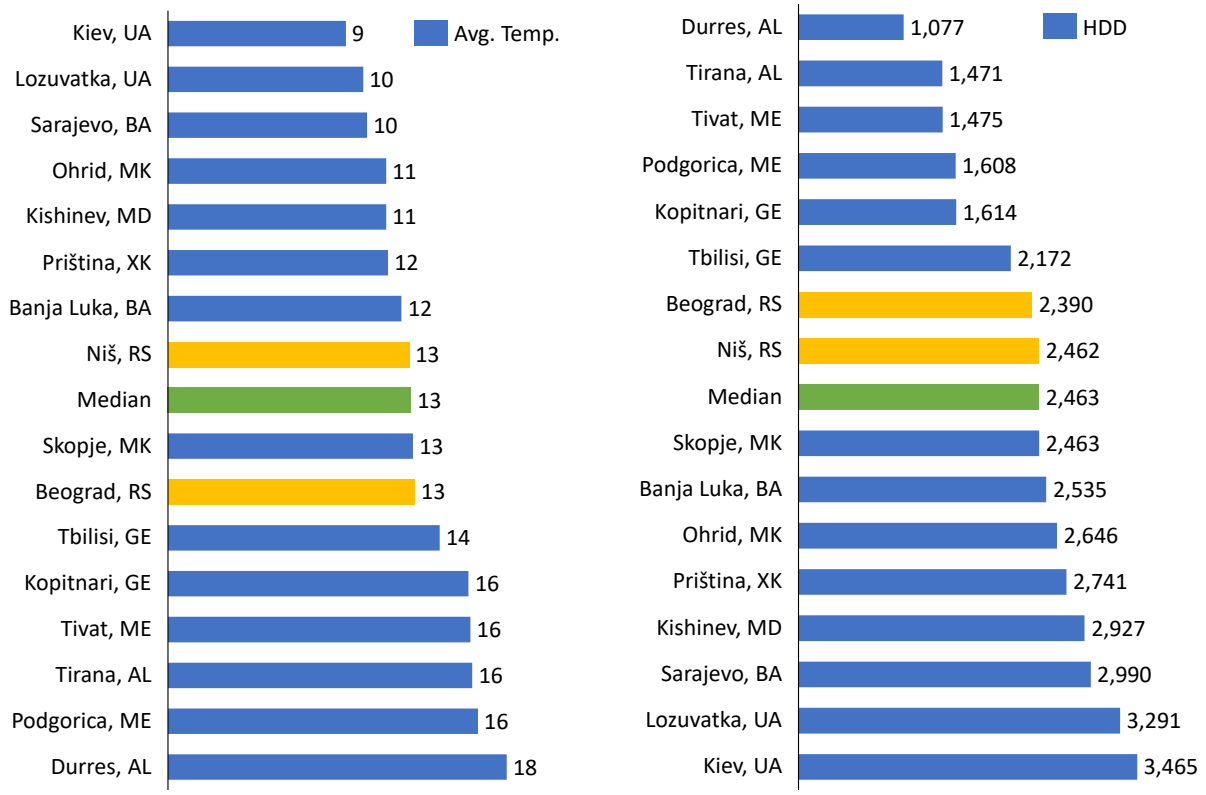


Figure 5-94. Average temperature in degrees Celsius and HDD in Beograd and Niš as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.9.5 Final energy consumption

In Serbia, there are two dominant energy sources used in the final energy consumption of households: electricity accounting for 41% and biomass at 30%. District heating represents additionally 14%, while coal and natural gas represent additional 7% each. The share of oil derivates is around 1%.

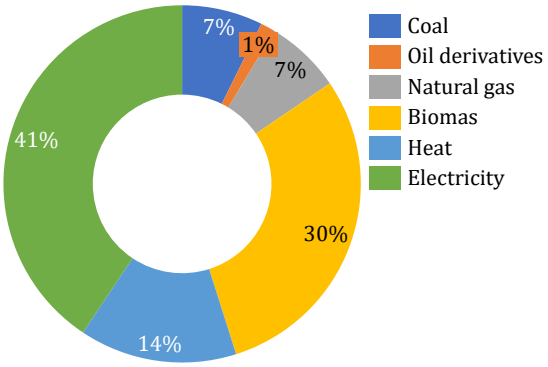


Figure 5-95. Structure of household energy consumption in Serbia

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 2.89 and consequently, the total number of households of 2.4 million, Figure 5-96 shows consumption of different fuels by the average household.

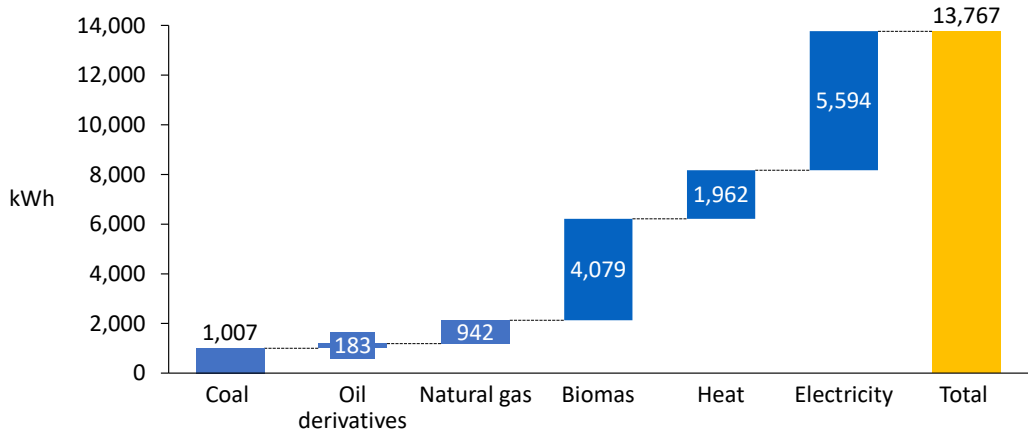


Figure 5-96. Structure of an average household energy consumption in Serbia

Source: EUROSTAT Energy Balances (2018 data)

5.9.6 Energy Efficiency

The largest proportion of the housing stock (48.55%) was built between 1971 and 1990. In family houses, single wood or electric stoves are the most common type of heating system, but only after 1991 when central hot water heating systems using wood were introduced. In multi-residential buildings, single electric stoves are used in buildings built before the 1970s. High-rise buildings are connected to district heating systems. Hot water is traditionally provided by electric boilers.

The average heating demand for family houses is 283 kWh/m^2 and for multi-apartment buildings 207 kWh/m^2. The potential savings can be as much as 61% of heating consumption for measures from the national energy efficiency standard, averaging 96.50 kWh/m^2 for family houses and 111.62 kWh/m^2 for multi-apartment buildings. An advanced improvement approach can achieve savings of 72% with an average heat energy demand of 72.23 kWh/m^2 for family houses and 72.24 kWh/m^2 for multi-apartment buildings.

Table 5-19. Energy efficiency indicators for housing stock in Serbia

Average energy demand for heating [kWh/m^2]		Energy efficiency improvement [kWh/m^2]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
283	207	Standard improvement 96.50 Advanced improvement 72.23	Standard improvement 111.62 Advanced improvement74.24

Source: National Typology of Residential Buildings in Serbia [38]

Areas of living spaces

The total floor area of the housing stock is 289,687,720 m.[129]

In all, 82.4% of the housing stock is owner occupied, and 75.4% of inhabitants live in family houses.[130]

Only 50% of household areas are heated. Research has shown that 25% of households heat less than 10 m^2 of their dwelling area at the high energy costs.[131] Other research shows that 25% of households among family housing heat less than 25 m^2, with 24% of households heating less than 49m^2, 23% of households heating less than 69 m^2 and only 28% of households heat more than 69 m^2 of their household area.[132]

[129] 2011 Census of Population, Households and Dwellings in the Republic of Serbia, and other information from the Statistical Office of the Republic of Serbia

[130] EUROSTAT (ilc_lvho01), 2016

[131] Stuck in the Past: Energy, Environment and Poverty in Serbia and Montenegro, Country Office in Serbia and Montenegro, United Nations Development Programme, 2004

[132] Jovanović Popović, M. et al. (2012) Atlas of family housing in Serbia, University of Belgrade, Faculty of Architecture

5.10 Ukraine

5.10.1 Macroeconomic development

In terms of economic development as measured by real GDP per capita, the Ukrainian economy is much less developed than the average EnC CPs economies. While on average, EnC CPs recorded 24% growth in real GDP during the 2010-2020 period, the Ukrainian economy grew by 5% during the same period. Due to slower growth of real GDP per capita, the gap between the Ukrainian and the average GDP per capita in EnC CPs has grown from 29% in 2010 to 40% in 2020. Also noticeable is the impact of the COVID-19 pandemic which lead to a drop in GDP per capita in Ukraine but also in EnC CPs in 2020 compared to 2019.

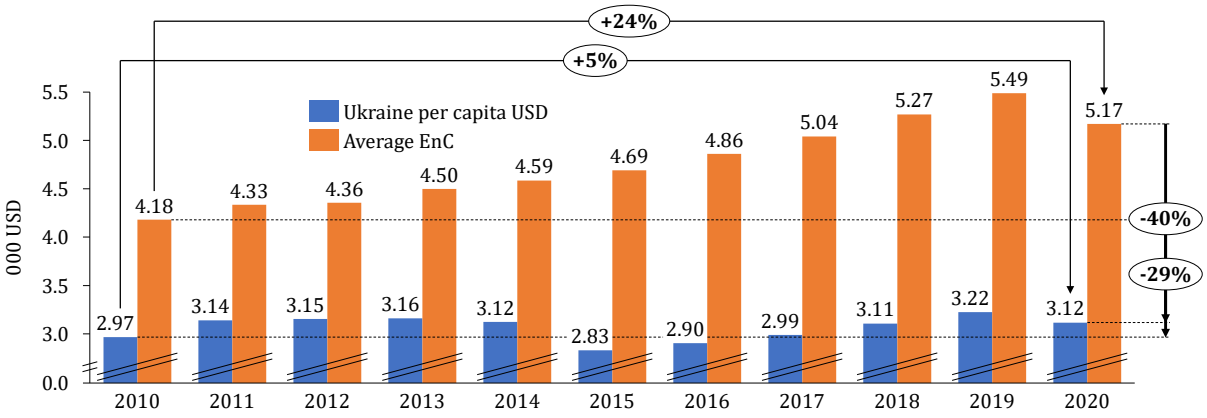


Figure 5-97. Real GDP per capita (constant 2010 US$) in Ukraine

Source: The World Bank

The unemployment rate in Ukraine has not changed dramatically during the last five years. The unemployment rate for men has been consistently higher than for women. The difference has been more than two percentage points but has declined to little below one percentage point in 2019.

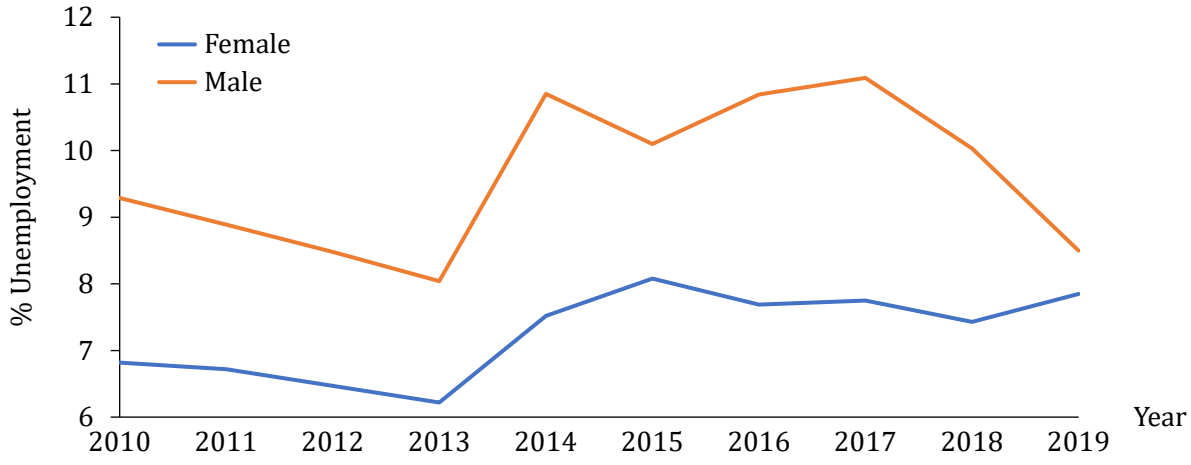


Figure 5-98. Level of employment by gender in Ukraine

Source: The World Bank

Net wages are lower than the average for EnC CPs. Even though average net wages for EnC CPs were three times higher than net wages in Ukraine at the end of 2014, Ukraine has recorded fast growth in net wages over the last five years. During the 2014-2019 period, net wages in Ukraine have grown by 202% while average net wages for EnC CPs have grown by 24%. Therefore, at the end of 2019, net wages in Ukraine were only 21% lower than average net wages for EnC CPs.

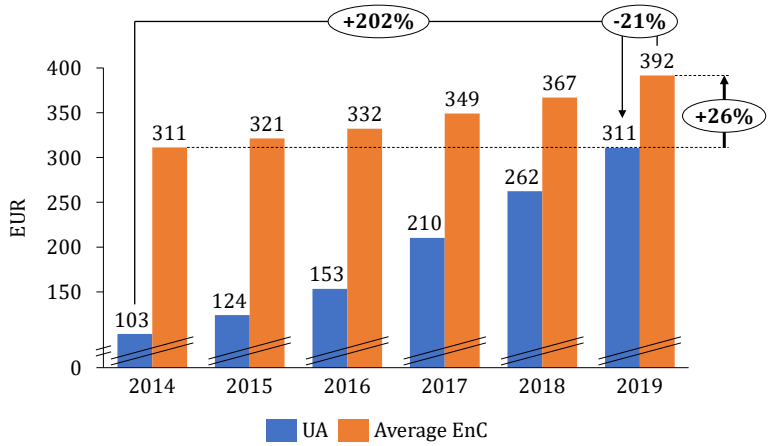


Figure 5-99. Trend for average monthly wages in Ukraine and the Energy Community

Source: EUROSTAT

5.10.2 Availability of different energy sources

Household consumers in Ukraine have access to electricity, gas and DH systems. Ukraine has quite a developed district heating (DH) infrastructure in all major urban settlements. In 2018, district heating covered 40% of households, which is approximately 5.5 million households and is estimated to cover about half of the energy demand for heating purposes.

Gas is also widely available in Ukraine. According to the annual report by the National Energy and Utilities Regulatory Commission of Ukraine, there were around 12.5 million gas household consumers in 2019 [39].

Table 5-20. Availability of different forms of energy sources in Ukraine

Country	Electricity	Gas	DH
Ukraine	✓	✓	✓

Source: author

5.10.3 Energy prices

Electricity prices in Ukraine[133] are at the lower end of EnC prices. For comparison, average prices in the EnC are 96% higher than in Ukraine. Also, Montenegro with the highest electricity prices in the EnC, has electricity prices that are 152% higher than in Ukraine.

[133] Electricity prices for household consumers for the DC band (between 2,500 kWh and 5,000 kWh of electricity annually) for the second half of 2020 for all CPs, except for Albania where the data refers to the second half of 2019.

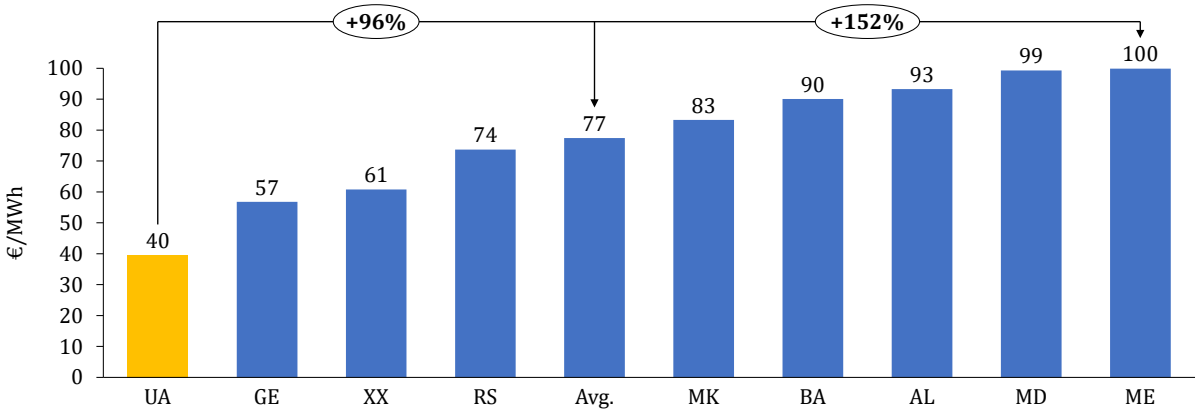


Figure 5-100. Electricity prices for household consumers in Ukraine

Source: EUROSTAT

Projections of future retail electricity prices in the recently published study by the Energy Community Secretariat [23] show a modest increase in electricity prices in Ukraine. Retail prices in Ukraine are expected to increase due to the decarbonization agenda in the medium to long term but to a lesser extent than those in other CPs.

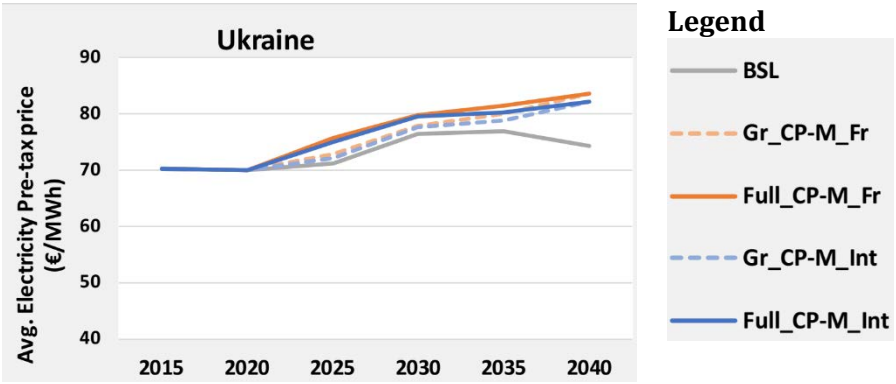


Figure 5-101. Projected trends for retail electricity prices in Ukraine in different carbon pricing and market integration scenarios

Source: Energy Community Secretariat [23]

Gas prices[134] in Ukraine are also the lowest among EnC CPs, and when compared to average gas prices in CPs, they are 44% lower.

[134] Gas prices for household consumers for the D2 band (between 20 GJ and 200 GJ of gas consumption annually) refer to the second half of 2020, except for North Macedonia where data refers to the first half of 2020.

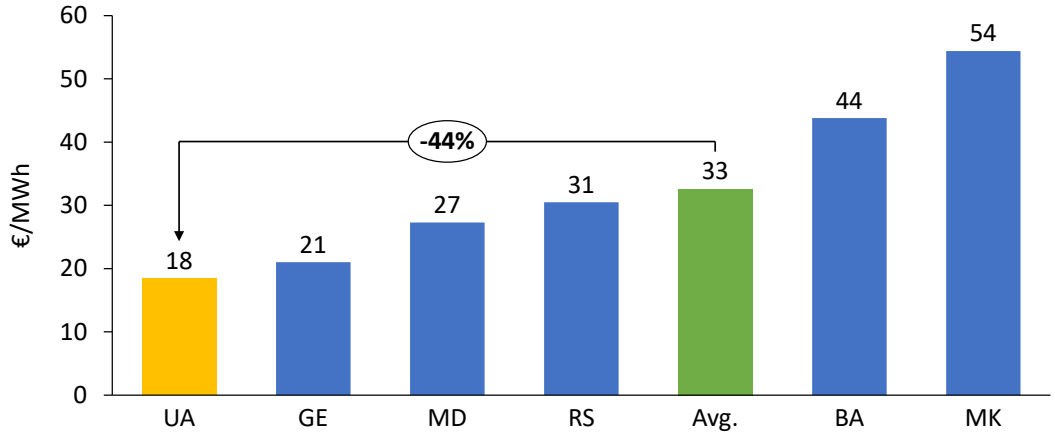


Figure 5-102. Gas prices for household consumers in Ukraine

Source: EUROSTAT

5.10.4 Climate

Based on data for average daily temperatures in Lozuvatka and Kiev for the period 2000-2020 period, the two figures below show average daily temperatures and HDD for the two cities. The conclusion is that Ukraine is the coldest country of all CPs. The number of HDD in Ukraine is more than 3000, with Kiev achieving almost 3500 HDD. Hence, the need for heating energy is greatest in Ukraine among all other CPs.

To assess whether there was a statistically significant increase in CDD or decrease in HDD values due to for example climate change, we performed a simple regression of HDD and CDD, each separately on a time trend. We found statistical significance of the negative trend variable for HDD values at 5% significance level for both cities. This implies statistical evidence of a decrease in HDD in both cities. On the other hand, we found no statistical evidence for an increase in CDD in Kiev, but we did for Lozuvatka, at a 10% significance level.

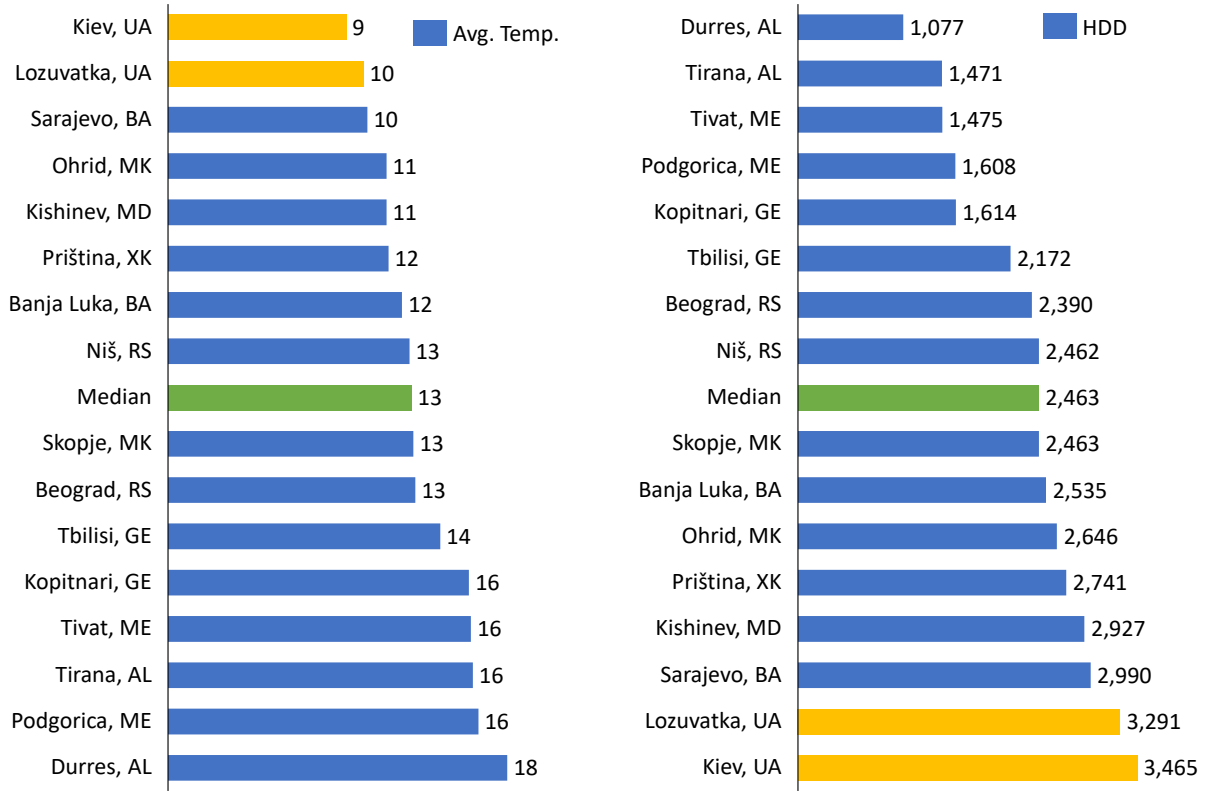


Figure 5-103. Average temperature in degrees Celsius and HDD in Kiev and Lozuvatka as compared to other cities in EnC CPs

Source: https://www.degreedays.net/

5.10.5 Final energy consumption

Gas commands a dominant share in the final energy consumption of households in Ukraine and is equivalent to 53%. The share of electricity, district heat and biomass are 19%, 14% and 11%, respectively. The share of other fuels is insignificant.

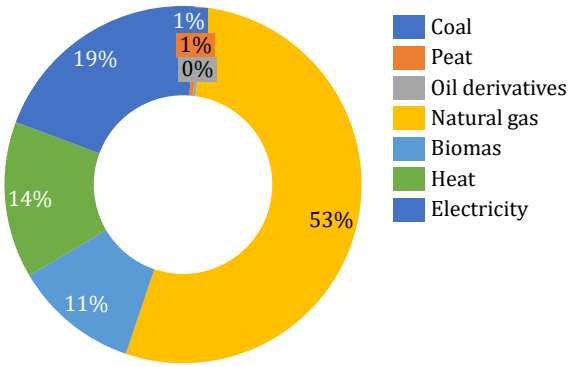


Figure 5-104. Structure of household energy consumption in Ukraine

Source: EUROSTAT Energy Balances (2018 data)

Assuming an average number of household members of 2.84 and consequently, the total number of households equivalent to 14.7 million, Figure 5-105, shows consumption of different fuels by the average household.

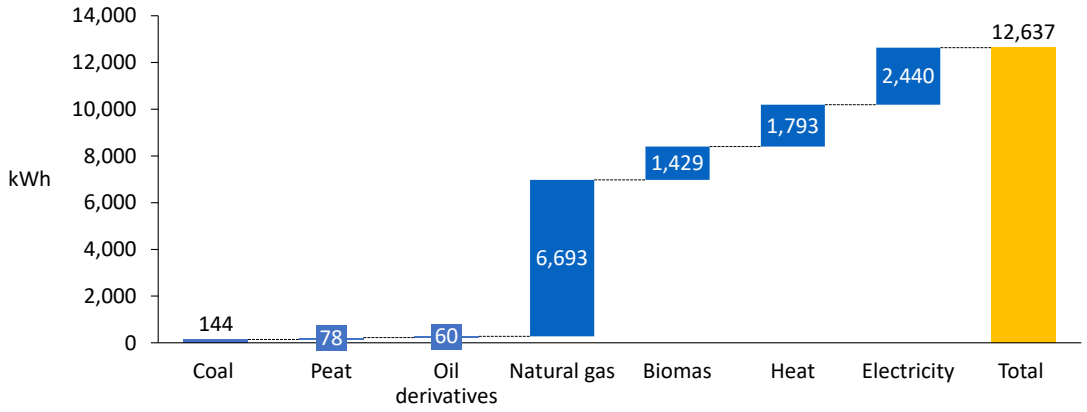


Figure 5-105. Structure of an average household energy consumption in Ukraine

Source: EUROSTAT Energy Balances (2018 data)

5.10.6 Energy Efficiency

The building stock was mostly built between 1945 and 1970 (49%), with 90% of the building stock was built before 2002, when energy saving regulation where established.

Average heat energy consumption ranges between 170 and 250 kWh/m² and results from poor or lack of thermal insulation in the building envelope. Energy efficiency requirement for heating is set below 140.48 kWh/m² for family houses and 91.14 kWh/m² for multi-apartment buildings. The energy saving potential is between 45% and 60%. Energy efficiency measures include thermal insulation of the building envelope and modernization of heating systems as well as DH substations and the introduction of billing of metered energy consumption, both for gas and DH.

The Government approved the concept for the implementation of state policy in the field of energy efficiency of buildings in terms of increasing the number of buildings with nearly zero energy consumption and the national plan to increase the number of such buildings.[135]

Table 5-21. Average heat energy consumption in housing sector

Average energy demand for heating and [kWh/m²]		Energy efficiency requirement for heating, cooling and DHW [kWh/m²][136]	
Family houses	Multi-apartment buildings	Family houses	Multi-apartment buildings
Heating 170 - 250		Temperature zone 1 Heating 140.48 – 174.01 Cooling 4.63 – 5.03 DHW 27.33 –30.64 Temperature zone 2	Temperature zone 1 Heating 91.14 – 140.48 Cooling 3.58 – 3.69 DHW 29.83 – 37.31 Temperature zone 2

[135] Fourth Annual Report under the Energy Efficiency Directive, https://www.energy-community.org/documents/parties.html

[136] Specific energy performance requirements for heating, cooling and hot water supply of standard residential buildings drawn from standard residential buildings (ZND-217-19 163.18-001, Ed. 01, 24/05/2019) for 1st and 2nd climate zones of Ukraine, and implementation of applicable standards (e.g., DSTU B.2.6-31, section 5 of DSTU B EN 15217). Source: Fareniuk GG, Director of NDIBK, Doctor of Technical Sciences, Supervisor conducting research and developing scientifically sound proposals for the establishment minimum requirements for energy efficiency of buildings, May 23, 2019

	Heating 122.82 – 153.68 Cooling 8.81– 9.02 DHW 29.32 – 30.62	Heating 75.90 – 83.22 Cooling 6.83 – 6.89 DHW 37.16 – 37.28

Source: EU4Energy Governance Support in development of the Long-term Strategy for Mobilizing Investment in the Renovation of the National Stock of Buildings in Ukraine, Final Report, 2020

Areas of living spaces

The total floor area of the national housing stock is 1,079.5 million m^2 and the total number of buildings is 9.15 million, including dormitories. Total area of buildings located in urban areas is equivalent to 605.5 million m^2 and 387.8 million m^2 in rural areas.[137] 60% of the building stock are multi-apartment buildings while the remaining 40% are single family houses.

[137] Housing Stock of Ukraine by Regions in 2018. The State Statistics Service of Ukraine. See more: http://www.ukrstat.gov.ua/operativ/operativ2019/zf/zhytl_fond/zhytlofond_za%20reg_18.xls

5.11 Gender

The relationship between energy, poverty and gender have been principally researched and addressed in the Global South, in what are termed 'less developed' countries ([40],[41]). In this part of the world, the lack of access to modern energy services has a strong gender dimension. Gender and energy in the Global South are interconnected in terms of both the drivers and impacts of energy poverty. Domestic energy deprivation has a strong gendered component due to lack of formal labor participation and political representation for women (as well as smaller relative incomes and less rights within the household unit). Also, women are disproportionately more exposed to the effects of inadequate energy access in terms of health, well-being, educational and work opportunities. Nonetheless, in the context of the Global South, a number of researchers have drawn attention to the existence of multiple 'gender myths' concerning energy poverty, including the proliferation of romanticized notions of women, care and domestic duties homemaking as well as the construction of energy technologies and interventions as agents of 'gender equality' [42].

In the Global North – a region that also, in energy terms, encompasses Central and Eastern Europe due to its higher rates of electrification and infrastructural development as a whole – knowledge of the gender-energy relationship is limited. For a long time, it was argued that energy in a Northern context is 'gender-neutral' [43] but this has been shown to be demonstrably untrue. Recent research has highlighted a "diverse array of gendered, socio-spatial vulnerabilities that exist in relation to energy poverty" [44]. There is growing recognition that gender inequality intersects with wider income, housing factors and demographic circumstances to produce complex and extensive forms of deprivation that often remain below the radar of policy and research. One of the entrenched challenges encountered by practitioners and analysts working in this area has been the lack of adequate statistics and indicators to identify and monitor the gender-energy poverty relationship. Given that most of the statistical data is only provided at the household scale, it is difficult to detect gendered aspects of intra-household vulnerability, some of which may be more private or personal ([45], [44]).

Nevertheless, there is now a significant body of evidence to suggest that, in the Global North, women bear the burden of work for household maintenance (with 80% of women being involved daily in unpaid household work, as opposed to 45% of men), which has major effects on energy inequalities as well [22]. This is the case even in countries like Sweden, which has strong gender inequality policies [46]. It has also been pointed out that [47] more women heads of households live in older, less efficient homes as is evident by the data. Pre-1970s homes are predominantly occupied by female household heads. [48] has shown that women are responsible for domestic energy management – placing an extra burden of care on them, particularly in times of austerity; a similar situation has been found in Sweden [46]. In Denmark, energy renovation programs have been shown to reinforce and entrench existing gender disparities [49]. Similar trends have been established in Catalonia, where [50] argues that "Ending gender inequality also implies a paradigm shift beyond corrective measures and parity quotas…we must speak of co-responsibility and not of conciliation, of an economy that is also reproductive and not only productive" (p. 32).

Policy efforts to mainstream gender issues in energy poverty debates have been aided by the growing prominence of these issues in the agendas of European institutions ([51], [22]). Nevertheless, data coverage and overall knowledge of the question remains poor, particularly in Central and Eastern Europe, where energy poverty problems and gender inequalities are also rooted in the specific social and infrastructural legacies of socialism and post-socialist transformation. In terms of the gender-energy poverty nexus, these include the relatively high labor participation of women – despite continued domestic inequalities – as well as poor social safety nets provided by the state, and continued forms of discrimination in all aspects of the energy sector, particularly towards ethnic minority women. A rare policy brief exploring links between air pollution and energy poverty in Bosnia [52] connects these problems with gender inequalities, arguing that the gendered division of labor in the country (due to which women tend to undertake a larger share of unpaid labor in the household) also means that women are more

likely to suffer adverse exposure to indoor air pollution. This problem exists in addition to the negative impacts of air pollution on pregnant women in particular. Measures to cope with air pollution also have adverse impacts on women's working hours and labor opportunities. Across Southeastern Europe, domestic work and care responsibilities are primarily undertaken by women, while requiring a higher burden of utility costs and services (particularly water, as well as energy for cooking, heating and appliances). Energy disconnections and bill arrears, as well as insufficient access to infrastructural services, have a greater impact on women due to their close connection with the private sphere of the home. Moreover, women's longer life span mean that they are more susceptible to energy poverty as they get older due to lower incomes, smaller social networks, limited mobility and a decreasing capacity to procure energy sources from biomass in the case of rural residents. Single mothers also face a higher risk of experiencing arrears in energy bills due to their lower incomes, and the inability of the social and legal system to support them in childrearing more generally (e.g., in instances where alimony payments are due but not paid). Many of these issues have been highlighted for the Southern European context more broadly, in a comprehensive report by the Catalan Association of Engineering Without Borders, by Irene Gonzalez Pijuan.[138]

Based on the above, and considering broader energy poverty challenges, we recommend the following steps towards the gender mainstreaming of energy poverty indicators and measures among the Contracting Parties:

- Provide and highlight any gender-specific energy inequality data that might be available. Single parent female-led households, or lone female pensioners, can normally be detected through existing data. Statistical offices should consider specialized surveys to collect time-of-use data connected to energy and gender, in order to address the invisibility of gender inequalities around domestic work, access to services and health in particular;
- Strive for gender equity among all aspects of energy decision-making in the public and private sector;
- Ensure that energy transition policies do not place an even greater burden of care on women, through increased household tasks or reproductive labor.

[138] https://esf-cat.org/wp-content/uploads/2018/02/ESFeres17-PobresaEnergeticaiDesigualtatdeGenere-ENG.pdf

6. CRITERIA AND INDICATORS FOR MEASURING ENERGY POVERTY

6.1 Energy poverty measurement and monitoring mechanisms

The detection and quantification of energy poverty is a complex and challenging task. There are three main reasons for this:

- Energy poverty is a private problem – it is largely confined to the walls of the home and is not easy to observe or follow from a public policy standpoint.
- Energy poverty varies over time as household circumstances change, manifesting differently in various geographical settings – every measurement is a 'snapshot' and may not adequately represent the entirety of circumstances faced by vulnerable households.
- Judging the level of energy services received in the home is a matter of individual perceptions and preferences, which themselves are dependent on social and cultural expectations. For example, a home that might be considered well-lit and warm by one individual may not be seen as such by another, especially if the two come from different backgrounds or live-in different countries.

Four main groups of methods have been used to measure and monitor energy poverty [53]–[55], [55], [56]. These vary in terms of their reliability, precision, and ease of use.

First, establishing the level of energy services in the home (heating, lighting, refrigeration, cooling, etc.) via direct readings, and comparing the obtained values to an expected standard (i.e., a constant temperature of at least 21°C in occupied rooms). Even if more reliable and precise, this approach is judged expensive and impractical and is rarely used other than in small-scale studies.

Second, examining the level of household energy expenses to pre-set absolute and relative levels, often involving household income levels. A common measure used in this context is the energy burden (which measures the share of household expenses as a share of total household incomes), including the M/2 indicator (which looks at the number of households in which absolute energy expenditure is below the national median of energy expenditures, thus measuring the 'underconsumption' of energy services) and the 2M indicator (which establishes how many households have an energy burden that is twice higher than the national median energy burden). National statistical agencies across Europe gather expenditure data via Household Budget Surveys (HBS), and combined with other demographic and economic data, this allows for identifying the groups that suffer from disproportionately high or low energy costs. The 2M and M/2 indicators have been used by the EU Energy Poverty Observatory to establish energy poverty across Europe based on data from household budget surveys. Of the two, the 2M indicator is judged to provide a more complete picture of energy poverty in countries such as those in SEE, where income inequality levels are greater. These approaches are rather precise and relatively easy to use, but not very reliable in the sense that they should be complemented by additional measures.

Third, establishing if people experience some of the objective symptoms of energy poverty: being unable to pay their energy bills on time; or living in a house with moldy walls, condensation, or a leaking roof. While these indicators principally capture some of the effects of energy poverty – and as such are not very reliable in determining whether a household is energy-poor – they are nevertheless relatively precise and easy to use. Fourth, asking people about their subjective (also known as 'consensual') impressions of the level and quality of energy services reaching their homes. In Europe, such data is frequently collected by national statistical agencies (Statistics on Income and Living Conditions (SILC) survey). The main measure is the self-reported 'inability to keep the home adequately warm'. This indicator is one of the few internationally comparative tools for judging the extent of energy poverty at the EU scale, and as such is also used by the EU Energy Poverty Observatory. However, even if it is relatively easy to use, its reliability and

precision are questionable due to individual and group differences in the subjective perception of domestic warmth.

The extent to which these indicators are suitable in the Southeastern European context depends on their wider parameters described above, as well the specific circumstances and constraints present in the region. Overall, the inability to keep the home warm remains the most suitable indicator, followed closely by the inability to pay energy bills and poor housing conditions; expenditure-based measures are next on the list.

6.2 Proposal of indicators to measure and monitor energy poverty

As already indicated, energy poverty is a complex problem, and no single indicator can capture the level of energy poverty in a country. Therefore, we propose a set of indicators that should be collected and used to monitor the level of energy poverty by EnC CPs.

6.2.1 Primary indicators

When selecting the indicators, the following criteria were taken into consideration:

- Only those indicators that have already been recognized by the community of researchers and practitioners should be accepted.
- Calculation of indicators should be based on (publicly) available statistical data.
- Indicators should allow for cross country comparison between CPs and preferably with EU Member States.

Therefore, the proposed indicators are based on publicly available data gathered either through *European Union Statistics on Income and Living Conditions* (EU SILC) or *Household Budget Surveys* (HBS).[139] While household budget surveys are carried out by all CPs, the EU SILC survey is currently available for only some CPs.[140] In the following chapter we will address these indicators in each CP and use alternative indicators in case some of the indicators are not available in the CPs.

The following table provides a list of proposed indicators.

[139] These indicators are already collected by the EU Energy Poverty Observatory (EPOV) which is a new initiative by the European Commission to help Member States in their efforts to combat energy poverty.

[140] It remains to be discussed with each CP that does not administer the EU SILC, whether there are actual plans in place to administer EU SILC surveys in the foreseeable future.

Table 6-1. Summary of empirical indicators relevant for SEE Contracting Parties

Indicator	Definition	Reliability	Precision	Ease of use	Data source
Energy burdens	Energy burden represents the share of energy costs in the total household income. The indicator is calculated as a share of expenditure on electricity, gas, and other fuels in total household expenditure. A high level of energy burden reflects the fact that households spend a large share of their income on energy related costs.	Medium – energy burdens are high among the general population across SEE. A proposed approach is to disaggregate energy burdens by income deciles.	Low – energy burdens and changes principally indicate prioritization of energy expenditure within household budgets.	Good – this data may be inferred from the Household Budget Survey or Eurostat data, but microdata is necessary.	HBS[141]
M/2	Absolute energy expenditure below half the national median	Medium – the indicator is relative and shows an underconsumption of energy – it captures the number of households consuming very little energy compared to other consumers.	Low – the distribution of energy expenditures within the population primarily shows inequalities in the amount of money spent on energy relative to income, rather than energy poverty itself.	Good – this data may be inferred from Household Budget Survey or Eurostat data, but microdata is necessary.	HBS
2M	The 2M indicator presents the proportion of households in which the share of energy expenditure in equivalized disposable income is more than twice the national median share.	Medium – the indicator is relative and shows high energy burdens relative to the median. It only captures the number of households in which the share of energy expenditure relative to the	Low – the distribution of energy burdens within the population primarily shows inequalities in the share of energy expenses in household budgets relative to income, rather	Good – this data may be inferred from Household Budget Survey or Eurostat data, but microdata is necessary.	HBS

[141] Household budget survey

		median national value is very high.	than energy poverty itself.		
Condensation, leaking roof, rot in windows or doors (HH040)	The indicator measures the share of population with leak, damp, or rot in their dwelling.	Medium – may reflect circumstances other than energy poverty but is a sign of poor housing and energy efficiency, which are both a symptom and driver of energy poverty.	High – it is relatively easy to objectively establish whether these conditions are present or not.	Good – this data is collected by Eurostat or may be present in some Household Budget Surveys.	EU SILC[142]
Arrears on utility bills (HS021)	This self-reported indicator aims to measure the share of the population experiencing financial difficulties in paying utility bills in the last 12 months.	Medium – may reflect circumstances other than energy poverty but is a sign of financial difficulties in paying energy bills, which is one of the symptoms of energy poverty. The main concern is the attitude towards timely bills payment in Southeast European countries where late bills payment might be a sign of social attitude and less of real financial distress. The main concern is the attitude towards timely bills payment in Southeast European countries where late bills payment might be a sign of social attitude and less of real financial distress.	High – it is relatively easy to objectively establish whether these conditions are present or not.	Good – such data is collected by Eurostat or may be present in some Household Budget Surveys.	EU SILC
Ability to keep home adequately	This self-reported indicator aims to measure the self-reported affordability of energy by asking households	High – may reflect individual perceptions but is a sign of financial or technical difficulty in maintaining	Medium – adequate domestic warmth is only one aspect of energy	Very good – such data is collected by Eurostat or may be present in some	EU SILC

[142] European Union Statistics on Income and Living Conditions

warm (HH050)	to provide an answer to the interview question: "Can your household afford to keep its home adequately warm?"	adequate energy services, which is a key element of energy poverty.	poverty (albeit a key one).	Household Budget Surveys.	

6.3 Secondary indicators

In addition to the primary indicators that should be collected by CPs, we also propose collecting data on secondary indicators. The secondary indicators should serve the purpose of monitoring the development of variables that affect the level of energy poverty and at the same time shed light on underlying causes of changes in the level of energy poverty.

For secondary indicators to be comparable across CPs, the proposed indicators should be available for all CPs. Therefore, we propose the following secondary indicators:

- Level of household electricity prices [source: EUROSTAT]
- Level of household gas prices [source: EUROSTAT]
- Average monthly net wages [source: National Statistics Offices]
- Annual unemployment rates by gender and aggregated [source: World Bank]
- Share of population living below USD 1.9 per day [source: World bank]

7. PRELIMINARY ASSESSMENT OF THE NUMBER OF ENERGY POOR HOUSEHOLDS

7.1 Description of the approach

Energy poverty is a complex issue caused by various factors such as income, the energy efficiency of dwellings and appliances, gender, demographics, to name just a few. This section aims to estimate the share of the population affected by energy poverty.

The most precise approach in estimating the prevalence of energy poverty is to assess the situation of each household in terms of energy poverty. However, this approach is impractical as it requires vast resources. Accordingly, to estimate the number of energy-poor households we relied on statistical data obtained from standardized statistical surveys.

The goal of statistical analysis is to estimate the share of households affected by energy poverty. There are a few caveats that should be highlighted at this point. First, the estimated share of the households affected by energy poverty does not necessarily represent the actual number of households that are energy poor. Rather, given that the estimate is based on a statistical sample, the estimated shares represent only an approximation of the potential problem concerning energy poverty. Nevertheless, this approximation provides policy makers with the estimated magnitude of the energy poverty problem and provides guidance on implementing possible measures to address the issue. Second, the number of energy poor households is affected by selected indicators and applied thresholds.

To estimate the number of energy poor households, we propose using the results from two main statistical surveys: **Household Budget Survey** (HBS) and **Survey on Income and Living Conditions** (SILC). While all CPs carry out HBSs (or some version of it), not all CPs conduct EU SILCs. Consequently, a complete comparative analysis across all CPs at this moment is not possible. The following table provides information on the availability of HBSs and SILCs in CPs.

CP	HBS	EU SILC
	Availability	Availability
Albania	✓	✓
Bosnia and Herzegovina	✓	✗
Georgia	✓	✗
Kosovo*	✓	✓
Moldova	✓	✗
Montenegro	✓	✓
North Macedonia	✓	✓
Serbia	✓	✓
Ukraine	✓	✗

Table 7-1. Availability of statistical data across CPs

To paint a realistic picture of the number of households in energy poverty, we employed several indicators to identify energy-poor households. A discussion of the possible indicators was provided in Chapter 6; here we will only provide a succinct summary:

- **Energy burden**. Share of energy costs in the household disposable income.
- **M/2 indicator**. The M/2 indicator is the share of households with absolute energy expenditure below half the national median, or in other words, abnormally low. This could be due to high energy efficiency standards but may also be indicative of households dangerously under-consuming energy.
- **2M indicator**. The 2M indicator represents the proportion of households with a share of energy expenditure in income more than twice the national median share.
- **Arrears on utility bills**. Share of the population in arrears on utility bills, based on the question "*In the last twelve months, has the household been in arrears, i.e., been unable to pay on time utility bills (heating, electricity, gas, water, etc.) for the main dwelling due to financial difficulties?*"
- **Inability to keep homes adequately warm**. Share of the population not able to keep their home adequately warm, based on the question "*Can your household afford to keep its home adequately warm?*".
- **Condensation, leaking roof, rot in windows or doors**. Share of population with a leak, damp or rot in their dwelling, based on the question "*Do you have any of the following problems with your dwelling/accommodation?*
  - *A leaking roof*
  - *Damp walls/floors/foundation*
  - *Rot in window frames or floor*"

Table 7-2 provides the sources for each of the indicators (HBS or EU SILC). To be able to calculate the value of the above indicators, we needed to receive disaggregated survey data (microdata) from the relevant statistical offices.

Indicator	Source
Energy burden	HBS
M/2 indicator	HBS
2M indicator	HBS
Arrears on utility bills	EU SILC
Inability to keep home adequately warm	EU SILC
Condensation, leaking roof, rot in windows or doors	EU SILC

Table 7-2. Source of indicators

For those CPs that have supplied the microdata for the HBS and EU SILC, we analyzed the proposed indicators by income deciles and various socioeconomic characteristics of households, where data permitted.

To gauge the level of energy poverty in CPs, we employed three indicators: (1) inability to keep the household warm (based on EU SILC data), (2) the 2M indicator, and (3) the M/2 indicator, where the M2 and M/2 indicators were based on HBS data. The indicators are calculated for the first four deciles, i.e., below average households in terms of income. In this way we were able to capture the most disadvantaged households and avoid some of the disadvantages associated with the proposed indicators (as discussed in Chapter 6).

The first indicator (inability to keep the home adequately warm) provides an assessment of a household's perception of energy poverty. Whether a household declares itself as unable to keep the home warm depends on the household's reference point: different households might quantify the same situation differently. Nevertheless, this indicator paints a clear picture regarding the energy poverty perception of households.

The 2M indicator identifies those households that spend twice the national median on energy. Spending twice as much as the median household is a good indication of possibly low energy efficiency of households. On the other hand, the M/2 indicator captures those households that spend less than the national median on energy. This same indicator is a good indication of households that cannot dedicate sufficient financial resources to energy spending.

To estimate the potential number of energy poor households we provided a range that is based on the lower bound represented by the share of population that claims they are unable to keep their home adequately warm, and an upper bound representing the share of population that either overspends (2M) or underspends (M/2) on energy (upper bound is obtained as a sum of households that meet 2M and M/2 criteria). For those CPs that have not provided statistical data, we used an estimate based on the publicly available data. Unfortunately, for some CPs there were even not relevant publicly available data that would allow for making even a rough estimate.

One of the outcomes of the proposed calculation for the indicators is to assist policy makers in comparing these indicators across CPs as well as making comparisons to indicators calculated for EU MS under the Energy Poverty Observatory.[143] Therefore, we propose calculating the indicators according to the methodological guidebook published by the Energy Poverty Observatory, also available online.[144]

In terms of actually calculating the indicators, we suggest calculating the indicators in a regulatory manner (every time HBSs and EU SILCs are conducted) by the statistics office and subsequently delivered to the relevant ministry in line with the following tasks:

- The statistics office collects the relevant surveys and possesses the necessary expertise to calculate the required indicators.
- Indicator calculations can be done immediately following completion of the surveys, resulting in timely availability of statistics, which is important for making timely policy decisions.
- Responsibilities of government ministries tend to change over time, with some undergoing merger or closures, and others newly created. Placing the onus on calculating the indicators with the statistics office means such issues are avoided.

[143] https://energy-poverty.ec.europa.eu/index_en

[144] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.2 Albania

The Albanian Institute of Statistics (INSTAT) is the body that carries out the Household Budget Survey (HBS) as well as the Survey on Income and Living Conditions (EU SILC). Unfortunately, INSTAT was not able to supply the required microdata for HBS and EU SILC surveys.

Country: Albania		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✗
EU SILC	✓	✗

7.2.1 Data Description

Given that the Consultant has not received the required microdata, the analysis is based on the publicly available data obtained from the INSTAT database on energy expenditures, and from the EUROSTAT database relating to the EU SILC survey.

7.2.2 Analysis of the indicators

7.2.2.1 Expenditures on energy

Due to the lack of HBS microdata, it was not possible to calculate the value of M/2 and 2M indicators. Only the share of household expenditures on housing, water, electricity, gas, and other fuels by quintile[145] was available. The figure below shows that average expenditures for the first quintile are 18%, and decline to 13%, 11%, 10%, and 7% for the successive quintiles. The average share of expenditure in the population is 10.1%. Given that the data includes expenditures on water and housing, it is safe to assume that energy-related expenditures are slightly lower.

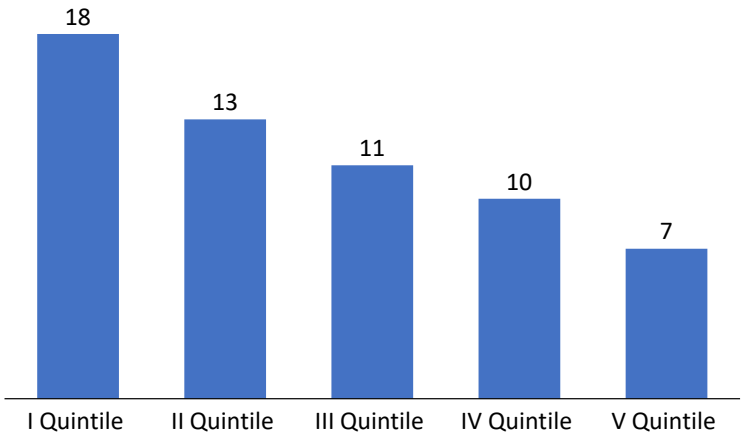


Figure 7-1. Share of average expenditure on housing, water, electricity, gas, and other fuels by quintile in 2019

Source: Albanian Institute of Statistics

[145] The data are ordered according to total equivalized disposable income. Four cut-point values (so-called quintile cut-off points) of income are identified, dividing the survey population into five groups equally represented by 20% of individuals each: (1) first quintile group of equivalized income; (2) second quintile group of equivalized income; (3) third quintile group of equivalized income; (4) fourth quintile group of equivalized income; and (5) fifth quintile group of equivalized income. The first quintile group represents 20% of the population with the lowest income (an income smaller or equal to the first cut-off value), and the fifth quintile group represents the 20% of population with the highest income (an income greater than the fourth cut-off value). Source: EUROSTAT, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Income_quintile_group

7.2.2.2 Arrears on utility bills

Due to the lack of microdata, only aggregated values of the indicator can be determined. Data on arrears on utility bills are based on EUROSTAT data for the year 2019. Data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

The percentage of households in arrears on utility bills is shown in the next figure for households with an income below 60% of the median equivalized income and captures the most vulnerable households. As the following figure shows, the highest proportion of households below 60% of the median equalized income in arrears on utility bills are those occupied by a single person with dependent children: 47% of such households in 2019 had arrears on utility bills.

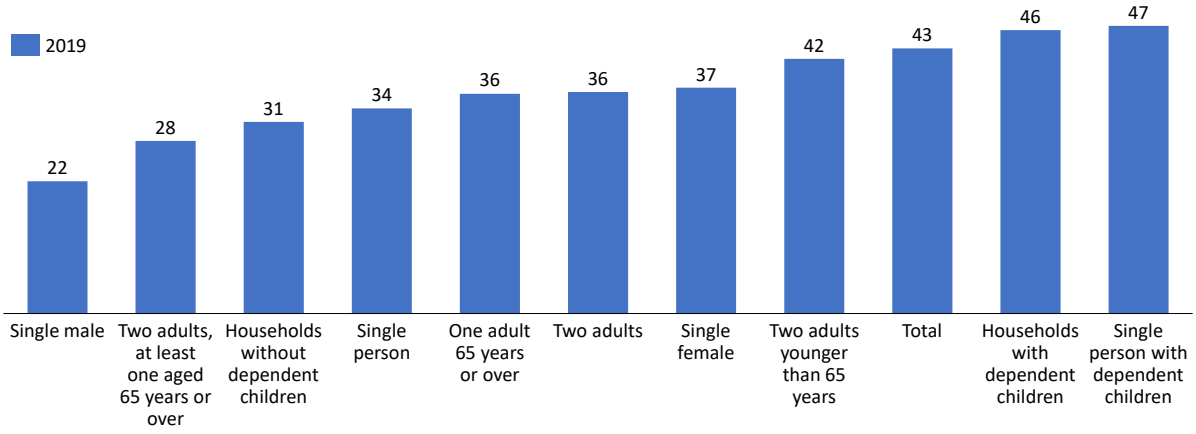


Figure 7-2. Share of households below 60% of the median equivalized income in Albania in arrears on utility bills in 2019

Source: EUROSTAT

As expected, the share of households in arrears on utility bills is lower when all households are taken into consideration. According to the following figure, 34% of all single-person households with dependent children were in arrears on the utility bills in 2019. When all households are taken into account, irrespective of income, 27% of households experienced arrears on utility bills.

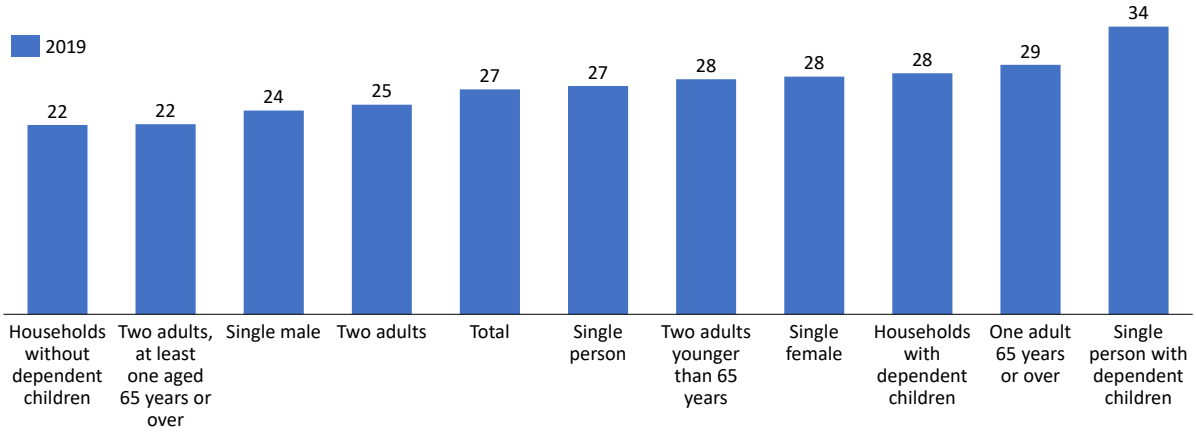


Figure 7-3. Share of households in Albania in arrears on utility bills in 2019

Source: EUROSTAT

7.2.2.3 Inability to keep home adequately warm

Due to the lack of microdata, only aggregated values of the indicator can be determined. Data on the inability to keep households adequately warm are based on EUROSTAT data for the year 2019. Data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

Data on the inability to keep a household warm are shown in the next figure for those households with an income below 60% of the median equivalized income and captures the most vulnerable households. The figure shows that households with single females face the greatest difficulties in keeping their homes warm: 71% of single female households in 2019 were unable to keep their homes warm. Similarly, though slightly lower values are observed for a single person with dependent children and a household with one adult of 65 years or over. These results point to the conclusion that probably single parent, single retired, and single-person households face the greatest difficulties in keeping their homes warm. Overall, 54% of households with income below 60% of the median equivalized income had difficulties in keeping their homes warm in 2019.

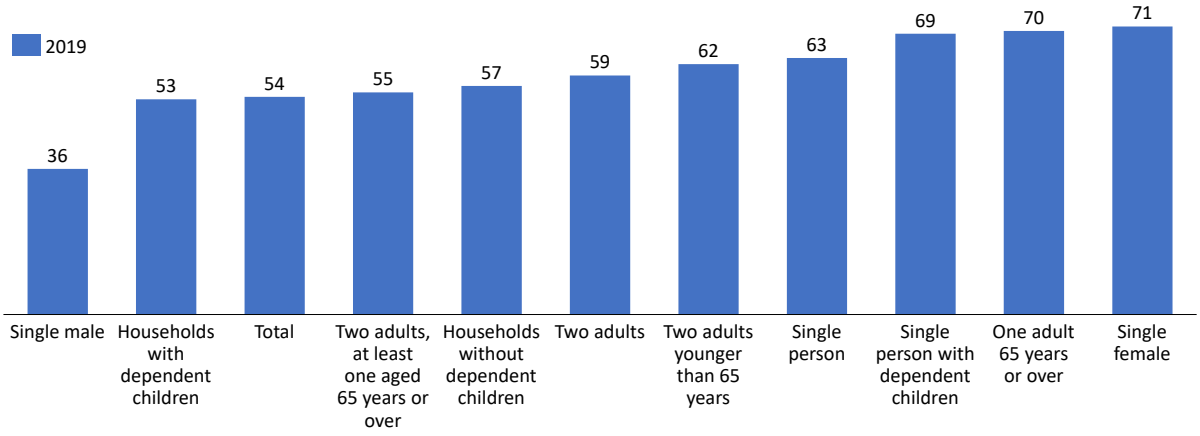


Figure 7-4. Share of households below 60% of the median equivalized income in Albania unable to keep homes adequately warm in 2019

Source: EUROSTAT

The share of households unable to keep their home adequately warm declines when all households are taken into consideration. The following figure shows that the highest share of households unable to keep their home adequately warm are those with one adult person 65 years or older: 55% of such households are unable to keep their home adequately warm. At the same time, 37% of all households are unable to keep their home adequately warm.

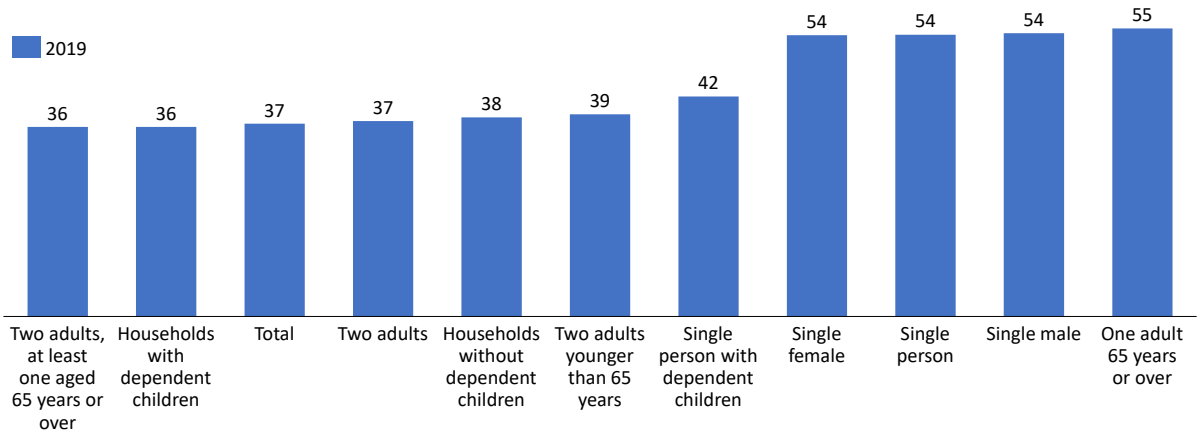


Figure 7-5. Share of households in Albania unable to keep home adequately warm in 2019

Source: EUROSTAT

7.2.2.4 Condensation, leaking roof, rot in windows or doors

Due to the lack of microdata, only aggregated values of the indicator can be determined. Data on condensation, leaking roof, rot in windows or doors are based on EUROSTAT data for the year 2019. Data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

Data on condensation, leaking roofs, rot in windows and doors are shown for households with an income below 60% of the median equivalized income and captures the most vulnerable households. The following figure shows that households with a single person and dependent children are the most affected: 47% of such households in 2019 meet the criteria.

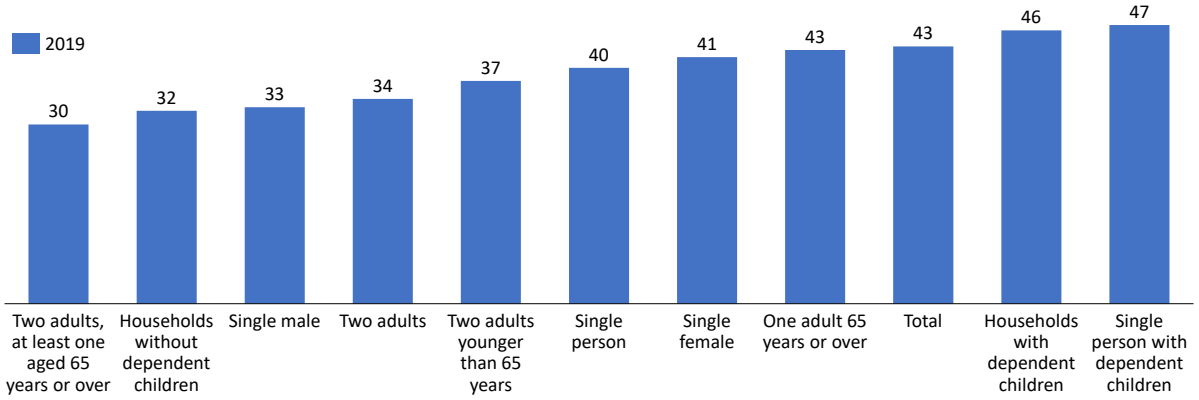


Figure 7-6. Share of households below 60% of the median equivalized income in Albania suffering from condensation, leaking roof, rot in windows or doors in 2019

Source: EUROSTAT

The share of households with leaking roofs declines as expected when all households are taken into consideration. Single-person households with dependent children are the most affected by the issue: 36% of such households face leaking roofs. At the same time, 30% of all households reported having an issue with leaking roofs.

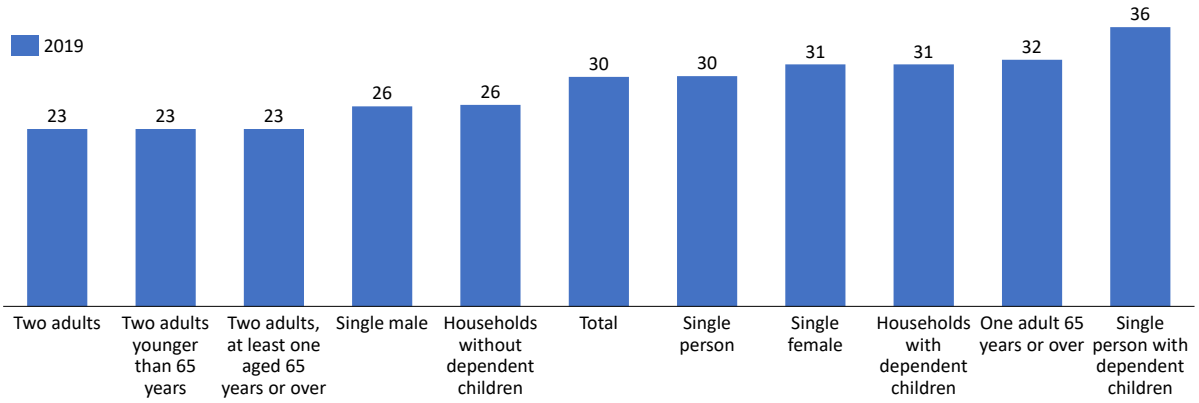


Figure 7-7. Share of households in Albania suffering from condensation, leaking roof, rot in windows or doors in 2019

Source: EUROSTAT

7.2.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using an upper and lower bound for the number of energy-poor households. The lower bound we used is the share of households that stated as unable to keep their homes adequately warm. We proposed the upper bound as the share of households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators, we captured both types of households: those that overspend (due to energy inefficient homes) and those who underspend due to lack of sufficient financial resources.

Based on information available to the Consultant, INSTAT conducts surveys such as the EU SILC and HBS and which are proposed for estimating and monitoring the number of energy-poor households in Albania. Unfortunately, the Consultant has not received the required microdata, hence estimating the number of energy-poor households in Albania using Albanian data was not possible. Therefore, only a rough estimate can be made based on the publicly available data.

According to the data provided in Figure 7-5, 37% of all households in Albania declare they cannot keep their homes adequately warm. Given that we have proposed to use the share of households unable to keep their homes adequality warm that belong to the first four deciles as a lower bound indicator, and that the reported 37% represents all households, the value of 37% can be considered an upper bound for the estimated number of energy poor households in Albania. Therefore, the estimated upper bound for the number of energy poor households in Albania is 272,000[146].

In terms of responsibility for calculating the indicators, we propose that INSTAT calculate the indicators. To ensure comparability with indicators calculated under the EU Energy Poverty Observatory project, the recommendation is that INSTAT use the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[147]

[146] Due to the lack of micro data, it is not possible to estimate the lower bound of the number of energy poor households in Albania.

[147] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.3 Bosnia and Herzegovina

According to information received by the Consultant, only the Household Budget Survey (HBS) is carried out in Bosnia and Herzegovina (BIH), whereas the Survey on Income and Living Conditions (EU SILC) is still not carried out. In terms of the HBS, the Consultant was unable to attain microdata from the Agency for Statistics of Bosnia and Herzegovina.

Table 7-3. Summary of available and received statistical data for Bosnia and Herzegovina

Country: Bosnia and Herzegovina		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✗
EU SILC	✗	✗

7.3.1 Data Description

Given that the Consultant has not received HBS microdata, the analysis is based on publicly available data obtained from the Agency for Statistics of Bosnia and Herzegovina.

7.3.2 Analysis of the indicators

7.3.2.1 Expenditures on energy

Given that microdata was not available to the Consultant, only the available indicators from the Household Budget Survey 2015 are presented here [57]. The share of energy expenditures in total consumption is represented by expenditures for electricity, gas, water, and other fuels. Given that the expenditures include outlays for water, it is safe to deduce that energy-related expenditures are slightly lower than the values presented here. Furthermore, expenditures are given as average values for various socioeconomic characteristics of households and were not available by income levels.

Average expenditures in Bosnia and Herzegovina do not differ from the Federation and Republika Srpska, where they averaged 9,4%. On the other hand, they were a percentage point lower, i.e., 8,4% in District Brčko.

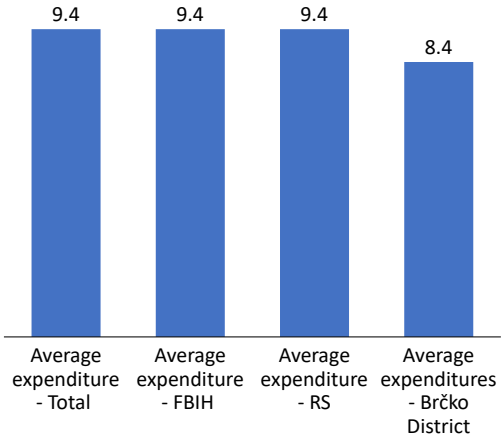


Figure 7-8. Share of average household expenditures for electricity gas, water, and other fuels in BIH in 2015

Source: Household Budget Survey 2015 [57]

In terms of expenditures by urban and non-urban (other) households, expenditures are higher in non-urban than in urban households, except for District Brcko. Expenditures in urban households

are slightly above 8%, while in non-urban households they are slightly above 10%, except for District Brcko where only a slight difference between urban and non-urban households exists.

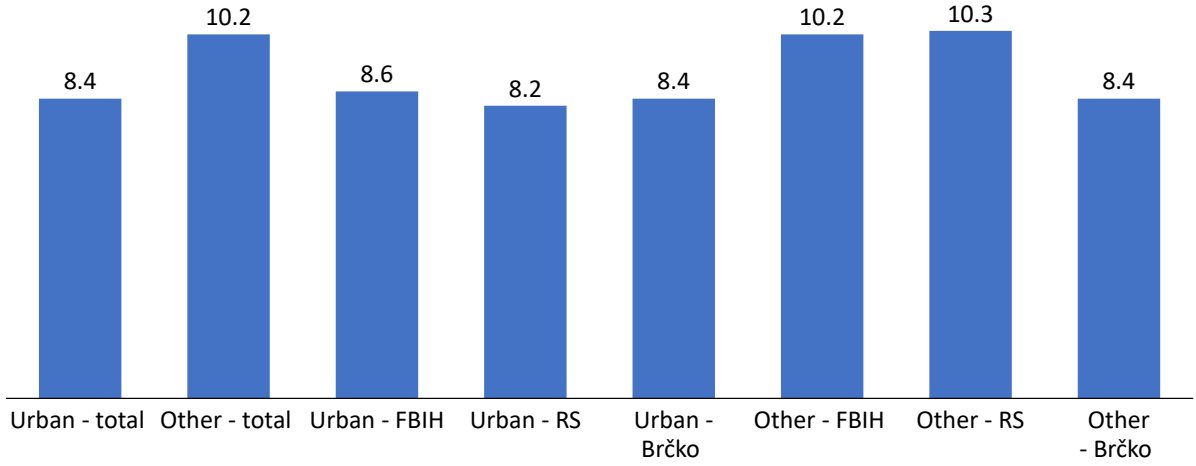


Figure 7-9. Share of average household expenditures for electricity gas, water, and other fuels in BIH in 2015 by dwelling type (urban vs rural)

Source: Household Budget Survey 2015 [57]

Regarding the relationship between expenditures and number of household members, the figure below shows that expenditures decline as the number of members increases, except for households with five or more members.

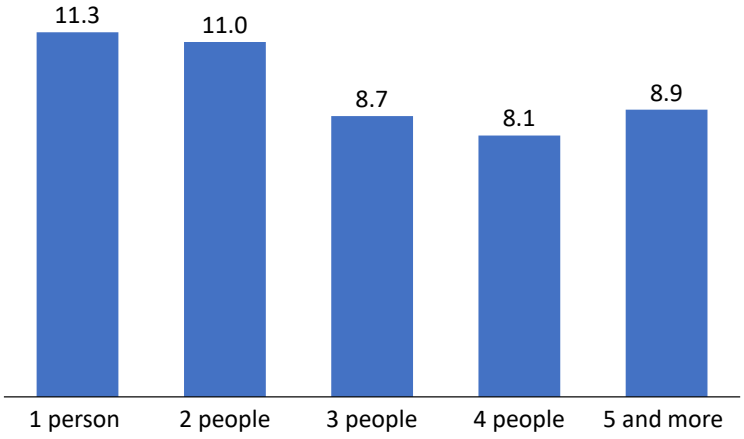


Figure 7-10. Share of average household expenditures for electricity gas, water, and other fuels in BIH in 2015 by number of household members

Source: Household Budget Survey 2015 [57]

In terms of employment status, in households where the house head is a housewife, energy expenditures are the highest and amount to 11.5% on average.

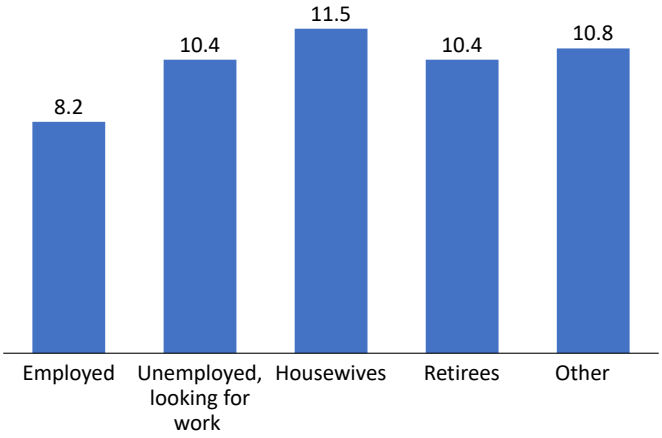


Figure 7-11. Share of average household expenditures for electricity gas, water, and other fuels in BIH in 2015 according to the employment status

Source: Household Budget Survey 2015 [57]

7.3.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using an upper and lower bound for the number of energy-poor households. The lower bound we used is the share of households that stated as unable to keep their homes adequately warm. We proposed the upper bound as the share of households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators, we captured both types of households: those that overspend (due to energy inefficient homes) and those who underspend due to lack of sufficient financial resources.

Based on information available to the Consultant, the Agency for Statistics of Bosnia and Herzegovina does not carry out EU SILC surveys. Therefore, the Consultant has suggested conducting the survey in Bosnia and Herzegovina as it would allow for precisely estimating the number of energy-poor households. At the same time, the Agency for Statistics of Bosnia and Herzegovina conducts the HBS but unfortunately, the Consultant has not received the required microdata. Accordingly, the Consultant was not able to estimate the prevalence of energy poverty in households in Bosnia and Herzegovina. Furthermore, due to the lack of relevant publicly available statistical information, the Consultant was not able to even make a rough estimate of the number of energy poor households in Bosnia and Herzegovina.

In terms of responsibility for calculating the indicators, we propose that the Agency for Statistics of Bosnia and Herzegovina calculate the indicators. To ensure comparability with indicators calculated under the EU Energy Poverty Observatory project, the recommendation is that the Agency for Statistics of Bosnia and Herzegovina use the methodological guidebook published by the Energy Poverty Observatory, which is also available online[148].

[148] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.4 Georgia

The National Statistics Office of Georgia supplied the necessary data for the Household Income and Expenditure Survey (HIES) for the years 2015, 2016, 2017, 2018, and 2019. The National Statistics Office of Georgia does not conduct the EU SILC survey.

Table 7-4. Summary of available and received statistical data for Georgia

Country: Georgia		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✓
EU SILC	✗	✗

7.4.1 Data description

The Household Income and Expenditure Survey (HIES) can be regarded as the Household Budget Survey (HBS) for Georgia and is available for each year from 2015 to 2019, comprising a total of five survey waves. The HIES constitutes the main source for calculating the expenditure-based energy poverty indicators, 2M (households with a significant share of energy expenditure in income) and M/2 (households with low absolute energy expenditure).[149] The survey contains detailed information on various sources of household member income and other monetary and non-monetary inflows as well as household consumption and expenditures. There are 10 999, 10 858, 11 590, 11 056, and 13 872 households in the samples for the survey waves from 2015 to 2019, respectively. While the exact response rates for the various survey waves are not readily available on the website of the National Statistics Office of Georgia, a large nominal number of surveyed households seems to suggest that the samples are representative. All variables are reported monthly, and indicator calculations were done on a monthly basis.

Income was calculated by summing all the individual member income variables (codes "ShemDaq", "ShemTviTdasaqm", "Shem_Sof", "Qonebidan", "PensStipDaxm", "Ucxoetidan", "Axloblebisagan", "QonebisGayidvit", "SesxAnDanazog", "ArafuladiMoxmareba", “tblincomes.sav” file) across households to obtain the household income variable.[150] Furthermore, total household income could have been additionally adjusted by adding the imputed rent (code “Rent”, file “tblshinda01.sav”) but the data are missing for most households (ranging between 70% and 85% across various survey waves), hence this adjustment is absent from the calculations. Household energy expenditures are represented by a single variable, namely expenditures on fuel and electricity ("energia", file "tblexpenditures.sav).

Both total household income and total household energy expenditure variables have been equivalized, meaning they have been adjusted by the number of household members using the

[149] Unless otherwise noted, the description of calculating energy poverty indicators provided in the text is based on Thema, J., and Vondung, F. (2020) *EPOV Indicator Dashboard: Methodology Guidebook*. Wuppertal Institut für Klima, Umwelt, Energie GmbH.

[150] From a methodological standpoint, it is worthwhile to note that these variables also include monetary and non-monetary inflows, namely property disposal (code "QonebisGayidvit"), borrowing and dissaving ("SesxAnDanazog") and gifts ("Axloblebisagan") which might not usually be regarded as income because they may constitute capital transfers (as opposed to current transfers such as income from employment). However, these are included in household income due to differences in the definitions of HBS-type survey variables between countries, which prevents us from establishing a common definition of household income across countries, therefore impairing data comparability. Regardless, due to the representativeness of the survey sample, these inflow variables do not affect the stability of income distribution across survey waves.

OECD-modified equivalence scale.[151] The calculation for equivalized household sizes implies assigning a value to each household member: 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 for each child aged under 14, and then subsequently summing up these values. Income and expenditure variables are then divided by the equivalized household size.

The share of household energy expenditure in income is calculated by dividing the equalized values of household energy expenditure and total household income. The M/2 indicator is calculated by dividing the weighted median of the equivalized absolute household energy expenditure by 2, while the 2M indicator is calculated by multiplying the weighted median of the share of household energy expenditure by 2. Presenting the shares of households in relation to these indicators requires assessing whether each household is under (M/2) or above (2M) the respective indicators. The shares themselves are then calculated as the sum of survey weights of households that satisfy the mentioned criteria divided by the total sum of household weights. This is done both for the total population but also by income decile groups, tenure status, and other household characteristics. Income decile groups were identified by calculating the weighted deciles of equivalized household income and assessing whether a household belongs to particular boundaries given by income decile values. In this manner, all reported variables, such as shares of households, mean/median, M/2, and 2M shares are weighted using survey weights. The survey weights used in the calculation were provided in the variable "Weights", file "sysschedule.sav".

Finally, assessing whether atypical values influenced reported results required performing a separate calculation using data that was "cleaned" of observations containing unrealistically high values of the share of household energy expenditure in income. To assess whether a maximal value is "atypical", the Grubbs test[152] was used. The Grubbs test assesses whether, at a predefined probability level, a single value belongs to the distribution in the dataset which is assumed to be normal. While the normality assumption is likely to be violated, the predefined probability level was very low (10^{-8}), so only households with the most extreme values of share of energy consumption were omitted.[153] The following table summarizes the results of the data cleaning exercise:

Table 7-5. Results of data cleaning for Georgia

Year	Number of households in the sample	Max value before cleaning	Max value after cleaning	Share of excluded households in the cleaning process
2015	10,999	1522.0%	78.2%	0.18%
2016	10,858	148.2%	73.7%	0.18%
2017	11,590	544.4%	88.1%	0.35%
2018	11,056	1380.0%	80.7%	0.48%
2019	13,872	1618.5%	81.7%	0.45%

Calculating the indicators relied on using the data on the first (2015) and last available year (2019).

[151] See https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf

[152] See e.g. https://en.wikipedia.org/wiki/Grubbs%27s_test

[153] This process is arbitrary to a degree and by all means not the only one possible. Nonetheless, to be able to report mean-based indicators it is necessary to clean the data of the most extreme observations. On the other hand, median-based as well as shares of households (2M and M/2) are more robust to atypical values so these indicators are fairly similar with or without data cleaning. In this report, only means are reported based on clean data while others are reported based on the full dataset.

7.4.2 Calculation of the indicators

7.4.2.1 2M indicator

The following two figures show the distribution of shares of energy consumption (expenditure) in income, with highlighted median and 2M points for the years 2015 and 2019 (the first and the last year available). For presentation purposes, households with a share of energy expenditure in income above 71% were excluded from the histogram, which amounts to 30 and 68 excluded households for 2015 and 2019 survey waves, respectively. The dark red line shows the median share of energy expenditure in income while the bright red line represents twice that amount, both of which were calculated using the entire sample.

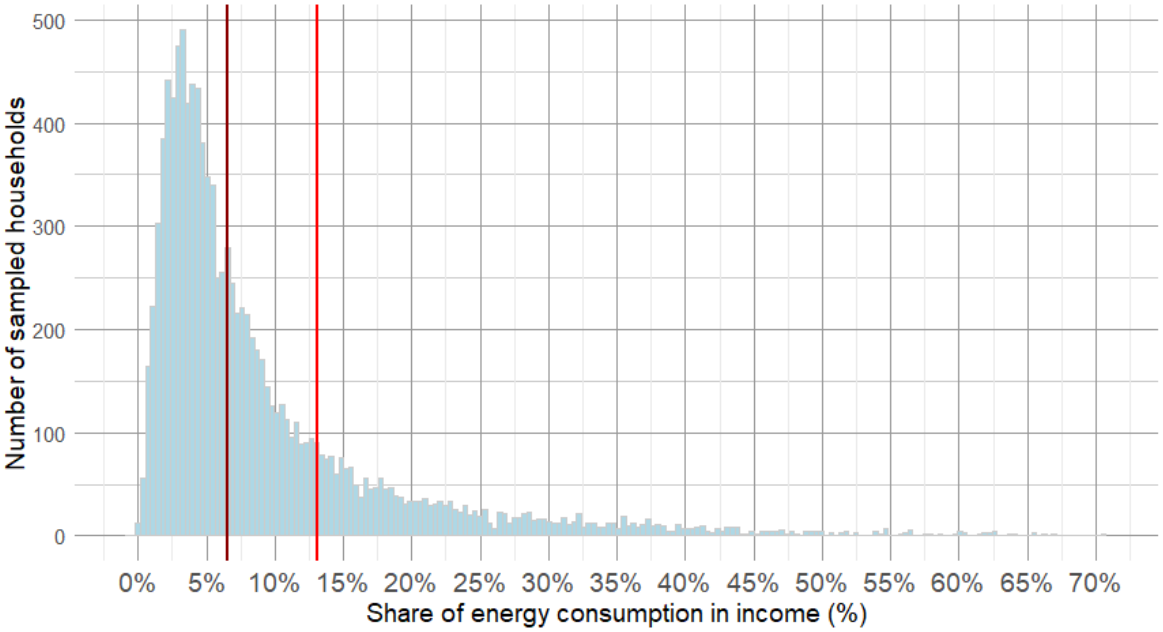


Figure 7-12. Share of energy consumption in income (%) for Georgian households in 2015

Source: HIES, 2015

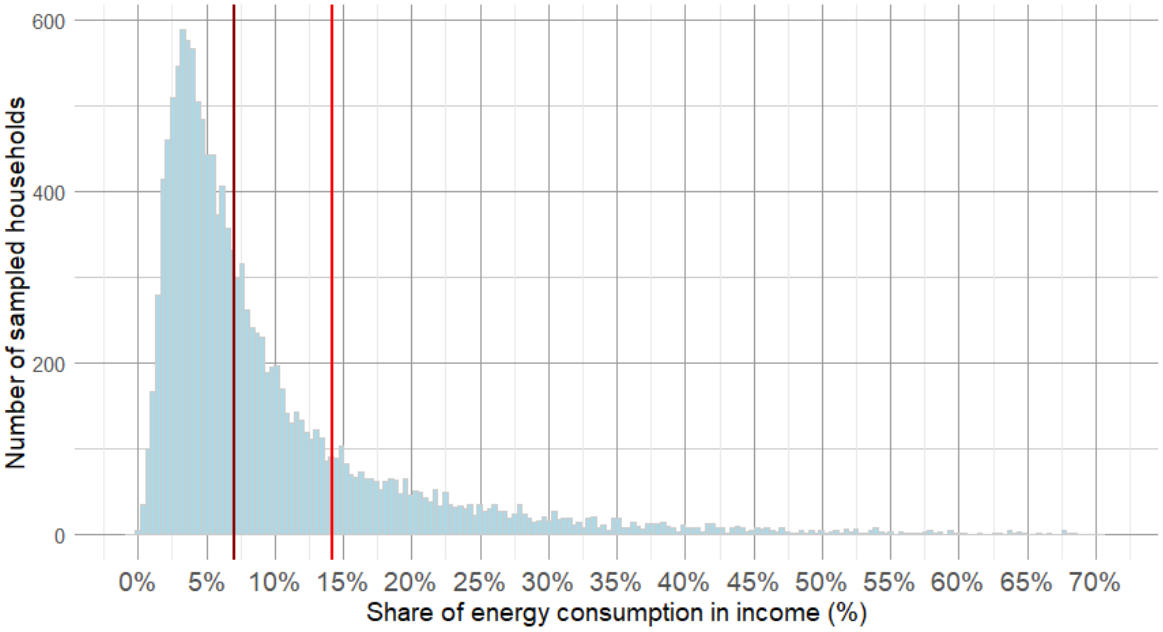


Figure 7-13. Share of energy consumption in income (%) for Georgian households in 2019

Source: HIES, 2019

The following two figures show the share of the population spending twice the national median on energy. Figure 7-14 shows the relative shares while Figure 7-15 shows the absolute number of households. The issue of overspending on energy is most pronounced in the first income decile where between 37%-47% of households (depending on the year) face the issue of energy overspending. In terms of total numbers, this is equivalent to between 39 and 54 thousand households that reported high energy bills in the first decile, depending on the year. When the entire population is taken into account, 23% of all households in both years spend more than twice the national median on energy.

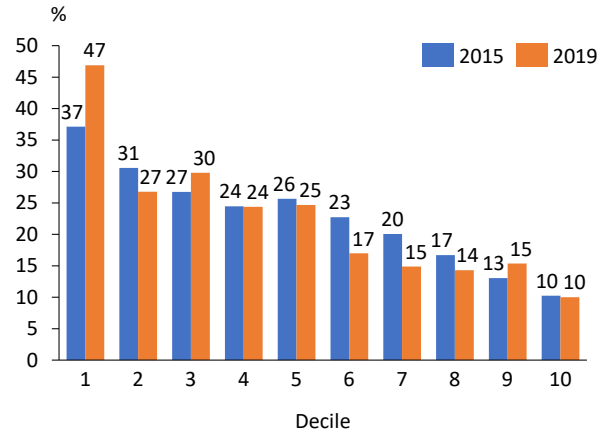


Figure 7-14. 2M indicator for Georgia, by deciles, relative shares

Source: HIES

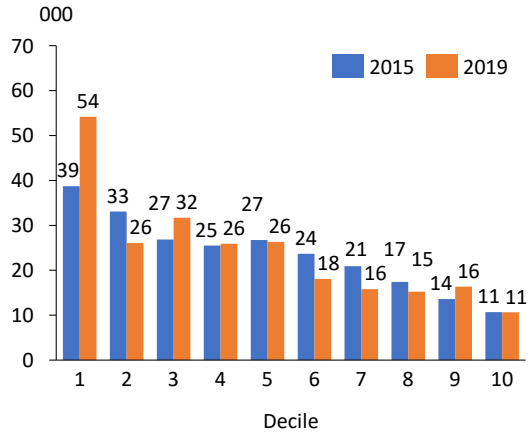


Figure 7-15. 2M indicator for Georgia, by deciles, the absolute number of households

Source: HIES

The following table shows the values of the 2M indicator for various socioeconomic characteristics of households for all available years. Standing out among the observed variables is the share of overspending by rented households. According to the data, more than 90% of the households that rent the property they live in spend twice the national median on energy expenditure. Another apparent issue is that overspending on energy becomes less pronounced as the size of the household increases. This can perhaps be explained by the fact that as the number of household members increases, the household prioritizes its income due to less availability of funds for energy needs, potentially contributing to self-curtailment of energy use.

Table 7-6. values of 2M indicator for various socioeconomic characteristics of the households

		2015		2016		2017		2018		2019	
		Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute
Settlement type	Urban	27%	166,225	27%	166,396	27%	167,731	25%	161,154	27%	173,700
	Rural	16%	70,965	14%	60,179	18%	78,107	16%	67,131	15%	66,607
Type of ownership	Belongs to the household	21%	198,743	19%	189,438	21%	203,710	19%	177,843	19%	185,567
	Rented	94%	30,228	95%	29,964	90%	31,764	92%	41,331	94%	46,948
	Mortgaged	10%	658	27%	869	17%	1,032	12%	624	15%	1,016
	Used without payment	19%	7,562	21%	6,305	21%	9,233	18%	8,271	18%	6,775
Number of household members	1	33%	45,278	30%	43,556	31%	44,904	30%	46,344	31%	51,267
	2	25%	51,535	22%	47,391	25%	56,127	24%	54,479	23%	52,829
	3	23%	44,371	22%	45,317	22%	45,340	22%	40,889	23%	44,161
	4	21%	42,676	21%	41,747	22%	42,702	21%	38,558	22%	39,387
	5	22%	29,735	18%	25,007	21%	27,104	17%	23,445	20%	29,505
	6+	15%	23,596	15%	23,557	18%	29,661	14%	24,570	14%	23,157

Source: HIES

7.4.2.2 M/2 indicator

The following two figures show the histogram of energy consumption (expenditures) for Georgia with highlighted median and M/2 value, for the years 2015 and 2019. The dark red line represents the median value, while the bright red line represents the M/2 value. For presentation purposes, households with a monthly energy expenditure above 300 GEL (approximately 80 EUR) were excluded from the histogram, which amounts to 60 and 133 excluded households for the 2015 and 2019 survey waves, respectively. The dark red line shows the median amount of energy expenditure while the bright red line shows half that amount, both of which were calculated using the whole sample.

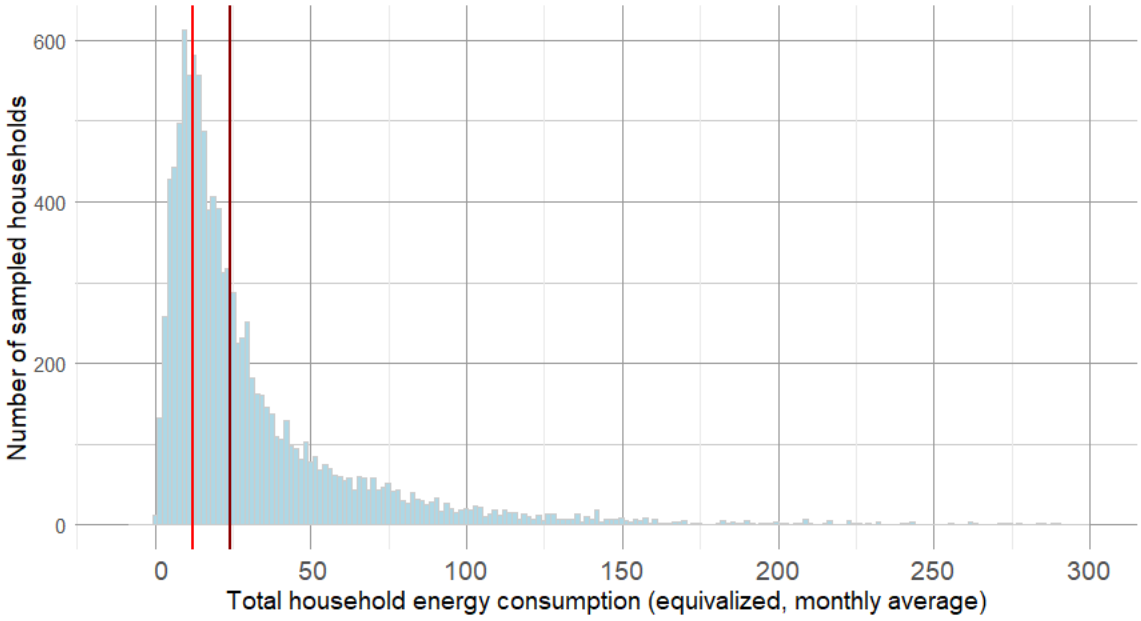


Figure 7-16. Histogram of expenditures for Georgia (2015), in GEL

Source: HIES, 2015

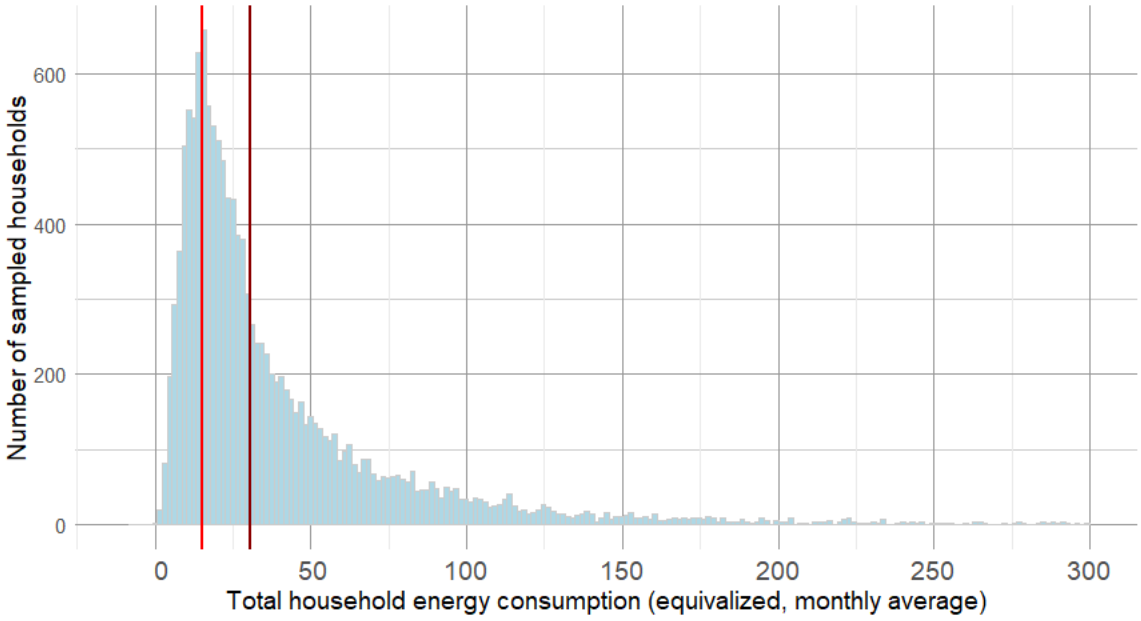


Figure 7-17. Histogram of expenditures for Georgia (2019), in GEL

Source: HIES, 2019

In terms of households that underspend on energy, the following two figures show the relative and absolute values of households that reported energy spending at less than half the national median. As expected, the number of households with expenditure below half the national median declines as households become wealthier. When the entire population is taken into account, 19% in 2019 and 21% in 2015 of all households have spending on energy that is below half the national median.

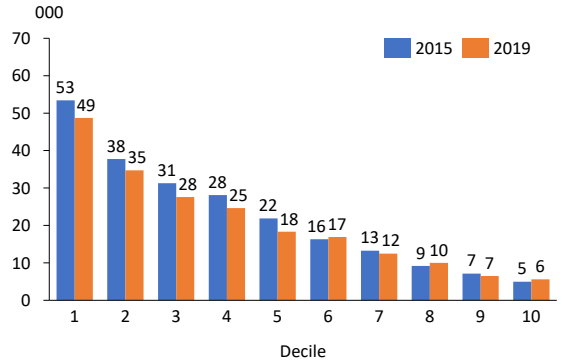


Figure 7-18. M/2 indicator for Georgia, by deciles, relative shares

Source: HIES

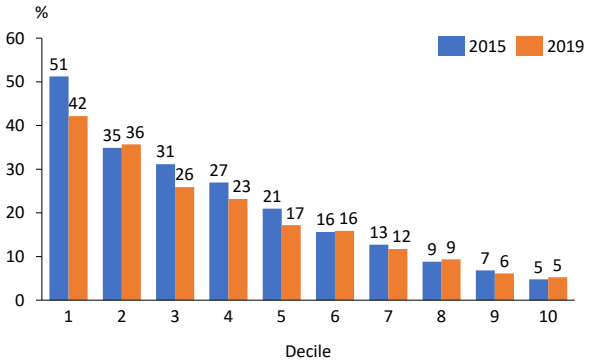


Figure 7-19. M/2 indicator for Georgia, by deciles, absolute numbers of households

Source: HIES

The following table shows the value of the M/2 indicator for various socioeconomic characteristics of households for all available years.

Table 7-7. values of M/2 indicator for various socioeconomic characteristics of the households

		2015		2016		2017		2018		2019	
		Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute
Settlement type	Urban	9%	52,886	8%	49,849	9%	57,897	8%	53,680	9%	55,549
	Rural	39%	170,376	39%	171,402	40%	173,843	35%	148,675	35%	149,895
Type of ownership	Belongs to the household	22%	212,137	21%	213,233	22%	217,665	20%	188,946	20%	193,764
	Rented	1%	252	0%	0	0%	88	0%	0	0%	0
	Mortgaged	7%	459	2%	72	12%	698	0%	0	10%	650
	Used without payment	26%	10,414	26%	7,945	30%	13,289	29%	13,272	30%	11,029
Number of household members	1	23%	31,978	21%	30,796	22%	31,769	19%	29,915	19%	30,158
	2	19%	40,367	20%	41,727	18%	39,867	16%	37,132	17%	39,220
	3	18%	35,052	17%	35,499	20%	41,708	16%	29,785	17%	32,607
	4	20%	40,144	19%	37,791	19%	37,724	18%	31,971	17%	30,027
	5	21%	28,908	22%	30,428	22%	28,666	19%	25,846	21%	30,239
	6+	29%	46,814	28%	45,009	32%	52,008	28%	47,705	27%	43,192

Source: HIES

7.4.2.3 Energy burden

The next two figures show the median and mean share of energy expenditures in household income by decile. The data indicates that the energy burden for households in the lowest income deciles is not much higher compared to other income deciles, as expected. Median share of energy expenditure in disposable income was 7% for the entire population in both observed years, while mean share of energy expenditure in disposable income was 17% and 10% for the entire population in 2019 and 2015 respectively.

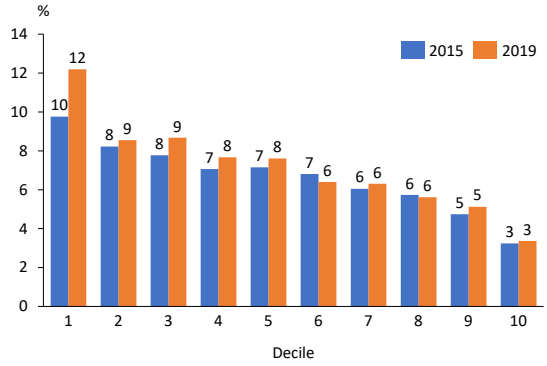


Figure 7-20. Median share of energy expenditure in disposable income for Georgia, by deciles

Source: HIES

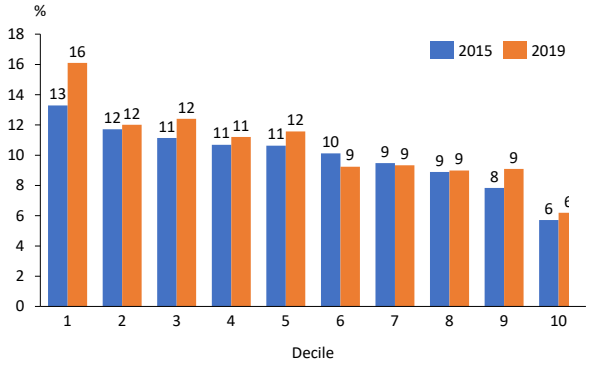


Figure 7-21. Mean share of energy expenditure in disposable income for Georgia, by deciles

Source: HIES

The following table presents the mean and the median energy burden (share of energy expenditure in income) for various socioeconomic characteristics of households for all available years.

Table 7-8. values of median and mean energy expenditure for various socioeconomic characteristics of households

		2015		2016		2017		2018		2019	
		Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean
Settlement type	Urban	8%	11%	8%	12%	9%	12%	8%	12%	8%	12%
	Rural	5%	8%	5%	8%	5%	9%	5%	8%	5%	8%
Type of ownership	Belongs to the household	6%	9%	7%	9%	7%	10%	7%	9%	7%	9%
	Rented	32%	34%	33%	35%	33%	33%	32%	34%	33%	35%
	Mortgaged	7%	8%	8%	10%	6%	10%	7%	9%	6%	9%
	Used without payment	6%	9%	7%	10%	7%	10%	7%	9%	7%	9%
Number of household members	1	8%	12%	8%	12%	9%	13%	9%	13%	9%	13%
	2	7%	10%	7%	10%	7%	11%	8%	11%	7%	11%
	3	7%	10%	7%	10%	7%	10%	7%	11%	7%	11%
	4	6%	9%	7%	10%	7%	11%	7%	10%	7%	11%
	5	6%	10%	7%	9%	7%	11%	7%	9%	7%	10%
	6+	5%	8%	6%	8%	6%	9%	6%	8%	6%	9%

Source: HIES

Finally, the following two figures show the median income and the median energy expenditure (both non-equalized) by decile.

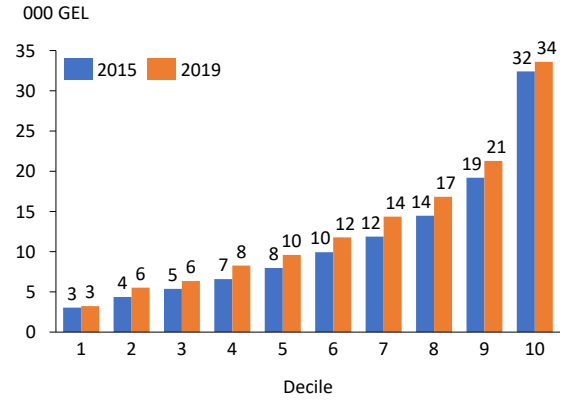


Figure 7-22. Median income by deciles, 000 GEL

Source: HIES

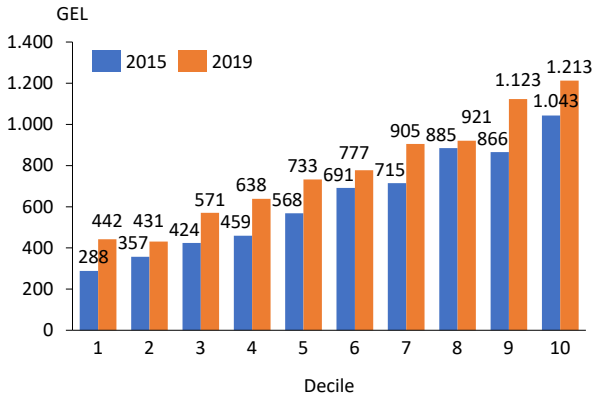


Figure 7-23. Median energy expenditure by deciles, GEL

Source: HIES

The following table provides data on median household energy expenditure (expend.) and median household income (income) for various socioeconomic characteristics of the households for the available years.

Table 7-9. values of median household income and median household energy expenditures for various socio-economic characteristics of households

		2015		2016		2017		2018		2019	
		Income	Expend.	Income	Expend.	Income	Expend.	Income	Expend.	Income	Expend.
Settlement type	Urban	10,188	784	10,395	852	10,802	920	10,825	869	11,412	931
	Rural	7,655	380	8,083	402	8,305	444	8,906	468	9,625	502
Type of ownership	Belongs to the household	8,769	583	9,283	622	9,817	682	10,037	676	10,632	716
	Rented	12,032	4,125	12,000	3,974	12,000	3,523	12,999	4,082	14,000	4,717
	Mortgaged	12,507	1,078	13,160	829	12,426	864	10,000	887	12,816	755
	Used without payment	7,182	424	6,634	477	6,620	498	6,159	457	7,129	480
Number of household members	1	3,160	272	3,289	296	5,727	616	5,749	690	12,375	520
	2	6,363	457	6,613	484	3,600	336	3,760	328	4,000	384
	3	9,210	635	9,702	690	7,360	564	7,546	560	8,364	592
	4	11,042	716	11,833	792	10,200	724	10,181	744	11,298	769
	5	12,479	788	12,339	851	12,160	869	12,761	820	13,232	896
	6+	14,182	783	13,852	820	12,795	920	13,327	886	14,019	912

Source: HIES

7.4.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using an upper and lower bound for the number of energy-poor households. The lower bound we used is the share of households that stated as unable to keep their homes adequately warm. We proposed the upper bound as the share of households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators, we captured both types of households: those that overspend (due to energy inefficient homes) and those who underspend due to lack of sufficient financial resources.

The National Statistics Office of Georgia conducts the Household Income and Expenditure Survey (HIES) which can be viewed as the Household Budget Survey (HBS). Despite their similarities, the suggestion is to conduct the survey strictly in line with the EUROSTAT methodology for HBS, making sure it is comparable to the HBSs of other CPs. Furthermore, the EU SILC survey has not been conducted in Georgia. The recommendation is that the survey be conducted also in line with the EUROSTAT methodology.

The available data for Georgia based on HIES provides the basis for calculating the upper bound value for energy poor households which is estimated at 24.6%.[154] Due to the lack of data, the lower bound cannot be estimated. Therefore, the estimated absolute number of energy poor households in Georgia is 274,000 households, which represents an upper bound.

In terms of responsibility for calculating the indicators, our proposal is that the National Statistics Office of Georgia perform the calculations. To ensure comparability with the indicators calculated under the EU Energy Poverty Observatory project, the suggestion is that the National Statistics Office of Georgia follow the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[155]

[154] This value represents the share of households that spend twice the national median on energy (12.4% of households) and share of households that spend half the national median (12.2% of all households).

[155] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.5 Kosovo*

According to official data, the Kosovo* Agency for Statistics (ASK) conducts the Household Budget Survey (HBS) and Survey on Income and Living Conditions (EU SILC). Unfortunately, ASK was not able to supply the microdata from the two surveys to the Consultant.

Table 7-10. Summary of available and received statistical data for Kosovo*

Country: Kosovo*		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✗
EU SILC	✓	✗

7.5.1 Data Description

Given that the Consultant has not receive the microdata for the HBS and EU SILC, the analysis is based on publicly available data obtained from the ASK database for the purpose of energy expenditures, and from the EUROSTAT database for the purpose of the EU SILC survey.

7.5.2 Analysis of the indicators

7.5.2.1 Expenditures on energy

Due to the lack of HBS microdata, it was not possible to calculate the value of the M/2 and 2M indicators. Only the empirical value for the share of housing expenditures was available. The values in the figure below show average expenditures in 2017 for various socioeconomic characteristics of households. As is evident, the share of energy expenditure in total expenditures ranges from 26% in rural to 31% in urban areas. Given that the data refers to housing expenditures, it is safe to assume that energy-related expenditures are slightly lower.

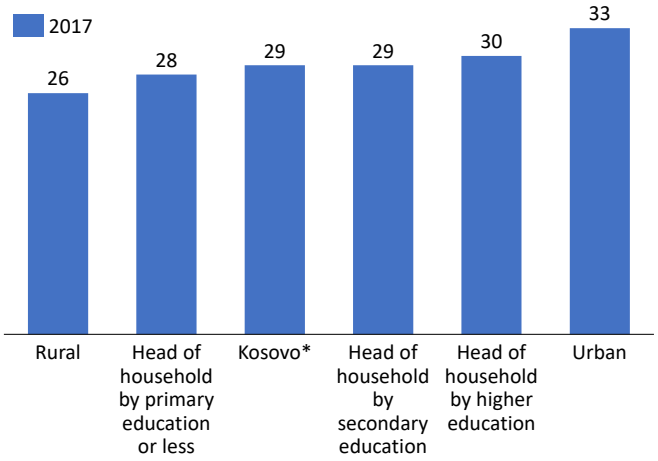


Figure 7-24. Housing costs as a share of total expenditures of Kosovo* households

Source: Kosovo Agency for Statistics [58]*

7.5.2.2 Arrears on utility bills

Data on arrears on utility bills are based on EUROSTAT data for the year 2018. The data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

The percentage of households in arrears on utility bills is shown in the next figure for households with income below 60% of the median equivalized income and covers the most vulnerable households. As shown in the figure, the highest proportion of households below 60% median equalized income in arrears on utility bills are those with single adults 65 years or more: 72% of such households reported arrears on utility bills. Among all households with an income below 60% of median equalized income, 68% reported arrears on utility bills.

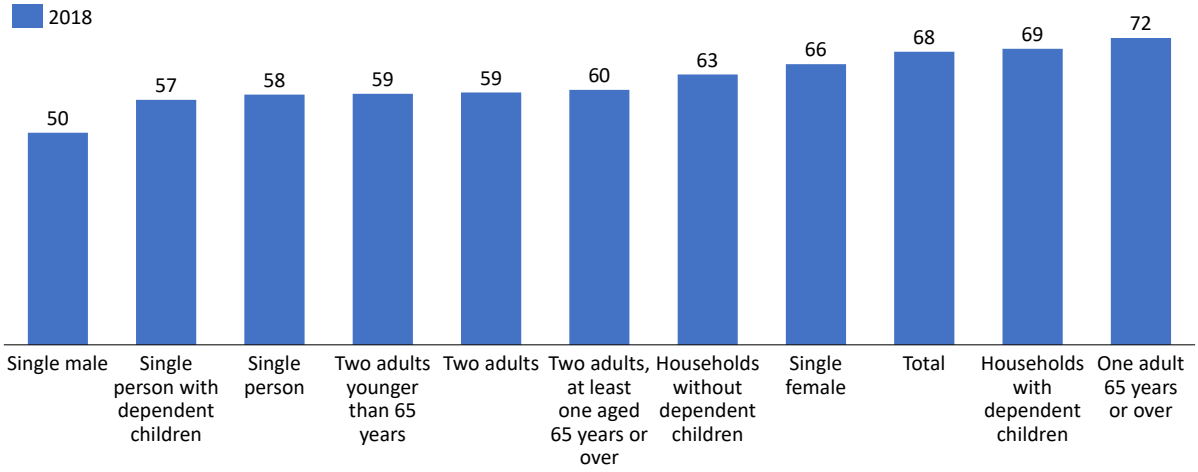


Figure 7-25. Share of households below 60% of median equivalized income in Kosovo* in arrears on utility bills in 2018

Source: EUROSTAT

As expected, arrears on utility bills are lower when all households are taken into consideration. According to the following figure, 59% of all single-person households with dependent children were in arrears on utility bills in 2019. Among all households, irrespective of income, 49% of households experienced arrears on utility bills.

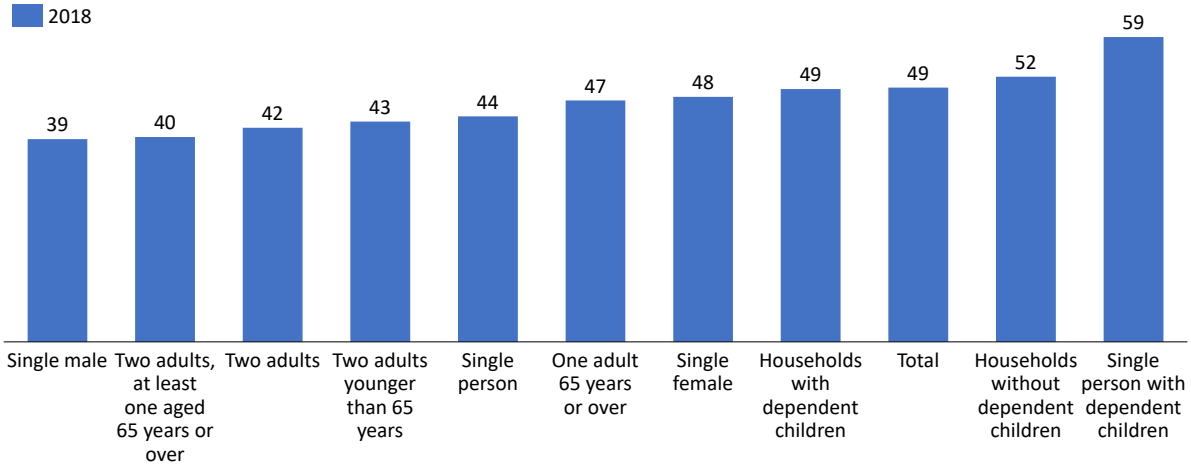


Figure 7-26. Share of households in Kosovo* with arrears on utility bills in 2018

Source: EUROSTAT

7.5.2.3 Inability to keep homes adequately warm

Data on the inability to keep households adequately warm are based on EUROSTAT data for the year 2018. The data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two

adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

Data on the inability to keep households warm are shown in the next figure relating to households with an income below 60% of the median equivalized income and covers the most vulnerable households. The following figure shows that single female households face the greatest difficulties in keeping their homes adequately warm: 66% of such households in 2018 were unable to keep their homes adequately warm. Slightly lower values exist for single-person households, where 61% of such households reported as unable to keep their homes adequately warm. Overall, 53% of households with an income below 60% of the median equivalized income had difficulties in keeping their homes adequately warm in 2018.

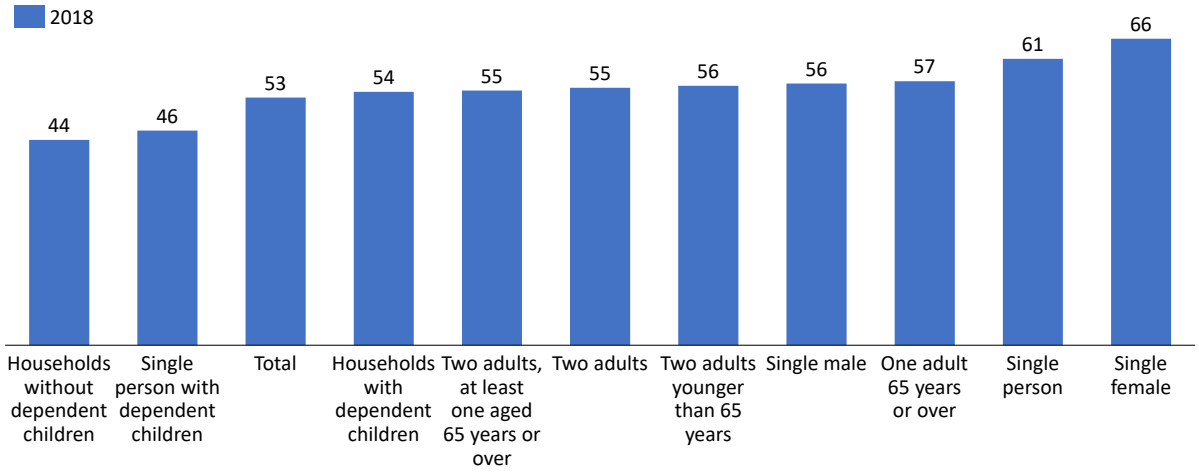


Figure 7-27. Share of households below 60% of the median equivalized income in Kosovo* unable to keep homes adequately warm in 2018

Source: EUROSTAT

The share of households unable to keep their homes adequately warm declines when all households are taken into consideration. The following figure shows that the highest share of households unable to keep their homes adequately warm are single female households. Moreover, 49% of such households are unable to keep their homes adequately warm. In all, 40% of all households are unable to keep their homes adequately warm.

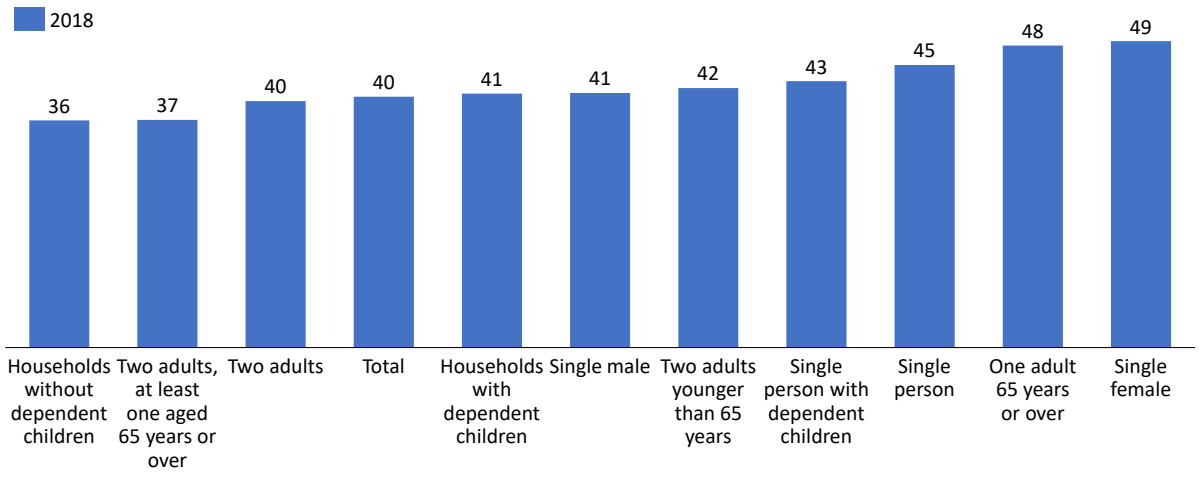


Figure 7-28. Share of households in Kosovo* unable to keep their homes adequately warm in 2018

Source: EUROSTAT

7.5.2.4 Condensation, leaking roof, rot in windows or doors

Data on condensation, leaking roof, rot in windows or doors are based on EUROSTAT data for the year 2018. The data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

The data on condensation, leaking roofs, rot in windows or doors are shown in the next figure for households with an income below 60% of the median equivalized income and covers the most vulnerable households. The following figure shows that 52% of households with two adults where at least one is aged 65 years or older with an income below 60% of median equivalized income reported condensation, leaking roofs, rot in windows or doors. Overall, 36% of all households with an income below 60% of the median equivalized income reported condensation, leaking roofs, rot in windows or doors.

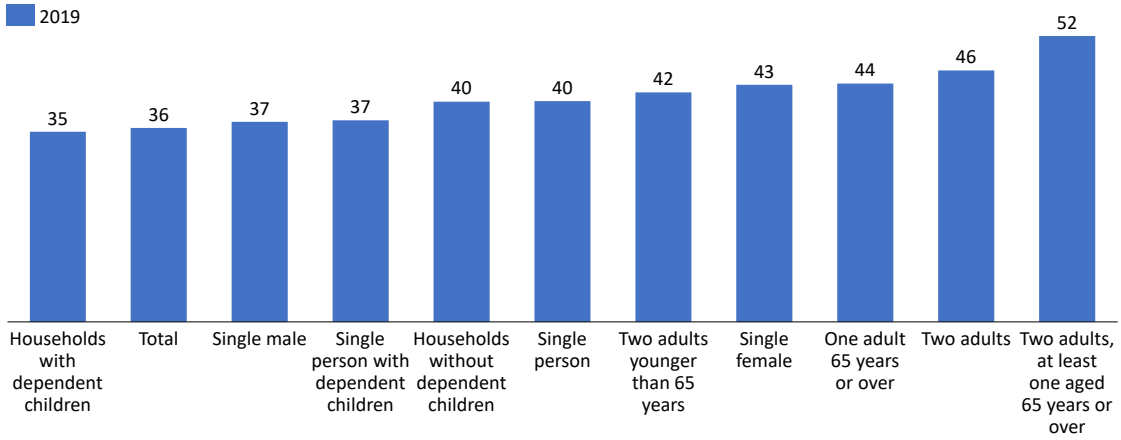


Figure 7-29. Share of households below 60% of the median equivalized income in Kosovo* experiencing condensation, leaking roof, rot in windows or doors in 2018

Source: EUROSTAT

The share of households with leaking roofs declines as expected when all households are taken into consideration. Single-person households with dependent children are most affected by this issue, i.e., 28% of such households have leaking roofs. At the same time, 21% of all households reported having an issue with leaking roofs.

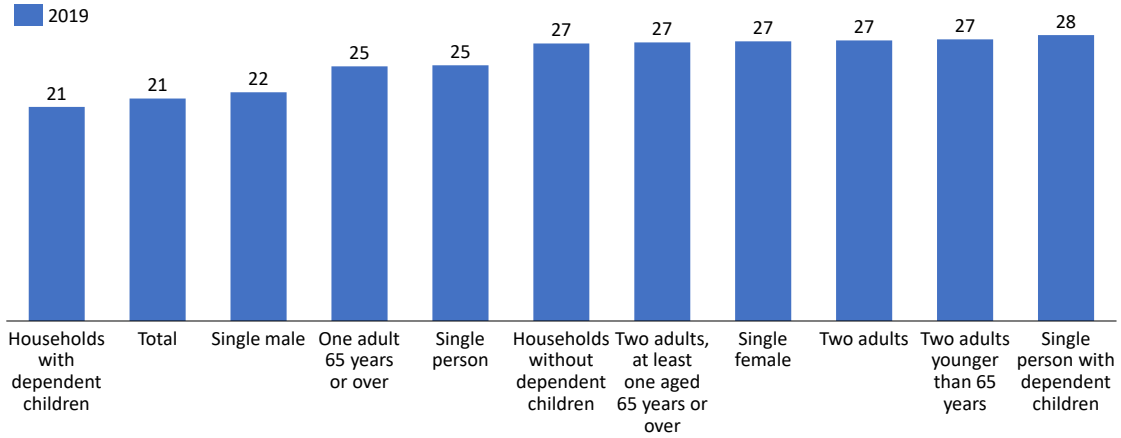


Figure 7-30. Share of households in Kosovo* experiencing condensation, leaking roof, rot in windows or doors in 2018

Source: EUROSTAT

7.5.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using an upper and lower bound for the number of energy-poor households. We set the lower bound as the share of households that stated they were unable to keep their homes adequately warm. We proposed the upper bound as the share of those households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators, we were able to cover both types of households: those that overspend (due to energy inefficiency of their homes) and those that underspend due to the lack of sufficient financial resources.

Based on the data available to the Consultant, the Kosovo* Agency of Statistics conducts the EU SILC and HBS surveys which are proposed for estimating and monitoring the number of energy-poor households in Kosovo*. Unfortunately, the Consultant has not received the required microdata, thus was not able to estimate the number of energy-poor households in Kosovo* based on Kosovo* data. Therefore, only a rough estimate can be made based on the publicly available data.

According to the data provided in Figure 7-28, 40% of all households in Kosovo* declare they cannot keep their homes adequately warm. Given that we have proposed to use the share of households unable to keep their homes adequately warm that belong to the first four deciles as a lower bound indicator, and that the reported 40% represents all households, the value of 40% can be considered an upper bound for the estimated number of energy poor households in Kosovo*. Therefore, the estimated upper bound for the number of energy poor households in Kosovo* is 133,000[156].

In terms of future responsibility for calculating the indicators, we propose that the Kosovo* Agency of Statistics calculate the indicators. To ensure comparability with indicators calculated under the EU Energy Poverty Observatory project, the recommendation is that the Kosovo* Agency of Statistics use the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[157]

[156] Due to the lack of micro data, it is not possible to estimate the lower bound of the number of energy poor households in Kosovo*.

[157] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.6 Moldova

Based on information provided to the Consultant, the National Bureau of Statistics of the Republic of Moldova (NBS) conducts the Household Budget Survey (HBS) but not the Survey on Income and Living Conditions (EU SILC).

The Consultant has not received microdata for calculating the poverty indicators. Following the discussion during the *Interim Report Presentation* held on 28 April 2021, it was apparent that the current legal framework in Moldova does not permit the distribution of microdata to other entities, except for research purposes. The recommendation was given that the NBS perform calculations for the proposed indicators and provide them to the Consultant. Unfortunately, at the time of this Study, the Consultant has yet to receive the required calculations.

Table 7-11. Summary of available and received statistical data for Moldova

Country: Moldova		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✗
EU SILC	✗	✗

Table 7-12. Availability of statistical data in Moldova

7.6.1 Data Description

Given that microdata was not available, the Consultant has used the data available on the official webpages of the National Bureau of Statistics of the Republic of Moldova related to household expenditures in Moldova to draft this report.

7.6.2 Analysis of the indicators

7.6.2.1 Expenditures on energy

The following figure shows the share of expenditure on housing, water, gas and electricity for the year 2020. Given that the data includes expenditures on housing and water, it is safe to assume that energy-related expenditures are less than the values shown.

The data is provided for five income quintiles of the population and separately for urban, rural, and total households. The share of expenditures is relatively stable over the quintiles and ranges from approximately 16% to 17%. Only in the 5th quintile does the share of expenditures fall to 14% for urban households.

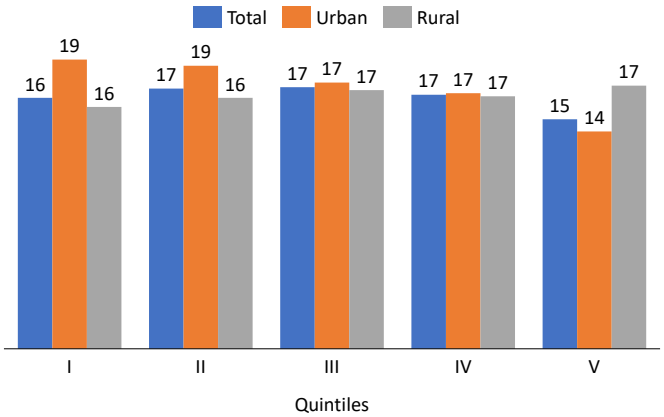


Figure 7-31. Consumption expenditures of the population by quintiles and areas for 2020

Source: National Bureau of Statistics of the Republic of Moldova

7.6.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using an upper and lower bound for the number of energy-poor households. The lower bound we used is the share of households that stated as unable to keep their homes adequately warm. We proposed the upper bound as the share of households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators we covered both types of households: those that overspend (due to energy inefficiency of their homes) and those that underspend due to the lack of sufficient financial resources.

Based on the information available to the Consultant, the NBS does not conduct the EU SILC survey. Therefore, the Consultant has suggested that the survey be conducted in Moldova in order to precisely estimate the number of energy-poor households.

The NBS conducts the HBS but unfortunately, the Consultant has not yet received the required microdata and therefore was not able to estimate the prevalence of energy poverty in households in Moldova using Moldovan data. Moreover, official webpages of the NBS do not contain any other data besides those report in Figure 7-31. Therefore, the Consultant was not able to make even a rough estimate on the number of energy poor households in Moldova.

In terms of future responsibility for calculating the indicators, we propose that the NBS calculate the indicators. To ensure comparability with the indicators calculated under the EU Energy Poverty Observatory project, the suggestion is that the NBS utilize the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[158]

[158] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.7 Montenegro

Statistical Office of Montenegro (MONSTAT) conducts the Household Budget Survey (HBS) as well as the Survey on Living and Income Conditions (EU SILC). Microdata from both surveys has been provided to the Consultant.

Table 7-13. Summary of available and received statistical data for Montenegro

Country: Montenegro		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✓
EU SILC	✓	✓

7.7.1 Data Description

The Statistical Office of Montenegro (MONSTAT) provided the necessary data sets for two surveys:

1. Household Budget Survey for the year 2017
2. EU Survey on Income and Living Conditions for the years 2015, 2017, 2018, and 2019.

7.7.1.1 Household Budget Survey

The Household Budget Survey (HBS) for the year 2017 is the main data source for calculating the expenditure-based energy poverty indicators, 2M (households with a significant share of energy expenditure in income) and M/2 (households with low absolute energy expenditure).[159] The survey provides detailed information on various income sources of household members as well as household consumption and expenditures. The sample includes 1327 households, with a response rate of 72.75%,[160] which is a sufficiently representative sample. All variables are reported on a monthly basis, and indicator calculation were done on a monthly basis.

Income was calculated by summing all the income variables (codes from "p62" to "p88", "vP3Prihodi" file) of individual members across households to obtain the household income variable. Furthermore, total household income was further adjusted by adding the imputed rent (code "04.2.1.0", file "vP2izdaci"). Household expenditure for electricity, gas and other fuels was calculated by summing expenditure items for electricity (variable code "04.5.1.0"), gas ("04.5.2.2" liquid fuels ("04.5.3.0"), solid fuels ("04.5.4.1" and "04.5.4.9") and heat energy ("04.5.5.0").

Both total household income and total household energy expenditure variables have been equivalized, meaning adjusted based on the number of household members using the OECD-modified equivalence scale.[161] The calculation of equivalized household size requires assigning a value to each household member: 1.0 to the first adult; 0.5 for the second and each subsequent person aged 14 and over; 0.3 for each child aged under 14, and subsequently summing these values. Income and expenditure variables are then divided by the equivalized household size.

The share of household energy expenditure in income is calculated by dividing the equalized values of household energy expenditure and total household income. The M/2 indicator is calculated by dividing the weighted median of the equivalized absolute household energy expenditure by 2, while the 2M indicator is calculated by multiplying the weighted median of the

[159] Unless otherwise stated, the description of the calculation for energy poverty indicators given in the text is based on Thema, J., and Vondung, F. (2020) *EPOV Indicator Dashboard: Methodology Guidebook*. Wuppertal Institut für Klima, Umwelt, Energie GmbH.

[160] Household Budget Survey in 2017 *Release 98/2,* Statistical Office of Montenegro 2018

[161] See https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf

share of household energy expenditure by 2. Getting the value of shares of households in relation to these indicators requires first assessing whether each household is under M/2 or above 2M. The shares are then calculated as the sum of household survey weights that satisfy the mentioned criteria and then divided by the total sum of household weights. This is done both for the total population and by income decile groups, tenure status, and other characteristics. Income decile groups were identified by calculating the weighted deciles of equivalized household income and assessing whether a household belongs to particular boundaries given by income decile values. In this manner, all reported variables, such as shares of households, mean/median, M/2, and 2M shares have been weighted using survey weights. The survey weights used in the calculation are provided in the variable "ponder", in the file "vPonderiDomac". There were no atypical values among the shares of household energy expenditure in income and no data cleaning was necessary.

7.7.1.2 Survey on Income and Living Conditions

The Survey on Income and Living Conditions (SILC) available for the years 2015, 2017, 2018, and 2019 is the main data source for calculating the consensual-based indicators, specifically:

- Share of households in arrears on utility bills (variable HS021)
- Share of households experiencing a leaking roof, damp walls/floors/foundation or rot in the window (HH040)
- Share of households unable to keep their homes adequately warm (based on HH050)

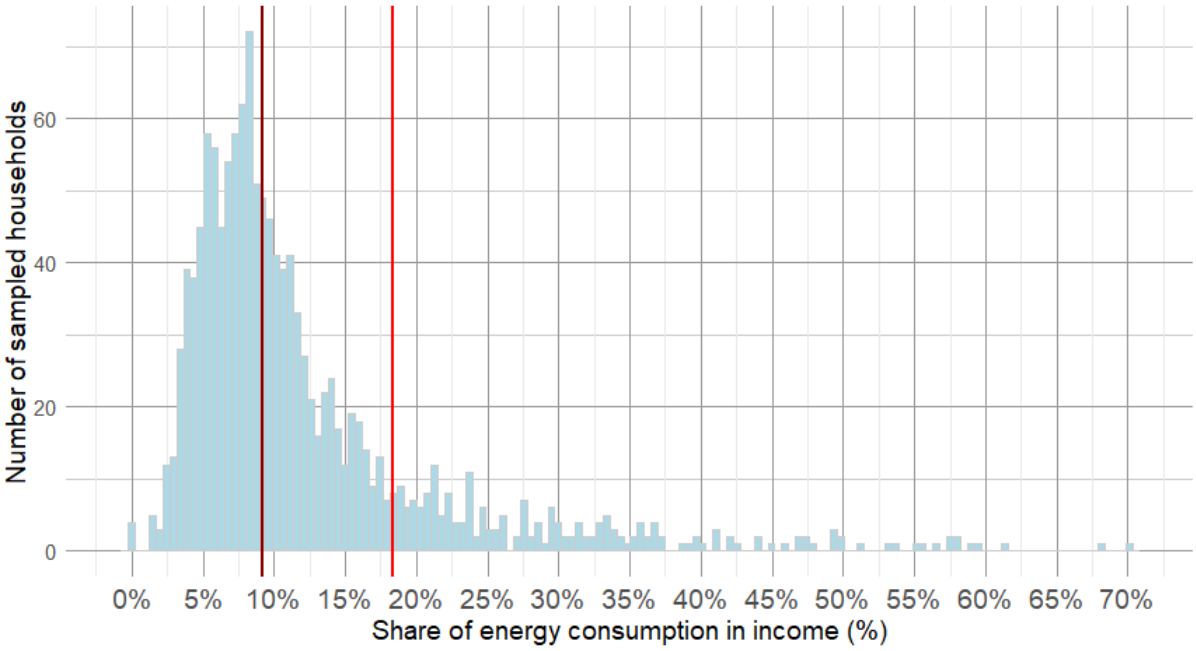
In the 2015, 2017, 2018, and 2019 survey waves there were 4362, 4283, 4200, and 4315 households in the samples, respectively, with response rates of 85.1%, 83.4%, 78%, and 78.2%, suggesting representative samples. In the SILC, all variables are reported yearly and, where applicable, the calculation of the indicators was also done on a yearly basis. Values for income were taken from the total disposable household income variable (HY020), increased by the amount of the imputed rent (HY030G), and equalized in the same manner as the HBS data. Shares of households were calculated in the same manner as for HBS variables, i.e., as the sum of weights for households satisfying the criterion divided by the total sum of weights, and the procedure was the same for income deciles. Cross-sectional weights (DB090) were used for weighting shares of households. No data cleaning was done when calculating consensual-based indicators.

7.7.2 Analysis of the indicators

7.7.2.1 2M indicator

The following figure shows the distribution of the share of energy consumption (expenditure) in income, along with highlighted median and 2M points. The dark red line shows the median value, while the bright red line shows the 2M value.[162]

[162] For presentation purposes, a single household with an energy expenditure share of 112% was left out of the histogram but included in all other calculations.



Source: HBS, 2017

The following two figures show the share of the population spending twice the national median on energy. The left figure shows the relative share while the right figure shows the absolute numbers. The issue of overspending on energy is most pronounced in the first income decile where 46% of household face the problem of energy overspending. In terms of the total numbers, this equals approximately nine thousand households that reported high energy bills in the first decile. This issue is much less pronounced in the next four deciles, though a spike in terms of the number of households in the third decile does appear, which may be due to the specific sample in the observed year. When the entire population is taken into account, 15% of all households have energy expenditures that are twice the national median.

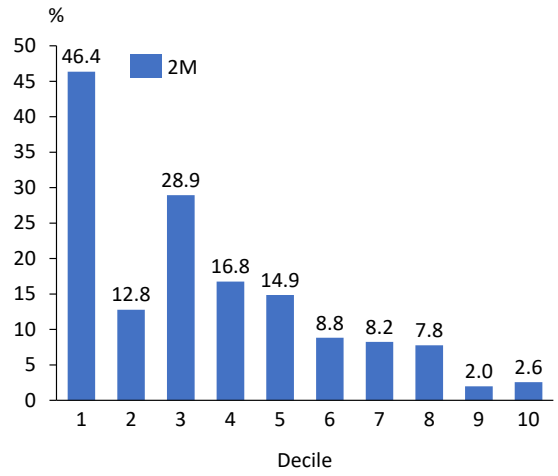


Figure 7-32. 2M indicator for Montenegro, by deciles (2017), relative share of households

Source: HBS, 2017

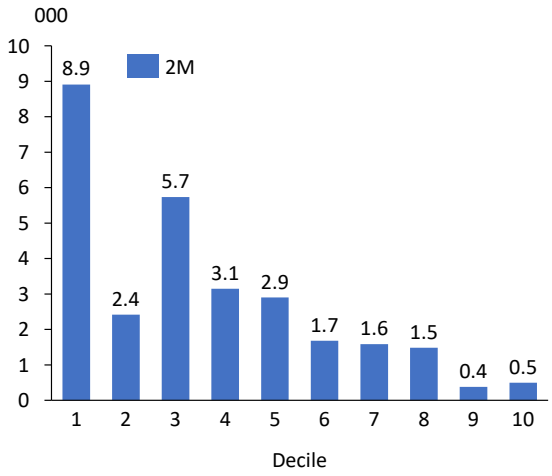


Figure 7-33. 2M indicator for Montenegro, by deciles (2017), absolute number of households

Source: HBS, 2017

The following table shows the values for the 2M indicator in terms of various socioeconomic characteristics for households.

Table 7-14. Values of 2M indicator for various socioeconomic characteristics of the households

Category	Value	No.	2M	
			Share	Absolute
The basis for dwelling usage	Owner	179,581	15%	26,261
	Renter (state owned apartment)	236	0%	0
	Renter (whole apartment)	7,888	22%	1,749
	Renter (part of apartment)	1,246	16%	202
	Living at parents, children or relatives	2,390	12%	284
	Other	848	28%	235
Type of apartment	Separate room	169	47%	80
	Studio apartment	2,674	15%	396
	One bedroom apartment	18,147	15%	2,643
	Two bedroom apartment	79,739	13%	10,424
	Three bedroom apartment	66,998	14%	9,680
	Four or more bedroom apartment	20,609	16%	3,274
	The room is not housing	3,854	58%	2,234
Type of heating	Central heating with own installations	7,070	33%	2,334
	Electricity heating	46,212	7%	3,028
	Solid fuel	131,547	18%	23,135
	Liquid fuel	295	0%	0
	Combined	7,066	3%	235
Number of household members	1	46,079	19%	8,689
	2	53,613	14%	7,473
	3	30,818	14%	4,229
	4	33,525	16%	5,527
	5	17,253	11%	1,853
	6+	10,903	9%	962

Source: HBS, 2017

7.7.2.2 M/2 indicator

The following figure shows the histogram of energy consumption (expenditures in EUR) for Montenegro with the median and M/2 values highlighted. The dark red line represents the median value, while the bright red line represents the M/2 value.

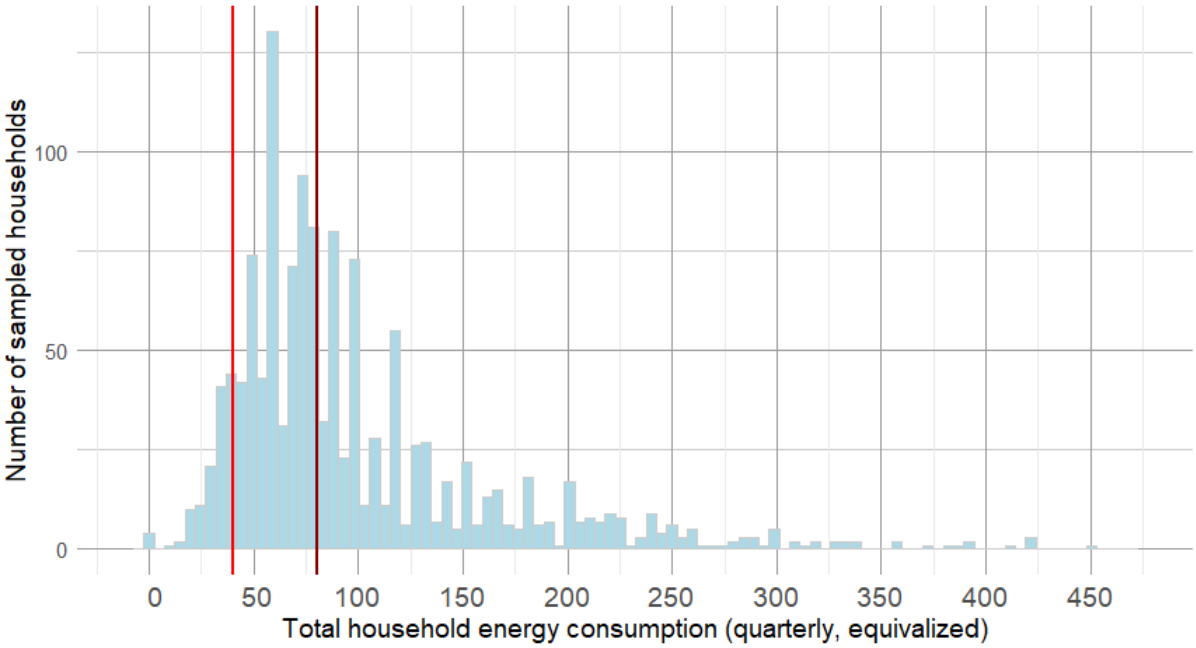


Figure 7-34. Histogram of expenditures for Montenegro (2019)

Source: HBS, 2017

In terms of the number of households that underspend on energy, the following two figures show the relative and absolute values of households that report energy spending less than half the national median. The issue of underspending is most pronounced in the first decile, with more than three times the number of households meeting this criterion compared to the second decile. When the entire population is taken into account, 6% of all households spend less than half the national median on energy.

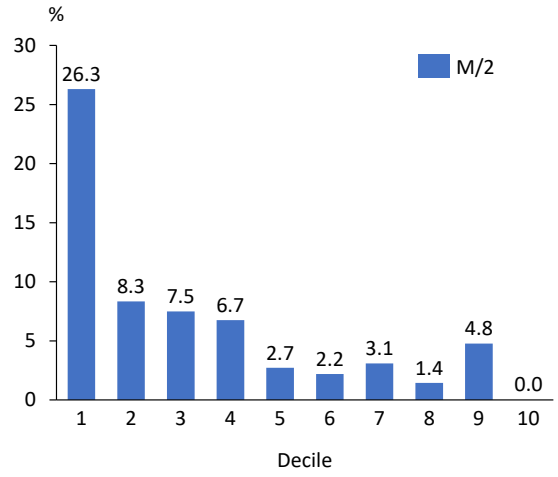


Figure 7-35. M/2 indicator for Montenegro, by deciles (2017), relative share of households

Source: HBS, 2017

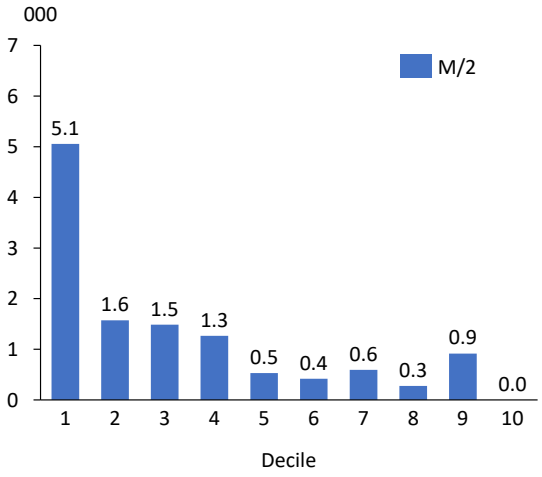


Figure 7-36. M/2 indicator for Montenegro, by deciles (2017), absolute number of households

Source: HBS, 2017

The following table shows the values of the M/2 indicator for various socioeconomic characteristics of households.

Table: values of the M/2 indicator for various socioeconomic characteristics of households

Category	Value	No.	M/2	
			Share	Absolute
The basis for dwelling usage	Owner	179,581	6%	11,204
	Renter (state owned apartment)	236	81%	190
	Renter (whole apartment)	7,888	5%	358
	Renter (part of apartment)	1,246	0%	0
	Living at parents, children or relatives	2,390	12%	275
	Other	848	11%	91
Type of apartment	Separate room	169	0%	0
	Studio apartment	2,674	4%	114
	One bedroom apartment	18,147	6%	1,055
	Two-bedroom apartment	79,739	8%	5,989
	Three-bedroom apartment	66,998	5%	3,254
	Four- or more bedroom apartment	20,609	4%	842
	The room is not housing	3,854	22%	865
Type of heating	Central heating with own installations	7,070	0%	0
	Electricity heating	46,212	1%	567
	Solid fuel	131,547	9%	11,478
	Liquid fuel	295	0%	0
	Combined	7,066	1%	74
Number of household members	1	46,079	3%	1,194
	2	53,613	1%	334
	3	30,818	6%	1,860
	4	33,525	7%	2,476
	5	17,253	16%	2,748
	6+	10,903	32%	3,508

Source: HBS, 2017

7.7.2.3 Energy burden

The next two figures show the median and mean share of energy expenditures in household income, by decile. Median and mean energy burden for the entire population are 9% and 12% respectively.

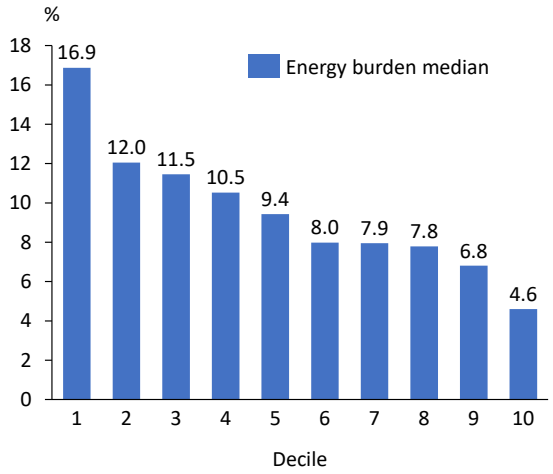


Figure 7-37. The median share of energy expenditures in disposable income for Montenegro, by deciles (2017)

Source: HBS, 2017

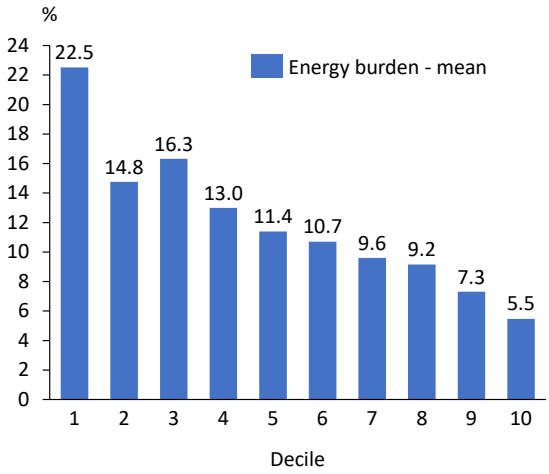


Figure 7-38. Mean share of energy expenditures in disposable income for Montenegro, by deciles (2017)

Source: HBS, 2017

The following table presents the median and mean energy burden (share of energy expenditure in income) for various socioeconomic characteristics of households.

Table 7-15. Median and mean energy burden for various socioeconomic characteristics of households

Category	Value	No.	Median energy burden	Mean energy burden
The basis for dwelling usage	Owner	179,581	9%	23%
	Renter (state owned apartment)	236	5%	15%
	Renter (whole apartment)	7,888	9%	16%
	Renter (part of apartment)	1,246	9%	13%
	Living at parents, children or relatives	2,390	10%	11%
	Other	848	8%	11%
Type of apartment	Separate room	169	5%	10%
	Studio apartment	2,674	11%	9%
	One bedroom apartment	18,147	10%	7%
	Two-bedroom apartment	79,739	9%	5%
	Three-bedroom apartment	66,998	9%	12%
	Four- or more bedroom apartment	20,609	8%	6%
	The room is not housing	3,854	24%	14%
Type of heating	Central with own installations	7,070	11%	16%
	Electricity heating	46,212	7%	11%
	Solid fuel	131,547	10%	14%
	Liquid fuel	295	10%	16%
	Combined	7,066	9%	12%
Number of household members	1	46,079	11%	13%
	2	53,613	9%	12%
	3	30,818	8%	12%
	4	33,525	8%	11%
	5	17,253	8%	27%
	6+	10,903	9%	14%

Source: HBS, 2017

Finally, the following two figures show median energy expenditures and median incomes (both non-equalized) by decile.

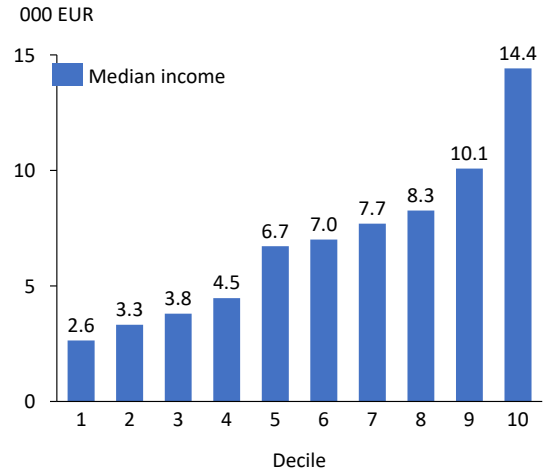


Figure 7-39. Median energy expenditure by deciles (2017), EUR

Source: HBS, 2017

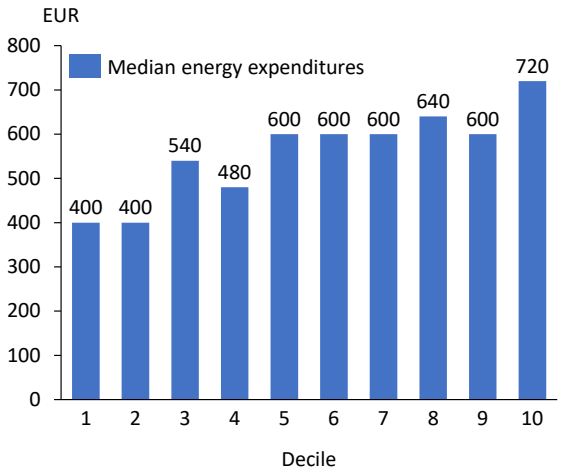


Figure 7-40. Median income by deciles (2017), EUR

Source: HBS, 2017

7.7.2.4 Arrears on utility bills

Figure 7-41 shows the share of households in arrears on utility bills for each income decile while Figure 7-42 shows the absolute number of households in arrears on utility bills. The figures show a very high share of the population in arrears on utility bills, even in the 10th decile, which may be attributed to regional social norms regarding the payment of bills. For the entire population the share of households with arrears for utility bills ranges between 24% and 35%, depending on the year.

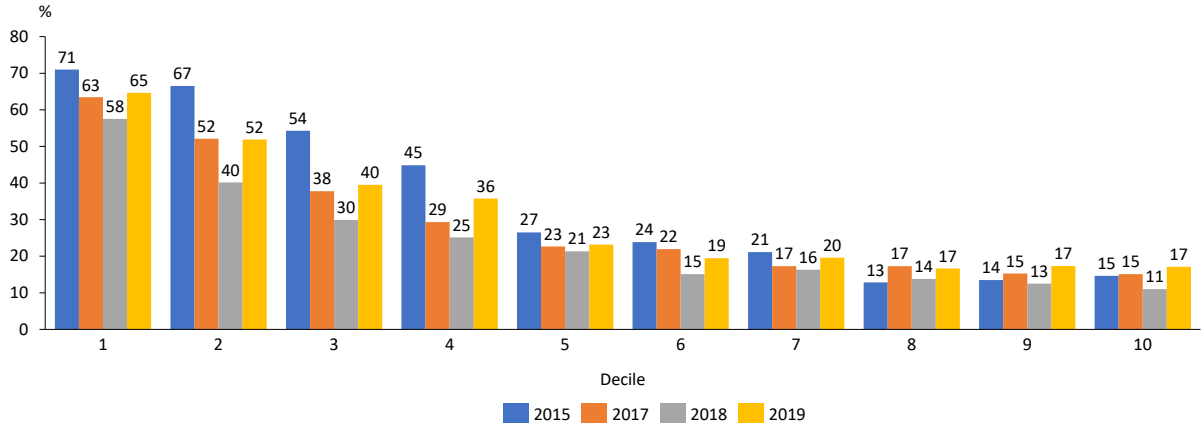


Figure 7-41. Share of households in arrears on utility bills in Montenegro, by equivalized income deciles (2015, 2017, 2018, 2019)

Source: EU SILC, 2015, 2017, 2018, 2019

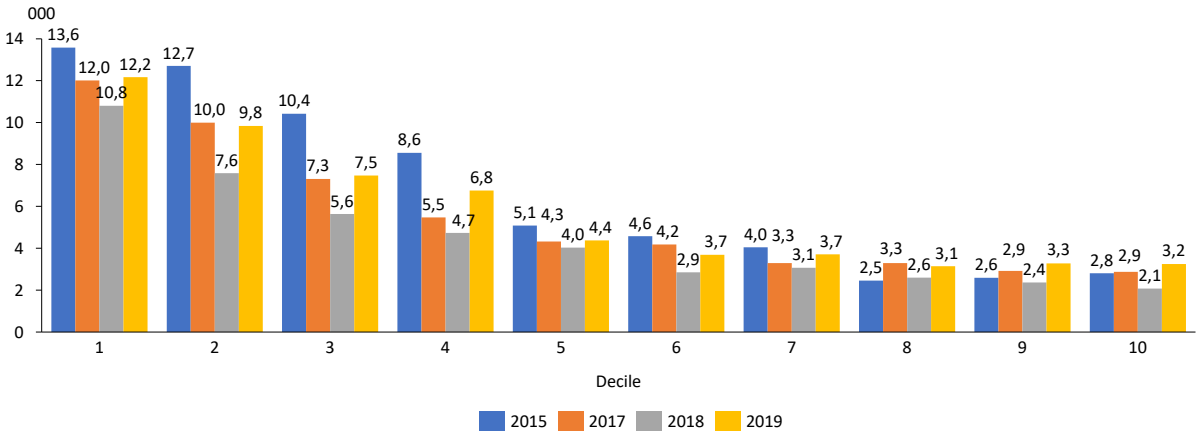


Figure 7-42. Number of households in arrears on utility bills in Montenegro, by equivalized income deciles (2015, 2017, 2018, 2019)

Source: EU SILC, 2015, 2017, 2018, 2019

The following table shows the share of households in arrears on utility bills according to various socioeconomic characteristics.

Table 7-16. ***Arrears on utility bills based on various socioeconomic characteristics of households (2015, 2017, 2018, 2019)***

Category	Value	EU SILC 2015		EU SILC 2017		EU SILC 2018		EU SILC 2019	
		Arrears		Arrears		Arrears		Arrears	
		Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute
Dwelling type (HH010)	Detached house	38%	52,303	32%	3,826	25%	34,222	32%	43,941
	Semi-detached or terraced house	34%	3,170	29%	2,176	19%	1,922	31%	2,883
	Apartment or flat in a building with less than 10 dwellings	21%	2,434	23%	2,654	19%	1,802	24%	2,596
	Apartment or flat in a building with 10 or more dwellings	26%	7,968	18%	6,190	20%	6,760	23%	7,265
	Some other kind of accommodation	62%	921	55%	803	70%	1,015	75%	970
Tenure status (HH021)	Outright owner	35%	56,231	29%	48,801	24%	39,955	31%	52,185
	Owner paying mortgage	26%	1,750	16%	499	20%	590	18%	613
	Tenant or subtenant paying rent at prevailing or market rate	37%	4,466	27%	3,436	20%	2,023	24%	1,977
	Accommodation is rented at a reduced rate	35%	141	14%	32	65%	269	100%	111
	Accommodation is provided Free	43%	4,208	33%	2,880	33%	2,884	31%	2,769

Source: EU SILC, 2015, 2017, 2018 ,2019

7.7.2.5 Inability to keep home adequately warm

During the 2018 and 2019 surveys, the share of households not able to keep their homes adequately warm was 43.7% and 36% in the first decile, respectively. In the two preceding years, this value was significantly lower. For the entire population, the indicator ranges between 4% and 11%, depending on the year.

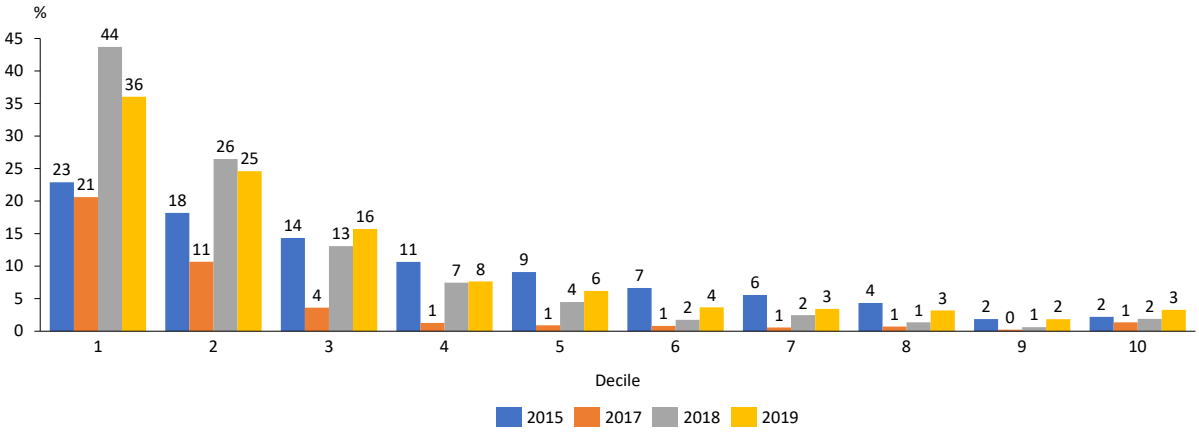


Figure 7-43. Share of households unable to keep homes adequately warm in Montenegro, by equivalized income deciles (2015, 2017,2018,2019)

Source: EU SILC, 2015, 2017, 2018 ,2019

The following figure shows the absolute number of households by income decile that claimed to be unable to keep their homes adequately warm.

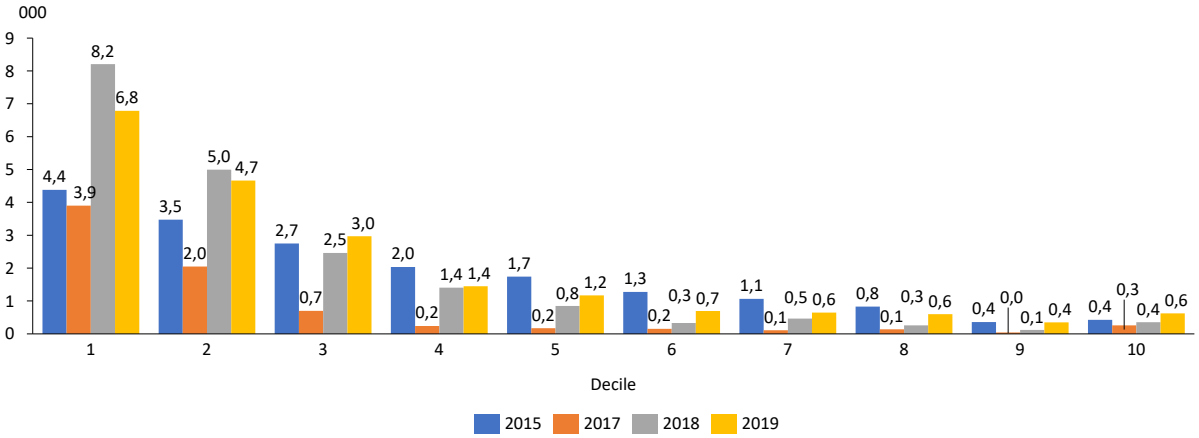


Figure 7-44. Number of households unable to keep homes adequately warm in Montenegro, by equivalized income deciles (2015, 2017,2018,2019)

Source: EU SILC, 2015, 2017,2018,2019

The following table presents the share of households with various socioeconomic characteristics unable to keep their homes adequately warm.

Table 7-17. Inability to keep household warm for various socioeconomic characteristics of households (2015, 2017, 2018, 2019)

Category	Value	EU SILC 2015		EU SILC 2017		EU SILC 2018		EU SILC 2019	
		Cold home		Cold home		Cold home		Cold home	
		Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute
Dwelling type (HH010)	Detached house	10%	13,911	4%	5,952	12%	15,960	12%	16,708
	Semi- detached or terraced house	11%	985	0%	17	6%	560	3%	300
	Apartment or flat in a building with less than 10 dwellings	9%	1,047	2%	224	8%	783	9%	995
	Apartment or flat in a building with 10 or more dwellings	7%	2,052	3%	994	4%	1,457	6%	1,753
	Some other kind of accommodation	23%	335	39%	572	47%	679	14%	183
Tenure status (HH021)	Outright owner	9%	15,260	4%	6,373	10%	17,075	11%	17,922
	Owner paying mortgage	4%	249	3%	106	3%	81	8%	254
	Tenant or subtenant paying rent at prevailing or market rate	14%	1,644	4%	454	5%	542	6%	499
	Accommodation is rented at a reduced rate	11%	44	0%	0	72%	300	51%	56
	Accommodation is provided free	12%	1,133	10%	827	16%	1,441	13%	1,209

Source: EU SILC, 2015, 2017, 2018, 2019

7.7.2.6 Condensation, leaking roof, rot in windows or doors

The following figure shows the share of households experiencing condensation, leaking roofs, or rot in windows. The figure shows that the share is the highest in the first decile, but there is no significant difference between the income deciles. For the whole population, between 23% and 33% of all households claim to face condensation, leaking roofs, or rot in windows.

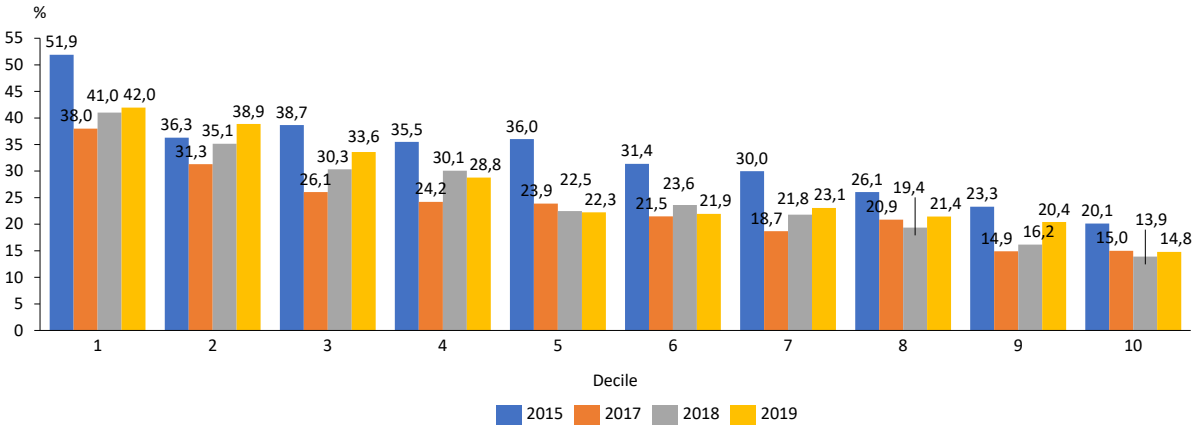


Figure 7-45. Share of households with a leaking roof, damp walls/floors/foundation, or rot in the window in Montenegro, by equivalized income deciles (2015, 2017,2018,2019)

Source: EU SILC, 2015, 2017, 2018, 2019

The following figure shows the absolute number of households experiencing condensation, leaking roofs, or rot in windows.

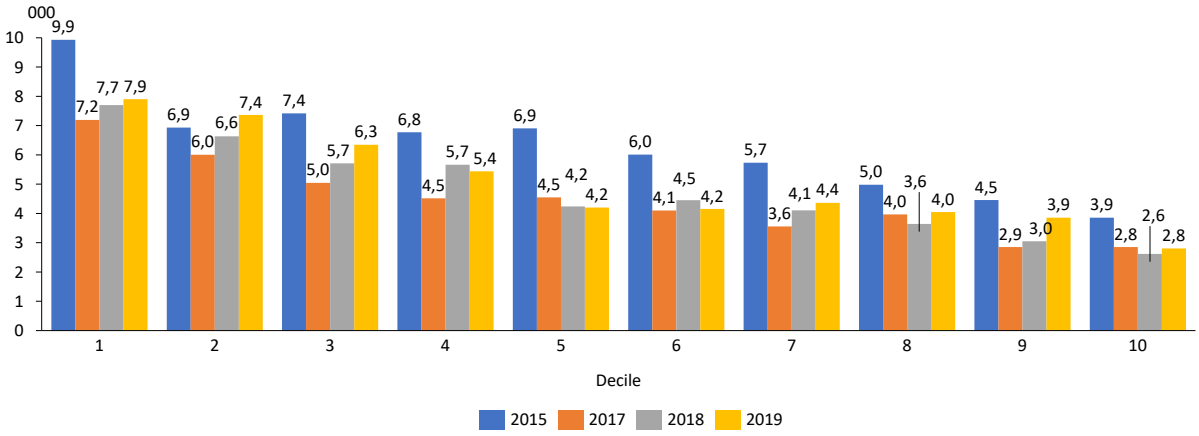


Figure 7-46. Number of households with a leaking roof, damp walls/floors/foundation, or rot in the window in Montenegro, by equivalized income deciles (2015, 2017,2018,2019)

Source: EU SILC, 2015, 2017,2018,2019

The following table presents the share of households with various socioeconomic characteristics that are experiencing leaking roofs.

Table 7-18. L*eaking roof, damp walls/floors/foundation for various socioeconomic characteristics of households in Montenegro (2015, 2017, 2018, 2019)*

Category	Value	EU SILC 2015		EU SILC 2017		EU SILC 2018		EU SILC 2019	
		Leaking roof		Leaking roof		Leaking roof		`Leaking roof	
		Share	Absolute	Share	Absolute	Share	Absolute	Share	Absolute
Dwelling type (HH010)	Detached house	32%	44,070	23%	31,386	25%	33,532	26%	35,967
	Semi- detached or terraced house	45%	4,107	36%	2,711	28%	2,758	26%	2,429
	Apartment or flat in a building with less than 10 dwellings	34%	3,974	20%	2,322	27%	2,626	28%	2,989
	Apartment or flat in a building with 10 or more dwellings	31%	9,663	20%	6,896	23%	7,637	27%	8,292
	Some other kind of accommodation	79%	1,170	89%	1,304	87%	1,257	61%	781
Tenure status (HH021)	Outright owner	33%	54,310	23%	38,173	25%	41,160	26%	44,359
	Owner paying mortgage	21%	1,396	23%	715	23%	691	24%	821
	Tenant or subtenant paying rent at prevailing or market rate	31%	3,714	17%	2,173	29%	2,916	29%	2,428
	Accommodation is rented at a reduced rate	27%	109	62%	138	52%	216	100%	111
	Accommodation is provided free	35%	3,455	40%	3,421	32%	2,828	31%	2,738

Source: EU SILC, 2015, 2017,2018,2019

7.7.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using an upper and lower bound for the number of energy-poor households. We used as the lower bound the share of households that stated they are unable to keep their homes adequately warm. We proposed as the upper bound using the share of households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators we covered both types of households: those that overspend (due to energy inefficient homes) and those who underspend due to lack of sufficient financial resources. According to the available data, the share of energy-poor households in Montenegro ranges between 8%[163] to 15%[164] of all households. This percentage implies that there are between 16,000 and 30,000 energy-poor households in Montenegro.

In terms of responsibility for calculating the indicators, we propose that MONSTAT perform calculations for the indicators. To ensure comparability with indicators calculated under the EU Energy Poverty Observatory project, the suggestion is that MONSTAT use the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[165]

[163] This value represents the share of population stating that they are unable to keep their homes adequately warm.

[164] This value represents the share of households that spend twice the national median on energy (10% of households) and share of households that spend half the national median (5% of all households).

[165] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.8 North Macedonia

The State Statistical Office of the Republic of North Macedonia conducts the Household Budget Survey (HBS) and Survey on Income and Living Conditions (EU SILC) but was unable to deliver the microdata from the two surveys due to current legal restrictions. Therefore, the Consultant relied on publicly available data.

Table 7-19. Summary of available and received statistical data for North Macedonia

Country: North Macedonia		
	Survey carried out in CP	Survey received by the Consultant
HBS	✓	✗
EU SILC	✓	✗

7.8.1 Data Description

Given that the Consultant did not receive the microdata, the analysis is based on publicly available data obtained from the State Statistics Office of the Republic of Macedonia database for energy expenditures and the EUROSTAT database for the EU SILC survey.

7.8.2 Analysis of the indicators

7.8.2.1 Expenditure on energy

Due to the lack of HBS microdata, it was not possible to calculate the value of the M/2 and 2M indicators. Only an average value for the share of household expenditures on housing, water, electricity, gas, and other fuels was available. Data was available for four different types of households: agricultural, mixed, all, and nonagricultural. Values in the following figure show that average expenditures increase from 9% for agricultural households to 12% for nonagricultural households. Since the data includes expenditures on water and housing, it is safe to assume that energy-related expenditures are slightly lower.

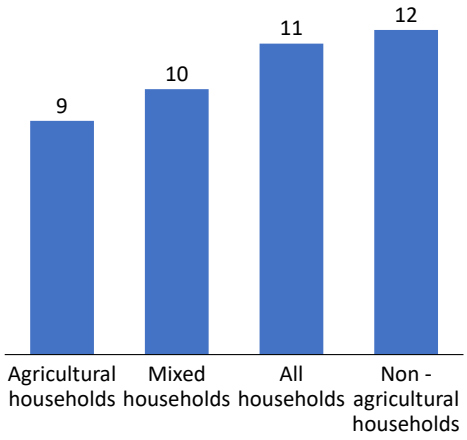


Figure 7-47. Share of expenditure on housing, water, electricity, gas, and other fuels in 2017

Source: State Statistical Office of the Republic of Macedonia

7.8.2.2 Arrears on utility bills

Data relating to arrears on utility bills are based on EUROSTAT data for the year 2019. The data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

The percentage of households in arrears on utility bills is shown in the next figure for those households with incomes below 60% of the median equivalized income and cover most vulnerable households. As the figure below shows, the highest proportion of households below 60% of the median equalized income in arrears on utility bills are those with dependent children: 68% of such households reported arrears on utility bills. Moreover, among all households below 60% of the median equalized income, 68% reported arrears on utility bills.

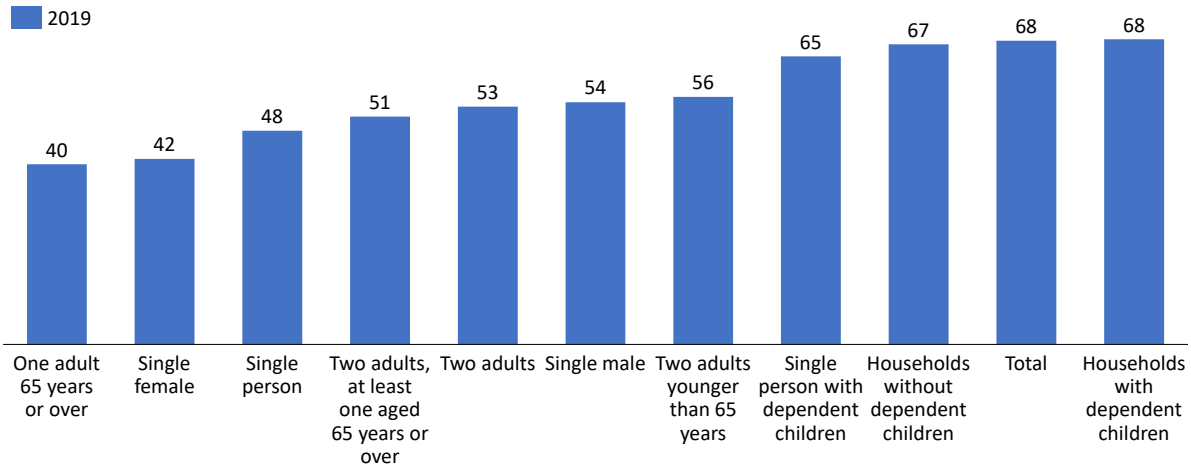


Figure 7-48. Share of households below 60% of the median equivalized income in North Macedonia in arrears on utility bills in 2019

Source: EUROSTAT

As expected, arrears on utility bills are lower when all households are taken into consideration. According to the following figure, 49% of all single-person households with dependent children were in arrears on utility bills in 2019. Among all households, irrespective of income, 34% of households were in arrears on utility bills.

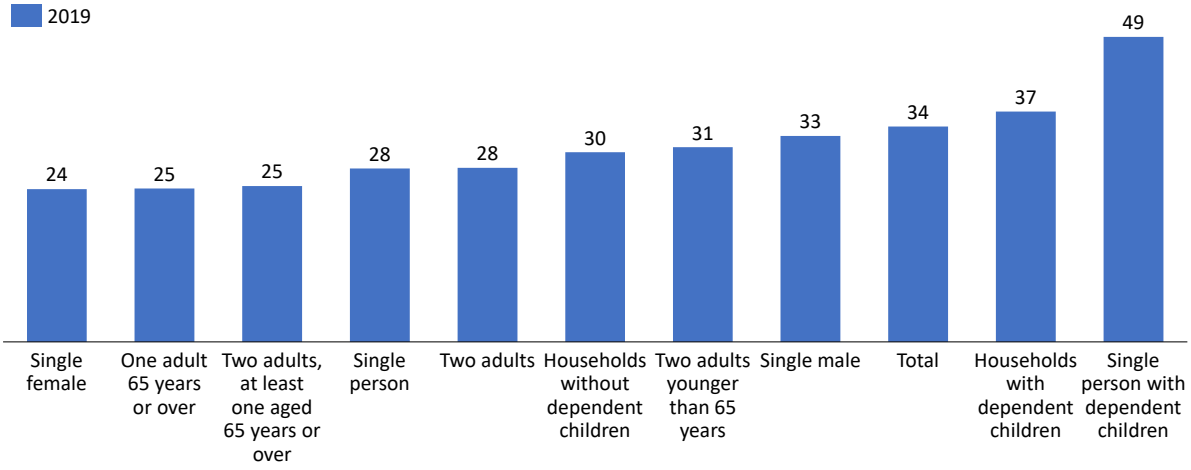


Figure 7-49. Share of households in North Macedonia in arrears on utility bills in 2019

Source: EUROSTAT

7.8.2.3 Inability to keep homes adequately warm

Data on the inability to keep households adequately warm are based on EUROSTAT data for the year 2019. The data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

Data on the inability to keep households warm are shown for households with incomes below 60% of the median equivalized income and covers the most vulnerable households. The following figure shows that single-person households with dependent children face the greatest difficulties in keeping their homes warm, i.e., 52% of such households in 2019 were unable to keep their homes adequately warm. Slightly lower values are observed for households without dependent children, where 50% of such households reported as unable to keep their homes adequately warm. Overall, 47% of households with incomes below 60% of the median equivalized income had difficulties in keeping their homes warm in 2019.

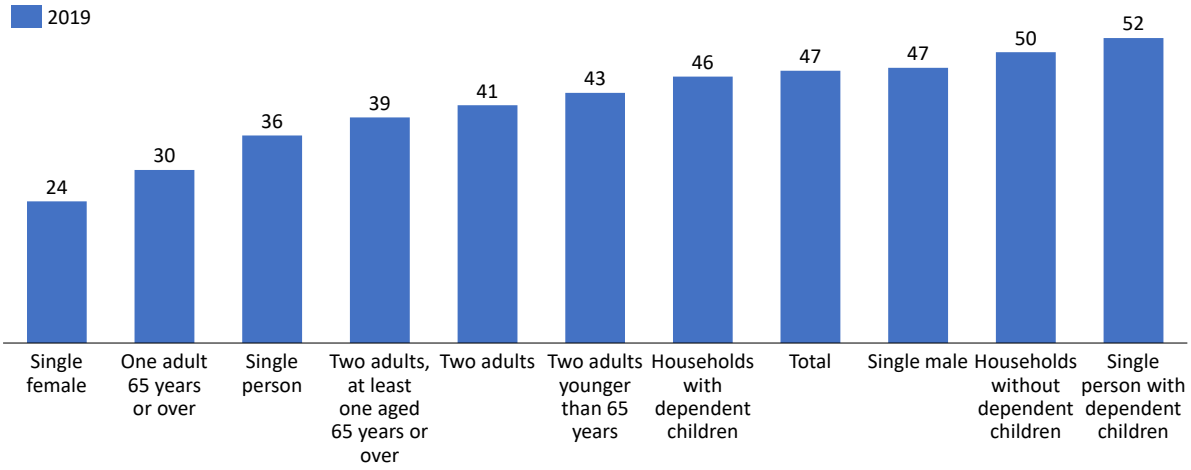


Figure 7-50. Share of households below 60% of the median equivalized income in North Macedonia unable to keep homes adequately warm in 2019[166]

Source: EUROSTAT

The share of households unable to keep their homes adequately warm declines when all households are taken into consideration. The following figure shows that the highest share of households unable to keep their home adequately warm are single male households, i.e., 35% of such households are unable to keep their homes adequately warm. At the same time, 33% of all households are unable to keep their homes adequately warm.

[166] Data marked as low reliability by EUROSTAT

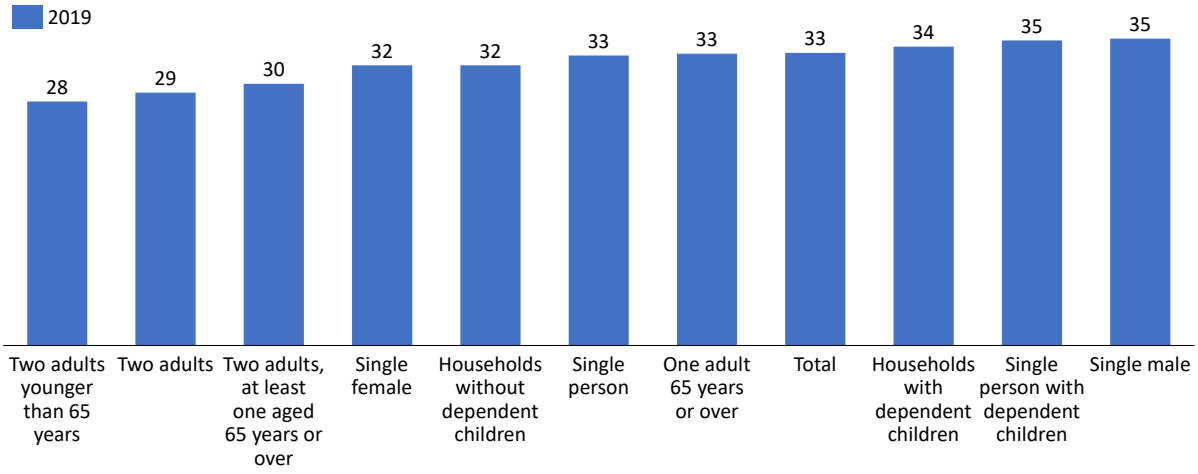


Figure 7-51. Share of households in North Macedonia unable to keep home adequately warm in 2019[167]

Source: EUROSTAT

7.8.2.4 Condensation, leaking roof, rot in windows or doors

Data on condensation, leaking roof, rot in windows or doors are based on EUROSTAT data for the year 2019. The data are provided for the following types of households: total, single person, one adult 65 years or over, single person with dependent children, single female, single male, two adults, two adults younger than 65 years, two adults, at least one aged 65 years or over, households without dependent children, and households with dependent children.

Data on condensation, leaking roofs, rot in windows or doors are for those households with incomes below 60% of the median equivalized income cover the most vulnerable households. The following figure shows that 44% of single male households reported condensation, leaking roofs, rot in windows or doors. At the same time, 26% of all households reported condensation, leaking roofs, rot in windows or doors.

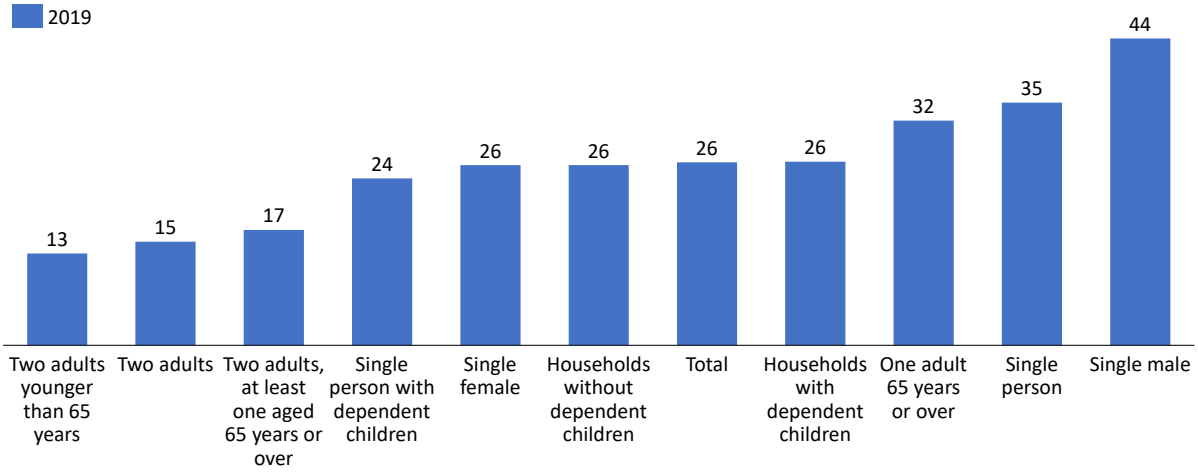


Figure 7-52. Share of households below 60% of the median equivalized income in Albania experiencing condensation, leaking roof, rot in windows or doors in 2019

Source: EUROSTAT

[167] Data marked as low reliability by EUROSTAT

The share of households with leaking roofs declines as expected when all households are taken into consideration. Single-person households with dependent children are most affected by the issue, i.e., 20% of such households face leaking roofs. At the same time, 14% of all households reported having an issue with leaking roofs.

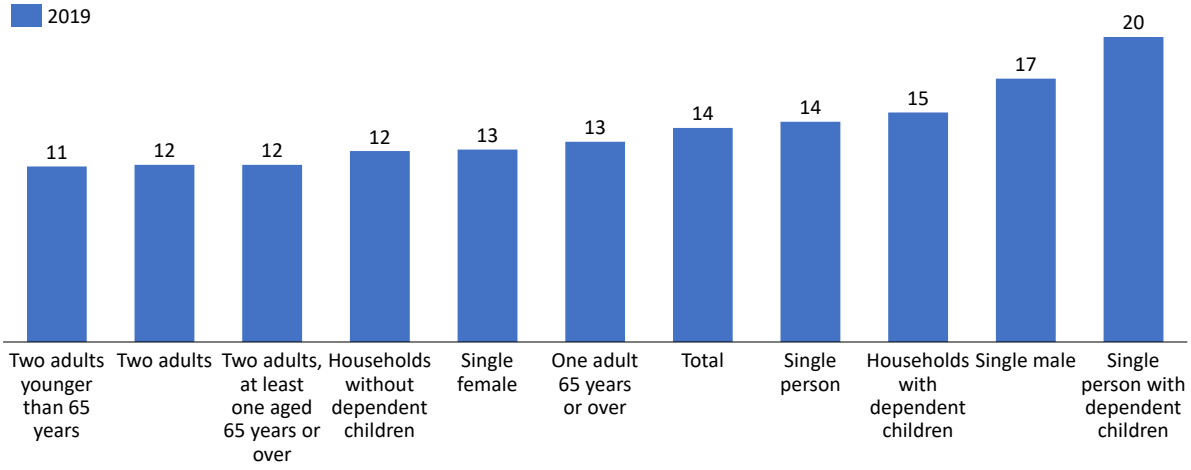


Figure 7-53. Share of households below 60% of the median equivalized income in Albania experiencing condensation, leaking roof, rot in windows or doors in 2019

Source: EUROSTAT

7.8.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using the number of energy-poor households as the upper and lower bounds. The lower bound is the share of households that stated as unable to keep their homes adequately warm. The proposed upper bound is the share of households that spend twice the national median on energy (2M) and the share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators we cover both types of households: those that overspend (due to energy inefficient homes) and those that underspend due to the lack of sufficient financial resources.

Based on information available to the Consultant, the North Macedonian Statistics Office conducts the EU SILC and HBS surveys and the proposal is to use them in estimating and monitoring the number of energy-poor households in North Macedonia. Unfortunately, the Consultant has not received the required microdata and hence was not able to estimate the number of energy-poor households in North Macedonia based on North Macedonian data. Therefore, only a rough estimate has been made.

According to the data provided in Figure 7-51, 33% of all households in North Macedonia declare they cannot keep their homes adequately warm. Given that we have proposed to use the share of households unable to keep their homes adequality warm that belong to the first four deciles as a lower bound indicator, and that the reported 33% represents all households, the value of 33% can be considered an upper bound for the estimated number of energy poor households in North Macedonia. Therefore, the estimated upper bound for the number of energy poor households in North Macedonia is 237 000[168].

[168] Due to the lack of micro data, it is not possible to estimate the lower bound of the number of energy poor households in North Macedonia.

In terms of responsibility for calculating the indicators, we propose that the North Macedonian Statistics Office perform the indicator calculations. To ensure comparability with indicators calculated under the EU Energy Poverty Observatory project, that suggestion is that the North Macedonian Statistics Office use the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[169]

[169] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.9 Serbia

The Statistical Office of the Republic of Serbia (RZS) conducts the Household Budget Survey (HBS) as well as Survey on Living and Income Conditions (EU SILC). The microdata from both surveys has been provided to the Consultant.

Table 7-20. Summary of available and received statistical data for Serbia

Country: Serbia		
	Survey conducted in the CP	Survey received by the Consultant
HBS	✓	✓
EU SILC	✓	✓

7.9.1 Data description

The Statistical Office of the Republic of Serbia has provided the following data sets:

1. The Household Budget Survey for the year 2019
2. The EU Survey on Income and Living Conditions for the year 2019

7.9.1.1 Household Budget Survey

The Household Budget Survey (HBS) for the year 2019 is the main source used for calculating expenditure-based energy poverty indicators, i.e., 2M (households with a significant share of energy expenditure in income) and M/2 (households with low absolute energy expenditure).[170] The survey contains detailed information on various incomes sources of household members as well as household consumption and expenditures. There are 6,354 households in the sample, with a response rate of 72%,[171] suggesting a sufficient representative sample. All variables are reported monthly, and indicator calculations are done on a monthly basis.

Income was calculated by summing all income variables (codes from "p3_1" to "p3_31", "Demog" file) of individual members across households in order to obtain the household income variable. Furthermore, total household income was additionally adjusted by adding the imputed rent (code "p2S_4", file "Hhold"). Household expenditure for electricity, gas and other fuels was calculated by summing expenditure items for electricity (variable code "p2PTD_31"), gas ("p2PTD_32" and "p2PTD_33"), liquid fuels ("p2PTD_34"), solid fuels ("p2PTD_35" and "p2PTD_36") and heat energy ("p2PTD_37").

Both variables for total household income and total household energy expenditure have been equivalized, i.e., adjusted by the number of household members using the OECD-modified equivalence scale.[172] Calculating the equivalized household size required assigning a value to each household member: 1.0 to the first adult, 0.5 to the second and each subsequent person aged 14 and over, 0.3 to each child aged under 14, and subsequently summing up these values. Income and expenditure variables are then divided by the equivalized household size. Calculating the equivalized household size using the HBS 2019 for Serbia revealed that there were 136 individuals with missing age data, assumed to be adults.

[170] Unless otherwise noted, a description of the calculation for energy poverty indicators provided in the text is based on Thema, J., and Vondung, F. (2020) *EPOV Indicator Dashboard: Methodology Guidebook*. Wuppertal Institut für Klima, Umwelt, Energie GmbH.

[171] HBS 2019 *Bulletin,* Statistical Office of the Republic of Serbia, Belgrade 2020.

[172] See https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf

The share of household energy expenditure in income is calculated by dividing the equalized values of household energy expenditure and total household income. The M/2 indicator is calculated by dividing the weighted median of the equivalized absolute household energy expenditure by 2, while the 2M indicator is calculated by multiplying the weighted median of the share of household energy expenditure by 2. Obtaining shares of households in relation to these indicators requires first assessing whether each household is under (M/2) or above (2M) the indicators. The particular shares themselves are then calculated as the sum of survey weights of households that satisfy the mentioned criteria divided by the total sum of household weights. This is done both for the total population but also by income decile groups, tenure status, and other household characteristics. Income decile groups were identified by calculating the weighted deciles of the equivalized household income and assessing whether a household lies within particular boundaries given by income decile values. Accordingly, all reported variables, such as shares of households, mean/median, M/2, and 2M shares were weighted using survey weights. The survey weights used in the calculations are provided in the variable "ponder", file "Ident".

Finally, to assess whether atypical values had an influence on reported results, a separate calculation was performed using data "cleaned" of observations providing unrealistically high values of the share of household energy expenditure in income. To assess whether a maximal value is "atypical" the Grubbs test[173] was used. The Grubbs test assesses whether, at a predefined probability level, a single value belongs to the distribution within the dataset which in turn is assumed to be normal. While the normality assumption is likely to have been violated, the predefined probability level was very low (10^{-8}), hence only households with the most extreme values for the share of energy consumption were omitted.[174] In conclusion, 68 households were excluded in this manner with share values ranging from 96.25% to 750% for these households, given a sample size of 6,286 after outlier extraction. In either case, the results remain largely unchanged.

7.9.1.2 Survey on Income and Living Conditions

The Survey on Income and Living Conditions (SILC) available for the year 2019 is the main source for calculating the consensual-based indicators, specifically:

- Share of households in arrears on utility bills (variable HS021)
- Share of households experiencing a leaking roof, damp walls/floors/foundation or rot in the window (HH040)
- Share of households unable to keep their homes adequately warm (based on HH050)

There are 5,130 households in the sample, with a response rate of 85.3%,[175] thus providing a representative sample. In the SILC, all variables are reported yearly, and, where applicable, the indicator calculations are done on a yearly basis. Income was taken from the total disposable household income variable (HY020) and equivalized in the same manner as was the HBS data. However, total household income was not increased by the amount of imputed rent (HY030) because the data for this variable is missing, although it would have been preferable. Shares of households were calculated in the same manner as with the HBS variables, i.e., the sum of weights for households satisfying the criterion divided by the total sum of weights and the procedure was also the same for income deciles. Cross-sectional weights (DB090) were used for weighting the

[173] See the example in https://en.wikipedia.org/wiki/Grubbs%27s_test

[174] This process is somewhat arbitrary and not the only option. Nonetheless, displaying distributions of indicators and reported mean-based indicators requires cleaning the data of the largest observed outliers. On the other hand, medians and shares of households (2M and M/2) are more robust against atypical values, hence these indicators are fairly similar with or without data cleaning. In this report, only histograms are based on clean data (6,286 observations) whereas others depictions are based on full datasets.

[175] *Survey on Income and Living Conditions 2020,* Statistical Office of the Republic of Serbia https://publikacije.stat.gov.rs/G2020/PdfE/G20201283.pdf

shares of households. Finally, there were 36 missing values for the variable arrears on the utility bills (HS021). No data cleaning was done when calculating consensual-based indicators.

7.9.2 Analysis of the indicators

7.9.2.1 2M indicator

The figure below shows the distribution of the share of energy consumption (expenditure) in income, with median and 2M points highlighted. The dark red line shows the median value, while the bright red line shows the 2M value. As already mentioned, the histogram was created using data cleaned of extreme outlier values, as explained in section 7.9.1.1. All other indicators are derived from microdata, including all observations in the sample.

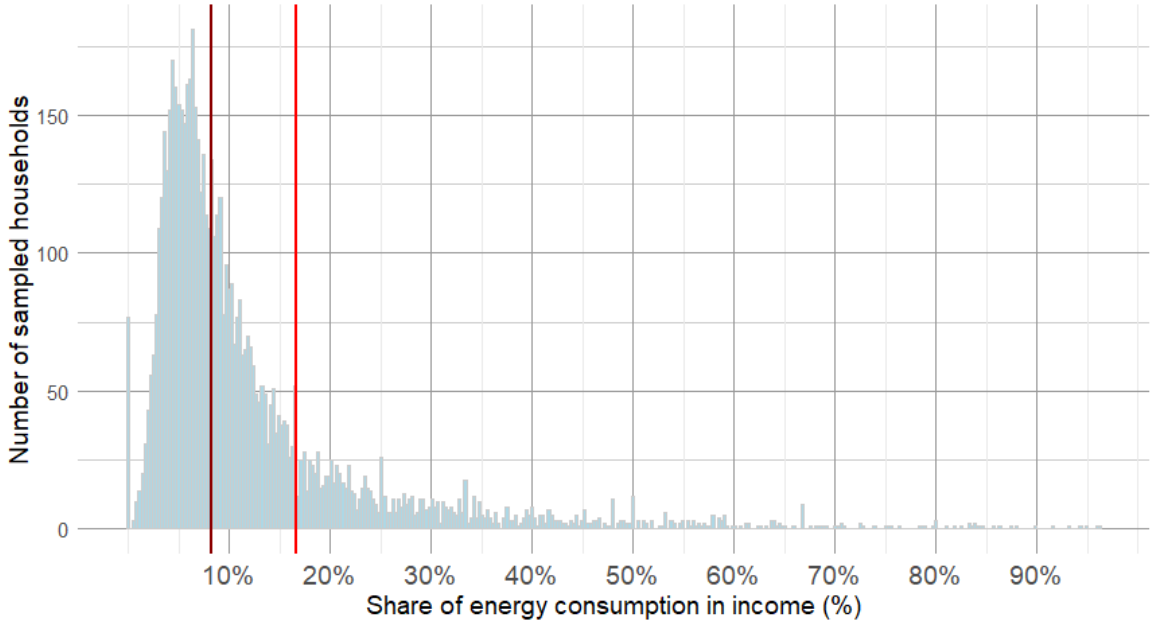


Figure 7-54. Share of energy consumption in income (%) for Serbian households

Source: HBS, 2019

The following two figures show the share of the population spending twice the national median on energy. The left figure shows relative shares while the right figure shows absolute values by decile. The issue of overspending on energy is most pronounced in the first income decile where 48% of household face the issue of energy overspending. In terms of total numbers, this is equivalent to 120,000 households reporting high energy bills in the first decile. The issue is much less pronounced in the next four deciles, where between 20-23% or between 49,000 and 57,000 households pre decile reported high energy bills. For the population as a whole, 19% of all households have expenditures on energy that are twice the national median.

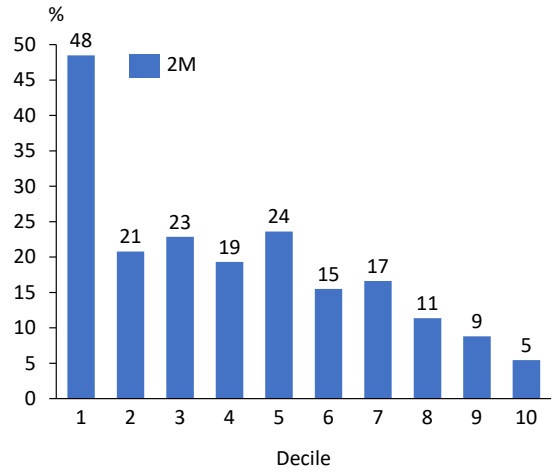


Figure 7-55. 2M indicator for Serbia using relative share by deciles (2019)

Source: HBS, 2019

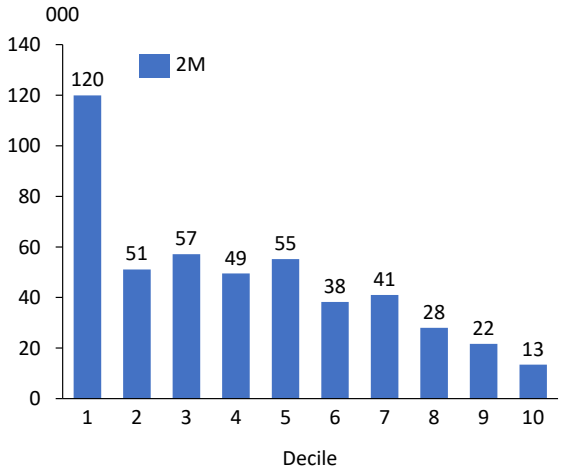


Figure 7-56. 2M indicator for Serbia using absolute number of households by deciles (2019)

Source: HBS, 2019

The following table shows the shares of households that spend more than twice the median on energy, for various socioeconomic characteristics of the households.

Table 7-21. Values of the 2M indicator for various socioeconomic characteristics of households

Category	Value	No.	2M	
			Share	Absolute
Settlement type	City	1,527,510	15%	231,684
	Other	938,806	26%	243,507
The basis for dwelling usage	Owner	2,145,449	19%	416,245
	Renting state owned apartment	2,356	48%	1,126
	Renting privately owned apartment	79,288	16%	12,396
	Free accommodation	239,223	19%	45,424
Type of apartment	Separate room	997	21%	213
	Studio apartment	42,277	10%	4,086
	One bedroom apartment	312,054	17%	52,880
	Two-bedroom apartment	994,569	17%	166,069
	Three-bedroom apartment	656,881	21%	135,793
	Four-or more bedroom apartment	459,155	25%	116,150
	The room is not housing	383	0%	0
Type of heating	Heat energy	507,625	12%	61,134
	Electricity heating	271,061	7%	19,952
	Solid fuel	1,378,511	25%	339,812
	Liquid fuel	10,905	8%	820
	Combined	143,295	21%	29,566
	Gas	154,920	15%	23,907
Household size	1	635,717	18%	115,145
	2	719,961	20%	141,290
	3	426,595	18%	77,053
	4	353,107	18%	61,900
	5	186,143	21%	39,250
	6+	144,793	28%	40,553

Source: HBS, 2019

7.9.2.2 M/2 indicator

The following figure provides a histogram of energy consumption (expenditures) for Serbia with the median and M/2 values highlighted. The dark red line represents the median value, while the bright red line represents the M/2 value. Again, the histogram was created using data cleared of the extreme observed outliers.

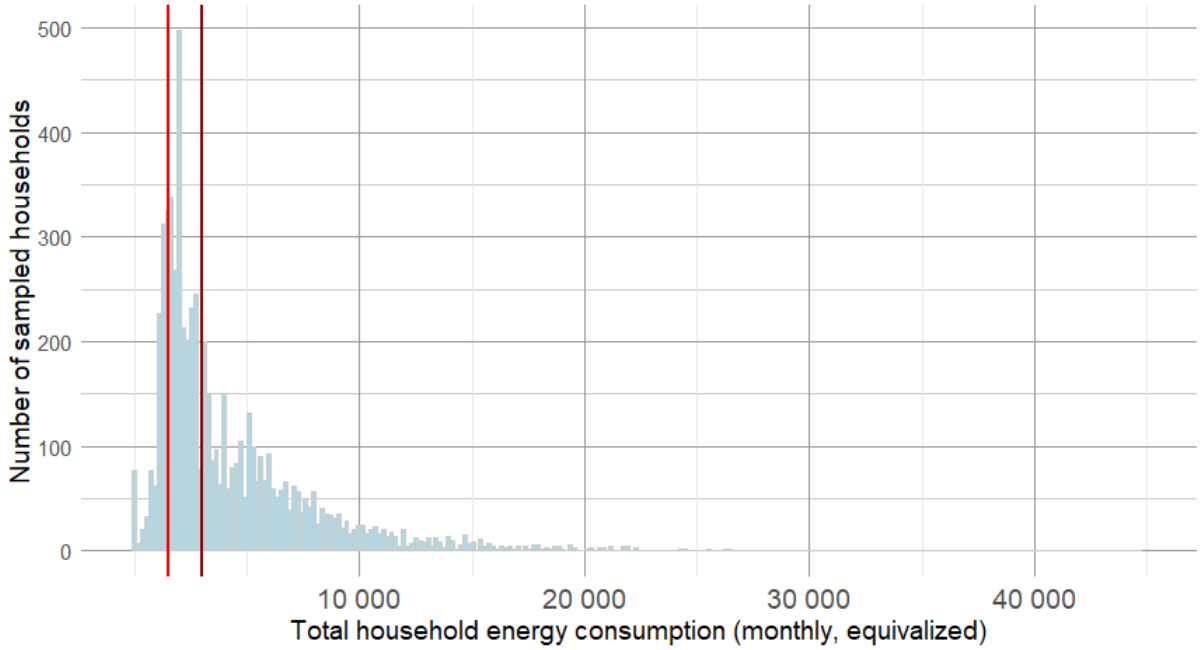


Figure 7-57. Histogram of expenditures for Serbia (2019)

In terms of households that underspend on energy, the following two figures show the relative and absolute values of households that reported energy spending equivalent to less than half the national median. For the population as a whole, 14% of all households have energy related expenditures that are below half the national median.

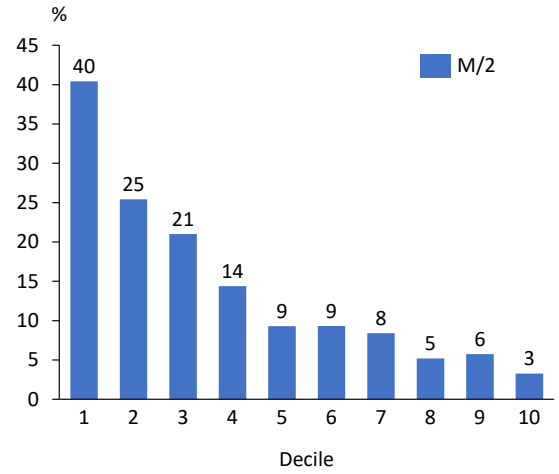


Figure 7-58. M/2 indicator for Serbia, relative shares by deciles (2019)

Source: HBS, 2019

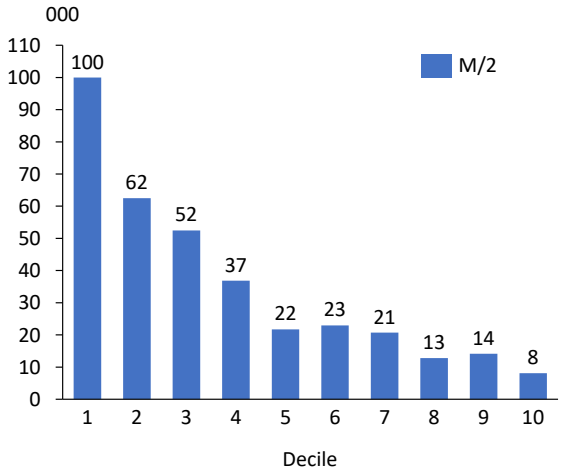


Figure 7-59. M/2 indicator for Serbia, absolute numbers of households by deciles (2019)

Source: HBS, 2019

The following table shows the values of the M/2 indicator for various socioeconomic characteristics of the households.

Table 7-22. Values of the M/2 indicator for various socioeconomic characteristics of households

Category	Value	No.	M/2	
			Share	Absolute
Settlement type	City	1,527,510	10%	145,567
	Other	938,806	22%	206,654
Basis for dwelling usage	Owner	2,145,449	14%	305,348
	Renting state owned apartment	2,356	0%	0
	Renting privately owned apartment	79,288	9%	6,764
	Free accommodation	239,223	17%	40,109
Type of apartment	Separate room	997	40%	403
	Studio apartment	42,277	33%	13,861
	One bedroom apartment	312,054	19%	58,161
	Two-bedroom apartment	994,569	13%	130,480
	Three-bedroom apartment	656,881	13%	87,406
	Four-or more bedroom apartment	459,155	13%	61,910
	The room is not housing	383	0%	0
Type of heating	Heat energy	507,625	1%	6,594
	Electricity heating	271,061	15%	40,642
	Solid fuel	1,378,511	21%	284,032
	Liquid fuel	10,905	15%	1,610
	Combined	143,295	9%	12,584
	Gas	154,920	4%	6,759
Household size	1	635,717	10%	63,848
	2	719,961	13%	92,726
	3	426,595	12%	52,192
	4	353,107	17%	61,167
	5	186,143	21%	39,834
	6+	144,793	29%	42,454

Source: HBS, 2019

7.9.2.3 Energy burden

The next two figures show the median and mean share of energy expenditures in household income by decile. As expected, values of energy expenditures are higher when mean values are considered. When median values are used (less affected by extreme values), only households in the first decile have energy-related expenditures that exceed a threshold of 10%. Median and mean energy burden for the population as a whole are 8% and 14% respectively.

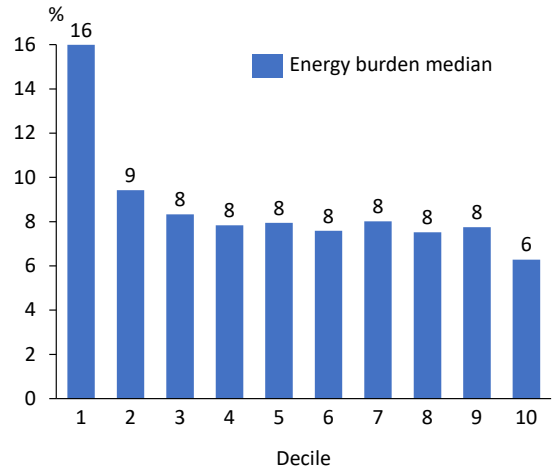


Figure 7-60. Median share of energy expenditures in disposable income for Serbia, by deciles (2019)

Source: HBS, 2019

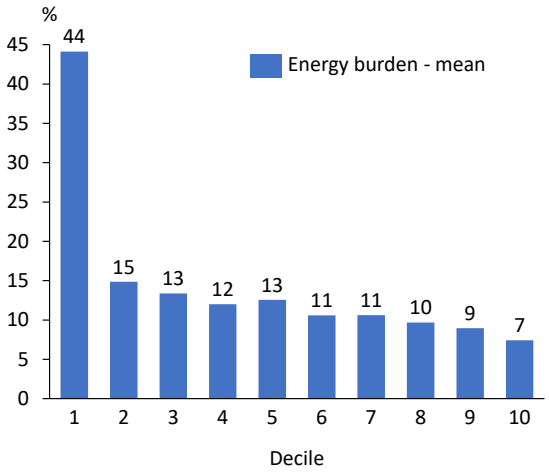


Figure 7-61. Mean share of energy expenditures in disposable income for Serbia, by deciles (2019)

Source: HBS, 2019

The following table presents the median and the mean energy burden (share of energy expenditure in income) for various socioeconomic characteristics of households.

Table 7-23. Values of the median energy expenditure for various socioeconomic characteristics of households

Category	Value	No.	Median energy burden	Mean energy burden
Settlement type	City	1.527.510	8%	12%
	Other	938.806	9%	19%
The basis for dwelling usage	Owner	2.145.449	8%	14%
	Renting state owned apartment	2.356	11%	28%
	Renting a privately owned apartment	79.288	9%	22%
	Free accommodation	239.223	8%	12%
Type of apartment	Separate room	997	6%	11%
	Studio apartment	42.277	6%	8%
	One bedroom apartment	312.054	8%	14%
	Two-bedroom apartment	994.569	8%	13%
	Three- bedroom apartment	656.881	8%	16%
	Four- or more bedroom apartment	459.155	8%	16%
	The room is not housing	383	9%	9%
Type of heating	Heat energy	507.625	10%	12%
	Electricity heating	271.061	6%	8%
	Solid fuel	1.378.511	8%	17%
	Liquid fuel	10.905	5%	8%
	Combined	143.295	8%	14%
	Gas	154.920	8%	10%
Household size	1	635.717	9%	13%
	2	719.961	8%	14%
	3	426.595	8%	16%
	4	353.107	7%	12%
	5	186.143	8%	17%
	6+	144.793	9%	21%

Source: HBS, 2019

Finally, the following two figures show median energy expenditures and median incomes (both non-equalized) by deciles.

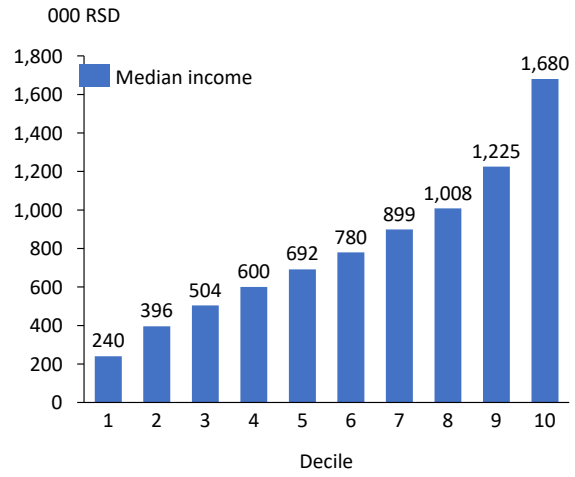


Figure 7-62. Median energy expenditure by deciles (2019), in 000 RSD

Source: HBS, 2019

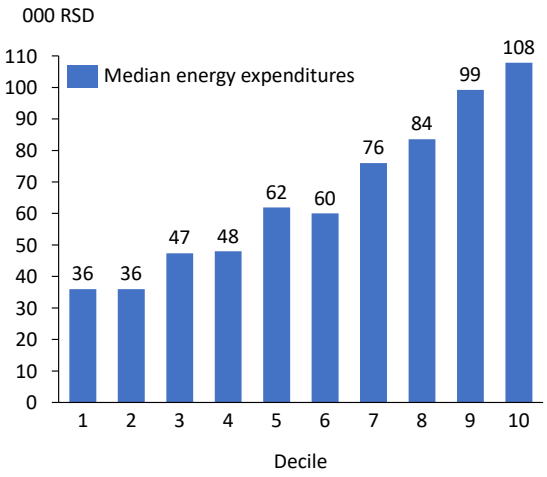


Figure 7-63. Median income by deciles (2019), in 000 RSD

Source: HBS, 2019

7.9.2.4 Arrears on utility bills

The following two figures show the share of households and absolute number of households in arrears on utility bills, respectively. As shown, the share of households in arrears on utility bills is quite high in the first several deciles. On average, 25% of all households have arrears on utility bills.

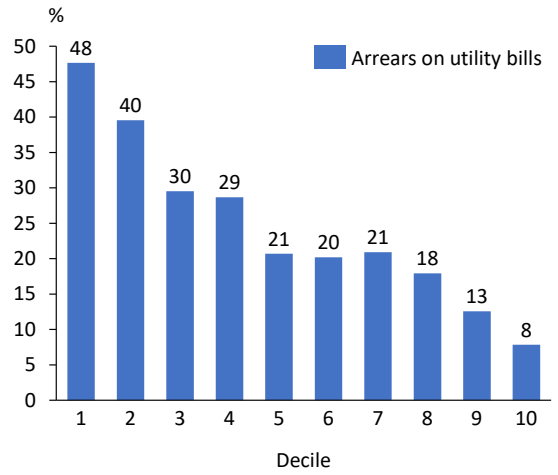


Figure 7-64. Share of households with arrears on utility bills in Serbia, by equivalized income deciles (2019)

Source: EU SILC, 2019

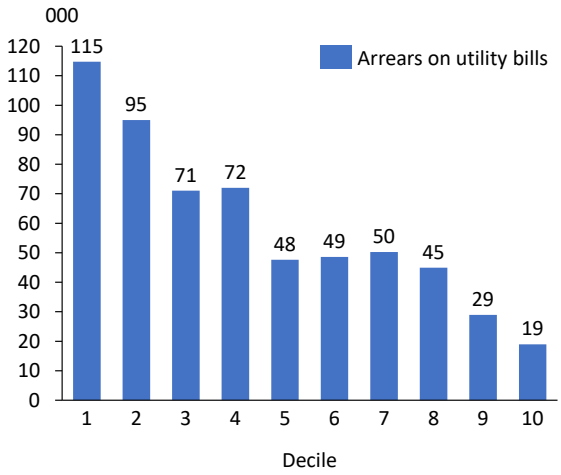


Figure 7-65. Number of households with arrears on utility bills in Serbia, by equivalized income deciles (2019)

Source: EU SILC, 2019

The following figure shows indicator values for different socioeconomic characteristics of households.

Table 7-24. Values of the "households in arrears" indicator for various socioeconomic characteristics of households

Category	Value	No.	HH in arrears (HS021)	
			Share	Absolute
Dwelling type (HH010)	Detached house	1,509,127	28%	423,650
	Semi-detached or terraced house	148,711	26%	38,330
	Apartment or flat in a building with less than 10 dwellings	99,680	21%	20,584
	Apartment or flat in a building with 10 or more dwellings	642,415	17%	107,128
	Other kinds of accommodation	5,725	41%	2,338
Tenure status (HH021)	Outright owner	1,966,769	24%	480,618
	Owner paying mortgage	17,000	17%	2,971
	Tenant or subtenant paying rent at the prevailing or market rate	81,597	26%	21,399
	Accommodation is rented at a reduced rate	15,337	19%	2,868
	Accommodation is provided free	324,954	26%	84,174
Degree of urbanization (DB100)	Densely populated area	891,821	18%	162,289
	Intermediate area	639,472	27%	171,012
	Thinly populated area	874,363	30%	258,728

Source: EU SILC, 2019

7.9.2.5 Inability to keep homes adequately warm

The lowest income decile appears to have the most trouble in keeping their homes adequately warm, i.e., approx. 30%. The issue is significantly less pronounced in other deciles. On average, 11% of all households are unable to keep their homes adequately warm.

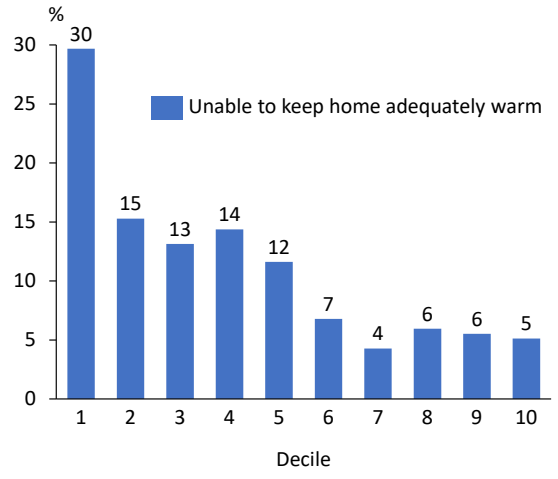


Figure 7-66. Share of households unable to keep homes adequately warm in Serbia, by equivalized income deciles (2019)

Source: EU SILC, 2019

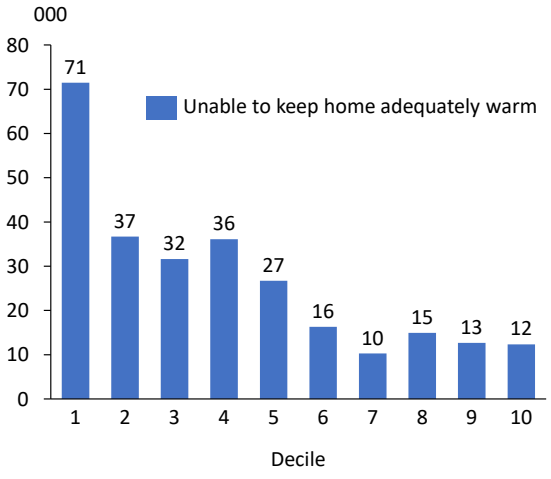


Figure 7-67. Number of households unable to keep homes adequately warm in Serbia, by equivalized income deciles (2019)

Source: EU SILC, 2019

The following table shows indicator values for different socioeconomic characteristics of households.

Table 7-25. Values of the "unable to keep household warm" indicator for various socioeconomic characteristics of households

Category	Value	No.	Cold home (HH050)	
			Share	Absolute
Dwelling type (HH010)	Detached house	1.509.127	14%	206.723
	Semi- detached or terraced house	148.711	11%	15.923
	Apartment or flat in a building with less than 10 dwellings	99.680	12%	11.710
	Apartment or flat in a building with 10 or more dwellings	642.415	5%	31.574
	Some other kind of accommodation	5.725	56%	3.218
Tenure status (HH021)	Outright owner	1.966.769	11%	215.808
	Owner paying mortgage	17.000	6%	963
	Tenant or subtenant paying rent at prevailing or market rate	81.597	9%	7.447
	Accommodation is rented at a reduced rate	15.337	6%	981
	Accommodation is provided free	324.954	14%	43.948
Degree of urbanization (DB100)	Densely populated area	891.821	8%	75.642
	Intermediate area	639.472	11%	71.433
	Thinly populated area	874.363	14%	122.073

Source: EU SILC, 2019

7.9.2.6 Condensation, leaking roof, rot in windows or doors

As was the case with the problem of unable to keep homes adequately warm, the problem of condensation, leaking roofs, and rot in windows or doors is most pronounced in the first income decile. On average, 19% of all households experience condensation, leaking roofs, rot in windows or door.

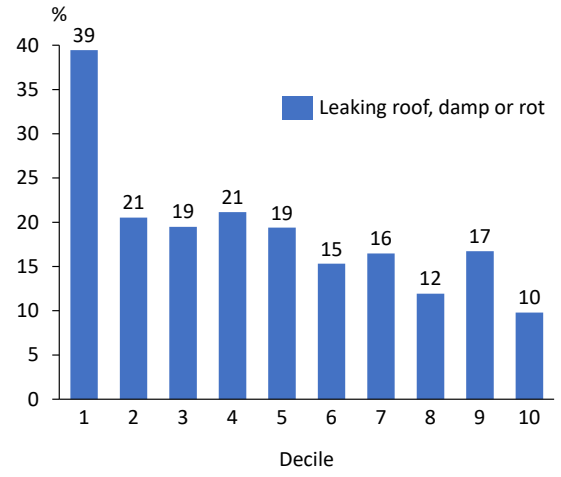


Figure 7-68. Share of households with a leaking roof, damp walls/floors/foundation, or rot in the window in Serbia, by equivalized income deciles (2019)

Source: EU SILC, 2019

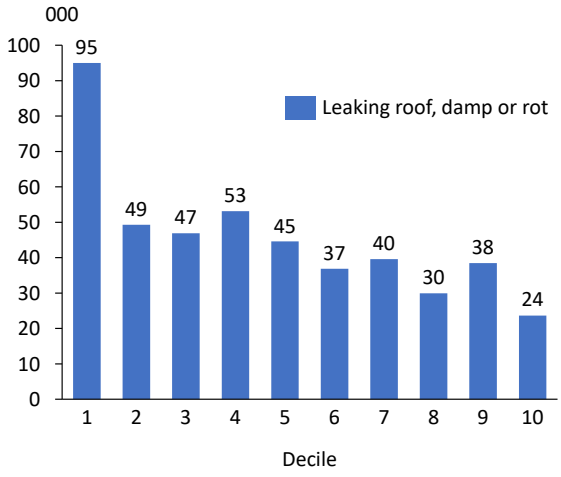


Figure 7-69. Number of households with a leaking roof, damp walls/floors/foundation, or rot in the window in Serbia, by equivalized income deciles (2019)

Source: EU SILC, 2019

The following table provides the share of households with a leaking roof, damp walls, or rot in the window in Serbia for various socioeconomics characteristics of households.

Table 7-26. Values of the "leaking roofs" indicator for various socioeconomic characteristics of households

Category	Value	No.	Leaking roofs (HH040)	
			Share	bsolute
Dwelling type (HH010)	Detached house	1,509,127	21%	310,585
	Semi-detached or terraced house	148,711	12%	18,379
	Apartment or flat in a building with less than 10 dwellings	99,680	28%	28,055
	Apartment or flat in a building with 10 or more dwellings	642,415	15%	97,552
	Other kind of accommodation	5,725	49%	2,796
Tenure status (HH021)	Outright owner	1,966,769	18%	358,275
	Owner paying mortgage	17,000	3%	560
	Tenant or subtenant paying rent at the prevailing or market rate	81,597	17%	13,501
	Accommodation is rented at a reduced rate	15,337	37%	5,698
	Accommodation is provided free	324,954	24%	79,334
Degree of urbanization (DB100)	Densely populated area	891,821	19%	167,987
	Intermediate area	639,472	16%	105,507
	Thinly populated area	874,363	21%	183,875

Source: EU SILC, 2019

7.9.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using upper and lower bounds for the number of energy-poor households. The proposed lower bound is the share of households that stated as unable to keep their homes adequately warm. The upper bound proposed by us is the share of households that spend twice the national median on energy (2M) and share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators we covered both types of households, i.e., those that overspend (due to energy inefficient homes) and those that underspend due to the lack of sufficient financial resources. According to available data, the share of energy-poor households in Serbia ranges from 7%[176] to 22%[177] of all households. This percentage implies that there are between 176,000 and 529,000 energy-poor households in Serbia.[178]

In terms of responsibility for calculating the indicators, we propose that the Statistical Office of Serbia (RZS) perform the indicator calculations. To ensure comparability with the indicators calculated under the EU Energy Poverty Observatory project, that suggestion is that the RZS use

[176] This value represents the share of population that stated they are unable to keep their home adequately warm.

[177] This value represents the share of households that spend twice the national median on energy (12% of households) and share of households that spend half the national median (11% of all households).

[178] While the lower bound value for Serbia is very close to the respective value in other CPs for which data were available, the upper bound is more than twice as large as in CPs for which data were available.

the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[179]

[179] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

7.10 Ukraine

The Statistics Service of Ukraine (Ukrstat) conducts the Survey of Living Conditions of Households (SLCH). The structure of the survey does not closely follow the structure of the HBS or EU SILC surveys but combines these two surveys to a certain degree. Consequently, not all variables present in the EU SILC are present in this survey.

Table 7-27. Summary of available and received statistical data for Ukraine

Country: Ukraine		
	Survey conducted in the CP	Survey received by the Consultant
HBS	✗	✗
EU SILC	✗	✗
SLCH	✓	✓

7.10.1 Data description

Ukrstat conducts the Survey of Living Conditions of Households (SLCH) based on provided data from 2019. After analyzing the received data, certain issues remained unclear and should be elaborated by the Ukrstat, specifically:

- What time period does the amount for energy expenditure refer to (variable h045)? It appears to represent annual expenditure, but this is unclear.
- Is the imputed rent contained in variable h042?

7.10.1.1 Survey of Living Conditions of Households

The Survey of Living Conditions of Households (SLCH) for the year 2019 is the main data source for calculating both the consensual-based indicators as well as expenditure-based energy poverty indicators. The survey contains information on the income of household members as well as household consumption and expenditures. The sample covers 8,093 households, with the precise response rate unknown as it is not readily available on the website of the State Statistics Service of Ukraine.

The consensual-based indicators include the following:

- Share of households with insufficient funds for timely and full payment of housing bills and services for housing maintenance, or payment covering gas for cooking (variable ozn_depr_16)
- Share of households experiencing poor housing conditions (leaking roof, damp walls/ foundation or rotten window frames or floors) due to lack of funds (ozn_depr_12)
- Share of households lacking funds to maintain a sufficiently warm temperature in their dwellings (for purchasing fuel, heaters, etc.) during the heating season (ozn_depr_17)

Income was taken from the total disposable household income variable (TOTALINC) and could have increased by the amount of imputed rent (h042). However, this variable is equivalent to 0 for 70% of the sample, and it is unclear whether it represents imputed rent. Shares of households were calculated as sums of weights for households satisfying the criteria, divided by the total sum

of weights belonging to a subgroup. Statistical weights (w_q) were used for weighting the shares of households. No data cleaning was done on the Ukrainian data.

Expenditure-based energy poverty indicators consist of 2M, i.e., households with a significant share of energy expenditure in income, and M/2, i.e., households with low absolute energy expenditure.[180] Household expenditure for electricity, gas, and other fuels was taken from the variable h045. Both total household income and total household energy expenditure variables have been equivalized, meaning adjusted by the number of household members based on OECD's 'old' equivalence scale.[181] The calculation of equivalized household size consists of assigning a value to each household member: 1.0 to the first adult, 0.7 to the second and each subsequent adult, 0.5 to each child aged under 18, and subsequently summing up these values. Income and expenditure variables are then divided by the equivalized household size. In calculating the equivalized household size using SLCH 2019 for Ukraine, there were 39 individuals with missing age data, and who were assumed to be adults.

The share of household energy expenditure in income is calculated by dividing the equalized values of household energy expenditure and total household income. The M/2 indicator is calculated by dividing the weighted median of the equivalized absolute household energy expenditure by 2, while the 2M indicator is calculated by multiplying the weighted median of the share of household energy expenditure by 2. Obtaining the shares of households in relation to these indicators requires first assessing whether each household is under (M/2) or above (2M) the indicators. The shares themselves are then calculated as the sum of statistical weights of households that satisfy the mentioned criteria, then divided by the total sum of household weights. This is done both for the total population but also by income decile groups, tenure status, and other household characteristics. Income decile groups were identified by calculating the weighted deciles of the equivalized household income and assessing whether a household lies within particular boundaries given by income decile values. Accordingly all reported variables, such as shares of households, mean/median, M/2, and 2M shares were weighted using statistical weights.

7.10.2 Analysis of the indicators

7.10.2.1 2M indicator

The following figures show the distribution of shares of energy consumption (expenditure) in income, with the median and 2M points for the year 2019 highlighted. The dark red line shows the median value, while the bright red line shows the 2M value.

[180] Unless otherwise stated, a description of the calculation for energy poverty indicators provided in the text is based on Thema, J., and Vondung, F. (2020) *EPOV Indicator Dashboard: Methodology Guidebook*. Wuppertal Institut für Klima, Umwelt, Energie GmbH.

[181] See https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf. Given that age data is only available in brackets ("up to 18 years", "18-35 years", "36-55 years", "56-59 years", and "60 years and older") the 'old' equivalence scale was calculated.

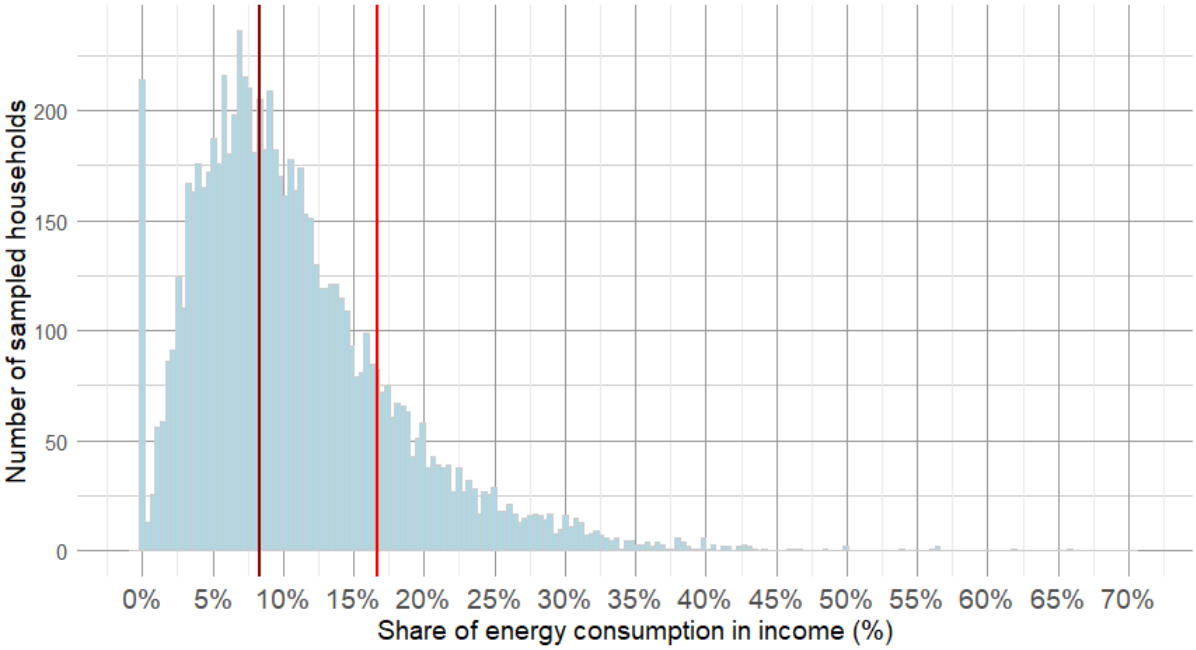


Figure 7-70. Share of energy consumption in income (%) for Ukrainian households in 2019

Source: SLCH, 2019

In the next two figures, we show the share of the population spending twice the national median on energy. Figure 7-71 shows relative shares while Figure 7-72 shows the absolute number of households. The issue of overspending on energy is quite pronounced in the first decile with 34% of the households spending twice the national median. In terms of the total numbers, this is equivalent to more than half a million households. On average, 12% of all households have energy related expenditures that are twice the national median.

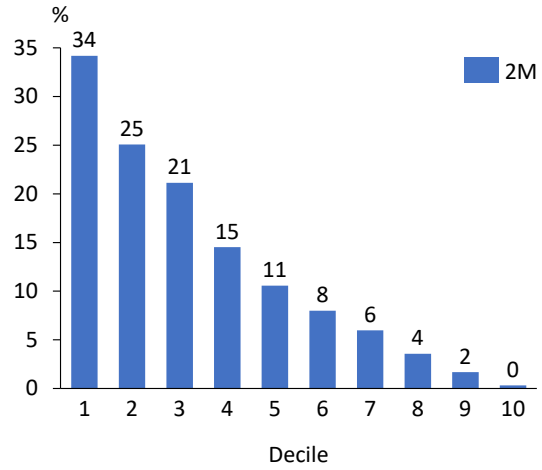


Figure 7-71. 2M indicator for Ukraine, relative shares by deciles

Source: SLCH, 2019

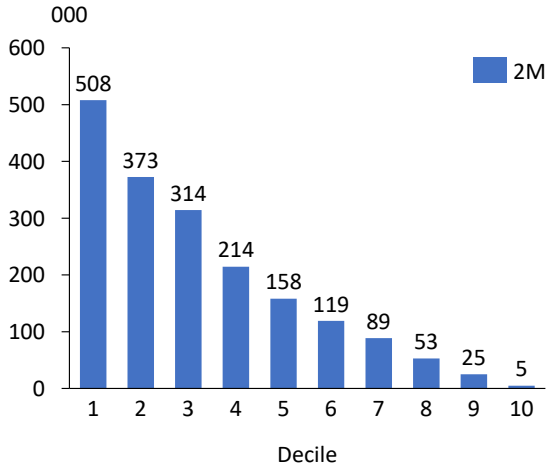


Figure 7-72. 2M indicator for Ukraine, absolute number of households by deciles

Source: SLCH, 2019

The following table shows the values of the 2M indicator for various socioeconomic characteristics of households.

Table 7-28. Values of 2M indicator for various socioeconomic characteristics of the households

Category	Value	No.	2M	
			Share	Absolute
Settlement type	Unknown	32,243	20%	6,547
	Big city	5,840,890	10%	592,637
	Small city	4,163,709	14%	598,096
	Rural area	4,826,630	14%	660,480
Household size	1	2,934,264	31%	898,784
	2	4,975,730	13%	627,403
	3	3,960,722	6%	231,183
	4	1,961,878	4%	71,822
	5+	1,030,878	3%	28,568

Source: SLCH, 2019

7.10.2.2 M/2 indicator

Figure 7-73 shows the histogram of energy consumption (expenditures) for Ukraine with median and M/2 values for the year 2019 highlighted. The dark red line represents the median value, while the bright red line represents the M/2 value.

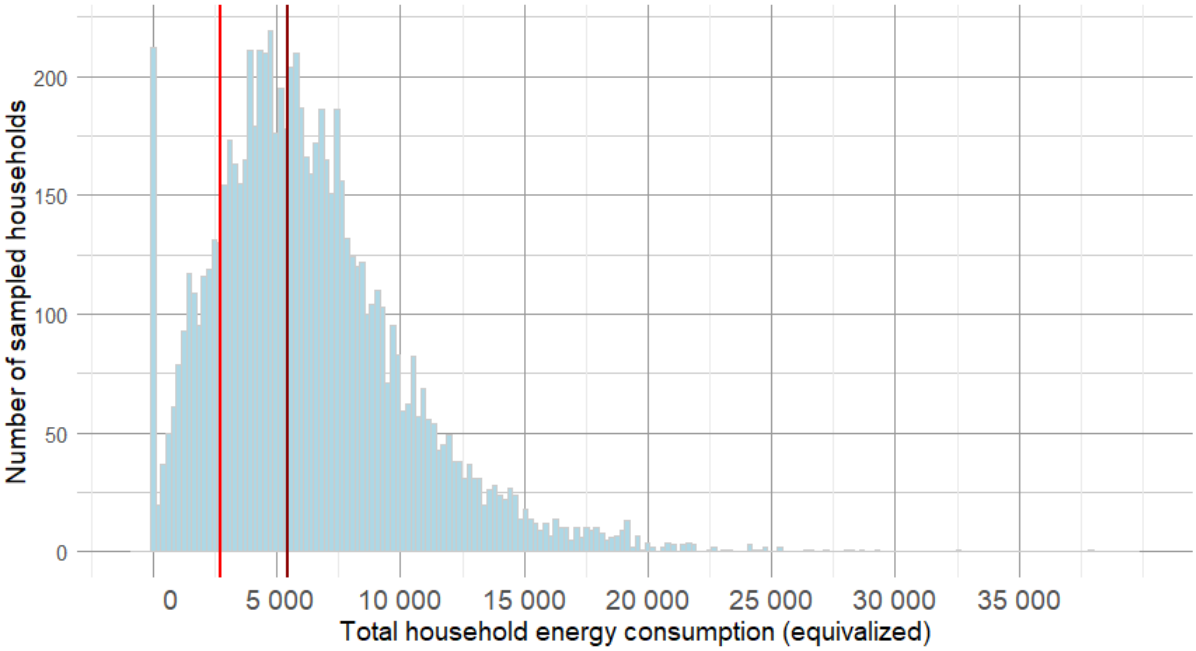


Figure 7-73. Histogram of expenditures for Ukraine (2019), in UAH

Source: SLCH, 2019

In terms of households that underspend on energy, the following two figures show the relative and absolute values of households that reported energy spending as less than half the national median. As the data shows, the issue of underspending is significantly more pronounced in the first decile, where 34% of households reported they spend less than the national median. The shares of households that underspend on energy in other deciles do not vary significantly. On average, 14% of all households have energy expenditures that are below half the national median.

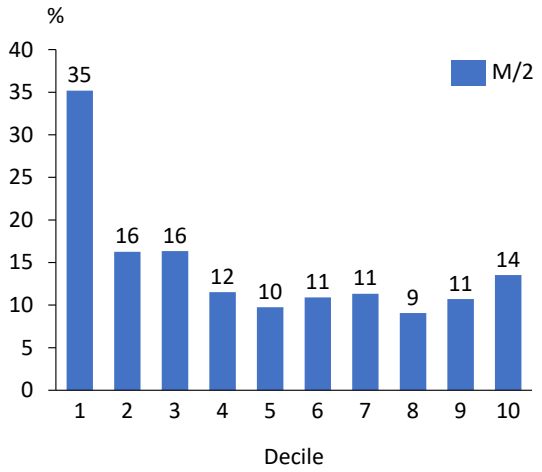


Figure 7-74. M/2 indicator for Ukraine, relative shares by deciles

Source: SLCH, 2019

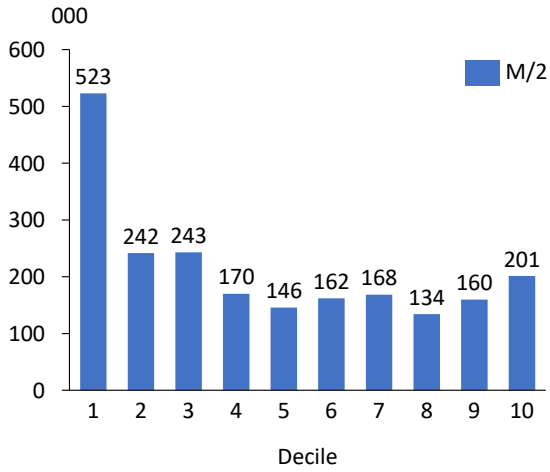


Figure 7-75. M/2 indicator for Ukraine, absolute number of households by deciles

Source: SLCH, 2019

The following table shows the value of the M/2 indicator for various socioeconomic characteristics of households.

Table 7-29. Values of the M/2 indicator for various socioeconomic characteristics of households

Category	Value	No.	M/2	
			Share	Absolute
Settlement type	Unknown	32,243	12%	3,891
	Big city	5,840,890	11%	635,740
	Small city	4,163,709	14%	572,010
	Rural area	4,826,630	19%	937,160
Household size	1	2,934,264	16%	460,475
	2	4,975,730	11%	566,553
	3	3,960,722	14%	542,726
	4	1,961,878	17%	335,554
	5+	1,030,878	24%	243,493

Source: SLCH, 2019

7.10.2.3 Energy burden

The next two figures show the median and mean share of energy expenditures in household incomes by decile. Average median and mean energy burden are 8% and 10% respectively.

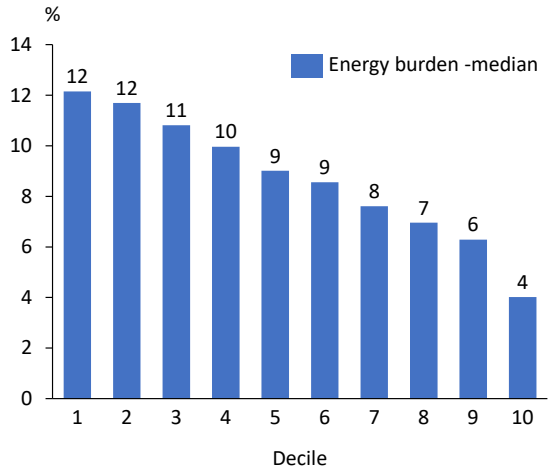


Figure 7-76. Median share of energy expenditures in disposable income for Ukraine, by deciles

Source: SLCH,2019

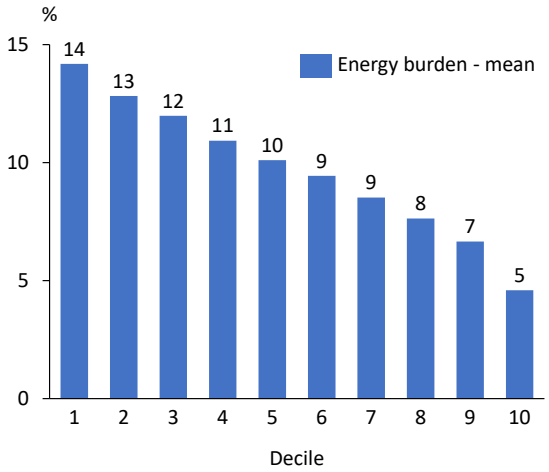


Figure 7-77. Mean share of energy expenditures in disposable income for Ukraine, by deciles

Source: SLCH, 2019

The following table presents the median and means energy burden (share of energy expenditure in income) for various socioeconomic characteristics of households.

Table 7-30. Values of median and mean energy expenditure for various socioeconomic characteristics of households

Category	Value	No.	Median energy burden	Mean energy burden
Settlement type	Unknown	32,243	9%	11%
	Big city	5,840,890	8%	9%
	Small city	4,163,709	9%	10%
	Rural area	4,826,630	9%	10%
Household size	1	2,934,264	12%	13%
	2	4,975,730	9%	10%
	3	3,960,722	7%	8%
	4	1,961,878	7%	8%
	5+	1,030,878	6%	7%

Source: SLCH, 2019

Finally, the following two figures show the median energy expenditure and median income (both non-equalized) by decile.

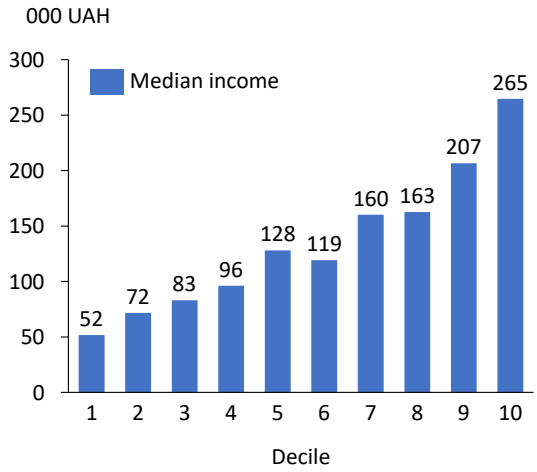


Figure 7-78. Median income by deciles, in 000 UAH

Source: SLCH, 2019

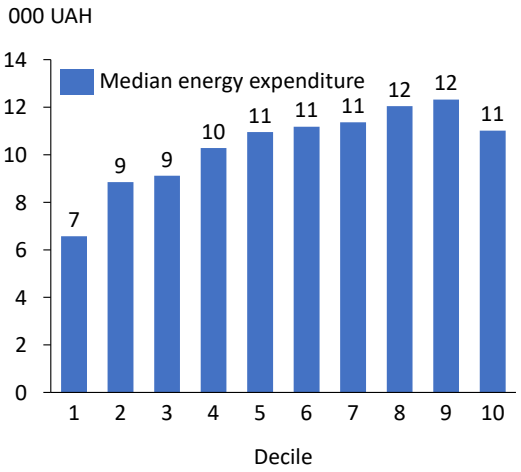


Figure 7-79. Median energy expenditure by deciles, in UAH

Source: SLCH, 2019

The following table shows the median household expenditure and median household income for various socioeconomic characteristics of households.

Table 7-31. Values of median household expenditure and median household income for various socioeconomic characteristics of households

Category	Value	No.	Median HH exp.	Median HH income
Settlement type	Unknown	32,243	10,261	131,252
	Big city	5,840,890	10,702	140,167
	Small city	4,163,709	10,112	116,754
	Rural area	4,826,630	10,123	114,120
Household size	1	2,934,264	7,278	55,315
	2	4,975,730	10,118	108,032
	3	3,960,722	11,264	152,673
	4	1,961,878	12,622	176,154
	5+	1,030,878	14,329	219,983

Source: SLCH, 2019

7.10.2.4 Inability to pay housing bills

The following figure shows the share of the population by deciles unable to pay housing bills (share of households with insufficient funds for timely and full payment of housing bills and services for housing maintenance, or payments for gas for cooking, similar to HS021 in the EU SILC survey). On average, there are 20% of all households facing difficulties in paying housing bills.

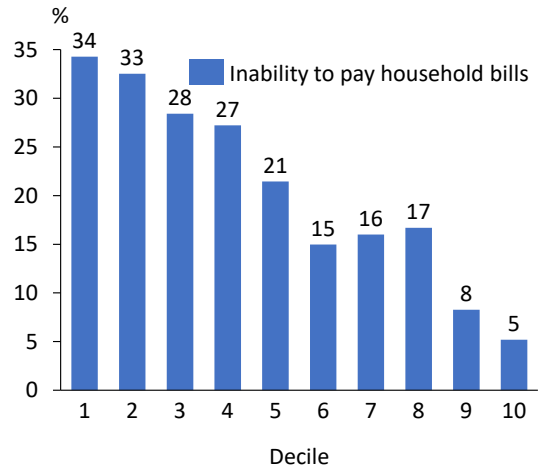


Figure 7-80. Relative share of households unable to pay household bills

Source: SLCH, (2019

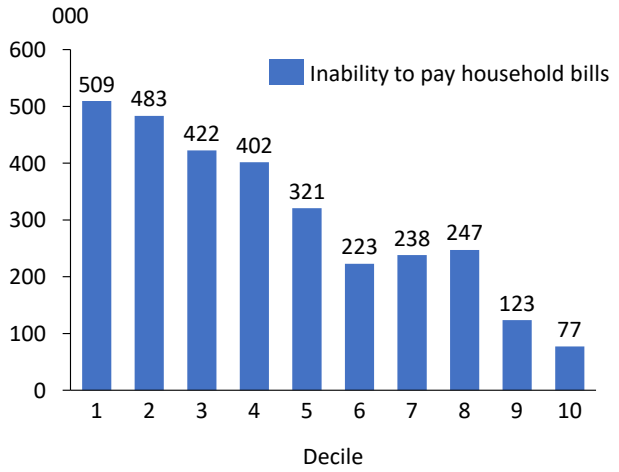


Figure 7-81. Absolute number of households unable to pay household bills

Source: SLCH, 2019

The following table provides information on the relative difficulty in paying household bills based on the type of household.

Table 7-32. Number and share of households unable to pay housing bills based on type of settlement

Category	Value	No.	Unable to pay bills	
			Share	Absolute
Settlement type	Unknown	50,430	15%	7,690
	Big city	5,840,890	20%	1,146,830
	Small city	4,163,709	23%	938,117
	Rural area	4,826,630	20%	953,744

Source: SLCH, 2019

7.10.2.5 Poor housing condition

The following two graphs show the share of the population by deciles living in poor housing conditions (leaking roof, damp walls/floors/foundation, or rot in windows, similar to the HH040 question in the EU SILC). On average, there are 9% of all households with poor housing conditions.

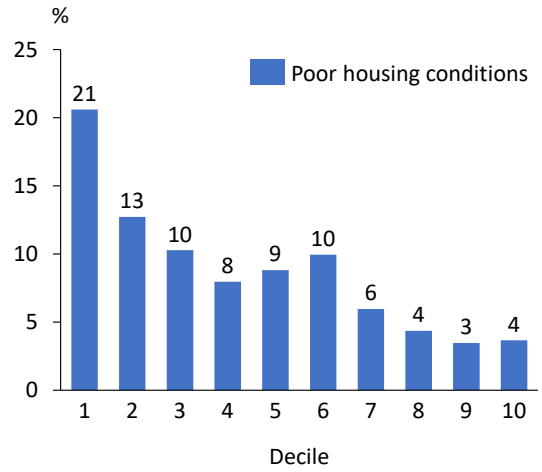


Figure 7-82. Relative share of households with poor housing conditions

Source: SLCH, 2019

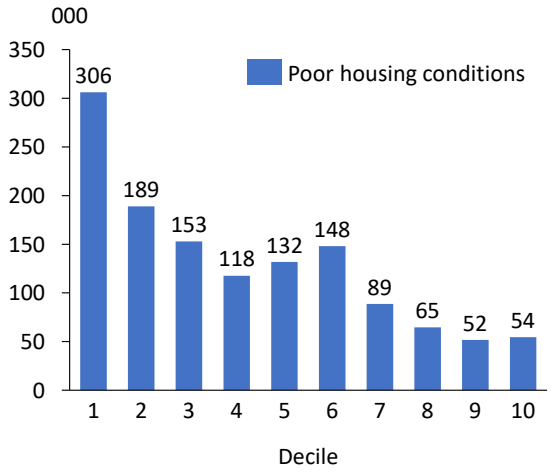


Figure 7-83. Absolute number of households with poor housing conditions

Source: SLCH, 2019

The following table provides information on the share of households with poor housing conditions based on the location of the household.

Table 7-33. Share and absolute number of households with poor living conditions based on the type of settlement

Category	Value	No.	Poor housing condition	
			Share	Absolute
Settlement type	Unknown	32,243	0%	0
	Big city	5,840,890	6%	346,485
	Small city	4,163,709	9%	367,719
	Rural area	4,826,630	12%	590,487

Source: SLCH, 2019

7.10.2.6 Inability to keep household warm

The following two figures show the share and absolute number of households that have insufficient means to keep homes warm (households lacking funds to maintain a sufficiently warm temperature in a dwelling, similar to question HH050 in the EU SILC). On average there are 23% of all households unable to keep household warm.

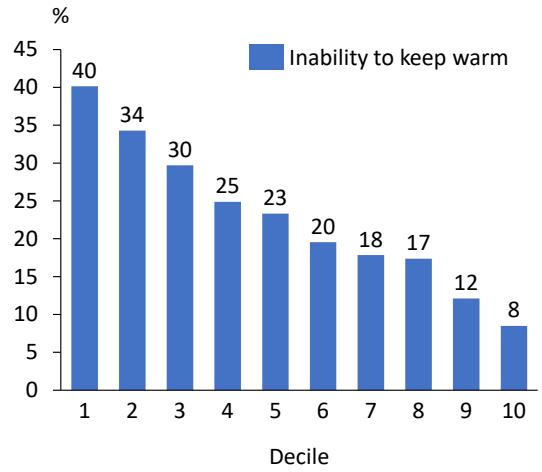


Figure 7-84. Relative share of households unable to keep their dwellings warm

Source: SLCH, 2019

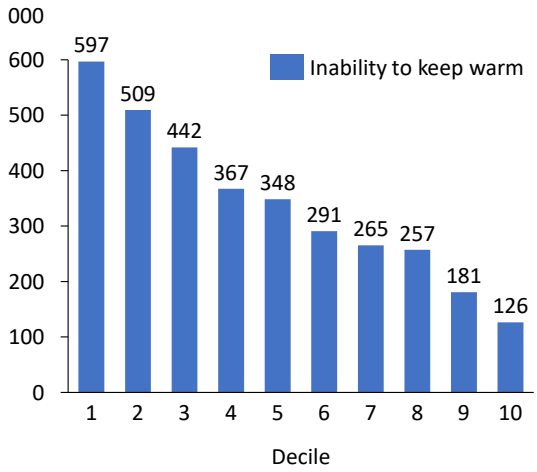


Figure 7-85. Absolute number of households unable to keep their dwellings warm

Source: SLCH, 2019

The following table provides information on shares of households unable to keep their dwellings warm.

Table 7-34. Share of household unable to keep their dwellings warm based on the type of settlement

Category	Value	No.	Unable to keep home warm	
			Share	Absolute
Settlement type	Unknown	32,243	15%	4,799
	Big city	5,840,890	14%	800,663
	Small city	4,163,709	25%	1,059,870
	Rural area	4,826,630	31%	1,517,482

Source: SLCH (2019)

7.10.3 A preliminary assessment of the number of households in energy poverty

Given that the number of energy-poor households is not exact but depends on the indicators and applied thresholds, we propose using upper and lower bounds for the number of energy-poor households. The lower bound is the share of households that stated as unable to keep their homes adequately warm. We propose the upper bound to be the share of households spending twice the national median on energy (2M) and share of households that spend half the national median on energy (M/2). By combining the 2M and M/2 indicators, we cover both types of households, i.e., those that overspend (due to energy inefficient homes) and those who underspend due to lack of sufficient financial resources. According to the available data, the share of energy-poor households in Ukraine ranges from 13%[182] to 18%[183] of all households. This percentage implies that there are between 1.9 and 2.6 million energy-poor households in Ukraine.

[182] This value represents the share of population that stated as unable to keep their homes adequately warm.

[183] This value represents the share of households that spend twice the national median on energy (10% of households) and share of households that spend half the national median (8% of all households).

Even though we did receive the required input data, we suggest that the relevant authorities endeavor to harmonize the national statistics with those in the EU, in particular in terms of conducting separately the Household Budget Survey and the Survey on Income and Living Conditions, in line with EUROSTAT methodology.

In terms of responsibility for calculating the indicators, we propose that Ukrstat perform calculation for the indicators. To ensure comparability with indicators calculated under the EU Energy Poverty Observatory project, the suggestion is that Ukrstat use the methodological guidebook published by the Energy Poverty Observatory, which is also available online.[184]

[184] EU Energy Poverty Observatory, *EPOV Indicator Dashboard: Methodology Guidebook*, May 2020, available at https://energy-poverty.ec.europa.eu/system/files/2021-09/epov_methodology_guidebook_1.pdf

8. ASSESSMENT OF POSSIBLE POLICIES AND MEASURES TO AID ENERGY POOR HOUSEHOLDS

8.1 Introduction

In this chapter, we provide recommendations for adequate objectives, policies, and measures to reduce energy poverty in the short and long term. As analysis of each CP has revealed in chapter 3, most CPs have already implemented some short-term measures aimed at alleviating energy poverty. In most cases, this refers to implementing supplementary income schemes to the most vulnerable customers, typically from the socially vulnerable categories. Furthermore, some CPs are also implementing certain non-disconnection schemes. Therefore, current measures in place are aimed primarily at alleviating the consequences of energy poverty and not addressing its root causes.

In terms of household coverage by current measures implemented in CPs, analysis of CPs in chapter 3 has revealed that the number of households covered by existing measures varies significantly. The following table shows the share of households covered by current measures, and the estimated total financial resources directed to each CP. Again, there is significant variability in average financial support for covered households.

Table 8-1. Summary of measures currently implemented by EnC CPs

CP	Households (HH)			Financial support	
	Total	Recipients	Share	Total EUR	EUR per HH[185]
Albania	734,080	213,000	29%	22,205,000	104
Bosnia and Herzegovina	918,002	69,268	8%	12,323,386	178
Georgia	1,112,026	208,033	19%	11,796,231	57
Kosovo*	333,666	36,648	11%	4,500,000	123
Moldova	903,118	227,000	25%	NA	NA
Montenegro	192,814	19,200[1]	10%	2,707,412	141
North Macedonia	716,682	NA	NA	973,606	NA
Serbia	2,397,827	74,665	3%	9,762,088	131
Ukraine	14,731,716	6,000,000	41%	42,210,000	7

([1]author calculation)

8.2 Overview of possible measures to address energy poverty

There are two main types of measures for alleviating causes and consequences of energy poverty [59]:

1. Measures aimed at increasing household income and protection against utility disconnections.
2. Measures aimed at decreasing energy-related expenditures.

The first group of measures focuses on increasing total household income and protects households from utility disconnections such as gas, electricity, and/or district heating networks.

[185] Represents the estimated financial support obtained as a ratio of total financial support and number of households that have received support.

Such measures are generally considered **short-term** measures as they affect primarily the consequences of energy poverty. This approach includes typically direct financial support - deductions on monthly energy bills, direct financial allowances, or financial transfers with the aim of lowering the overall energy bill burden for households, and protection against utility disconnections. The main items in this group of measures are:

A. Protection
   - Protection against utility disconnections in case of non-payment
   - Provision of minimum energy supply

B. Price regulation
   - Social tariffs
   - Pre-paid meters

C. Direct financial support
   - Various models of support for paying energy bills and increasing income

The second group of measures is typically focused on decreasing household energy consumption, such as improving the energy efficiency of dwellings and household appliances. Such measures are generally considered to have a **long-term** impact in that they address the causes of energy poverty. Based on this approach, the challenge lies in the fact that many energy-poor households spend less energy than needed, and require higher overall consumption of energy if the standard of quality and quantity of energy services is to be met. On the other hand, typical energy policies aimed at improving energy efficiency are focused on subsidizing energy efficiency improvements subject to applicants providing proof of energy and emissions savings. The fact that many energy-poor households underspend energy means that most of the public energy efficiency financing schemes are unavailable to the energy poor. The reason for this is that in typical energy efficiency schemes applicants are expected to demonstrate energy savings and/or reduction of emissions. But as energy-poor households underspend energy, implementing energy efficiency schemes will generally not result in a decrease in energy consumption but rather the level of energy consumption remains mostly unaffected, whereas the quality of service improves (Figure 8-1).

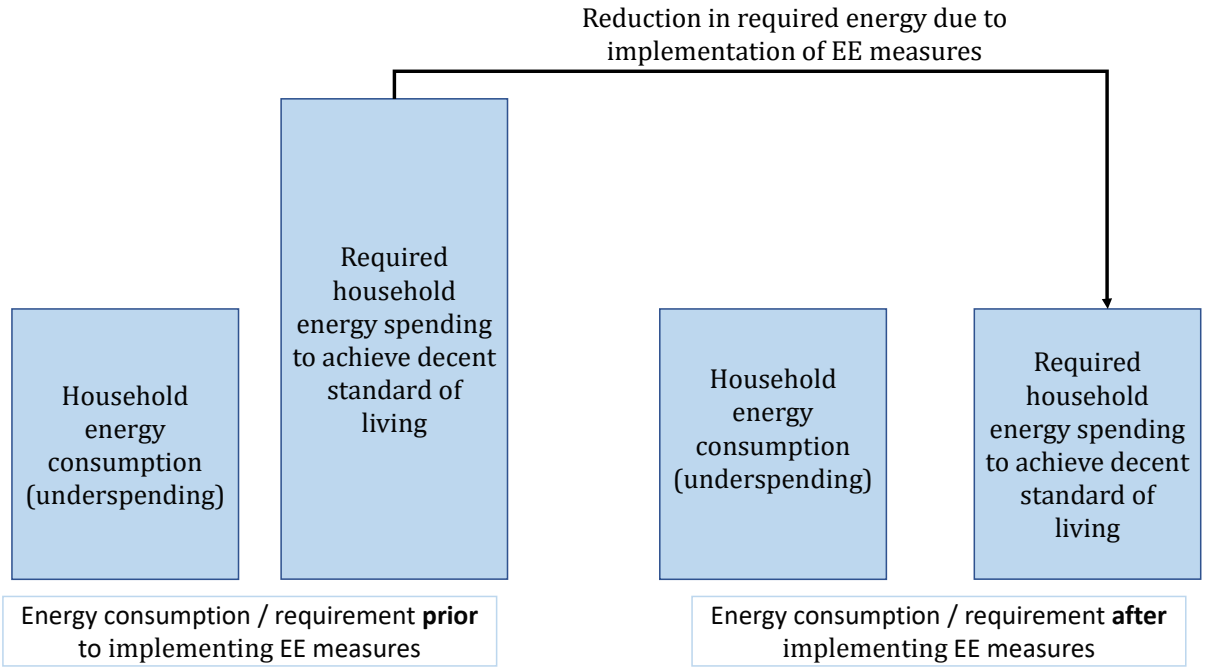


Figure 8-1. Energy efficiency measures and energy consumption of energy-poor households

The main measures from this group directly target energy poor households, but have not been observed in analyses of CPs (except to some extent in North Macedonia)[186], including the following:

A. Energy efficiency improvements
   - Energy retrofitting of buildings, including replacing windows and doors, and replacing energy inefficient household appliances with more efficient ones

B. Heating system improvements
   - Replacing the main heating source with more efficient, environmentally friendly, and affordable types of heating
   - Modernization and expansion of heating systems
   - Implementation of heating systems where not available

C. Implementation of low-cost energy efficiency measures including energy counseling:
   - Installing simple and low-cost energy efficiency measures such as draught-proofing of windows and doors, and LED lighting
   - Undertaking simple energy audits and providing information on rational and efficient energy use

D. Support for renewable energy sources (RES)[187]
   - Incentives for installing photovoltaic panels
   - Incentives for installing solar-thermal collectors

Most Energy Community CPs already implement the majority of these long-term measures at a national or local level, but these measures are not targeted towards energy poor households. When it comes to supporting energy poor households, most CPs have chosen direct support mechanisms as their main approach. Such an approach is typically justified by its simple implementation. This type of measure represents a good short-term approach; however, mitigation of energy poverty requires thorough mitigation of its causes, and direct financial support alone is usually not sufficient to achieve that goal.

8.3 Description of the possible short-term and long-term measures

In this section, we provide a list and a description of possible short-term and long-term measures that can be applied across Energy Community CPs to alleviate the issue of energy poverty.

8.3.1 Short term measures

8.3.1.1 Protection measures

According to sustainable development goals, everyone should have access to the required energy supply.[188] For vulnerable groups, some EnC CPs have already set up protection against disconnection and provided energy supplies to those in need. Some CPs also have measures for heating (gas and district heating supply) and usually have disconnection policies for winter months.

Protection against disconnection measures do not require significant financial resources to be implemented, yet they provide significant benefits for vulnerable consumers. It is important to note that protection against disconnection does not mean that households have been given a waiver for their energy bills: rather, it implies that in case of financial hardship such households

[186] But have been implemented in EU Member States.

[187] In combination with the heating system improvements or as a standalone measure.

[188] Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy; More information available here: https://www.un.org/sustainabledevelopment/energy/

are given the opportunity to postpone payments for consumed energy. Protection against disconnections in wintertime is very effective and should be implemented as a minimum.

As indicated several times in the report, energy-poor consumers are not frequently covered by mainstream social protection policy. These consumers do not meet income and health criteria and are therefore ineligible for support. To protect them in case of unexpected financial hardship, we suggest setting up protection against utility disconnections as a universal policy, especially during the winter months.

8.3.1.2 Direct financial support

Direct financial support can be implemented at a local or national level, and can be funded by local authorities or state budgets. Direct financial support is possible in terms of directly deducting monthly bills by a given monetary amount or by providing a certain amount of kWh free of charge to beneficiaries. It can also be delivered directly in terms of fuel (i.e., provision of fuelwood in winter months), as allowances which can be used on any fuel, or by fully financing household energy expenditures.

The measure can be delivered monthly, seasonally, annually, or as onetime support under special circumstances. Direct financial support can ease the energy burden for households, and can also decrease the stress of "*heat or eat*" and similar existential dilemmas. It is best used as a complementary measure to other types of measures in case when infrastructural measures alone are insufficient. For example, if a household is given support for deep energy renovation, including heating system improvements, and after implementation of such measures it still faces difficulties in paying its energy bills, the household should be given financial assistance. For most households, the expectation is that energy efficiency and heating system improvements alone will be sufficient to ease financial burdens; however, some households will need additional support even after implementation of various energy efficiency, renewable energy, and other infrastructural measures.

The disadvantage of the direct financial support measure, in addition to having a weak impact on alleviating the main causes, is that it represents a long-term burden on the state / local budget. In addition, financial support disincentivizes households to behave efficiently in terms of energy consumption. Finally, the measure frequently suffers from the "leakage" problem implying that it is awarded to households who in essence do not require it.

8.3.1.3 Energy prices regulation and social tariffs

Regulating energy prices in some cases can provide a mechanism for protecting vulnerable consumers; however, it is more efficient to protect vulnerable consumers using different social policy measures rather than intervening in the energy market by directly affecting energy prices [60]. Having an impact on prices in practice has meant keeping prices below market levels and thus limiting competition and narrowing choices for consumers. It can also decrease the likelihood of implementing energy efficiency measures.

Social tariffs are limited to well-defined vulnerable groups, and have a less negative impact compared to blanket price regulation. Again, attention is required in defining sources of financing for covering the difference between market prices and regulated prices in order to ensure that such measures do not result in market distortions. Good targeting is also important as more non-energy poor households may benefit from support using this approach.

8.3.2 Long term measures

The aim of the long-term measures is to include the energy poor households in the energy transition. Energy efficiency improvements should be the principal measures for alleviating energy poverty and are associated with several crucial positive impacts. The main benefit of energy efficiency improvements is that it contributes to decreasing energy consumption and

improvements in health and wellbeing. It also contributes to local economic growth and combating climate change. Economic growth can be felt locally through increased provision of energy efficiency services which means more opportunities for local businesses and more jobs. Economic growth also stems from a decreasing dependency on energy imports and households increasing spending on other goods and services. A decrease in energy consumption results in lower CO_2 emissions, thus mitigating climate change. Energy efficiency retrofits to buildings leads to increases in property values. Finally, the cheapest energy is energy that is not consumed.

Energy efficiency improvements aimed at mitigating energy poverty should be targeted at both the production and consumption chain. They should include energy retrofits to buildings (entire envelope), replacement of household appliances, improvements to distribution systems, and energy efficiency improvements to production units, including fuel switching. Energy efficiency can also lead to reduction of energy prices, through decreased demand, and through less need for upgrading the grid and building of new production capacities [61].

A n overview of the relevant costs for integrated energy efficiency measures (EE1 + HIS 2 and 3 + RES 1) specific to national building stock is given in Table 8-2. **It should be noted that costs provided in this report are only indicative and vary by country depending on different market conditions. Therefore, the costs in this report should be considered only a rough guide in each of the CPs.**

Table 8-2. Overview of costs from EE measures for specific CPs

Country	Average dwelling floor area m^2	Prevailing construction period	Heat energy saving potential	Building envelope retrofit cost	Technologies	Technical system retrofit cost
Albania	117.58	1991 - 2011	Up to 85%	SFH[189] 35 – 55 - 70 EUR/m^2 MFH[190] 22 – 48 - 100 EUR/m^2 (three values for three climate zones)	Introducing central heating system including DHW using wood pellets; Heat pump (air-water) with SCOP> 3 or 4	SFH 55 - 68 EUR/m^2 MFH 36 - 60 EUR/m^2
Bosnia and Herzegovina	90	1971 – 2014 (1992-2014)	50%	SFH 87 EUR/m^2 MFH 74 EUR/m^2	SFH, MFH: Introducing central heating system including DHW using wood pellet, including piping; DH[191] system improvement by introducing TRV[192], system balancing, heat exchanger for centralized DHW SFH, MFH: solar thermal collectors connected to centralized heating system	SFH 3,800 EUR MFH 12,000 EUR 30,000 DH TRV 3,450 – 7,200 EUR DH TRV + centralized DHW 6000 EUR SFH, MFH central solar thermal collectors 2,000 – 4,200 EUR

[189] SFH: single family house

[190] MFH: multifamily house

[191] DH: District Heating

[192] Thermostatic regulation valve

Georgia	90	1951 - 1990	> 50%	SFH 55 - 87 EUR/m^2 MFH 74 – 172 EUR/m2	Introducing central heating system including DHW equipped with low temperature/condensing gas boiler or biomass boiler for pellets or logs	SFH LT gas EUR 2,375 – 3,790 SFH condensing gas EUR 4,975 – 7,783 SFH biomass EUR 4,500 MFH gas EUR 5,000 – 37,950
Kosovo*	83.3	52% after 2000	62%	SFH 138 - 185 EUR/m^2 MFH 184 – 227 EUR/m^2	SFH, MFH: Introducing central heating system using biomass, piping, TRV; SFH, MFH: individual electric DHW boiler SFH, MFH: Introducing central heating system using biomass, piping, TRV, and centralized hot water supply equipped with a biomass boiler or in combination with solar collectors; MFH: central heating system equipped with a biomass boiler or a heat pump and integrated sanitary hot water and solar collectors	SFH biomass EUR 4,500 SFH HP EUR 3,600 SFH, MFH: single electric boiler EUR 150 SFH, MFH central DHW biomass 600 – EUR 1,200 SFH, MFH central solar thermal collectors EUR 2,700 – 4,200 MFH biomass EUR 3,200 MFH HP EUR 3,900

Moldova	65	1950 - 1980	> 50%	SFH 87 – 123 EUR/m^2 MFH 73 - 96 EUR/m^2	Introducing central heating system including DHW with low temperature/condensing gas boiler or biomass boiler for pellets or logs, including piping; DH system improvement by introducing TRV, system balancing, heat exchanger for centralized DHW, billing of metered energy consumption	SFH LT gas EUR 2375 – 3,790; SFH condensing gas EUR 4,975 – 7,783; SFH biomass boiler EUR 3,000 – 4,500; SFH solar thermal collectors EUR 2,000 MFH centralized gas EUR 10,500 – 33,000 MFH solar thermal collectors EUR 4,000 MFH DH EUR 3,500 – 13,000
Montenegro	SFH 74 m^2 MFH 65 m^2	1970 – 1990 After 2000	67%	SFH 225 - 305 EUR/m^2 MFH 265 - 305 EUR/m^2	SFH: Introducing central heating system including DHW using wood pellets; heat pump for cooling MFH: air-water heat pump with SCOP> 3 or 4	SFH 50 EUR/m^2 MFH 80 EUR/m^2

North Macedonia	82.87	Before 1991	40%	SFH 87 - 123 EUR/m^2 MFH 73 – 96 EUR/m^2	SFH, MFH: Introducing central heating system including DHW using wood pellet, including piping; DH[193] system improvement by introducing TRV[194], system balancing, heat exchanger for centralized DHW SFH, MFH: solar thermal collectors connected to centralized heating system; SFM, MFH in urban area: air-water heat pump with SCOP> 3 or 4	SFH EUR 3,800 MFH 12,000 EUR 30,000 DH TRV EUR 3,450 – 7,200 DH TRV + centralized DHW EUR 6,000 SFH, MFH central solar thermal collectors EUR 2,000 – 4,200 SFH air-water heat pump EUR 4,500 MFH air-water heat pump 100 EUR/m^2

[193] DH: District Heating

[194] Thermostatic regulation valve

Serbia	Average building area 129 m²	1971 - 1990	62 – 72 %	SFH 87 - 123 EUR/m² MFH 73 – 96 EUR/m²	Introducing central heating system including DHW equipped with low temperature/condensing gas boiler or biomass boiler for pellets or logs, including piping and TRV; SFH Centralized heating, cooling, and DHW system equipped with heat pumps SCOP 3 or 4 (air-water or water – water) MFH: DH system improvement by introducing TRV, system balancing, heat exchanger and buffer for centralized DHW, billing of metered energy consumption; SFM, MFH in urban area: air-water heat pump with SCOP> 3 or 4	SFH LT gas EUR 2375 – 3,790; SFH condensing gas EUR 4,975 – 7,783; SFH biomass boiler EUR 3,000 – 4,500; SFH solar thermal collectors EUR 2,000 SFH HP EUR 4,500 MFH centralized gas EUR 10,500 – 33,000 MFH solar thermal collectors EUR 4,000 MFH DH EUR 3,500 – 13,000 SFH air-water heat pump EUR 4,500 MFH air-water heat pump 100 EUR/m²

Ukraine	Average building area 118 m²	1949 – 1970	45 – 60%	SFH 87 - 123 EUR/m² MFH 73 – 96 EUR/m²	SFH, MFH: Introducing central heating system including DHW equipped with low temperature/condensing gas boiler or biomass boiler for pellets or logs; MFH: DH system improvement by introducing TRV, system balancing, heat exchanger, and buffer for centralized DHW	SFH LT gas EUR 2,375 – 3,790 SFH condensing gas EUR 4,975 – 7,783 SFH biomass EUR 4,500 MFH 5,000 – EUR 37,950 MFH DH 3,500 – 13,000

8.3.2.1 Energy efficiency measures group 1 (EE1): Energy retrofitting of buildings

General energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, including replacement of windows and doors results in significant energy savings and quality of life improvements. This measure can be implemented partially (segment by segment) or through measures including all segments: windows and doors, walls, roof, floor.

Building envelope retrofit measures include integral energy refurbishment using the following components:

- Installing energy-efficient windows, with low emission double/triple glazing, different frames and a total heat transfer coefficient U_w= 1,2 W/m^{2}K / 0,9 W/m^{2}K
- Thermal insulation of the external wall using the ETICS system based on 5, 10, or 14 (20) cm of EPS or MW depending on the climate zone, including foundation insulation with min 8 cm of XPS
- Thermal insulation of floors, including 4cm XPS, screed
- Thermal insulation of ceilings under unheated attics with 5, 10, 16, or 20 cm of mineral wool and a vapor barrier and using vapor permeable foil
- Thermal insulation of sloped roofs (in case of heated attic areas) with 16 or 20 cm of mineral wool or flat roof with 16 or 20 cm of XPS or EPS and vapor barrier and vapor permeable foil.

These measures can be implemented as single measures, but integrated energy retrofits should be aimed to harness the full saving potential. This includes the building envelope improvement (EE1), and energy efficiency improvements of the production units (HIS 2 and 3), including fuel switching and use of RES where appropriate (RES 1 and 2).

8.3.2.2 Energy efficiency measures group 2 (EE2): Replacement of household appliances via the "old for new" scheme

Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and do not provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) leads to a decrease in energy consumption and offers the same or often better quality of service. It also reduces energy bills and CO_2 emissions while improving quality of life. The "old for new" principle is of key importance and has the goal of helping the beneficiary forfeit the old appliance, and acquire a new one. This approach is necessary to prevent households having both appliances which would result in higher energy consumption.

The estimated cost of the measure per household is as follows:

- Replacing of 20- to 30 year-old refrigerator with a new class A refrigerator: EUR 300 for the refrigerator with an estimated payback period of 3.5 years,
- Replacing a 30-year-old or older washing machine with a new class A: EUR 350 EUR for the washing machine with an estimated payback period 6 years,
- Installing a dishwasher in a household with a minimum of 2 family members who use an electric boiler for domestic hot water (DHW) (45 cm dishwasher): EUR 380 for the dishwasher with an estimated payback period of 7 years.

8.3.2.3 Energy efficiency measures group 3 (EE3): District heating production and distribution system improvements

Energy efficiency improvements to distribution heating networks results in lower energy costs for consumers. This type of measure is particularly important for networks experiencing significant energy losses, such as is the case in many district heating networks in CPs. Therefore, this measure is appropriate only for those CPs that have DH systems in place.

Energy efficiency improvements to production units, and if needed fuel switching (i.e., switching from fuel oil or coal to cheaper and more environmental fuels in district heating networks) can also result in significant energy bill reductions for end consumers while also providing improvements to air quality and less CO_2 emissions.

8.3.2.4 Measures relating to heating system improvements (HSI) for households

The inability to keep houses adequately warm is a key challenge of living in energy poverty. Cold homes contribute to excess deaths during wintertime and numerous adverse impacts on health. Energy poor households are often unable to pay for heating bills, and many lack adequate heating systems. Many homes are heated from only single heating sources and often there is no heating in other parts of dwellings. Many rely on burning low-quality fuelwood, coal and some even burn trash. Low quality fuelwood furnaces contribute adversely on health due to pollution from indoor particles and local outdoor pollution ([62], [63]). These kinds of single heating systems, e.g., stoves, do not provide uniform heat distribution across the entire living space.

Thus, making improvements to heating systems is a key measure for alleviating energy poverty. This specific measure comprises the following submeasures:

8.3.2.4.1 HSI 1: Improving energy efficiency of systems.

Replacing existing systems with the same type of system with better efficiency, i.e. replacing traditional fuelwood stoves with new higher efficiency biomass furnace or stove. This type of measure can be particularly applicable in the rural area where there might still be a high prevalence of traditional biomass (fuelwood use) and where alternative fuel sources might be too costly or unavailable for the vulnerable groups. The use of this measure should be very limited to the most energy-vulnerable consumers and should be considered as a measure of last resort. Wood biomass furnace of min 10 kW is recommended with an estimated cost of 500 EUR or biomass stove of up to 10 kW with an estimated cost of 800 EUR.

8.3.2.4.2 HSI 2: Modernization and expansion of the heating system.

This means replacing the entire heating system with a more adequate one. This measure does not necessarily provide energy savings, but rather it improves efficiency, i.e., the replacement of heating from separate heating sources by installing a centralized household heating system.

For family houses, the cost varies between EUR 3,000-5,000 per housing unit and includes the cost of a 6-14 kW biomass boiler as well as all piping, radiators, and thermostatic valves. The cost of a 6-10 kW gas boiler varies between EUR 2,400-3,800 per housing unit and includes the cost of the boiler and installation of piping, radiators, and thermostatic valves.

For multi-residential buildings, the cost varies between EUR 10,000- 33,000 depending on the building size and includes the cost of a 26-60 kW low-temperature gas boiler as well as installation of piping, radiators, and thermostatic valves. The cost of a 14-46 kW condensing gas boiler varies between EUR 10,000-38,000, depending on the size of the building.

For the case of a district heating system and installing a more efficient heating substation rated at 42 kW to 84 kW, including heating system balancing and thermostatic valves in the apartments, the cost varies between EUR 3,000-7,200, depending on the size of the building.

A detailed overview of relevant technologies for specific CPs is given in Table 8-2.

8.3.2.4.3 HSI 3: Fuel switching

Switching fuel from fossil to renewable sources. Switching to biomass requires taking into account biomass sustainability, and fuelwood quality and furnace efficiency when using fuelwood as a biomass source.

For family houses, the cost varies between EUR 3,000-5,000 per housing unit and includes the cost of a 6-14 kW biomass boiler as well as installation of piping, radiators, and thermostatic valves. When using 2-4 kW heat pumps, the cost varies between EUR 4,500-6,000.

8.3.2.5 Implementing low-cost energy efficiency based on energy advice (EEEA) measures

Education and raising awareness are important aspects in mitigating energy poverty. Raising awareness is key to delivering effective public policy. Education along with simple energy audits and low-cost energy efficiency measures have proven to be a good first step. This measure is relatively easy to implement, provides instant relief to some of the households struggling, and offers insight into the reality of living in energy poverty in a targeted area based on collected data. Simple energy audits have proven to be a good approach to acquiring the necessary data on the presence of energy poverty. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of two.

8.3.2.5.1 EEEA1: Setting up simple and low-cost energy efficiency measures

This measure includes implementing measures such as draught-proofing of windows and doors, and LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar strategies. The measures are simple and quick to implement, and do not require assistance from professionals. Research has shown that households benefiting from such measures have evaluated them positively, particularly the draught-proofing of windows and doors where immediate improvement are felt ([64], [65]).

The estimated cost of the measure is EUR 30-100 per household for equipment plus EUR 200 per household for providing the service.

8.3.2.5.2 EEEA2: Simple energy audits and education

Simple energy audits assume that basic information on energy consumption and energy habits have been collected. This data comes in the form of interviews when utility bills are analyzed. The interview consists of gathering basic demographic information and information on the building (such as the age of the building, presence of thermal insulation, type of windows and roof, type of building, construction material, heating type, heating fuel, etc.). Acquiring information on buildings does not rely on measures, but instead data is obtained from the surveyor's visual observations and information provided by household members. Based on the collected data, approximate energy consumption and related costs are calculated and a proposal for energy saving and energy efficiency measures are drawn up. During a household visit, information is provided to household members on better understanding energy bills and energy habits, and also more rational use of energy. Typically, information is also provided on the availability of various support schemes which may directly benefit the household.

The estimated cost of the measure is EUR 200 per household.

8.3.2.6 Support for renewable energy sources

In terms of utilizing renewable energy sources (RES) in energy-poor homes, the measure is usually limited to the use of biomass and fuelwood, and is often of questionable sustainability. Fuelwood use by the energy poor is typically inefficient and unsustainable with numerous adverse impacts on health, even though it is considered biomass and thus a RES. Although the use of other RES for energy-poor is out of reach for many authorities at the moment, such measures should be considered and implemented if energy transition is to be just. There are successful examples of incentivizing RES use for vulnerable groups. They include providing support for installing photovoltaic panels and solar-thermal panels and such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements.

8.3.2.6.1 RES 1 Incentives for installing photovoltaic and domestic solar thermal panels

Providing financing for installing photovoltaic panels enables households to reduce their energy bills and to make some profit in the case of on-grid systems. It also enables households to become active players in the energy market and empowers them. This measure can be implemented both on-grid and off-grid, thus also providing a good solution for those people who do not have access to the electricity grid.

The average size of a photovoltaic system for a household is 4 kW and the expected surface area to integrate this system is 23 m^2., depending on the solar irradiation of the location The average cost of the PV modules is from 1,000 EUR/kWp up to 1,400 EUR/kWp. The expected cost of installation of this PV system, including mounting and design documentation is from 4,500 up to 6,500 EUR.

8.3.2.6.2 RES 2 Incentives for installing solar-thermal collectors

Providing financing for installing solar-thermal panels reduces energy bills for domestic hot water. This can be done in combination with heating system improvements or as a standalone measure.

The cost of average solar thermal collector systems for a family house is EUR 2,500 and includes two solar vacuum collectors, a 200-litre hot water tank and installation costs.

8.4 Selection of policies and measures

Decisions on issues relating to energy poverty requires cooperation from various stakeholder groups. It requires a joint approach based on energy, social, and even public health policies, which makes the process more challenging. An additional layer of complexity is that energy poverty is a multidimensional problem defined by a wide range of indicators and criteria used for decision making. It requires making compromises that are often conflicting and challenging. At the same time, the issue of energy poverty requires urgent solutions. This puts decision-makers in a situation where they have to decide what is more important: benefits for society, the environment or the economy. Accordingly, decision-makers must make choices and solutions which are financially and operationally feasible.

Public policy processes, if done participatively, require the participation of a wide range of stakeholders, which means that the decision-making process is more challenging, and reaching a consensus becomes difficult. A possible solution to finding an optimal set of measures to address energy poverty is to use a **multicriteria analysis**, based on the analytic hierarchy process. This approach enables the ranking of key criteria and measures while ensuring an objective approach to consensus, based on assessments which to a certain extent need to be subjective. We propose the use of multicriteria analysis to select measures for implementation by each CP.

8.4.1 Multicriteria approach to solving energy poverty

Multicriteria analyses are mostly applied to policy-making decisions which can have significant non-financial impacts. Energy poverty is one such public policy. Alleviating energy poverty has multiple societal and environmental benefits and directly contributes to achieving sustainable development goals, such as:

- Reducing energy consumption, and also contributing to the reduction of CO_2 emissions
- Improving the health of citizens
- Improving quality of life and ability to take part in social activities
- Decreasing overall poverty.

Most of these benefits from alleviating energy poverty are hard to quantify or expressing the associated financial worth is difficult, thus one of the methods for choosing optimal policy responses to alleviate energy poverty is using the analytic hierarchy process (AHP). The AHP approach facilitates identifying preferences among key stakeholders regarding criteria for choosing policy responses in alleviating energy poverty and choice of appropriate measures.

One of the main advantages of the AHP method for tackling energy poverty is its intuitive and simple nature applied to real-life decision-making situations. AHP is easy to understand for stakeholders of various backgrounds and applicable in dynamic environments in which working groups and round tables operate. To make the process fully participative, decisions on energy poverty require input from energy and social welfare experts, health experts and practitioners, energy poverty experts, politicians, and decision-makers from different levels - local, regional, national, international, NGO representatives, energy agencies, cooperatives and citizens. The AHP method for supporting the decision-making process assists all these diverse stakeholder groups to contribute in devising measures, which in turn means they too are equal participants in the process.

In practice, these decision-makers rely on evaluating the impacts their decisions will have on society as a whole, including social, economic, and environmental impacts while retaining personal biases and interests. To decrease the impact of individual biases and interests, processes are run participatively and inclusively, making the evaluation of specific benefits and costs more complex and which requires reaching a consensus. Reaching a consensus can be hard and requires

at times exhaustive processes. Thus, the AHP method serves as a lever for an easier, quicker, and more just decision-making process.

Multicriteria decision-making is a process relaying on ranking different alternatives (options) based on multiple criteria. It requires:

- evaluating the importance/ranking of criteria
- ranking each alternative based on each criterion
- prioritization of alternatives.

The main criteria and measures are chosen from existing research and relevant literature (Figure 3-2). These together form a hierarchy to be used in the AHP method.

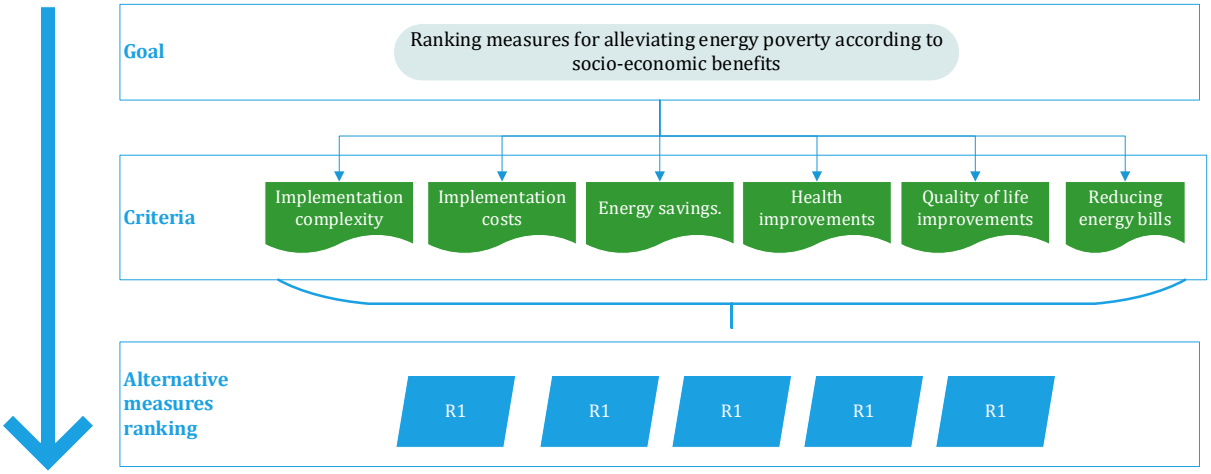


Figure 8-2. Multicriteria analysis of measures to alleviate energy poverty

At the top of the hierarchy is the main goal of the analysis, which is in this case ranking of the measures for alleviating energy poverty in each contracting party. The second step is the definition of criteria based on which the measures are to be ranked. Within this step, after the criteria are defined, they are compared with each other and given a ranking. The final, and third step is defining and ranking the alternatives for achieving the goal (ranking of the selected measures) based on already ranked criteria.

The AHP is a method of relative measurement of criteria that can be hard to quantify, where priorities are determined by mutually comparing elements that need to be ranked. The mutual comparison-ranking of these elements, which can include both rankings of alternatives based on criteria and criteria against each other, is the specificity of the AHP method. The main advantage in comparing each element to other elements is that people are biologically conditioned to intuitively and easily give relative rankings to one element over another, and decide on the preferred element and to what extent is the preference. Doing this in the AHP method means that the comparisons are done on a scale of 1 to 9, as shown in Table 8-3.

Table 8-3. Ranking of criteria in the AHP method

Degree of importance	Definition	Explanation
1	Equal value	Both criteria contribute equally to the goal
3	Slightly more value	Based on experience and assessments, a moderate preference is given to one criterion or alternative over the other
5	Essential or strong value	Based on experience and assessments, one criteria or alternative is significantly more preferable than the other
7	Very strong, proven value	One criteria or alternative is strongly favored, and its dominance is demonstrated and proven in practice

9	Extreme value	Evidence favoring one over the other is of the highest possible order of affirmation
2, 4, 6, 8	Intermediate values	

These rankings can be done using pen and paper, and then analyzed using an available software package, or can be directly inserted into the selected software. There are several available software packages and tools for performing AHP analysis, which can also be performed using simple tools such as MS Excel.

The most commonly used pre-developed software is the commercial package type without a free license version even for academic purposes. Some recommended free versions that offer efficient data processing, and not as time-consuming as creating the entire model in MS Excel are:

- SuperDecisions - only for single expert exercises
- AHP Online System, for group processes

As for commercial tools, ExpertChoice[195] is highly recommended, but the software has to be purchased.

In addition to choosing the appropriate software, an important part of the process is stakeholder choice. As previously discussed, policy making and implementation processes in democratic societies involves participatory consultation processes that require collaboration among a wide range of various stakeholders. Therefore, implementing group exercise using the AHP method for selecting measures to combat energy poverty relies on involvement of the following groups of recommended stakeholders in the process:

- Decision-makers - representatives of local self-government units, state government, and parliament,
- Experts - in the field of energy, social policy, and energy poverty,
- Scientists - in the field of energy poverty,
- Interested public - representatives of civil society organizations and associations dealing with energy poverty and, if possible,
- The energy poor and vulnerable - people affected living energy poverty or at risk of energy poverty.

8.4.1.1 Criteria for evaluating measures

The analytic process is initiated by determining the relative value of each selected criteria. We propose the following criteria to be used in evaluating measures for alleviating energy poverty: operational, economic, energy and environmental, health, social and financial. A description of the criteria is as follows (criteria in alphabetic order).

A. The economic – total cost of implementing the measure for authorities.
- The fewer economic resources required in implementing the measure, the more acceptable the measure for the authorities. Also, the less economic resources required, such resources are more available for other public projects.

B. Energy and environmental – energy savings and related CO_2 emission savings
- Reducing negative impacts on the environment through reduction of energy use.
- The greater expected energy savings of a measure, the higher the expected positive impact on the environment, and hence the measure becomes more appealing to authorities.

C. Financial – reducing total monthly energy costs for households

[195] https://www.expertchoice.com/ahp-software

- The less spent from the household budget on energy, more is available for spending on other household needs. Measures contributing to this criterion have a positive impact not only on household budgets but also on the overall economy by increasing household spending capacity and reducing the risk of poverty.

D. Health – improving the physical and mental health of targeted households, reducing adverse impacts on health

- The more a measure contributes to health improvements, the better for the government, i.e., the fewer financial resources are needed for healthcare and more people are able to contribute to the economy.

E. Operational – complexity of implementation.

- The capacity of state administration to implement selected measures.
- Ability to obtain data necessary for implementation, operational capacity to implement the measure, i.e., the easier a measure is to implement, the more appealing it is to authorities.

F. Social – improving overall quality of life

- The more a measure contributes to quality-of-life, so too does it contribute to social equity, and consequently reducing poverty and increasing social inclusion.

The aim is to find and implement measures that provide the greatest social, environmental, and economic benefits. The following table provides the summary of proposed criteria.

Criteria	Importance
Economic - total investment cost	- Total cost of investments in the measures at the desired level (local, regional, national) during the planned timeframe. - The fewer funds needed, the more appealing is the measure to authorities. - Total cost of implementation is often a decisive factor upon which decisions are made.
Energy - environmental - energy and CO_2 savings	- The greater the energy savings, the greater the positive impact on the environment and climate. - Energy savings contribute to energy independence and decrease in energy prices, *ceteris paribus*. - Greater potential for energy savings is more likely to be accepted by authorities.
Financial - a decrease in monthly household energy bills	- A decrease in household energy bills means that households can spend more on other needs and mitigate the risk of poverty.
Health - improvement to physical and mental health	- A decrease in negative impacts on health leads to lower public health spending. - The less resources are spent on public health, the more attractive is the measure to authorities. - Improved health facilitates a person's ability to join the labor market and increases employability.
Operative - complexity of implementation	- Capacity of a public body to implement selected measures: includes staff capacity and knowledge (human resources), data availability. - The easier the measure is to implement, the more attractive it is to the implementing body. - Complexity of implementation is often a decisive factor in selecting a particular measure.

Criteria	Importance
Social – improvement to quality of life	- Improvements to quality of life contribute to energy justice, as well as reducing general poverty, and increasing inclusiveness. - Improved quality of life increases one's ability to take part in community activities.

Table 8-4. Summary of criteria used for ranking measures directed to alleviating energy poverty

To illustrate the use of AHP, we will present the results of using this tool for certain CPs where this approach was used to select the measures.

9. PROPOSED MEASURES AND POLICIES FOR THE CONTRACTING PARTIES

In this chapter, we propose a list of measures for implementation. We start the analysis for each CP with the list of current measures that are being applied and follow it with the identification of key energy poverty issues (detailed analysis of the current measures in place in each CP is provided in Chapter 3). Next, we provide a list of measures we believe should be implemented. The proposed submeasures for each measure do not represent an exhaustive list of submeasures. For example, when proposing the "old for new" scheme, we list the main items (submeasures) that may fall under these measures. The final and detailed specification of each submeasure should be the topic of further discussion among relevant stakeholders in each CP. Also, we indicate for each proposed measure whether a similar measure already exists in the national energy efficiency or climate plans that can be expanded to include measures proposed in this report.

9.1 Albania

9.1.1 Overview

Currently, there are two measures to aid vulnerable consumers, both targeting low-income individuals. The measures provide financial support to households that consume up to 200 and 300 kWh/month of electricity, respectively. A summary of the measures is given in Table 9-1. Both measures are short-term in nature and do not alleviation energy poverty, but rather address only the consequences. Furthermore, the measures are limited only to the most vulnerable parts of society (individuals classified as vulnerable, i.e., the disabled, retired and low income). The measures cover approximately 213,000 households at an estimated annual cost of approx. EUR 22.2 million.

Table 9-1. Current measures in place to aid vulnerable consumers in Albania

Measure name	Number of HH covered	Approximate annual financial expenditures		
		ALL	€ (mil)	Year
Compensation for increase in electricity prices	213,000	874 mil.	€7.2	2020
Compensation for removing the protected energy consumption threshold of 300 kWh/month	213,000	1.76 bln	€15	2020
Total	**213,000**		**€ 22.2**	

Albania is currently in the process of drafting its National Energy and Climate Plan (NECP) which should deliver a plan for implementation of specific measures in alleviating energy poverty as well as assessing the current definition of a vulnerable consumer. The NECP should also foresee measures and plan monitoring situations regarding energy poverty in the country. A system for regular reporting to the European Commission as part of the harmonization with the EU acquis should also be set up.

Albanian households use primarily three energy sources: electricity, biomass, and liquefied petroleum gas (LPG). Electricity represents the largest proportion of energy consumption at 53%, followed by biomass at 26%, and LPG at 21%.

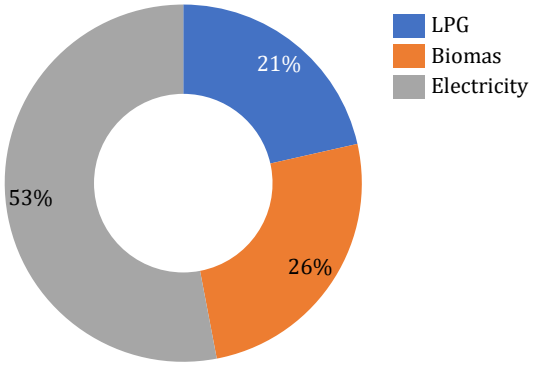


Figure 4-1. Structure of household energy consumption in Albania

Source: EUROSTAT Energy Balances (2018 data)

According to the document titled *The Typology of the Residential Building Stock in Albania and the Modeling of its Low-Carbon Transformation* [24], the territory of Albania is divided into three climatic zones (based on heating degree days (HDD) for a base temperature of 17.5 °C). The zones are:

- Zone A: degree days are fewer than 1,500. In this zone, a southwest subzone is distinguished with degree days fewer than 900.
- Zone B: degree days are between 1,501 and 2,300.
- Zone C: degree days are more than 2,300.

In terms of the share of dwellings in each zone, 36% of dwellings are in zone A, 48% in zone B, and 16% in zone C. The conclusion indicates that the need for heating in Albania is rather low in absolute values but also when compared to other CPs.

Individual stoves are the most typical heating systems (63.3%), followed by electric heaters (8.5 %) and air heat pumps (6%). About 9% of households have no heating. Heat pumps are often used as a secondary heat source. Only 3.2% of private households have central heating (building or dwelling heating), while 4.4% have a fireplace.

The average heating demand is 191.31 kWh/m^2 for family houses and 80.87 kWh/m^2 for multi-apartment buildings. National energy efficiency standards have not been defined but a study on low carbon transition for the national building stock indicates potential savings of 80%. This may reduce heat energy demand to 26.20 kWh/m^2 for family houses and 11.53 kWh/m^2 for multi-apartment buildings.

9.1.2 Policy recommendations

Based on its definition of energy vulnerable consumers and current legislation (Law on the Power Sector, Law on the Natural Gas Sector, and Government Decision No. 8 of 2015), Albania has taken the first important step in protecting the most vulnerable consumers. Its legislation recognizes the issue of energy vulnerability and the necessity of offering protection, which is now only in the form of direct financial support for the most vulnerable groups. However, no long-term measures have been set for alleviating energy poverty, but further improvements in protection measures and direct support are possible.

Given that there is potential to reduce household demand for heat, and current implemented measures are short-term in nature, most of the proposed measures are long-term. Incorporating them within the NECP draft will ensure improved energy efficiency of dwellings and reduced energy needs of households.

9.1.2.1 Short term measures

9.1.2.1.1 Protection measures

Though Albania's primary legislation has recognized the concept of vulnerable consumers, the approach has been limited to providing only direct financial support. An important issue that has to be addressed is disconnection of utilities for vulnerable groups in case of non-payment: disconnection should be prohibited primarily during winter months, and these measures should be introduced into legislation.

9.1.2.1.2 Direct financial support

As shown in Table 9-1, there are two measures in place aimed at directly subsidizing the cost of energy for vulnerable consumers. Such financial measures should remain limited to the most socially vulnerable consumers and be implemented alongside infrastructural measures aimed at alleviating the main causes of energy poverty. Furthermore, direct financial support should be provided for those households, which after having long-term measures implemented, still require support because they are unable to cover their energy-related expenses.

9.1.2.2 Long term measures

The main approach in mitigating energy poverty in Albania should be aimed at improving the energy efficiency of dwellings belonging to energy-poor households as well as facilitating fuel switching and heating system improvements, primarily for those households relying on unsustainable fuelwood. The primary measures should have a long-term effect as contributing to eliminating the root causes of energy poverty. The proposed measures are focused primarily on achieving maximum benefits for households while easing burdens on the national budget in the long run.

Given that those measures are also beneficial for the general public, they should be further assessed in the NECP and other strategic documents that aim to improve energy efficiency in Albania. Consequently, we propose the following measures:

1. **Program for mitigating energy poverty**. We have noticed there is no systematic approach to addressing the issue of energy poverty in Albania. Therefore, we propose drafting and adopting a formal document that defines a detailed plan for implementing measure to address energy poverty. The program should extend beyond income support to involve energy efficiency improvements and targeted measures for vulnerable households.
2. **Energy retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes resulting in the inability to heat the entire living surface or the homes overall. We propose measures aimed at improving the energy efficiency of homes, and in turn reducing energy demand.
3. **Replacement of household appliances via the "old for new" scheme**. Due to low disposable income, energy-poor households own inefficient appliances that contribute to increased energy demand and hence energy poverty. We propose measures to help energy-poor households replace aging home appliances.
4. **Heating system improvements** (HSI) refers to related measures in households, including: (i) HSI 1: Improving the heat system energy efficiency; (ii) HSI 2: Modernization and expansion of heating systems; and (iii) HSI 3: Fuel switching.
5. **Implementation energy advice (EEEA) measures for low-cost energy efficiency**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Conducting simple energy audits along with education
6. **Support for renewable energy sources**, including the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors

A detailed description of measures is given in the tables below.

Table 9-2. Detailed description of the measure Program for Mitigating Energy Poverty

Name of Measure		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures to determine their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If should define steps for integrating new indicators in the existing statistical system at the national level (conducted by the Institute of Statistics). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[196]	National level
Implementation	List of implementation activities and descriptions	The first step is the development of the Program. The Program should be developed using participatory development principles including gender sensitivity and interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-3. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030

[196] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, and floor. The fact that 50% of households in Albania heat only part of their living space in the winter indicates the need for energy efficiency retrofits of buildings for the energy-poor and potentially high energy savings. The primary aim of this measure is to eliminate the main causes of energy poverty. This is achieved by improving the efficiency of dwellings while also eliminating adverse impacts on health, typically caused by low energy efficiency (through cold, dampness, mold, and draft). It improves the overall quality of life. The measure also boosts investments, energy savings, reduces CO_2 emissions, increases local employment, improves security of supply, and increases the property values. Devising a national scheme for implementing this measure requires keeping in mind that there is widespread use of fuelwood. This factor may possibly hinder implementation of the scheme for the most vulnerable (who most likely use fuelwood in rural areas) if the precondition to proving CO_2 savings exists. Biomass is considered carbon neutral, hence any such scheme would not apply to those using fuelwood. It is thus important to take into consideration other benefits of energy retrofits and to design the scheme in such a way that carbon reductions are not seen as eliminating factors. Measures for improvement can be implemented as an integral refurbishment or renovation, including improvements to both the building envelope and heating systems. The standard scenario concerning heat energy demand and compliance with regulatory standards involves thermal insulation of the external envelope using 5 cm of insulation material for walls and the roof, including double-glazed insulating windows for all building typologies. The average investment cost for thermal insulation of an external envelope for family houses varies between 35 and 55 EUR/m^2 and for multi-residential buildings ranges from 22 to 48 EUR/m^2. An advanced scenario for heat energy demand beyond regulatory standards includes thermal insulation of the building envelope using 10 cm of thermal insulation material for walls, 12 cm for the roof and 5 cm for floors, including triple-glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope ranges from 70 EUR/m^2 to 100 EUR/m^2. In colder climate zones with HDD>2000, a centralized heating system using wood pellets and heat accumulation/pyrolytic boiler equipped with heat accumulator and thermostatic valves, providing a system efficiency of η=90% is recommended. The recommendation for DHW is a centralized system in conjunction with a heating system and solar collector system. In multi-apartment buildings, a central heating system using wood or wood pellets, equipped with heat accumulator, hydraulic system balance, and thermostatic valves and a system efficiency of η=90% is recommended. A central domestic hot water system in conjunction

		with a heating system and solar collector system is recommended. The average cost for heating systems varies between 55-65 EUR/m^2 for single-family houses and 36-60 EUR/m^2 for multi-residential buildings.[197] In mild climate zones with HDD <1500, heat pumps with a SCOP>3 or 4 are recommended, which provides heating and cooling without extra measures.
	Level of governance	National level

Table 9-4. Detailed description of the measure Replacement of Household Appliances Via the Old for New Scheme

Name of measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2022-2030
	Aim / Short description	Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) decreases energy consumption for the same or often better quality of service. It also reduces energy bills and CO_2 emissions, while improving quality of life. The "old for new" principle is key as the intention for beneficiaries to forfeit their old appliances before acquiring a new one. This approach is needed to ensure that households do not retain both appliances resulting in higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of old refrigerators (energy class D or lower) with a new class A refrigerator. This scheme will help provide new refrigerators for households which currently do not own one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bill; **Freezers**: Replacement of old freezers (energy class D or lower) with a new class A freezer: - This measure provides energy savings and reduces energy bills; **Washing machines**: Replacement of old washing machines (energy class D or lower) with a new class A washing machine. This scheme will help provide new washing machines for households without one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty washing machines or those without

[197] The typology of the residential building stock in Albania and the modelling of its low-carbon transformation, REC, 2015

		one. It contributes to energy savings and energy bill reductions.
	Level of governance	National scheme delivered locally

Table 9-5. Detailed description of the measure Heating System Improvements (HSI) in Households

Name of measure		Heating system improvements (HIS) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to keep houses adequately warm is a key challenge of living in energy poverty. This is evident in Albanian households heat only part of their living space in winter, which indicates a potential in improving availability of heating by installing heating systems throughout entire living spaces, thus preventing households from reducing their living space in winter months. HSI for energy-poor refers to three main variations, and which can be implemented as a single measure or in combination: **HSI 1: Improving energy efficiency of heating systems** Replacing existing systems with the same but higher efficiency systems, i.e., replacing traditional fuelwood stoves with more efficient fuelwood stoves. This measure is particularly applicable in rural areas where there is a high prevalence of using biomass (fuelwood) and where alternative fuel sources can be too costly or unavailable for vulnerable groups. **This measure should be limited** to the most energy-vulnerable consumers and considered a measure of last resort. Wood biomass furnaces rated at a min 6 kW are recommended, and the estimated cost is EUR 500. **HSI 2: Modernization and expansion of heating systems** This involves replacing entire heating systems with more adequate heating systems. This measure does not necessarily provide energy savings, but efficiency, i.e., replacement of individual heating sources with centralized heating systems in households. This measure applies to all dwellings. Eligibility criteria should consider cost-effectiveness and improvements to overall quality of life. In colder climates with HDD>2000, centralized heating systems running on wood pellets equipped with heat accumulation/pyrolytic boilers, heat accumulators and thermostatic valves, and a rated system efficiency of η=90% are recommended. Regarding DHW, centralized systems in conjunction with heating systems and solar collector systems are recommended. In multi-apartment buildings, central heating systems running on wood or wood pellets, equipped with heat accumulators, hydraulic system balance, and thermostatic valves and rated at a system efficiency of η=90% are recommended. Central domestic hot water systems in conjunction with heating systems and solar collector systems are recommended. The average cost for heating systems varies between 55-65 EUR/m^2 for single-family houses and 36-60 EUR/m^2 for multi-residential buildings.[198] In mild climate zones with HDD<1500, heat pumps

[198] The typology of the residential building stock in Albania and modelling of its low-carbon transformation, REC, 2015

		rated at SCOP>3 or 4 are recommended, providing heating and cooling without extra measures. **HSI 3: Fuel switching** Switching fuel from fossil to renewable source. Switching to biomass requires considering biomass sustainability and, in case of using fuelwood as a biomass source, consideration should also be given to fuelwood quality and furnace efficiency. The same systems are recommended as in HSI2.
	Governance level	National scheme delivered locally

Table 9-6. Detailed description of the measure Implementation of the Low-Cost Energy Efficiency and Energy Advice (EEEA) Measures

Measure name		**Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)**
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two. Persons conducting household visits can provide both support in sharing information and guidance to households in the implementation of national and local support programs, and also the implementation of measures listed here: **EEEA1: Implementing simple and low-cost energy efficiency measures** Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Simple energy audits along with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures.

		During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level delivered locally

Table 9-7. Detailed description of the measure Support for Renewable Energy Sources

Name of measure		Support for Renewable Energy Sources
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions.
	Level of governance	National level

9.2 Bosnia and Herzegovina

9.2.1 Overview

There are currently two measures in place in Bosnia and Herzegovina to support vulnerable consumers. One of the measures is administered at the national level, and other at the local level (Sarajevo Canton). The measure at the national level is available to individuals who are beneficiaries of permanent financial assistance and to the retired individuals who meet certain eligibility criteria. The measure administered in Sarajevo is open to individuals who also meet certain income and social vulnerability criteria. Both measures are of short-term nature, meaning they are aimed primarily at easing the consequences of energy-related financial burdens and are directed to the most socially vulnerable members of society. The measures address the consequences of energy poverty but not the causes, and do not contribute to alleviating the problem of energy poverty in the long run. The following table summarizes the two measures including the number of beneficiaries and annual implementation costs. The measures cover approximately 70,000 households at an annual cost of EUR 25 million. The bulk of resources are planned for the measure implemented at the national level that aims to reduce the electricity costs.

Table 9-8. Current measures in place to aid vulnerable consumers in BiH

Name of measure		Approximate annual financial expenditures		
English	**Number of HH covered**	**BAM mil.**	**€ mi.**	**Year**
Reduction of household electricity costs and stimulation of energy efficiency	67,936	24.13	12	Average 2011-2019
Subsidy for electricity, natural gas, and district heating in the Sarajevo Canton	1,332	0.52	0.3	Average 2014-2018
Total	**69,268**	**24.65**	**12.3**	

The Energy Efficiency Act of the Federation of Bosnia and Herzegovina (OG No. 22, 24.03.2017) does not mention vulnerable consumers. However, they are mentioned in the Federation of Bosnia and Herzegovina *National Energy Efficiency Action Plan* (NEEAP) for the period 2016 to 2018 (OG 40/18) in the Financing Section (5.2.1.1.1) which states that one of the planned improvements in the energy taxation system (taxes and levies) in the first year is the measure FS1.1. *Introduction of levies for electricity use in households*, however, in combination with support to socially vulnerable categories. Based on annual reporting to EnCS, there has been no progress in this activity.

If the levies are introduced as planned, they should be implemented with care for vulnerable households, providing them with mechanisms to either directly offset price increases, or enable them to make investments to reduce energy demand. Importantly, Bosnia and Herzegovina legislation has to unify its approach across its entities to protect energy vulnerable consumers.

Bosnia and Herzegovina is currently in the process of drafting the National Energy and Climate Plan (NECP) which should facilitate implementation of specific measures for alleviating energy poverty as well as assessments of the existing state of affairs. NECP should also envisage measures and monitoring plan of the current situation regarding energy poverty in the country, and set up a system for regular reporting as part of harmonization with the EU acquis. Therefore, the development of the NECP offers a great opportunity for harmonization of the approach for protecting the energy vulnerable and alleviating energy poverty in Bosnia and Herzegovina.

In terms of the structure of energy consumption in the household sector, biomass represents the largest share of final energy consumption in households accounting for 63%, followed by electricity at 23%. Biomass is often of questionable quality and likely to contribute to indoor pollution and unsustainable use patterns. While biomass is a renewable energy source, due to questionable sustainability and quality of fuelwood, when designing measures for promoting biomass use, these factors need to be considered, while aiming for sustainability and fuel quality.

The share of other energy sources is much lower: consumption of gas accounts for 2% of all energy consumption in households while heat from district heating systems accounts for another 6%. These two energy sources are used primarily in large urban areas. Moreover, oil derivatives (including LPG, gas oil, and diesel oil) represent an additional 2% of household energy consumption and lignite represents 4% of total household energy consumption.

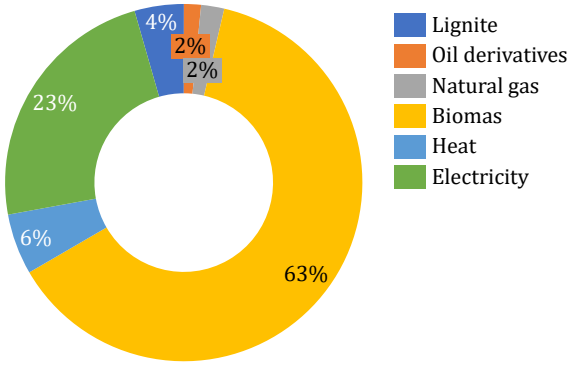


Figure 9-1. Structure of household energy consumption in BIH

Regarding heating needs, a typical household heats only 55.8 m² or 62% of its living area. The heating area does not vary significantly between urban and rural households. Given the fact that the climate in Bosnia and Herzegovina has intense winters with about 3000 HDD in some areas (Sarajevo, 2990 HDD, Banja Luka 2535), this means that vulnerable households are faced with difficulties in affording an adequate amount of heating energy in their homes.

In addition to significant reliance on biomass (fuelwood) for heating (45%), there is also a heavy reliance on coal as a primary source of heating (38.8%). Most of the housing stock surface was built between 1971 and 2014 (84.87%), the highest proportion of stock between 1992 and 2014 (32.25%). The average heating demand is 139.04 kWh/m² for family houses and 137.40 kWh/m² for multi-apartment buildings.

9.2.2 Policy recommendations

Bosnia and Herzegovina has made some progress in protecting energy vulnerable groups and mitigating energy poverty. The progress, however, has not been comparable across all entities. Furthermore, the measures in place focus solely on direct financial support and only target the most vulnerable groups – recipients of various social welfare benefits. While these measures, particularly when targeted at the most vulnerable groups, offer an important reduction of the energy burden for such households, they only ease the consequences of energy poverty in the short run.

Given that only short-term measures assist vulnerable consumers, and due to the low energy efficiency of dwellings with a significant HDD value, the need for energy efficiency improvements in the homes of the energy-poor is a high priority. Therefore, most of the measures proposed hereafter relate to long-term measures aimed at improving the energy efficiency of dwellings and reducing the energy needs of households.

9.2.2.1 Short term measures

9.2.2.1.1 Protection measures

According to the sustainable development goals, every person should have access to necessary energy supplies.[199] While Bosnia and Herzegovina has made some progress in protecting the vulnerable households at the entity level, the approach has not been harmonized across the country. The Program for the Protection of Vulnerable Electricity Consumers in the Household Category in line with the Electricity Act of Federation of Bosnia and Herzegovina (OG 66/2013, 94/2015, 54/2019), defines activities related to the protection of vulnerable consumers ensuring they will not be disconnected as well as protection of consumers in remote areas. This program ensures protection against disconnection of utilities for electricity consumers on the territory of the Federation of Bosnia and Herzegovina. However, the development and implementation of this program is still pending. Protected consumers in Republika Srpska are supplied by the supplier under a public service obligation, where the energy protected consumer is a household that has a household member who, due to a health condition, requires permanent access to electricity (Electricity Act of Republika Srpska (OG 68/20)).

The Ordinance on the Organization and Regulation of the Gas Sector (83/07) of the Federation of Bosnia and Herzegovina defines a protected consumer as a consumer entitled to a sufficient quantity of gas supply in case of accidental disruption in the gas supply system, as well as in case of extremely low average daily air temperatures. This Ordinance provides partial protection against disconnection of utilities for gas consumers in the Federation of Bosnia and Herzegovina. In other words, it does not protect vulnerable consumers from disconnections due to non-payment.

While this shows some progress in offering protection against disconnection for the most vulnerable groups, it has not been done systematically across the entire country. The recommendation is that protection from disconnection is, in acquiring the status of energy vulnerable consumer, regulated across the country and applicable to all the vulnerable electricity and gas consumers.

9.2.2.1.2 Direct financial support

As shown in Table 9-8, there are some entity level and local level measures in place aimed at directly subsidizing the cost of energy for vulnerable consumers. Although direct financial support does not represent the main approach, in the case of Bosnia and Herzegovina the expansion of such measures and harmonization across entities may be beneficial to the most vulnerable groups in the short term. However, such financial measures should be limited to the most socially vulnerable consumers and implemented alongside infrastructural measures aimed at alleviating the main causes of energy poverty. Direct financial support should also be provided for those households, which after being the subject of long-term measures implemented, still require support as they are unable to cover their energy-related expenses. This should be harmonized across entities and be equally available to all vulnerable consumers in Bosnia and Herzegovina.

9.2.2.2 Long term measures

The main approach in mitigating energy poverty in Bosnia and Herzegovina should be targeted at improving the energy efficiency of the dwellings of energy-poor households and enabling fuel switching and heating system improvements, primarily for households relying on coal and unsustainable fuelwood. Primary measures should have a long-term effect in contributing to removing the root causes of energy poverty. The measures proposed here are focused primarily

[199] Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy; More information available here: https://www.un.org/sustainabledevelopment/energy/

on achieving maximum benefits for households while easing the burden on the national budget in the long run.

Measures such as revitalization and improvement of district heating systems, which would also potentially aid vulnerable and energy-poor consumers are not included in the analysis. Such measures are also likely to be very beneficial to the vulnerable and energy-poor in case they are connected to district heating systems. However, given that these measures are also beneficial for the general public, they should be further assessed in the NECP and other strategic documents aimed at improving energy efficiency in Bosnia and Herzegovina. Consequently, we propose implementation of the following long-term measures (where applicable, we indicate whether similar measures exist in the CP that are complementary to the proposed measure and that can be expanded to accommodate the measures for energy poor households):

1. **Program for Mitigating Energy Poverty**. We notice that there is no systematic approach to addressing the issue of energy poverty in Bosnia and Herzegovina. Therefore, we propose drafting and adopting a formal document that defines a detailed plan for implementing the measure to address energy poverty. The program should extend beyond income support to include energy efficiency improvements and targeted measures for vulnerable households
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes resulting in the inability to heat the entire living surface. We propose measures aimed at improving the energy efficiency of homes, hence reducing energy demand. This measure is complementary to R1 Energy renovation of the envelope of existing residential buildings and houses from the 3rd NEEAP.
3. **Replacement of Household Appliances via the** O**ld for New Scheme**. Due to low disposable income, energy-poor households own low efficient appliances that contribute to increased energy demand and hence energy poverty. We propose measures to aid energy-poor households to replace aging home appliances. This measure is complementary to measure R5 Procurement and use of energy efficient electrical household appliances from the 2nd NEEAP (2016-2018).
4. **Heating System Improvements** (HSI) and related measures in households, including: (i) HSI 1: Improving energy efficiency of the system; (ii) HSI 2: Modernization and expansion of the heating system; (iii) HSI 3: Fuel switching. This measure is complimentary to the measure R2 Energy performance improvements of existing systems and installation of new, energy efficient technical systems in residential buildings and family houses from the 2nd NEEAP (2016-2018).
5. **Implementation of Low-Cost Energy Efficiency along with Energy Advice (EEEA) Measures**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits along with education. This measure is complimentary to the measure R2 Energy performance improvements of existing systems and installation of new, energy efficient technical systems in residential buildings and family houses from the 2nd NEEAP in the segment that focuses on EE improvements of lighting. However, it should be adapted to include other low-cost interventions and energy advice.
6. **Support for Renewable Energy Sources**, including the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors. This measure is complimentary to the measure R2 and R3 Energy generation from RES in households from the 2nd NEEAP.

While most of the proposed measures are in line with the existing framework and are viewed as complementary to already proposed measures, making these measures accessible to the energy poor requires taking into consideration vulnerability criteria and providing higher co-financing rates. Furthermore, unlike for general public, when designing schemes to implement measures aimed at alleviating energy poverty, support systems need to be designed and put in place. This

should be elaborated within the Program for Mitigating Energy Poverty. The aim of these support systems is to facilitate identifying those in need and provide them with support in applying for and accessing available measures. A detailed description of measures is given in the tables that follow.

Table 9-9. Detailed description of the measure Program for Mitigating Energy Poverty

Name of Measure		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure foresees the development and implementation of a program to define the timeframe, assessment of detailed measures and their potential, and prioritized implementation measures for mitigation of energy poverty. The specific aim of the measure is to set up a system for providing support to the energy vulnerable and energy poor. The program shall also provide an implementation plan for enabling support to vulnerable groups who can apply for the available measures. The support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visit provides a basic assessment of the energy situation in households and supports households in preparing required documentation to apply for different national and local grants aimed at mitigating energy poverty. The program also defines steps for setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required through the NECP, as well as assessment of existing state of energy poverty. If necessary, it defines steps for integrating new indicators into the existing statistical system at the national level (conducted by the Agency for Statistics of Bosnia and Herzegovina). The program also defines steps for widening energy vulnerability criteria and for expanding already implemented schemes.
	Level of governance[200]	National level
Implementation	List of implementation activities with description	The first step is the development of the Program. The program is developed using participatory development principles including gender sensitivity as well as interdisciplinary and cross-sector collaboration. The second step is to select eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (e.g., firstly, only targeting beneficiaries of social assistance programs). This step also includes a plan for widening vulnerability criteria and defining the implementation phases. The final step is defining the monitoring and reporting system.

Table 9-10. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030

[200] There are two assumed levels of governance for implementation of the measures: a national level and a national level delivered locally. The national-level scheme secures funds are secured at the national level and is administered by a national level institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (through the budget for example) but are implemented by the local authorities.

		Comprehensive energy retrofitting of buildings, which includes thermal insulation on the entire building envelope, replacement of windows and doors resulting in significant energy savings and improvement to quality of life. This measure is implemented partially (segment by segment) or as a measure incorporating all segments: windows and doors, walls, roof, floor. The fact that most households in Bosnia and Herzegovina heat only part of their living space in the winter, and given the high number of heating degree days, all this indicates the need for energy efficiency retrofitting of buildings for the energy-poor and likely high energy savings. The most important impact of this measure is elimination of the causes of energy poverty and consequently its alleviation. This leads to reducing energy costs by improving the energy efficiency of dwellings while also eliminating adverse impacts on health typically due to low energy efficiency (cold, dampness, mold, and draft). It improves overall quality of life. The measure also contributes to boosting investments, energy savings, CO_2 reductions, local employment, supply security, increasing the value of properties. In devising the national scheme to implement this measure, the widespread of fuelwood use needs to be considered. This factor can hinder applicability of the scheme for the most vulnerable (those most likely using fuelwood in rural areas) if the precondition to achieve CO_2 savings exists. Biomass is considered carbon neutral, hence such schemes do not apply to those using fuelwood. It is thus important to take into consideration other benefits of energy retrofits and to design the scheme in such a way that carbon reductions are not seen as eliminating factors.
	Aim / Short description	Improvement measures can be implemented as integral refurbishment or renovation, including both the building envelope and systems improvements. The standard scenario involving heat energy demand in compliance with the national regulatory standard includes thermal insulation of the external envelope with 10 cm of insulation material for walls, 20 cm for roofs, and double-glazed insulating windows for all building typologies. The average investment cost for thermal insulation of the external envelope is 87 EUR/m^2 for family houses and 74 EUR/m^2 for multi-residential buildings. The advanced scenario relating to heat energy demand extending beyond regulatory standard includes thermal insulation of the building envelope with 20 cm of thermal insulation material for walls, 10 cm for floors, 30 cm for roofs, and triple-glazed insulation windows for all building typologies. The average investment cost for thermal insulation of the external envelope is 124 EUR/m^2 for family houses and 87 EUR/m^2 for multi-residential buildings. In family houses, the recommendation is central heating systems running on wood or wood pellet with heat accumulation/pyrolitic boilers equipped with heat accumulators and thermostatic valves, and a system efficiency of η=90%. For domestic hot water (DHW), an accumulation boiler in conjunction with a heating system is recommended. Solar collector systems are considered an additional improvement. The average cost for a boiler and piping for single-family houses is EUR 3,800. Additionally, a solar collector system can be installed at an average cost of EUR 2,000. In multi-family buildings, a central heating system including centralized DHW running on wood pellets, equipped with a heat accumulator, hydraulic system balance, and thermostatic valves

		and a system efficiency of η=90% is recommended. The average cost for boiler and piping per multi-residential building varies between EUR 12,000- 30,000. When connected to a DH system, the recommendation is a heat substation equipped with temperature regulation based on outside temperature, variable flow pump, remote substation control, and measuring of supplied heat, hydraulic system balancing and thermostatic valves, achieving the system efficiency of η=95%. The average cost for upgrading a DH installation per multi-residential building varies between EUR 3,450-5,700. Additionally, a solar collector system can be introduced at an average cost of EUR 4,200.
	Leve of governance	National level

Table 9-11. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Measure name		**Replacement of Household Appliances via the Old for New Scheme**
Measure index		EE2
	Time frame	2022-2030
	Aim / Short description	Inefficient and old household appliances lead to inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide intended quality of service (i.e., too cold or too warm refrigerators). Replacing household appliances (e.g., refrigerators, washing machines) decreases energy consumption and provides the same or often better quality of service. It also decreases energy bills and CO_2 emissions and improves quality of life. The "old for new" scheme is of key importance as it envisages beneficiaries giving up on old appliance before obtaining a similar new appliance. This approach ensures that households do not retain both old and new appliances which would lead to higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of an old refrigerator (energy class D or lower) with a new class A refrigerator. This scheme should also provide new refrigerators for households which currently do not yet own one (subject to providing proof from the local social welfare office or similar body to verify not possessing the respective appliance in the household): - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bills. **Freezers**: Replacement of an old freezer (energy class D or lower) with a new A freezer - The measure leads to energy savings and reduces energy bills. **Washing machines:** Replacement of an old washing machine (energy class D or lower) with a new class A washing machine. This scheme assists households currently not owning a washing machine to get a new one (subject to providing proof from the local social welfare office or similar body to verify not possessing the respective appliance in the household): - The measure improves quality of life, particularly for households with a faulty washing machine or none at all. It leads to energy savings and reduces energy bills.
	Level of governance	National-level scheme delivered locally

Table 9-12. Detailed description of the measure Heating System Improvements (HSI) in Households

Name of Measure		Heating System Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to keep a house adequately warm is a key challenge of living in energy poverty. This lack of warmth in dwellings has been observed in that households in Bosnia and Herzegovina heat only part of their living space in winter, indicating a high potential for improving availability of heating by installing heating systems throughout entire of living spaces, and thus helping households not reduce their living space in the winter months. HSI for the energy-poor consists of three main variations, which can be implemented as a single measure or in any combination: **HSI 1: Improving the energy efficiency of systems** Replacing existing systems with the same type but more efficient system, i.e., replacing traditional fuelwood stoves (estimated efficiency of existing furnaces is 50%) with more efficient ones. This type of measure is particularly applicable in rural Bosnia and Herzegovina, both in single-family and multi residential buildings. Due to the high prevalence of using traditional biomass (fuelwood use) and even coal, alternative fuel sources may be too costly or unavailable for vulnerable groups. **The application of this measure should be limited** to only the most energy-vulnerable consumers and be considered a measure of last resort. Wood biomass furnaces rated at a min of 6 kW are recommended at an estimated cost of EUR 500. **HIS 2: Modernization and expansion of heating systems.** This means replacing entire heating systems with more adequate systems. This measure does not necessarily lead to energy savings, but rather improves efficiency, i.e., replacement of heating incorporating individual heating bodies with a centralized household heating system. This measure can apply to any type of dwelling. Eligibility criteria should be designed for cost-effectiveness and improvement of overall quality of life improvements. All measures in HSI 2 include fuel switching as well as introducing a centralized heating system. In family houses, the recommendation is to install a central heating system running on wood or wood pellets and equipped with a heat accumulation/pyrolitic boiler, heat accumulator and thermostatic valves, at a system efficiency of η=90%. For domestic hot water (DHW) an accumulation boiler in conjunction with a heating system is recommended. Solar collector systems are considered as an additional improvement. The average cost for a boiler and piping for a single-family house is EUR 3,800. In family houses, the recommendation is a central heating system running on wood or wood pellets and equipped with a heat accumulation/pyrolitic boiler, heat accumulator and thermostatic valves, at a system efficiency of η=90%. For a domestic hot water (DHW), the recommendations is an accumulation boiler in conjunction with a heating system. A solar collector system is considered as an additional improvement. The average cost for a boiler and piping for a single-family house is EUR 3,800. Additionally, a solar collector system can also be installed at an average cost of EUR 2,000.

		In multi-family buildings, the recommendation is a central heating system including centralized DHW running on wood pellets, equipped with a heat accumulator, hydraulic system balance, and thermostatic valves at a system efficiency of η=90%. The average cost for a boiler and piping for a multi-residential building varies between EUR 12,000-30,000. When connected to a DH system, the recommendation is a heat substation with temperature regulation based on outside temperature, equipped with variable flow pump, remote substation control, measuring of supplied heat, hydraulic system balancing and thermostatic valves, at a system efficiency of η=95%. The average cost for upgrading a DH installation for a multi-residential building varies between EUR 3,450-5,700. Additionally, a solar collector system can also be introduced at an average cost of EUR 4,200. **HSI 3: Fuel switching** Switching from fossil fuels to renewable sources. Switching to biomass requires taking biomass sustainability in account and, if using fuelwood as a biomass source, also fuelwood quality and furnace efficiency. This measure is of particular importance for households relying on coal and oil as their main source of heating. All measures in HSI 2 include switching fuel from traditional biomass stoves/furnaces or electric furnaces to modern biomass, except for DH systems. Furthermore, individual electric accumulation boilers should be replaced with accumulation boilers equipped with exchangers using heat from a centralized heating system and additionally heat produced from a solar collector system. The solar collector system can be installed at cost varied between EUR 2,000-4,200.
	Level of governance	National level scheme delivered locally

Table 9-13. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures has proven to be a good first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in a targeted area based on collected data. Simple energy audits have proven to be a good approach to acquiring needed data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures or a combination of two. This measure can be combined with the proposed section of the Program for Mitigating of Energy Poverty in Bosnia and Herzegovina, which focuses on providing hands-on support in gaining knowledge on available grants and mechanisms, and filling out the respective applications to access such grants and mechanisms. Persons conducting household visits can provide both support in sharing information and guidance to households in the implementation of national and local support programs, and also the implementation of measures listed here:

		EEEA1: Implementing simple and low-cost energy efficiency measures Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Simple energy audits along with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level scheme delivered locally

Table 9-14. Detailed description of the measure Support for Renewable Energy Sources

Name of Measure		**Support for Renewable Energy Sources**
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. In Bosnia and Herzegovina, there is also the issue of a high dependency on coal and fossil fuels as the main source of heating. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels**

		Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions.
	Level of governance	National

9.2.3 Ranking of criteria and measures

As discussed in the chapter 8.4.1 Multicriteria approach to solving energy poverty, multicriteria decision making is a decision-making process based on the ranking of different alternatives (options) and multiple criteria. It requires:

- Evaluating the importance/ranking of criteria
- Ranking each alternative in line with each criterion
- Prioritization of alternatives

To gain insight into views of decision-makers on the importance of criteria for mitigating energy poverty and ranking proposed measures, an exercise using an analytic hierarchy process was undertaken. The analysis was done using the web-based BPMSG software [66].

The hard copy questionnaires were sent to Bosnia and Herzegovina project representatives, who in turn returned the filled-out survey on 13 October 2021. The Consultant provided the Bosnia and Herzegovina representatives with the instructions on completing the survey. A total of nine surveys were received by the Consultant.

Respondents ranked health criteria in the survey as the most important factor in valuing the proposed measures followed closely by financial criteria in lowering the financial costs of energy. The respondents ranked operational criteria as least significant, implying that difficulty in implementing the measures is not considered an obstacle to implementing any particular measure. The ranking of criteria is provided in Figure 9-2.

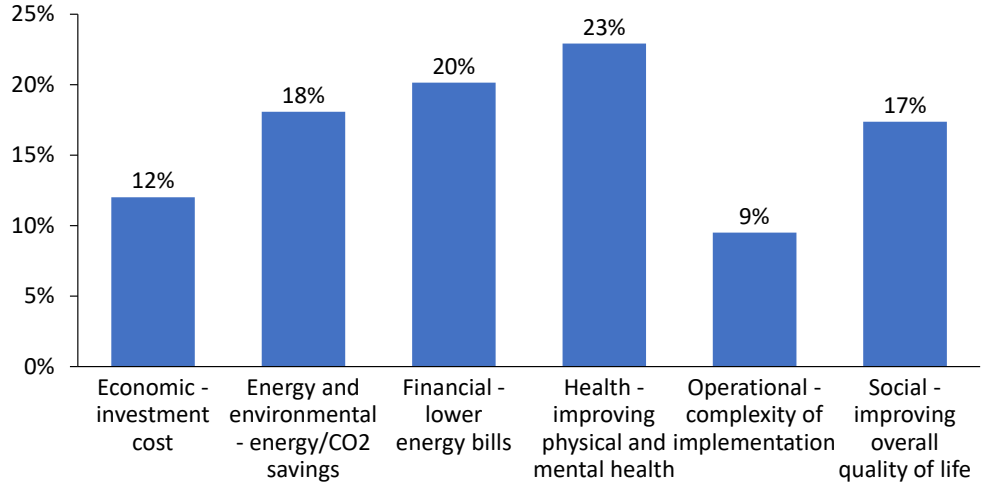


Figure 9-2. Ranking of criteria by BiH stakeholders

A sensitivity analysis was conducted to identify the most crucial criteria possibly affecting change in the ranking of alternatives (measures). It indicated an uncertainty (overlapping with uncertainty) in ranking the following criteria:

- Health – improving physical and mental health and Financial – lower energy bills
- 2: Financial – lower energy bills, Energy and environmental – energy/CO2 savings, and Social - improving overall quality of life

Overlapping of uncertainties means that a slight change in the rating of any criteria may change the ranking of criteria ranked within the uncertainties. On the other hand, "Economic – investment cost" and "Operational – complexity of implementation" were ranked without overlapping, meaning an unlikelihood that small changes to rankings by participants will affect their position.

Group consensus was relatively low (58,7%). This indicator ranges from 0% to 100%. Zero percent corresponds to no consensus at all, 100% to full consensus.[201] It is a measure of homogeneity of priorities between participants, where values below 50% indicate practically no consensus within the group and a high diversity of judgments. Values in the 80%–90% range indicate a high overlap of priorities and excellent agreement of judgments among group members.

After ranking the criteria, measures were also ranked based on each criterion. Here, three surveys were incomplete, meaning six surveys were used to determine the ranking of measures. Five measures were considered for Bosnia and Herzegovina, as discussed, though the Program for Mitigating Energy Poverty was not considered a measure:

- Energy Retrofitting of Buildings
- Replacement of Household Appliances
- Heating System Improvements
- Low-Cost EE along with Energy Advice
- Support for RES

The results show that the **highest priority, without any overlapping and uncertainty was given to the Energy Retrofitting of Buildings**, whilst the lowest priority was given to the replacement of household appliances. There was no overlapping with uncertainty for any measure, implying that if participants slightly modified their inputs when comparing different alternatives, there would be no change in their ranking. The following table provides a summary of ranked measures.

[201] https://bpmsg.com/ahp-group-consensus-indicator-how-to-understand/

Table 9-15. Ranking of measures for BIH

Criterion / measure	Weight	Energy Retrofitting of Buildings	Replacement of Household Appliances	Heating System Improvements	Low-cost EE along with Energy Advice	Support for RES
Economic - investment cost	12%	16%	14%	14%	50%	6%
Energy and environmental - energy/CO2 savings	18%	38%	5%	18%	6%	33%
Financial - lower energy bills	20%	49%	8%	19%	6%	17%
Health - improving physical and mental health	23%	25%	6%	24%	9%	37%
Operational - complexity of implementation	9%	23%	18%	21%	23%	14%
Social - improving overall quality of life	17%	49%	10%	17%	6%	18%
Group Result		35%	9%	19%	14%	23%

Overall group consensus was high at 73.9%. As discussed above, the AHP group consensus indicator is used to quantify the consensus of the group, i.e., get an estimate of agreement on the outcoming priorities among participants.

It must be noted that the results in this report are an illustration of the likely priority measure and ranking of the other possible measures for alleviating energy poverty in Bosnia and Herzegovina. The recommendation is to undertake the ranking process while drafting legislation with all stakeholders who will take part in the drafting process. Prior to that, the cost of each measure, estimated energy, and emissions savings are to be calculated, and the implementation process is to be defined and barriers identified.

9.3 Georgia

9.3.1 Overview

There are a total of seven measures to aid vulnerable consumers in Georgia. Some are implemented at the national level, others at the local level. All of the measures aim to alleviate energy and utility costs. As such, the measures do not contribute to alleviating the causes of energy priority.

Table 9-16. Current measures in place to aid vulnerable consumers in Georgia

Name of measure	Number of HH covered	Approximate annual financial expenditures		
		GEL mil	€ mil	Year
Socially vulnerable families in Georgia (excluding Tbilisi Municipality)	65,907	3.2	1	2018
Socially vulnerable families in Tbilisi Municipality	45,000	7.4	2.3	2019
High mountainous settlements	80,256	10.9	3.6	2018
Families with 4 or more children under a rating score of 300,000	270	3.5	1.1	2019
Mountainous settlements in Kazbegi and Dusheti Municipality	3,600	8.6	2.8	2018
Residents living in villages near occupation borderline (cash payment)	13,000	3	0.99	2018
Approval of rules and conditions for subsidizing utility bills	NA	NA	NA	11/ 2020 - 02/ 2021
TOTAL	**208,033**	**36.5**	**11.8**	

Although Georgia's First National Energy Efficiency Action Plan (NEEAP) does not specifically mention energy poverty or energy vulnerability, it does, however, foresee measures that can tackle such issues in the future. Specifically, it does envisage energy efficiency measures in buildings – B-1: Regulations on improving efficient lighting systems in residential and commercial buildings. An additional measure called Improvement of Energy Efficiency in Existing Private Houses is also included in the NEEAP, but no implementation details are provided. Furthermore, the Law on Energy Efficiency envisages energy performance contracts. According to Article 13, the energy performance contract is seen as a tool for achieving energy savings.

In terms of final energy consumption in households, the dominant energy source in Georgia is gas which represents 59% of final energy consumption in households. This makes Georgia unique as it is the only CP where gas commands such a large share in household energy consumption. Following gas, the second most important energy source is biomass with a share of 22% in final energy consumption followed by electricity at 17%. Oil derivatives (LPG) represent 2% of final energy consumption in households, while the use of coal is almost nonexistent. There are no district heating systems in Georgia.

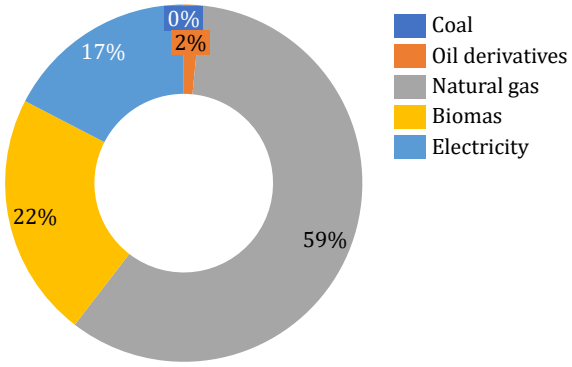


Figure 9-3. Structure of household energy consumption in Georgia

Source: EUROSTAT Energy Balances (2018 data)

In terms of the use of energy sources, gas is the dominant source used in urban households, while biomass (firewood, agricultural waste) is the primary source in rural households. The use of biomass in rural areas is significantly above the optimum level and has contributed to deforestation in Georgia [67]. Without intervention, this situation will result in households unable to obtain affordable firewood for their consumption [67].

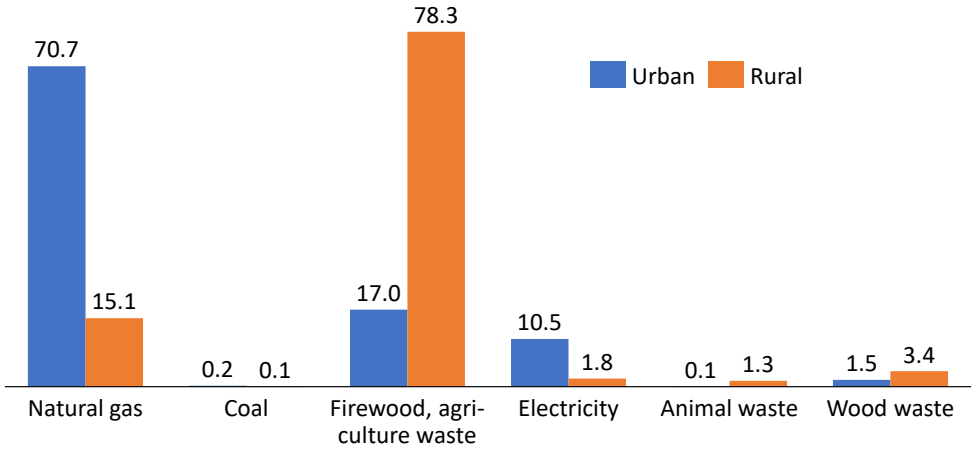


Figure 9-4. Forms of energy used in individual heating facilities

Source: Energy Consumption in Georgia, 2017 [26]

In terms of heating requirements, data for Kopitnari indicates an average number HDD of 1614 and 2172 for Tbilisi.

9.3.2 Policy recommendation

The issue of energy affordability and energy poverty have been recognized by Georgian authorities, and some initiatives are already in place to provide suggestions on addressing energy poverty. The above analysis has shown that Georgia has put in place several measures to aid vulnerable consumers, all of which are intended to reduce the energy burden.

9.3.2.1 Short term measures

9.3.2.1.1 Protection measures

Protection against disconnection of utilities is an important measure that should be in place to protect energy-poor consumers. Based on a review of Georgian legislation, there appears to be no such measure in place. The recommendation is that protection against disconnection should, after

having acquired the status of an energy vulnerable consumer, be regulated across the country and applicable to all vulnerable electricity and gas users, especially during winter months.

9.3.2.1.2 Direct financial support

As shown in Table 9-16, there are several measures in place aimed at directly subsidizing the cost of energy for various consumer categories. We do not suggest expanding the existing measures, but instead propose direct financial support to be provided to those households, which after receiving long-term measures, still require support as they are unable to cover their own energy-related expenses.

9.3.2.2 Long term measures

The main approach in mitigating energy poverty in Georgia should aim at improving the energy efficiency of dwellings belonging to vulnerable and energy-poor households, as well as facilitating fuel switching and improvements to heating systems, primarily for those households relying on unsustainable fuelwood. The primary measures should have a long-term effect so as to facilitate eliminating the root causes of energy poverty. The proposed measures are focused primarily on achieving maximum benefits for households while easing over the long term the burden on the national budget. We propose the following measures:

1. **Program for Mitigating Energy Poverty**. We have noticed there is no systematic approach to addressing the issue of energy poverty in Georgia. Therefore, we propose drafting and adopting a formal document that defines a detailed plan for implementing measures to address energy poverty. The program should extend beyond income support and involve energy efficiency improvements as well as targeted measures for vulnerable households.
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes resulting in the inability to heat the entire living surface or heat it to the required temperature. We propose measures aimed at improving the energy efficiency of homes, hence reducing energy demand.
3. **Replacement of Household Appliances via the Old for New Scheme**. Due to low disposable income, energy-poor households own less efficient appliances that increase energy demand and hence energy poverty. We propose measures to aid energy-poor households in replacing aging home appliances.
4. **Heating System Improvements** (HSI) in households, includes: (i) HSI 1: Improving energy efficiency of systems; (ii) HSI 2: Modernization and expansion of heating systems; (iii) HSI 3: Fuel switching.
5. **Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)**, includes: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits along with education.
6. **Support for Renewable Energy Sources**, includes the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors

A detailed description of measures is given in the tables below.

Table 9-17. A detailed description of the measure Program for Mitigating Energy Poverty

Name of Measure		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures assessment as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the

		measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If necessary, it will define steps for integrating new indicators in the existing statistics system at the national level (conducted by the National Statistics Office of Georgia). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[202]	National level
Implementation	List of implementation activities along and description	The first step is the development of the program. The program should be developed using participatory development principles including gender sensitivity and interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-18. Detailed description of the measure Energy Retrofitting of Buildings

Measure name		**Energy Retrofitting of Buildings**
Measure index		EE1
	Time frame	2022-2030
	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, and floor. The fact that most households in Georgia heat only part of their living space in the winter (up to 62% of floor area), indicates the need to perform energy efficiency retrofitting of buildings for the energy-poor to likely achieve major energy savings. The most important effect of this measure is to alleviate energy poverty by eliminating its main causes. This is done by reducing energy costs through upgrading efficiency of the dwelling while

[202] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

		also removing adverse health effects typically caused by low energy efficiency (due to cold, dampness, mold, and draft). It improves the overall quality of life. The measure also boosts investments, energy savings, reduces CO_2 emissions, increases local employment, improves security of supply, and increases the property values. Improvement measures can be implemented as integral refurbishments, including improvements to both the building envelope and systems improvement. The standard scenario involving demand for heat energy in compliance with international energy efficiency standards includes thermal insulation of the external envelope using 10 cm of insulation material (20 cm for the roof) and double-glazed insulating windows for all building typologies. The investment cost for thermal insulation of the external envelope varies between 59-99 EUR/m^2, depending on the age of the building. The recommendation is to install a central heating system equipped with condensing gas boiler at a system efficiency of η=105% including a buffer tank, and a centralized DHW cylinder in combination with a heat generator both for family houses and multi-apartment buildings. Typical systems and related installation costs including piping and hot water supply for family houses, include a 4 kW condensing gas boiler costing EUR 4,975, or a 6 kW condensing gas boiler costing EUR 5,350, and EUR 7,783 for a 10 kW boiler. For multifamily houses, the typical system and related installation costs including piping is a centralized condensing gas boiler with a hot water supply rated at 14 kW at a cost of EUR 9,638, for a 22 kW boiler the cost is EUR 14,865, and for a 46 kW costing EUR 37,950. The advanced scenario for heat energy demand extending beyond the regulatory standard includes thermal insulation of the building envelope using 20 cm of thermal insulation material (30 cm roof) and triple glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope is up to 172 EUR/m^2, depending on the age of the building. The heating systems are the same as in the standard scenario while the cost is up to 30% lower.
	Level of governance	National level

Table 9-19. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Name of Measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2022-2030
	Aim / Short description	Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) decreases energy consumption for the same or often better quality of service. It also reduces energy bills and CO_2 emissions, while improving quality of life. The "old for new" principle is key as the intention for beneficiaries to forfeit their old appliances before acquiring a new one. This approach is needed to ensure that households do not retain both appliances resulting in higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of old refrigerators (energy class D or lower) with a new class A refrigerator. This scheme will help provide new refrigerators for households which currently do not own one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bill; **Freezers**: Replacement of old freezers (energy class D or lower) with a new class A freezer - This measure provides energy savings and reduces energy bills; **Washing machines**: Replacement of old washing machines (energy class D or lower) with a new class A washing machine. This scheme will help provide new washing machines for households without one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty washing machines or those without one. It contributes to energy savings and energy bill reductions.
	Level of governance	National level delivered locally

Table 9-20. Detailed description of the measure Heating System Improvements (HSI) in Households

Measure name		Heating System Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to keep a house adequately warm is a key challenge of living in energy poverty. HSIs for energy-poor consist of three main variations, which can be implemented as a single measure or combined: **HIS 1: Improving the energy efficiency of the system.**

		Replacing existing systems with the same but higher efficiency systems, i.e., replacing traditional fuelwood stoves with more efficient furnaces. This measure is particularly applicable in rural areas where there is a high prevalence of using biomass (fuelwood) and where alternative fuel sources can be too costly or unavailable for vulnerable groups. **This measure should be limited** to the most energy-vulnerable consumers and considered a measure of last resort. Wood biomass furnaces rated at a min 6 kW are recommended, and the estimated cost is EUR 500. **HIS 2: Modernization and expansion of the heating system.** This involves replacing entire heating systems with more adequate heating systems. This measure does not necessarily provide energy savings, but efficiency, i.e., replacement of individual heating sources with centralized heating systems in households. This measure applies to any type of dwelling. Eligibility criteria should be devised so that cost-effectiveness and overall quality of life improvements for women and men are both taken into consideration. The recommendation for family houses is to use a natural gas central heating system and equipped with a gas fired boiler at a system efficiency of η=90% including hot water supply. Introducing a central heating system equipped with a condensing gas boiler at a system efficiency of η=105% and a buffer tank, as well as a centralized DHW cylinder in combination with a heat generator is the recommendation for both family houses and multi-apartment buildings. Typical systems and related installation costs including piping and hot water supply for family houses for condensing gas boiler are EUR 4,975 for 4 kW, EUR 5,350 for 6 kW and EUR 7,783 for 10 kW boilers. For multifamily houses, the typical system and related installation costs including piping is a centralized condensing gas boiler with a hot water supply of 14 kW with the cost of 9,638 EUR, for 22 kW the cost of 14,865 EUR, and for 46 kW the cost is 37,950 EUR. **HIS 3: Fuel switching** Switching fuel from a fossil to renewable source. Switching to biomass requires consideration of biomass sustainability and in case of using fuelwood as a biomass source, the fuelwood quality and furnace efficiency. Using an air-water heat pump is also recommended for thermally insulated buildings. The recommended system involves a heating biomass boiler at a cost of EUR 3,000 and additional piping at a minimum cost of EUR 1,500. For highly efficient single-family houses, the use of centralized heating with air/water heat pumps at SCOP>3 or 4 are recommended at a cost of EUR 4,500.
	Governance level	National level delivered locally

Table 9-21. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of

		living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two. Taking a gender-sensitive approach is important in order to achieve best results. Persons conducting household visits can provide both support in terms of sharing information and guiding households through implementation of national and local support programs, and also implementation of the measures listed below: **EEEA1: Setting up simple and low-cost energy efficiency measures** Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Undertaking simple energy audits along with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	The national level delivered locally

Table 9-22. Detailed description of the measure Support for Renewable Energy Sources

Name of Measure		Support for Renewable Energy Sources
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower

		households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions. The measure also improves livelihoods, hygiene and comfort, reduces the burden of unpaid labor, empowers women, and reduces urbanization.
	Level of governance	National level

9.4 Kosovo*

9.4.1 Overview

The current legislative framework in Kosovo *does not go beyond the prescribed direct financial support. Currently, there is only one measure in place in Kosovo* to aid vulnerable consumers. The measure has been in force since 2019 and provides financial support to families benefiting from various social assistance schemes. The total number of households covered was slightly below 37,000 for which the allocated budget was 4.5 million EUR.

Table 9-23. Current measures in place to aid vulnerable consumers in Kosovo*

Name of measure	Number of HH covered	Approximate annual financial expenditures	
		€ mil.	Year
Subsidizing consumed electricity for families benefiting from the Social Assistance Scheme (SNS), the Martyrs' Families and War Invalids Scheme (FDIL), the Blind Persons Scheme (SPV), and the Paraplegic and Tetraplegic Scheme (SPPT) for 2019.	36,648	4.5	2019
Total	**36,648**	**4.5**	

Regarding energy use, biomass and electricity represent the largest share in final energy consumption of households in Kosovo*, at 61% and 35% respectively. The heat from district heating and oil derivatives (LPG, gas and diesel oil) each represent 2% of final energy consumption in households. Finally, despite being rich in lignite, official statistics state that lignite represents a very small share of final energy consumption by Kosovo* households.

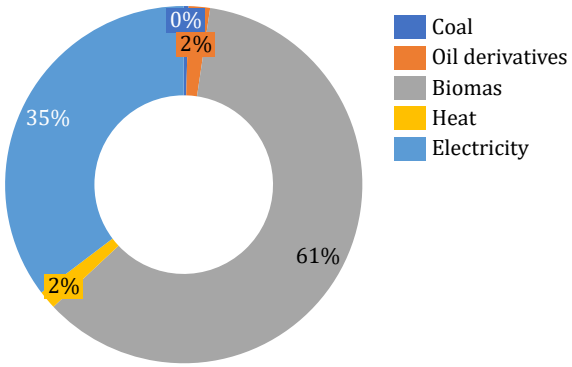


Figure 9-5. Structure of household energy consumption in Kosovo*

Source: EUROSTAT Energy Balances (2018 data)

Individual dwellings use fuelwood stoves, along with space heating, domestic hot water (DHW), and possibly cooking functions as the primary heating system. Electrical heating is predominant in collective housing, while in main cities (Prishtina, Prizren, and Mitrovica) only 1.7% of the residential area is connected to district heating systems.

In terms of heating needs, and as indicated from the data for Pristina, Kosovo* has above average heating needs when compared to other CPs. Kosovo* is characterized by low existing comfort levels across its main cities. This is indicative of a consistent likely incidence of energy poverty in the household sector.

9.4.2 Policy recommendations

Kosovo* has only introduced the concept of vulnerable consumers in its primary legislation without significant measures in place. There is only one recent measure in place that provides direct financial assistance to certain categories of socially vulnerable consumers. There are no measures in place to tackle the structural issue of energy poverty.

The main characteristics of households in Kosovo* include low comfort levels, low energy efficiency of buildings, a relatively high need for heating, with some of the lowest household incomes among CPs.

Given the fact that only short-term measures to aid socially vulnerable consumers are currently in place which are only implemented sporadically in certain parts of the country, and due to the low energy efficiency of dwellings with a significant number of HDD, the need for energy efficiency improvements in the homes of the energy-poor and energy vulnerable is a high priority. Therefore, most of the measures proposed in this section relate to long-term measures aimed at improving the energy efficiency of dwellings and reducing the energy needs of households.

9.4.2.1 Short term measures

9.4.2.1.1 Protection measures

Protection from disconnection is an important measure that should be in place to protect energy-poor consumers. The Rule on General Conditions of Energy Supply adopted on 13 April 2017, the Rule on Disconnection and Reconnection of Consumers in the Energy Sector adopted on 30 March 2017, and the Electricity Act (OG 05/L-085) mention the issue of utility disconnections. Nevertheless, based on analysis of the above-mentioned legal acts, it is unclear whether protection against utility disconnection is in force yet.

The recommendation is that protection against utility disconnection is, upon acquiring the status of an energy vulnerable consumer, regulated across the country and applicable to all vulnerable electricity and future gas consumers, especially during winter months.

9.4.2.1.2 Direct financial support

As provided in Table 9-23, there is a single measure in place to aid mostly socially vulnerable consumers by subsidizing their electricity consumption. We do not propose expanding this measure except for those households, which after having long-term measures implemented, still require support as they are unable to cover their energy-related expenses.

9.4.2.2 Long term measures

The main approach in mitigating energy poverty in Kosovo* should aim at improving the energy efficiency of dwellings belonging to the vulnerable and energy-poor households as well as facilitating fuel switching and heating system improvements, primarily for those households relying on coal and unsustainable fuelwood. The primary measures should have a long-term effect in contributing to the elimination of root causes of energy poverty. The proposed measures are focused primarily on achieving maximum benefits for households while easing the long-term burden on the national budget.

Measures such as the revitalization and improvement of district heating systems, also potentially aiding vulnerable and energy-poor consumers are not included in the analysis. Such measures are likely to be beneficial to the vulnerable and energy-poor in case they are connected to the district heating system. Given that such measures are also beneficial for the general public, they should be further addressed in other strategic documents that aim to improve energy efficiency in Kosovo*. Accordingly, we propose the long-term measures given below. As a sidenote, where applicable, we have indicated whether similar measures exist in the CP that are complementary

to the proposed measure and that can also be expanded to accommodate measures for energy poor households:

1. **Program for Mitigating Energy Poverty**. We have noticed there is no systematic approach to addressing the issue of energy poverty in Kosovo*. Therefore, we propose drafting and adopting a formal document that defines a detailed plan for implementing measure to address energy poverty. The program should extend beyond income support to involve energy efficiency improvements and targeted measures for vulnerable households.
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes resulting in the inability to heat the entire living surface or the homes overall. We propose measures aimed at improving the energy efficiency of homes, and in turn reducing energy demand. This measure is linked to measure 3.2.3. Additional Measures Addressing Energy Efficiency in Buildings and Appliances from the 4th NEEAP. The EBRD Green Economy Financing Facility (GEFF) has been operational in Kosovo* since 2018. GEFF provides finance for green economy investments in the residential sector as well as to businesses that provide energy efficiency and renewable energy products and services to households.
3. **Replacement of Household Appliances via the 'Old for New Scheme**. Due to low disposable income, energy-poor households own low efficient appliances that contribute to increased energy demand and hence energy poverty. We propose measures to aid energy-poor households by replacing their aging home appliances.
4. **Heating System Improvements (HSI) in Households**, including: (i) HSI 1: Improving the energy efficiency of systems; (ii) HSI 2: Modernization and expansion of heating systems; (iii) HIS 3: Fuel switching. In part, this measure is complimentary to 3.6. Promotion of Efficient Heating and Cooling (Article 14) from the 4th NEEAP although measure 3.6 from the 4th NEEAP covers several areas.
5. **Implementation of Low-Cost Energy Efficiency along with Energy Advice (EEEA)**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits with education. This measure is to some extent complimentary to 3.1.4. Consumer Information Programs and Training (Articles 12, 17) from the 4th NEEAP. There are promotional campaigns aimed at raising awareness of all categories of energy consumers, and reflecting the importance of energy saving measures as well as renewable energy sources. The campaigns include the placement of billboards as well as broadcasting promotional advertisements on LED monitors in different cities in Kosovo* and different areas depending on the targeted sector.
6. **Support for Renewable Energy Sources**, including the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors

A detailed description of measures is given in the tables that follow.

Table 9-24. Detailed description of the measure Program for Mitigating Energy Poverty

Name of Measure		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures assessment as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor.

		The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If should define steps for integrating new indicators in the existing statistical system at the national level (conducted by the Kosovo* Agency for Statistics). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[203]	National level
Implementation	List of implementation activities and description	The first step is the development of the Program. The program should be developed using participatory development principles including gender sensitivity and interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-25. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		**Energy Retrofitting of Buildings**
Measure index		EE1
	Time frame	2022-2030
	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, and floor. The fact that 75% of households in Kosovo* heat only up to 50 m^2 of their living space indicates the need for energy efficiency retrofitting of buildings for the energy-poor resulting in likely high energy savings.[204] The most important impact of this measure is alleviation of energy poverty in terms of eliminating its main causes. This is achieved by improving the efficiency of dwellings while also eliminating

[203] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

[204] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

		adverse impacts on health, typically caused by low energy efficiency (through cold, dampness, mold, and draft). It improves the overall quality of life. The measure also boosts investments, energy savings, reduces CO_2 emissions, increases local employment, improves security of supply, and increases the property values. Devising a national scheme for implementing this measure requires keeping in mind that there is widespread use of fuelwood (90% of all households) [31]. This factor may possibly hinder implementation of the scheme for the most vulnerable (who most likely use fuelwood in rural areas) if the precondition to proving CO_2 savings exists. Biomass is considered carbon neutral, hence any such scheme would not apply to those using fuelwood. It is thus important to take into consideration other benefits of energy retrofits and to design the scheme in such a way that carbon reductions are not seen as eliminating factors. Measures for improvement can be implemented as an integral refurbishment or renovation, including improvements to both the building envelope and heating systems. The standard scenario concerning heat energy demand and compliance with regulatory standards involves thermal insulation of the external envelope using (16 cm for the roof), 5 cm for the floor, and double-glazed insulating windows for all building typologies. The average investment cost for thermal insulation of the external envelope is 138 EUR/m^2 for family houses and 184 EUR/m^2 for multi-family buildings. A central heating system with biomass including a hot water supply system is recommended for single-family houses. The cost of a typical system is EUR 3,400. For multifamily houses, the recommendation is to keep the existing individual electric stoves and install a centralized hot water supply equipped with solar collectors. The cost of a typical hot water system is EUR 1,080 for a dwelling.[205] The advanced scenario for heat energy demand extending beyond regulatory standards includes thermal insulation of the building envelope with 20 cm of thermal insulation material (20 cm roof), 10 cm for floors, and triple-glazed insulation windows for all building typologies. The average investment cost for thermal insulation of the external envelope is 185 EUR/m^2 for family houses and 227 EUR/m^2 for multi-residential buildings .[2][206] Heating systems are the same for single-family houses incorporating a centralized biomass heating system and DHW electric boilers. The expected cost for installing a centralized biomass heating system is EUR 3,000 and the cost for piping is EUR 1,500. The cost of an electric DHW boiler is EUR 150. The cost for solar thermal collectors is at least EUR 2,000. For multi-family houses, a central heating system running on biomass or equipped with a heat pump and integrated sanitary hot water, where the solar thermal system is optional. The cost of an average biomass system is EUR 3,200 while for cost for the heat

[205] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

[206] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

		pumps is EUR 3,900. Piping installation costs ranges from EUR 5,000 to EUR 30,000. A centralized DHW installation equipped with a biomass boiler varies between EUR 600-1,200. Installation costs for a solar collector system is EUR 4,200.[207]
	Level of governance	National level

Table 9-26. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Name of Measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2022-2030
	Aim / Short description	Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) decreases energy consumption for the same or often better quality of service. It also reduces energy bills and CO_2 emissions, while improving quality of life. The "old for new" principle is key as the intention for beneficiaries to forfeit their old appliances before acquiring a new one. This approach is needed to ensure that households do not retain both appliances resulting in higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of old refrigerators (energy class D or lower) with a new class A refrigerator. This scheme will help provide new refrigerators for households which currently do not own one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bill; **Freezers**: Replacement of old freezers (energy class D or lower) with a new class A freezer; - This measure provides energy savings and reduces energy bills; **Washing machines**: Replacement of old washing machines (energy class D or lower) with a new class A washing machine. This scheme will help provide new washing machines for households without one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty washing machines or those without one. It contributes to energy savings and energy bill reductions.
	Level of governance	National level delivered locally

[207] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

Table 9-27. Detailed description of the measure Heating System Improvements (HSI) in Households

Name of Measure		Heating System Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to keep a house adequately warm is a key challenge of living in energy poverty. This is noticeable in that 75% of households in Kosovo* heat only up to 50 m^2 of their living space,[208] indicating a lot of potential in improving availability of heating by installing heating systems throughout all of the living space and thus helping households not to reduce their living space in the winter months. HSI for energy-poor consists of three main variations, which can be implemented as a single measure or in any combination: **HIS 1: Improving the energy efficiency of the system.** Replacing existing systems with the same type but more efficient system, i.e., replacing traditional fuelwood stoves with more efficient furnaces. This measure is particularly applicable in family houses where there is still a high prevalence of traditional biomass (fuelwood use) and where alternative fuel sources might be too costly or unavailable for vulnerable groups. **The use of this measure should be very limited** to the most energy-vulnerable consumers and considered a measure of last resort. A 6 kW wood biomass furnace is recommended at an estimated cost of EUR 500. **HIS 2: Modernization and expansion of the heating system.** This involves replacing entire heating systems with more adequate heating systems. This measure does not necessarily provide energy savings, but efficiency, i.e., replacement of individual heating sources with centralized heating systems in households. This measure applies to all dwellings. Eligibility criteria should consider cost-effectiveness and improvements to overall quality of life. Heating systems for single-family houses is based on a centralized biomass heating system and DHW electric boiler. The expected cost for installing a centralized biomass heating system is EUR 3,000 and the cost for piping is EUR 1,500. The cost for an electric DHW boiler is EUR 150. The cost for solar thermal collectors is at least EUR 2,000. For multi-family houses, a central heating system with biomass or a heat pump and integrated sanitary hot water, and a solar thermal system is optional. The cost of an average biomass system is EUR 3,200 while for heat pumps the cost is EUR 3,900. Piping installation costs can vary between EUR 5,000-30,000. A centralized DHW installation equipped with a biomass boiler varies between EUR 600-1,200. Installation of a solar collector system costs EUR 4,200. **HIS 3: Fuel switching**

[208] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

		Switching fuel from fossil to renewable source. Switching to biomass requires considering biomass sustainability and, in case of using fuelwood as a biomass source, consideration should also be given to fuelwood quality and furnace efficiency. This measure is particularly important for households relying on coal and oil as their main source of heating. Central heating systems in family houses based on heat pumps with a minimum COP 2.5 are recommended. The central DHW system is connected to heating systems and includes a solar collector system. The average cost for heating systems is EUR 6,060 for single-family house.[209] The recommendation for multiapartment buildings is a central heating system running on biomass, equipped with a heat accumulator, VSD pump, hydraulic system balance, and thermostatic valves with system efficiency η=85–90%. The central DHW system is connected to the heating system and includes a solar collector system. The expected cost is EUR 2,520 for a dwelling.[210]
	Level of governance	National level delivered locally

Table 9-28. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two. Persons conducting household visits can provide both support in sharing information and guidance to households in the implementation of national and local support programs, and also the implementation of measures listed here: **EEEA1: Implementing simple and low-cost energy efficiency measures** Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals.

[209] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

[210] Draft Building Renovation Strategy for Kosovo*, v3., Dec. 2020.

		This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Simple energy audits along with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level delivered locally

Table 9-29. Detailed description of the measure Support for Renewable Energy Sources

Name of Measure		Support for Renewable Energy Sources
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. This issue in Kosovo* also relates to a high dependence on coal and fossil fuels as the main source of heating. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market

		and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions.
	Level of governance	National level

9.5 Moldova

9.5.1 Overview

There are two types of national measures and one local measure offered to vulnerable households related to their energy expenses. National measures are the Social Assistance (AS) programs covering the poorest families based on income as a criterion and heating social programs during the cold period of the year complementary to social assistance. The local-level measure is a subsidy for heating costs in Chisinau and Balti.

The current measures represent short terms solutions to the problem of energy poverty. They reduce the cost of energy for the poor, but they do not contribute to eliminating the main causes of energy poverty.

Table 9-30. Current measures in place to aid vulnerable consumers in Moldova

Name of measure	Number of HH covered	Approximate annual financial expenditures		
		LEI	€	Year
Social Assistance (SA)	96,067	NA	NA	2020
Aid for the cold period of the year	245,425	NA	NA	2020
Local-level assistance in Chisinau and Balti	40,000	NA	NA	2018-2019
Total	381,492			

In addition, projects relating to the modernization of district heating system are aimed at improving the efficiency and operation of heat transmission and distribution infrastructure as well as building-level systems, and implemented in Chisinau and Balti, which should contribute to reducing energy poverty.

Sectoral acts (Gas Act and Electricity Act), unlike the Energy Act, define "vulnerable" consumers as disadvantaged persons or members of disadvantaged families. These individuals are protected through social protection measures which should not prevent effective market liberalization and functioning. These acts are currently undergoing amendments and the provisions on energy poverty will either be introduced in these two acts or in the Energy Act. Only the Energy Efficiency Act specifically defines "energy poverty" as a situation characterized where the final consumer lacks access to modern sources of energy and technologies and/or reduced consumer purchasing power for energy resources, in particular fuels used for cooking, electricity and/or heat, and/or lacking thermal comfort in homes or buildings. Energy efficiency schemes should give priority to energy efficiency measures providing a positive social impact, and to measures aimed at reducing energy poverty or improving the living conditions of vulnerable consumers.

Existing policy documents such as the Moldavian Energy Strategy up to 2030 and National Energy Efficiency Action Plan (NEEAP) 2019-2021 do not contain specific measures aimed directly at alleviating energy poverty.

However, the plan is to elaborate this problem within the scope of the National Energy and Climate Plan (NECP) and Long-Term Renovation Strategies (LTRS), both currently in the drafting process. The NECP will facilitate implementation of specific measures for alleviating energy poverty and envisage measures and plans for monitoring the specific situation regarding energy poverty in the country. Information on the outcome of measures for alleviating energy poverty should be included in NECP progress reports. The LTRS encompasses an overview of policies and actions to target the worst performing segments of the national building stock, demarcate incentive dilemmas and market failures, and outline relevant national actions that contribute to alleviating energy poverty. Therefore, drafting energy legislation amendments as well as the NECP and LTRS is an important opportunity for harmonization of the policy and legislative approach for protecting the energy vulnerable and alleviating energy poverty.

Regarding climate conditions, the average temperature in Kishinev is lower and the number of HDD is higher compared to the median values for EnC CPs. Given that the value of heating degree days is slightly below 3000, there is a significant need for heating energy.

In terms of energy consumption, the most dominant source of energy in final energy consumption is biomass, accounting for 54% of final energy consumption. Natural gas, electricity, and district heating systems represent 19%, 10%, and 9%, respectively, of final energy consumption. Oil derivatives (LPG) and coal (mostly anthracite) represent the remaining 5% and 3%, respectively.

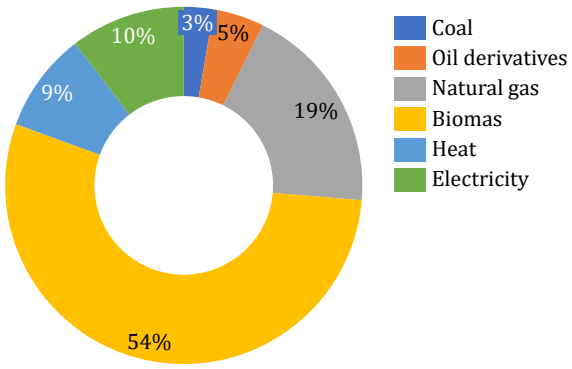


Figure 9-6. Structure of household energy consumption in Moldova

Source: EUROSTAT Energy Balances (2018 data)

The total heated area of residential buildings is 86,265,231 m². Residential buildings represent 87% of the total surface area of the national building stock. In all, 59% of dwellings are located in urban areas and 41% in rural areas. The existing building stock was mainly built from 1951 until the late 1980s and along with buildings constructed until 1990, represents 79.3% of total households.

Regarding the heating area, most of the rural and dominantly urban households heat only a fraction of their homes, i.e., most homes heat only up to 50 m² of their living area.

In rural households, individual stoves at an efficiency of 50% and running on solid fuels are mostly used. Even in urban areas individual wood-fueled stoves dominate.

The largest share of the building stock has no thermal insulation, and the average heating demand is 260 kWh/m² for family houses and 220 kWh/m² for multi-apartment buildings. In the deep energy retrofit scenario, energy demands can be reduced by more than 50%. This includes thermal insulation of the building envelope and introducing individual heating substations and highly efficient heating technologies based on biomass and natural gas.

9.5.2 Policy recommendations

One of the DSA goals is the reduction of poverty and ensuring access to affordable, reliable, sustainable, and modern energy for all citizens. This should be achieved by means of an increasingly strong social protection system and by integrating an inclusive development perspective into all sector policies. According to the Energy Strategy, the national priority is to ensure affordable and clean energy.

Following these goals, Moldova has made some progress in protecting the energy vulnerable and mitigating energy poverty. The short-term measures that are in place (social assistance program/heating assistance program at the state and local level) are focused on direct financial support targeting the socially vulnerable consumers.

Given the lack of energy resources, the fact that only short-term measures to aid socially vulnerable consumers are currently in place and due to the low energy efficiency of dwellings

exposed to a significant number of HDD, the need for energy efficiency improvements in the homes of energy-poor and energy vulnerable is a high priority. Therefore, most of the measures proposed here relate to long-term measures aimed at improving the energy efficiency of dwellings and reducing the energy needs of households.

9.5.2.1 Short term measures

9.5.2.1.1 Protection measures

Sectoral laws on gas and electricity envisage the possibility (not obligatory) of suppliers applying support mechanisms to avoid interruption in supplying natural gas to vulnerable consumers, even in the event of payment delays. There is no such option in DH legislation.

The recommendation is that protection against utility disconnection is, upon acquiring the status of an energy vulnerable consumer, regulated across the country and applicable to all vulnerable consumers, especially during winter months.

9.5.2.1.2 Direct financial support

Direct financial support should be limited to the most socially vulnerable consumers and be implemented alongside infrastructural measures aimed at alleviating the main causes of energy poverty. Direct financial support should also be provided for those households, which after been the beneficiaries of long-term measures, continue to require support as they are unable to cover their energy-related expenses. This should be harmonized at the state and local level and equally available to citizens in urban and rural areas.

9.5.2.2 Long term measures

The main approach in mitigating energy poverty in Moldova is to focus on improving the energy efficiency of dwellings belonging to vulnerable and energy-poor households and facilitating heating system improvements. Primary measures should provide long-term effects in contributing to eliminating the root causes of energy poverty. The proposed measures are focused primarily on achieving maximum benefits for households while easing over the long term the burden on the national budget.

Measures such as revitalization and improvement of district heating systems, which also potentially aid vulnerable and energy-poor consumers are not included in the analysis. However, such measures are likely to be very beneficial to the vulnerable and energy-poor in case they are connected to the district heating system. Given that such measures are also beneficial for the general public, they should be further addressed in the NECP and other strategic documents which aim to improve energy efficiency in Moldova.

Consequently, we propose the following measures:

1. **Program for Mitigating Energy Poverty**. To ensure a harmonized and coordinated approach, we propose drafting and adopting the formal document that defines a detailed plan of measures to address energy poverty in urban and rural areas. The program should extend beyond income support to involve energy efficiency improvements and targeted measures for vulnerable households.
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes resulting in the inability to heat the entire living surface. We propose measures aimed at improving the energy efficiency of homes, and hence reducing energy demand.
3. **Replacement of Household Appliances via the Old for New Scheme**. Due to low disposable income, energy-poor households own low efficient appliances that contribute to increased energy demand and hence energy poverty. We propose measures to aid energy-poor households to replace aging home appliances.

4. **Heating System Improvements** (HSI) in Households, including: (i) HSI 1: Improving the energy efficiency of the system; (ii) HSI 2: Modernization and expansion of the heating system; (iii) HSI 3: Fuel switching
5. **Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA) Measures**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits along with education
6. **Support for Renewable Energy Sources**, including the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors.

A detailed description of measures is given in the tables that follow.

Table 9-31. A detailed description of the measure Program for Mitigating Energy Poverty

Name of Measure		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures assessment as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If necessary, it will define steps for integrating new indicators in the existing statistics system at the national level (conducted by the National Bureau of Statistics of the Republic of Moldova). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[211]	National level
Implementation	List of implementation activities and description	The first step is the development of the program. The program should be developed using participatory development principles including gender sensitivity and interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could

[211] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

		be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-32. Detailed description of the measure Energy Retrofitting of Buildings

Measure name		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030
	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, and floor. The fact that most of the rural and dominantly urban households heat only a fraction of their homes, most of the homes heat up to 50 m^2 of living area and based on the high number of heating degree days, this indicates the need for energy efficiency retrofitting of buildings for the energy-poor and the high potential in energy savings. The most important effect of this measure is to alleviate energy poverty by eliminating its main causes. This is done by reducing energy costs through upgrading efficiency of the dwelling while also removing adverse health effects typically caused by low energy efficiency (due to cold, dampness, mold, and draft). It improves the overall quality of life. The measure also boosts investments, energy savings, reduces CO_2 emissions, increases local employment, improves security of supply, and increases the property values. Devising the national scheme for implementing this measure requires taking into account the widespread use of fuelwood. This factor could possibly hinder implementation of the scheme for the most vulnerable (those most likely using fuelwood in rural areas) if the prerequisite is to provide proof of CO_2 savings. Biomass is considered carbon neutral, so any such scheme does not apply to those using fuelwood. Other benefits of energy retrofits should be taken into consideration so that carbon reduction is not seen as an eliminating factor. The standard scenario involving heat energy demand in compliance with regulatory standards includes thermal insulation of the external envelope using 10 cm of insulation material (20 cm for the roof) and double-glazed insulating windows for all building typologies. The average investment cost for thermal insulation of the external envelope is 87 EUR/m^2 for family houses and 74 EUR/m^2 for multi-residential buildings. The advanced scenario concerning heat energy demand beyond the regulatory standards includes thermal insulation of the building envelope using 20 cm of thermal insulation material (30 cm for the roof) and triple glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope varied between 87-172 EUR/m^2, depending on the age of the building. The average investment cost for thermal insulation of the external envelope is 124 EUR/m^2 for family houses and 87 EUR/$m^2$for multi-residential buildings.
	Level of governance	National level

Table 9-33. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Name of Measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2023-2030
	Aim / Short description	Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) decreases energy consumption for the same or often better quality of service. It also reduces energy bills and CO_2 emissions, while improving quality of life. The "old for new" principle is key as the intention for beneficiaries to forfeit their old appliances before acquiring a new one. This approach is needed to ensure that households do not retain both appliances resulting in higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of old refrigerators (energy class D or lower) with a new class A refrigerator. This scheme will help provide new refrigerators for households which currently do not own one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bill; **Freezers**: Replacement of old freezers (energy class D or lower) with a new class A freezer - This measure provides energy savings and reduces energy bills; **Washing machines**: Replacement of old washing machines (energy class D or lower) with a new class A washing machine. This scheme will help provide new washing machines for households without one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty washing machines or those without one. It contributes to energy savings and energy bill reductions.
	Level of governance	National level delivered locally

Table 9-34. Detailed description of the measure Heating System Improvements (HSI) in Households

Measure name		Heating System Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	Inability to keep houses adequately warm is a key challenge of living in energy poverty. This is evident in that more than half of households heat only up to 50 m^2 of their living space in winter, which indicates a high potential in improving availability of heating by installing heating systems throughout the entire living space and thus enabling eliminating the need for households reduce their living space in winter months. Keeping in mind that 93% of urban

		and 88% of rural households do have access to gas,[212] the measures should be aimed at replacing the predominant use of biomass with gas. HSI for energy-poor refers to three main variations, and which can be implemented as a single measure or in combination: **HSI 1: Improving energy efficiency of heating systems** Replacing existing systems with the same but higher efficiency systems, i.e., replacing traditional fuelwood stoves with more efficient furnaces. This measure is particularly applicable in rural areas where there is a high prevalence of using biomass (fuelwood) and where alternative fuel sources can be too costly or unavailable for vulnerable groups. **This measure should be limited** to the most energy-vulnerable consumers and considered a measure of last resort. Wood biomass furnaces rated at a min 6 kW are recommended, and the estimated cost is EUR 500. The recommendation for family houses is a central heating system running on wood or wood pellets and equipped with a heat accumulation/pyrolitic boiler, heat accumulator and thermostatic valves, at a system efficiency of η=90%. The recommendation for multi-apartment buildings is a central heating system running on wood or wood pellets, equipped with a heat accumulator, hydraulic system balance, and thermostatic valves at a system efficiency of η=90%. **HIS 2: Modernization and expansion of the heating system.** This means replacing the entire heating system with a more efficient one. This measure does not necessarily result in energy savings, but rather improves efficiency, upon replacing heating based on individual heating sources and installing a centralized household heating system equipped with gas boilers (low temperature η=90% or condensing η=103%). Typical systems and installation costs including piping for family houses are as follows: low-temperature gas boiler rated at 6 kW costing EUR 2,375, 8 kW costing EUR 2,750, and 10 kW costing EUR 3,790 whereas for the cost for a condensing gas boiler rated at 4 kW is EUR 4,975, 6 kW costs EUR 5,350, and 8 kW costs EUR 6,390 EUR. A typical centralized condensing gas boiler system and associated installation costs including piping for multi-apartment buildings are as follows: 14 kW costing EUR 9,638 EUR, 22 kW costing EUR 14,865 and 46 kW costing EUR 37,950. This measure applies to any type of dwelling. Eligibility criteria should be devised so that cost-effectiveness and overall improvements to quality of life are taken into consideration. **HIS 3: Fuel switching** Switching fuel from fossil to renewable source. Switching to biomass requires considering biomass sustainability and, in case of using fuelwood as a biomass source, consideration should also be given to fuelwood quality and furnace efficiency. Achieve highly efficient single-family houses requires the use of centralized heating with air/water heat pumps rated at 2 kW with a SCOP>3 (EUR 6,065).
	Level of governance	National level delivered locally

[212] Source: National Bureau of Statistics

Table 9-35. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two. This measure goes hand in hand with the proposed section of the Program for Mitigating of Energy Poverty in Moldova and which focuses on providing hands-on support in acquiring knowledge of available grants and mechanisms, as well as filling out the required applications to access the grants and mechanisms. Persons conducting household visits can provide both support in sharing information and guidance to households in the implementation of national and local support programs, and also the implementation of measures listed here: **EEEA1: Installing simple and low-cost energy efficiency measures** Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Undertaking simple energy audits with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level delivered locally

Table 9-36. Detailed description of the measure Support for Renewable Energy Sources

Measure name		Support for Renewable Energy Sources
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions.
	Level of governance	National level

9.6 Montenegro

9.6.1 Overview

Currently, two measures are available for energy vulnerable consumers in Montenegro at the national level. Two financial measures are offered to socially vulnerable households in the form of direct financial support for easing the household burdens from electricity expenses. Both available measures provide subsidies for electricity bills if fulfilling certain eligibility criteria, i.e., criteria relating to total household income, health, or disability status. The measures cover between 17,000-21,000 households at an average financial cost of approx. EUR 2.7 million.

Table 9-37. Current measures in place to aid vulnerable consumers in Montenegro

Name of measure	Number of households covered	Approximate annual financial expenditures	
		EUR	Year
Subsidy for electricity bills (Ordinance on the Supply of Electricity to Vulnerable Consumers)	400-700	N/A	NA
Subsidy for Electricity Bills (Guidance on the Procedure and Manner of Implementing the Electricity Bill Subsidization Program)	17,000 – 21,000	2,707,412.21	2018
Total	**17,400-21,7000**	**2,707,412.21**	

The 4th National Energy Efficiency Action plan (NEEAP) addresses energy poverty in measure E.7 Development of Decentralized Energy Production by Consumer-Producers (Prosumers). This measure states the need for setting up ambitious goals in terms of the obligatory share of energy from RES, as well as goals related to energy efficiency, and matters relating to internal electricity market organization, in order to facilitate economic growth. Moreover, the 4th NEEAP recognizes that investments in such measures contribute to alleviating energy poverty. The same action plan envisages financial support for energy efficiency improvements in households but fails to distinguish between vulnerable and non-vulnerable households.

Though the timeframe of the 4th NEEAP has expired, it still carries weight in recommending implementation of the respective measures. Recognizing the potential of RES as a tool for reducing energy poverty is an important step and innovative approach for the country of Montenegro. As a Mediterranean country, the benefit is particularly likely due to utilization of solar energy for providing both electricity and domestic hot water (DHW). Also, energy efficiency improvement in households is a key measure for alleviating energy poverty, and though the 4th NEEAP does not distinguish measures aiming at the general public from those for reducing energy poverty, the recommendation is pushing implementation of the measures. Both the mentioned approaches should be integrated into the forthcoming National energy and Climate Plan (NECP), which is currently being drafted. The Montenegrin NECP will be the first document focusing on alleviating and monitoring energy poverty. It will include measures for monitoring and alleviating targets regarding energy poverty.

Unlike many other contracting parties, Montenegro does not have a district heating system or gas network. It also has a mild Mediterranean climate in a significant part of the country, with an average temperature of approx. 16 degrees Celsius, and about 1500 HDD. The mountainous part of the country is less populated; however, it has more harsh winters and less access to quality energy services. According to [34], Montenegro is divided into three climate zones where the average value of HDD for zone 1 (mild) is 1623 (Bar, Budva, Danilograd, Herceg Novi, Kotor, Podgorica, Tivat, Ulicnj), HDD belongs to zone 2 (moderate) (Nikšić and Cetinje) amounting to

2525, while the average number of HDD for climate zone 3 (mountain) is 3388 (Andrijevica, Berane, Bijelo Polje, Žabljak, Kolašin, Mojkovac, Plav, Plužine, Pljevlja, Rožaje, Šavnik).

In terms of the share of dwellings in each zone, 64% of dwellings lie in zone 1, 11% in zone 2, and 25% in zone 3. That being said, the coastal part of the country has higher requirements for cooling in summer with up to 500 and more CDDs.

In Montenegro, the dominant source of energy in the final energy consumption of households is biomass accounting for 54%, followed by electricity with 44% of the share. The use of coal and lignite is negligible.

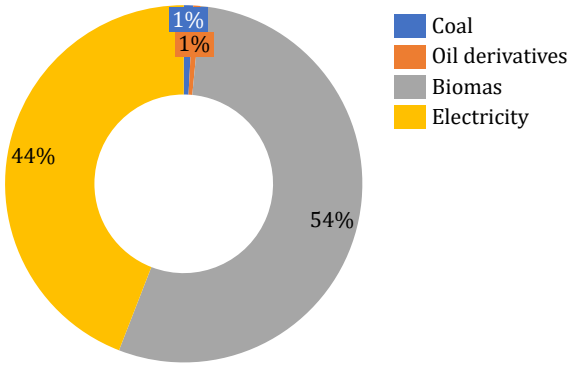


Figure 9-7. Structure of household energy consumption in Montenegro

Source: EUROSTAT Energy Balances (2018 data)

The most common energy source for heating is solid fuel and accounts for 84% (mainly wood), followed by electricity at 13.3%. Both conventional wood-burning stoves and low-efficiency electric air-to-air heat pumps are widely used. Solar heating and other energy sources, such as oil, are negligible. About 1.6% of the total household stock is not heated. In small houses and older, medium-sized buildings, wood is the dominant energy source, while electricity is the dominant heat source in large buildings. Centralized heating systems are present in 1% to 7% of multi-apartment buildings. In all, 54% of dwellings are equipped with mechanical cooling systems. Most of the cooling units are reversible, meaning that they are also used for heating, although this cannot be supported by statistical data. Typically, hot water is produced using an electric boiler.[213]

The average heating demand is 276.50 kWh/m^2 for family houses and is similar for multi-apartment buildings at 286.99 kWh/m^2. DHW demand is 31.90 kWh/m^2 in both housing categories, while cooling demand is 74 kWh/m^2 for family houses and 54 kWh/m^2 for multi-apartment buildings.

9.6.2 Policy recommendations

Based on the definition of energy vulnerable consumers and current legislation (The Energy Act (OG 5/16, 51/17, and 82/20) and the Ordinance on the Supply of Electricity to Vulnerable Consumers (OG 81/2018), Montenegro has already taken the first important step in protecting vulnerable consumers. Its legislation recognizes the issue of energy vulnerability and the need of offering protection, which at the moment is only in the form of direct financial support for the most vulnerable groups. However, no long-term measures have been set for alleviating energy poverty.

The fact that only short-term measures aiding socially vulnerable consumers are currently in place, and due to the low energy efficiency of dwellings located in certain parts of the country with

[213] Household Census 2011, Monstat

a significant number of HDD and CDD in others, all this indicates the need for energy efficiency improvements in homes of the energy-poor and energy vulnerable. Therefore, most of the measures we propose relate to long-term measures aimed at improving the energy efficiency of dwellings and reducing the energy needs of households.

9.6.2.1 Short term measures

9.6.2.1.1 Protection measures

Importantly, utility disconnections of vulnerable groups in case of non-payment is an important issue. If fulfilling vulnerability criteria, disconnections from an electricity grid should be prohibited, especially during the winter months. Currently, Article 198 (5) of the Energy Acts prohibits disconnecting vulnerable consumers that fulfill eligibility criteria, from electricity and gas network in the period from October to April.[214] Therefore, Montenegro has the required measures in place for vulnerable consumers, though it is suggested disconnections from the grid should be prohibited for all household consumers during the winter months.

9.6.2.1.2 Direct financial support

As shown in Table 9-37, there are two measures aimed at directly subsidizing energy costs for vulnerable consumers. These financial measures should be limited only to the most socially vulnerable consumers and implemented alongside infrastructural measures aimed at alleviating the main causes of energy poverty. Furthermore, direct financial support should be provided for those households, which after receiving long-term measures, still required support as they are unable to cover their energy-related expenses.

9.6.2.2 Long term measures

The main approach to mitigating energy poverty in Montenegro should be targeted at improving the energy efficiency of the dwellings of energy-poor households. In addition, due to the specific climate and diversity of the three climate zones in Montenegro, measures should also vary across the climate zones. Though energy efficiency improvements should be the main measure for all three zones, depending on the zone the improvements should be followed by (1) heating system improvements along with fuel switching - for those vulnerable households situated in the zone with longer and colder winters and reliant on traditional inefficient stoves, or (2) the provision of cooling systems for those facing hot and long summers. Furthermore, the use of RES should be considered given the favorable climate in Montenegro.

The primary measures should provide long-term effects in contributing to eliminating the root causes of energy poverty. The proposed measures focus primarily on providing maximum benefits for households while easing the burden on the national budget in the long run. Where applicable, we have indicated whether similar measures exist in the specific CP complementary to the proposed measure and the possibility of expanding it to accommodate measures for energy poor households. Accordingly, we propose the long-term measures given below:

1. **Program for Mitigating Energy poverty**. Our observation is that there is no systematic approach to addressing the issue of energy poverty in Montenegro. We propose the drafting and adoption of a formal document that provides a detailed plan for implementing measures to address energy poverty. The program should go beyond income support and incentivize energy efficiency improvements as well as targeted measures for vulnerable households.
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes. We propose measures aimed at improving the energy efficiency of

[214] Energy Act (Official Gazette of Montenegro. No. 5/16, 51/17 and 82/20),

homes, hence reducing energy demand. This measure is to some extent complimentary to the R2 Financial support for EE investments for physical persons from the 4th NEEAP. However, energy retrofits aimed at mitigating energy poverty need to be delivered through more comprehensive co-financing schemes and support mechanisms.

3. **Replacement of Household Appliances via the Old for New Scheme**. Due to low disposable income, energy-poor households own low efficient appliances that contribute to increased energy demand and hence energy poverty. We propose measures that assist energy-poor households in replacing aging home appliances.
4. **Heating System Improvements** (HSI) in Households, including: (i) HSI 1: Improving the energy efficiency of the system; (ii) HSI 2: Modernization and expansion of the heating system. This measure is to some extent complimentary to the R2 Financial support for EE investments for physical persons from the 4th NEEAP.
5. **Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)**, including: (i) EEEA1: Implementing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits with education
6. **Support for Renewable Energy Sources**, including the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors. This measure is to some extent complimentary to R2 Financial support for EE investments for physical persons and measure E7 Development of Decentralized Energy Consumption through prosumers from the 4th NEEAP. This measure in the 4th NEEAP specifically mentions the possible benefit of mitigating energy poverty.

Though some of the proposed measures are in line with the existing framework and are viewed as complementary to already proposed measures available in the 4th NEEAP, making those measures accessible to the energy poor requires taking into consideration vulnerability criteria and the provision of higher co-financing rates. Furthermore, unlike for general public, designing schemes to implement measures aimed at alleviating energy poverty requires devising and putting into place support systems. This should be elaborated in the Program for Mitigating Energy Poverty. The aim of these support systems is to identify persons in need and provide them with support in applying to and accessing the available measures.

A detailed description of measures is given in the tables below.

Table 9-38. A detailed description of the measure Program for Mitigating Energy Poverty

Name of Measure		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed measures assessment as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status

		quo in energy poverty. If should define steps for integrating new indicators in the existing statistical system at the national level (conducted by the MONISTAT). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[215]	National level
Implementation	List of implementation activities with description	The first step is development of the program. The program should be developed through participatory principles as well as interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-39. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030
	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. The primary aim of this measure is to eliminate the main causes of energy poverty. This is achieved by improving the efficiency of dwellings while also eliminating adverse impacts on health, typically caused by low energy efficiency (through cold, dampness, mold, and draft). It improves the overall quality of life. The measure also boosts investments, energy savings, reduces CO_2 emissions, increases local employment, improves security of supply, and increases the property values. This measure is equally applicable across all climate zones as it improves living conditions and decreases energy costs for households in both winter and summer. Devising a national scheme for implementing this measure requires keeping in mind that there is widespread use of fuelwood. This factor may possibly hinder implementation of the scheme for the most vulnerable (who most likely use fuelwood in rural areas) if the precondition to proving CO_2 savings exists. Biomass is considered carbon neutral, hence any such scheme would not apply to those using fuelwood. Other benefits of energy retrofits should be taken into consideration: a scheme should be designed so that carbon reductions are not seen as eliminating factor. Measures for improvement can be implemented as an integral refurbishment or renovation, including improvements to both the building envelope and heating systems. The standard scenario concerning heat energy demand and compliance with regulatory standards involves thermal insulation of the external envelope using 10 cm of insulation material for walls

[215] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

		and the roof, including double-glazed insulating windows for all building typologies. The investment cost for thermal insulation of the external envelope is 225 EUR/m^2 for family houses and 265 EUR/m^2 for multi-apartment buildings. The advanced scenario includes thermal insulation of the building envelope with up to 20 cm of thermal insulation material and triple glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope is 305 EUR/m^2 for family houses and multi-apartment buildings. The recommendation for family houses is a centralized heating system equipped with wood pellet boilers, automatic regulation, and centralized hot water preparation. The average cost is 55 EUR/m^2. The recommendation for multi-apartment buildings is a air/water heat pump for SCOP>4 and a centralized DHW system. The average cost is 80 EUR/m^2.
	Level of governance	National level

Table 9-40. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Name of Measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2023-2030
	Aim / Short description	Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) decreases energy consumption for the same or often better quality of service. It also reduces energy bills and CO_2 emissions, while improving quality of life. The "old for new" principle is key as the intention for beneficiaries to forfeit their old appliances before acquiring a new one. This approach is needed to ensure that households do not retain both appliances resulting in higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of old refrigerators (energy class D or lower) with a new class A refrigerator. This scheme will help provide new refrigerators for households which currently do not own one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bill; **Freezers**: Replacement of old freezers (energy class D or lower) with a new class A freezer - This measure provides energy savings and reduces energy bills; **Washing machines**: Replacement of old washing machines (energy class D or lower) with a new class A washing machine. This scheme will help provide new washing machines for households without one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty washing machines or those without

		one. It contributes to energy savings and energy bill reductions. **Air conditioners (AC)**: replacing old AC systems with new energy-efficient ones and providing an AC system where none is currently installed. - This measure reduces energy consumption, firstly, where an old AC is replaced with a new one, and in both cases, contributes to improving health and living conditions;
	Level of governance	National level delivered locally

Table 9-41. Detailed description of the measure Heating System Improvements (HSI) in Households

Name of Measure		Heating system Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to keep houses adequately warm is a key challenge of living in energy poverty. HIS improvements for the energy-poor consist of two main variations, which can be implemented as a single measure or in combination: **HIS 1: Improving the energy efficiency of systems.** Replacing existing systems with the same type but more efficient system, i.e., replacing traditional fuelwood stoves with pyrolytic furnaces. This type of measure is particularly applicable in rural Montenegro where a high prevalence of traditional biomass (fuelwood) exists, and alternative fuel sources might be too costly or unavailable for vulnerable groups. Wood biomass furnaces rated at min of 6 kW are the recommended option at an estimated cost of 500 EUR. **HIS 2: Modernization and expansion of heating systems.** This involves replacing entire heating systems with more adequate heating systems. This measure does not necessarily provide energy savings, but efficiency, i.e., replacement of individual heating sources with centralized heating systems in households. This measure is applicable to any type of dwelling. Eligibility criteria consider cost-effectiveness and improvements to overall quality of life. The recommendation for family houses is a centralized heating system equipped with wood pellet boilers, automatic regulation, and centralized hot water system. The average cost is 50 EUR/m^2. Additionally, a heat pump is recommended for cooling costing on average 10 EUR/m^2. The recommendation for multi-apartment buildings is an air/water heat pump for SCOP> 3 or 4, supplying both heat energy for heating and cooling, along with a centralized DHW system. The average cost for the SCOP 3 system is 75 EUR/m^2 and for SCOP 4 system it is 120 EUR/m^2.
	Level of governance	National level delivered locally

Table 9-42. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030

	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two. This measure goes hand in hand with the proposed section of the Program for Mitigating of Energy Poverty in Montenegro, and which focuses on providing hands-on support in obtaining knowledge of available grants and mechanisms as well as completing the required applications to access the grants and mechanisms. Persons conducting household visits can provide both support in sharing information and guidance to households in the implementation of national and local support programs, and also the implementation of measures listed here: **EEEA1: Installing simple and low-cost energy efficiency measures** - Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. - This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Undertaking simple energy audits with education** - Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. - This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level delivered locally

Table 9-43. Detailed description of the measure Support for Renewable Energy Sources

Measure name	Support for Renewable Energy Sources
Measure index	RES

	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions. Given the good insulation of the country, high dependence on electricity as the main source of heating (and the need for cooling in summer) means that these measures should likely be prioritized in Montenegro.
	Level of governance	National level

9.6.3 Ranking of criteria and measures

As discussed in the chapter "Multicriteria approach to solving energy poverty", multicriteria decision making is a process based on the ranking of different alternatives (options) and multiple criteria. It requires:

- evaluating the importance/ranking of criteria
- ranking each alternative based on each criterion
- prioritization of alternatives

To gain insight the views of decision-makers on the importance of criteria for mitigating energy poverty and ranking the proposed measures, an exercise incorporating an analytic hierarchy process was undertaken. The analysis was done using the web-based BPMSG software [66].

The online workshop was held on the June 29 with seven stakeholders from Montenegro taking part. The participants were introduced to the analytic hierarchy process and the six criteria to be ranked. The survey of stakeholders showed that they considered lowering households energy bills the most important characteristic of the potential measures. The ranking of other criteria is given in Figure 9-8.

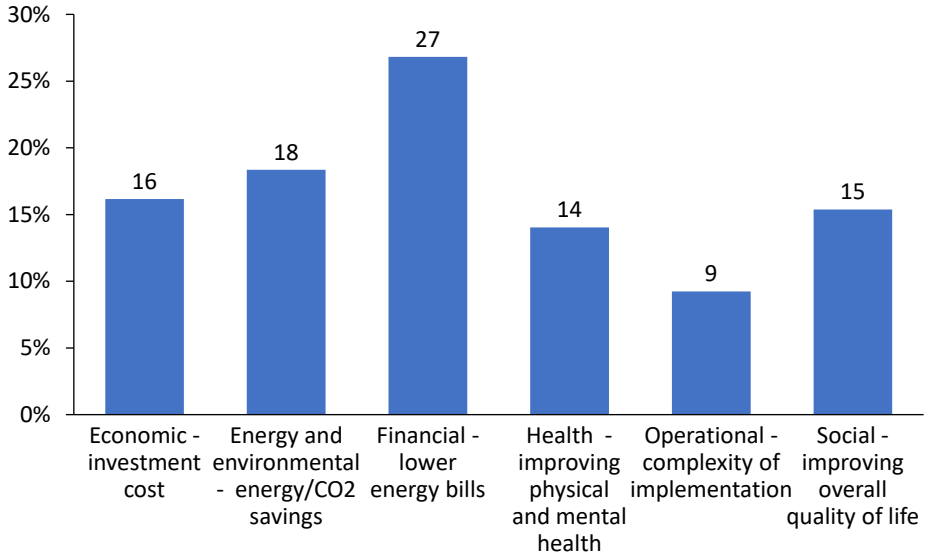


Figure 9-8. Ranking of criteria by Montenegrin stakeholders

A sensitivity analysis was conducted to highlight the most critical criteria affecting changes in the ranking of alternatives, i.e., measures. The sensitivity analysis indicated an uncertainty (overlapping with uncertainty) in the ranking of the following criteria:

- Energy and environmental- energy/CO2 savings, Economic – Investment costs, and Social – improving the overall quality of life criteria all overlap with uncertainties
- Economic – Investment costs, Social – improving the overall quality of life criteria all overlap with uncertainties

Overlapping within uncertainties means that a slight change in the rating of any criteria may possibly change the ranking of criteria ranked within uncertainties. On the other hand, Financial – lowering energy bills and Operational – complexity of implementation criteria are ranked without overlap, meaning small changes to participants' ranks are unlikely to affect their position.

There was moderate group consensus (66.6%). The AHP group consensus indicator has an estimated agreement on outcoming priorities between participants. This indicator ranges from 0% to 100%, i.e., 0% corresponds to no consensus at all, and 100% to full consensus.[216] It measures the homogeneity of priorities between participants, where values below 50% indicate practically no consensus within the group and a high diversity of judgments. Values in the 80% – 90% range indicate a high overlapping of priorities and excellent agreement for judgments among group members.

Having ranked the criteria, measures were ranked for each criterion. As discussed, there are five measures considered for Montenegro (Program for Mitigating Energy Poverty was not considered a measure):

[216] https://bpmsg.com/ahp-group-consensus-indicator-how-to-understand/

- Energy Retrofitting of Buildings
- Replacement of Household Appliances
- Heating System Improvements
- Low-cost EE and Energy Advice
- Support for RES

The results show that the **highest priority, without any overlapping and uncertainty, was given to the Energy Retrofitting of Buildings**, while the lowest priority was given to Support for RES and Low-Cost EE along with Energy Advice, which overlaps within uncertainty.

Just as was discussed above regarding criteria ranking, sensitivity analysis was conducted, and where exists a clear ranking, even if workshop participants changed their opinion and gave slightly different ranks to certain alternatives under each criterion, the ranking of measures did not change. On the other hand, alternatives overlap within uncertainty are those which are likely to change ranking against each other if participants slightly modified their inputs when comparing different alternatives. The following table provides the summary of ranked measures.

Table 9-44. Ranking of measures for Montenegro

Criterion / measures	Weight	Energy Retrofitting of Buildings	Replacement of Household Appliances	Heating System Improvements	Low-cost EE and Energy Advice	Support for RES
Economic - investment cost	16.16%	32.25%	18.83%	15.96%	23.11%	9.85%
Energy and environmental - energy/CO2 savings	18.36%	40.33%	19.54%	17.71%	8.18%	14.24%
Financial - lower energy bills	26.82%	44.81%	14.96%	20.80%	9.15%	10.27%
Health - improving physical and mental health	14.03%	33.59%	19.12%	26.15%	12.03%	9.11%
Operational - complexity of implementation	9.24%	13.76%	37.76%	19.28%	18.20%	10.99%
Social - improving overall quality of life	15.39%	45.60%	14.41%	18.55%	9.93%	11.51%
Group Result		37.64%	19.03%	19.72%	12.59%	11.03%

Group consensus was the highest in ranked measures relating to Energy and environmental criteria (69.6%, moderate), and lowest in rankings relating to operational criteria (47%). This indicate some unclarity in defining operational criteria, which may have led to stakeholders reaching a different understanding and interpretation. As discussed above, the AHP group consensus indicator is used to quantify group consensus, i.e., estimates the agreement on the outcoming priorities between participants.

Importantly, the results shown in this report illustrate the likely prioritized measure and ranking of the other possible measures for alleviating energy poverty in Montenegro. The recommendation is to perform the ranking process while drafting the legislation, and engaging all stakeholders taking part in the drafting process. Prior to that, the cost of each measure, estimated energy, and emissions savings are to be calculated, and the implementation process is to be defined and barriers identified.

9.7 North Macedonia

9.7.1 Overview

Currently, for beneficiaries of social and permanent social assistance, there is an energy subsidy of MKD 1,000 or EUR 16 per month; however, only one-third of eligible households obtain this subsidy, due to the requirement of providing official receipts for utility bills. In 2019, the Strategy for Energy Development of the Republic of North Macedonia Until 2040 was adopted, facilitating adoption of a program for vulnerable consumers.

The current Program for the Protection of Vulnerable Energy Consumers for 2021 states that part of the funds, i.e., MKD 8,000,000 (EUR 131,000), are provided from the Budget of the Republic of North Macedonia for 2021. In January 2021, the Macedonian government adopted the Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households for 2021. The funds for this program total MKD 52,000,000 (EUR 842,606). The measures listed in the Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households for 2021 are long-term measures and address the causes of the problem by partially providing funds necessary for making households belonging to vulnerable consumers more energy efficient. The following table provides the list of active measures.

Table 9-45. Current measures in place to aid vulnerable consumers in North Macedonia

Name of Measure	No. of HH covered	Approximate annual financial expenditures		
		MKD	EUR	Year
Energy subsidy	N/A	8,000,000 MKD	€ 131,000	2021
Rules for suppliers concerning vulnerable consumers	N/A	N/A	N/A	
Reimbursement of part of the costs for purchased and installed solar thermal collector systems up to 30%	N/A	MKD 6,000,000	€ 97,224	2021
Reimbursement of part of the costs for purchased and installed solar thermal collector systems up to 70%	N/A	MKD 2,000,000	€ 32,408	2021
Reimbursement of part of the costs for purchased and installed PVC or aluminum windows up to 50%	N/A	MKD 19,000,000	€ 307,875	2021
Reimbursement of part of the costs for purchased and installed PVC or aluminum windows up to 70%	N/A	MKD 3,000,000	€ 48,612	2021
Reimbursement of part of the costs for purchase and installation of pellet stoves up to 50%	N/A	MKD 11,000,000	€ 178,244	2021
Reimbursement of part of the costs for purchase and installation of pellet stoves up to 70%	N/A	MKD 3,000,000	€ 48,612	2021

Reimbursement of part of the costs for purchase and installation of photovoltaic panels for the production of electricity rated at up to 4 kW for own household consumption, on a building which the beneficiary has right of ownership or use, up to 30%	N/A	MKD 8,000,000	€ 129,631	2021
Total		**MKD 60,000,000**	**€ 973,606**	

North Macedonia recognizes vulnerable consumers in its laws and strategic documents. The Strategy for Energy Development of the Republic of North Macedonia Until 2040 requires the Government to define a program for protecting vulnerable consumers. The Energy Act and the Social Protection Act provide the legal basis for the yearly Program for Protection of Energy Vulnerable Consumers, which defines vulnerable consumers and conditions for receiving funds aimed at energy vulnerable consumers. It also defines the rules of supplying electricity where the energy supplier is obliged to provide energy (electricity or/and natural gas) to vulnerable consumers. The Program for Protection of Energy Vulnerable Consumers for 2021 defines a vulnerable consumer as a household that uses the minimum guaranteed assistance and receives a cash benefit covering some of the energy consumption costs as stipulated in Article 7 of the Social Security Act of the Elderly, or a person that lives in a state of social risk (motherhood, illness, old age, injury, and disability) where energy supply and/or the use of the network is given under special conditions.

The draft of the National Energy and Climate Plan of the Republic of North Macedonia (NECP) also envisages devising an annual program for vulnerable consumers ensuring their protection from price shocks. One of the key targets concerning the internal energy market is to devise annual programs for vulnerable consumers, along with an appropriate increase in intensity of the measures based on annual needs. The document also lists supply rules adopted by the Energy Regulatory Commission. These are the same rules as those provided in the description of the Program for Protection of Vulnerable Consumers of Energy for 2021.

Regarding energy consumption and HDD, the required heating energy in North Macedonian cities slightly exceeds the median in EnC CPs.

Electricity and biomass are the dominant energy sources used in North Macedonian households and represent 53% and 37% of the final energy consumption in households, respectively. Heat accounts for 7% of final energy consumption, while coal (lignite) and oil derivatives each account for roughly 1% of final energy consumption in households.

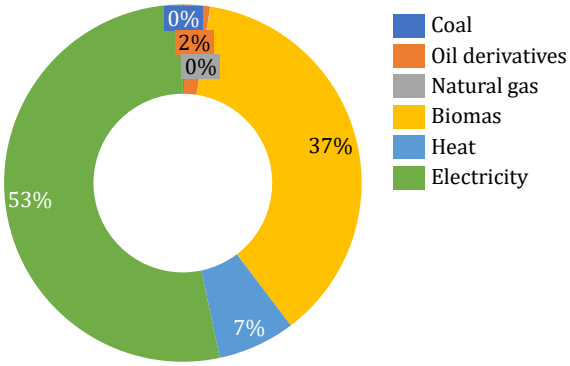


Figure 4-7. Structure of household energy consumption in North Macedonia

Source: EUROSTAT Energy Balances (2018 data)

In terms of heating requirements, households mostly consume fuelwood (61.59%), electricity (28.60%), district heating (8.33%), and other fuels (1.48%).[217] Only 6% of households use central heating systems and 74.3% use individual solid fuel stoves in rural as well urban households [64]. These types of stoves cannot heat households' entire living spaces as they are designed to heat only a limited area. Electric accumulation stoves are also used (33.79%), followed by electric heaters (31.35%), air conditioners (10.57%), and inverter conditioners (6.32%)[36]. In all, 81.96% of households were built before 1991 and 17.78% of such households have thermal insulation of the building envelope [36]. The average heating energy demand in the residential sector is 157.78 kWh/m^2. According to the national energy efficiency requirement, the heat demand should be 90 kWh/m^2.

The average dwelling area is 82.87 m^2 and on average only 37.41 m^2 is heated. There are, on average, 3.69 members per household [36]. There are most often two, three, and four-room apartments.[218] In all, 58.16% of households reside in detached single-family buildings and 95.10% of households own their dwelling. The Government is constructing apartments with a minimum area of 30 m^2.[219] This appears to be a good step in potentially offering social housing to the energy poor.

9.7.2 Policy recommendations

Based on its definition of energy vulnerable consumers and set legislation (Energy Act, Social Protection Act from 2015, National Energy and Climate Plan of the Republic of North Macedonia and the Program for Protection of Energy Vulnerable Consumers for 2021), North Macedonia has taken significant steps in protecting vulnerable consumers. Its legislation recognizes the issue of energy vulnerability and necessity of offering protection. Given that long-term measures are defined in the Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households, alleviating energy poverty and further improvements are made within the scope of protection measures and direct support.

North Macedonia has measures for actively promoting energy efficiency, nevertheless, we have no information as to their effectiveness. Therefore, energy efficiency measures continue to remain in our proposal. We also suggest evaluating current measures to assess their adoption and contribution to alleviating the energy poverty.

9.7.2.1 Short term measures

9.7.2.1.1 Protection measures

The issue of utility disconnection in case of non-payment for vulnerable groups has been addressed in current legislation. In other words, vulnerable consumers are protected from utility disconnections due to non-payment.

9.7.2.1.2 Direct financial support

As shown in Table 9-45, one of the measures is aimed at directly subsidizing energy costs for vulnerable consumers. These financial measures should remain limited to the most socially vulnerable consumers and should be implemented alongside infrastructural measures aimed at alleviating the main causes of energy poverty. Furthermore, direct financial support should be

[217] Energy consumption in households - Statistical Review, 2014.

[218] Based on the households interviewed in research project Reduce energy consumption and change habits project, Mapping the national situation on energy poverty in Macedonia, 2013.

[219] Data calculated based on Annual program for construction, sale and maintenance of housing units owned by the Republic of North Macedonia for 2021.

provided for those households, which after receiving long-term measures, nonetheless, still require support as they are unable to cover their energy-related expenses.

9.7.2.2 Long term measures

North Macedonia has long-term measures in the field of energy efficiency relating to vulnerable consumers. Nevertheless, we do not have information on the effectiveness of these measures. Therefore, we propose a wide set of measures to be implemented. Given that these measures are also beneficial for the general public, they should be further assessed in the NECP and other strategic documents that aim to improve energy efficiency in North Macedonia. Accordingly, we propose implementing the following long-term measures, and where applicable, we indicate whether similar measures exist in the CP complementary to the proposed measure and the possibility of expanding them to accommodate measures for energy poor households:

1. **Program for Mitigating Energy Poverty**. We have noted the absence of any long-term approach to addressing energy poverty in North Macedonia. Annual programs do exist, but do not appear to have any long-term perspective. Therefore, we propose drafting and adopting a formal document that defines a detailed plan for implementing measures to address energy poverty. The program should extend beyond income support and involve energy efficiency improvements as well as targeted measures for vulnerable households. It should also be further described in the NECP and include clear eligibility criteria.
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes. We propose measures aimed at improving the energy efficiency of homes, hence reducing energy demand. This measure is already partially covered in the annual Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households, which should be further assessed in the NECP, along with setting a larger subsidy percentage (the current subsidy is 70% for low-income persons).
3. **Replacement of Household Appliances via the Old for New Scheme**. Due to low disposable income, energy-poor households have low efficient appliances that increase energy demand and hence energy poverty. We propose measures to aid energy-poor households by replacing aging home appliances. This measure is also covered in the annual Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households, which should be covered in the actual NECP.
4. **Heating System Improvements** (HSI) related measures in households, including: (i) HSI 1: Improving the energy efficiency of the system; (ii) HIS 2: Modernisation and expansion of the heating system. This measure is covered in the annual Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households, but should also be further assessed in the NECP, and a larger subsidy percentage set (the current subsidy is 70% for low-income persons).
5. **Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA) measures**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits with education
6. **Support for Renewable Energy Sources**, including the following measures: (i) RES 1 Incentives for installing photovoltaic panels; (ii) RES 2 Incentives for installing solar-thermal collectors. This measure is included in the annual Program for Promoting Renewable Energy Sources and Incentivizing Energy Efficiency in Households, but should also be further assessed in the NECP, and a larger subsidy percentage set (the current subsidy is 70% for low-income persons).

Though most of the proposed measures conform to existing framework and are seen as complementary to already proposed measures, making those measures accessible to the energy poor requires considering vulnerability criteria and setting higher co-financing rates. Furthermore, unlike for the general public, when devising schemes to implement measures aimed

at alleviating energy poverty, support systems need to be designed and put in place. This should be elaborated within the Program for Mitigating Energy Poverty. The aim of the support systems is to help identify those in need and provide support to them in applying to and accessing available measures. A detailed description of measures is given in the tables that follow.

Table 9-46. Detailed description of the measure Program for Mitigating Energy Poverty

Measure name		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures assessment as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If should define steps for integrating new indicators in the existing statistical system at the national level (conducted by the State Statistics Office). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[220]	National level
Implementation	List of implementation activities and description	The first step is the development of the program. The program should be developed using participatory development principles including gender sensitivity and interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-47. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030

[220] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, and floor. The most important impact of this measure is elimination of the causes of energy poverty and consequently its alleviation. This leads to reducing energy costs by improving the energy efficiency of dwellings while also eliminating adverse impacts on health typically due to low energy efficiency (cold, dampness, mold, and draft). It improves overall quality of life. The measure also contributes to boosting investments, energy savings, CO_2 reductions, local employment, supply security, increasing the value of properties. In devising the national scheme to implement this measure, the widespread of fuelwood use needs to be considered. This factor can hinder applicability of the scheme for the most vulnerable (those most likely using fuelwood in rural areas) if the precondition to achieve CO_2 savings exists. Biomass is considered carbon neutral, hence such schemes do not apply to those using fuelwood. Other benefits of energy retrofits should also be considered including devising the scheme so that carbon reductions are not seen as an eliminating factor. Improvement measures can be implemented as integral refurbishment or renovation, including both the building envelope and systems improvements. The standard scenario involving heat energy demand in compliance with the national regulatory standard includes thermal insulation of the external envelope with 10 cm of insulation material and double-glazed insulating windows for all building typologies. The investment cost for thermal insulation of the external envelope varies between 59-99 EUR/m^2, depending on the age of the building. The recommendation for family houses and multi-aparment buildings is the installation of a central heating system equipped with a low-temperature (LT)/condensing gas boiler or biomass boiler/wood gasification boiler for pellets or logs, along with a buffer tank, as well as centralized domestic hot water (DHW) cylinder in combination with a heat generator. The cost for the heating system is from EUR 900 (for an LT gas boiler), EUR 1,500 (condensing gas boiler), and EUR 3,000 (for biomass boiler) in single-family houses. The additional cost of piping varies between EUR 1,500-4,000. The cost of a centralized heating system in multi-family houses varies between EUR 1,200-2,500 (for an LT gas boiler), EUR 1,500 for a condensing gas boiler for each building. The additional cost of piping varies between EUR 9,500-30,500, depending on the building size. In all multifamily buildings supplied with district heating (DH), substation improvement using flow system control based on outside temperature, thermostatic valves in apartments, and introducing consumption-based billing is the standard recommendation. The cost varies between EUR 3,500-7,200 for a building, for TRV up to EUR 13,000 including a heat exchanger and buffer for DHW. The advanced scenario includes thermal insulation for the building envelope with 20 cm of thermal insulation material and triple glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope

		varies between 87-172 EUR/m^2, depending on the age of the building.
	Level of governance	National level

Table 9-48. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Name of Measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2023-2030
	Aim / Short description	Inefficient and old household appliances lead to inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide intended quality of service (i.e., too cold or too warm refrigerators). Replacing household appliances (e.g., refrigerators, washing machines) decreases energy consumption and provides the same or often better quality of service. It also decreases energy bills and CO_2 emissions and improves quality of life. The "old for new" scheme is of key importance as it envisages beneficiaries giving up on old appliance before obtaining a similar new appliance. This approach ensures that households do not retain both old and new appliances which would lead to higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of an old refrigerator (energy class D or lower) with a new class A refrigerator. This scheme should also provide new refrigerators for households which currently do not yet own one (subject to providing proof from the local social welfare office or similar body to verify not possessing the respective appliance in the household): - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bills. **Freezers**: Replacement of an old freezer (energy class D or lower) with a new A freezer - The measure leads to energy savings and reduces energy bills. **Washing machines:** Replacement of an old washing machine (energy class D or lower) with a new class A washing machine. This scheme assists households currently not owning a washing machine to get a new one (subject to providing proof from the local social welfare office or similar body to verify not possessing the respective appliance in the household): - The measure improves quality of life, particularly for households with a faulty washing machine or none at all. It leads to energy savings and reduces energy bills.
	Level of governance	National level delivered locally

Table 9-49. Detailed description of the measure Heating System Improvements (HSI)

Name of Measure		Heating System Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The use of individual stoves in North Macedonia accounts for 74.3% of cases, followed by 53% for electricity and 37% for biomass, as the most widely used fuels.[221] HSI for the energy-poor consists of three main variations, which can be implemented as a single measure or in any combination: **HIS 1: Improving the energy efficiency of the system** Replacing existing systems with the same type but more efficient system, i.e., replacing traditional fuelwood stoves with more efficient furnaces. This type of measure is particularly applicable in rural areas where there is a high prevalence of traditional biomass (use of fuelwood) and alternative fuel sources might be too costly or unavailable for vulnerable groups. Nevertheless, the main idea of this measure is the introduction of a biomass-based centralized heating system in households. Wood biomass furnaces rated at a min 6 kW are the recommendation setup at an estimated cost of 500 EUR. **HIS 2: Modernization and expansion of heating systems.** This measure applies to any type of dwelling. Eligibility criteria should be devised so that the cost-effectiveness and overall quality of improvements to the quality of life are taken into consideration. This implies replacing the entire heating system with a more adequate one, in areas where gas is available. The measure does not necessarily contribute to energy savings, but rather improves efficiency, i.e., replacement of individual heating sources with central heating systems running on wood or wood pellets and equipped with a heat accumulation/pyrolitic boiler, heat accumulator and thermostatic valves, for a system efficiency of η=90% as the general recommendation for family houses. For domestic hot water (DHW), an accumulation boiler in conjunction with a heating system is the general recommendation. A solar collector system is considered as an additional improvement. The average cost for a boiler and piping is EUR 3,800 for a single-family house. Additionally, a solar collector system can be installed for an average cost of EUR 2,000. The recommendation for multi-family buildings is a central heating system including centralized DHW running on wood pellet, equipped with a heat accumulator, hydraulic system balance, thermostatic valves at a system efficiency of η=90%. The average total cost of a boiler and piping for a multi-residential building varies between EUR 12,000- 30,000. When connected to the DH system, the recommendation is to install a heat substation equipped with temperature regulated based on the outside temperature, including variable flow pump, remote substation control, and the measuring of supplied heat, including hydraulic system balancing and thermostatic valves, achieving the system efficiency of η=95%. The average cost of improving a DH installation for a multi-residential building varies between EUR 3,450-5,700. Additionally, a solar collector system can be installed at an average cost of EUR 4,200. **HIS 3: Fuel switching**

[221] The State Statistical Office, "Energy consumption in households - Macedonia." 2014.

		Switching from fossil fuels to renewable sources. Switching to biomass requires taking biomass sustainability in account and, if using fuelwood as a biomass source, also fuelwood quality and furnace efficiency. This measure is particularly important for the very small percentage of households relying on coal and oil as their main source of heating, and where cost of a biomass boiler is EUR 3,000 EUR including additional piping at an expected minimum cost of EUR 1,500. Highly efficient single-family houses in the nZEB standard and all refurbishments in urban areas should use centralized heating equipped with air-water heat pumps at SCOP>3 or 4 for heating and cooling at a total cost of EUR 4,500. The costs of an air/water heat pump for a multifamily house starts at 100 EUR/m^2.
	Level of governance	National level delivered locally

Table 9-50. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		**Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)**
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two. Persons conducting household visits can provide both support in sharing information and guidance to households in the implementation of national and local support programs, and also the implementation of measures listed here: **EEEA1: Implementing simple and low-cost energy efficiency measures** - Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. - This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Simple energy audits along with education** - Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data

		is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. - This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level delivered locally

Table 9-51: Detailed description of the measure Support for Renewable Energy Sources

Name of Measure		Support for Renewable Energy Sources
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 More incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life; **RES 2 More incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a

		standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions;
	Level of governance	National level

9.7.3 Ranking of criteria and measures

As discussed in the chapter "Multicriteria approach to solving energy poverty", multicriteria decision making is a process based on ranking different alternatives (options) and multiple criteria. It requires:

- evaluating the importance/ranking of criteria
- ranking each alternative based on each criterion
- prioritization of alternatives

To gain insight the views of decision-makers on the importance of criteria for mitigating energy poverty and ranking the proposed measures, an exercise incorporating an analytic hierarchy process was undertaken. The analysis was done using the web-based BPMSG software [66].

Hard copy questionnaires were sent to North Macedonian project representatives, who returned the completed survey on September 24, 2021. The Consultant provided the North Macedonian representatives with instructions on completing the survey. A total of 4 received surveys were defined as valid for the purpose of the criteria selection, but only two were deemed valid for the purpose of selecting measures.

As required by the survey, the respondents ranked the economic criterion as most important in valuing proposed measures which was followed by health and financial criteria. The respondents ranked operational criteria as least significant, implying that difficulty in implementing the measures should not be viewed as an obstacle to implementing a particular measure. The ranking of criteria is provided in Figure 9-9.

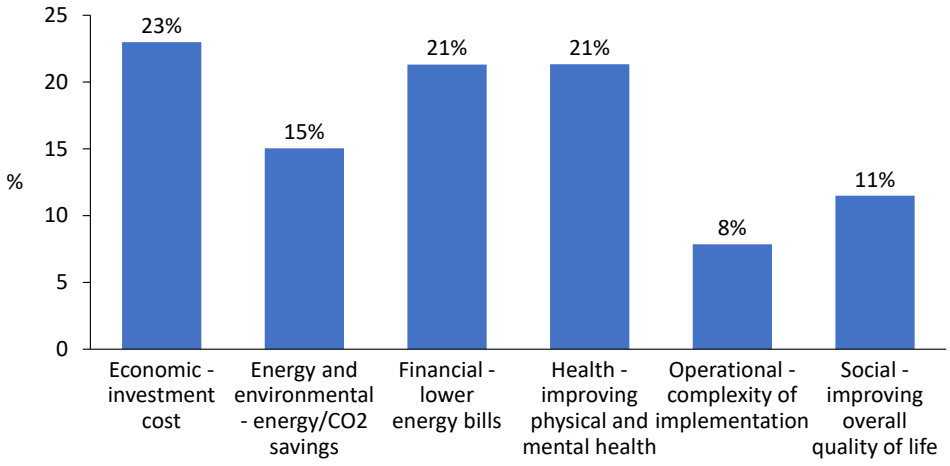


Figure 9-9. Ranking of criteria by North Macedonian stakeholders

A sensitivity analysis was conducted to highlight the most critical criteria affecting changes in the ranking of alternatives, i.e., measures. The sensitivity analysis indicated an uncertainty (overlapping with uncertainty) in the ranking of the following criteria:

- Economic – investment cost, Health – improving physical and mental health, Financial – lower energy bills
- Energy and environmental – energy/CO2 savings, Social – improving overall quality of life

Overlapping within uncertainties means that a slight change in the rating of any criteria may possibly change the ranking of criteria ranked within uncertainties. On the other hand, Operational – complexity of implementation criterion is ranked without overlap, meaning small changes to participants' ranks are unlikely to affect their position.

Group consensus was moderate (69.7%). The AHP group consensus indicator has an estimated agreement on outcoming priorities between participants. This indicator ranges from 0% to 100%, i.e., 0% corresponds to no consensus at all, and 100% to full consensus.[222] It measures the homogeneity of priorities between participants, where values below 50% indicate practically no consensus within the group and a high diversity of judgments. Values in the 80% – 90% range indicate a high overlapping of priorities and excellent agreement for judgments among group members.

Having ranked the criteria, measures were ranked for each criterion. As discussed, there are five measures considered for North Macedonia (Program for Mitigating Energy Poverty was not considered a measure):

- Energy Retrofitting of Buildings
- Replacement of Household Appliances
- Heating System Improvements
- Low-cost EE and Energy Advice
- Support for RES

The results show that the **highest priority was given to heating system improvements** measure, while the lowest priority was given to Support for RES, Low-Cost EE and Energy Advice, as well as Replacement of Household Appliances. Unfortunately, there is no clear ranking and all alternatives overlap with uncertainty (due to a very small sample size, n=2):

- Heating System Improvements, Energy Retrofitting of Buildings
- Energy Retrofitting of Buildings, Replacement of Household Appliances, Low-Cost EE and Energy Advice, Support for RES

Just as was discussed above regarding criteria ranking, sensitivity analysis was conducted, and where exists a clear ranking, even if workshop participants changed their opinion and gave slightly different ranks to certain alternatives under each criterion, the ranking of measures did not change. On the other hand, alternatives overlap within uncertainty are those which are likely to change ranking against each other if participants slightly modified their inputs when comparing different alternatives. The following table provides the summary of ranked measures.

Table 9-52. Ranking of measures for North Macedonia

Criterion / measure	Weight	Energy Retrofitting of Buildings	Replacement of Household Appliances	Heating System Improvements	Low-Cost EE and Energy Advice	RES Support
Economic - investment cost	23%	32%	14%	25%	21%	8%
Energy and environmental - energy/CO2 savings	15%	13%	19%	34%	10%	25%

[222] https://bpmsg.com/ahp-group-consensus-indicator-how-to-understand/

Financial - lower energy bills	21%	22%	20%	28%	22%	8%
Health - improving physical and mental health	21%	25%	15%	20%	9%	31%
Operational - complexity of implementation	8%	12%	31%	13%	30%	13%
Social - improving overall quality of life	11%	16%	20%	30%	17%	18%
Group Result		22%	18%	26%	17%	17%

The group consensus was high and is equivalent to 80.9%. Group consensus was very high for all the measures, except for the Health – improving physical and mental health criterion where group consensus was 62.7% (low). As discussed above, the AHP group consensus indicator is used to quantify group consensus, i.e., to estimate agreement on the outcoming priorities between participants.

Importantly, the results in this report illustrate the likely priority measure and ranking of the other possible measures for alleviating energy poverty in North Macedonia. The recommendation is that the ranking process be done while drafting legislation with all stakeholders who take part in the drafting process. Prior to that, the costs of each measure, estimated energy, and emissions savings are to be calculated, and the implementation process needs to be defined and barriers identified.

9.8 Serbia

9.8.1 Overview

Currently, there are two national-level measures for protecting vulnerable customers, and no current measures have been implemented specifically at alleviating energy poverty. The national-level measures are aimed at reducing monthly electricity and gas expenditures (in line with the Ordinance on Energy Vulnerable Consumers). Both measures offer short-term support for the most vulnerable households. They are available to households that fulfil the total household income criteria. The measures offer varying amounts of monthly bill deductions, depending on the number of household members, and/or living surface area, as discussed in chapter 3.8.5. In 2019, approx. 75,000 citizens acquired the status of energy vulnerable consumer according to statements from the Serbian Electric Power Utility company (EPS).

Additionally, some measures in Serbia are available at the local level and are also aimed at supporting vulnerable energy consumers. Such measures are available in Belgrade and Novi Sad, and they are, just as the national-level measures, also aimed at providing financial support. The following table summarizes existing measures, number of households (HH) covered by existing measures and the allocated financial resources. Data on local measures (Novi Sad and Beograd) were unavailable to the Consultant.

Table 9-53. Current measures in place to aid vulnerable consumers in Serbia

Name of Measure	Number of HH covered	Approximate annual financial expenditures		
		RSD	EUR	Year
Reduction of monthly electricity bill obligations (Ordinance on Energy Vulnerable Consumers)	74,615	1,251,483,868	9,761,574	2019
Reduction of monthly gas bill obligations (Ordinance on Energy Vulnerable Consumers)	50	63,667	514	2019
Reduction of the obligation to pay for utility fees in Novi Sad (Decision on Determining the Criteria for Reducing the Obligation to Pay for Utility Fees for Families with Three or More Children in 2020)	NA	NA	NA	NA
Subsidies for utility products and services in Belgrade (Intervention Measures for Protecting the Most Vulnerable Consumers and the Decision on Determining the Category of Users Eligible for Utility Bill Subsidies)	NA	NA	NA	NA
Total	**74,665**	**1,251,547,535**	**9,762,088**	

The 3rd Serbian NEEAP mentions vulnerable energy consumers within measure D3, Promotion of Energy-Efficient Lighting and Electric Appliances, stating that the promotion of energy-efficient lighting can be achieved by providing free-of-charge LED light bulbs to socially vulnerable electricity consumers. The suggestion is that this should be organized by the EPS (Serbian public electric utility) which has already organized such campaigns for distributing compact fluorescent lightbulbs (CFL) in the 2010-2012 period. The 4th NEEAP (covering the period until 2021) has been drafted and adopted with delay.

Serbia is also currently in the process of drafting the National Energy and Climate Plan (NECP). The NECP will be the first document focusing on alleviating and monitoring energy poverty. It should also include measures for monitoring and alleviating energy poverty.

In terms of average energy consumption, there are two dominant energy sources used in the final energy consumption of households: electricity accounting for 41% and biomass accounting for 30%. District heating represents an additional 14% while coal (a third of which is lignite and the remaining two-thirds is brown coal briquettes) as well as natural gas each account for 7%. The share of oil derivates is around 1%. The biomass use is typically equivalent to fuelwood use, and its use is widespread in rural Serbia. The biomass used is often of questionable quality and likely contributes to indoor pollution and unsustainable use patterns.

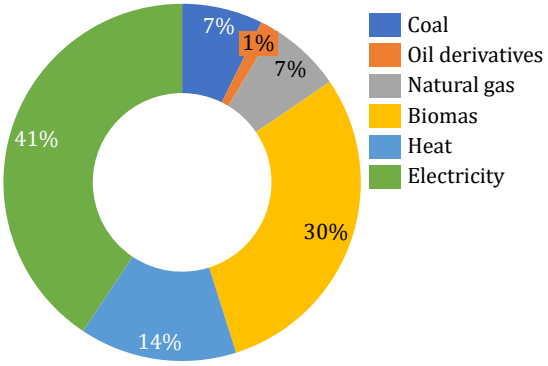


Figure 9-10. Structure of household energy consumption in Serbia

Source: EUROSTAT Energy Balances (2018 data)

The average heat energy demand in households is 283 kWh/m^2 for family houses and 207kWh/m^2 for multi-apartment buildings. Both in family houses and multi-apartment buildings, the high energy consumption per square meter indicates low energy efficiency of dwellings. In terms of heating requirements, the average value of HDD for Serbia is 2,658.

9.8.2 Policy recommendations

Based on its definition of energy vulnerable consumers and set legislation, Serbia has already taken the first important step in protecting vulnerable consumers. The Serbian Energy Act (OG 145/14, 95/2018, 40/21) defines energy vulnerable consumers in Article 10. Serbian legislation, upon implementing the Energy Act (OG 145/14, 95/2018, 40/21) and the Ordinance on Energy Vulnerable Consumers (OG 113/2015, 48/2016 88/2016, 49/2017, 104/2017, 36/2018, 59/2018, 88/2018, 34/2019, 82/2019, 76/2020, 144/2020), has been aligned with the requirements of the 3rd EU energy package in protecting energy vulnerable consumers. However, no long-term measures have been devised for alleviating energy poverty and further improvements can be made in protection measures and direct support. The recently adopted Energy Efficiency and Rational Use of Energy Act (OG 40/2021), introduces a definition of energy poverty and establishes (within the Ministry in charge of energy matters) a new Directorate for financing and promoting energy efficiency. The Directorate has (beside others) the task of preparing specific programs for implementing energy efficiency measures for energy vulnerable customers and other customers with a view to reducing energy poverty (Art 73). The Act also lists energy poverty mitigation as a key area and defines it as a combination of a household's low income, large expenditure of available income on energy and low energy efficiency.

Given the fact that only short-term measures to aid socially vulnerable consumers are currently in place, and due to the low energy efficiency of dwellings with a significant number of HDD indicates the need for energy efficiency improvements in the homes of energy-poor and energy vulnerable. Therefore, most of the measures we propose relate to long-term measures aimed at improving the energy efficiency of dwellings and reducing the household energy needs.

9.8.2.1 Short term measures

9.8.2.1.1 Protection measures

The Ordinance on Energy Vulnerable Consumers (OG 113/2015, 48/2016 88/2016, 49/2017, 104/2017, 36/2018, 59/2018, 88/2018, 34/2019, 82/2019, 76/2020, 144/2020) defines protection against utility disconnections for vulnerable consumers whose household members have health support devices reliant on electricity. The Ordinance does not, however, protect those in need of heat energy or gas. According to the last amendment of the Energy Act (2021), Serbia is in the process of drafting a new regulation on district heating, which should also protect against utility disconnections in the winter months. Therefore, we propose that protection against utility disconnections for all network-supplied energies (gas, electricity, and district heat) be given to all vulnerable consumers, especially during the winter months.

9.8.2.1.2 Direct financial support

There are national and local level measures in place aimed at directly subsidizing energy costs for vulnerable consumers. We do not propose expanding these measures but instead that financial measures be limited to the most socially vulnerable consumers. Furthermore, direct financial support should be provided to households, which, having received benefits from long-term measures, still require support as they are unable to cover their energy-related expenses.

9.8.2.2 Long term measures

Our proposal for Serbia is targeted at improving the energy efficiency of dwellings belonging to vulnerable and energy-poor households. All measures have long-term effects in contributing to eliminating the root causes of energy poverty. Furthermore, we propose measures targeting vulnerable and energy-poor consumers with a high impact in reducing energy poverty based on invested funds. Therefore, revitalization and improvement of district heating systems, which also potentially aids vulnerable consumers and energy-poor consumers are not included. Accordingly, we propose the following long-term measures to be implemented and where applicable, we indicate whether similar measures exist in the CP complementary to the proposed measure and the possibility of expanding them to accommodate measures for energy poor households:

1. **Program for Mitigating Energy Poverty**. We have noted that there is no systematic approach to addressing the issue of energy poverty in Serbia. Therefore, we propose drafting and adopting a formal document to devise a detailed plan implementing measures to address energy poverty. The program should extend beyond income support and include energy efficiency improvements and targeted measures for vulnerable households
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is low energy efficient homes. We propose measures to improve the energy efficiency of homes, thus reducing energy demand and energy expenditures. This measure is complimentary to measure D1. Energy Efficiency Measures in Residential Buildings from the 4th NEEAP, where measure D1 refers to reconstruction and rehabilitation of residential buildings and thermotechnical systems in buildings, implemented through financial incentives from IFIs, placed through domestic banks, and also addresses alternative measures under Article 7 of the EED. To make it more applicable to the energy poor, additional financing and support schemes need to be implemented.
3. **Replacement of Household Appliances via the Old for New Scheme**. Due to low disposable income, energy-poor households own low efficient appliances leading to increased energy demand and hence energy poverty. We propose measures to help energy-poor households replace aging home appliances. This measure is complimentary to measure D3, Promoting the Use of Energy Efficient Appliances in Households, from the 4th NEEAP.
4. **Heating System Improvements** (HSI) in households, including: (i) HSI 1: Improving the energy efficiency of systems; (ii) HSI 2: Modernization and expansion of heating systems;

(iii) HSI 3: Fuel switching. This measure is complimentary to measure D1, Energy Efficiency Measures in Residential Buildings from the 4th NEEAP. To make it more applicable to the energy poor, additional financing and support schemes need to be implemented.

5. **Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Simple energy audits along with an educational campaign. This measure is complimentary to H4 – Energy Efficiency Awareness and the education measure from the 4th NEEAP.

Though some proposed measures are in line with the existing framework, particularly the 4th NEEAP, making them accessible to the energy poor requires taking vulnerability criteria into consideration and setting higher co-financing rates. Furthermore, when devising schemes to implement measures for alleviating energy poverty, support systems need to be devised and put in place. This should be elaborated in the Program for Mitigating Energy Poverty. The aim of these support systems is to help identify those in need and provide support to them in applying and accessing available measures.

A detailed description of measures is given in the tables below.

Table 9-54. A detailed description of the measure Program for Mitigating Energy Poverty

Measure name		**Program for Mitigating Energy Poverty**
Measure index		
	Time frame	2022 – 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If should define steps for integrating new indicators in the existing statistical system at the national level (conducted by the RZS). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance[223]	National level
Implementation	List of implementation	The first step is the development of the program. The program should be developed using participatory development principles

[223] There are two levels of governance for implementation of measures: national and national locally delivered. The national scheme is a scheme with funds secured at the national level and implemented by a national institution (e.g., Energy Efficiency Funds). National schemes delivered locally are schemes that are funded nationally (e.g., through the budget) but are implemented by local authorities.

	activities and description	including gender sensitivity and interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-55. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030
	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, and floor. High heat energy consumption per household in Serbia, coupled with more than 2390 heating degree days (HDD) indicates the need for energy efficiency retrofits of buildings for the energy-poor and likely large energy savings. The most important impact of this measure is elimination of the causes of energy poverty and consequently its alleviation. This leads to reducing energy costs by improving the energy efficiency of dwellings while also eliminating adverse impacts on health typically due to low energy efficiency (cold, dampness, mold, and draft). It improves overall quality of life. The measure also contributes to boosting investments, energy savings, CO_2 reductions, local employment, supply security, increasing the value of properties. Devising the national scheme for implementing this measure requires bearing in mind the widespread use of fuelwood. This factor can hinder applicability of the scheme for the most vulnerable (those most likely using fuelwood in rural areas) if a prerequisite to show CO_2 savings exists. Biomass is (usually) considered carbon neutral so any such scheme does not apply to all those using fuelwood. Taking into consideration other benefits of energy retrofits is important as well as devising a scheme in such a way that carbon reduction is not used as an eliminating factor. Improvement measures can also be implemented as an integral refurbishment, including both the building envelope and improvement to systems. The standard scenario involving heat energy demand in compliance with the national building standard includes thermal insulation of the external envelope with 10 cm of insulation material and double-glazed insulating windows for all building typologies. The investment cost for thermal insulation of the external envelope varies between 59-99 EUR/m^2, depending on the age of the building. The recommendation for family houses and multi-apartment buildings is a central heating system equipped with a low-temperature (LT)/condensing gas boiler or biomass boiler/wood gasification boiler running on pellets or logs, a buffer tank, as well as a centralized domestic hot water (DHW) cylinder in combination with a heat generator. The cost of a heating system for single-family

		houses ranges from EUR 900 (LT gas boiler), EUR 1,500 (condensing gas boiler), and EUR 3,000 (biomass boiler). The additional cost of piping varies between EUR 1,500-4,000. The cost of a centralized heating system in a multi-family house varies between EUR 1,200-2,500 (LT gas boiler) and EUR 1,500 for a condensing gas boiler for each building. The additional cost of piping varies between EUR 9,500-30,500 depending on the size of the building. The recommendation for all district heating (DH) supplied to multifamily buildings is substation improvement using flow system control based on outside temperatures, equipped with thermostatic valves in apartments, and consumption-based billing. The cost varies between EUR 3,500-7,200 for each building for TRV and up to EUR 13,000 when including a heat exchanger and buffer for DHW. The advanced scenario includes thermal insulation of the building envelope with 20 cm of thermal insulation material and triple glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope varies between 87-172 EUR/m^2, depending on the age of the building.
	Level of governance l	National level

Table 9-56. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Name of Measure		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2023-2030
	Aim / Short description	Inefficient and old household appliances lead to inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide intended quality of service (i.e., too cold or too warm refrigerators). Replacing household appliances (e.g., refrigerators, washing machines) decreases energy consumption and provides the same or often better quality of service. It also decreases energy bills and CO_2 emissions and improves quality of life. The "old for new" scheme is of key importance as it envisages beneficiaries giving up on old appliance before obtaining a similar new appliance. This approach ensures that households do not retain both old and new appliances which would lead to higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of an old refrigerator (energy class D or lower) with a new class A refrigerator. This scheme should also provide new refrigerators for households which currently do not yet own one (subject to providing proof from the local social welfare office or similar body to verify not possessing the respective appliance in the household): - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bills. **Freezers**: Replacement of an old freezer (energy class D or lower) with a new A freezer - The measure leads to energy savings and reduces energy bills.

		Washing machines: Replacement of an old washing machine (energy class D or lower) with a new class A washing machine. This scheme assists households currently not owning a washing machine to get a new one (subject to providing proof from the local social welfare office or similar body to verify not possessing the respective appliance in the household): - The measure improves quality of life, particularly for households with a faulty washing machine or none at all. It leads to energy savings and reduces energy bills.
	Level of governance	National level delivered locally

Table 9-57. Detailed description of the measure Heating System Improvements (HSI) in Households

Name of Measure		Heating System Improvements (HSI) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to keep houses adequately warm is a key challenge of living in energy poverty. In Serbia, the inability to keep warm is particularly the issue for the lowest income group, indicating a high potential in improving the quality and energy efficiency of existing heating systems and installation of heating systems where they currently do not exist. HIS improvements for the energy-poor consist of three main variations, which can be implemented as a single measure or in any combination: HIS 1: Improving the energy efficiency of the system Replacing existing systems with the same type but more efficient system, i.e., replacing traditional fuelwood stoves with more efficient furnaces. This type of measure is particularly applicable in rural areas where a high prevalence of traditional biomass (fuelwood) exists and alternative fuel sources might be too costly or unavailable for vulnerable groups. Nevertheless, the main idea behind of this measure is to install biomass-based centralized heating systems in households. Wood biomass furnaces rated at a min of 6 kW are recommended at an estimated cost of EUR 500. HIS 2: Modernization and expansion of heating systems. This measure is applicable for any type of dwelling. Eligibility criteria are devised such that the cost-effectiveness and overall improvements to quality of life are considered. It involves replacing the entire heating system with a more adequate one, in areas where gas is available. This measure does not necessarily lead to energy savings, but rather improves efficiency, i.e., replacement of individual heating sources with a centralized household heating system equipped with gas boilers (low temperature η=90% or condensing η=103%). Typical systems and installation costs including piping for family houses are as follows: low-temperature gas boiler rated at of 6 kW costing EUR 2,375 EUR, rated at 8 kW costing EUR 2,750 EUR, and rated at 10 kW costing EUR 3,790 whereas condensing gas boiler rated at 4 kW costing EUR 4,975, rated at 6 kW costing EUR 5,350, and rated at 8 kW costing EUR 6,390 EUR. Typical systems costs for multi-family houses are as follows: 26 kW low-temperature gas boiler costing EUR 1,200, rated at 60 kW costing EUR 2,500 and condensing gas boiler rated at 22 kW costing

		EUR 1,500 and the same boiler rated at 46 kW costing EUR 3,500 EUR, while piping and other system improvements vary in cost between EUR 5,000-30,000. HIS 3: Fuel switching Switching fuel from fossil to renewable sources. Switching to biomass requires taking into consideration biomass sustainability, and if using fuelwood as a biomass source, the fuelwood quality and furnace efficiency should also be considered. This measure is particularly important for a very small percentage of households relying on coal and oil as their main source of heating, where a biomass boiler costs EUR 3,000 and additional piping at a minimum cost of EUR 1,500. Switching fuel from fossil to renewable source is recommended for highly efficient single-family houses and multifamily houses in urban areas. The use of centralized heating equipped with air-water heat pumps for SCOP>3 or 4 are feasible and cost EUR 4,500.
	Level of governance	National level delivered locally

Table 9-58. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two: **EEEA1: Installing simple and low-cost energy efficiency measures** Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Undertaking simple energy audits with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household

		members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable.
	Level of governance	National level and delivered locally

Table 9-59. Detailed description of the measure Support for Renewable Energy Sources

Name of Measure		Support for Renewable Energy Sources
Measure index		RES
	Time frame	2023-2030
	Aim / Short description	Energy poor households seldomly have access to RES other than traditional biomass, which is often unsustainable. The use of fuelwood in energy-poor homes is commonly accompanied by indoor air pollution, low efficiency, and heating limited to individual heating sources. Measures incentivizing the use of RES for the energy poor and energy vulnerable offer numerous benefits. These measures improve quality of life, ensure a steady source of revenue, empower households and help achieve national climate and energy targets while reducing social and energy vulnerability. Those measures include providing support for installing photovoltaic panels and solar-thermal panels, where such measures can be implemented as stand-alone measures or in combination with heating system and energy efficiency improvements. **RES 1 Incentives for installing photovoltaic panels** Offering co-financing for installing photovoltaic panels helps households reduce energy bills and generate profit for on-grid systems. Households become active players in the energy market and are empowered to participate in the energy market. This measure can be implemented both on-grid and off-grid, providing a good solution for people without access to the electricity grid. Possible self-financing some of the investment is achievable via the ESCO model, or in a similar manner, thus ensuring that even the most vulnerable households can receive grants. This measure contributes to electricity availability for off-grid systems in remote areas. It provides an additional source of revenue for on-grid systems, contributes to CO_2 reductions and improves quality of life. **RES 2 Incentives for installing solar-thermal collectors** Offers co-financing for installing solar-thermal panels, thus reducing energy bills for domestic hot water systems. As a standalone measure, it can be combined with improvements to heating systems. This measure results in reduction of energy use and CO_2 emissions.
	Level of governance	National level

9.8.3 Ranking of criteria and measures

As discussed in the chapter "Multicriteria approach to solving energy poverty", multicriteria decision making is a process based on the ranking of different alternatives (options) and multiple criteria. It requires:

- evaluating the importance/ranking of criteria
- ranking each alternative based on each criterion
- prioritization of alternatives

To gain insight the views of decision-makers on the importance of criteria for mitigating energy poverty and ranking the proposed measures, an exercise incorporating an analytic hierarchy process was undertaken. The analysis was done using the web-based BPMSG software [66].

The online workshop was held on 4th June 2021, with four stakeholders from Serbia taking part. The participants were introduced to the analytic hierarchy process and to the six criteria which they subsequently ranked. Based on the result of criteria ranking by stakeholders, the impact that measures have on the Economic – Investment Cost was selected as the most important criteria - shown below in the following figure.

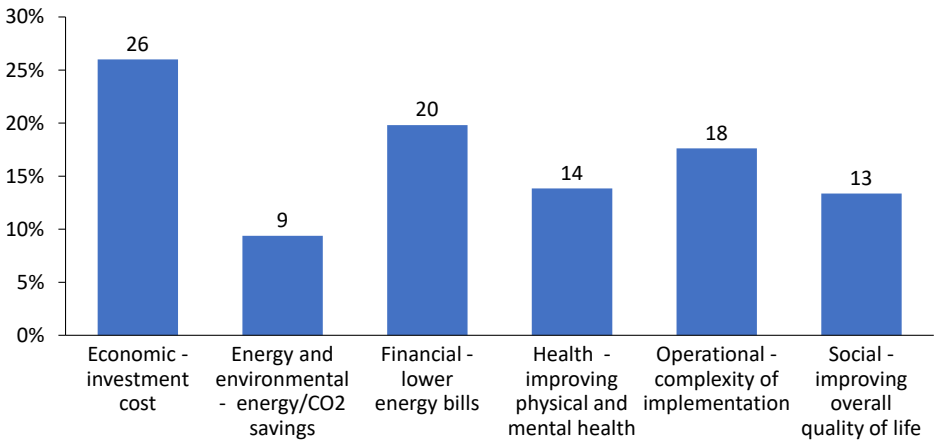


Figure 9-11 Ranking of criteria by Serbian stakeholders

Sensitivity analysis was conducted to provide insight on the key criteria affecting changes in the ranking of alternatives (measures). The sensitivity analysis showed an uncertainty (overlapping with uncertainty) in the ranking of the following criteria:

- Financial – lower energy bills, Operational – complexity of implementation
- Operational – complexity of implementation, Health – improving physical and mental health, Social – improving the overall quality of life

Overlapping within uncertainty means that a slight change in the rating of any criteria may change the ranking of criteria ranked within uncertainties. On the other hand, Economic – investment cost and Energy and environmental – energy/CO2 savings are ranked without overlapping, meaning small changes to the ranks of participants are unlikely to have an impact their position.

There was high group consensus (80.3%). This indicator ranges from 0% to 100%, i.e., 0% corresponds to no consensus at all, and 100% to full consensus.[224] It measures the homogeneity of priorities between participants, where values below 50% indicate practically no consensus

[224] https://bpmsg.com/ahp-group-consensus-indicator-how-to-understand/

within the group and a high diversity of judgments. Values in the 80% – 90% range indicate a high overlapping of priorities and excellent agreement for judgments among group members.

Having ranked the criteria, measures were ranked for each criterion. There are five measures under consideration for Serbia:

- Energy Retrofitting of Buildings
- Replacement of Household Appliances
- Heating System Improvements
- Low-cost EE and Energy Advice
- Support for RES

The results show that the **highest priority was given to Energy Retrofitting of Buildings**, while the lowest priority was given to Support for RES, which has no overlapping. On the other hand, the following groups of alternatives are overlapping within uncertainties:

1: Energy Retrofitting of Buildings, Replacement of Household Appliances

2: Replacement of Household Appliances, Heating System Improvements, Low-cost EE and Energy Advice

Alternatives that overlap within uncertainty are those which are likely to change ranking with respect to each other if participants slightly modify their inputs for comparing either criteria or alternatives. The following table provides a summary of ranking measures for Serbia.

Table 9-60. Ranking of measures for Serbia

Criterion / Measure	Weight	Energy Retrofitting of Buildings	Replacement of Household Appliances	Heating System Improvements	Low-Cost EE and Energy Advice	Support for RES
Economic - investment cost	26,00%	7,64%	24,33%	18,77%	42,01%	7,25%
Energy and environmental - energy/CO2 savings	9,37%	39,54%	16,03%	24,76%	14,07%	5,60%
Financial - lower energy bills	19,81%	48,24%	20,81%	19,28%	5,58%	6,09%
Health - improving physical and mental health	13,83%	35,78%	17,06%	29,50%	10,02%	7,63%
Operational - complexity of implementation	17,62%	13,95%	32,41%	17,62%	27,27%	8,76%
Social - improving overall quality of life	13,37%	26,32%	25,66%	30,45%	11,65%	5,92%
Group Result		26,17%	23,45%	22,28%	21,10%	7,01%

Group consensus was highest in the ranking of measures according to Financial criteria (93.5%, very high), and lowest in ranking according to Operational criteria (57.3%, low). This may indicate some unclarity in defining operational criteria, which may in turn have led to a different understanding and interpretation by each stakeholder. As discussed above, the AHP group consensus indicator is used to quantify group consensus, i.e., estimate agreement on outcoming priorities between participants.

Importantly, the results given in this report illustrate the likelihood of a priority measure and the ranking of other possible measures for alleviating energy poverty in Serbia. The recommendation is to perform the ranking process while drafting legislation with all stakeholders who take part in the drafting process. Prior to that, the costs of each measure, estimated energy, and emissions savings are calculated, the implementation process needs to be defined and barriers identified.

9.9 Ukraine

9.9.1 Overview

There are two main forms of direct financial support for vulnerable consumers in Ukraine – subsidies and abatements. The subsidy is non-refundable monetary assistance aimed at supporting low-income families, and compensates part of the cost of housing and utility services. Abatements are awarded to citizens on an individual basis by law as a discount on payments for the actual consumption of utility services. As of January 2021, more than 3.1 million households in Ukraine receive housing subsidies, and additional 1.8 million families receive abatements ranging from 25% to 100%, depending on the category of beneficiary. Non-financial support mechanisms include forbidding disconnecting users from heating systems during the heating season. The following table provides a summary of current measures in place to protect vulnerable consumers.

Table 9-61. Current measures in place to aid vulnerable consumers in Ukraine

Name of Measure	Number of HH covered	Approximate annual financial expenditures		
		Local currency	€	Year
Housing subsidies	2.4 mil.	UAH 39.3 bln		2020
Program ENERGODIM	68,500	UAH 1.6 bln		2018-2021
Program WARM LOAN	853,000[225]	UAH 400 mln		2020
Total				

There is no universal legal definition of the concept of vulnerable consumers or energy poverty, but certain aspects related to eliminating energy poverty have been addressed. The Natural Gas Market Act[226] introduced the definition of a vulnerable consumer as household consumer entitled to state support through the procedure established by the Cabinet of Ministers of Ukraine. The protection of vulnerable consumers is defined by law as one of the main tasks of regulator of the natural gas market. Vulnerable consumers are also entitled to receive subsidies as compensation for expenses for natural gas and other types of targeted support as specified in the Order that is to be drafted by the Cabinet of Ministers of Ukraine.

The Electricity Market Act[227] defines vulnerable consumers as household consumers who are entitled to reimbursement of the cost of electricity consumption and/or protection against power outages in certain periods. Vulnerable consumers are also protected in terms of lower electricity prices under the law-based PSO regime defined in detail by the Resolution of Cabinet of Ministers of Ukraine No. 483 of 5 June 2019 (the PSO Regulations).

The poor energy performance of the building stock is one of the main causes of energy poverty in Ukraine. The Energy Efficiency of Buildings Act[228] introduces mechanisms for stimulating recipients of social assistance, subsidies for housing, and communal services to implement measures to ensure (improved) energy efficiency of buildings. A state warm loans program was launched providing partial compensation for energy efficiency measures undertaken in individual houses or multi-apartment buildings where a homeowners' association or a housing construction cooperative was established.

[225] https://saee.gov.ua/sites/default/files/blocks/Otsinka_TK_14.06.2021.pdf

[226] Natural Gas Market Act of 9 April 2015, No. 329-VIII (as amended on 20-09-2019)

[227] Electricity Market Act of 13 April 2017, No. 2019-VIII (as amended on 01-09-2020)

[228] Energy Efficiency of Buildings Act (2017, No. 2118-VIII (as amended 2019, No. 199-IX)

Several strategic documents deal with poverty reduction and recognition of the concept of vulnerable consumers, but there is no dedicated state policy document directly focused on reducing energy poverty. However, this problem should be further elaborated within the scope of the National Energy and Climate Plan (NECP) and long-term renovation strategies (LTRS), both of which are in the final stages of the drafting process. The NECP will deliver a plan to implement of specific measures for alleviating energy poverty and set measures and plans for monitoring the energy poverty situation in the country. Information on the outcome of measures to alleviate energy poverty should be included in NECP progress reports. The LTRS encompasses an overview of policies and actions to target the worst performing segments of the national building stock, split incentive dilemmas and market failures, and outline relevant national actions that contribute to alleviating energy poverty.

In terms of climate conditions and based on data on average daily temperatures for Lozuvatka and Kyiv from the years 2000 to 2020, the conclusion is that Ukraine is the coldest country of all CPs. The number of HDD in Ukraine is above 3000 with Kyiv reaching almost 3500 HDD. Therefore, the need for heating energy is greatest in Ukraine compared to other CPs.

In terms of energy consumption, gas commands a dominant share in final energy consumption in households in Ukraine accounting for 53%. The share of electricity, district heating, and biomass is 19%, 14%, and 11%, respectively. The share of other fuels is insignificant.

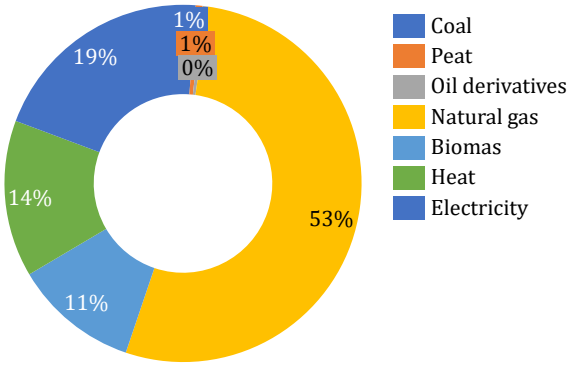


Figure 9-12. Structure of household energy consumption in Ukraine

Source: EUROSTAT Energy Balances (2018 data)

Ukraine has quite a developed district heating infrastructure in all major urban settlements. In 2018, district heating reached 40% of the population, which is approx. 5.5 million households and is estimated to cover about half of the energy demand for heating. Gas is also widespread with approx. 12.5 million gas household consumers at the end of 2019.

The building stock was mostly built between 1945 and 1970 (49%) and overall, 90% of the building stock was built before 2002 when energy-saving regulations were established.

Average heat energy consumption ranges from 170 to 250 kWh/m^2 and is due to poor or lack of thermal insulation of the building envelope. The energy efficiency requirement for heating is set below 140.48 kWh/m^2 for family houses and below 91.14 kWh/m^2 for multi-apartment buildings. The energy-saving potential is between 45% and 60%. Energy efficiency measures include thermal insulation of the building envelope as well as modernization of heating systems and DH substations and the introduction of billing metered energy consumption, both for gas and DH.

9.9.2 Policy recommendations

Short-term measures for vulnerable consumers in the energy sector include non-refundable financial support covering utility costs in the form of subsidies and abatements as well as protection against disconnecting DH customers during certain periods. In addition, customers in the electricity market are protected by the PSO regime.

Financial support to vulnerable consumers is also available through the state's "warm loans" and "Energodim" programs aimed at improving the energy efficiency of households.

Given the dependence on energy imports, further liberalization of the energy market, a complex social support system, and due to the low energy efficiency of dwellings with a significant number of HDD, the need for energy efficiency improvements in the homes of the energy-poor and the energy vulnerable is a high priority. Therefore, most of the measures proposed hereafter relate to the long-term measures aimed at improving the energy efficiency of dwellings and reducing the energy needs of households.

9.9.2.1 Short term measures

9.9.2.1.1 Protection measures

According to the SDA goals, all people should have access to needed supplies of energy. In line with this goal, forbidding disconnections from electricity, gas and DH systems during the heating season should be ensured for all vulnerable consumers.

9.9.2.1.2 Direct financial support

Direct financial support should be limited to the most socially vulnerable consumers and be implemented alongside infrastructural measures aimed at alleviating the main causes of energy poverty. Direct financial support should also be provided for those households, which being the subject of long-term measures, still require support due to their inability to cover energy-related expenses. This should be harmonized between state and local administrations.

9.9.2.2 Long term measures

The main approach to mitigating energy poverty in Ukraine is to improve the energy efficiency of dwellings belonging to vulnerable and energy-poor households. The primary measures should have a long-term effect in eliminating the root causes of energy poverty. The proposed measures are focused primarily on achieving maximum benefits for households while easing the burden on the national budget in the long run.

Measures such as the revitalization and improvement of district heating systems are not included in the analysis as they benefit general public as well and are extremely financially demanding. However, those measures are also likely to be beneficial to the vulnerable and energy-poor, if they are connected to the district heating system, and they should be further addressed in the NECP and other strategic documents that aim to improve energy efficiency in Ukraine.

Consequently, we propose the following measures:

1. **Program for Mitigating Energy Poverty**. To ensure a harmonized and coordinated approach, we propose drafting and adopting the formal document that defines a detailed plan for implementing the measure to address energy poverty in urban and rural areas. The program should extend beyond income support and encompass energy efficiency improvements and targeted measures for vulnerable households.
2. **Energy Retrofitting of Buildings**. The major cause of energy poverty is the low energy efficiency of homes and thus not been able to heat the entire living surface. We propose measures aimed at improving the energy efficiency of homes, hence reducing energy demand.
3. **Replacement of Household Appliances via the Old for New Scheme**. Due to low disposable income, energy-poor households own low efficient appliances leading to increased energy demand and, consequently, energy poverty. We propose measures to help energy-poor households replace aging home appliances.

4. **Heating System Improvements** (HSI) in households, including: (i) HSI 1: Improving the energy efficiency of the system; (ii) HSI 2: Modernization and expansion of the heating system; (iii) HSI 3: Fuel switching
5. **Implementation of Low-cost Energy Efficiency and Energy Advice (EEEA)**, including: (i) EEEA1: Installing simple and low-cost energy efficiency measures; (ii) EEEA2: Undertaking simple energy audits with education

A detailed description of measures is given in the tables that follow.

Table 9-62. Detailed description of the measure Program for Mitigating Energy Poverty

Measure name		Program for Mitigating Energy Poverty
Measure index		
	Time frame	2022 - 2030
	Aim / Short description	This measure envisages development and implementation of a program to define the timeframe, detailed assessment of measures assessment as to their potential, and the prioritizing of measures to be implemented aimed at mitigating energy poverty. The aim of the measure is to set up a system to support the energy vulnerable and energy poor. The program will also outline an implementation plan to facilitate support to vulnerable groups based on the available measures. Support includes on-site visits to the homes of the vulnerable by qualified staff based on eligibility status. The visits help in obtaining a basic assessment of the energy situation in households and assist households in preparing the documentation necessary when applying for various national and local grants that aim to mitigate energy poverty. The program also defines steps in setting up a monitoring and reporting system for energy poverty. This system facilitates reporting as required in the NECP as well as assessing the status quo in energy poverty. If should define steps for integrating new indicators in the existing statistical system at the national level (conducted by the UKRSTAT). The program will also define steps for widening energy vulnerability criteria and for expansion of already implemented schemes.
	Level of governance	National level
Implementation	List of implementation activities and description	The first step is development of the program. The program should be developed through participatory principles as well as interdisciplinary and cross-sector collaboration. The second step is a selection of eligibility criteria and priority lists of potential beneficiary groups for each measure including the time frame, scope, and sources of financing (for instance, in the first instance only beneficiaries of the social assistance program could be targeted). This step also includes a plan for widening the vulnerability criteria and definition of implementation phases. The final step is defining the monitoring and reporting system.

Table 9-63. Detailed description of the measure Energy Retrofitting of Buildings

Name of Measure		Energy Retrofitting of Buildings
Measure index		EE1
	Time frame	2022-2030

	Aim / Short description	Overall energy retrofits of buildings, which includes installing thermal insulation on the entire building envelope, as well as replacement of windows and doors results in significant energy savings and improvements to quality of life. This measure can be implemented partially (segment by segment) or as a measure that includes all segments: windows and doors, walls, roof, floor. The high heat energy consumption for each household, together with more than 3000 heating degree days indicates the need for energy efficiency retrofitting of buildings for the energy-poor and the likely high potential in energy savings. The most important impact of this measure is alleviation of energy poverty through elimination of its main causes. This is achieved by reducing energy costs and improving the efficiency of dwellings while also eliminating adverse impacts on health typically caused by low energy efficiency (due to cold, damp, mold, and draft). This improves the overall quality of life. The measure also boosts investments, energy savings, CO_2 reductions, local employment, security of supply, and increased market value of properties. Measures for improvement can be implemented as integral refurbishment, including both the building envelope and systems improvement. The standard scenario concerning heat energy demand in compliance with national building standard includes thermal insulation of the external envelope using 10 cm of insulation material and double-glazed insulating windows for all building typologies. The investment cost for thermal insulation of the external envelope ranges from 59-99 EUR/m^2, depending on the age of the building. The recommendation for family houses and multi-apartment buildings is a central heating system equipped with a low-temperature (LT)/condensing gas boiler or biomass boiler/wood gasification boiler running on pellets or logs, a buffer tank, as well as a centralized domestic hot water (DHW) cylinder in combination with a heat generator. The cost of the heating system for a single-family house is EUR 900 EUR (LT gas boiler), EUR 1,500 (condensing gas boiler), and EUR 3,000 (biomass boiler). Additional cost of piping varies between EUR 1,500-4,000. The cost of a centralized heating system for a multifamily house varies between EUR 1,200-2,500 (LT gas boiler) and EUR 1,500 for a condensing gas boiler, for each particular building. Additional costs for piping vary between EUR 9,500-30,500, depending on the size of the building. For recommendation in all district heating (DH) supplied multifamily buildings, involves substation improvement through flow system control based on outside temperatures, thermostatic valves in apartments, and consumption-based billing. The cost varies between EUR 3,500-7,200 for each building for TRV and costs up to EUR 13,000 which includes a heat exchanger and buffer for DHW. The advanced scenario includes thermal insulation of the building envelope using 20 cm of thermal insulation material and triple glazed insulation windows for all building typologies. The investment cost for thermal insulation of the external envelope only varies between 87-172 EUR/m^2, depending on the age of the building.
	Lebel of governance	National level

Table 9-64. Detailed description of the measure Replacement of Household Appliances via the Old for New Scheme

Measure name		Replacement of Household Appliances via the Old for New Scheme
Measure index		EE2
	Time frame	2022-2030
	Aim / Short description	Inefficient and old household appliances result in inadequate energy services and high energy consumption. Old appliances are often unsafe, and fail to provide the intended quality of service (e.g., too cold or too warm refrigerators). Replacing household appliances (refrigerators, washing machines) decreases energy consumption for the same or often better quality of service. It also reduces energy bills and CO_2 emissions, while improving quality of life. The "old for new" principle is key as the intention for beneficiaries to forfeit their old appliances before acquiring a new one. This approach is needed to ensure that households do not retain both appliances resulting in higher energy consumption. This measure is applicable for the following appliances: **Refrigerators**: Replacement of old refrigerators (energy class D or lower) with a new class A refrigerator. This scheme will help provide new refrigerators for households which currently do not own one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty refrigerators or those with none. It provides energy savings and reduces energy bill; **Freezers**: Replacement of old freezers (energy class D or lower) with a new class A freezer - This measure provides energy savings and reduces energy bills; **Washing machines**: Replacement of old washing machines (energy class D or lower) with a new class A washing machine. This scheme will help provide new washing machines for households without one (subject to providing proof from the local social welfare office or similar body verifying that a household does not own such an appliance); - This measure improves quality of life, particularly for households with faulty washing machines or those without one. It contributes to energy savings and energy bill reductions.
	Level of governance	National level delivered locally

Table 9-65. Detailed description of the measure Heating System Improvements (HSI) in Households

Name of Measure		Heating System Improvements (HIS) in Households
Measure index		HIS
	Time frame	2022-2030
	Aim / Short description	The inability to maintain a house adequately warm is a key challenge of living in energy poverty. HIS for the energy-poor consist of three main variations, and can be implemented as a single measure or in any combination: **HIS 1: Improving the energy efficiency of systems.**

		Replacing existing systems with the same type but more efficient system, i.e., replacing traditional fuelwood stoves with more efficient furnaces. This type of measure is particularly applicable in rural areas with a high prevalence of traditional biomass (fuelwood) and where alternative fuel sources might be too costly or unavailable for vulnerable groups. Wood biomass furnace at a min of 6 kW is recommended at an estimated cost of EUR 500. The suggestion for households that use gas heating is to replace old and inefficient gas boilers. The estimated cost varies between EUR 600-900. **HIS 2: Modernization and expansion of the heating system.** This involves replacing entire heating systems with more adequate heating systems. This measure does not necessarily provide energy savings, but efficiency, i.e., replacement of individual heating sources with centralized heating systems in households. This measure is appliable for any type of dwelling. Eligibility criteria should be devised so the cost-effectiveness and improvements to the overall quality of life are both considered. The recommendation for family houses and multi-apartment buildings is a central heating system equipped with a low-temperature (LT)/condensing gas boiler or biomass boiler/wood gasification boiler running on pellets or logs, a buffer tank, as well as centralized domestic hot water (DHW) cylinder in combination with a heat generator. The cost for a heating system in single-family houses is EUR 900 EUR (LT gas boiler), EUR 1,500 (condensing gas boiler), and EUR 3,000 (biomass boiler). The additional cost of piping varies between EUR 1,500-4,000. The cost for a centralized heating system in a multi-family house varies between EUR 1,200-2,500 (LT gas boiler), EUR 1,500 (condensing gas boiler) for each building. The additional cost of piping varies between EUR 9,500-30,500, depending on the size of the building. The recommendation in all district heating (DH) supplied to multi-family buildings is a substation improved by using flow system control based on outside temperatures, thermostatic valves in apartments, and consumption-based billing. The cost varies between EUR 3,500-7,200 for each building for TRV and up to EUR 13,000 including heat the exchanger and buffer for DHW. **HIS 3: Fuel switching** Switching fuel from fossil to renewable source. Switching to biomass requires attention to biomass sustainability and in case of using fuelwood as a biomass source, consideration of the fuelwood quality and furnace efficiency. This measure is of particular importance for households relying on coal and oil as their main source of heating where a biomass boiler costs EUR 3,000 and additional piping costs EUR 1,500.
	Level of governance	National level delivered locally

Table 9-66. Detailed description of the measure Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)

Name of Measure		Implementation of Low-Cost Energy Efficiency and Energy Advice (EEEA)
Measure index		EEEA
	Time frame	2022-2030
	Aim / Short description	Education along with simple energy audits and low-cost energy efficiency measures have proven to be an adequate first step. This measure is relatively easy to implement, provides instant relief to

		some struggling households, and offers insight into the reality of living in energy poverty in targeted areas based on collected data. Simple energy audits have proven to be a good approach to acquiring necessary data on energy poverty situations. This measure usually consists of either energy audits and advice or low-cost energy efficiency measures, or a combination of the two: **EEEA1: Installing simple and low-cost energy efficiency measures** Draught-proofing of windows and doors, LED lighting, reflective foils, timers for electric boilers, aerators for water taps, water-saving showerheads, and similar. Such measures are easy and quick to implement, and do not require professionals. This measure contributes to quality of life, provide energy savings and reduce energy bills. **EEEA2: Undertaking simple energy audits with education** Simple energy audits assume the collection of basic information on energy consumption and energy habits. Data is collected from interviews and utility bills. The interview consists of collecting basic demographic information and information on buildings (age of buildings, existence of thermal insulation, type of windows and roof, type of buildings, construction material, type of heating systems, heating fuels). In collecting information on buildings, no measures are undertaken but rather data is collected based on visual observations from surveyors and information provided by household members. Collected data can approximate energy consumption and help in calculating related costs, resulting in proposals for energy saving and energy efficiency measures. During a household visit, information is provided to household members on better understanding energy bills and their energy habits, and the manner of using energy more rationally. Typically, information is also provided on the availability of different support schemes to assist households. This measure facilitates monitoring national data and increases awareness of energy poverty. It also improves energy literacy amongst the energy vulnerable
	Level of governance	National level delivered locally

10. CONCLUSION

The objective of the study is to assess the number of households in energy poverty in Energy Community Contracting Parties (CPs) and to propose policies and measures for addressing the issue.

The starting point of the study was an analysis of the current legal framework in CPs. The analysis enabled to identify whether CPs have definitions of vulnerable consumers in place and criteria for defining them. We identified that all CPs have definitions of vulnerable consumers and that the definitions are closely related to social (income) and health status. In other words, the status of a vulnerable customer is in principle given to consumers that meet certain social and health criteria. Other aspects and drivers of energy poverty, such as energy efficiency of homes, gender, and energy needs, are not considered. Therefore, due to this narrow definition of vulnerability, a certain share of energy-poor households that do not meet the current criteria are not eligible for support. To ensure CPs protect all energy-poor households, not only the most vulnerable ones, we propose that all CPs adopt a definition of energy poverty.

We identified in the legal analysis key institutions involved in protecting vulnerable consumers, together with existing policies aimed at providing them with support. The analysis reveals that all CPs (except for North Macedonia[229]) implement only income supporting measures as the main tool to aid vulnerable consumers. We have concluded that the income supporting mechanism can temporarily reduce the burden of energy poverty, but such measures do not remove its main causes.

To determine the number of energy poor households, we propose using statistical data collected by national statistics offices. We propose using standardized statistical surveys: the HBS and EU SILC. These standardized statistical surveys ensure that data is readily available to all CPs and it also enables cross country comparison. We have confirmed that HBS and EU SILC surveys are available in most of the CPs. For those CPs that do not administer the surveys, we propose that national authorities and national statistical offices make an additional effort and adopt policies and procedures to facilitate conducting the HBS and EU SILC.

We propose a set of statistical indicators for measuring the extent of energy poverty in CPs. For CPs that provided disaggregated HBS and EU SILC data, a range of energy poor households was calculated. For CPs that did not provide statistical data, an estimate relying on aggregate national data was used as a basis for the estimate.

As it was stated in the document on several occasions, energy poverty is a complex and structural problem caused by the low real income of households and high energy demand. The most effective long-term policies to combat energy poverty are those based on energy efficiency measures. Energy efficiency measures result in improved living conditions as well as reduced energy demand which in turn results in reduced energy expenditures.[230] Therefore, we propose a set of mid to long-term energy efficiency measures aimed at reducing energy poverty. For those CPs that have similar measures in place, we propose those measures be expanded to address more

[229] As described in Chapter 3.7 of the report, also energy efficiency measures are used in North Macedonia for protecting vulnerable consumers.

[230] Not necessarily the case for households that underspend energy. As indicated in Chapter 8.2, implementation of energy efficiency measures might not decrease the energy consumption of energy poor due to underspending of such households.

specifically energy-poor households. Each CP should decide what it believes to be a priority in terms of causes of energy poverty and select measures that best address its concerns[231].

The main conclusions of the study can be summarized as follows:

1. CPs should adopt a definition of energy poverty as a distinct term from energy vulnerability. Energy vulnerability is linked to social and health status, while energy poverty is related to a household's inability to secure adequate amounts of energy.
2. The analysis has shown that two surveys (HBS and EU SILC) provide valuable information on the level of energy poverty in CPs. Therefore, our suggestions are that CPs that do not administer EU SILC and HBS, do so. Regarding possible amendments to the surveys, the HBS is by design a numerical survey, while EU SILC is categorical. Therefore, if any amendments are envisaged, they should be categorical (for EU SILC) and numerical (for HBS). Nevertheless, the HBS and EU SILC are EU wide surveys and amending these two surveys in EnC CPs would make them different compared to EU countries.
3. To have relevant energy poverty indicators available for policy decision making, the indicators proposed in this study should be calculated by the relevant statistical offices. This is the most rational option as: (a) national statistical offices collect the required microdata and are the first to have access to it, (b) statistics offices have relevant expertise required for calculating the indicators, and (c) having statistics office calculate the indicators guarantee continuity of the availability of the indicators.
4. To alleviate the issue of energy poverty, we propose a set of long term and short-term measures. We also propose that such measures be included in the national NECP and NEEAPs to ensure their implementation.

In conclusion, this study provides an overview of the current state of play in CPs regarding the treatment of energy poor households in terms of legislative framework, institutional arrangements, measures and resources in place. The study represents a baseline for future work and identifies major gaps that should be addressed in order to create a viable long term policy framework for addressing energy poverty in EnC CPs.

[231] For example, while replacement of old refrigerators and washing machines generates proven benefits, a CP might not consider such measure relevant and might for instance consider measures related to heating system improvement to be a priority.

11. ANNEXES

11.1 Heating and cooling degreed days

Heating Degree Days (HDD) index: The severity of the cold in a specific period taking into consideration outdoor temperature and average room temperature (in other words, the need for heating). The calculation of HDD relies on the base temperature, defined as the lowest daily mean air temperature not leading to indoor heating. The value of the base temperature depends, in principle, on several factors associated with the building and surrounding environment. In using a general climatological approach, the base temperature is set to a constant value of 15°C in the HDD calculation. The formula for calculating HDD is as follows:

If Tm ≤ 15°C Then [HDD = ∑i(18°C - Tim)] Else [HDD = 0] where Tim is the mean air temperature of day i.

Cooling degree days (CDD) index: The severity of the heat in a specific period taking into consideration outdoor temperature and average room temperature (in other words, the need for cooling). The calculation of CDD relies on the base temperature, defined as the highest daily mean air temperature not leading to indoor cooling. The value of the base temperature depends, in principle, on several factors associated with the building and surrounding environment. In using a general climatological approach, the base temperature is set to a constant value of 24°C in the CDD calculation. The formula for calculating CDD is as follows:

If Tm ≥ 24°C Then [CDD = ∑i(Tim - 21°C)] Else [CDD = 0] where Tim is the mean air temperature of day i.

11.2 Ukraine

11.2.1 Social norms and standards, within which abatements and subsidies are provided

Type of housing/utility service	Amount of service which may be covered by subsidies/abatements
Used for assigning subsidies	
Building management and maintenance Building management and maintenance where a homeowners' associations/housing construction cooperatives is established	13.65 m^2 total area per person and additional 35.22 m^2 per household
Heat supply (district or individual heating); distribution and supply of natural gas or electricity for individual heating	13.65 m^2 total area per person and additional 35.22 m^2 per household
Ready to Serve fee: -for heat and/or hot water supply, centralized water supply and/or centralized sanitation -for the treatment of domestic waste	 UAH 32.19 per consumer UAH 15.25 per consumer
Used for assigning abatements	
Building management and maintenance Building management and maintenance where a homeowners' associations/housing construction cooperatives is established	21 m^2 total area per person and additional 10.5 m^2 per household
Heat supply (district or individual heating); distribution and supply of natural gas or electricity for individual heating For the families of war veterans, victims of Nazi persecution consisting only of disabled persons, in case of gas supply usage	21 m^2 total area per person and additional 10.5 m^2 per household 42 m^2 total area per person and additional 21 m^2 per household
Used for assigning subsidies and abatements	
District or individual heating by consumers, who live in buildings equipped with meters or heat allocators	0.0383 Gcal/m^2 of heated area per month during the heating season
Natural gas for individual heating	4 m^3 of natural gas/m^2 of heated area per month during the heating season
Electricity for individual heating	30 kWh/m^2 of heated area per month during the heating season

District or individual heating by consumers, who live in buildings not equipped with meters or heat allocators	70.03 UAH/m^2
Centralized water supply (sanitation): -if there is a hot water supply service -if there is no hot water supply service	 2 m^3 of cold water per person per month; 3.6 m^3 of cold water per person per month
Hot water supply	1.6 m^3 of hot water per person per month
Handling of solid, bulky, construction waste Handling of liquid waste	0.4167 m^3 per person per month 0.76 m^3 per person per month
Removal of liquid sewage (where there are no centralized drainage systems)	3.6 m^3 per household per month
Supply of natural gas: - gas stove and centralized hot water supply - gas stove in the absence of centralized hot water supply and gas water heater - gas stove and gas water heater	 3.3 m^3 per person per month 5.4 m^3 per person per month 10.5 m^3 per person per month
Electricity supply for residential buildings: - equipped with stationary electric stove, with centralized hot water supply -equipped with stationary electric stoves, no centralized hot water supply - without stationary electric stoves, with centralized cold water supply, no centralized hot water supply and gas water heaters	110 kWh per month per family (household) which consists of 1 person and additionally 30 kWh for every other member of the family (household), but not more than 230 kWh; 130 kWh per month per family (household) which consists of 1 person and additionally 30 kWh for every other member of the family (household), but not more than 250 kWh; 100 kWh per month per family (household) which consists of 1 person and additionally 30 kWh for every other member of the family (household), but not more than 220 kWh; 30 kWh per person per month 70 kWh per month per family (household) which consists of 1 person and additionally 30 kWh for every other member of the

- in rural areas, for persons who are entitled with 100% discount for lightning - other types of buildings, not specified above	family (household), but not more than 190 kWh
Building management and maintenance Building management and maintenance with homeowners' associations or housing construction cooperatives	6.72 UAH/m^2
Installation, maintenance and replacement fees for water and heat meters	Contributions are determined by municipalities

11.2.2 List of legislative acts securing rights for abatements

№	Law	Art.	Category	Type/amount of abatement	Conditionality
1.	**On the Status of Military Service Veterans, Veterans of Internal Affairs Bodies, Veterans of the National Police and Some Other Persons and Their Social Protection** https://zakon.rada.gov.ua/laws/show/203/98-%D0%B2%D1%80#Text	6	Veterans of military service, veterans of internal affairs, veterans of the National Police, veterans of the tax police, veterans of the state fire service, veterans of the State Penitentiary Service of Ukraine, veterans of the Civil Defence Service, veterans of the State Service for Special Communications and Information Protection of Ukraine, members of their families living with them	50% abatement on water supply, gas, electricity, heat and other services or a 50% discount on the cost of fuel, including liquid for persons living in houses without central heating	The abatement applies within the norms prescribed by law. *A 'norm' hereby means a regulated value of specific energy or fuel consumption.*
2.	**On the Status of War Veterans, Guarantees of Their Social Protection**	12, 13, 14	Participants in wars Family members of deceased war veterans *A person is regarded as a participant of war if he/she served in the Armed Forces of the former USSR, worked in the rear area.*	50% discount on utilities (gas, electricity, and other services) and liquefied petroleum gas for domestic use, fuel, including liquid, for persons living in houses that do not have central heating	1) Applies within the norms prescribed by law, 2) The abatement is provided considering the amount of the heating area and based on a standard area of 21 m^2 of heating area per person permanently living in a dwelling (house), and an additional 10.5 m^2 per family.
			Participants in warfare. Injured participants of the Revolution of Dignity *A person is regarded to be a participant of warfare if he/she participated in conducting combat missions to protect the Motherland*	75% discount on housing services, utilities (gas, electricity, and other services) and liquefied petroleum gas for domestic use, fuel, including liquid, for persons living in houses	

			as part of military units, formations of all types and branches of the Armed Forces/navy, guerrilla units, underground fighters' units and other formations in both military time and in peacetime.	that do not have central heating	
			Participants in past wars who are older than 85 years old. Persons are disable as a result of war. Persons with special merits before the Motherland; widows (widowers) of a person with special merits, parents of a deceased person with special merits. *A person is regarded to have special merits before the Motherland if he/she is awarded the Merit of Hero of the Heavenly Hundred, Hero of the Soviet Union, full Knight of the Merit of Glory, awarded four or more medals "For Courage", was awarded the title of Hero of Socialist Labor during the World War II.*	100% discount on housing services, utilities (gas, electricity, and other services) and liquefied petroleum gas for domestic use, fuel, including liquid, for persons living in houses that do not have central heating	
3.	**On Social and Legal Protection of Military Servicemen and**	12	Servicemen, as well as persons discharged from military service who became disabled during their	50% discount on housing services and utilities	1) Applies within the norms prescribed by law

	Members of Their Families https://zakon.rada.gov.ua/laws/show/2011-12#Text		service, and members of their families who are dependent on them, parents and family members of servicemen who died or went missing during military service	(water, gas, electricity, heat, and other services)	2) The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles them to a social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine. *Amount of income that entitles to social tax benefit does not exceed* *the amount of the monthly subsistence minimum valid for an able-bodied person as of January 1 of the reporting tax year, multiplied by 1.4 and rounded to the nearest UAH 10.*
4.	**On the State Service for Special Communications and Information Protection of Ukraine** https://zakon.rada.gov.ua/laws/show/3475-15#Text	18	Officers of the State Service for Special Communications and Information Protection of Ukraine and members of their families	50% discount on housing services and utilities (water, gas, electricity, heat and other services)	1) Applies within the norms prescribed by law, 2) The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
5.	**Code of Civil Defence of Ukraine**	120	Officers of the Civil Protection Service and members of their families who are dependent on them; parents and family members of the officers who died (disappeared) or went missing	50% discount on housing services and utilities (water, gas, electricity, heat and other services)	1) Applies within the norms prescribed by law, 2) The abatement is provided if the average monthly total family income per person for the previous six

	https://zakon.rada.gov.ua/laws/show/5403-17#top		during service; persons dismissed from the civil protection service due to age, illness or years of service, and who became persons with disabilities during the performance of official duties, and members of their families.		months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
6.	**On Security Service of Ukraine** https://zakon.rada.gov.ua/laws/show/2229-12#Text	29	Officers of the Security Service of Ukraine who have been dismissed/retired due to age, illness or years of service	50% discount on housing services and utilities (water, gas, electricity, heat and other services)	1) Applies within the norms prescribed by law, 2) The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
7.	**On the Status and Social Protection of Citizens Affected by the Chernobyl Disaster** https://zakon.rada.gov.ua/laws/show/796-12#Text	20	Persons with a disability who were participants in the liquidation of the Chernobyl disaster and victims of the Chernobyl disaster, in respect of whom a causal link between disability and the Chernobyl disaster is established, patients with radiation sickness as a result of the Chernobyl disaster - category 1; family members of citizens affected by the Chernobyl disaster	50% discount on housing services and utilities (water, gas, electricity, heat and other services), 50% discount on the cost of fuel, including liquid for persons living in houses without central heating	Applies within the norms prescribed by law
8.	**On the Primary Principles of Social Protection of Labor**	9	Persons who have special labor merits and members of their families living with them (Heroes	100% discount on housing services and utilities	

	Veterans and Other Elderly Citizens in Ukraine https://zakon.rada.gov.ua/laws/show/3721-12#Text		of Socialist Labor, Heroes of Ukraine and full Knights of the Order of Labor Glory). Benefits are retain for one of the surviving spouses and the parents of the Heroes of Socialist Labor, the Heroes of Ukraine, full Knights of the Order of Labor Glory;	(water, gas, electricity, heat and other services).	
9.	**On the Social Protection of Children of War** https://zakon.rada.gov.ua/laws/show/2195-15#Text	5	Children of war. *A person is regarded as a child of war is he/she is a citizen of Ukraine and who by the end of World War II (September 2, 1945) was less than 18 years old.*	25% discount on housing services and utilities (water, gas, electricity, heat and other services)	1) Applies within the norms prescribed by law, 2) The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
10.	**On the Victims of Nazi Persecution** https://zakon.rada.gov.ua/laws/show/1584-14#Text	6^1-6^4	Former prisoners of concentration camps, ghettos and other places of detention during World War II; persons who were forcibly deported to forced labor on the territory of Germany or its allies; children of partisans, underground fighters, other participants in the struggle against the National Socialist regime in the rear of the enemy, who in connection with the patriotic activities of their parents were subjected to repression,	50% discount on housing services and utilities (water, gas, electricity, heat and other services) a 50% discount on the cost of fuel, including liquid for persons living in houses without central heating	1) Applies within the norms prescribed by law, 2) The abatement is provided considering the amount of heating area based on a standard area of 21 m^2 of heating area per person who permanently lives in a dwelling (house) and is entitled to a discount, and an additional 10.5 m^2 per family. For families consisting only of disabled people applies a norm of twice the standard heated area (42

			physical violence, persecution; wives (husbands) of deceased victims of the Nazis who did not remarry.		m^2 per person entitled to a discount, and 21 m^2 per family).
			Former juvenile prisoners of concentration camps (under the age of 18 at the time of detention), ghettos, other places of detention established by Nazi Germany and its allies during the Second World War, children born in places of detention and members of their families living with them.	75% discount on housing services and utilities (water, gas, electricity, heat and other services) a 75% discount on the cost of fuel, including liquid for persons living in houses without central heating	
			Former juvenile prisoners of concentration camps (under the age of 14 at the time of detention), ghettos and other places of detention, recognized as persons with disabilities from general illness, occupational injury.	100% discount on housing services and utilities (water, gas, electricity, heat and other services) a 100% discount on the cost of fuel, including liquid for persons living in houses without central heating.	
11.	**On the Rehabilitation of Victims of Repressions of the Communist**	6	A rehabilitated person who has become a person with a disability as a result of repression or is a pensioner.	50% discount on housing services and utilities	Applies within the norms prescribed by law.

	Totalitarian Regime of 1917-1991 https://zakon.rada.gov.ua/laws/show/962-12?lang=en#Text				
12.	On the Protection of Childhood https://zakon.rada.gov.ua/laws/show/2402-14#Text	13	Multiple children families; family-type orphanages and foster families in which three or more children have lived for at least one year. *A multiple children family is a family in which the spouses (husband and wife) are in a registered marriage, live together and raise three or more children, or one parent (one mother) who (which) lives with three or more children and raises them independently.*	50% discount on housing services and utilities (gas, electricity and other services) and the cost of liquefied petroleum gas for domestic use, 50% discount on the cost of fuel, including liquid for persons living in houses without central heating	1) Applies within the norms prescribed by law, 2) The abatement is provided considering the amount of heating area based on a standard area of 21 m^2 of heating area per person who permanently lives in a dwelling (house), and an additional 10.5 m^2 per family.
13.	**On the Restoration of the Rights of Persons Deported on National Grounds** https://zakon.rada.gov.ua/laws/show/1223-18#Text	6	Persons of the Crimean Tatar nationality, representatives of other nationalities (citizens of the former USSR) who were forcibly relocated on national grounds to special settlements from places of permanent residence that is the territory of modern Ukraine; persons (citizens of the former USSR) and members of their families who were forcibly sent to special settlements after military service, return from evacuation,	50% discount on utilities and the cost of fuel, including liquid for persons living in houses without central heating	Applies within the norms prescribed by law.

			forced labor, punishment, etc.; persons (citizens of the former USSR) who were subject to restrictions on rights and freedoms on national grounds, including a ban on return and residence in places of permanent residence; persons born in the families of deported persons before their return to their place of permanent residence, but not later than the entry into force of the Act.		
14.	**On Plant Protection** https://zakon.rada.gov.ua/laws/show/180-14#n207	20	Plant protection professionals who live and work in rural areas; retired plant protection specialists who have worked in the field of plant protection in rural areas and live there.	100% discount on housing services and utilities.	The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
15.	**Fundamentals of Ukrainian Legislation on Health Care** https://zakon.rada.gov.ua/laws/show/2801-12#n551	77	Medical and pharmaceutical workers who live and work in rural areas; retired medical and pharmaceutical workers who have worked in rural areas and live there.	100% discount on housing services, heating and lightning.	The discount is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.

16.	**On culture** https://zakon.rada.gov.ua/laws/show/2778-17#Text	29	Employees of state and municipal cultural institutions, pedagogical employees of educational institutions in the field of culture, working in rural areas; retired persons who worked in rural areas and live in them.	100% discount on housing services, heating and lightning.	1) Applies within the norms prescribed by law, 2) the abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
17.	**On Libraries and Librarianship** https://zakon.rada.gov.ua/laws/show/32/95-%D0%B2%D1%80#Text	30	Library staff working in rural areas, retired persons who worked in rural areas and live in them.	100% discount on housing services, heating and lightning.	1) Applies within the norms prescribed by law, 2) The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
18.	**On Museums and Museum Work** https://zakon.rada.gov.ua/laws/show/249/95-%D0%B2%D1%80#Text	28	Museum staff working in rural areas	100% discount on housing services, heating and lightning.	The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.
19.	**On Education**	57	Teachers working in rural areas, retired persons who worked in rural areas and live in them.	100% discount on housing services, heating and lightning.	1) Applies within the norms prescribed by law,

	https://zakon.rada.gov.ua/laws/show/2145-19#Text				2) The abatement is provided if the average monthly total family income per person for the previous six months does not exceed the amount of income that entitles to social tax benefit, in the manner prescribed by the Cabinet of Ministers of Ukraine.

11.3 Description of scenarios

1. **Baseline scenario** assumes there will be no carbon pricing mechanism in the CPs and subsidies for fossil fuel will remain (**BSL**).
2. **Baseline Scenario with a Cross-Border Adjustment Carbon Tax** (**BSL_CBAT**) assumes the imposition of a cross-border adjustment carbon tax (CBAT) on electricity exports from CPs to EU countries in proportion to their carbon intensity.
3. **Full Carbon Pricing and Market Fragmentation Scenario** (Full_CP-M_Fr) assumes CPs apply full carbon pricing with full auctioning of allowances from 2025 onwards, with no exemptions. CPs also proceed to the opening of electricity trading and market integration no later than 2025 in order to remedy the adverse effects of carbon pricing. Meanwhile, gas infrastructure development, easing access to and sharing of gas coming from diverse sources, which benefits the development of variable RES. CPs develop national ETS systems in a coordinated manner, with the aim of linking them to the EU ETS in 2030.
4. **Gradual Carbon Pricing and Market Fragmentation Scenario** (Gr_CP-M_Fr) assumes that CPs adopt carbon pricing based on their flexibility levels. Power and gas markets remain fragmented which takes a toll on CPs that are most exposed to carbon pricing. Market fragmentation prevents those CPs in particular from gaining access to low carbon resources, thus from adjusting their power generation mix to a reasonably high carbon emissions price. Despite graduality of the process, the application of the carbon price brings with it significant price increases and forces consumers to bear unreasonably high consequences, that cannot be remedied under market fragmentation conditions.
5. **Full Carbon Pricing and Market Integration** (Full_CP-M_In) assumes that CPs apply carbon pricing fully, yet markets remain fragmented due to the persistence of national specificities, and so each CP embarks on an individual path to the EU ETS. The scenario assumes NTC values remain at current levels, markets are not coupled while balancing and reserves continue to rely on domestic resources. The negative price implications for consumers are significant and the transition hard to manage, particularly for CPs that depend the most on solids.
6. **Gradual Carbon Pricing and Market Integration** (Gr_CP-M_Int) assumes that CPs adopt carbon pricing in a coordinated way, in a transitional period, where different auctioning rates and timeframes apply from country to country. This is to accommodate different levels of flexibility to carbon allowing the most vulnerable CPs to help their emitters adapt more easily and protect consumers from strikingly high electricity and heat prices.

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