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People Behind the Policy: Social Impacts of EU ETS2 in Bulgaria, Czechia, and Poland

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List of Abbreviations

BGN	Bulgarian Lev
CEEB	Central Emissions Register of Buildings
EA	Energy Act
EED	Energy Efficiency Directive
EPBD	Energy Performance Buildings Directive
ETS	Emissions Trading System
HBS	Household Budget Survey
HICP	Harmonised Consumer Price Index/Indices
LIHC	Low-income, high-cost
LTRS	Long-Term Renovation Strategy
MFH	Multi-Family Homes
MS	Member States
NAP	National Air Protection Programme
NECP	National Energy and Climate Plan
NGO	Non-Governmental Organization
PEP	Polish Energy Policy
PV	Photovoltaic
SCF	Social Climate Fund

SCP	Social Climate Plan
SFH	Single-Family Homes
SILC	Survey on Income and Living Conditions
WPB	Worst-Performing-Buildings

Summary

As part of the EU's "Fit for 55" package, a second emissions trading system (ETS2) will be introduced in 2027 (Directive (EU) 2023/959 2024). Covering the buildings and transport sectors, the ETS2 effectively puts a carbon price on fossil fuels used for heating and road transport. To support those most affected by resulting price increases, the Social Climate Fund (SCF) was established (Regulation (EU) 2023/955 2023). It targets vulnerable groups and households already facing energy and transport poverty, who may struggle to afford energy efficiency upgrades. The SCF Regulation sets out how funds are distributed among Member States, defines eligible households, and requires each state to submit a Social Climate Plan (SCP).

The three MS examined in this study – **Bulgaria, Czechia, and Poland** – have been particularly vocal in raising concerns about the potential negative effects of the ETS2, at various points advocating for delays in its implementation or stronger price stabilization mechanisms. The aim of this study is to analyse what groups are likely to be most affected by the ETS2, examine the current draft SCPs, and identify policy gaps. Findings are summarised in the table below.

Table 1-1: Summary of the assessment of targeted policies from the SCP

Identified vulnerable group		Assessment			
		Well targeted and financed	Targeted with limited financing	Financed but not targeted specifically	Unclear / No targeting
Bulgaria	Low-income homeowners in single-family homes in rural areas		X		
	Low-income tenants in urban areas				X
	Single parents who are tenants in multi-family homes in urban areas				X
Czechia	Low-income SFH and MFH homeowners in rural areas			X	
	Tenants	X			
	Low-income households in small MFH			X	
	Single parents in MFH (in urban areas)			X	
Poland	Low-income SFH homeowners in rural areas	X			
	Low-income homeowners in MFH				X
	Low-income one-person homeowners (in MFH)			X	
	Single parent tenants			X	

Source: Own compilation

General recommendations for policy design and to address policy gaps include:

1. Funding through the SCF is and should be **targeted at vulnerable groups and energy poor households**. A focus on the identified policy gaps in the individual countries can be addressed with ETS2 revenues, as well as focusing on areas with high savings potentials, such as Worst-Performing-Buildings.
2. While direct financial payments are important to ensure that vulnerable households are not further burdened with unreasonable energy costs, **investments that ensure long-term transformations in the buildings sector towards climate neutrality are key**. The focus should remain on improvements in energy efficiency and investments into low and zero-carbon technologies.
3. Overall, **deep renovations are needed** to ensure noticeable reductions in energy costs due to the low energy efficiency standards overall in the three MS. As ETS2 prices rise, higher energy efficiency standards and technological switches in heating will be needed to avoid high costs. The focus therefore must remain on providing extensive funding for deep retrofitting measures. Additional funds from the ETS2 revenues and funding beyond the timeline foreseen for the SCP will be necessary.
4. Within the buildings sector, **policy design needs to consider the housing situations that vulnerable households are in**. This includes determining a focus on SFH (single-family homes) or MFH (multi-family homes) or whether to allocate funds to support tenants and is essentially a question of adequate targeting. ETS2 revenues should be funnelled into programs that address the policy gaps identified.

1 Introduction to the ETS2 and Social Climate Fund

As part of the EU's "Fit for 55" Package, a second emissions trading system (ETS2) will be introduced in 2027 (Directive (EU) 2023/959 2024). The ETS2 covers the buildings and transport sectors, effectively setting a carbon price on fossil fuels used for heating and transport. The aim is to set up a market instrument at EU-level that will incentivise improvements in energy efficiency and switches to zero carbon or less carbon-intensive technologies in those sectors, for example by replacing gas boilers with heat pumps and prioritising EVs. Revenues from the ETS2 are a new income stream for Member States (MS) that must be spent on climate action and social measures, as stated in the Directive. The ETS2 is another cornerstone of the EUs climate policy to reach the 2050 climate neutrality target (Graichen et al. 2025). Alongside the current ETS it is a central instrument to reduce total emissions, drive technological change forward, and to ensure that interim climate goals are met.

The introduction of the ETS2 is accompanied by a Social Climate Fund (SCF) (Regulation (EU) 2023/955 2023). The aim of this fund is to support those who are vulnerable to the price increases through the ETS2 as well as households affected by energy and transport poverty, that are already experiencing high cost-burdens and unable to easily implement energy efficiency measures that require significant financial capital (Eden et al. 2023). The Social Climate Fund Regulation outlines how the funds are distributed across MS, defines vulnerable and energy/transport poor households, and sets out requirements for Social Climate Plans (SCP) that each MS has to submit (Regulation (EU) 2023/955 2023). These must include national definitions and data on energy and transport poverty and vulnerability, as well as details on the measures that will be implemented to support these identified groups. MS were required to submit their draft SCP by 30 June 2025. It is unclear how many countries submitted their SCP on time, as there is no requirement to publish these plans and experts report delays across the EU.

The Social Climate Fund is funded by auctioning revenues from the ETS2 - 65 billion Euro will be provided to MS from 2026-2032. Member States are required to co-finance at least 25% of their Social Climate Plans, for which they can use auctioning revenues. In total, around 86.7 billion Euro will be mobilised as part of the SCF (Bird et al. 2024).

Additional revenues from the ETS2 are allocated by Member States as they see fit under the umbrella of 'climate action' as outlined by the ETS directive. Estimations of total revenues from the ETS2 differ based on the assumptions made about the development of the price. Assuming an average price of 45 Euro and over 5,700 million auctioned allowances, total revenues would amount to around 260 billion Euro between 2027-2032 (Eden et al. 2023). If all Member States use their revenues to co-finance their SCP, around 173.3 billion Euro in revenues would remain. It should be noted, however, that various studies and econometric models have estimated significantly higher prices, ranging from 68 Euro/tCO_2 (Breshani 2024) up to 210 Euro/tCO_2 in 2030 (Veyt 2025), which would indicate higher revenues especially in the earlier years where technological switches and energy efficiency improvements are still underway.[1] The Directive states that these revenues have to be used for climate action and social measures, for example insulation, heating and cooling technologies, low- and zero-carbon mobility, and to mitigate the social impacts of the carbon price, and record and report their revenue use (Directive (EU) 2023/959 2024).

The objective of this study is to provide an overview of potentially vulnerable groups in three MS- **Bulgaria, Czechia, and Poland** – by looking at data on energy poverty and living conditions. Additionally, the draft SCP were reviewed where available and expert interviews were carried out to

[1] Higher price estimates are usually the result of econometric models assuming that fewer measures will be introduced to reduce fossil fuel usage and demand will remain high. See also Günther et al. (2025).

supplement this analysis and gain a deeper understanding of the national contexts. Based on this, the report offers insights into possible priority groups for policy development and identifies gaps based on current plans. The study focuses solely on the buildings sector.

1.1 Current debates and state of play: status-quo in Bulgaria, Czechia, and Poland

The three MS examined in this study have been particularly vocal in raising concerns about the potential negative effects of the ETS2, at various points advocating for delays in its implementation or stronger price stabilization mechanisms.

During early stages of decision-making on the specifics of the ETS2, four MS (Slovakia, Bulgaria, Poland, Czechia) had already called to delay its implementation to 2028 and make changes to the market stability reserve (Scott 2025). More recently, 16 Member States put forward a non-paper outlining concerns and possible changes to the ETS2 (Gitton 2025). The non-paper argues that the uncertainty around the initial price level in 2027 limits the ability to anticipate the effects of the instrument and take adequate measures to reduce price shocks. Other experts argue that reopening discussions around the Market Stability Reserve (MRS), for example, could weaken climate ambitions and that price mechanisms should be reviewed once the ETS2 is underway (LIFE Effect 2025b). Bulgaria, Czechia, and Poland are amongst the signatories of this non-paper (ERR News 2025).

Despite these discussions on the specifics of the ETS2, the primary focus in **Bulgaria** has been on developing their SCP. A draft for public consultation has been developed and includes information on the planned measures, although no impact assessment has been carried out to date. In light of high levels of energy poverty in the country – up to 30% of the population according to the Bulgarian Agency for Sustainable Energy Development – developing support mechanisms for vulnerable groups when implementing the ETS2 is essential (Krassen 2025). Experts report that the plan was prioritised by the Ministry of the Environment and Water in coordination with other ministries, while discussions around the ETS2 have taken a back seat. NGOs such as the WWF, Za Zemyata, and Habitat Bulgaria warned that Bulgaria will miss out on up to 2.5 billion Euro of funding from the SCF if they fail to produce their SCP in time, although it is unclear whether this is likely and significant steps have been taken towards producing the SCP.

Similarly in **Czechia**, the Ministry of the Environment has focused on developing their SCP with support from the Technical Support Instrument[2] from the Commission draft SCP, but this has not yet been submitted to the Commission. Experts report that discussions on the transposition of the ETS2 are currently on hold until the next administration comes into power. The current Prime Minister Fiala announced as early as December 2024 that he would be lobbying for a delay in the implementation of the ETS2 and softening of the price mechanisms (Plevák 2024). In June 2025, Czechia also continued to push for the implementation of the ETS2 to become voluntary (Lazarová 2025). This has since become a political issue, as opposition parties in the country have stated their intentions to push back against the ETS2, if elected (Brooke 2025). It is likely that the ETS2, rising heating costs, and Czechia's relationship to Brussels will become talking points during the next election cycle with elections being held in October 2025.

Similar trends can be observed in **Poland**. While Poland held the Presidency of the Council of the EU, Donald Tusk warned that the ETS2 would lead to high energy prices and asked members to

[2] For details on this instrument see https://reform-support.ec.europa.eu/tsi-2024-flagship-support-social-climate-fund-and-revised-eu-emissions-trading-system_en.

reflect on the consequences of the prospective introduction of the ETS2 (EP 2025). This critical stance towards the ETS2 has continued in Poland, but experts see an increased focus on discussions around price ceilings and corridors (e.g. through the non-paper) rather than a delay or cancellation of the ETS2 and interpret this as a softening of the approach. Others see this as a strategic move, where reopening the legislative text gives new political majorities in the European Parliament the opportunity to weaken this climate policy instrument. The introduction of the ETS2 also coincides with an election year in Poland. According to newspaper reports, this is part of the reason why current Prime Minister Donald Tusk is working towards delaying the implementation of the ETS2 or at the very least making significant changes to the system before implementation. The Deputy Minister of Climate and Environment confirmed these considerations, stating that the ETS2 was not necessary for the energy transition and would result in undue burdens for households. Nonetheless, a comprehensive draft SCP was developed by the Ministry of Funds and Regional Policy and made publicly available.[3] Poland will receive the largest share of funds from the SCP, as per the allocation key.

Current public and political perceptions of the ETS2 in these MS are shaped by scepticism and worries of significant price increases. Revenues from the ETS2 and spending through the SCF, however, provide a significant financial resource for the individual MS to drive the energy transformation forward and ensure crucial investments in the buildings and transport sector are being made. Understanding and shaping how these funds and revenues are used, is central for ensuring that the system is effective and heightening public acceptability.

[3] See https://www.funduszeeuropejskie.gov.pl/strony/o-funduszach/spoleczny-fundusz-klimatyczny/plan/

2 Quantitative assessment of households in the building sector

To gain clarity on how programs in the building sector should be targeted, a quantitative analysis using household microdata available on EU-level was conducted. The two datasets used are the EU Household Budget Survey (HBS) and the EU Survey on Income and Living Conditions (SILC). The data shows energy expenditures across income quintiles, as well as information on the housing conditions of households.

2.1 Short methodological description

Using the EU **HBS,** this report shows absolute heating expenditures, the share of heating expenditures in total expenditures, and where possible, expenditure by fuel type. These variables are displayed across expenditure quintiles (as a proxy for income) and by degree of urbanisation. This data shows the level of financial burden households face in relation to their heating expenditures, the share of fossil fuels, and how these change in relation to total expenditure or across the different degrees of urbanisation.

Data from 2015 is used and expenditures are inflated to the year 2023 using the Eurostat all-items HICP[4]. This is due to the incomplete data from the 2020 HBS and that data from this year is not considered representative because of the influence of the covid pandemic. Inflating the 2015 data in this way assumes no changes in behaviour or technology.

Using the EU-**SILC** this report shows tenure status and dwelling type by income quintiles, degree of urbanisation and household type, as well as levels of energy poverty by income quintiles, degree of urbanisation, household type, and dwelling type. Limited number of observations in the datasets means that tenure status cannot be shown for the energy poverty indicators for the three countries. The two energy poverty indicators reported in the SILC data base are as follows (Energy Poverty Advisory Hub 2022):

- “The inability to keep home adequately warm indicator represents the share of (sub-) population not able to keep their home adequately warm, based on the question "Can your household afford to keep its home adequately warm?"”
- “The arrears on utility bills indicator represents the share of (sub-) population with arrears on utility bills, based on the question "In the last twelve months, has the household been in arrears, i.e., has been unable to pay on time due to financial difficulties for utility bills (heating, electricity, gas, water, etc.) for the main dwelling?"”

The two EU-level energy poverty indicators based on the HBS data are also shown for comparison.[5] They are not, however, discussed in more detail, as they are based on 2015 data. Insights from national publications and data on energy poverty are included for additional context.

An explanatory note outlining the methods for data analysis is published alongside this report.

[4] Harmonised Consumer Price Index

[5] The 2M indicator refers to households whose share of energy expenditures of their income is more than twice the national median. The M/2 indicator represents the share of households whose absolute energy expenditures if below half the national median.

2.2 Status-quo: heating costs, living conditions, and energy poverty in Bulgaria

2.2.1 The financial burden of energy costs

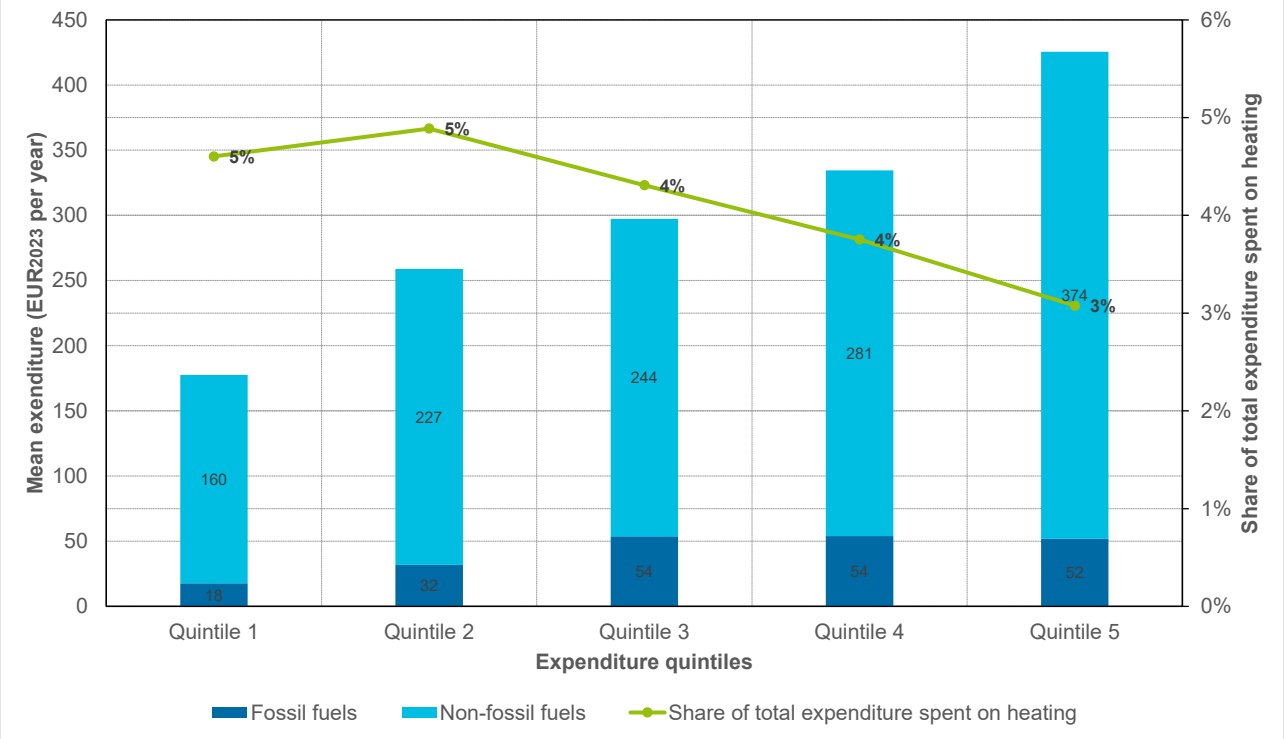
Based on the HBS data (Figure 2-1), low-income households have lower absolute heating expenditures but spend a higher share of their total expenditures on heating. In Bulgaria this is not only true for the lowest income quintile, but also for the second income quintile. This indicates that lower-middle income groups are also affected by high cost burdens. Households in rural areas also have higher absolute heating-related expenditures (approx. 380 Euro) than those in densely populated areas (approx. 250 Euro), which coincides with a higher costs burden as well (see Figure 5-1).

Additionally, heating expenditures in Bulgaria are overwhelmingly non-fossil fuel related. The majority of households, regardless of their expenditures, are heating using what is classified in the data as “heat energy”, which includes heat pumps, other electric heating technologies such as electrical heaters, or district heating systems, for example. The use of wood or other biomass for heating is more widespread in rural areas and considered a particularly affordable heat source.

In Bulgaria, many households both heat and cool using electrical heaters or air conditioning units. Others are connected to district heating systems. This means that households will not be directly affected by price increases due to the ETS2, which would affect households heating with gas or oil.[6] Nonetheless, experts report that prices of firewood, for example, are closely linked to gas prices, meaning that when these rise, other households who are dependent on firewood for heating are inadvertently affected as well. The draft SCP also argues that firewood prices are likely to rise due to higher transport costs and therefore includes households in energy poverty that do not heat with fossil fuels in their targeting.

[6] Electricity is already covered under the current ETS.

Figure 2-1: Heating expenditures by expenditure quintile in Bulgaria



Source: Oeko-Institut's own calculations based on EU HBS 2015 microdata. Notes: The expenditure data is inflated to 2023 levels using the average monthly Eurostat Harmonised Consumer Price Indices (HICP) for Bulgaria. Fossil fuels include gas, oil and coal. Non-fossil fuels include biomass and heat energy.

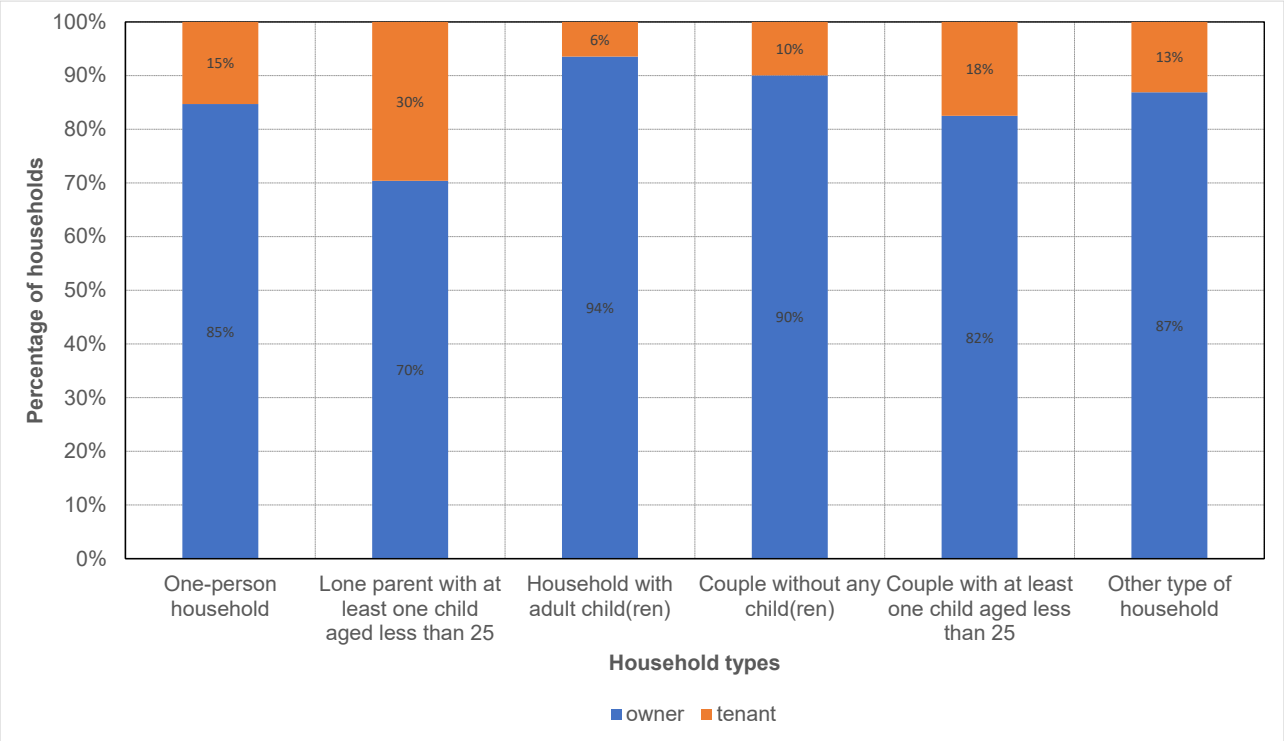
2.2.2 The living conditions of households

In Bulgaria the majority of households are owners rather than tenants (Figure 5-2).

- In the first income quintile, around 80% of households own their dwelling and only 20% are tenants. As income increases, the share of tenants decreases further.
- The share of owners is slightly higher in thinly populated areas i.e. rural areas (90%) than in densely populated areas (82%), but the differences in tenure status across levels of urbanisation are minimal (Figure 5-3).
- When looking at tenure status across household types, the share of owners lies between 80-90% for most groups (Figure 2-2). Notable is a higher share of tenants amongst single parents are tenants at 30%.

A high share of ownership means that the majority of households in Bulgaria, even those with low-income, have autonomy over their dwelling and can make decisions about energy efficiency improvements and changes in heating technology. Some potentially vulnerable groups, such as single parents are, however, also tenants and dependent on their landlords to undertake retrofitting measures.

Figure 2-2: Tenure status by household type in Bulgaria



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. Notes: The category "tenant" should be flagged for "lone parent with at least one child aged less than 25" and "household with adult child(ren)" (20 – 49 observations).

A more detailed look at the type of house households live in shows:

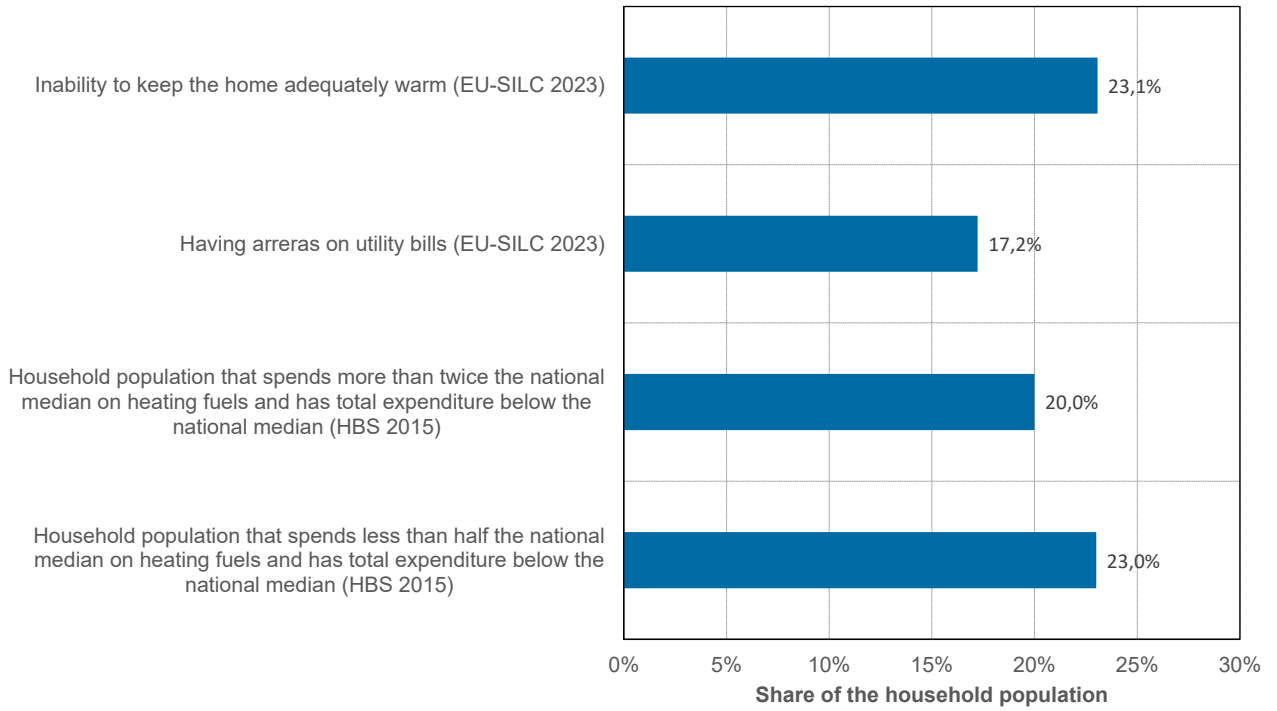
- The share of households living in apartments increases with income (Figure 5-4). 72% of households in the highest income quintile live in in apartments, while 66% of households in the lowest income quintile live in detached or semi-detached houses.
- The share of households living in apartments is significantly higher in urban areas (83%) than in rural areas, where 95% of households live in detached or semi-detached houses (Figure 5-5).
- When looking at household types, there is a relatively even distribution between households living in apartments and those living in detached or semi-detached housing (Figure 5-6).
- Single parents tend to live in apartments (66%), which may coincide with the higher levels of renters in this group.

Although there is a high level of ownership in Bulgaria, those living in urban areas, with higher income, and single parents are more likely to live in apartments rather than single-family homes (SFH). For these households, it may be more difficult to make significant investments, as these usually concern the whole building increasing costs and requiring consensus amongst owners. Low-income households and those in rural areas are more likely to living in SFH.

2.2.3 Overview of energy poverty and vulnerabilities

Based on the two self-reported indicators of energy poverty calculated for this report, between 17% and 23% of households in Bulgaria are considered energy poor (Figure 2-3). The two expenditure indicators from the 2015 HBS confirm this high share of affected households.

Figure 2-3: Energy poverty indicators for Bulgaria



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata and HBS 2015 microdata.

Based on the "inability to keep home adequately warm" indicator the following trends can be observed:

- 40% of households in the first quintile report not being able to keep their home adequately warm (Figure 5-7). This drops to 26% in the second quintile.
- Across degrees of urbanisation the share of households who cannot keep their home warm is relatively consistent, ranging from 23% in urban areas and 25% in thinly populated areas (Figure 5-8).
- The share is slightly higher for those living in detached houses (26%) or semi-detached houses (24%) than those living in apartments (under 20%) (Figure 5-9); and
- Is higher for one-person households (30%) than other household types (Figure 5-10).

When looking at "arrears of utility bills" as a second indicator of energy poverty a similar pattern emerges.

- Households in the lowest income quintile report the highest share of arrears (31%) (Figure 5-11). This drops of significantly with higher income.

- The share of households with arrears on their utility bills is higher in rural areas (21%) than in urban areas (15%) (Figure 5-12).
- 22% of households living in detached and 19% of those living in semi-detached houses report arrears on their utilities, which is higher than those living in apartments (Figure 5-14).
- A higher share of single-parent households (21%) report arrears on utility their bills, followed by one-person households (15%) and households with adult children (17%) (Figure 5-13).

The energy poverty indicators show that low-income households and those living in SFH, as well as one-person and single-parent households are often already affected by energy poverty either due to low-income, high prices, or low energy efficiency. Although first analyses have already shown that low-income households are not necessarily heating with fossil fuels in Bulgaria, but in the case of indirect cost impacts, these households will be significantly impacted.

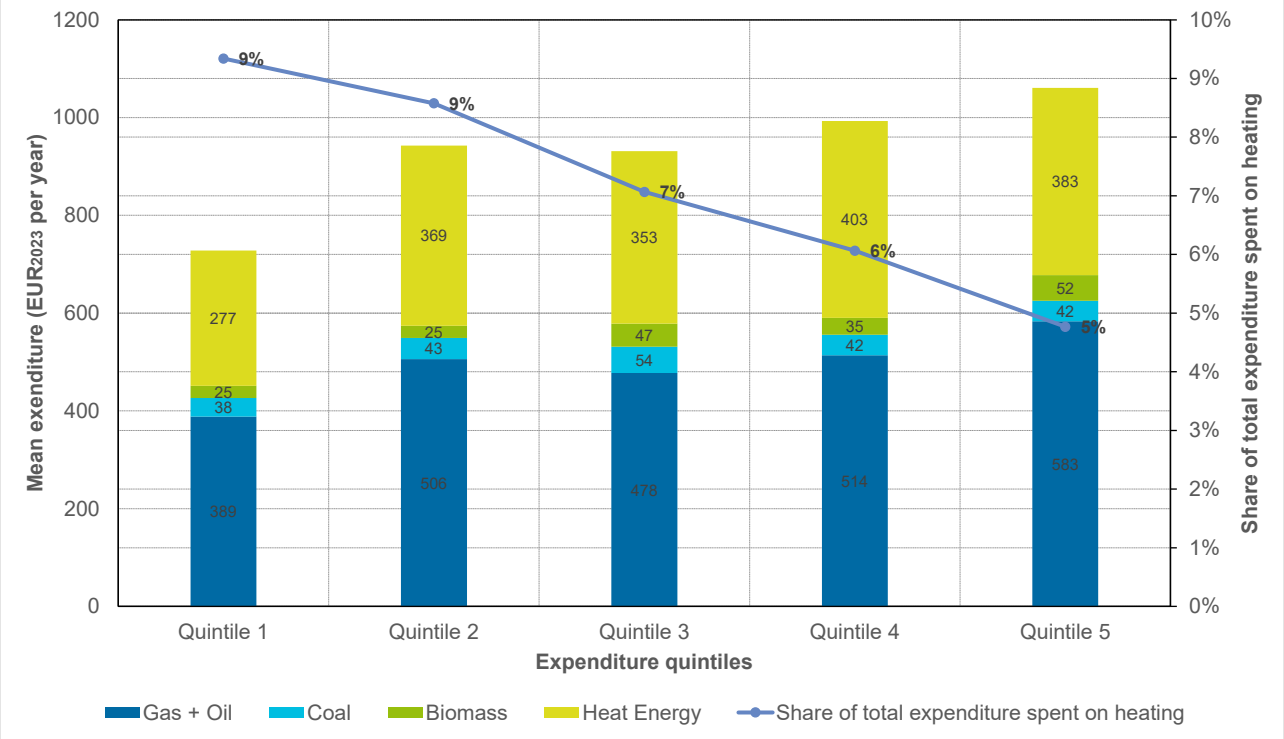
2.3 Status-quo: heating costs, living conditions, and energy poverty in Czechia

2.3.1 The financial burden of energy costs

In Czechia, households in the lowest income quintile spend around 700 Euros per year on heating (Figure 2-4). This increases across the expenditure quintiles. For the lowest expenditure group, this makes up 9% of their total expenditures. Although absolute expenditures increase, the share of heating expenditures of total expenditure decreases with higher income. Across degrees of urbanisation both absolute heating expenditures (1 500 Euro), as well as relative cost burdens (8%) are highest in intermediate areas, which generally refers to smaller towns or areas on the outskirts or larger urban settlements (Figure 5-15).

The share of fossil fuel related heating expenditures is significant across all expenditure quintiles. Gas and oil make up the largest share of heating related expenditures for each quintile, but coal also plays a minor role. Many other households heat using electric heaters or are connected to district heating systems. In rural areas the share of households heating using gas and coal is much higher than in more densely populated areas, as district heating networks are uncommon outside of cities.

Figure 2-4: Heating expenditures by expenditure quintiles in Czechia



Source: Oeko-Institut's own calculations based on EU HBS 2015 microdata. Notes: The expenditure data is inflated to 2023 levels using the average monthly Eurostat Harmonised Consumer Price Indices (HICP) for Czechia. The category "coal" should be flagged due to a low number of observations (20 - 49 observations per quintile).

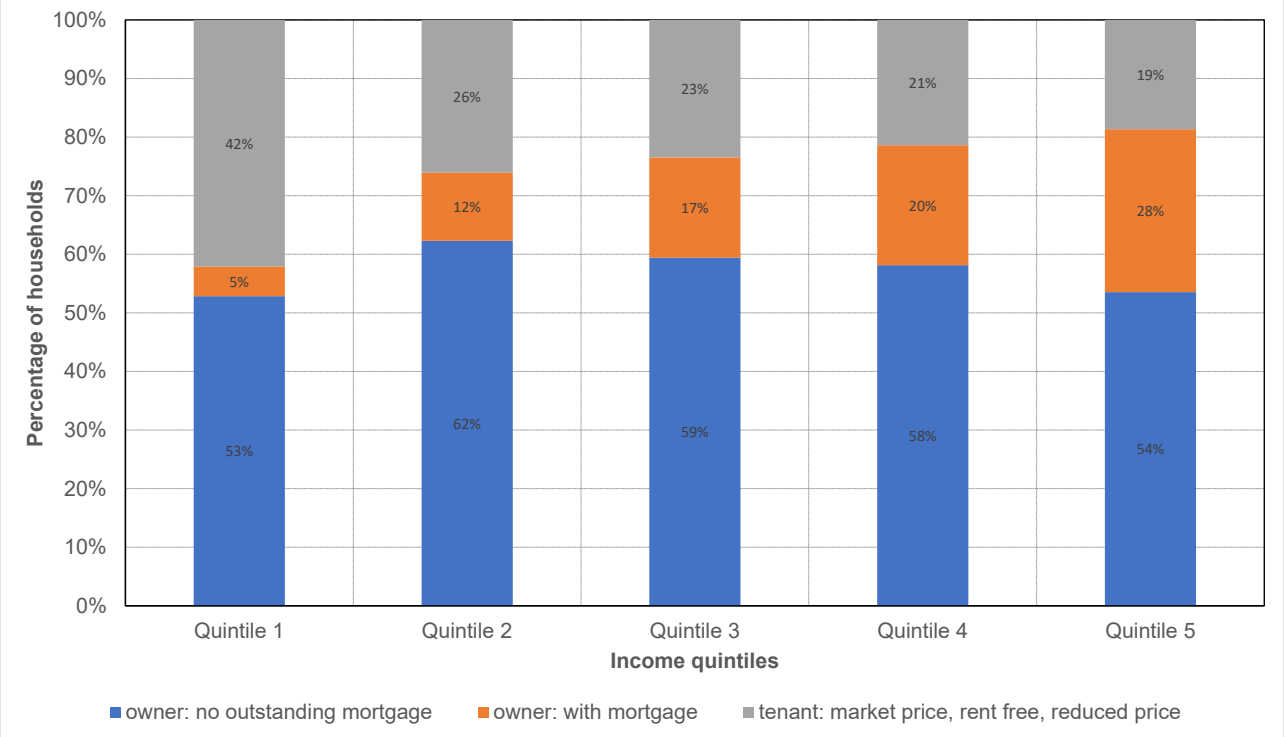
2.3.2 The living conditions of households

In Czechia the majority of households are owners rather than renters:

- The share of owners with mortgages, however, increases significantly across income quintiles (Figure 2-5). The share of renters is highest in the lowest income quintile at 42%.
- The share of tenants is significantly higher in urban (densely populated) areas at 34%, while in rural areas only 18% of households rent (Figure 5-16).
- When looking at the distribution of ownership status by household type, 46% of single parents and 39% of one-person households are tenants, while the share is much lower for all other household types (Figure 5-17). Overall, there is still a higher share of owners across all household types.

Although ownership shares are generally high in Czechia, there are significant shares of tenants in low-income groups and amongst single-parents and one-person households, who are reliant on their landlords to carry out energy efficiency improvements or switching out inefficient fossil-fuel based heating systems. The split-incentive issue remains relevant in Czechia and is discussed in more detail in Section 4.2.4.

Figure 2-5: Tenure status by income quintiles in Czechia



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

The distribution of households living in apartments versus houses is relatively even across income quintiles (Figure 5-18):

- Between 62% and 53% of households live in apartments.
- The share of households living in detached or semi-detached houses is, however, significantly higher in thinly populated areas (78%) than in urban areas (Figure 5-19); and
- Households with adult children are more likely to living in houses, while 71% of single households and 75% of single parents live in apartments (Figure 5-20).

As expected, the share of households living in SFH is higher in rural areas, while households in urban areas are more likely to live in multi-family homes (MFH). Across other household characteristics previously identified groups, such as single parents, are more likely to live in apartments. It is notable that there is no clear differentiation in dwelling type across income. This indicates that issues in undertaking retrofitting in MFH, which can be more complex, costly, and time intensive, is relevant for many different types of groups.

2.3.3 Overview of energy poverty and vulnerabilities

In Czechia the share of energy poor households varies by indicator type (Figure 5-21). The self-reported indicators on "the ability to keep the home adequately warm" and "arrears on utility bills" show that 7% or only 1.8% of households are energy poor. The expenditure-based indicators indicate a much higher share of affected households (between 11-13%).

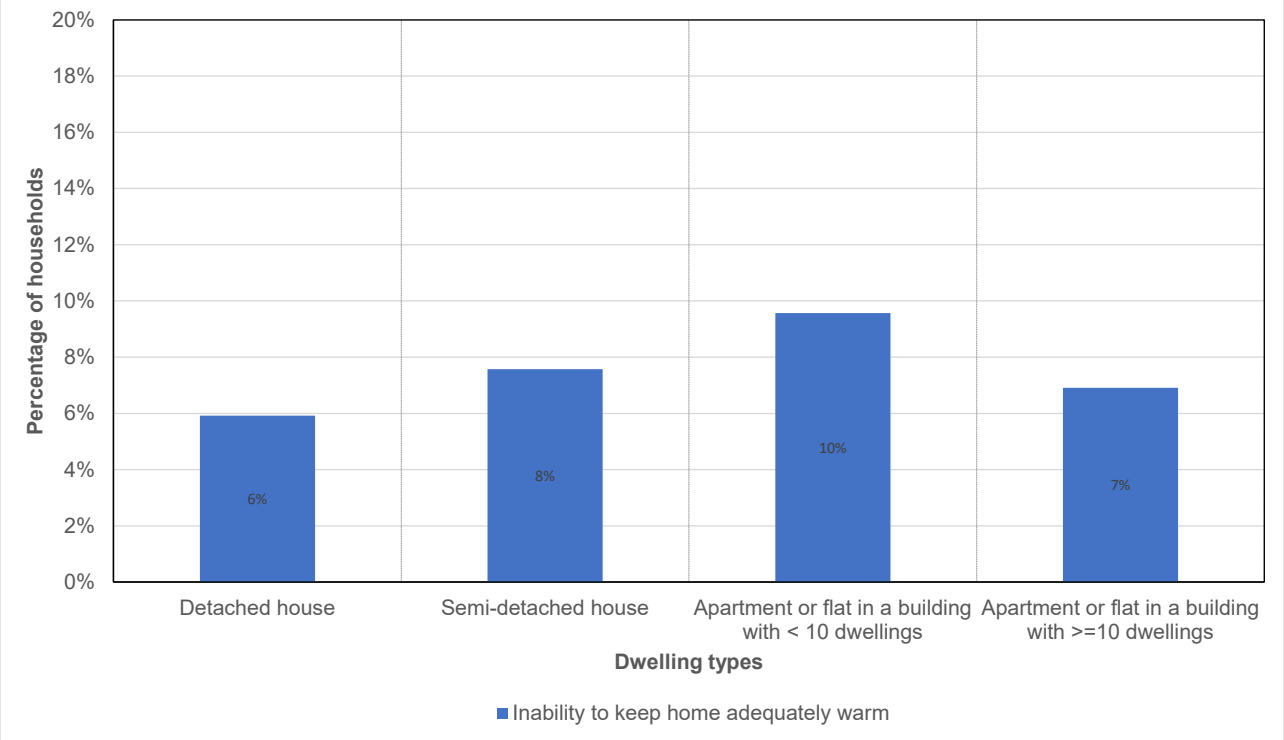
The share of households reporting an inability to keep their home warm is significantly higher for low income groups (Figure 5-22):

- 14% of households in the first income quintile are affected, dropping to below 10% in the second quintile.
- No significant differences in the share of energy poor households according to this indicator are notable when disaggregating the data by degrees of urbanisation (Figure 5-23). The share of affected households is around 7% across all three urbanisation categories.
- Differences can be observed based on dwelling types. 6% of households living in detached houses and 10% of households in smaller apartment buildings report an inability to keep their home adequately home (Figure 2-6).[7]
- 15% of single parent households also report being affected (Figure 5-24).

Energy poverty according to this indicator is not very high in comparison to the (older) expenditure based indicators. Due to this significant span of affected households, additional national studies should be consulted to better understand what groups are affected by energy poverty and whether these are likely to also be strongly affected by the ETS2. Based on the self-reported indicators, energy poor households are more likely to live in SFH and affected low-income groups will struggle most with higher energy costs.

Overall, only a very small number of households in Czechia reported arrears on their utility bills. The small number of observations in this category means that data cannot be further disaggregated.

Figure 2-6: Inability to keep home warm by dwelling type in Czechia



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

[7] Data on the inability to keep the home adequately warm by household type in Czechia cannot be shown due to the low number of observations.

2.4 Status-quo: heating costs, living conditions, and energy poverty in Poland

2.4.1 The financial burden of energy costs

Based on the HBS microdata analysis absolute heating-related expenditures increase significantly across income quintiles (Figure 5-25). The relative cost-burden of these expenditures also increases with income and only decreases in the highest income quintile. This is an unusual trend, as the share of expenditures spent on heating usually decreases with higher income, as seen in Bulgaria and Czechia. This data may indicate that low-income households are underusing energy due to financial constraints, often referred to as “hidden energy poverty” as it cannot be easily captured by examining expenditure data. National experts indicate, however, that this is likely an issue with the HBS data quality rather than indicative of a trend.

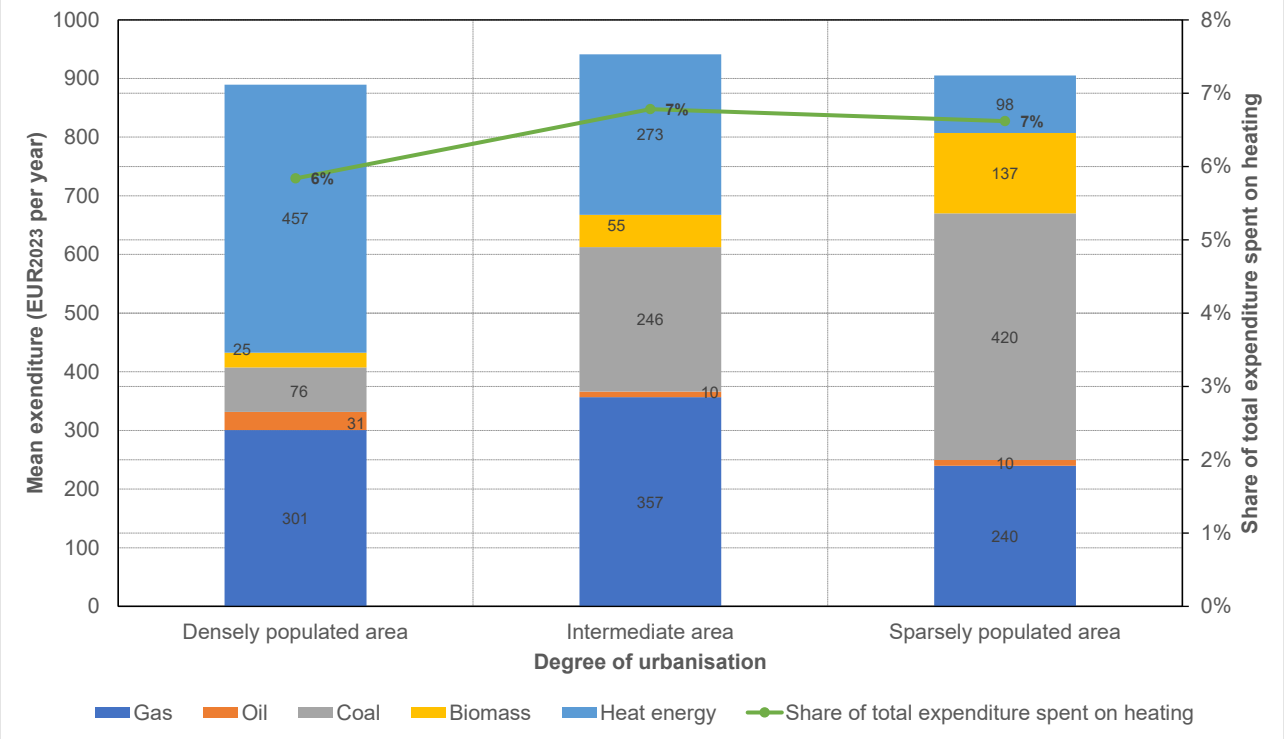
National research institutions in Poland conducted similar analyses using the more recent 2020 HBS data, which showed that households in the first income decile spent just over 10% of their disposable income on energy related costs (Gutowski and Glowacki 2023). In the second decile this share was higher at around 13% and remains high for households until the sixth income decile. This confirms that the energy cost burden is high across middle income groups but does not show the strong inverse relationship seen in Figure 5-25.

Further analyses based on national statistics indicated average monthly expenditures on energy of around 80 Euro across the first three income deciles, which increases to 100 Euro for households with the highest income (Gutowski and Glowacki 2023). In the first income decile this makes up over 45% of their income. The average monthly energy expenditure in relation to income drops sharply in the second income decile to around 13% and gradually decreases with higher income. It should be noted that this data cannot be directly compared with the HBS analyses conducted in this study, as income deciles and total income are used as a measure (rather than expenditure decile and total expenditure), monthly expenditures and income are used as a measure instead on annual averages, and in these calculations all energy costs are included, not just heating costs. Nonetheless, this national data indicates the expected trend that low-income households experience higher cost-burdens, despite lower absolute expenditures on energy.

When disaggregating the 2015 HBS heat expenditure data used in this report by degree of urbanisation a clear trend can be observed, where the reliance on heating energy i.e. district heating districts is high in more populated areas, while rural areas are heavily reliant on coal and gas for heating (Figure 2-7). These areas are therefore most likely to see higher energy costs due to the ETS2 implementation.

Studies based on national data sources also show a high reliance on district heating – around 52% of households in 2022 derive their energy from district heating (Sokolowski 2023). Around 20% of households get their energy from coal or wood usage and 15% from gas. The study conducted by WiseEuropa based on the 2020 HBS data also shows significant shares of coal and gas related energy expenditures across all income deciles (Gutowski and Glowacki 2023). Electricity costs are high amongst all income deciles, but these are not included in the analyses here as only heating expenditures will be affected by the ETS2.

Figure 2-7: Energy expenditures by degree of urbanisation in Poland



Source: Oeko-Institut's own calculations based on EU HBS 2015 microdata. Notes: The expenditure data is inflated to 2023 levels using the average monthly Eurostat Harmonised Consumer Price Indices (HICP) for Poland.

2.4.2 The living conditions of households

In Poland, levels of homeownership are high overall:

- The share of owners is above 80% across all income quintiles – the share increases slightly with income (Figure 5-26). The share of owners with mortgages also increases with income.
- The share of owners is also relatively stable across degrees of urbanisation (Figure 5-27). It is above 90% in rural areas and just below 80% in urban areas. The share of owners with a mortgage is highest in densely populated areas, suggesting that those with higher income are perhaps more likely to live in urban areas.
- Disaggregated by household type, 28% of single parents and 21% of single households are tenants (Figure 5-28). In all other household groups, the share is at or below 15%. Overall, the share of owners is high across all variables considered here.

As in Bulgaria, homeowners make-up the largest share of households across various other households characteristics indicating that a majority of households will have the autonomy to undertake energy efficiency renovations or changes in heating technologies, if the financial means are available. Especially those living in rural areas who are more likely to be heating with fossil-fuels will be homeowners.

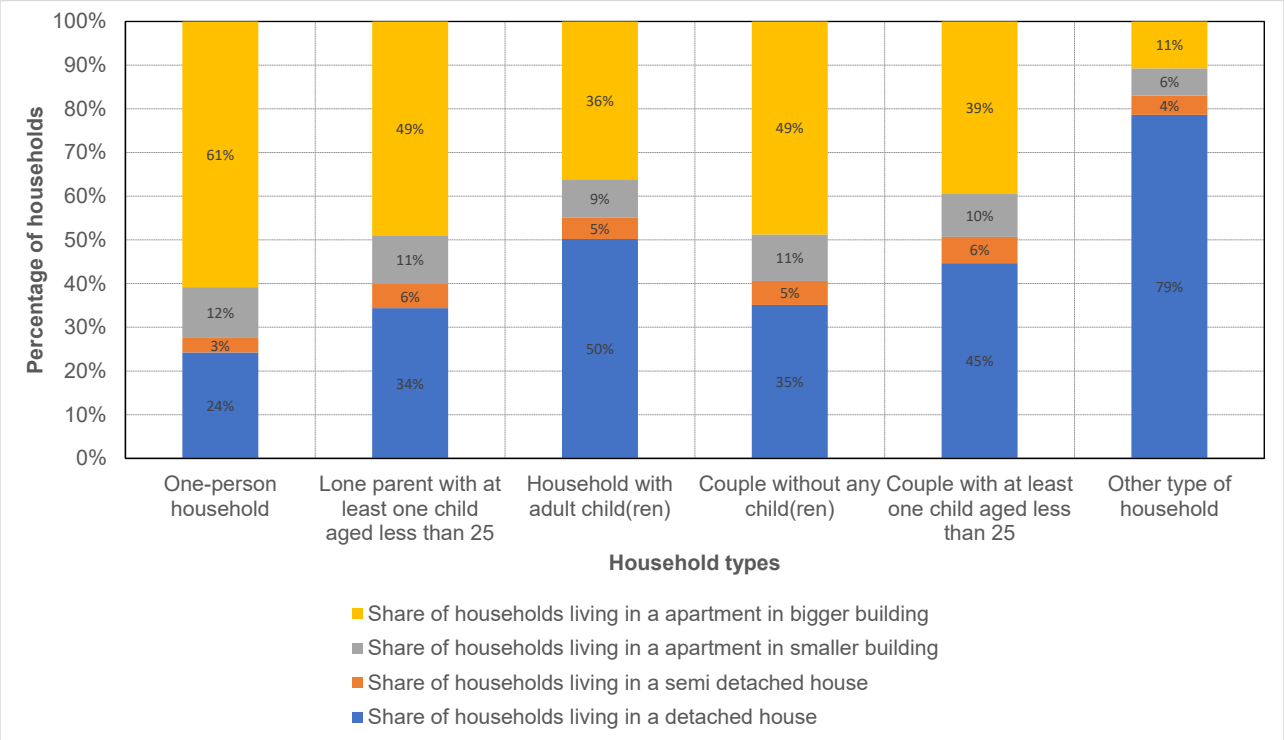
When looking at the type of housing occupied by households, the pattern is less clear:

- 53% of households in the first income quintile live in detached or semi-detached houses (Figure 5-29). This share drops slightly as income increases.

- By degree of urbanisation, the distribution is similar to Bulgaria and Czechia and the share of households living in houses is significantly higher in rural areas (80%) than in densely populated areas, where apartments dominate (Figure 5-30).
- Households with adult children and couples with at least one child are also more likely to live in a house rather than an apartment, while 73% of single-person households live in apartments (Figure 2-8).

In rural areas, where the reliance on fossil-heating is slightly higher, SFH homes dominate. Low-income groups, who do not have the capital to make necessary investments to offset higher energy prices due to the ETS2 (or otherwise) live in both SFH and MFH and are likely spread across urban and rural areas.

Figure 2-8: Dwelling type by household type in Poland



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "semi detached house" should be flagged for "Lone parent with at least one child aged less than 25" (20 - 49 observations).

2.4.3 Overview of energy poverty and vulnerabilities

The share of energy poor households in Poland varies significantly by indicator (Figure 5-31). Less than 6% of households report being unable to keep their home adequately warm and around 4% that they have arrears on their utility bills. In contrast, 12% of households have very high heating fuel expenditures and 24% have very low heating expenditures, indicating that they may be underheating due to financial restraints.

Looking at the “inability to keep home warm” indictor, some groups stand out as being more affected:

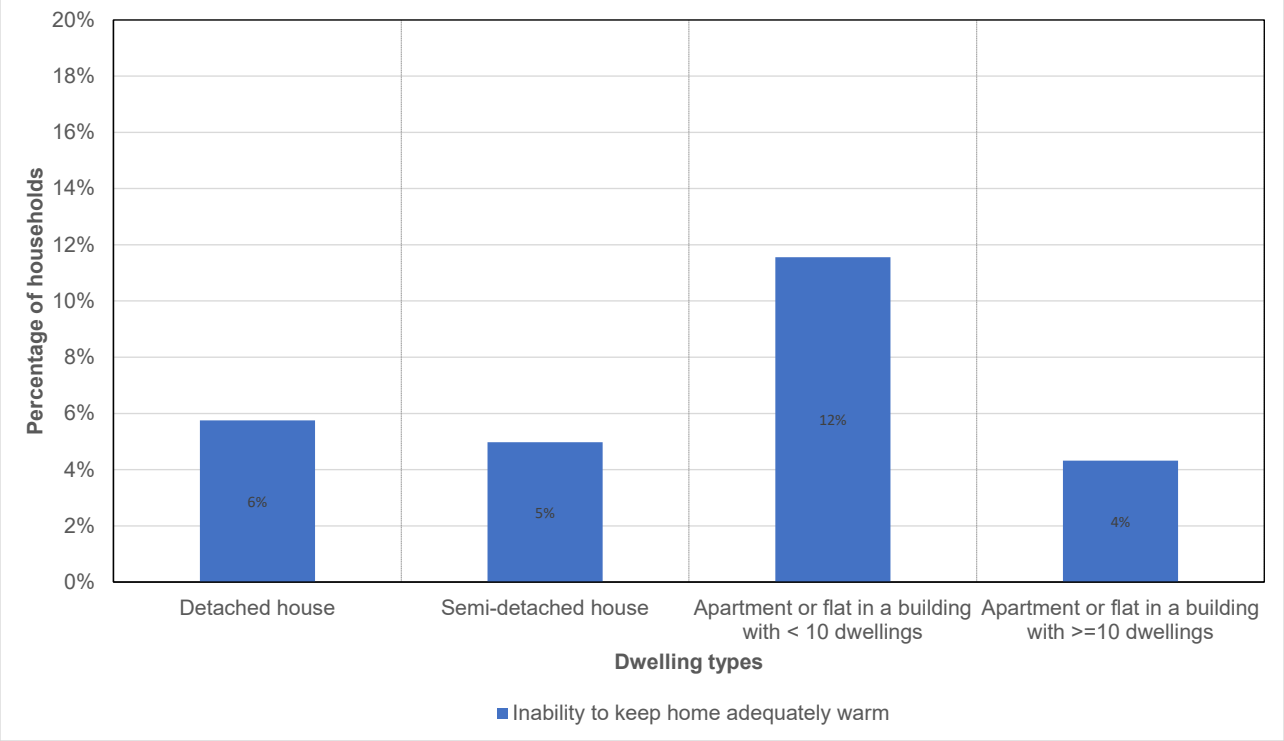
- 11% of households in the lowest income quintile report an inability to keep their home adequately warm. This share drops steadily across income quintiles (Figure 5-32).
- There is a slightly higher share of households reporting this in rural areas (6.4%) than in densely populated areas (5.3%) (Figure 5-33).
- Households living in small apartment buildings are disproportionally affected (Figure 2-9). 12% of these households are in self-reported energy poverty based on this indicator.
- 9% of single parents and one-person households report their inability to heat their home, which is higher than other household types (Figure 5-34).

Similar trends can be seen based on the “arrears on utility bills” indicator:

- The share of households reporting arrears on their utility bills is significantly higher in the first income quintile (7%) in comparison to all other quintiles (3-4%) (Figure 5-35).
- Households with reported arrears are evenly distributed across rural and urban areas, with no significant differences in the share of households affected (Figure 5-36).
- Single parents are, however, disproportionally affected: 8% report arrears on their utility bills, while all other household types show a share of 2-5% of affected households (Figure 5-37).
- The share of affected households is also significantly higher at 9% for those living in small apartment buildings than in all other dwelling types (Figure 5-38).

The energy poverty indicators show that low-income groups are already in precarious situations with regard to their energy costs. Single parents stand-out as an affect group, as well as one-person households. Those living in small apartment buildings also report higher shares of energy poverty according to this indicator. As fossil-fuelled heating becomes more expensive, if households are already affected by energy poverty these price increase will further exacerbate these precarious situations.

Figure 2-9: Inability to keep home warm by dwelling type in Poland



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

3 Synthesis: linking vulnerabilities and policy needs

This analysis of energy cost burdens, the reliance on fossil fuels for heating, the living conditions of households, and the characteristics of households in energy poverty using the HBS and SILC microdata gives an indication of which groups are most likely to be vulnerable to price increases due to the ETS2 and are already in precarious situations, such as low-income or self-reported energy poverty. Identifying these groups consequently supports policy design to ensure that funding is used effectively and where it is needed most.

The following household characteristics were identified as relevant with regards to the implementation of the ETS2:

- Primarily, **households reliant on fossil fuels for heating** will see increases in their heating costs with the implementation of the ETS2. In these three countries, these are often households in rural areas that do not have access to district heating networks. As was identified in Bulgaria, however, indirect price spikes may also affect households reliant on other heating sources such as firewood, for example.
- Of these, **low-income households** who do not have the financial means to undertake significant retrofitting measures will require financial and institutional support to move away from these fossil-fuel heating sources or make energy efficiency improvements.
- **Households living in MFH and/or as tenants** are faced with additional challenges, such as higher costs and longer renovation periods due to the large building size and in incentivising landlords to undertake such retrofitting measures. Homeowners in SFH benefit from their freedom to make choices about their dwelling and to undertake changes.
- Finally, **energy poor households**, as these are already experiencing energy-related hardship and increases in energy prices (direct or indirect) are a significant additional burden. Several EU regulations also require policies to address this group, such as the Energy Efficiency Directive EU/2023/1791 (EED) and the Energy Performance of Buildings Directive EU/2024/1275 (EPBD).

In light of these key characteristics, the overall household living situation for the three countries is summarised below. Overall, in **Bulgaria** policies should focus on low-income households, single-family homes, homeowners, and rural areas. Combining these aspects for targeted support would be beneficial as there are significant overlaps in these groups. But specialised support is also needed for: low-income tenants and single parents living as tenants in multi-family homes, both groups that are also likely to live in urban areas.

In Bulgaria, levels of energy poverty are high overall and **low income** is a significant driver of energy poverty. It is for example, especially high for the first income quintile in the “inability to keep home warm” indicator. These low-income households also report a high relative heating cost burden. Although the reliance on fossil fuels for heating is low across all groups, indirect price increases are likely to affect the prices of other heating sources, such as firewood, a heating source low-income groups are highly reliant on. Low-income groups are slightly more likely to be tenants, but the share of homeowners is still high, and they are more likely to be living in single-family homes than apartments.

Differences between **rural and urban** areas are not significant when looking at these indicators of energy poverty, but there are more households reporting arrears on their utility bills in rural areas. Additionally, both relative and absolute heating related costs are higher in rural than urban areas, which may indicate lower energy efficiency of dwellings in some cases. In these rural areas the majority of households live in single family homes.

The “inability to keep home warm” and the “arrears on utility bills” indicators are both higher for households living in **single-family houses**, which coincides with the high share of households living in houses rather than apartments overall. As indicated, this share of households living in SFH is higher in low-income groups and rural areas.

Single parents are also identified as a vulnerable group with higher shares reporting their inability to keep their home adequately warm than other household types. This group is also slightly more likely to rent and live in multi-family houses than other household groups, which applies to around a third of this group.

Overall, in **Czechia** levels of energy poverty differ significantly depending on what types of indicators are considered. When looking only at the self-reported “inability to keep home adequately warm” indicator, low-income households, households living in (small) MFH, and single parents emerge as possible target groups for policies. Due to a high reliance on fossil fuels, targeted support is also needed for rural areas. For all groups this should cover both tenants and homeowners. Finally, single parent tenants living in MFH thus likely in urban areas can also be considered a vulnerable group.

In Czechia, **low incomes** are also linked to higher levels of energy poverty e.g., the “inability to keep home warm” indicator. Low-income households also have a higher heating cost burden, spending higher shares of their total expenditure on heating than other households with a high reliance on gas and oil for heating. The share of tenants is also higher in low-income groups, although there are still around 60% of households in the first income quintile that are homeowners.

No significant differences in the “ability to keep home warm” indicator can be observed across degrees of urbanisation, but the reliance on fossil fuels for heating is significantly higher in **rural areas**. The share of expenditures on coal for heating in particular rises sharply in rural areas. Both the share of homeowners and SFH is higher in rural areas.

Indeed, higher levels of energy poverty can also be observed in **small multi-family homes**. The share of households living in MFH is relatively consistent across income groups at around 50-60%, but higher in rural areas.

Finally, **single parents** stand out as a group where 30% of households report an “inability to keep home warm”, which is higher than for other household groups. These households are also more likely to be tenants and live in apartments than other household types.

Overall, in **Poland** there should be a strong focus should be on homeowners, as this is high across all income groups and degrees of urbanisation. Low-income households in both MFH and SFH, but particularly those in small multi-family homes likely in urban areas, fossil-fuel reliant households in rural areas who are likely living in single-family homes, and both single parent tenants and one-person homeowners, should be targeted by housing policy.

In Poland, **low-income** households are also more strongly affected by energy poverty than other groups. Based on various studies based on national data sources, low-income groups also report (very) high energy costs burdens. Around 50% of low-income groups live in SFH.

A significant share of households affected by energy poverty based on both self-reported indicators examined in this report can also be found in **small multi-family homes**. This coincides with around half of households in the lowest income quintile living in MFH. Since the share of single-family homes is significantly higher in rural areas, this points to affected households living in urban areas.

Although the energy poverty indicators do not show differences in the number of affected households across degrees of urbanisation, the reliance on coal (as well as gas) for heating is significantly higher in **rural areas**. As mentioned, the share of SFH in rural areas is very high.

In terms of energy poverty, two additional groups are more affected than others: **single parents**, as well as **one-person households**. Around a third of single parents are tenants that live in both MFH and SFH, while almost 80% of one-person households are owners and the majority live in apartment buildings.

4 Qualitative assessment of the current policy landscape in relation to the ETS2

Identifying vulnerable groups and targeting policies has also been a point of discussion within the three Member States. Most recently, the first drafts of the SCP have been submitted by MS. The plans for Bulgaria and Poland (Portal Funduszy Europejskich 2025) have been made publicly available, while Czechia's SCP has not been published. In these, groups vulnerable to the introduction of the ETS2 have been identified and measures developed to support them. Based on these plans, further relevant national research, as well as expert interviews, the first section of this chapter summarises these current developments.

This then opens up the discussion about different approaches to policy design and how this is being tackled in the draft SCP. This includes discussing trade-offs between targeted and blanket support, providing direct financial compensation and funding retrofitting programs, focusing on deep renovations or low-intervention energy efficiency measures, and prioritising MFH or SFH homes as well as the tenant-landlord dilemma. An assessment of the chosen approaches and the targeting within the SCP based on the findings from the quantitative analysis in this report highlights policy gaps and provides recommendations for further policy design with regard to the SCF and the ETS2.

4.1 Identification of vulnerable groups: status-quo and the Social Climate Plans

Energy poverty was first defined in **Bulgaria** in the Energy Act in 2023 (Simeonov 2024). This was based on research conducted by the Economic Research Institute of the Bulgarian Academy of Sciences and included estimations of energy poverty using 12 different indicators. One of these was then adopted as part of the official definition of energy poverty in Bulgaria, which combines a relative and an absolute approach, includes an energy component to measure energy efficiency, and shows high levels of energy poverty in the lowest income deciles (Peneva 2024). Based on this indicator, around 30% of households, 1.8 million people, are in energy poverty (Krassen 2025). Experts report, however, that despite the introduction of the official definition, Bulgaria lacks a coordinated effort to combat energy poverty. This forms the basis for the SCP.

The draft SCP was completed by the Council of Ministers Administration, a central governing body comprised of the prime minister and the ministers, on the 30th of June 2025. Preceding the publication, public consultations were held that allowed NGOs and other experts to provide input into the plan. As part of the current SCP draft, a vulnerable household is a household that meets one of the following criteria:

- "an energy-poor household" as defined in the Energy Act (EA), which is a household that, at current energy carrier prices, has a disposable average monthly income per household member for the previous year less than or equal to the official poverty line, after deducting the household's expenditure for the typical energy consumption determined by reference to the energy characteristics of the dwelling, and that therefore lacks access to basic energy services for adequate heating, cooling, lighting, and energy provision.
- household affected by the price impact of the inclusion of greenhouse gas emissions from the buildings sector in the scope of Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading, which has an income equal to or less than the average income per person in the household for the country as a whole according to the NSI Statistics on Income and Living Conditions (SILC) survey for each household member.

Based on the first definition, around 897,000 households are energy poor in Bulgaria (2024). In this energy poor group only 2% of households heat using fossil fuels, confirming that the dependence on fossil fuels for residential heating is not particularly high for low-income groups as seen in Figure

2-1. For the second definition, only households using natural gas, coal, and liquid fuels for heating are considered – the 2% within the first group are not counted again. This amounts to around 330,000 households or 11.5% of the total number of households (2023). Of these 175,000 households have an income less than or equal to the national average. In total, around 1,018,000 households (35.5%) in Bulgaria are considered vulnerable under the SCP.

In **Czechia**, the Ministry of Environment is responsible for the development of the SCP. This has been supported by the Technical Support Instrument of DG REFORM. The Czech SCP has not been made public so far, but previous research on energy poverty gives some indication of the direction it may go in. As early as 2015, a working group was established at ministerial level to address energy poverty in the country and definitions and indicators, drawing on EU-level guidance, were included in the National Energy and Climate Plan (NECP) (Koďousková and Lehotský 2021).

Nonetheless, there is no official definition of energy poverty in place and discussions around the measurement of energy poverty are still ongoing at a ministerial level. According to national experts, the Ministry of Industry and Trade is responsible for developing an energy poverty definition at national level. This is coupled to the transposition of the EED and the definition includes elements of low income, high energy costs, and high energy consumption. The energy performance of buildings is used as a baseline for determining energy consumption and is based on a building register, although the number of registered buildings is limited and will be strengthened through mandatory renovation passes. Vulnerable households are defined in the SCP as per the regulation and, according to experts, focuses on households living in social housing thus explicitly identifying tenants as a vulnerable group.

Based on national studies and depending on which indicators are used a range of 2-25% of the population is affected by energy poverty (Zpracovala 2022). The self-reported indicators based on the EU-SILC indicate the lowest shares, which is consistent with our analysis in Figure 5-21, while expenditure indicators are much higher. A study synthesising the four common EU indicators, shows that highest share of affected households, indicating that up to 2.7 million people are affected by at least one of the four indicators (Vysoká škola ekonomická v Praze 2021). Depending on the indicator that is used, different groups are identified as particularly affected (Vysoká škola ekonomická v Praze 2021). Overall, pensioners tend to have high relative energy expenditures but are less likely than other groups to have arrears in their utility bills, for example.

A recent study prepared for the Ministry of Social Affairs estimates that around 13% of the population – 1.3 million people in 700.000 households – live in energy poverty in Czechia (Rovenský 2025). This is based on households falling into one of the following groups: inability to afford their own home, arrears on their utility bills, or spending more than 20% of their income on energy costs. Within this group children and seniors make up significant shares. Additionally, tenants and low-income homeowners are identified as particularly vulnerable. This is in line with findings outlined in section 3.

In **Poland** the Ministry for Development Funds and Regional Policy is responsible for the development of the SCP. The ministry is also working on a medium term development strategy, which includes priorities of investment policy and regional and industrial policy (Ministry of Development Funds and Regional Policy 2024). This includes an emphasis on climate change, energy transition, and decarbonisation in the European context. It should be noted, however, that another ministry, the Ministry of Climate and Environment, that is responsible for the implementation of the ETS2.

In terms of identifying vulnerable groups, the SCP refers to the definition of energy poverty in the Energy Law (Climate Change Laws of the World 2025):

- a situation in which a household run by one person or by several persons jointly in a self-contained dwelling or in a single-family dwelling in which no commercial activity is carried out cannot secure sufficient heat, cooling and electricity to power appliances and for lighting, where the household collectively meets the following conditions: it has a low income, it has high energy expenses, it resides in a premises or building with low energy efficiency.

In the SCP several possible indicators are mentioned to measure the phenomenon. These include the 2M indicator, as well as the SILC-based indicators suggested in the Energy Efficiency Directive (EED) (Directive (EU) 2023/1791 2023): “arrears on utility bills”, “leak, damp and rot in the building”, “at risk of poverty”, and “inability to keep home warm”. The indicator “low-income, high-cost” (LIHC) is also included as an additional measure for energy poverty, that is deemed as particularly good for capturing the phenomenon in Poland, according to experts. The indicator is based on a previous measure of energy poverty developed in the UK, that captures households that need to spend a large portion of their income on energy.[8] The SCP includes a variety of measures and provides multiple indicators for energy poverty, the Reform Institut criticises the lack of clarity in the SCP around the measurement of energy poverty (Instytut Reform 2025).

Ultimately, the Polish SCP uses the arithmetic average of the four SILC indicators to measure energy poverty – around 7% of all households in 2023. The 12% of affected households based on the LIHC indicator in 2023 are used as an additional measure. Overall, around 1.5 million households are considered energy poor according to the SCP.[9] The plan gives additional details on affected households, including the prevalence of low income, that affected households are more likely to live in rural areas, in older single-family houses that are privately owned, and that the risk of energy poverty is highest amongst pensioners and those receiving welfare support. Residents of single-family homes built before 1980 are considered particularly vulnerable to the price increases.

Additional studies based on 2020 HBS data differentiates levels of energy poverty based on a variety of indicators by income deciles.(Gutowski and Glowacki 2023). Results show that in the first and second deciles most indicators of energy poverty range from 30-40% and are significantly lower for middle income groups, especially for the LIHC indicator. They also identify pensioners, those living off unearned payments (such as welfare payments, donations, or rental income) as well as farmers as particularly affected groups.

Earlier studies based on national HBS data from 2017, also indicate that around 12% of the population is energy poor (Rutkowski et al. 2018). According to this data, affected households usually live in rural areas or smaller towns and do not generally have access to district heating networks. This confirms what was found in this report based on Figure 2-7, for example. Another commonly applied indicator is the 2M indicator, where households have energy expenditures that are equal to or more than twice the national median. Based on this indicator, 2.4 million households were considered energy poor in 2017 (Sokolowski et al. 2019). Additional findings indicate that most affected households live in older dwellings and that coal, wood, or oil stoves as the main heating source were the most common heating sources for energy poor households regardless of the indicator used. A study focusing solely on women facing energy poverty in Poland, finds that of the 1.2 million households in energy poverty, 12% are households headed by a women, the majority of which are either living alone or are single mothers. This coincided with findings in section 3, that single parents should be a priority policy group (Mazurkiewicz et al. 2023).

[8] See for example: Galvin (2024)
[9] The draft plan does not distinguish between energy poor and vulnerable households in the buildings sector.

4.2 Discussion of relevant policy dichotomies: planned and current measures

Based on the identification of vulnerable groups, the SCPs lay out measures to provide targeted support to these groups. These measures should be in addition to already existing programs and ETS2 revenues provide an additional source of income for MS to develop and invest into further programs in the buildings sector. Based on findings in sections 3 and 4.1, this section discusses potential policy priorities for programs in the buildings sector.

4.2.1 Targeted interventions vs. blanket support

The SCF specifies that measures need to be targeted at vulnerable groups, while the stipulations for ETS2 revenue use only determine that they must be used for climate and social actions. It is therefore relevant to consider whether spending should be targeted at specific groups or blanket support is more favourable. It should also be noted that the extent of targeting can also vary greatly.

Overall, scepticism of EU policies is high in the three MS and national political agendas tend to further push this critical interpretation. Additionally, taxes and carbon taxation schemes in particular are not massively popular, meaning that support for the ETS2 in the general public is likely to be low. Experts in Poland, for example, indicated that the ETS2 is largely being kept out of the media and has received little attention in the general public, being brushed off as “just another Brussels tax”.

During the energy price crisis, many MS focused on providing blanket support, rather than targeted income or price related measures (Sgaravatti et al. 2023), and in the redistribution of ETS2 revenues similar mechanisms have been discussed. Arguably, the acceptability for the carbon tax will increase, if the general public feels they are being reimbursed and that this will alleviate any additional financial burdens. Research on the acceptability of carbon taxes finds, however, that allocating revenues within the tax domain, i.e. carbon tax revenue allocation for climate measures, boosts favourability (Mus et al. 2023). Mixed revenue use that includes portions earmarked for supporting low-income households is also likely improve acceptability (Maestre-Andrés et al. 2021). Similarly, a study from Germany, France, and Poland finds that a majority of the voting population is in favour of ambitious climate policy and support the financing of related measures (Abou-Chadi et al. 2024). The study, however, also shows a low favourability rating for CO_2 taxes and reflects higher approval for targeted compensation mechanisms to offset negative distributional effect.

Indeed, from a distributional perspective it is clear that the ETS2 will be regressive and have a stronger impact on low-income groups. From a purely economic stand-point, different groups should be supported based on the expected negative impact that the ETS2 will have on them and thus targeted support to identified vulnerable groups a priority.

A study carried out in **Poland** analysed the changes in household welfare based on three scenarios that included no additional support for households, equal support for all, and support only for the lowest three income groups (Gutowski and Glowacki 2023). This assumed an average allowance price of 70 Euros and that around 800 million Euros would be available for direct financial compensation. Results show that only when all direct financial support is entirely dedicated to the lowest three income deciles, declines in household welfare would be more or less offset for these income groups. Higher income groups would still experience losses in household welfare, which no distribution mechanism would be able to offset. If additional price stability mechanisms are introduced, the assumed funding would be enough to offset negative effects for the lowest three income groups. This further points towards the need for additional revenue use for targeted rather than blanket support for all households. It also suggests that direct-financial support instrument are

needed even when investments in energy retrofitting are being made. This is discussed in more detail in section 4.2.2.

The targeting of measures can, however, differ greatly in its extent. For example, in the **Polish** SCP, the direct-income support is currently targeted at the elderly with low-income that are reliant on fossil-fuels[10]. This is aligned with research in Poland, suggesting that older individuals living alone are particularly affected by energy poverty (Mazurkiewicz et al. 2024). While this is one of the groups identified to be most at risk in the SCP, they are not the only group who will require direct financial support as fossil fuel prices rise. Rural populations and those living in older buildings not connected to the district heating system will likely experience price spikes, as shown in various national studies and reported in the SCP itself. According to national experts, the targeting of the elderly is likely due to an easy distribution system for this group via their pension payments. Often the distribution of payments is a key difficulty in the implementation of financial payments and can result in an overly specific targeting that excludes other key groups. The plan acknowledges that this narrows the target group and includes the possibility of extending the direct-payments to other groups but does not specify how. 5.7 billion Euros are allocated to these direct payments.

Additionally, retrofitting measures outlined in the SCPs are specifically targeted at vulnerable households, usually as indicated by low-income coupled with low energy efficiency and a dependence on fossil-fuelled heating. This kind of targeting of measures ensures that those households that will be most directly affected by the carbon tax, receive additional support when they cannot cover high costs for structural measures themselves. On the other hand, it can be argued, that targeting should focus on Worst-Performing-Buildings (WPB) that face the greatest investment effort and the greatest potential reductions (Buk and Izdebski 2024). Focusing additional spending of ETS2 revenues towards WPB could also support MS in meeting requirements from the EED and the EPBD, that also stipulates this additional targeting for energy efficiency savings.

Revenue use from the ETS2 could therefore further support the most vulnerable households, but on the other hand, the energy transition needs to be pursued amongst the entire population. Providing funding support as incentives for a broader group can be beneficial considering that energy use and the possibilities for energy savings are usually higher in high income households. Possible mechanisms include developing renovation schemes that provide various stages of funding support based on income, for example, or projects that target broader infrastructural developments.

4.2.2 Retrofitting vs. direct-compensation

The previous section already discussed differences in whether support is provided for renovations or in the form of direct-financial compensation. The SCF Regulation dictates that up to a third of the funding can be allocated to direct payments, while the rest has to be related to energy efficiency investments in the building and transport sector.

Direct-financial payments are particularly important in the early phases of the ETS2 implementation, as prices are likely to rise immediately and steadily, but measures to renovate buildings or switch heating sources will take time to implement and vulnerable households will require financial support during this transition period. A study from Poland, argues more directly that such transfers will be necessary even if extensive investment support programs are implemented, as they would not fully protect against rising energy poverty levels in Poland (Gutowski and Glowacki 2023). To offset immediate price shocks, direct financial support is crucial in supporting low-income and vulnerable

[10] As reported through the Central Emission Register of Buildings (CEEB).

households. To ensure effectiveness, these have to be designed in a way that enables simple and fast distribution (also to avoid additional administrative burdens) and should ideally match the additional financial burden experienced by households. Research on the acceptability of carbon pricing mechanisms has shown that opponents of a carbon tax tend to favour direct financial transfers to all or low-income households (Maestre-Andrés et al. 2021). Direct payments can therefore also have an important signalling function when acceptability is low.

In **Bulgaria**, just under 450 million Euros are planned for direct income support – this covers both the buildings and transport sector for which two separate mechanisms are planned. For the residential sector a voucher mechanism is envisioned for vulnerable households as defined in the SCP. These vouchers can be used exclusively to pay for gas or solid fuel. Heating by these means is therefore a criterion that households must meet to receive this payment, but additional income support is also planned for households heating with wood, as increases in transport costs due to the ETS2 are expected, although it is unclear how much financing will be allocated to this group. It is estimated that this will amount to around BGN 61 (31 Euros) per year. It is assumed that 208,000 households will benefit from this direct income support.

These direct payments will provide important immediate relief to affected households as prices rise but are only a short-term measure that does not lead to long-term resilience against higher fossil fuel prices. Indeed, the ETS2 price will increase significantly over time, as the aim of the mechanisms is to reduce carbon emissions, improve energy efficiency, and reduce reliance on fossil fuels. While direct financial support can be an important mechanism to ensure households are not falling into energy poverty (further) because of carbon pricing mechanisms, additional measures are needed to ensure that vulnerable households have the opportunity to partake in and benefit from these transformations. These measures will ensure long-term resilience against further energy price increases, ensure that climate goals at EU and national level will be met, and that households are not being left behind.

4.2.3 Deep renovations vs. low-intervention measures

When developing and financing energy efficiency measures, further distinctions can be drawn between those programs that aim at deep renovations and others that focus on smaller, low intervention measures to improve energy efficiency.

On the one hand, deep renovations are often necessary. Especially when the housing stock is older, few renovations have been undertaken, and additional work is necessary for energy efficiency upgrades and heating exchanges. In the long-standing **Czech** New Green Savings program – a program to provides grants for energy retrofitting to households and is being expanded for the SCP with a stronger focus on low-income households – for example, experts report that sometimes additional extensive upgrades that are not related to energy efficiency initially are necessary and thus financed, such as bad roofs preventing the installation of PV (Gellová et al. 2025). The installation of heat pumps is also most profitable when the energy efficiency standard of the building is already high, hence often requiring additional upgrades before a switch in the heating system. Such deeper retrofitting measures are often more time intensive, sometimes also requiring longer preparation periods and potentially multiple contractors. It may also be more complicated to identify relevant buildings and households needs for more comprehensive renovations. Nonetheless, deep retrofitting of highly inefficient buildings occupied by vulnerable households is necessary to reduce high cost burdens in the long term, improve resilience, and ensure participation in the energy transition, and should therefore be continuously financed alongside other low intervention energy efficiency measures. The multiple iterations of the New Green Savings Program have seen high uptake rates, which speak for the necessity and success of such a deep renovation program.

Such deep renovation measures can also ensure that households will not require consecutive renovations in their dwellings but can upgrade their energy efficiency status significantly within one cycle. This often also means that additional costs (such as scaffolding) can be bundled and minimised. Within the mentioned New Green Savings programs, additional support is provided through an advisor that supports households during the entire process in more extensive retrofitting projects as these can be difficult for households to navigate. This helps to improve uptake and ensure smooth implementation of programs.

Low intervention measures on the other hand can be easier and faster to implement. This would include single measures such as the replacement of windows and insulation of doors, for example. Within the available timeframe given by the SCF, such retrofitting measures could be rolled-out quickly and therefore provide relief for a larger number of households. Such measures could also include informational and advisory programs, where households are supported in managing their energy consumption or supported with small interventions, such as LED lightbulbs or changes in electrical appliances. This is usually more common with regards to electricity consumption rather than heating, but could still be relevant especially in countries, such as Bulgaria, where a large number of households are energy poor, but reliant on electricity for heating and indirect electricity price surges are expected.

The SCP for **Bulgaria** therefore also includes a measure for the replacement of old electric appliances. They are often inefficient and drive up electricity costs. The SCP draft expects an average reduction of electricity consumption of 25-40% for households, which would significantly reduce energy-related cost burdens for energy poor households. This kind of measure is relatively easy to roll-out via the issuance of e-vouchers with registered traders that will then be reimbursed by the municipalities. The program aims to reach around 166,000 households by 2031 with around 140,000 Euros of funding.

Providing advice to households is also an important tool to ensure that deep retrofitting is being carried out and grant applications submitted. In **Poland**, EcoAdvisers support households at the local level (through local governments) to provide information on measures and help with applications for funding programs (Gellová et al. 2025). Their work covers a wide scope including education activities, developing local strategies, reporting on implementation and so on, meaning they are not only focused or specialised in supporting households. These advisors used to be financed through EU funds but are now allocated to local government budgets. Further advisory support is also planned in the Polish SCP. It foresees 7.9 million Euros for the training of social assistance institutions to provide additional support to energy poor households. On average, each municipality should have two people with the relevant training. Similarly, in **Czechia** 80 million Euros are allocated through the SCP to consulting measures, including energy consulting, supporting vulnerable families with small-scale energy savings in the home, as well as vulnerable households in energy communities.

4.2.4 Multi-family homes vs Single-family homes

Finally with regards to targeting, a central concern that emerges out of the SCP is whether to focus on single-family or multi-family homes. For all three countries both national studies and findings from this report point towards households in single-family homes being strongly affected by the ETS2, with some specific groups living in MFH that should not be forgotten, although in Czechia the distribution of vulnerable groups in MFH and SFH is less skewed. In addition, while the majority of households are homeowners, including vulnerable and energy poor households, some vulnerable tenant groups were identified, who are reliant on their landlords to undertake renovations while keeping rents stable.

Based on the 2021 National Population and Housing Census the **Polish** SCP highlights that 90% of the housing stock in Poland are single-family homes. The share of single-family homes is slightly higher in rural areas (97%) than in urban areas (81%), which is in line with findings based on the SILC microdata in Figure 5-30. These are primarily houses built before 1990 that are characterised by low energy efficiency and 60% of these buildings use solid fuels (such as coal or wood) as the main source of heating, making this a target group for the SCF funded measures. Data in this report has shown, however, that households living in smaller apartment buildings, likely in urban areas, and where some vulnerable groups may also be tenants should also be considered a target group alongside SFH homeowners (see section 3). Providing support for MFH is often more difficult because structural changes to the roof, insulation or the heating system affect all parties in the house, in case of multiple owners requires additional coordination, and due to the size of the building may also be more costly. Conducting deep retrofitting on MFH, such as wall insulations, can also be more time and labour intensive meaning that potentially fewer buildings can be tackled within the timeframe of the SCF. Extending programs beyond the scope of the SCF with adjustments is likely to be necessary.

The current Polish SCP foresees investing further in the already existing Clean Air Program, targeted at single-family homes, while multi-family homes are primarily being tackled through the investment in social and community housing development – the SCP foresees supporting thermo-modernisations of municipal housing that are rented to low-income households, i.e. social and communal housing. Just under 750 million Euros are allocated towards this program. The Clean Air Program is highlighted as the flagship measure in the SCP, receiving 3.1 billion Euros of funding, providing grant support for energy retrofitting with high levels of funding for low-income households.

Additional funding from the ETS2 revenues could therefore be funnelled into developing a targeted program for MFH in urban areas. Often these groups identified as vulnerable in MFH are tenants and single parents, which is also the case in Bulgaria. Although this may affect less households overall, their vulnerable status will be exacerbated if there is no targeted support is offered.

The current New Green Savings Program in **Czechia** provides grants for energy retrofitting for both single- and multi-family homes (Gellová et al. 2025). The program focuses on thermal insulation measures and improvements in heating efficiency, but also supports the installation of renewables. Between 2009 and 2024, 153,000 single-family homes and 9,400 multi-family homes saw renovations completed, showing that despite a broad coverage, multi-family homes are significantly less likely to undertake financed renovations. For projects in multi-family homes, the program implements a bonus that is paid to the Homeowners Association, a separate legal entity that manages multiple owners in one building, as part of the subsidy. This bonus has to be used to support any vulnerable households in the building, for example through a reduction of their payments to the association. According to the implementers, this is an important element of the subsidy, which helps to rally support for the renovation measure in the building. The New Green Savings Light sub-program was launched in 2023 and is specifically targeted at vulnerable households, including pensioners, those on disability pensions or receiving housing benefits. This is the flagship program of the Czech SCP. Notable in this sub-program is, that households get up to 100% of their costs covered and do not have to provide up-front financing themselves. Whether the total subsidy available is high enough to conduct extensive retrofitting work is, however, unclear. The current Czech SCP foresees around 650 million Euros funding to continue the New Green Savings Light program. Using ETS2 revenues to further fund and support this existing program could help to ensure that all vulnerable groups are receiving support. It could also serve as an implementation example for other MS to expand existing projects to MFH.

One of the four measures suggested by the **Bulgarian** SCP is a renovation scheme for energy poor and vulnerable households living in multi-family residential buildings. Of the around 1.5 billion Euros allocated to the buildings sector and vulnerable households, around 60% of funding will go into this program. The aim is to improve energy performance of buildings, upgrading heating installations, promoting the use of renewable energy, and provide guidance on cost-effective energy consumption through behavioural measures. This program builds on previous experience with renovation programs for multi-family buildings and as part of the National Recovery and Resilience Plan. For affected households 100% grant funding will be provided. Experts criticize this focus on multi-family homes, as the majority of households overall, but particularly those in energy poverty, live in single-family homes (see also section 3). This is aligned with findings based on the SILC microdata in this report. They argue that the program is not well targeted at the affected groups and that financing is not well invested. The plan estimates that the scheme will support around 25,600 vulnerable households, only around 2.5% of identified households.

The Warm Homes program focuses on renovations in single-family houses. The Plan indicates that almost 1.3 million residential buildings, around 90%, are single-family homes that are primarily located in smaller towns and villages. This program therefore foresees financing single energy efficiency measures including window replacements, wall, roof, and floor insulations, as well as the installation of new heat pumps, in the form of lump sum grant payments. The responsibilities for this program will lie primarily with the municipalities through collection applications, assessing eligibility, and all other administrative duties. The scheme aims to support around 12,000 households with at least one measure and at least 2,300 households with the installation of a heat pump. Considering the large number of affected households and the allocated 200 million Euros for this program, it is unlikely that significant improvements for this group will be possible.

In Bulgaria, additional funding will be required from the ETS2 to ensure that households in single-family homes are adequately supported. The Warm Homes scheme is a step in the right direction, but the strong focus on multi-family homes and significant funding allocated to this through the SCF will have to be compensated.

Finally, households living in multi-family homes are often more likely to be tenants. The share of tenants is not particularly high for any of the three MS considered in this report, but individual vulnerable groups were identified as more likely to be tenants, including single parent or one-person households. Supporting tenants to improve energy efficiency is more difficult, because the incentive for landlords to undertake renovations or replace gas boilers is usually not given. Either the benefits of such measures, such as a reduction in energy costs, are felt by the tenant and are hence not a motivator for the landlord to invest in their property or when improvements are made rents increase, and the tenants face similar or higher overall cost burdens sometimes leading to being pushed out of their current tenement.

Potential measures to address this tenant-landlord dilemma include regulating energy efficiency standards for rental properties, which would ensure that landlords provide housing of a high (efficiency) standard. Additional subsidies and grants can also be provided to landlords to incentivise investments. These should ideally be coupled to binding rental agreements that protect renters from being priced out after retrofitting. This is, for example, foreseen in **Czechia** with a program for targeted renovations of apartment buildings which includes rental obligations for landlords in the eligibility criteria. 280 million Euros are planned for this program as part of the SCP. In **Poland**, 743 million Euros are planned for the renovation of municipal housing as well and the focus on the elderly as a particularly vulnerable group is supporter further through a program that focuses on providing energy efficiency assisted housing to pensioners.

To provide additional affordable rental housing, Poland and Czechia are also planning to finance new social housing construction through the SCF. In Poland the Social and Community Housing Program aims to provide affordable housing to households who cannot afford renting on the private market. 1.4 billion Euros will be provided to municipalities for construction, aiming to deliver affordable housing to around 110,000 households. In Czechia 570 million Euros are foreseen for the construction of energy efficient rental housing for vulnerable households.

5 Synthesis: targeting of vulnerable groups through the SCP and identifying policy gaps

Based on the draft SCPs and further insights from national experts, the following section provides an initial assessment of whether the identified groups from the quantification in this report are targeted in the current planned policies in the SCPs.[11]

In **Bulgaria**, the low reliance on fossil fuels amongst energy poor and low-income means direct impacts of ETS2 will be limited, but indirect impacts are likely as gas and firewood prices are closely corelated to electricity prices, according to experts. The SCP acknowledges this and includes energy poor households as a target group. There is, however, no further differentiation of vulnerable groups that guides targeting of the planned programs. Direct-income support is only specified for low-income households reliant on fossil fuels and within the retrofitting programs MFH homes are prioritised, although the majority of vulnerable households live in SFH.

From current SCP planning, it is clear that more funding is needed for single-family homes, as this is the biggest group, but only limited funds are allocated to the Warm Homes Program. Measures that address tenants are absent, likely as shares of ownership are high overall, and certain vulnerable groups may feel significant effects of high energy prices and be left behind in the transition process. Finally, while the voucher system is clearly described, there is a lack of clarity in how direct-income support will benefit non-fossil fuel heating energy poor households.

Additional funding is needed in all areas to support energy poor households regardless of the ETS2 especially because limited action has been taken so far to support and target these groups. Additionally, the ETS2 also provides an opportunity for continued and reliable funding for these policy areas; as experts report the country being very reliant on EU funds such as the RRF and that once these funding channels are exhausted, it is difficult to mobilise national funds. As retrofitting programs are rolled-out, energy efficiency increases, and households move away from fossil-fuelled heating, revenues are likely to decrease, but so will the need for such funding programs.

[11] It should be noted that not all of the planned measures were discussed in detail in this report.

Table 5-1 Assessment of policy targeting based on the draft SCP in Bulgaria

	Low-income homeowners in single-family homes in rural areas	Low-income tenants in urban areas	Single parents who are tenants in multi-family homes in urban areas
Definitions of energy poverty and vulnerability	No further differentiation other than “energy poor” and “vulnerable” included in the SCP.		
Targeted direct-income support in form of vouchers	If heating with fossil-fuels, will benefit from the planned vouchers, but lower-income households are more likely to heat with firewood and how much funding will be made available for these households is unclear.		
Targeted renovation program for multi-family residential buildings		Targeted renovation program for multi-family residential buildings planned, but only for owners and no provisions yet for how to deal with the landlord-tenant dilemma.	
Warm Homes Program	Warm Homes Program targets this group, but very limited allocation of funds through the SCF to this particular program.		
Energy efficient appliances	No further targeting of this program but can be accessed by all households. Provides only limited support.		
Energy communities	RES installations targeted at both SFH and MFH homes where at least 30% of participants/users are energy poor with fixed prices for this group.		

Source: Own compilation

In **Czechia**, rural areas will be most strongly affected because they are more likely to be heating with fossil fuels and do not have opportunities to connect to district heating networks as is common in urban areas. Equally, targeting MFH alongside SFH and providing support to tenants as well as homeowners is important in Czechia, because even though the housing landscape is dominated by SFH homeowners, vulnerable groups are found across all housing situations.

There is currently no targeting specifically at rural households, as a regional differentiation is not part of the Czech policy approach according to national experts. Tenants are, however, identified as a policy priority in the SCP, which is reflected in the types of measures planned. Comprehensive funding is available to a variety of households under the New Green Savings Light Program, but it is unclear if this is extensive enough for the depth of renovations that are likely to be needed. A strong focus on renovating and constructing social and rental housing is positive, although the specifics of these programs are still unknown as the SCP has not been finalised or made publicly available.

In previous years, the New Green Savings (Light) Program saw a stark uptake in applications during the energy price crisis, indicating that households will seek out such programs at a higher rate when prices increase, and higher uptake than previously of existing programs could be expected. Financial readiness in this regard is crucial and ETS2 auctioning revenues can support this.

Table 5-2 Assessment of policy targeting based on the draft SCP in Czechia

	Low-income SFH and MFH homeowners in rural areas	Tenants	Low-income households in small MFH	Single parents in MFH (in urban areas)
Definitions of energy poverty and vulnerability	Low-income homeowners generally identified as a vulnerable group in study for the Ministry of Social Affairs	Identified as a vulnerable group in study for the Ministry of Social Affairs and in the SCP according to experts.		
	Lack of clarity in identification of vulnerable groups due to the SCP not being published and experts reporting that differentiating within this group is not part of the general strategy.			
New Green Savings Light	Not specifically targeted but SFH homeowners will profit which make up a large share of households in rural areas.	Only for homeowners.	Some provisions available to support low-income homeowners in MFH although only a low number of applications come from housing cooperatives.	
Construction of affordable rental housing		Targeted specifically to this group, but only provides new housing and does not improve existing housing.		
Targeted renovation of apartment buildings	Share of MFH still relatively high in rural areas, therefore also relevant.	Provisions are planned for landlords including rental contract rules as part of eligibility criteria.	Targeted specially at these groups living in MFH.	
Energy consulting	Provide support to all low-income households; details of the programs still unclear.			

Source: Own compilation

In **Poland**, the "Clean Air Program" is considered the flagship program of the SCP providing extensive financial support primarily to homeowners in SFH for retrofitting measures. Additional programs focusing on municipal housing target other vulnerable groups that are renters. A variety of advisory programs and trainings to set these up, also at local level, provide important additional support in ensuring that households are supported in carrying out retrofitting. This ensures that existing programs are being utilised by the target groups.

Policy gaps include that homeowners in MFH are not considered within the current policy design and no measures are included to address the private rental sector. Additionally, the planned direct-

financial payments are limited to a very specific target group, which ignores other households that may require such financial support.

The SCF provides a first step in financing a comprehensive program such as “Clean Air”, but it is crucial that such programs receive stable funding over the long periods necessary for significant changes in the building stock to occur. There has also been a strong focus on ensure alignment between the SCP, the NECP, and the Long-Term Renovation Strategy (LTRS), and other national development strategies (e.g. PEP2040[12], NAP[13]). Any further planning and spending through ETS2 revenues should be orientated along these existing strategies, which already lay an important groundwork for the next steps.

Table 5-3 Assessment of policy targeting based on the draft SCP in Poland

	Low-income SFH homeowners in rural areas	Low-income homeowners in MFH	Low-income one-person homeowners	Single parent tenants
Definitions of energy poverty and vulnerability	Identified in SCP as a priority group, especially when living in older housing as well.		No specific mention of this group.	Additional studies from independent organisations identify single mothers as a vulnerable group.
Direct-financial support	Targeted only at low-income pensioners who are reliant on fossil fuels.			
Clean Air Program	Targeted at single-family homes.		Only relevant if living in SFH and the majority live in MFH	
Social and Community Housing Programme				Provides additional affordable housing at high energy efficiency standards, but does not improve existing housing.
Renovation of municipal social housing				Relevant if living in rented municipal housing
Assisted Housing Program	Targeted at pensioners and other in need of assisted living, who are identified as an at risk group			

[12] Polish Energy Policy until 2040
[13] National Air Protection Programme

Training programs / EcoAdvisors	Can support all households who require support in improving energy efficiency and undertaking retrofitting. Broad support mechanism that is particularly important for vulnerable households.
Energy Communities Pilot	No specific targeting of these pilot measures outlined in the SCP.

Source: Own compilation

5.1 Recommendations for policy design and targeting of vulnerable groups under the ETS2

Based on the identification of possible target groups for policies, the state of energy poverty and the SCP, and the discussion of relevant policy dichotomies with reference to examples from the three MS, this section summarises findings and provides general recommendations for policy design.

From the discussion of the policy dichotomies and the policy gaps identified in the previous section for the individual MS, the following conclusions can be drawn:

5. The SCF Regulation stipulates that funds should be **targeted at vulnerable groups and energy poor households**. This is reflected in all of the SCP of the MS considered in this report. Further ETS2 revenues need to be funnelled into climate action, but the target group of individual measures may be broader, although a blanket compensation scheme is generally not recommended. Instead, a focus on the identified policy gaps in the individual countries can be addressed with the revenues, as well as focusing on areas with high savings potentials, such as Worst-Performing-Buildings.
6. The SCF Regulation also determines how funds should be allocated and that two thirds need to be invested in the buildings and transport sector, while the smaller share may be used for temporary direct-income support. While such payments are important to ensure vulnerable households are not further burdened with unreasonable energy costs, **investments that ensure long-term transformations in the buildings sector towards climate neutrality are key**. ETS2 revenues should therefore not be invested into such compensation mechanism, weakening the effects of the system such as fossil fuel subsidies. The focus should remain on improvements in energy efficiency and investments into low and zero-carbon technologies. This means further financing existing programs beyond the scope of the SCF (as necessary) and focusing on filling policy gaps.
7. Overall, **deep renovations are needed** to ensure noticeable reductions in energy costs due to the low energy efficiency standards overall in the three MS, as reported in their SCPs. More complex and comprehensive retrofitting, however, requires bigger grants and will take longer to complete. Shallow renovations and behavioural changes can provide relief to households in the short- to medium-term. As ETS2 prices rise, higher energy efficiency standards and technological switches in heating will be needed to avoid high costs. Such significant changes in the buildings sector are also what is required to ensure climate targets are met. The focus therefore must remain on providing extensive funding for deep retrofitting measures. Additional funds from the ETS2 revenues and funding beyond the timeline foreseen for the SCP will be necessary.
8. Within the buildings sector, **policy design needs to consider the housing situations that vulnerable households in**. This includes determining a focus on SFH or MFH or whether to allocate funds to support tenants and is essentially a question of adequate targeting. In Bulgaria

where the majority of households are homeowners and living in SFH, the strong focus on a renovation program for MFH will not ensure that the biggest household group will profit from the fund. In Poland a strong focus on SFH and additional social housing policies reflects the vulnerable groups identified in the SCP and aligns with findings in the report. The Czech catalogue of measures is the most diverse, focusing on SFH, but also on the renovation and construction of affordable rental properties, which is in line with the identified vulnerable groups that included tenants. ETS2 revenues should be funnelled into programs that address the policy gaps identified.

From the programs examined in this study and as presented in the SCPs, some broad policy recommendations for the design of such measures can be summarized as follows:

- Ensuring **no or limited up-front costs** for low-income households, as they often do not have the financial resources to cover costs up-front and this poses a significant barrier for them. The **Czech** Green Savings Program, for example, provides upfront subsidies upon request, which makes it significantly easier for households to implement retrofitting measures. Implementers report a low rate of misuse of funds.
- There should also be **a variety of financial measures** in place beyond dedicated retrofitting programs that complement each other, such as additional grants, bonuses for deep retrofits or low-income households, tax-credits, and loans, which make it easier for a variety of households to get maximum support. In **Poland**, for example, an energy renovation tax credit provides additional financial support for energy renovations of single-family buildings. This can be combined with the “Clean Air” program ensuring that households, who do not receive a 100% coverage of their costs, can reduce their overall expenses through a tax deduction. This is particularly relevant for low-middle income households who may not be eligible to cover 100% of their costs.
- Ensuring that the application process for households is **easy and transparent** also increases the uptake of these programs. The **Czech** New Green Savings Program, for example, reports that simplified options for low-income households and a flexibility in the types of renovations that are supported increased accessibility. Digitisation of processes also helps to improve ease of access.
- Key to high uptake is also ensuring **good public awareness** of the programs that are in place. Research on energy efficiency in the buildings sector in eastern Europe has shown that besides inadequate financing, a lack of financial information is the biggest barrier for the uptake in renovations, heating system replacements, and renewables (Gellová et al. 2025). Low participation in existing programs is often also linked to limited awareness of the programs, how they work, and how to apply. Public engagement strategies are necessary to drive up demand. In both the **Bulgarian** and **Polish** SCP funds are allocated to informational campaigns. Bulgaria is planning around 2 million Euros for the development of information and communication including public events, development and dissemination of promotional materials, as well as an information campaign. In Poland, 57 million Euros are planned to instate over 160 energy advisors at municipal level.

List of References

Bird, M.; Scott, E.; Galantine, B. (2024): Social Climate Fund, Frequently Asked Questions. Carbon Market Watch (ed.). Online available at https://carbonmarketwatch.org/wp-content/uploads/2024/07/Joint-SCF-briefing-080724.pdf, last accessed on 5 Aug 2025.

Bold, F. (2021): Non-transparent handling of ETS revenus and potential violation of ETS Directive in the Czech Republic. Brno, Czech Republik. Online available at https://frankbold.org/sites/default/files/publikace/non-transparent_handling_of_ets_revenus_and_potential_violation_of_ets_directive_in_the_czech_republic_.pdf, last accessed on 6 Aug 2025.

Breshani, E. (2024): Montel News Covers ClearBlue's Special Report on EU ETS 2. Clear Blue Markets (ed.). Online available at https://www.clearbluemarkets.com/news/montel-news-covers-clearblues-special-report-on-eu-ets-2, last updated on 5 Aug 2025, last accessed on 12 Aug 2025.

Brooke, T. (2025): Czech opposition slams EU's ETS 2 carbon scheme, warns of soaring fuel and heating costs, Karel Havlíček, deputy leader of the Czech opposition ANO, says his party will "have the balls" to stand up to Brussels over carbon emission allowances, unlike the current administration. REMIX News (ed.). Online available at https://rmx.news/article/czech-opposition-slams-eus-ets-2-carbon-scheme-warns-of-soaring-fuel-and-heating-costs/, last updated on 19 Jun 2025, last accessed on 5 Aug 2025.

Buk, W. and Izdebski, M. (2024): Analysis of the impact of ETS2 on the cost of living for Poles. Warsaw, Poland. Online available at https://ets2koszty.pl/wp-content/uploads/2024/11/ets2_report_ENG.pdf, last accessed on 5 Aug 2025.

Climate Change Laws of the World (2025): Energy Law (Dz.U. 1997 nr 54 poz. 348). Climate Change Laws of the World (ed.). Online available at https://climate-laws.org/document/energy-law-dz-u-1997-nr-54-poz-348_ceee, last updated on 5 Aug 2025, last accessed on 5 Aug 2025.

Directive (EU) 2023/1791 (2023): European Parliament; European Council. Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast) (Text with EEA relevance), Directive (EU) 2023/1791. In: *Official Journal, L 231, 1-111* 2023. Online available at http://data.europa.eu/eli/dir/2023/1791/oj.

Directive (EU) 2023/959 (2024): European Parliament; European Council. Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system (Text with EEA relevance), Directive (EU) 2023/959. Online available at http://data.europa.eu/eli/dir/2023/959/oj, last accessed on 13 Jun 2024.

Eden, A.; Holovko, I.; Cludius, J.; Unger, N.; Noka, V.; Schumacher, K.; Vornicu-Chira, A.; Gutowski, P.; Glowacki, K. (2023): Putting the ETS 2 and Social Climate Fund to Work, Impact

Considerations, and Opportunities for European Member States. adelphi; Oeko-Institut; WiseEuropa and Center for the Study of Democracy (ed.). Online available at https://adelphi.de/system/files/document/policy-report_putting-the-ets-2-and-social-climate-fund-to-work_final_01.pdf, last accessed on 2 Jul 2024.

EEA - European Environment Agency (2024): Auctioning revenues and reported usage, (Million EUR), in 2023, for each Member State. European Environment Agency (ed.). Online available at https://www.eea.europa.eu/en/analysis/indicators/use-of-auctioning-revenues-generated/auctioning-revenues-of-2023?activeTab=570bee2d-1316-48cf-adde-4b640f92119b, last updated on 6 Aug 2025, last accessed on 6 Aug 2025.

Energy Poverty Advisory Hub (2022): Energy Poverty National Indicators Report, Insights for a more effective measuring. Online available at https://energy-poverty.ec.europa.eu/system/files/2023-01/EPAH_Energy%20Poverty%20National%20Indicators%20Report_0.pdf, last accessed on 5 Apr 2023.

EP - European Parliament (2025): Verbatim report of proceedings - Presentation of the programme of activities of the Polish Presidency (debate). European Parliament (ed.). Online available at https://www.europarl.europa.eu/doceo/document/CRE-10-2025-01-22-ITM-005_EN.html, last updated on 5 Aug 2025, last accessed on 5 Aug 2025.

ERR News (2025): Estonia joins 14 other EU states in calling for ETS2 amendments. ERR News (ed.). Online available at https://news.err.ee/1609730229/estonia-joins-14-other-eu-states-in-calling-for-ets2-amendments, last updated on 25 Jun 2025, last accessed on 5 Aug 2025.

Galvin, R. (2024): Reducing poverty in the UK to mitigate energy poverty by the 10% and LIHC indicators: What tax changes are needed, and what are the consequences for CO2 emissions? In: *Ecological Economics* 217. DOI: 10.1016/j.ecolecon.2023.108055.

Gellová, M.; Zahradník, P.; Hrbek, J.; Nikodemová, K.; Laifer, A.; Pálffy, A. (2025): Unlocking Financing and Technical Assistance for Energy-Efficient Renovations: Strategies, challenges, and best practices, PERCEE Webinar. Hosted by: PLGBC. Online, 9 Apr 2025. Online available at https://plgbc.org.pl/wydarzenia/percee-webinar-unlocking-financing-and-technical-assistance-for-energy-efficient-renovations, last accessed on 5 Aug 2025.

Gitton, M. (2025): Anticipating the carbon price: The sixteen leading states of the new ETS2. Online available at https://www.linkedin.com/pulse/anticipating-carbon-price-sixteen-leading-states-new-ets2-gitton-ewahe/, last updated on 4 Jul 2025, last accessed on 5 Aug 2025.

Günther, C.; Pahle, M.; Govorukha, K.; Osorio, S.; Fotiou, T.): Carbon prices on the rise? Shedding light on the emerging second EU Emissions Trading System (EU ETS 2). Climate Policy (ed.).

Gutowski, P. and Glowacki, K. (2023): Raport Krajowy, Badanie wpływu EU ETS 2 na dobrobyt gospodarstw domowych w Polsce w kontekście ubóstwa energetycznego i transportowego – rekomendacje do planu społeczno-klimatycznego. WiseEuropa (ed.). Warszawa, Poland. Online available at https://wise-europa.eu/wp-content/uploads/2024/05/RAPORT-KRAJOWY-online-3.pdf, last accessed on 5 Aug 2025.

Haase, I.; Velten, E. K.; Branner, H.; Reyneri, A. (2022): The use of auctioning revenues from the EU ETS for climate action, An analysis based on eight case studies. Ecologic Institut. Berlin. Online available at https://www.ecologic.eu/sites/default/files/publication/2022/EcologicInstitute-2022-UseAucRevClimate-FullReport.pdf, last accessed on 4 Apr 2023.

Instytut Reform (2025): Dokument wart 11 miliardów euro. Instytut Reform ocenia projekt Planu Społeczno Klimatycznego. Instytut Reform (ed.). Online available at https://ireform.eu/nasze-projekty/dokument-wart-11-miliardow-euro-instytut-reform-ocenia-projekt-planu-spoleczno-klimatycznego/, last updated on 4 Aug 2025, last accessed on 5 Aug 2025.

Koďousková, H. and Lehotský, L. (2021): Energy poverty in the Czech Republic: Individual responsibility or structural issue? In: *Energy Research & Social Science* (72). DOI: 10.1016/j.erss.2020.101877.

Krassen, N. (2025): Bulgaria risks losing €2.5 billion from EU Social Climate Fund, Civil society warns that the country is late in preparing its national social climate plan. Euractiv (ed.). Online available at https://www.euractiv.com/section/politics/news/bulgaria-risks-losing-e2-5-billion-from-eu-social-climate-fund/, last updated on 19 Mar 2025, last accessed on 5 Aug 2025.

Lazarová, D. (2025): Minister: Czech Republic will seek opt-out from EU's ETS 2 scheme. Radio Prague International (ed.). Online available at https://english.radio.cz/minister-czech-republic-will-seek-opt-out-eus-ets-2-scheme-8855405, last updated on 3 Jul 2025, last accessed on 5 Aug 2025.

LIFE Effect (2025a): Education, Communication, Participation - Social Climate Fund and ETS2 in Poland. LIFE Effect (ed.). Online available at https://life-effect.org/2025/06/26/education-communication-participation-social-climate-fund-and-ets2-in-poland/, last updated on 26 Jun 2025, last accessed on 6 Aug 2025.

LIFE Effect (2025b): Managing the risk of a high ETS2 carbon price for households. LIFE Effect (ed.). Online available at https://life-effect.org/2025/07/15/managing-the-risk-of-high-ets2-prices/, last updated on 16 Jul 2025, last accessed on 12 Aug 2025.

Maestre-Andrés, S.; Drews, S.; Savin, I.; van den Bergh, J. (2021): Carbon tax acceptability with information provision and mixed revenue uses. In: *Nat Commun* 12 (1), pp. 1–10. DOI: 10.1038/s41467-021-27380-8.

Mazurkiewicz, J.; Prusak, A.; Frankowski, J. (2024): How to use social support networks to tackle energy poverty? Instytut Badań Strukturalnych (ed.). Online available at https://ibs.org.pl/en/publications/how-to-use-social-support-networks-to-tackle-energy-poverty/, last updated on 11 Mar 2024, last accessed on 5 Aug 2025.

Mazurkiewicz, J.; Prusak, A.; Jakubowski, M.; Frankowski, J. (2023): Energy poverty among women in Poland. Instytut Badań Strukturalnych (ed.). Online available at https://ibs.org.pl/en/publications/energy-poverty-among-women-in-poland/, last updated on 10 Dec 2024, last accessed on 5 Aug 2025.

Ministry of Development Funds and Regional Policy (2024): Minister K. Pełczyńska-Nałęcz: The goals and directions of Poland's development must be clearly defined - Ministry of Development Funds and Regional Policy - Gov.pl website. Ministry of Development Funds and Regional

Policy (ed.). Online available at https://www.gov.pl/web/funds-regional-policy/minister-k-pelczynska-nalecz-the-goals-and-directions-of-polands-development-must-be-clearly-defined, last updated on 5 Aug 2025, last accessed on 5 Aug 2025.

Mus, M.; Mercier, H.; Chevallier, C. (2023): Designing an acceptable and fair carbon tax: The role of mental accounting (10). Online available at https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000227.

Peneva, T. (2024): Energy Poverty in Bulgaria – Status and Policies Review. In: *Economic Studies journal* (8), pp. 51–77. Online available at https://ideas.repec.org/a/bas/econst/y2024i8p51-77.html, last accessed on 5 Aug 2025.

Plevák, O. (2024): Czechia wants to delay ETS 2 until at least 2028, Environmental targets should be revised to limit negative impact on the economy, Fiala said. Euraktiv (ed.). Online available at https://www.euractiv.com/section/politics/news/czechia-wants-to-delay-ets-2-until-at-least-2028/, last updated on 17 Dec 2024, last accessed on 5 Aug 2025.

Portal Funduszy Europejskich (2025): Plan Społeczno-Klimatyczny - Ministerstwo Funduszy i Polityki Regionalnej. Portal Funduszy Europejskich (ed.). Online available at https://www.funduszeeuropejskie.gov.pl/strony/o-funduszach/spoleczny-fundusz-klimatyczny/plan, last updated on 5 Aug 2025, last accessed on 5 Aug 2025.

Regulation (EU) 2023/955 (2023): European Parliament; European Council. Regulation (EU) 2023/955 of the European Parliament and of the Council of 10 May 2023 establishing a Social Climate Fund and amending Regulation (EU) 2021/1060, Regulation (EU) 2023/955. In: *Official Journal* (130), pp. 1–51. Online available at http://data.europa.eu/eli/reg/2023/955/oj, last accessed on 15 Feb 2024.

Rovenský, J. (2025): Energy Poverty in the Czech Republic. Institut pro Politiku a spolecnost (ed.). Online available at https://www.politikaspolecnost.cz/wp-content/uploads/2025/02/2_2025_Energy-Poverty-in-the-Czech-Republic_IPPS_Jan-Rovensky-2.pdf, last accessed on 5 Aug 2025.

Rutkowski, J.; Salach, K.; Ziotkowska, K.; Szpor; Aleksander (2018): How to reduce energy poverty in Poland? Instytut Badań Strukturalnych (ed.). Online available at https://ibs.org.pl/en/publications/how-to-reduce-energy-poverty-in-poland/, last updated on 1 Feb 2023, last accessed on 5 Aug 2025.

Scott, E. (2025): U-turn on EU's Emissions Trading System for road transport and buildings carries huge environmental, social and economic price tag. Carbon Market Watch (ed.). Online available at https://carbonmarketwatch.org/2025/01/24/u-turn-on-eus-emissions-trading-system-for-road-transport-and-buildings-carries-huge-environmental-social-and-economic-price-tag/, last updated on 27 Jan 2025, last accessed on 5 Aug 2025.

Sgaravatti, G.; Tagliapietra, S.; Trasi, C.; Zachmann, G. (2023): National fiscal policy responses to the energy crisis. Bruegel (ed.). Online available at https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices, last updated on 5 Aug 2025, last accessed on 5 Aug 2025.

Simeonov, G. (2024): Bulgaria adopts an Energy Poverty Regulation. Cooltorise (ed.). Online available at https://cooltorise.eu/bulgaria-adopts-an-energy-poverty-regulation/, last updated on 5 Mar 2024, last accessed on 5 Aug 2025.

Sokolowski, J. (2023): Energy Poverty and Unfit Housing in Poland, An investement strategy to renovate the worst-performing segment of the housing stock. European Federation of National Organisations Working with the Homeless (ed.). Online available at https://www.feantsa.org/public/user/Resources/reports/2023/Energy_poverty__unfit_housing_in_Poland/Energy_Poverty__Unfit_Housing_in_Poland.pdf, last accessed on 4 Oct 2024.

Sokolowski, J.; Kiełczewska, A.; Lewandowski, P. (2019): Defining and measuring energy poverty in Poland. Instytut Badań Strukturalnych (ed.). Online available at https://ibs.org.pl/en/publications/defining-and-measuring-energy-poverty-in-poland/, last updated on 1 Feb 2023, last accessed on 5 Aug 2025.

Supreme Audit Office of Poland (2025): Managing proceeds from the sale of emissions allowances. Supreme Audit Office of Poland (ed.). Online available at https://www.nik.gov.pl/en/news/managing-proceeds-from-the-sale-of-emissions-allowances.html, last updated on 6 Aug 2025, last accessed on 6 Aug 2025.

Veyt (2025): Starting in 2027, Europe’s second big emission trading scheme will increase fossil fuel prices, European Carbon. Veyt (ed.). Online available at https://veyt.com/press-releases/starting-in-2027-europes-second-big-emission-trading-scheme-will-increase-fossil-fuel-prices/?utm_%20m, last updated on 21 May 2025, last accessed on 12 Aug 2025.

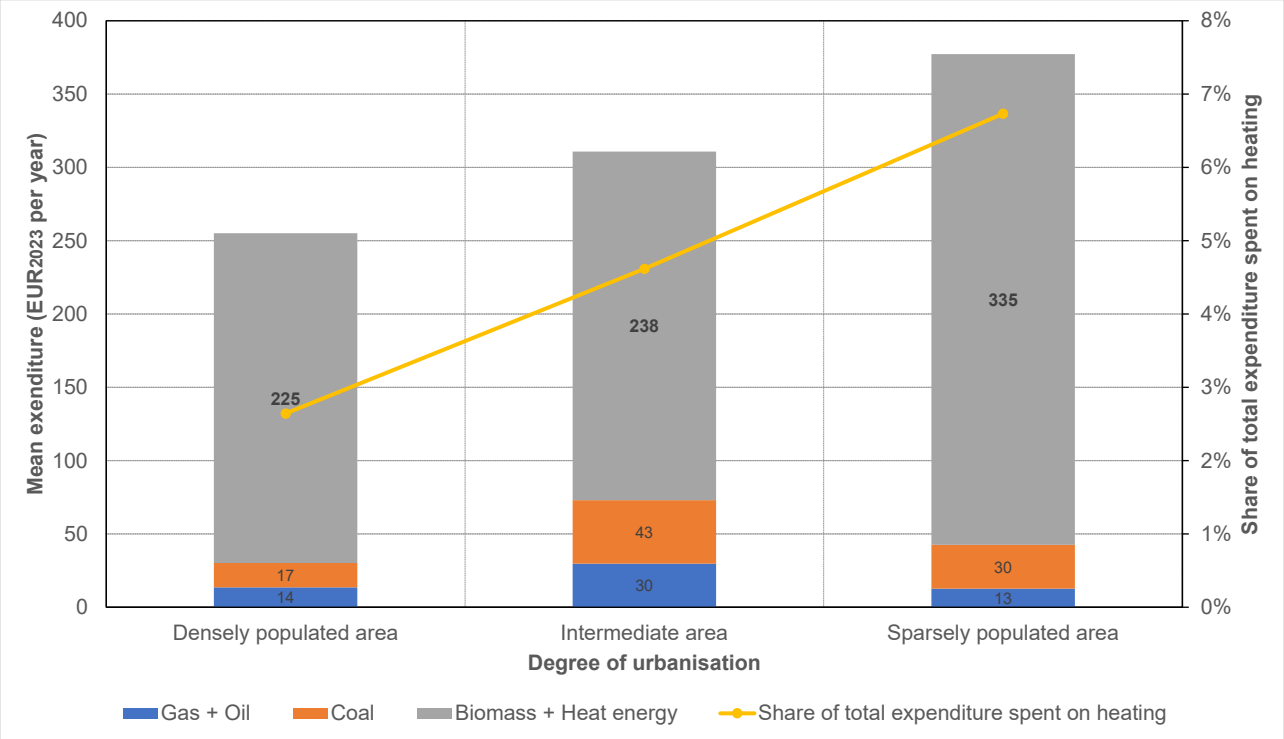
Vysoká škola ekonomická v Praze (ed.) (2021): Zranitelný zákazník a energetická chudoba v ČR, Mapovací a plánovací studie. Fakulta podnikohospodářská. Online available at https://mpo.gov.cz/assets/cz/energetika/vyzkum-a-vyvoj-v-energetice/resene-dokoncene-projekty-a-jejich-vystupy/projekty-podporene-v-ramci-1-verejne-souteze-programu-theta/2021/7/ECH_ZZ_studie.pdf, last accessed on 5 Aug 2025.

Zpracovala, K. Z. (2022): Energetická chudoba v Česku, definice, indikátory, vývoj a řešení. Amo.cz (ed.). Online available at https://www.amo.cz/wp-content/uploads/2022/11/Factsheet_energeticka_chudoba_final.pdf, last accessed on 5 Aug 2025.

Annex

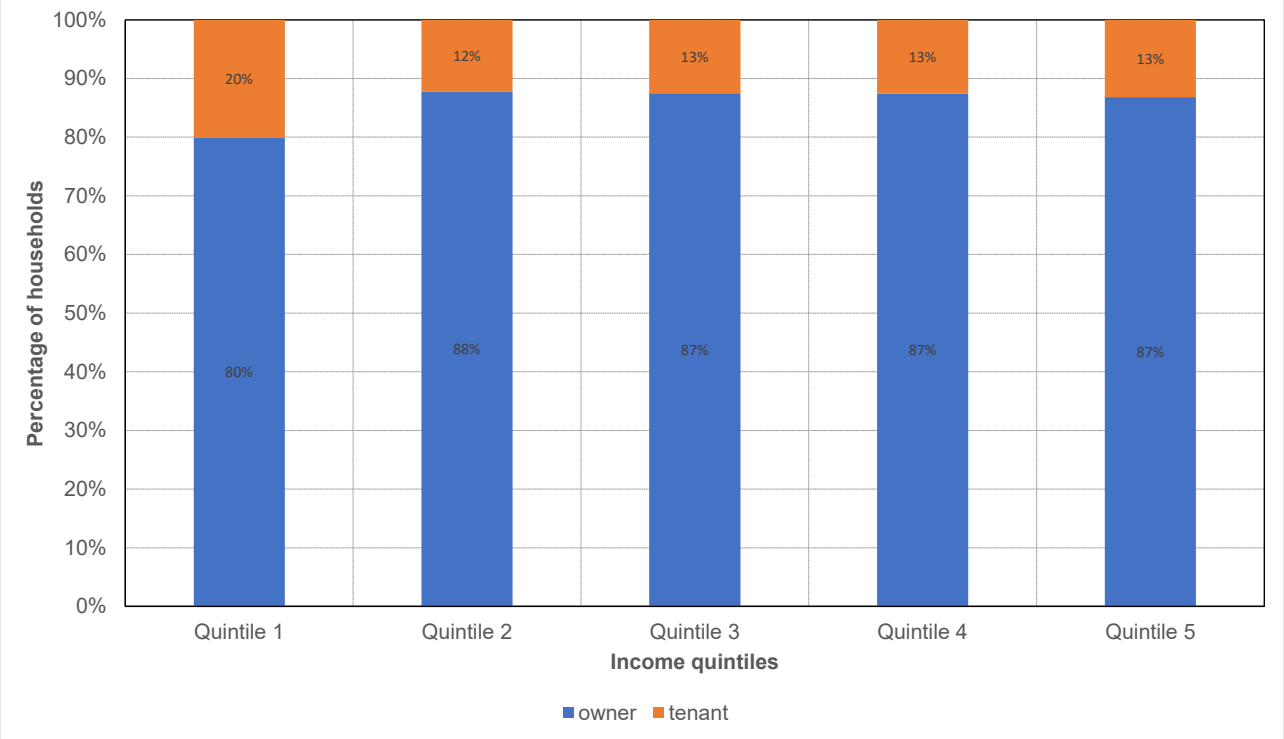
Annex I. Bulgaria: additional figures

Figure 5-1: Energy expenditures by degree of urbanisation in Bulgaria



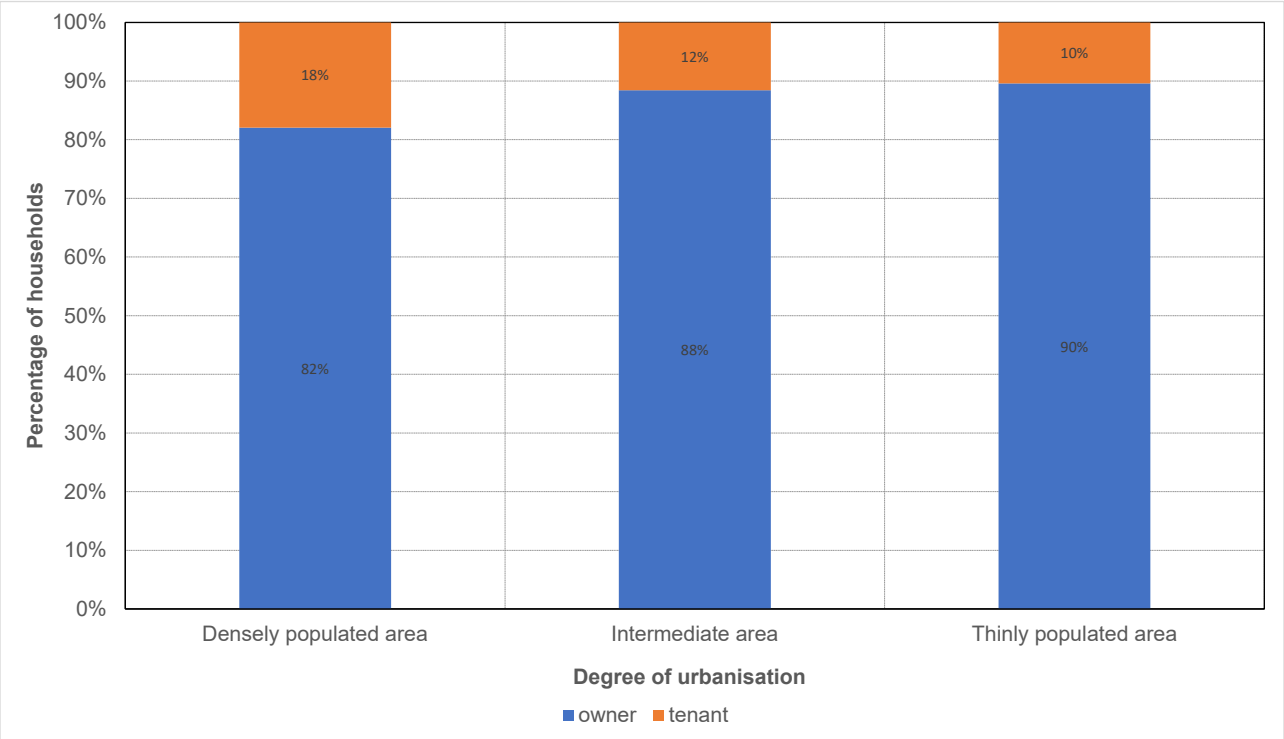
Source: Oeko-Institut's own calculations based on EU HBS 2015 microdata. Notes: The expenditure data is inflated to 2023 levels using the average monthly Eurostat Harmonised Consumer Price Indices (HICP) for Bulgaria.

Figure 5-2: Tenure status by income quintiles in Bulgaria



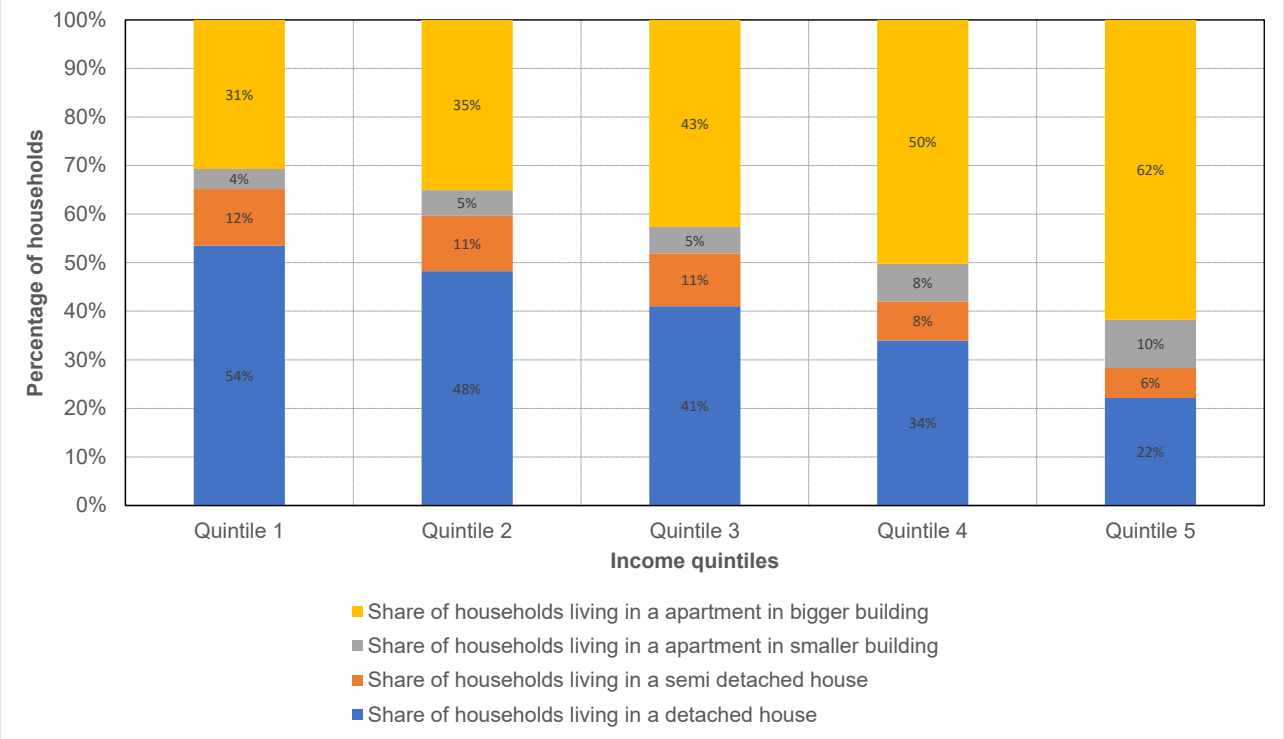
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-3: Tenure status by degree of urbanisation in Bulgaria



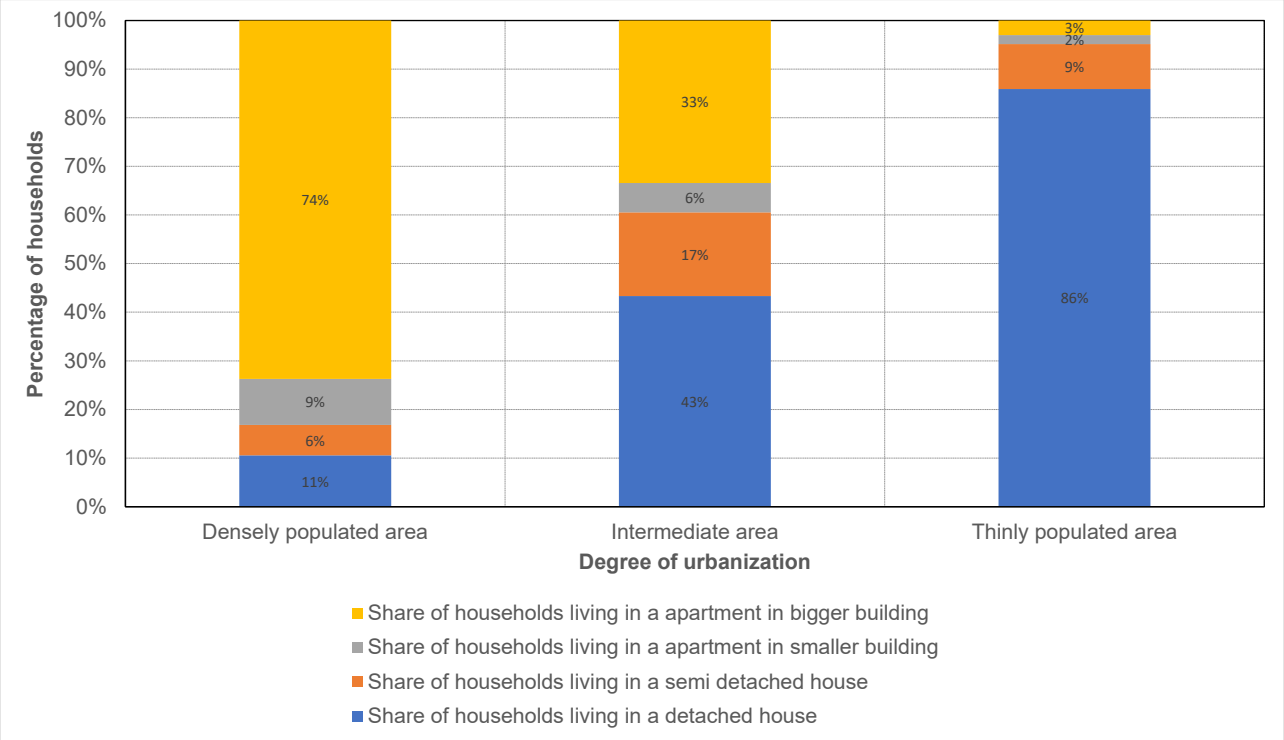
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-4: Dwelling type by income quintiles in Bulgaria



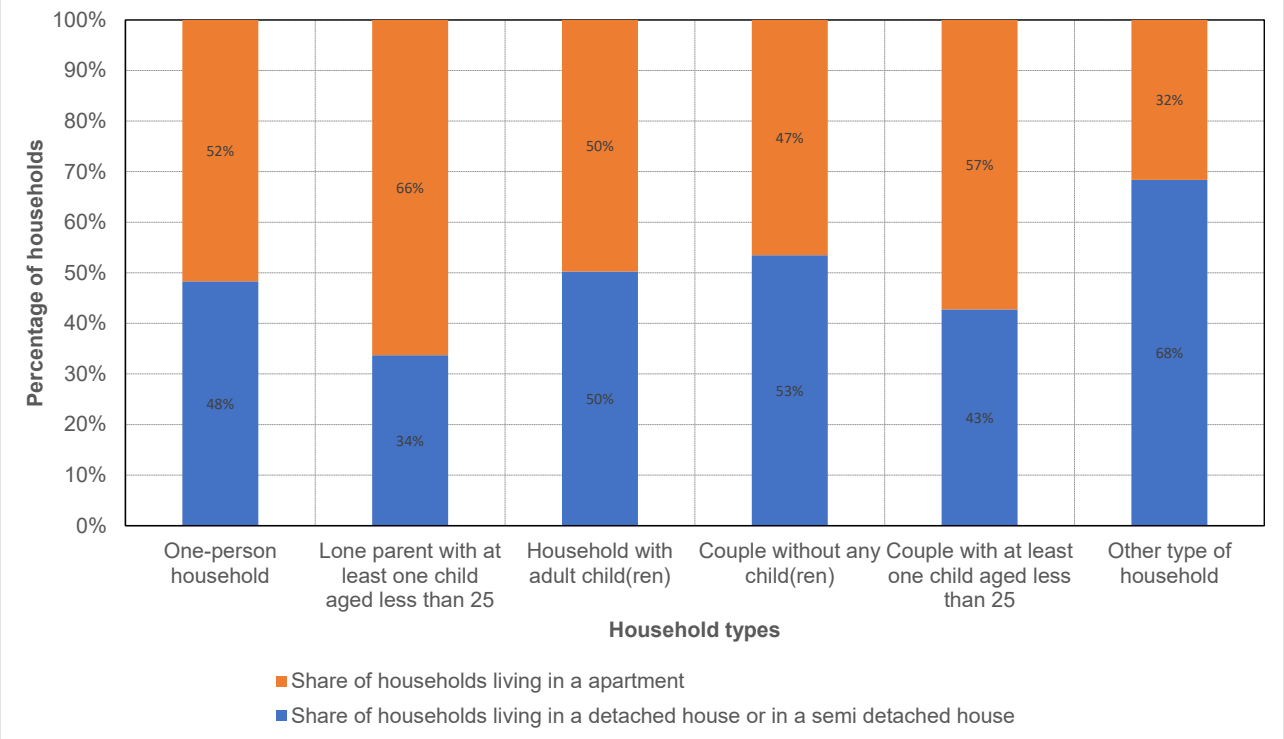
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-5: Dwelling type by urbanisation in Bulgaria



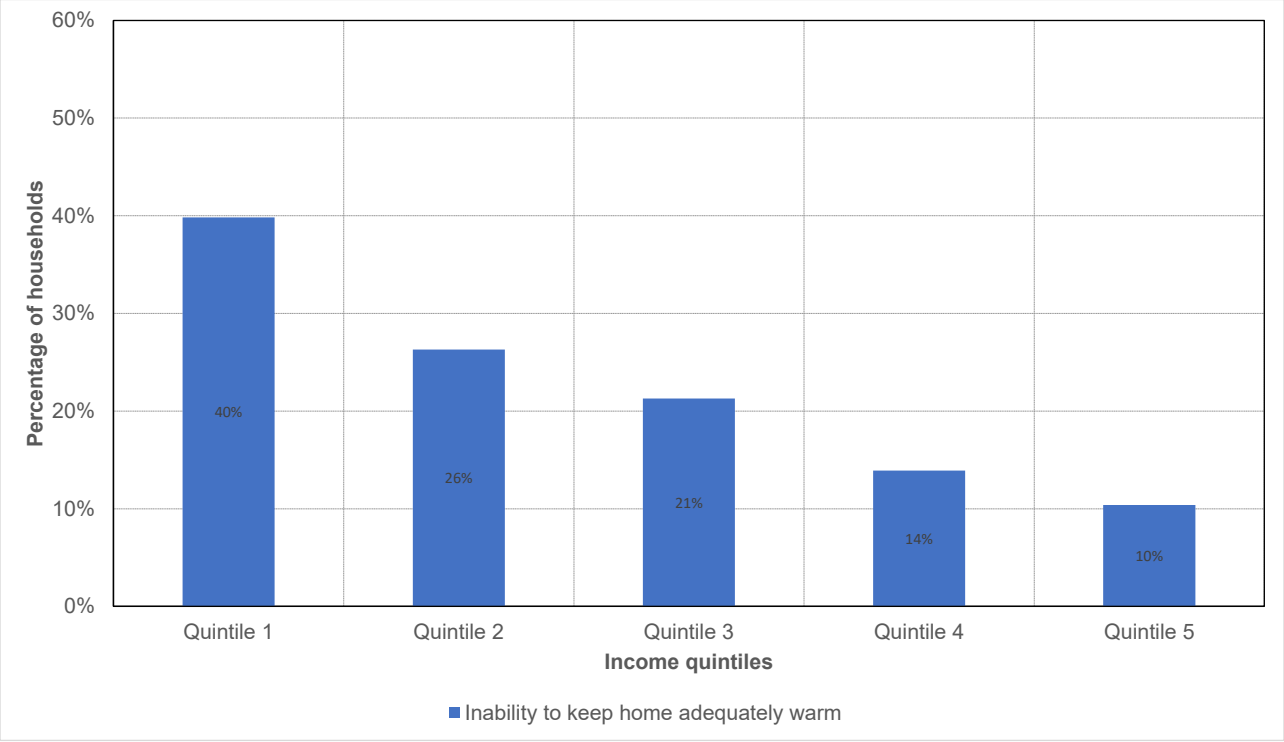
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "apartment in smaller building" should be flagged for "Thinly populated areas" (20 – 49 observations).

Figure 5-6: Dwelling type by household type in Bulgaria



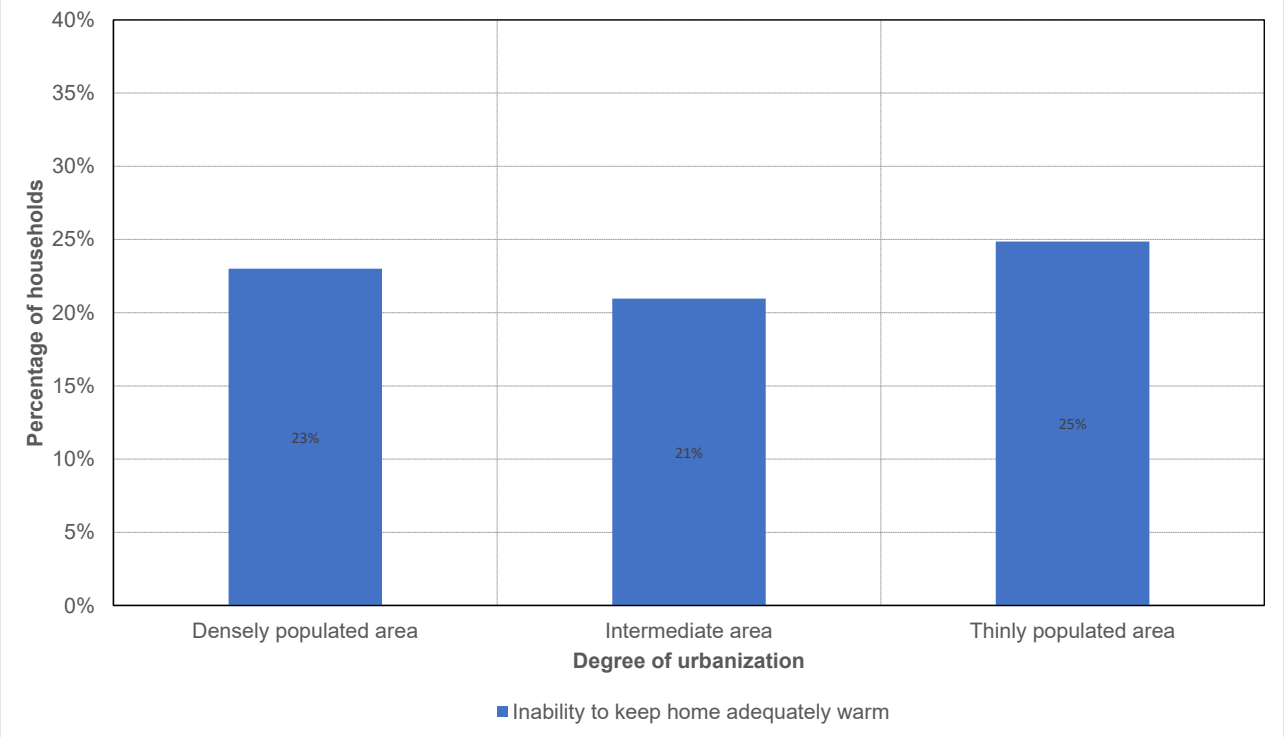
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-7: Inability to keep home warm by income quintiles in Bulgaria



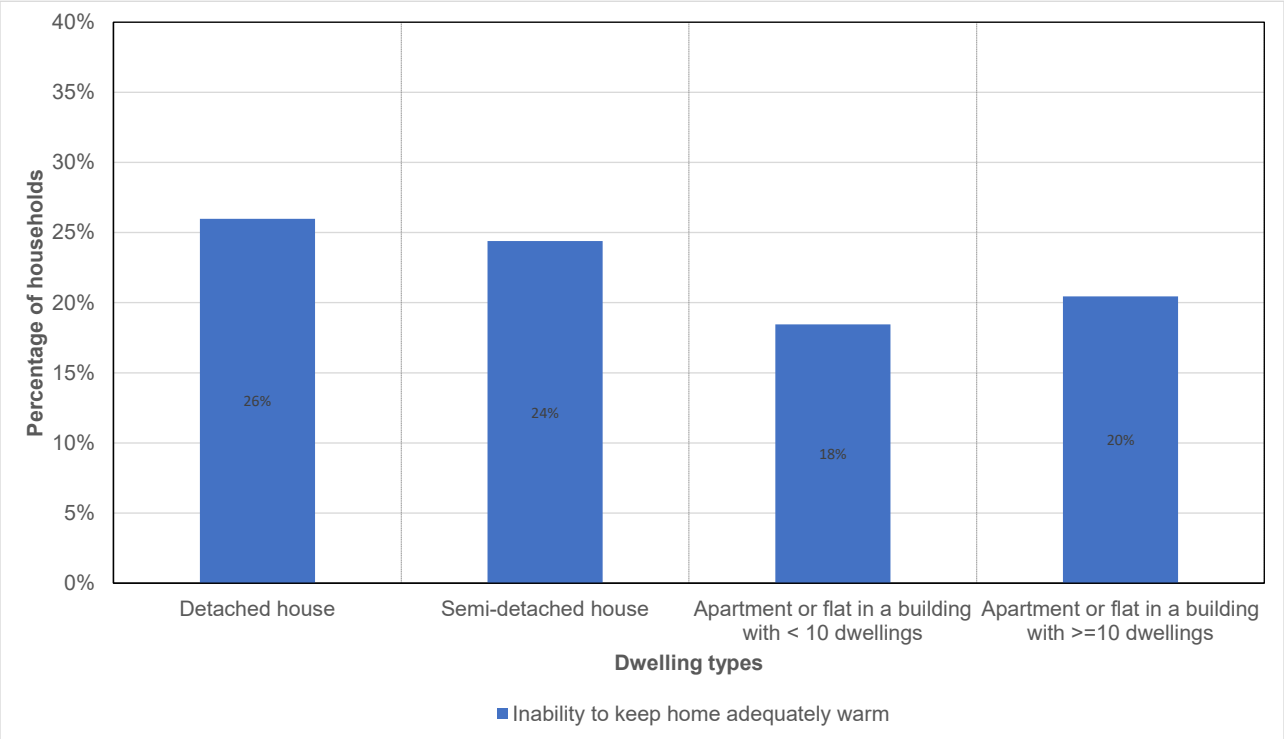
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-8: Inability to keep home warm by urbanisation in Bulgaria



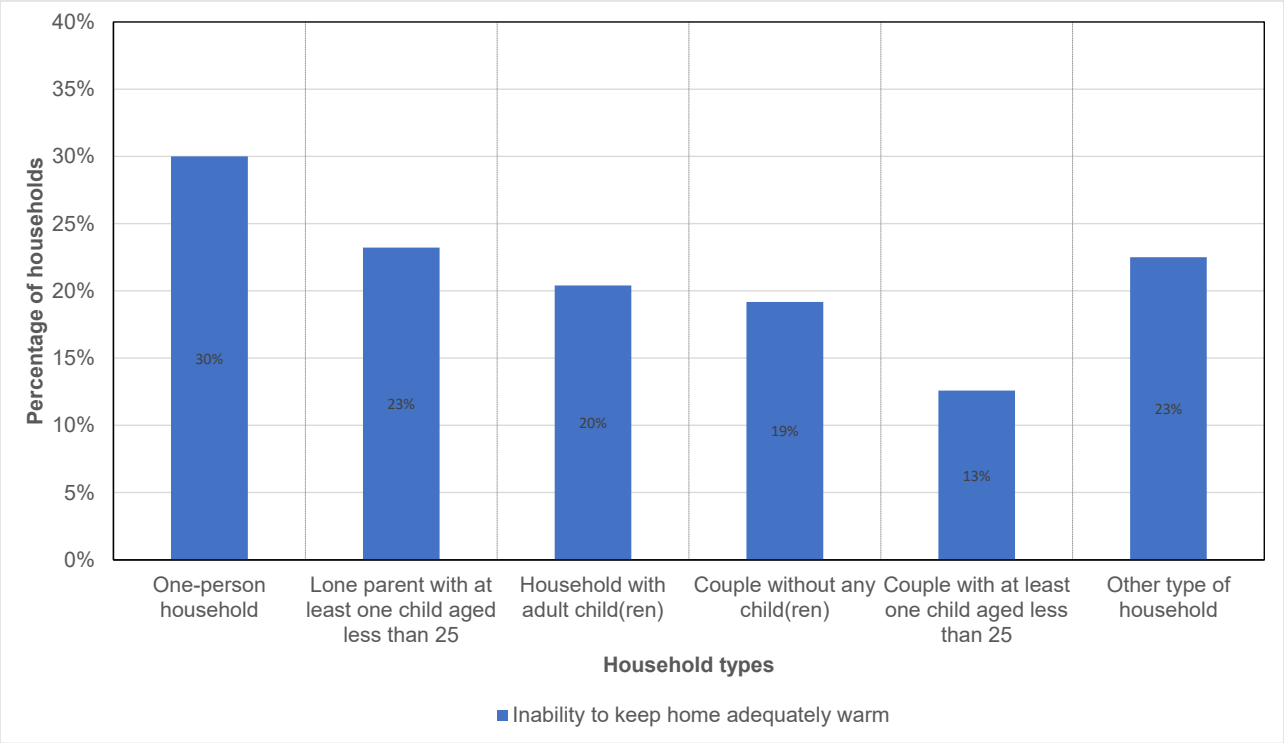
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-9: Inability to keep home warm by dwelling type in Bulgaria



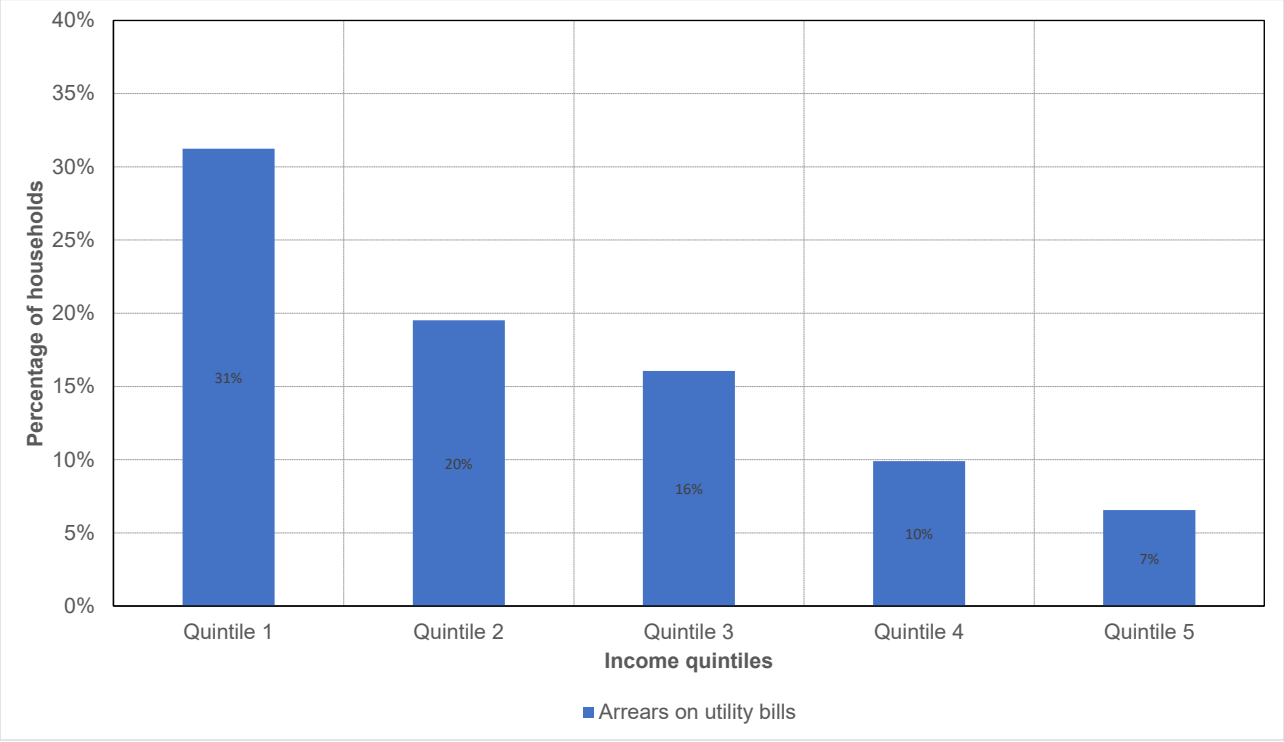
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-10: Inability to keep home warm by household type in Bulgaria



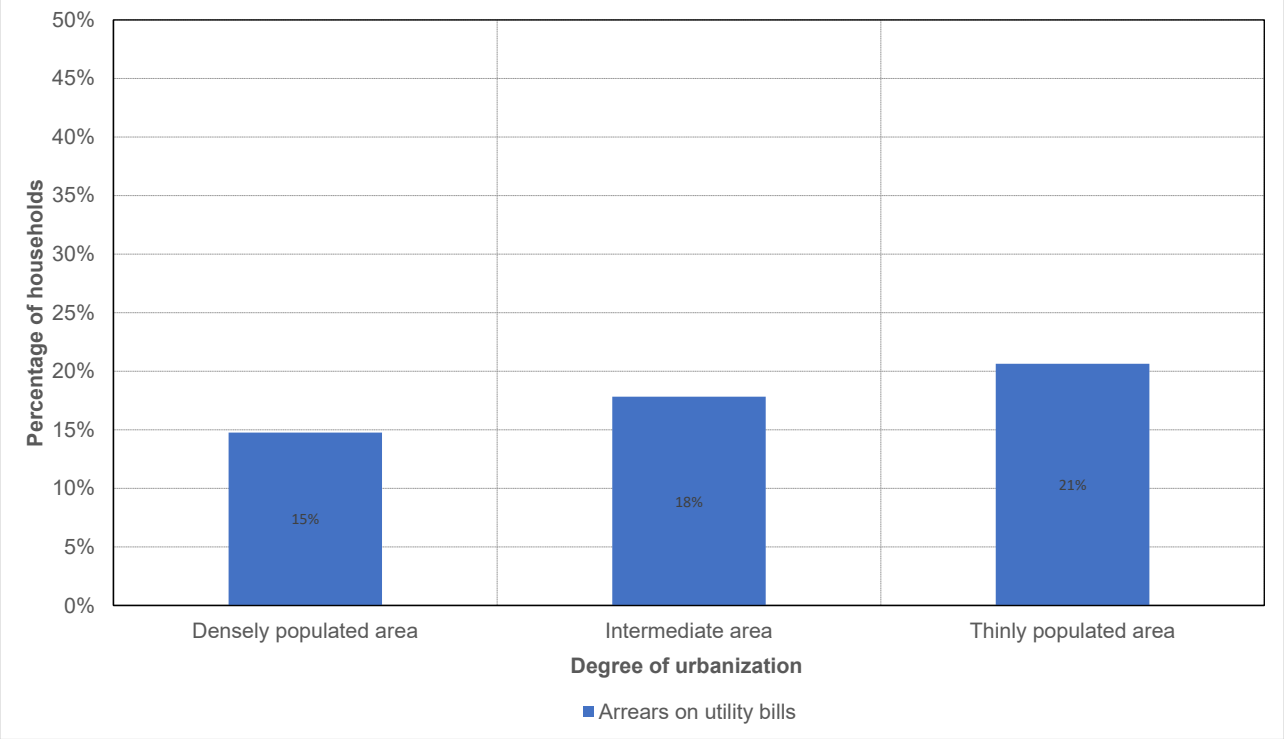
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-11: Arrears on utility bills by quintile in Bulgaria



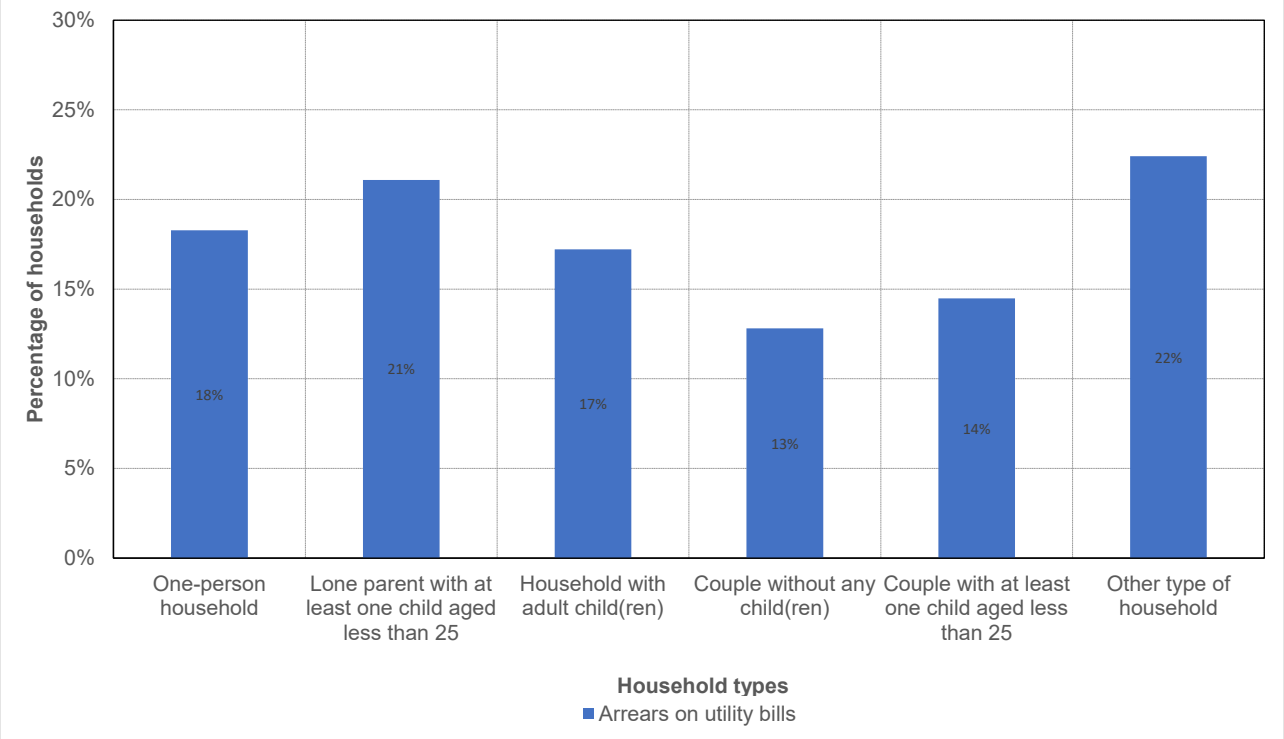
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-12: Arrears on utility bills by degree of urbanisation in Bulgaria



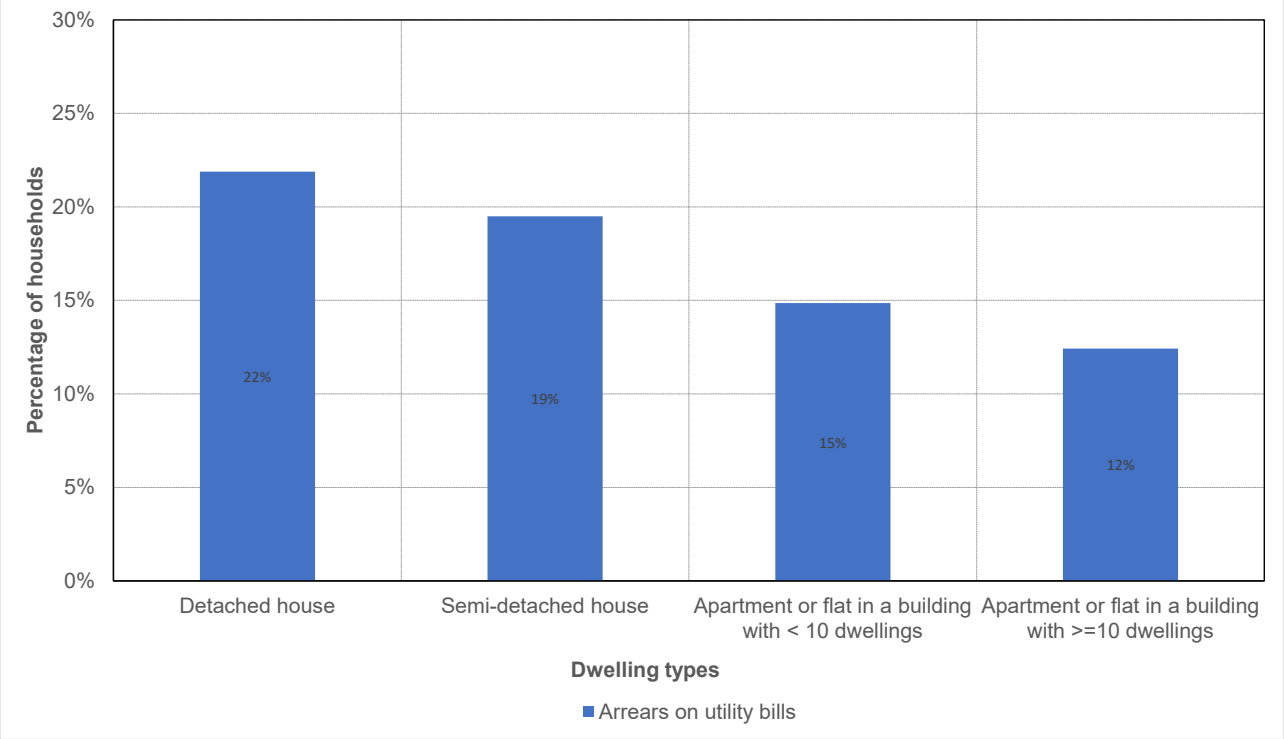
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-13: Arrears on utility bills by household type in Bulgaria



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

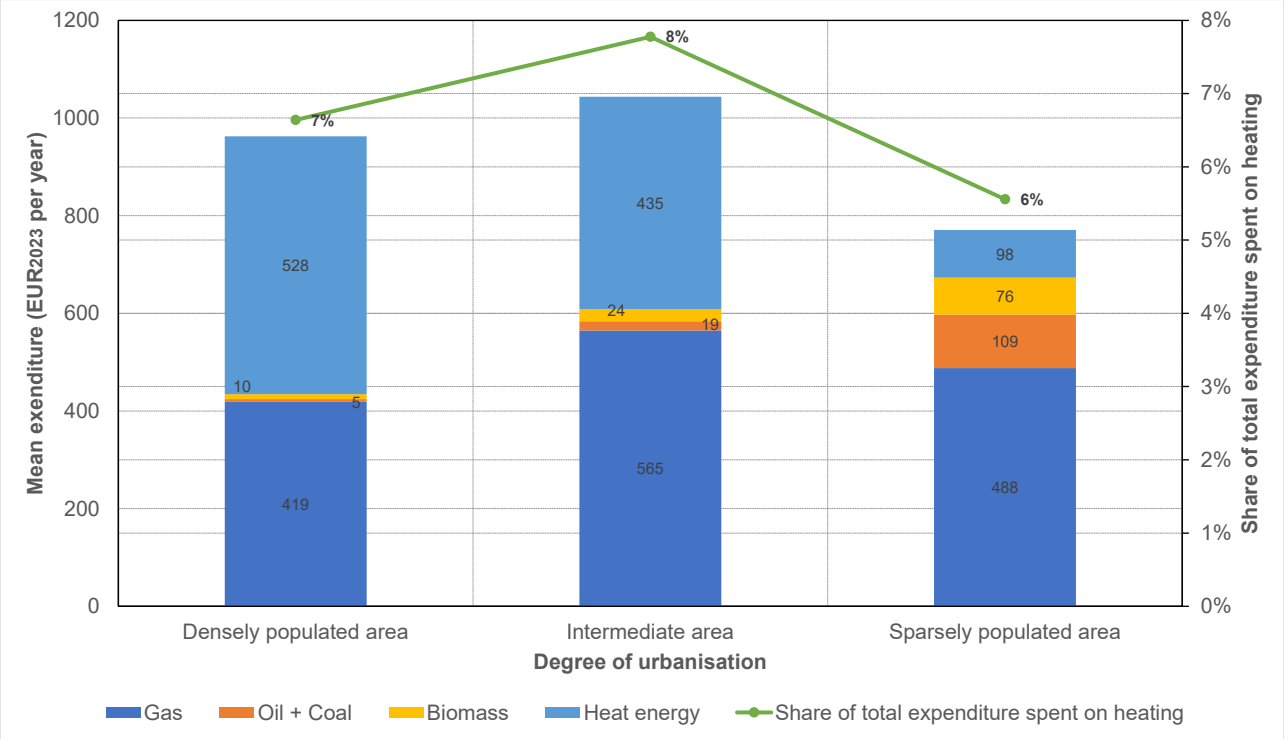
Figure 5-14: Arrears on utility bills by dwelling type in Bulgaria



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

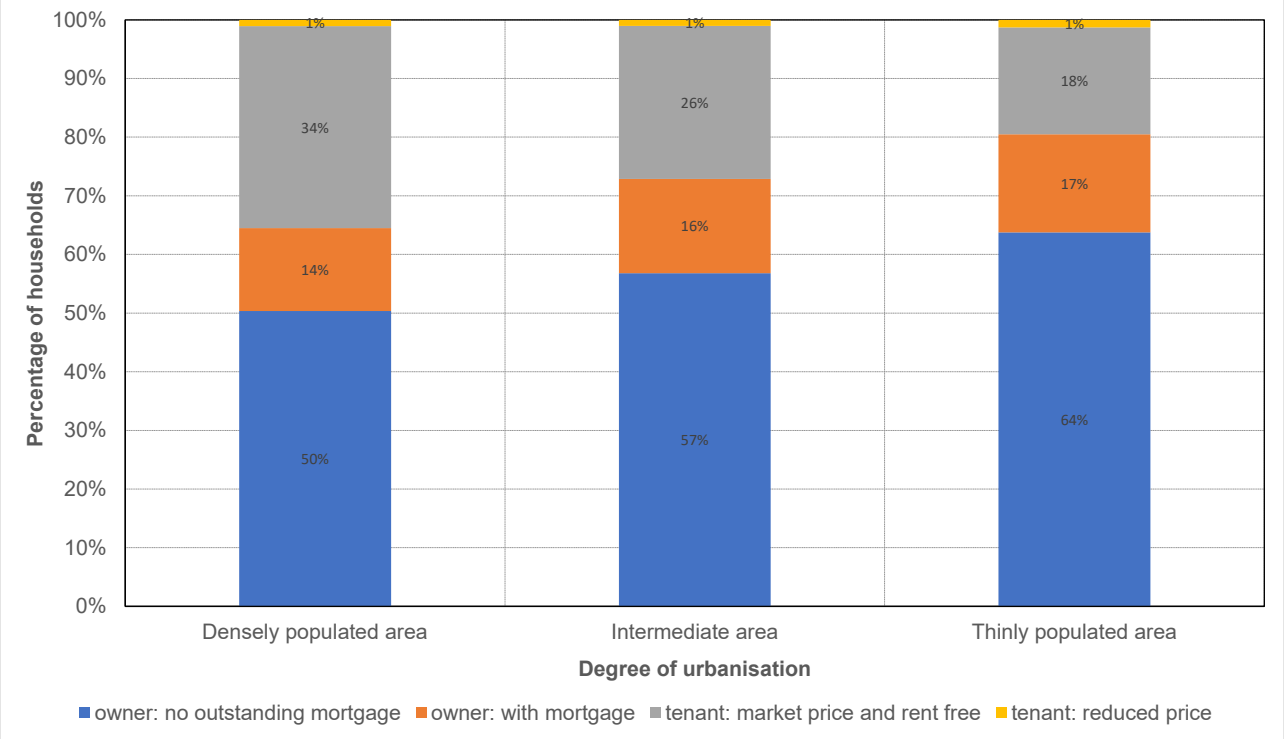
Annex II. Czechia: additional figures

Figure 5-15: Energy expenditures by degree of urbanisation in Czechia



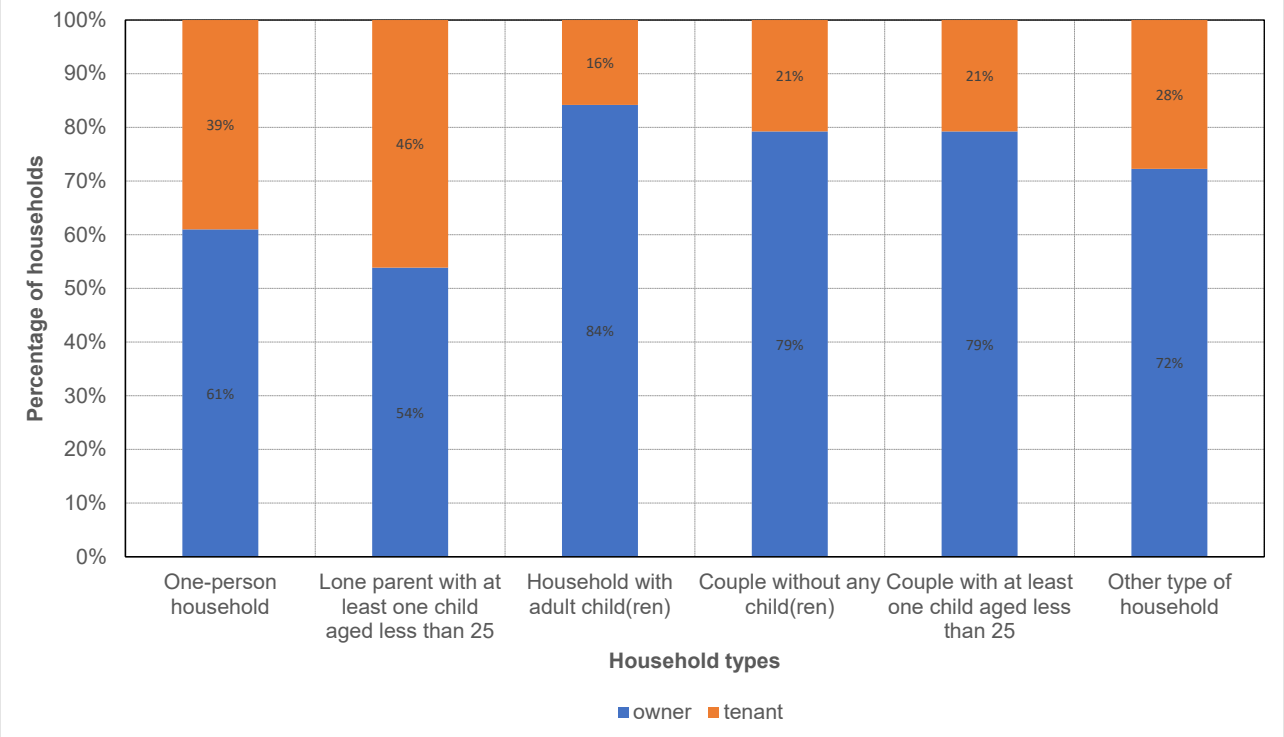
Source: Oeko-Institut's own calculations based on EU HBS 2015 microdata. The category "Oil + Coal" should be flagged for "Densely populated areas" (20 – 49 observations). Notes: The expenditure data is inflated to 2023 levels using the average monthly Eurostat Harmonised Consumer Price Indices (HICP) for Bulgaria.

Figure 5-16: Tenure status by degree of urbanisation in Czechia



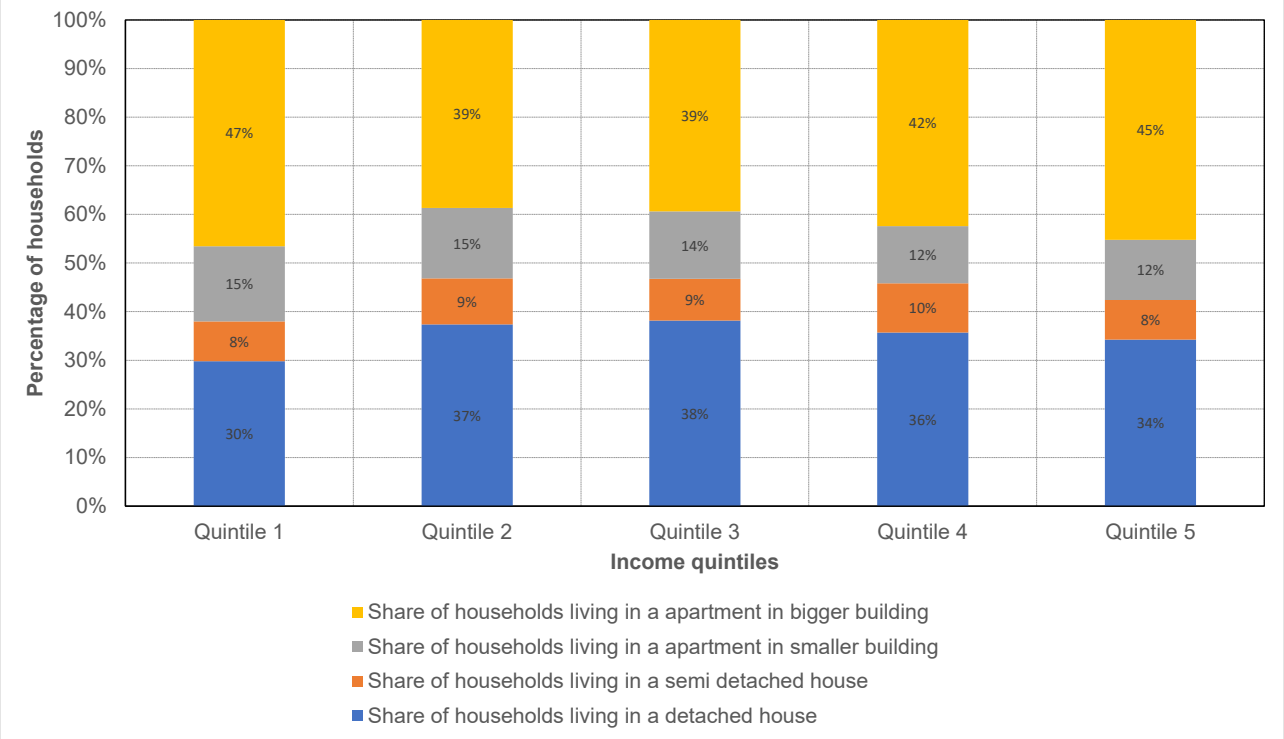
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "tenant: reduced price" should be flagged (20 – 49 observations).

Figure 5-17: Tenure status by household type in Czechia



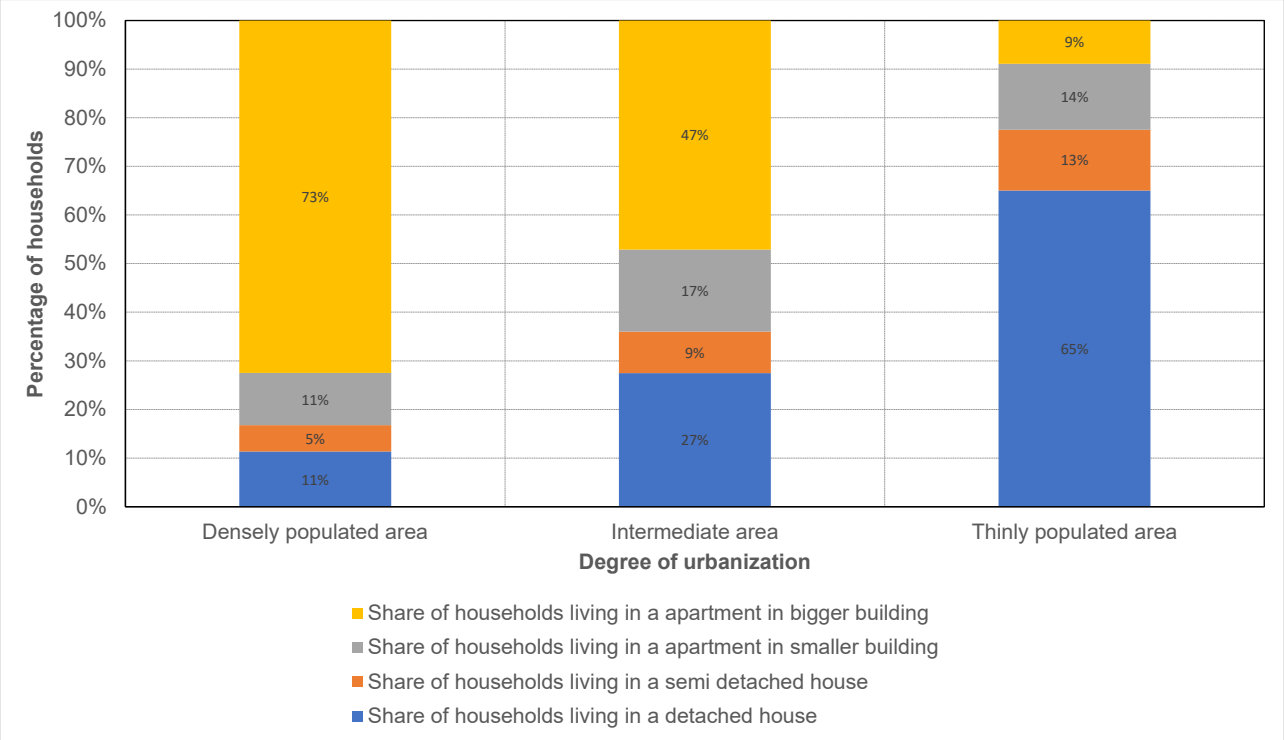
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "tenant" should be flagged for "other type of household" (20 – 49 observations).

Figure 5-18: Dwelling type by income quintiles in Czechia



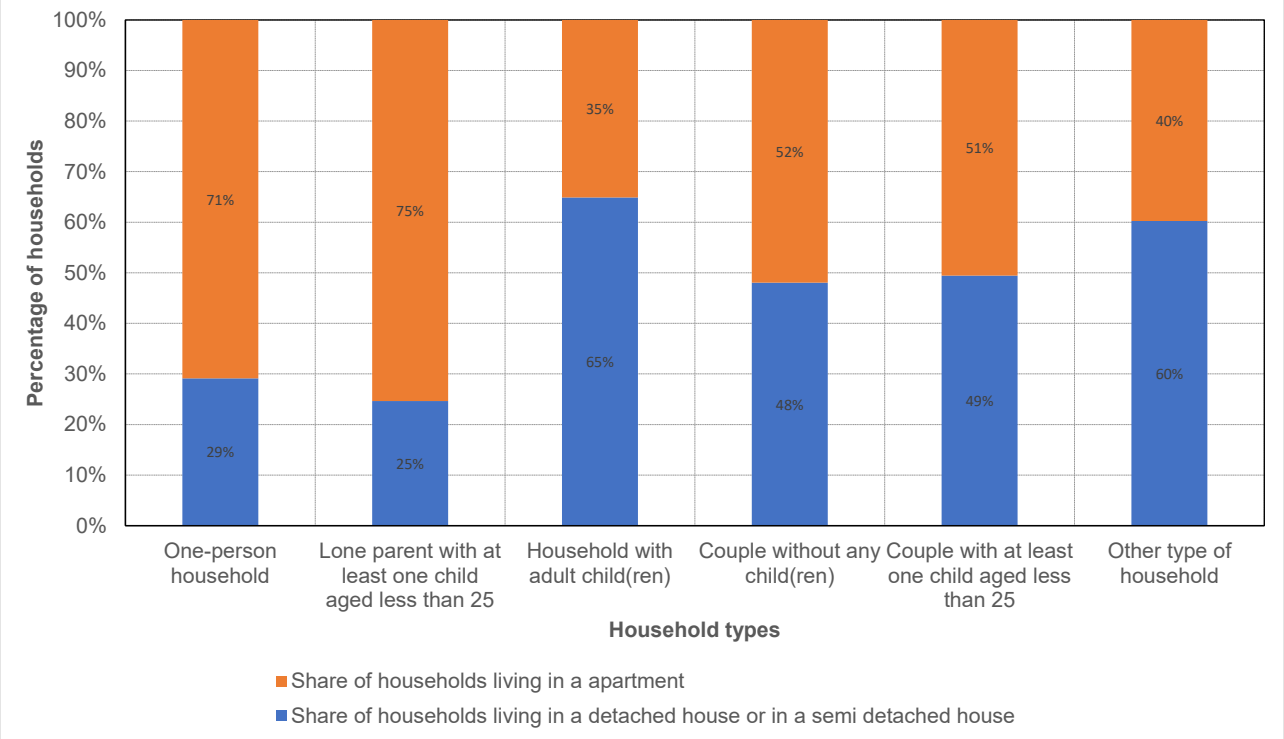
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-19: Dwelling type by urbanisation in Czechia



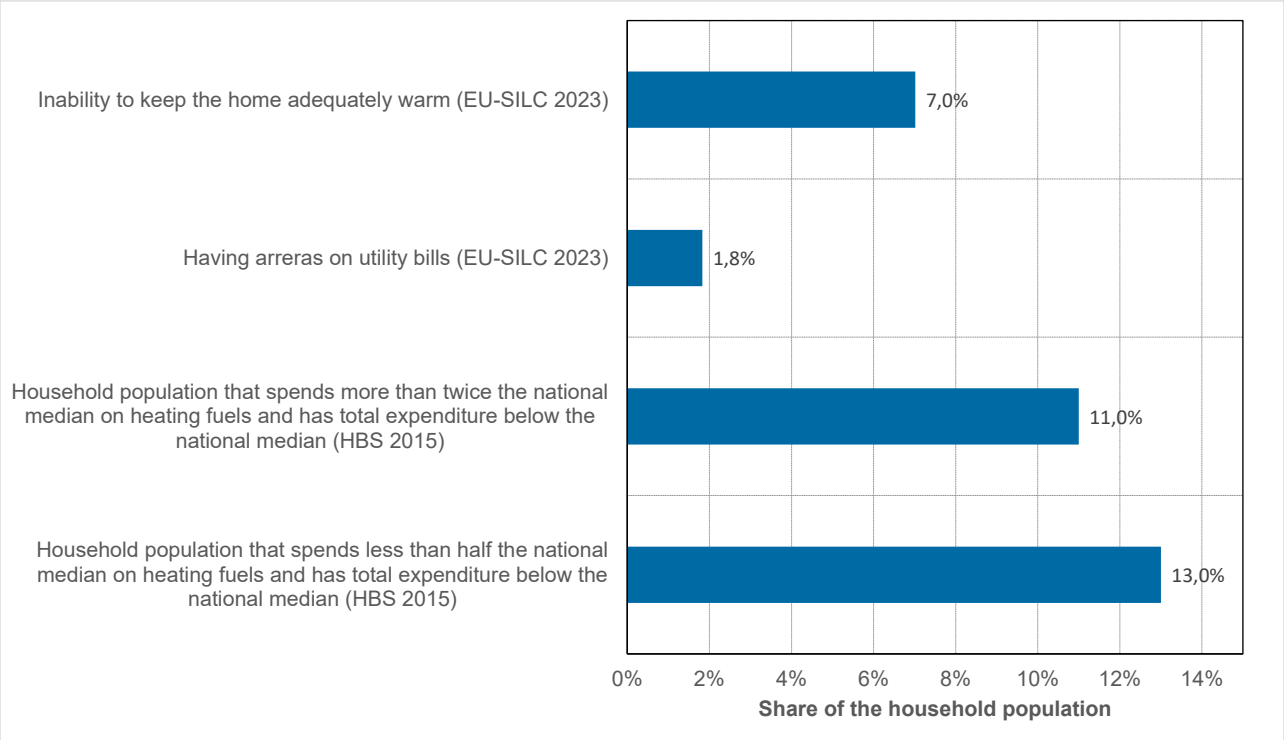
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-20: Dwelling type by household type in Czechia



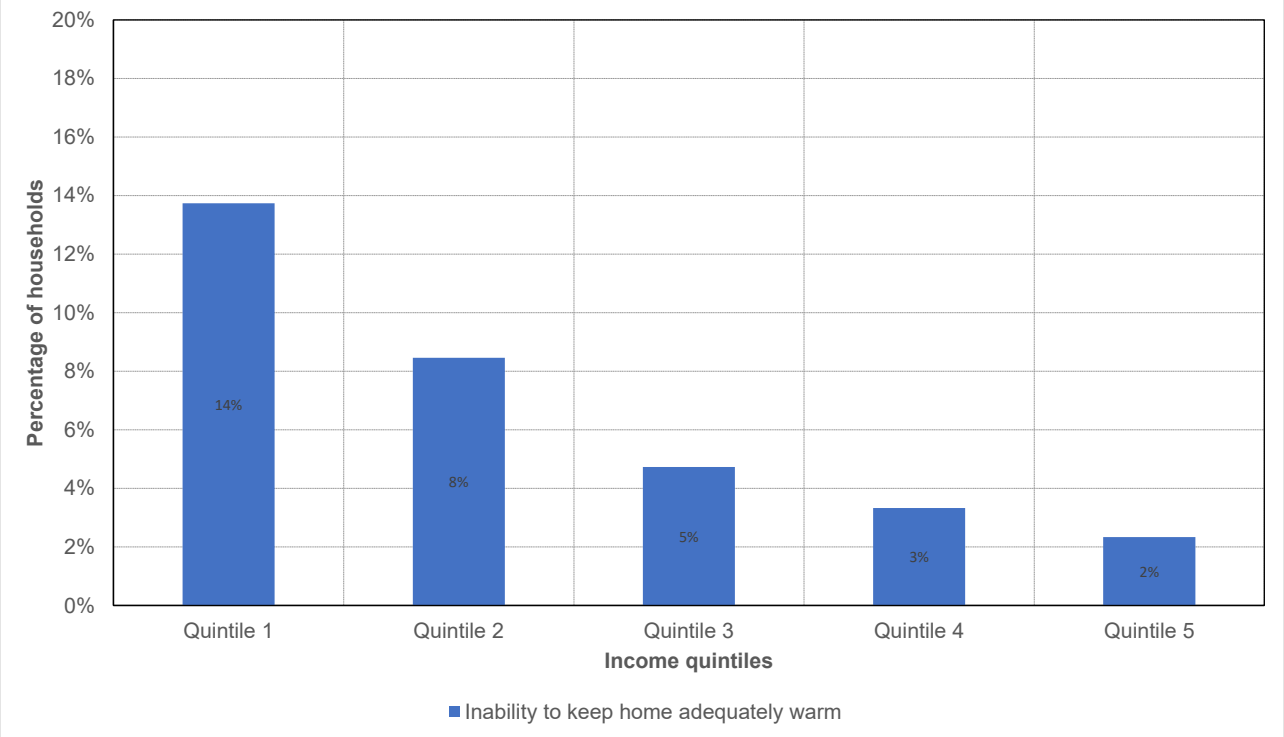
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-21: Energy poverty indicators for Czechia



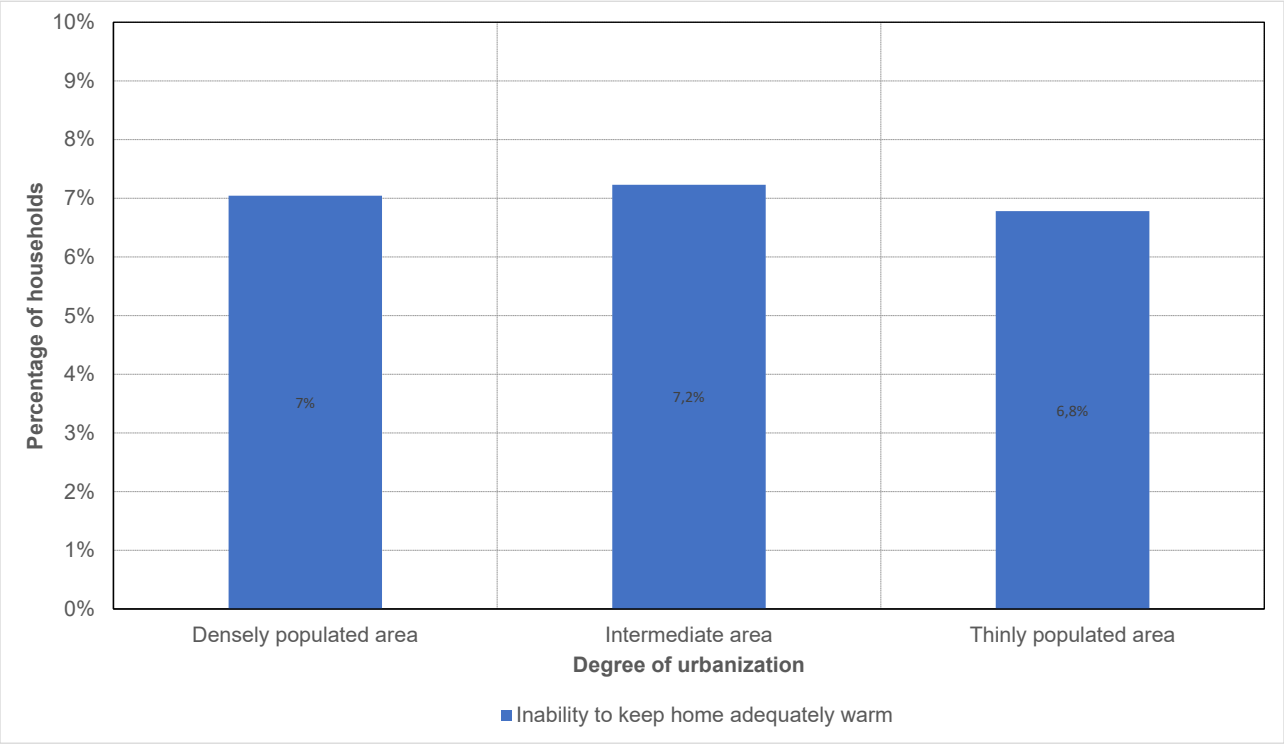
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata and HBS 2015 microdata.

Figure 5-22: Inability to keep home warm by income quintiles in Czechia



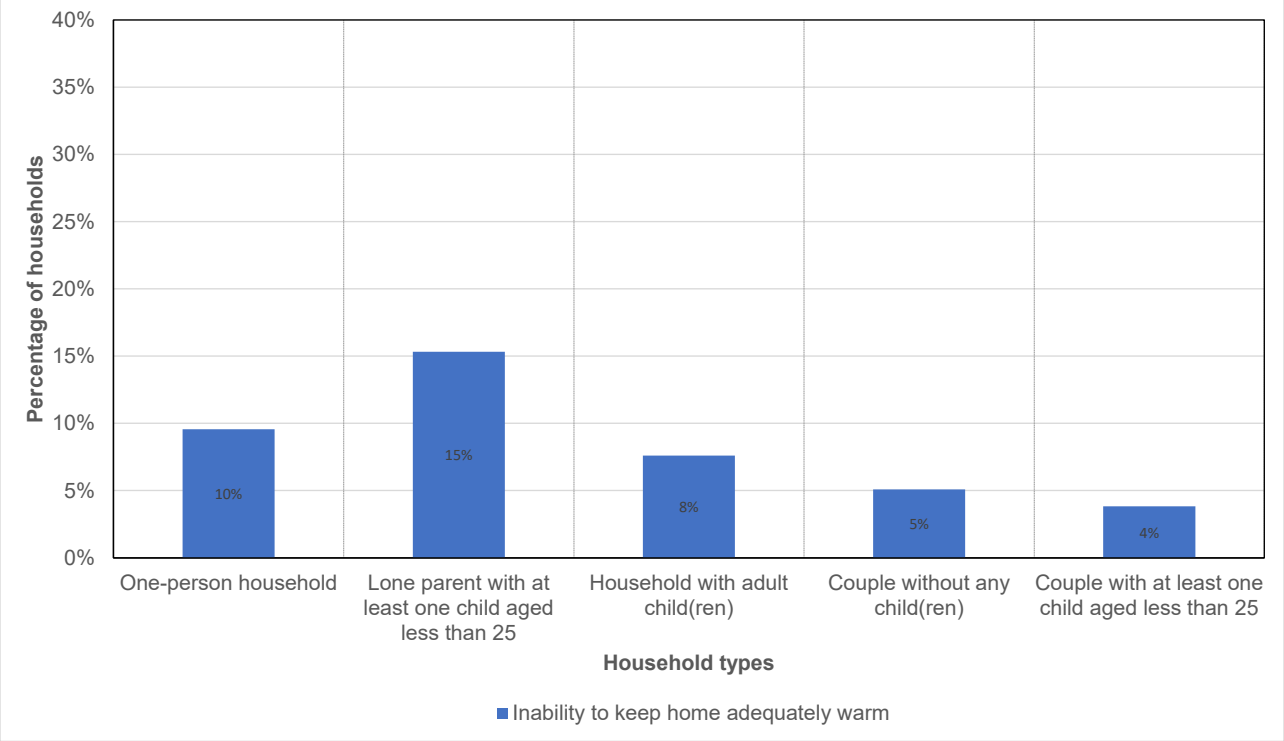
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. Quintile 4 & 5 should be flagged (20 – 49 observations).

Figure 5-23: Inability to keep home warm by urbanisation in Czechia



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

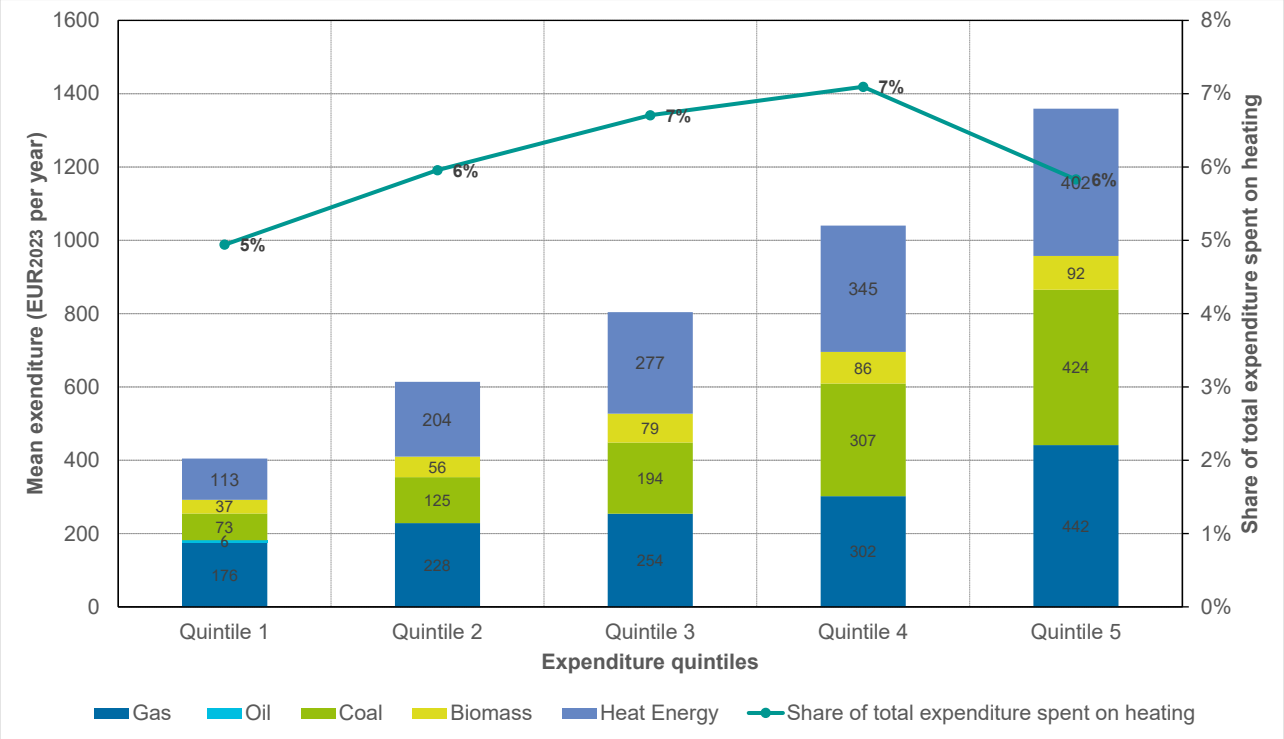
Figure 5-24: Inability to keep home warm by household type in Czechia



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "other type of households" cannot be displayed because of a low number of observations (<20 observations).

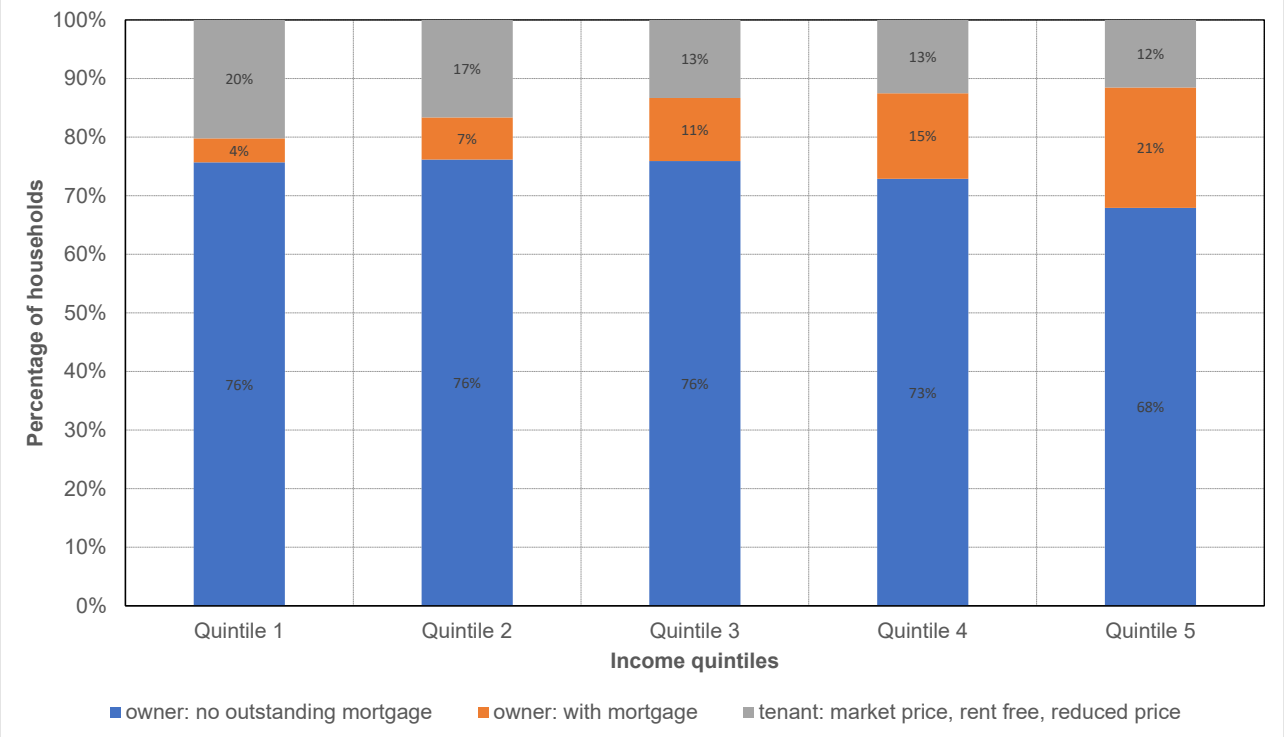
Annex III. Poland: additional figures

Figure 5-25: Energy expenditures by expenditure quintile in Poland



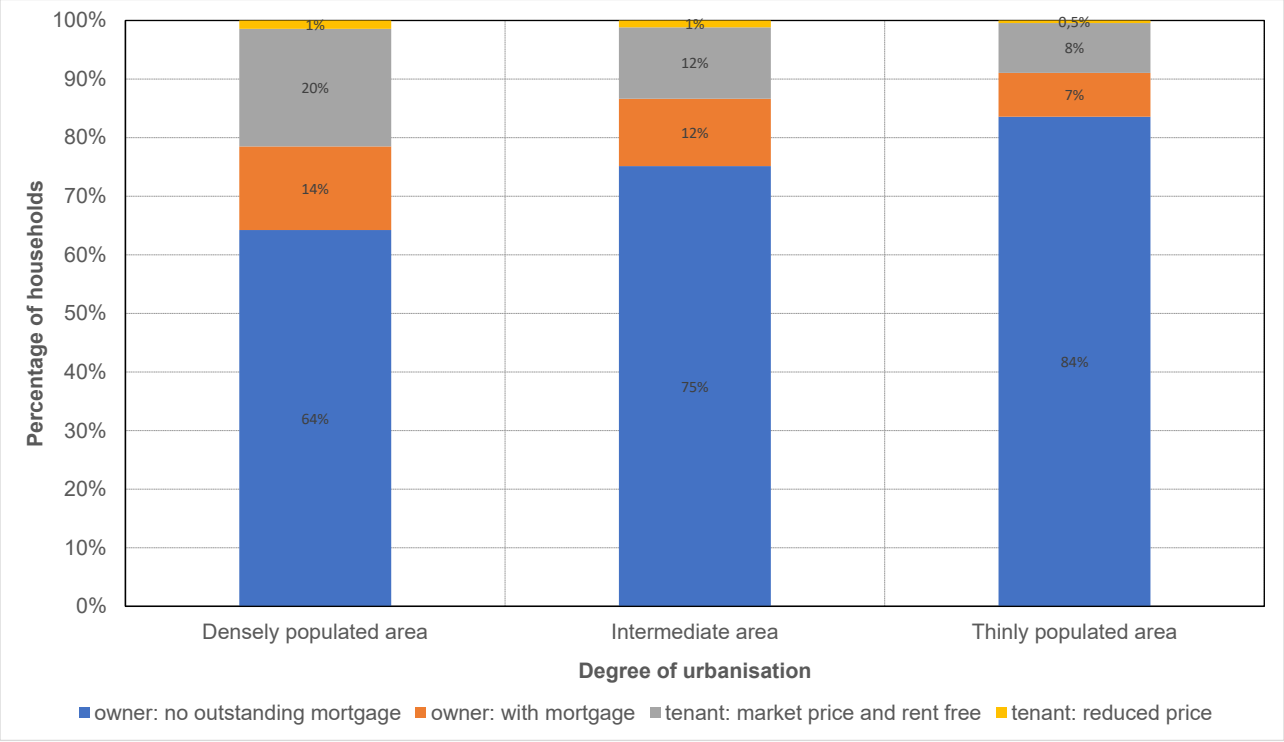
Source: Oeko-Institut's own calculations based on EU HBS 2015 microdata. Notes: The expenditure data is inflated to 2023 levels using the average monthly Eurostat Harmonised Consumer Price Indices (HICP) for Poland.

Figure 5-26: Tenure status by income quintiles in Poland



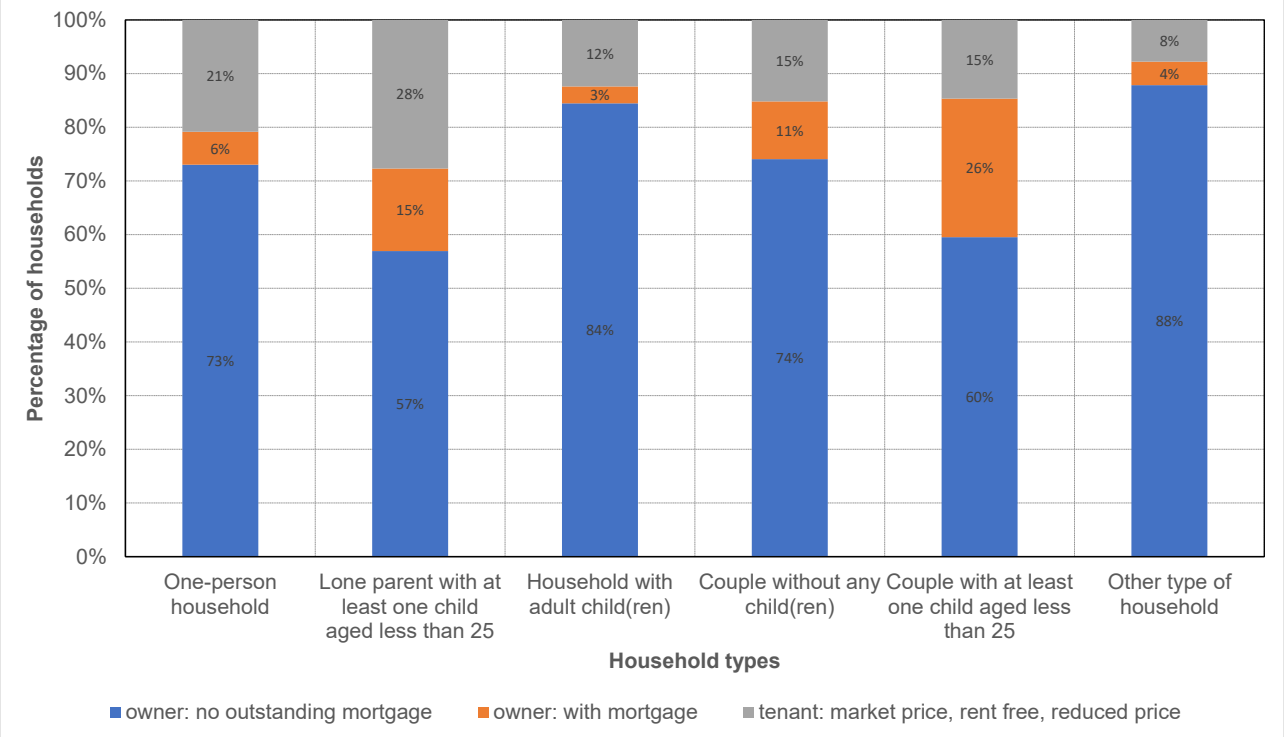
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-27: Tenure status by degree of urbanisation in Poland



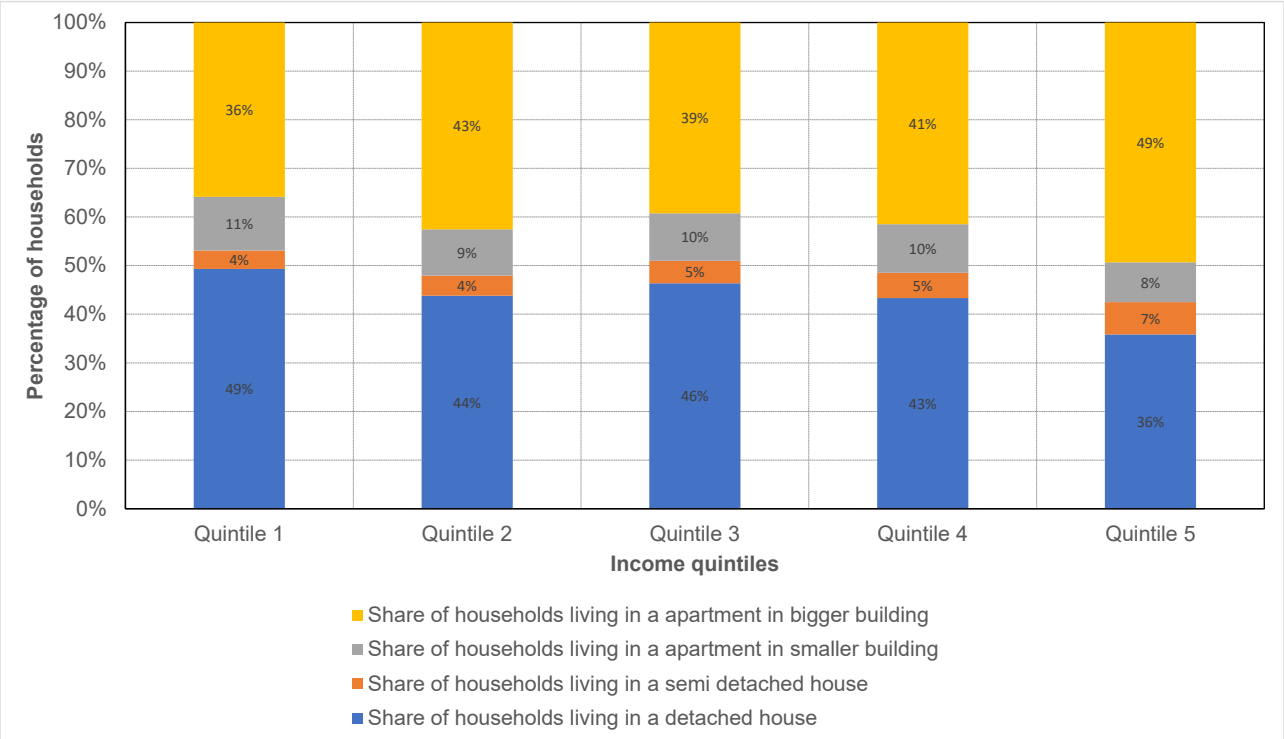
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "tenant: reduced price" should be flagged for "intermediate area" and "thinly populated area" (20 – 49 observations).

Figure 5-28: Tenure status by household type in Poland



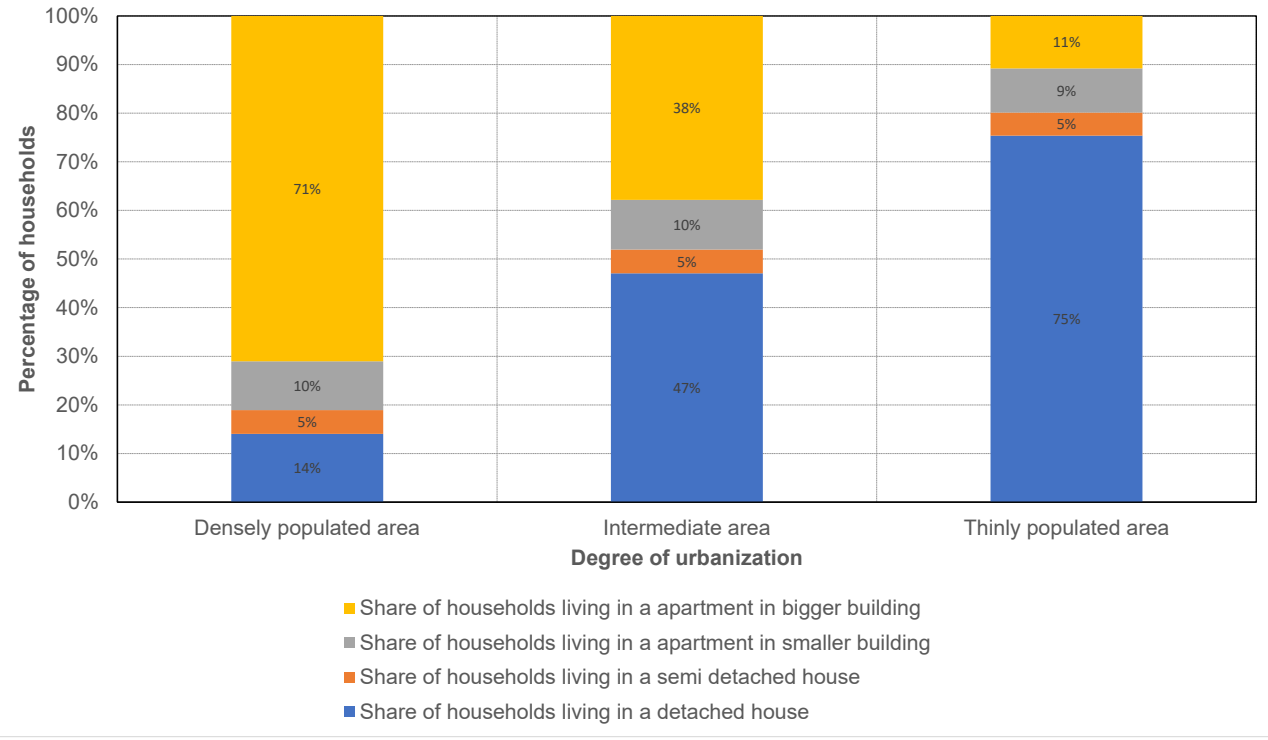
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-29: Dwelling type by income quintiles in Poland



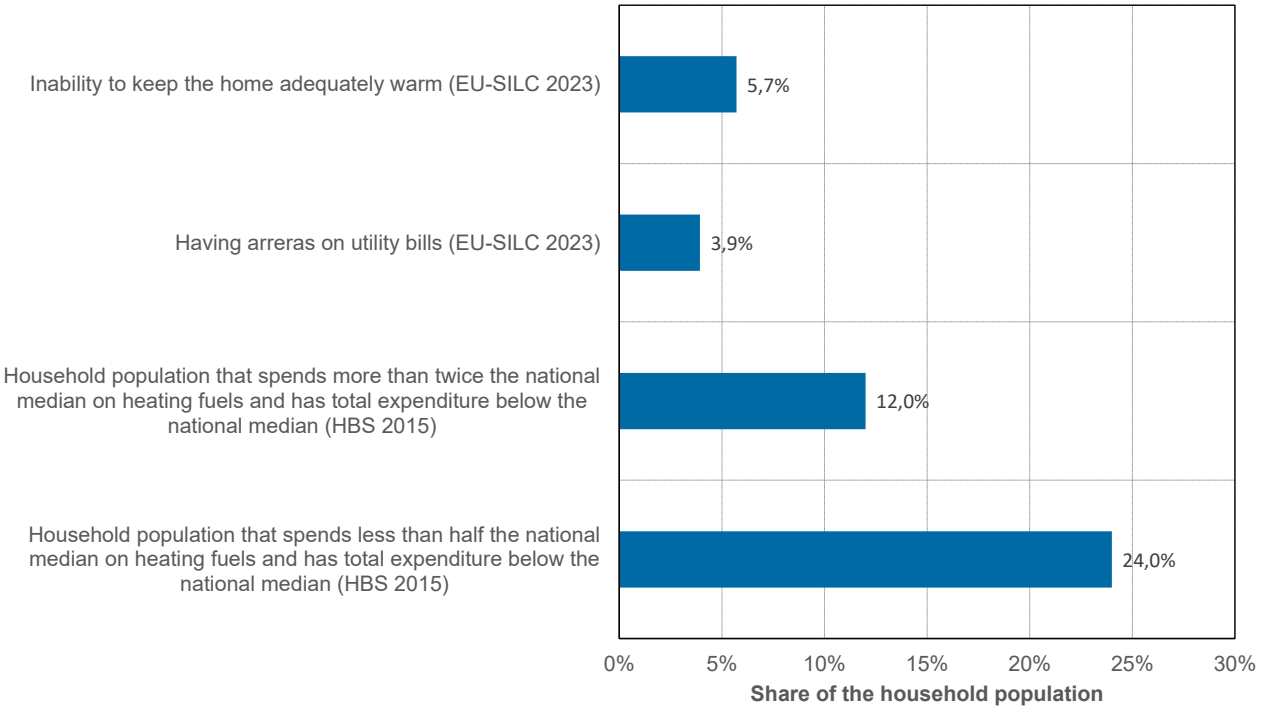
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-30: Dwelling type by urbanisation in Poland



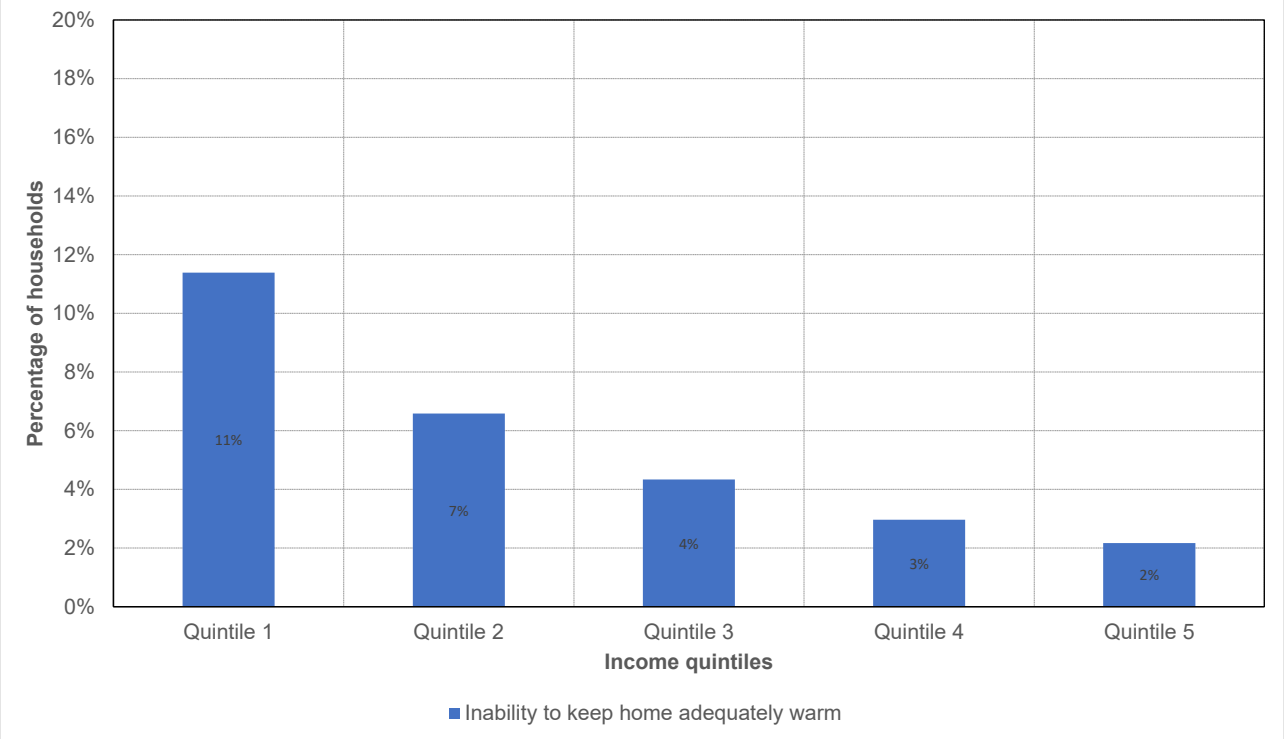
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-31: Energy poverty indicators for Poland



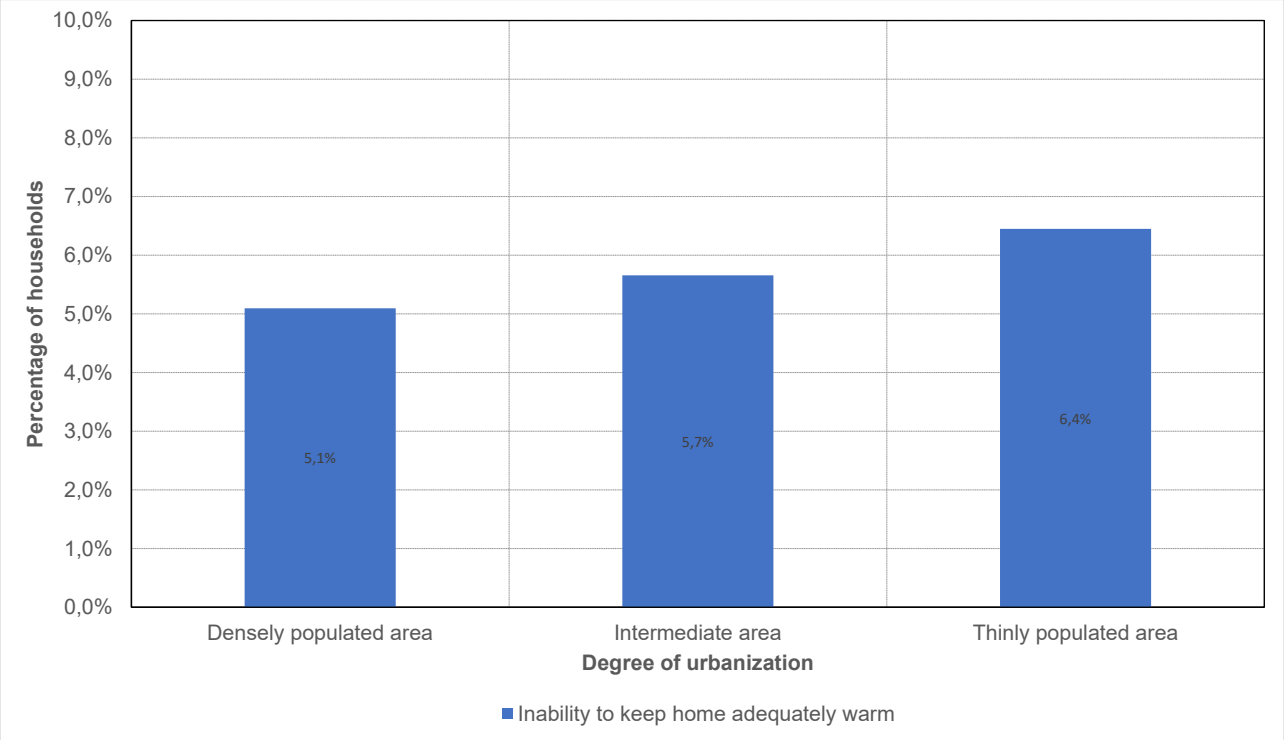
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata and HBS 2015 microdata.

Figure 5-32: Inability to keep home warm by income quintiles in Poland



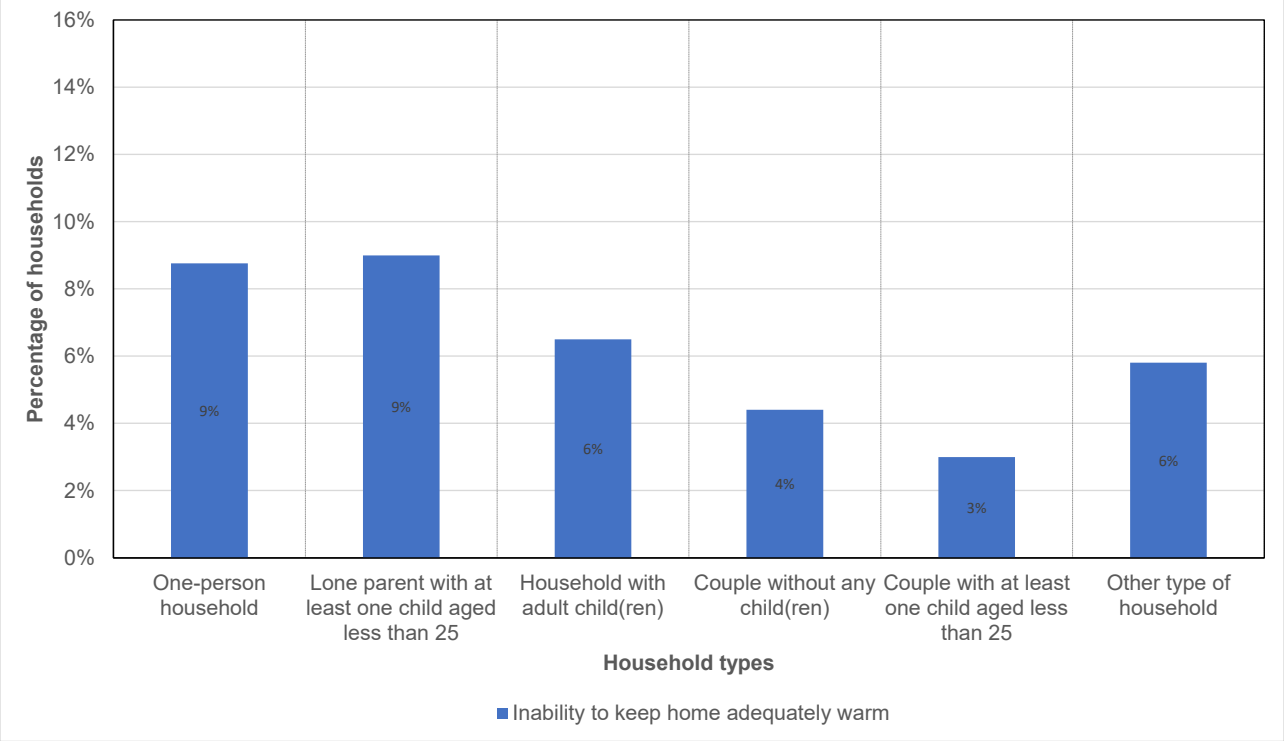
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-33: Inability to keep home warm by urbanisation in Poland



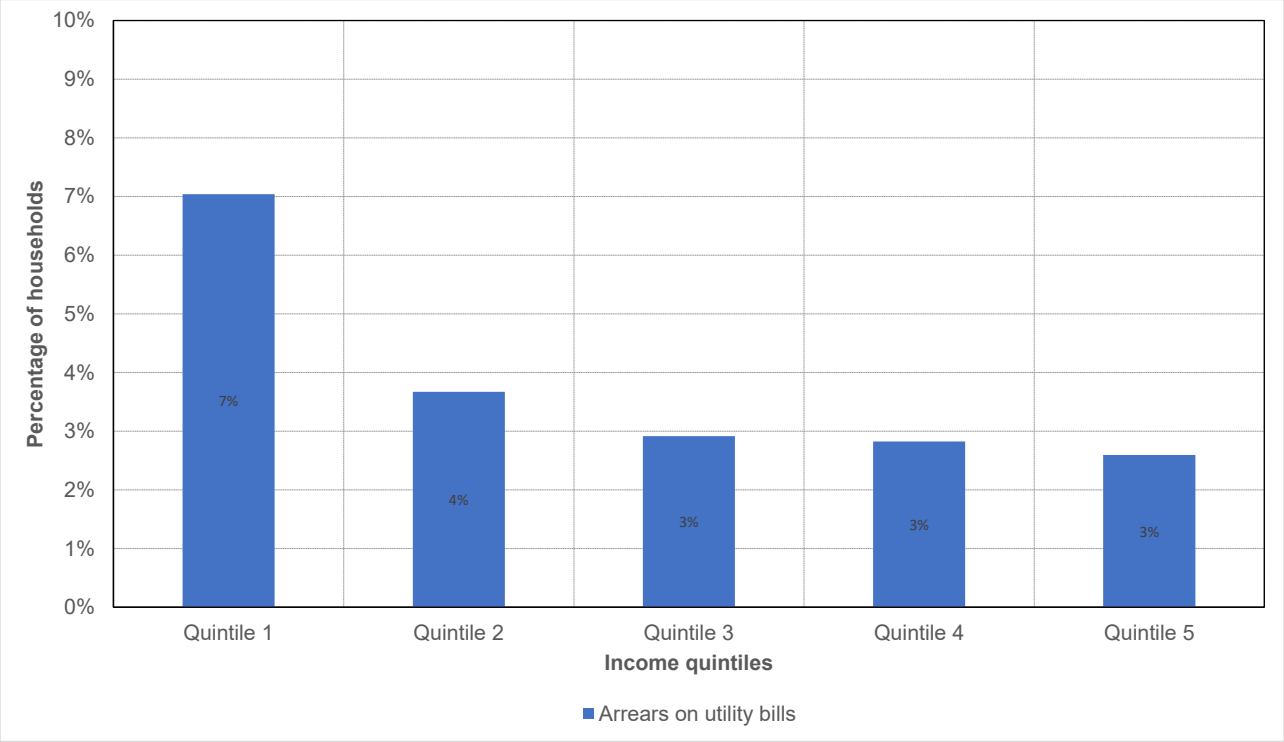
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-34: Inability to keep home warm by household type in Poland



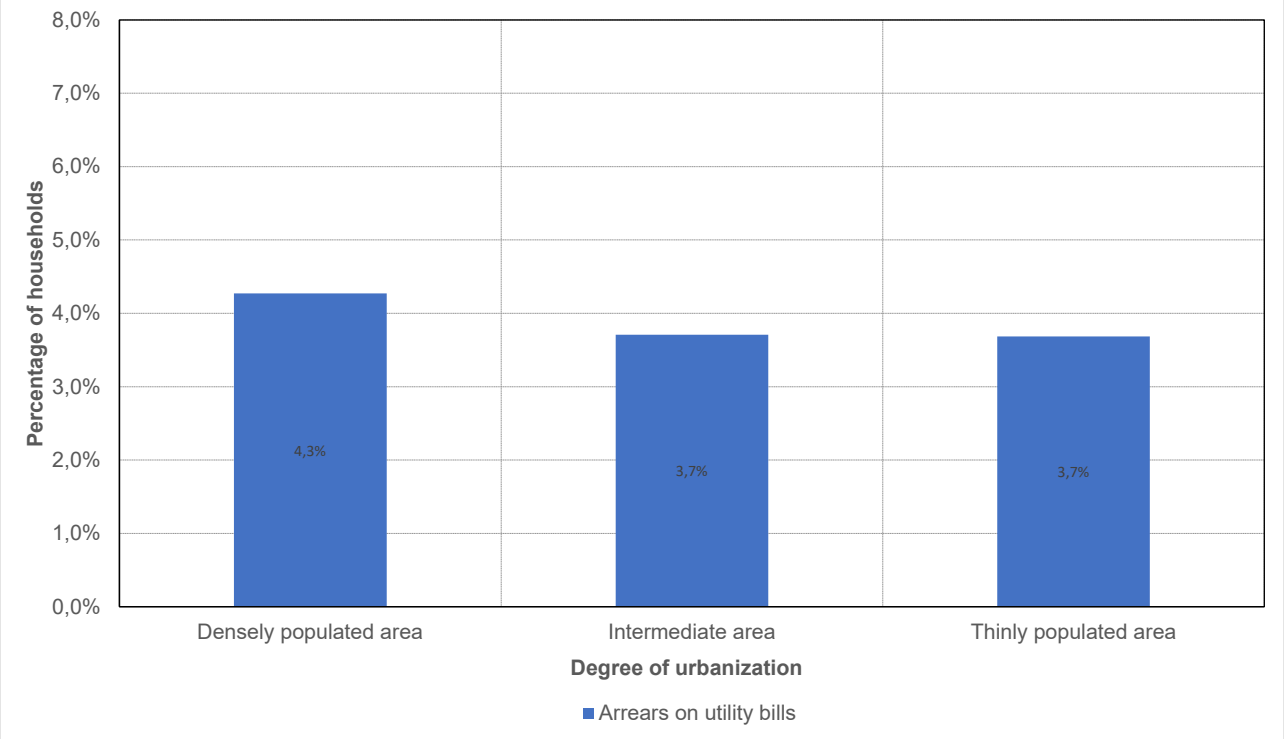
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-35: Arrears on utility bills by quintile in Poland



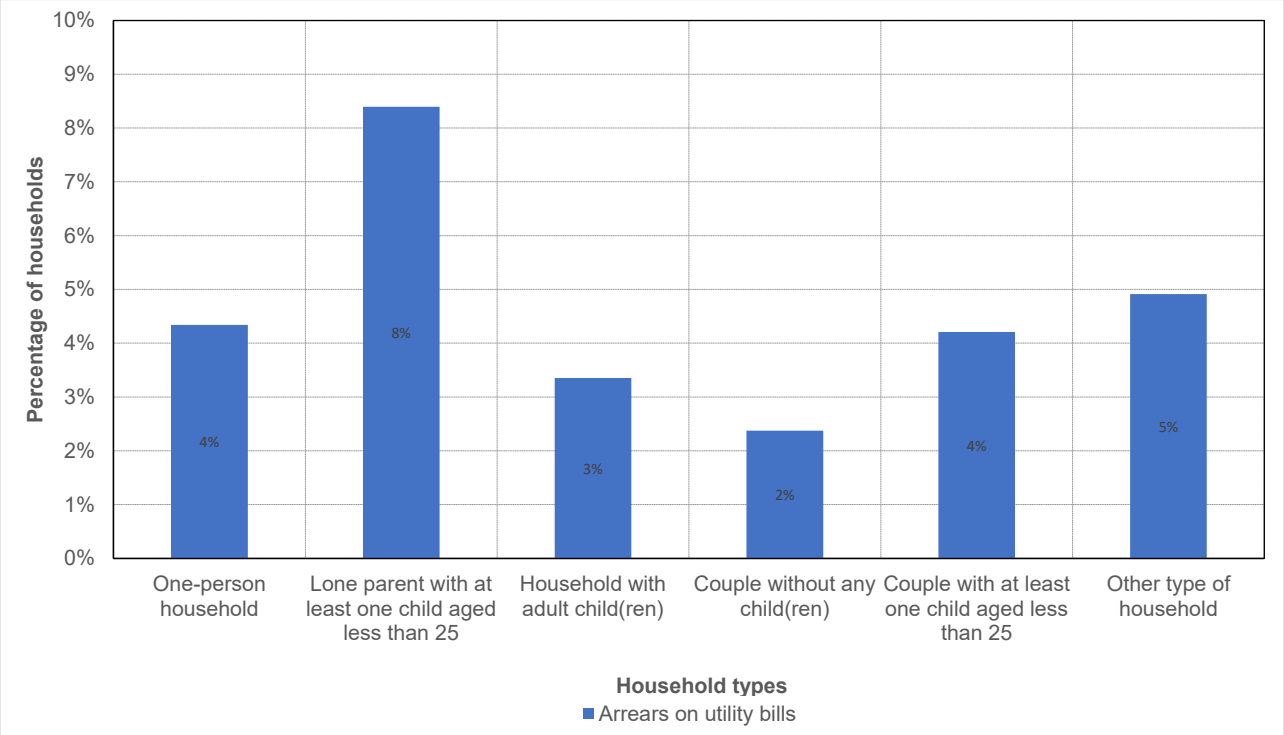
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-36: Arrears on utility bills by degree of urbanisation in Poland



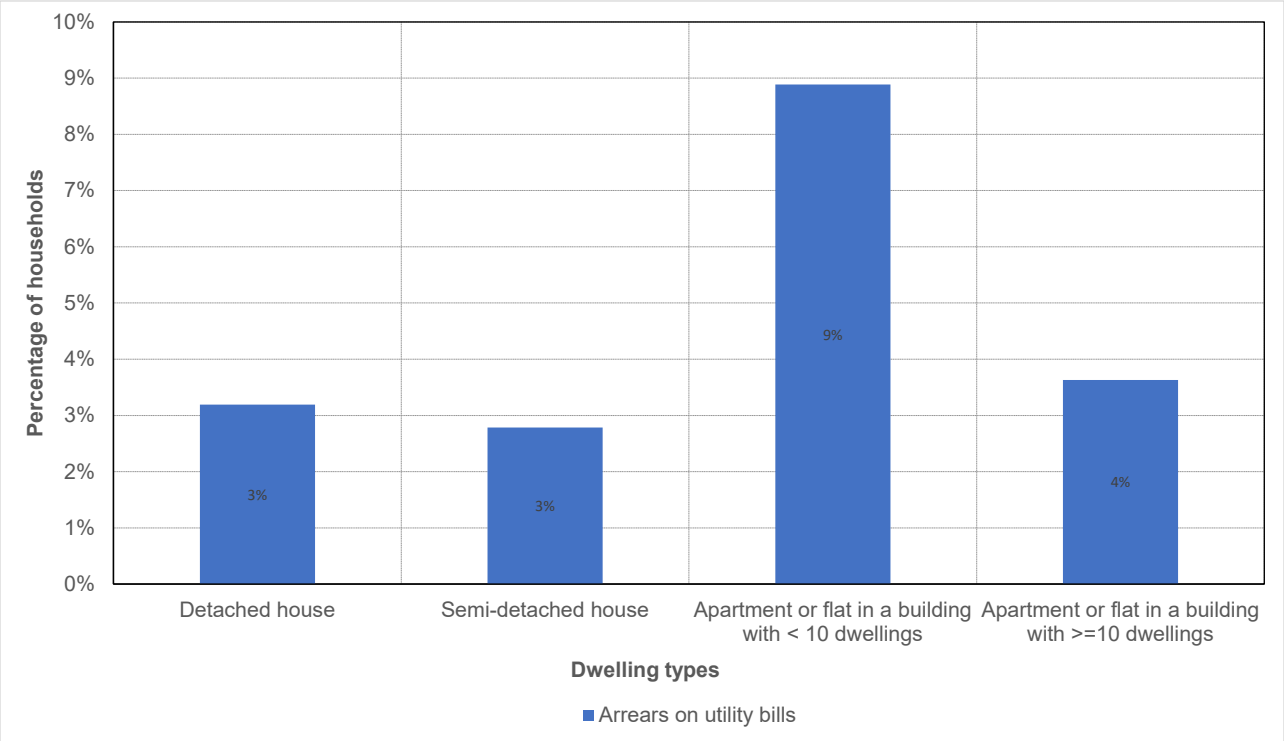
Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-37: Arrears on utility bills by household type in Poland



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata.

Figure 5-38: Arrears on utility bills by dwelling type in Poland



Source: Oeko-Institut's own calculations based on EU-SILC 2023 microdata. The category "Semi-detached house" should be flagged (20 – 49 observations).