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Shedding Light: Unveiling the Dynamics of Energy Poverty in the EU

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Abstract

More than 10.5% of the population of the European Union (EU) struggled with inadequate home heating in 2023. This is a worrying escalation on previous years (+3.7 percentage points since 2021), with some countries reaching as high as 20%. At the same time 3% of EU citizens were affected by long-term persistent energy poverty, primarily challenged by utility bill arrears and difficulties in heating their homes. Energy poverty affected households across all income levels, with some regions witnessing substantial challenges even among those in the middle and highest income brackets. This report provides disaggregated data and statistical analysis on energy poverty indicators across all EU Members States, regions and socioeconomic strata. The findings highlight the urgent need for targeted interventions to address the deep-rooted causes of energy poverty and to reduce its prevalence across the EU. As we intensify efforts to achieve the energy transition, these insights are crucial to ensure that no citizen is left behind in the pursuit of a sustainable and equitable energy future.

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Executive Summary

Energy poverty remains a persistent and complex challenge across the European Union, representing a barrier to the bloc's aspirations for a socially inclusive energy transition. As the EU navigates towards a low-carbon future, ensuring equitable access to energy services is paramount. This report synthesises the latest research on energy poverty within the EU, shedding light on its prevalence, determinants, and impact on vulnerable populations.

Policy context

This study is framed by the European Green Deal and the European Pillar of Social Rights, which together emphasise the need for a fair transition that prioritises energy access for all citizens. The report responds to the urgent call for policy interventions that can alleviate energy poverty while supporting the EU's climate objectives, particularly in the face of fluctuating energy markets and increasing environmental concerns. The insights contained in this report are also highly relevant to the Social Climate Fund. The findings can inform the design and implementation of the fund, ensuring that it targets and supports vulnerable populations most at risk of energy poverty, thereby facilitating a just and inclusive transition towards a low-carbon economy.

Key conclusions

Following a decade of structural decline in energy poverty, the pattern has been reversed since 2021 as evidenced by substantial rises in various indicators. Energy poverty remains a pervasive issue, with significant variations across regions and demographic groups. The results of this analysis underscore the complexity of energy poverty, influenced by factors such as income levels, energy prices, housing costs and quality. They reveal a minor correlation between energy poverty and adverse health outcomes, as well as a marked persistence of energy poverty in certain regions and among specific demographic groups. Greece, Romania and Bulgaria have the highest numbers of individuals facing arrears on utility bills, reflecting broader socioeconomic disparities. Households with the lowest incomes are disproportionately affected, with some regions recording figures as high as 55% of individuals struggling to meet energy costs. The findings highlight the necessity for targeted policy measures that address both the symptoms and the root causes of energy poverty.

Main findings

Energy poverty affects a significant portion of the EU population, with regional disparities pointing to a higher prevalence in certain Member States. The report identifies vulnerable households, including those with low incomes, poor housing conditions, and higher energy expenditures relative to income. It also discusses the role of social factors, such as age, household composition and immigration background, in exacerbating the risk of energy as well as the role energy price changes may play in excess death rates. In 2023, more than 10.5% of EU residents could not adequately warm their homes, with four countries experiencing highest rates as high as 20%. Long term persistent energy poverty, affects 3% to 7% of the population, and even high-income households in certain regions.

Related and future JRC work

This report is a continuation of our work to decode energy poverty dynamics in the EU. Several existing JRC-led publications already provide quantitative and qualitative data and analysis on energy poverty (see e.g. Ozdemir and Koukoufikis, 2024; Maier, and Dreoni, 2024; Koukoufikis et al., 2023, Menyhert, 2023; Papadimitriou et al., 2023; Vandyck et al., 2023; Koukoufikis and Uihlein 2022; Gangale and Mengolini, 2019). Future research will aim to provide deeper insights into various aspects of energy poverty and its intersection with other socioeconomic challenges, highlighting the need for more sophisticated measurement methods and the further evaluation of policy interventions.

Quick guide

The structure of the report is as follows: Chapter 1 introduces the issue of energy poverty and sets the stage for the analysis. Chapter 2 outlines the methodological framework employed in the study. The core empirical findings are presented in Chapter 3, which examines the dimensions of energy poverty, and in Chapter 4, which focuses on regional variations. Chapter 5 examines special considerations, including the impact of energy prices on health and the persistence of energy poverty. The report concludes with Chapter 6, synthesising the insights and offering policy recommendations. The annexes provide supplementary tables, figures and references to support the analysis.

1 Introduction

Energy is a fundamental pillar of modern society, crucial not only for economic development but also for securing the wellbeing of European citizens. As the European Union (EU) moves ahead with its ambitious energy transition policies towards a greener and more sustainable future, the issue of energy poverty has emerged as a significant policy challenge that requires urgent attention. This report, conducted by the Joint Research Centre (JRC), examines the particularities of energy poverty within the EU, providing a comprehensive analysis to inform policy actions and support the EU's commitment to leaving no one behind.

Energy poverty, also recognised as fuel poverty or energy vulnerability, is a complex phenomenon characterised by a household's inability to access or afford adequate energy services, such as heating, cooling and powering appliances. It intersects with broader socioeconomic factors, amplifying inequalities and adversely affecting the health, comfort and overall quality of life of affected individuals. The issue gains an added layer of complexity within the context of the EU's energy transition, where the dual objectives of achieving climate targets and ensuring social equity must be balanced.

Energy poverty has only recently been clearly defined in EU legislation, in the recast Energy Efficiency Directive (EED) ([1]) of 2023, as 'a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health' ([2]). This definition opens the door to further policy developments, for example in the Energy Performance of Buildings Directive (EPBD) ([3]), adopted in 2024. The EPBD builds on the definition established in the EED and prioritises the renovation of those buildings with the highest potential to alleviate energy poverty.

Energy poverty and vulnerability have been acknowledged in EU legislation since 2009, mandating Member States to implement measures such as national energy action plans, social security benefits and assistance for energy efficiency enhancements. The imperative to address energy poverty is underscored by its alignment with the European Pillar of Social Rights, which upholds energy as a basic social right, and the European Green Deal, which emphasises a just transition that is inclusive and leaves no one behind (see principle 20 on access to essential energy services). The urgency is further heightened by the increasing volatility of global energy markets and the resultant energy price spikes along with general inflation dynamics which have exacerbated the risk and depth of energy poverty across Member States.

This report is driven by the need to understand and mitigate the detrimental impacts of energy poverty in the context of the EU's broader energy and climate goals. The study was initiated to unravel the complex web of determinants that underpin energy poverty, examine its prevalence and distribution, and evaluate the effectiveness of existing policies in addressing this critical issue. Through rigorous analysis of robust data sources and the employment of advanced analytical techniques, the research aims to provide insights that can inform targeted policy interventions.

The policy problem at the core of this study is complex. First, there is a need to identify and understand the households most vulnerable to energy poverty, which requires a granular analysis of the social, economic and demographic factors that contribute to this vulnerability. Second, the report grapples with the question of how to measure and monitor energy poverty effectively, acknowledging that a tailored approach is necessary to capture its diverse manifestations. Finally, the significance of this issue is amplified by the potential health implications, the risk of exacerbating social inequalities, and the challenges it poses to the EU's climate ambitions.

The primary objective of this research is to map the dimensions of energy poverty across the EU and identify the determinants that contribute to its persistence. By analysing patterns and trends, the study seeks to shed light on the underlying factors that drive energy poverty, including income disparities, housing quality, energy prices and household characteristics. Additionally, with country-level comparisons, the report can help

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1 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).

2 The full definition in the Directive is: *"a household's lack of access to essential energy services, where such services provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing national social policy and other relevant national policies, caused by a combination of factors, including at least non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes".*

3 Proposal for a Regulation of the European Parliament and of the Council on the energy performance of buildings (recast), COM(2021) 802 final 15.12.2021

policymakers to evaluate the success of various policy measures and identify best practices which can be scaled up or adapted for different regional contexts within the EU.

In addressing these objectives, the report adopts a comprehensive methodological framework that leverages data from the European Union Statistics on Income and Living Conditions (EU-SILC) and the Household Budget Survey (HBS). It employs a mixed-methods approach, combining descriptive analysis with multivariate logistic regression models to clarify the relationship between energy poverty indicators and an array of independent variables. This robust analytical strategy ensures that the findings are statistically reliable and policy-relevant.

By providing a clear picture of the state of energy poverty in the EU, this research can guide the development of targeted policy interventions aimed at reducing energy poverty and its associated risks. Furthermore, the study's findings can inform broader discussions on social equity and justice within the context of the EU's energy transition, contributing to the formulation of policies that are both environmentally sustainable and socially inclusive.

In conclusion, this report represents a critical step towards understanding and combating energy poverty in the EU. It offers a valuable resource for policymakers, stakeholders and researchers, providing evidence-based insights that can shape policy to ensure a fair and just energy transition. As the EU continues to navigate the challenges of decarbonisation and energy system transformation, addressing energy poverty will be essential for building a socially resilient and inclusive union equipped to meet the demands of the future.

The report is structured to facilitate an in-depth understanding of the nature of energy poverty. *Section 2* lays out the methodological framework, providing clarity on the data sources and analytical techniques, and the rationale behind their selection. *Section 3* investigates the dimensions of energy poverty, dissecting patterns and trends through descriptive and multivariate analyses of key indicators. It further explores regional variations in *Section 4*, highlighting the disparities in energy poverty across EU regions. *Section 5* discusses special considerations, including the links between energy poverty, energy prices and excess mortality, and examines the persistence of energy poverty over time. Finally, the report concludes in *Section 6* with a synthesis of the findings, reflecting on their policy implications and providing insights for future actions. Further details of the study's methodology and results can be found in the annex.

2 Methodological framework

The methodology of our analysis captures a comprehensive view of energy poverty in the EU, drawing from robust data sources and employing rigorous analytical techniques to understand the prevalence, trends and determinants of energy poverty across the EU. We employ two primary data sources to conduct the analyses presented: the European Union Statistics on Income and Living Conditions (EU-SILC) and the Household Budget Survey (HBS) microdata sets. Additionally, supplementary statistics published on the Eurostat database webpage are utilised as auxiliary data sources.

EU-SILC, implemented since 2003 (Eurostat 2022), collects data on income and socioeconomic inequality across EU Member States and some non-EU countries ([4]). It has a cross-sectional component, which provides a snapshot of income and living conditions at a given time, and a longitudinal component, which tracks a rotational sample of individuals over a four-year period. Approximately 25% of the sampled population in the cross-sectional sample is followed for four years, including in the last panel wave (Eurostat 2014). The majority of data is gathered through the core EU-SILC questionnaire, complemented by periodic modules implemented every three or six years and ad-hoc modules to meet specific policy needs (Eurostat a). The EU-SILC dataset encompasses a vast array of socio-demographic, income-related, labour market and health-related variables at individual and household level. Its larger sample size compared to other social surveys, such as the Eurobarometer, European Values Survey (EVS) and European Social Survey (ESS), allows for more statistically reliable findings per Member State and per year.

For the analysis of energy poverty, two EU-SILC variables are employed: the inability to keep the home adequately warm (HH050) and having arrears on utility bills in the last 12 months (HS021). These two variables are among the energy poverty indicators recommended by the Energy Poverty Advisory Hub (EPAH) (see Gouveia 2022). The variable on the ability to keep the home adequately warm is a dichotomous variable (1 “Yes”, 2 “No”); with responses of "Yes" or "No," asked consistently in all EU-SILC waves. The variable on arrears on utility bills has a different structure, where the answer categories are 1: “Yes – once”, 2: “Yes – twice and more” and 3: “No”. This question is asked only of those households which declare that they have some utility bills to pay. Those who do not are flagged with the code -2: “Not applicable (no utility bills)”. However, this variable was dichotomous until 2007 (GESIS MISSY). For the purposes of this analysis, the arrears variable has been converted to a dichotomous variable, in which the answer categories are 0: “No (including flag -2 for no utility bills)” and 1: “Yes-at least once (categories 1 and 2 combined). It should be noted that the EU-SILC question on arrears applies not only to expenditure on domestic energy, but also to water, sewage and solid waste bills (Eurostat 2022).

These two energy poverty indicators have been used as the dependent variables in both descriptive and multivariate analysis. Some other socio-demographic background variables published in the EU-SILC cross-sectional microdata sets have been used as explanatory independent variables to explore factors affecting the two main indicators. These variables include individual-level background characteristics such as the age and sex of the individual, and household characteristics like household composition, household disposable income level and dwelling-related variables. In addition, some of the individual-level variables have been converted to household-level characteristics such as the household’s migration background, based on the adult members’ country of birth, and the highest level of education attained by the adult members of the household.

Given that the dependent variables are dichotomous, a logistic regression model was employed for multivariate analysis. This model allows us to explore the likelihood of individuals being unable to adequately heat their homes and having arrears on utility bills without resorting to complex formulas. Instead of specific equations, we focus on the concept of conditional probability, where P(Yi=1) represents the likelihood of the outcome variable. This approach estimates regression coefficients through maximum likelihood estimation, assuming the qualitative nature of the dependent variable. By maximising the probability of observing the experimental data, we can estimate parameter values effectively (Sommet and Morselli, 2017; Eboli and Mazzula, 2009).

The logistic regression analyses have been conducted both on the EU-level and on the country level. The second set of multivariate analysis has been implemented to examine whether there are variations in the factors affecting the energy poverty status across countries, whereas the EU-level analysis has been

[4] See: https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions

implemented to see the patterns in the EU as a whole. The models utilise pooled EU-SILC cross-sectional datasets from 2010, 2016 and 2020, excluding data from 2021 and 2022 to incorporate the effects of having leaks, dampness, or rot in the dwelling on energy poverty. Additionally, separate multivariate analyses use pooled data including EU-SILC 2022, excluding the variable on dwelling conditions. In all these analyses, the year of the survey has been employed as an independent variable to measure the impact of time on the likelihood of being energy poor in the EU. The full list of the independent variables used in the logistic regression models can be found in **Table 5** and **Table 6** in the Annex.

Household Budget Surveys (HBS) are national surveys collecting data on household expenditure on goods and services, primarily to calculate weights for the consumer price index (Eurostat b) ([5]). A detailed expenditure dataset on numerous items is collated, alongside variables on household characteristics (Eurostat 2023). Eurostat began collecting and publishing HBS data after 1988, but HBS data sets from 2010, 2015 and 2020 are currently accessible to researchers and are not comprehensively available for all countries.

The unit of analysis for EU-SILC is individuals, while for HBS, it is households. Descriptive analysis is conducted using HBS microdata for selected energy poverty indicators, such as the high share of energy expenditure in income (2M). This indicator assesses the energy poverty status of a household according to the ratio of the household's equivalised energy expenditure over the total equivalised disposable household income. If the value for a given household is twice or more than the national median, the household is considered energy poor. This indicator is also one of the energy poverty indicators recommended by EPAH (see Gouveia 2022). It should be noted that the household's energy expenditure refers to expenditure solely for housing purposes (e.g. cooking, heating, cooling, electric devices, etc.) and it does not include transport-related energy expenditure. The expenditure on energy for housing purposes is the sum of a household's expenditure on electricity, gas, liquid fuel, solid fuel and heat energy (Eurostat 2023). The HBS analysis in this report has been conducted to see the changes in the proportion of people in 2M indicator across years, and the differentiation in this proportion according to households' income levels and actual share of energy expenditure in disposable household income.

[5] See: https://ec.europa.eu/eurostat/web/microdata/household-budget-survey

3 Dimensions of energy poverty

Energy poverty is a complex social issue that affects a significant number of individuals and households throughout the EU. It appears in various forms, from the struggle to afford energy bills to the challenges of ensuring adequate heating and cooling in homes. This section explores the core aspects that define energy poverty, examining key indicators that help us to understand its prevalence and distribution. We explore patterns and trends in energy poverty, including arrears on utility bills, the inability to keep homes adequately warm and the disproportionate share of energy expenditure in household income. Through a combination of descriptive and multivariate analysis, we aim to shed light on the underlying factors contributing to these dimensions of energy poverty and discuss the regional disparities that highlight the unequal burden across the EU. Our analysis inform policymakers and stakeholders, providing them with the necessary evidence to develop targeted interventions to alleviate energy poverty and promote energy equity.

3.1 Descriptive analysis of energy poverty patterns

The manifestation of energy poverty throughout the EU is diverse, reflecting a wide range of socioeconomic factors and policy landscapes. This section provides a descriptive analysis of the prevailing patterns of energy poverty as evidenced by the data. Here, we scrutinise indicators such as arrears on utility bills, the inability to keep homes adequately warm and the share of income spent on energy. By examining trends and disparities across different EU Member States and demographic groups, we aim to identify the most affected populations and the extent of the impact of energy poverty. This analysis will serve as a foundation for understanding the nuances and breadth of energy poverty, setting the stage for a more in-depth exploration of its determinants in the subsequent sections.

The data indicate a complex pattern of energy poverty, with significant variation across countries, age groups and socioeconomic backgrounds. While the overall trend suggests a decrease in energy poverty over the past decade, recent increases in some countries and among certain populations highlight ongoing challenges and the need for targeted policy interventions.

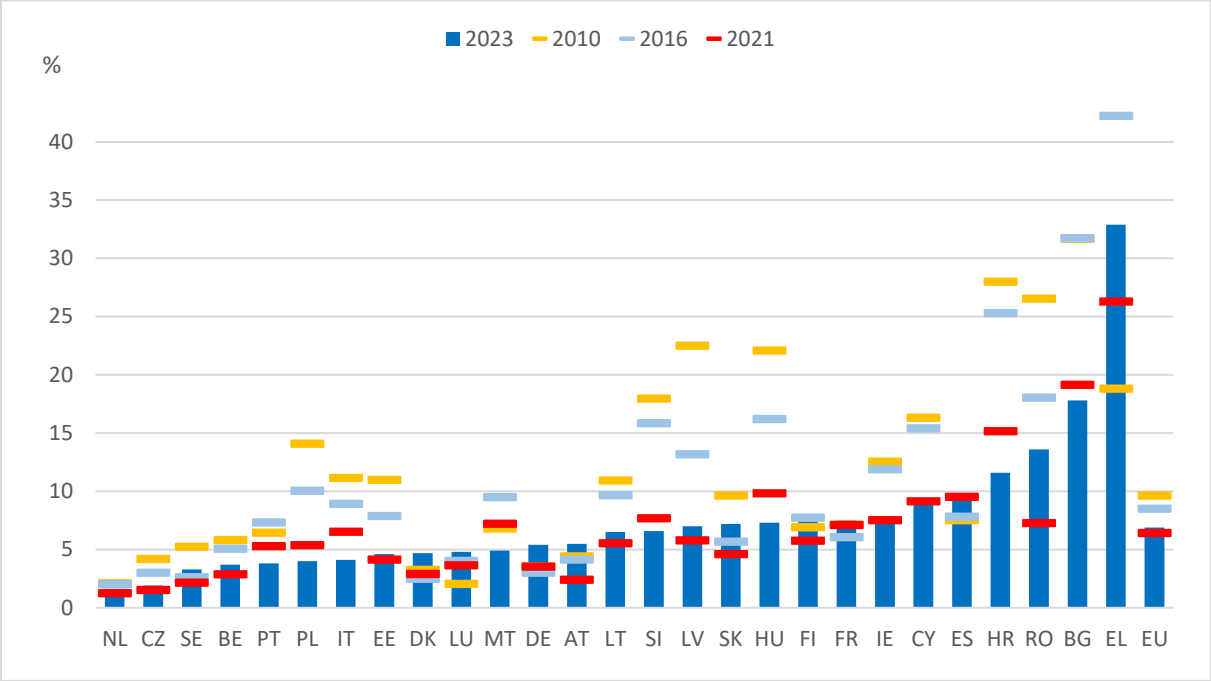
3.1.1 Arrears on utility bills

Analysis of arrears on utility bills in 2023 reveals significant variation between EU Member States. Approximately, 7% of individuals in the EU reported having arrears on utility bills, with the highest incidence observed in Greece, where almost one in three individuals faced this financial challenge (**Figure 1**). Other countries with notably high rates include Bulgaria, Romania, and Croatia, where the prevalence of arrears exceeded 10%. In stark contrast, fewer than 2% of individuals in the Netherlands and Czechia experienced arrears, with nine other Member States reporting rates below 5%.

Figure 1, illustrating the proportion of individuals with arrears from 2010 to 2023, shows a modest increase in the EU average for 2023. However, this aggregate figure masks the general trend of a gradual decline in arrears since 2010 (**Figure 2**). The majority of Member States follow this downward trajectory, albeit with distinct country-specific patterns. For example, Latvia, Hungary, Croatia, Bulgaria and Slovenia saw reductions exceeding 10 percentage points over the 12-year period. Conversely, in Greece, the 2022 arrears rate was 15 percentage points higher than in 2010, with Luxembourg and Spain also experiencing increases.

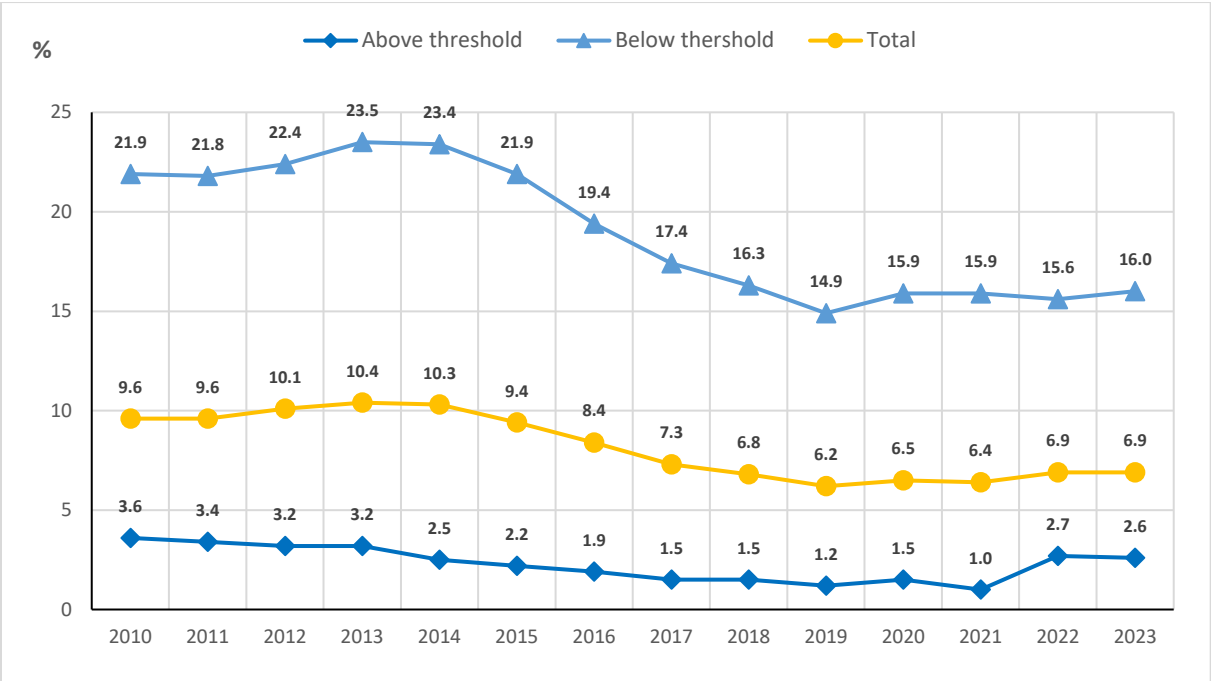
Between 2021 and 2023, the proportion of individuals with arrears rose significantly in Romania (by 6.3 percentage points) and Greece (6.6 percentage points), while several other counties (like Germany, Denmark, Austria, Slovakia) experienced notable increases. This recent uptick contrasts with the broader declining trend and suggests emerging financial strains for households in these countries.

Figure 1. Individuals with arrears on utility bills, 2010-2023



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation and Eurostat Economic Strain (ilc_mdes01)

Figure 2. Individuals with arrears on utility bills by at-risk-of-poverty status, 2010-2023



Note: at-risk-of-poverty threshold status is 60% of national median

Source: Eurostat Economic Strain (ilc_mdes01)

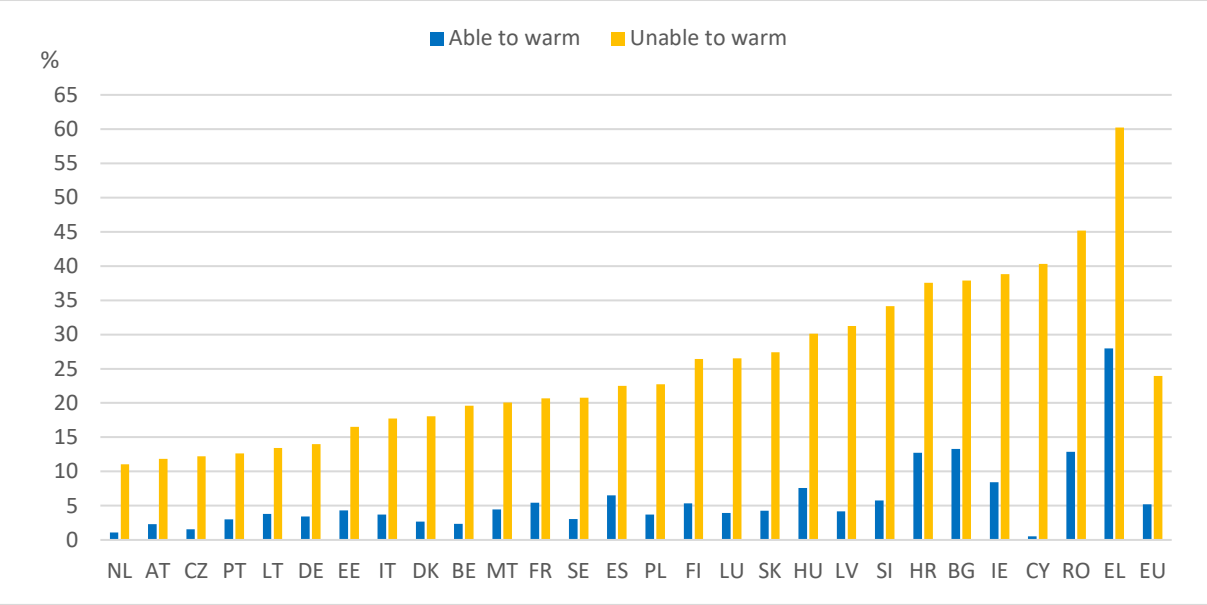
Between 2010 and 2014, there was a slight increase in figures of arrears on population bellow the risk-of-poverty threshold, likely due to the negative socioeconomic effects of the financial crisis. However, the share of individuals with arrears is decreasing in the long term both above and below the poverty threshold. The decline was more significant for those at risk of poverty, with an almost 8 percentage point difference between 2014 and 2022. Interestingly, the 0.5 percentage point rise in the EU average between 2021 and

2022 is attributed to an increase in the proportion of individuals above the poverty threshold, while figures for those below the threshold have remained stagnant since 2020.

3.1.1.1 Inequalities, financial resilience and material deprivation

The link between energy poverty and arrears on utility bills is further underscored by the correlation with households' ability to keep their homes adequately warm. In the EU, individuals who struggled to heat their homes were almost five times more likely to have arrears than those without heating issues (**Figure 3**). In Greece, 60% of those unable to warm their homes had arrears, with Romania (45%), Cyprus (40%) and several other countries recording rates exceeding 30%. This issue was prevalent in all Member States in 2022 to varying degrees.

Figure 3. Individuals with arrears on utility bills by inability to keep home warm status, 2022



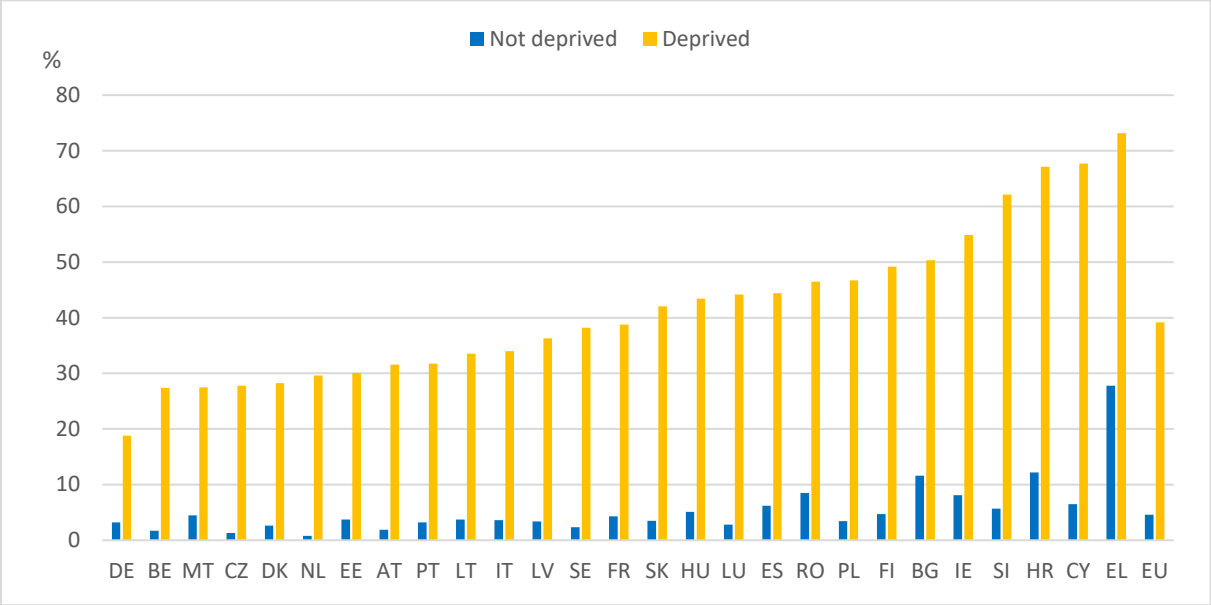
Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

A strong correlation exists between severe material deprivation and the likelihood of having arrears (**Figure 4**) ([6]). In 2022, two out of five severely materially deprived individuals in the EU had arrears, while the percentage was just below 5% among those not severely deprived. This disparity is even more pronounced in specific countries. For instance, nearly three-quarters of severely materially deprived individuals in Greece also had arrears, while the proportion was around two-thirds in Cyprus and Croatia, slightly over 60% in Slovenia, and more than half in Ireland and Bulgaria. At the other end of the scale, less than one-fifth of severely deprived people in Germany had arrears in the same year, and the figures for this group were below 30% in the Netherlands, Denmark, Czechia, Malta and Belgium.

The data highlights significant disparities in the occurrence of arrears on utility bills between those who are severely materially deprived and those who are not. In 2022, the difference was over 60 percentage points in Cyprus, over 50 percentage points in Slovenia and Croatia, and above 40 percentage points in Greece, Finland, Poland and Luxembourg. The smallest difference was observed in Germany, at 15.5 percentage points.

[6] Material deprivation is defined for the purposes of this analysis as meeting at least four of the nine material deprivation factors outlined in the Europe 2020 strategy (see Eurostat c), including arrears on utility bills and being unable to keep the home adequately warm.

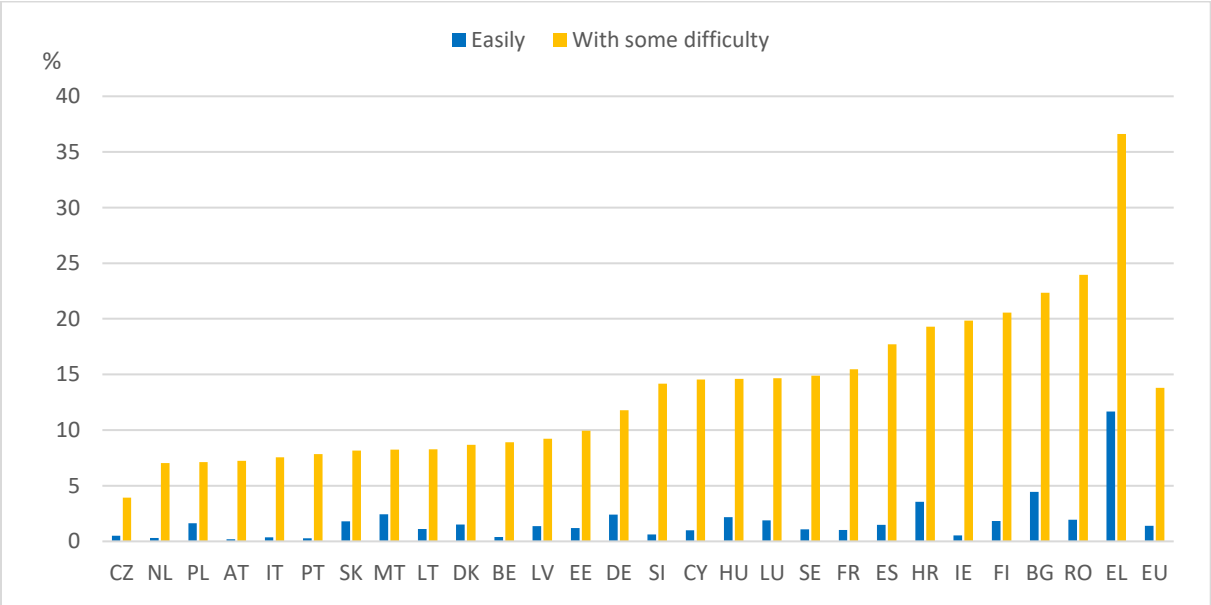
Figure 4. Individuals with arrears on utility bills by severe material deprivation status, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

Financial resilience plays a crucial role in this context. Our analysis indicates that individuals who struggle to make ends meet are more likely to have utility bill arrears (**Figure 5**). In the EU, 14% of those facing financial difficulties had arrears, compared to only 1.5% of those managing comfortably. The most severe rates among those with financial difficulties were found in Greece (37%), Romania, Bulgaria, and to a lesser extent, Finland, Ireland and Croatia. Conversely, in Greece, over 10% of those who easily made ends meet still experienced arrears, highlighting the gravity of the situation even among the relatively well-off, a trend not mirrored to the same extent in the other Member States.

Figure 5. Individuals with arrears on utility bills by being able to make ends meet, 2022

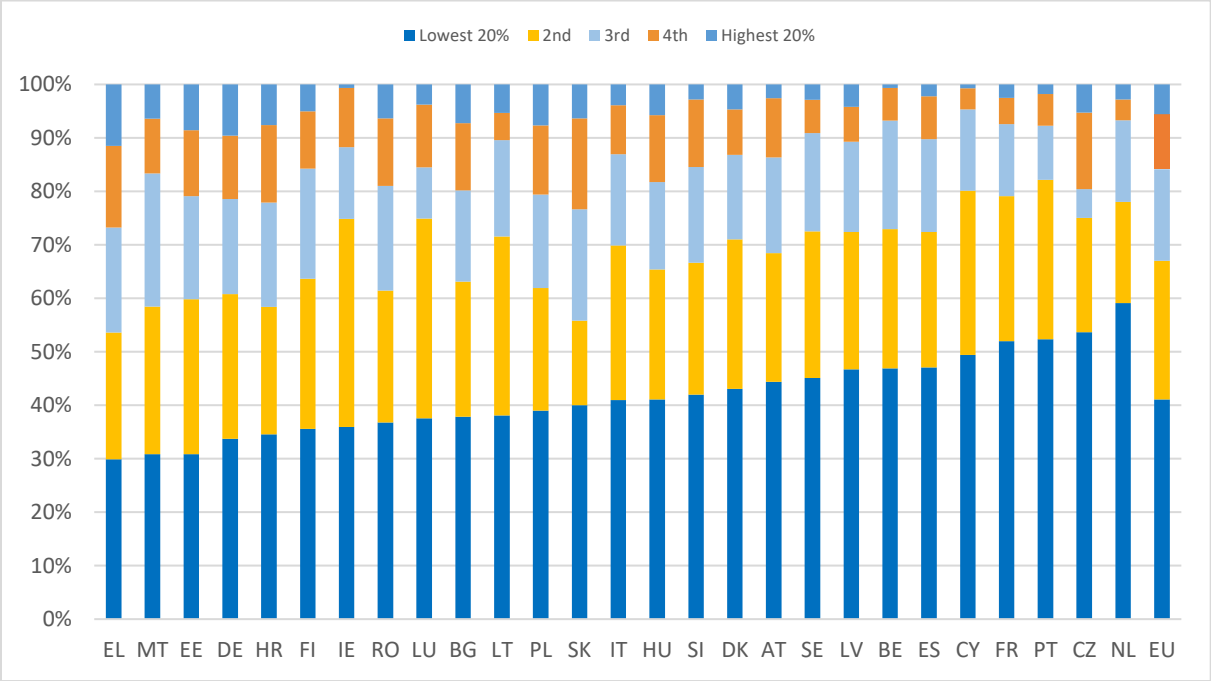


Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

The findings confirm an inverse relationship between household income level and the likelihood of experiencing arrears on utility bills. In 2022, the majority of individuals in arrears in the EU were part of the lowest income quintile, in stark contrast with the 5.5% in the highest quintile experiencing arrears (**Figure 6**).

The trend of arrears decreasing from the lowest to the highest income quintiles is observed in most Member States. However, in Greece, Malta and Estonia, the proportion of the lowest quintile in arrears was significantly lower, with Greece and Germany having the highest proportions of individuals in arrears in the top income quintile. A potential correlation between income inequality and the proportion of individuals with arrears defined as the ratio of the figure for the highest income group relative to that of the lowest income group, suggests a broader socioeconomic pattern, although outliers such as Latvia, Slovenia, Cyprus, Spain and Ireland indicate that these dynamics may be influenced by additional factors.

Figure 6. Distribution of individuals with arrears on utility bills by equivalised disposable income quintiles, 2022



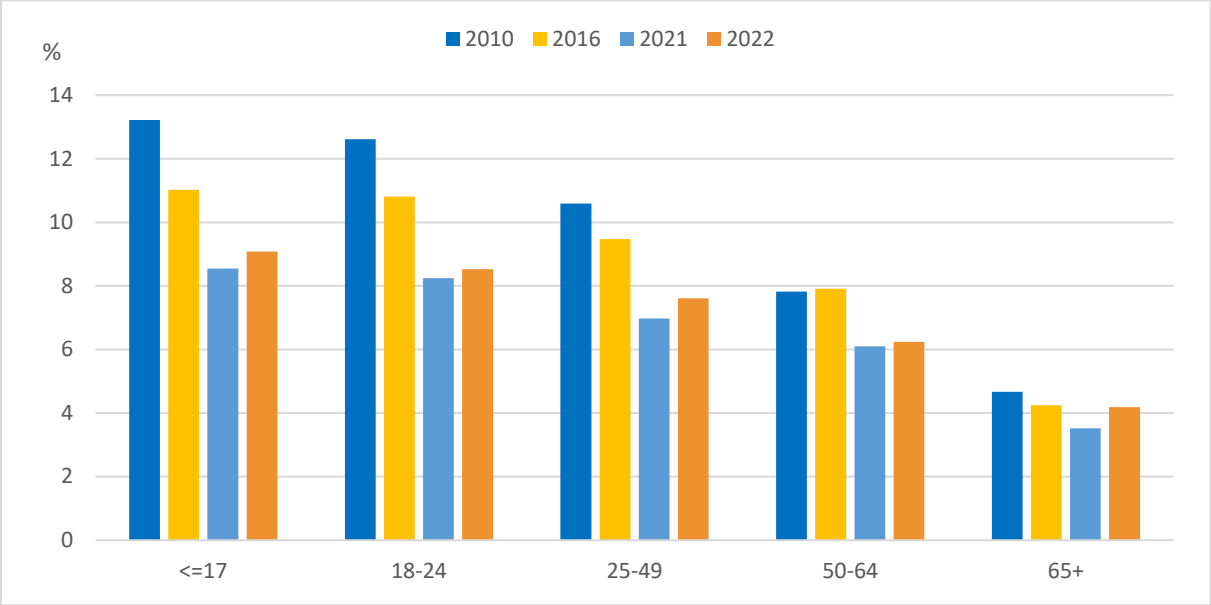
Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

3.1.1.2 Age, immigration background and educational attainment

The analysis further demonstrates a socioeconomic gradient in the risk of utility bill arrears, with a pronounced inverse relationship between age and arrears. Younger populations (below 25 years) consistently show higher rates of arrears compared to older age groups (65 years and above). Interestingly, despite an overall increase in arrears between 2021 and 2022 across all age cohorts, the rate of increase was slightly more pronounced for the senior population, though the broader inverse age trend persists (**Figure 7**).

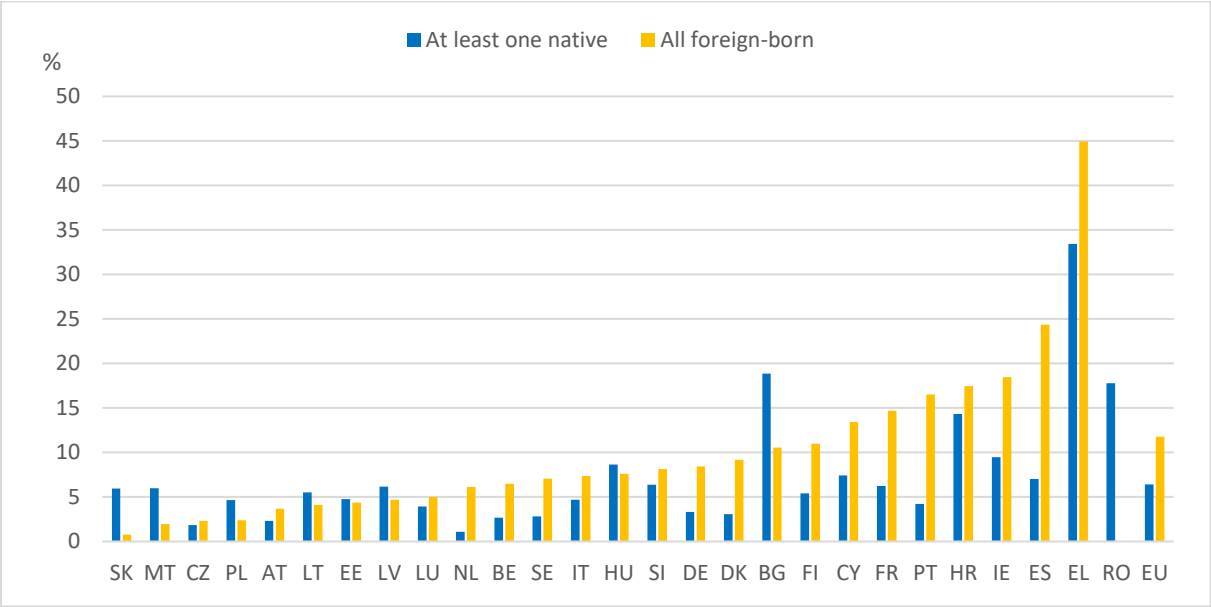
The analysis also indicates that households comprised entirely of foreign-born adults (not of the reporting country) are more at risk of utility bill arrears. In the EU, the incidence of arrears among households with at least one native-born adult was nearly half that of all-foreign-born adult households (**Figure 8**). The Netherlands, followed by Portugal, Spain and Denmark, displayed the largest relative challenges for all-foreign-born households, even though the Netherlands had the lowest overall level of arrears. By contrast, in Slovakia, Malta, Poland, Bulgaria, Lithuania, Latvia, Estonia and Hungary, foreign-born households reported fewer arrears than their native-born counterparts, despite typically higher at-risk-of-poverty rates among those born abroad (Eurostat d; Eurostat e).

Figure 7. Individuals with arrears on utility bills by age groups, 2010- 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

Figure 8. Individuals with arrears on utility bills by the country of birth of adult household members, 2022



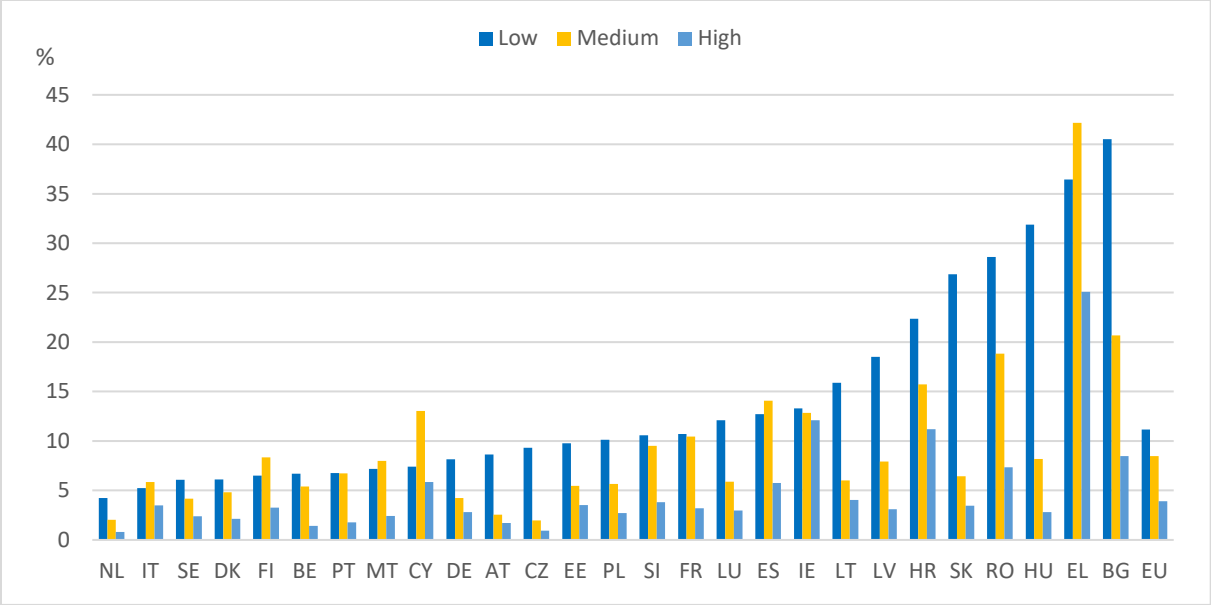
Note: In RO, the figure for "All foreign-born" is unviable, due to an insufficient number of cases. In BG, the finding for the same category has low statistical reliability due to the small number of observations.

Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

The findings show that in 2022, in the EU as a whole, the proportion of individuals with arrears on utility bills within the total population living in the household, where the highest education level attained among the adult members was basic schooling or lower secondary education (low education attainment level), was almost three times that of the proportion of those living with at least one adult with tertiary education attainment (high education attainment level) (11% and 4% respectively) (**Figure 9**). The inverse relationship between educational attainment and arrears was consistent across Member States, with exceptions in Cyprus, Greece, Finland, Italy, Spain and Malta, where the highest rates were found among medium educational

attainment levels. Bulgaria, Greece and Hungary reported particularly high rates among low educational attainment households. In Greece, even individuals in households with tertiary education made up a quarter of those facing arrears, highlighting a pervasive issue across all educational levels.

Figure 9. Individuals with arrears on utility bills by the highest level of education attainment among adult household members, 2022



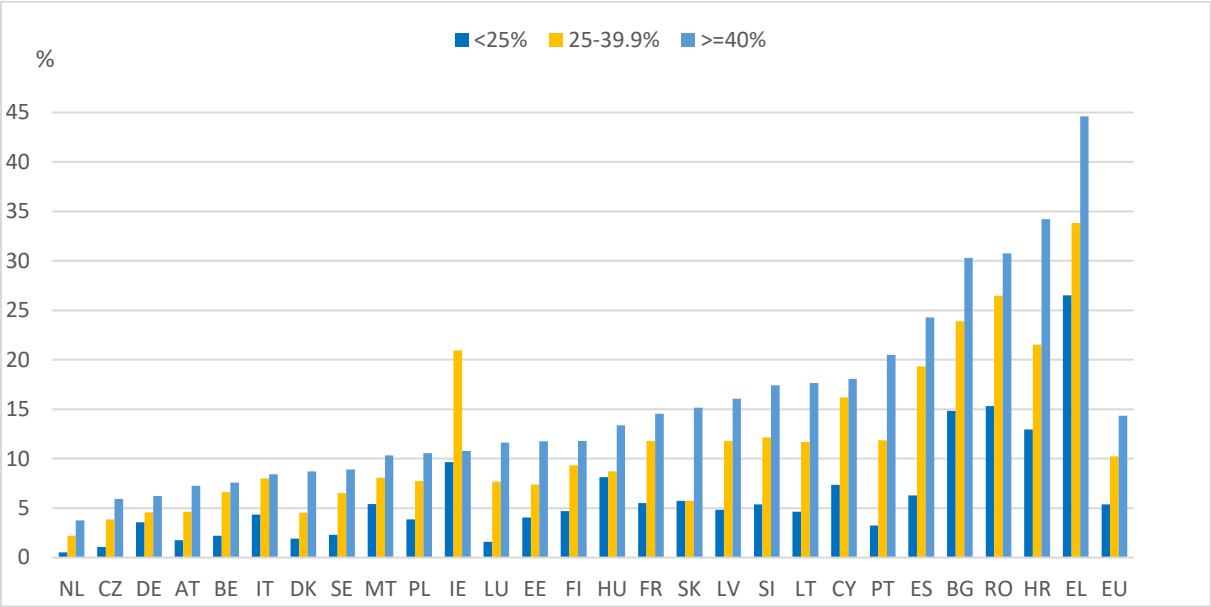
Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

3.1.1.3 Housing cost burden, tenure status and dwelling types

The correlation between housing cost burden and the incidence of arrears on utility bills is a key finding of our analysis. For the EU as a whole in 2022, only 5.5% of individuals whose housing costs were less than a quarter of household disposable income faced arrears. This figure climbed to 10% for those with housing costs accounting for 25% to 39.9% of their income and escalated to 14.5% among those dedicating more than two-fifths of their disposable income to housing expenses (**Figure 10**). In 20 Member States, individuals in the highest category for housing cost burden were at least twice as likely to experience arrears compared to the country average. Portugal, Lithuania and Czechia showed particularly stark contrasts, while Ireland, Greece, Germany and Hungary exhibited a less pronounced disparity. Notably, in Greece, Slovakia and Hungary, there was minimal difference in arrears between those in the lowest and medium housing cost burden categories. Ireland presents an exceptional case, where the highest proportion of arrears was observed among those with a medium level of housing cost burden.

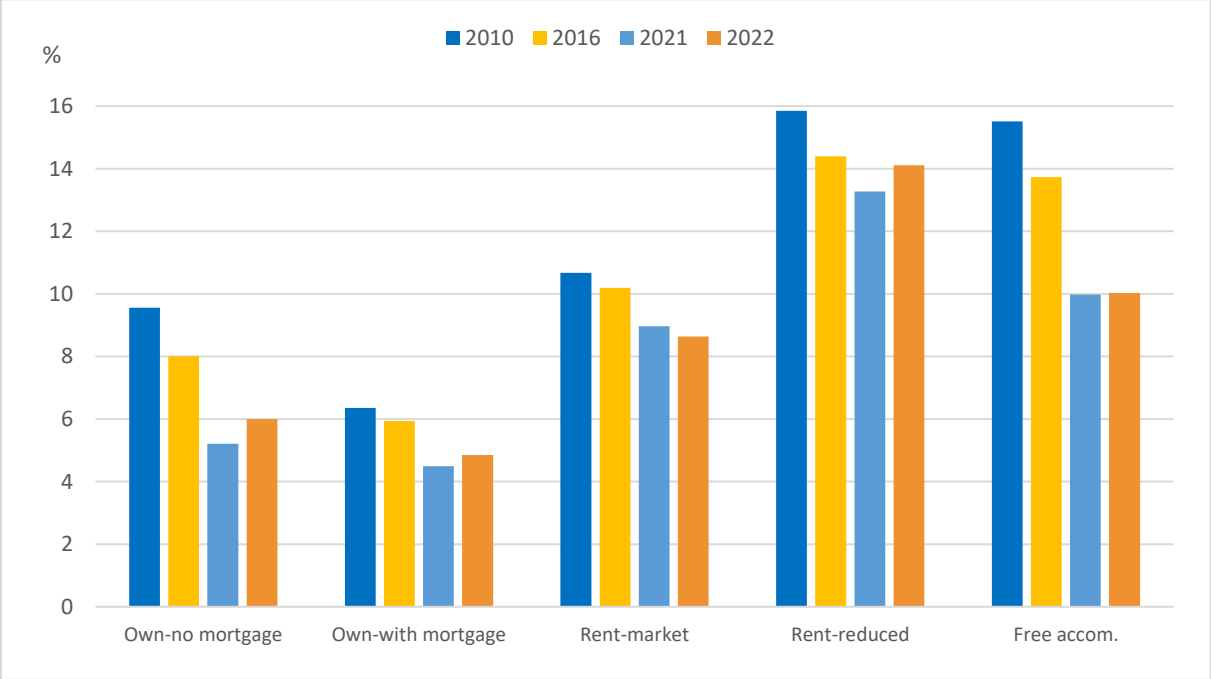
Our analysis of the 2022 data reveals a striking correlation between tenure status and the prevalence of arrears on utility bills across the European Union (**Figure 11**). Individuals residing in dwellings with reduced rent exhibited the highest proportion of arrears, at 14% for the EU average (Figure 5). This trend extends to those in free accommodation, with one in ten experiencing arrears, and is slightly less pronounced for those paying market-rate rent, at approximately 8.5%. Property owners generally fared better, with significantly lower rates of arrears, particularly among owners with mortgages compared to those who owned their homes outright. Over the 2010-2022 period, this pattern has been consistent, with the exception of a narrowing gap between outright owners and mortgage payers in the last two years.

Figure 10. Individuals with arrears on utility bills by the ratio of total housing costs relative to disposable household income, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation.

Figure 11. Individuals with arrears on utility bills by tenure status, 2010- 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation.

However, we observe significant disparities when examining the data across Member States (**Table 3**). In 14 EU countries, individuals with mortgages were at least 1 percentage point more likely to have arrears than those without mortgages. Greece presents the most extreme difference at 13 percentage points, with over two-fifths of mortgage payers reporting arrears. Other notable gaps were observed in Croatia (5 percentage points), Spain (approximately 4.5 percentage points), and Italy and Luxembourg (over 3 percentage points each). In Greece, a staggering 42% of individuals with reduced rent, and two-thirds of those in free accommodation, reported arrears. High rates were also recorded in Romania, Lithuania, Cyprus and Bulgaria for reduced rent occupants, and similarly extreme figures for those in free accommodation in Romania,

Bulgaria and Hungary. For tenants at market rates, Greece again topped the list with 38%, with Romania, Spain and Lithuania all having significant proportions of tenants experiencing arrears. It is important to note that while market rate tenants generally experienced higher-than-average arrears in most Member States, the relative disadvantage was more acute in Spain and Lithuania, and to a lesser degree in Ireland, Portugal, Cyprus and Luxembourg.

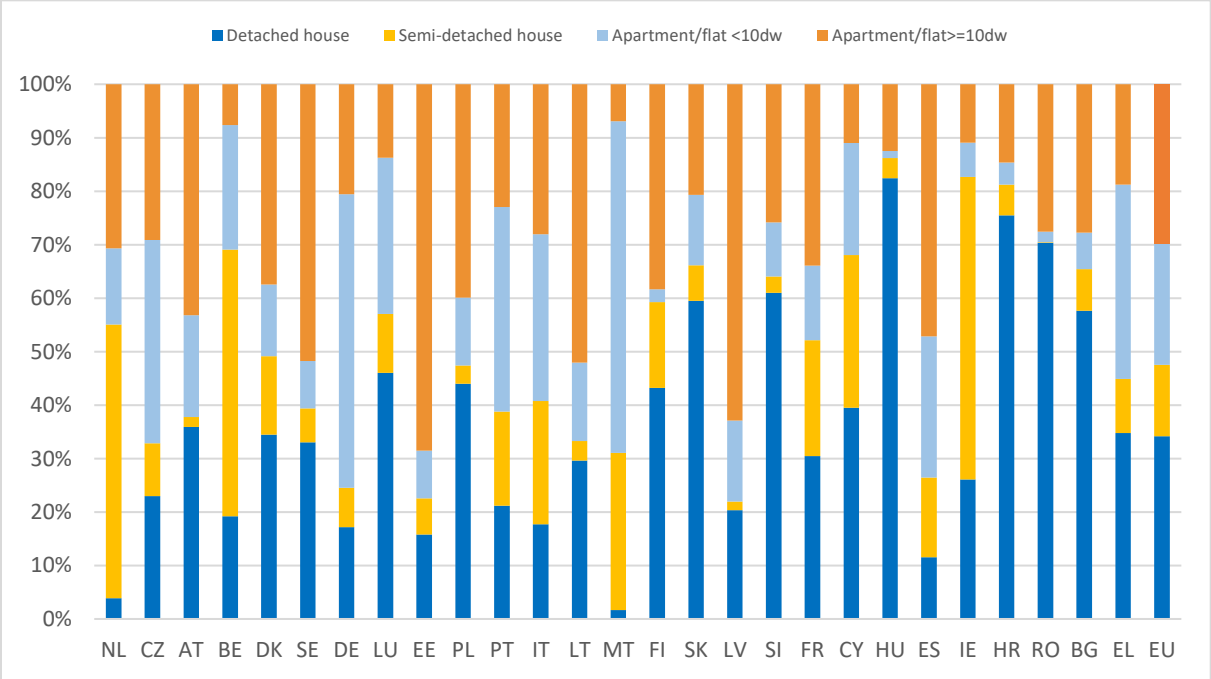
The 2022 data on the distribution of dwelling types among individuals with arrears on utility bills in the EU does not reveal a uniform pattern. Across the EU, one third of individuals with arrears lived in detached houses, followed by 30% living in apartments or flats within larger buildings containing 10 or more units, and just 13% residing in semi-detached houses (**Figure 12**). Notable variations emerge when examining individual Member States. In Hungary, an overwhelming 80% of those with arrears were in detached houses, with Croatia and Romania also showing high proportions in this category. Conversely, Malta and the Netherlands had notably low percentages of arrears among residents of detached houses.

The prevalence of arrears among individuals living in semi-detached houses was particularly pronounced in Ireland and the Netherlands, where they constituted over half of that population. Similarly, Belgium approached 50% in this category. In contrast, the majority of Member States had much lower proportions of arrears among residents of semi-detached houses.

Apartments or flats in buildings with fewer than 10 dwelling units represented a significant share of arrears in places like Malta, where they accounted for 60% of cases, and Germany, where the figure stood at 55%. In Estonia, nearly 70% of arrears were among residents of larger apartment buildings, followed by Latvia and Lithuania, highlighting a trend towards higher arrears within such housing types.

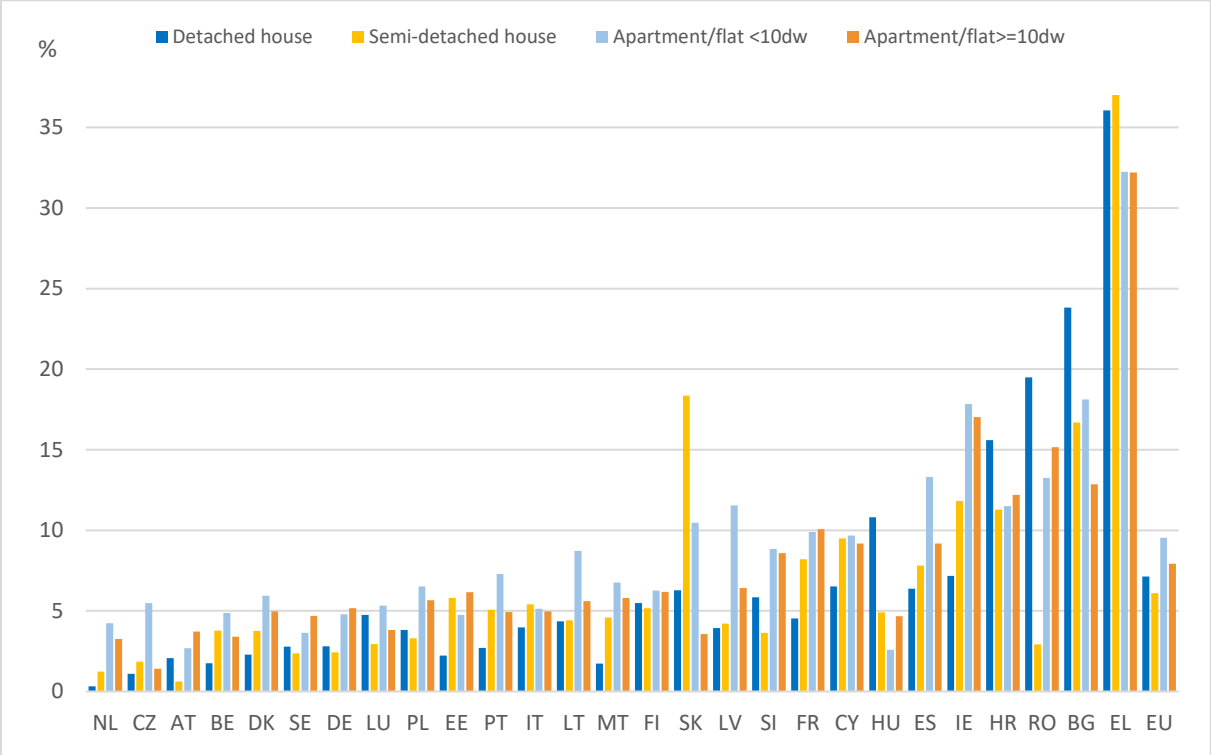
However, it is essential to contextualise these findings by considering the proportion of arrears within each dwelling type relative to the total housing stock, which is influenced by various country-specific factors, including geographical, socioeconomic and cultural conditions. When looking at the proportion of people with arrears within each dwelling type (**Figure 13**), we see that although the largest share of individuals with arrears in the EU were in detached houses, the highest rate of arrears occurred among those living in apartments or flats in buildings with fewer than 10 units – at 9.5%. This finding held true in 16 Member States for residents of smaller apartment buildings and in 12 countries for those in larger apartment complexes. The relative disadvantage for individuals in detached houses was only evident in five Member States (Bulgaria, Hungary, Greece, Romania and Croatia), while those in semi-detached houses faced a relative disadvantage in six countries (Slovakia, Greece, Cyprus, Ireland, France and Estonia).

Figure 12. Distribution of individuals with arrears on utility bills by dwelling type, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation.

Figure 13. Individuals with arrears on utility bills by dwelling type, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

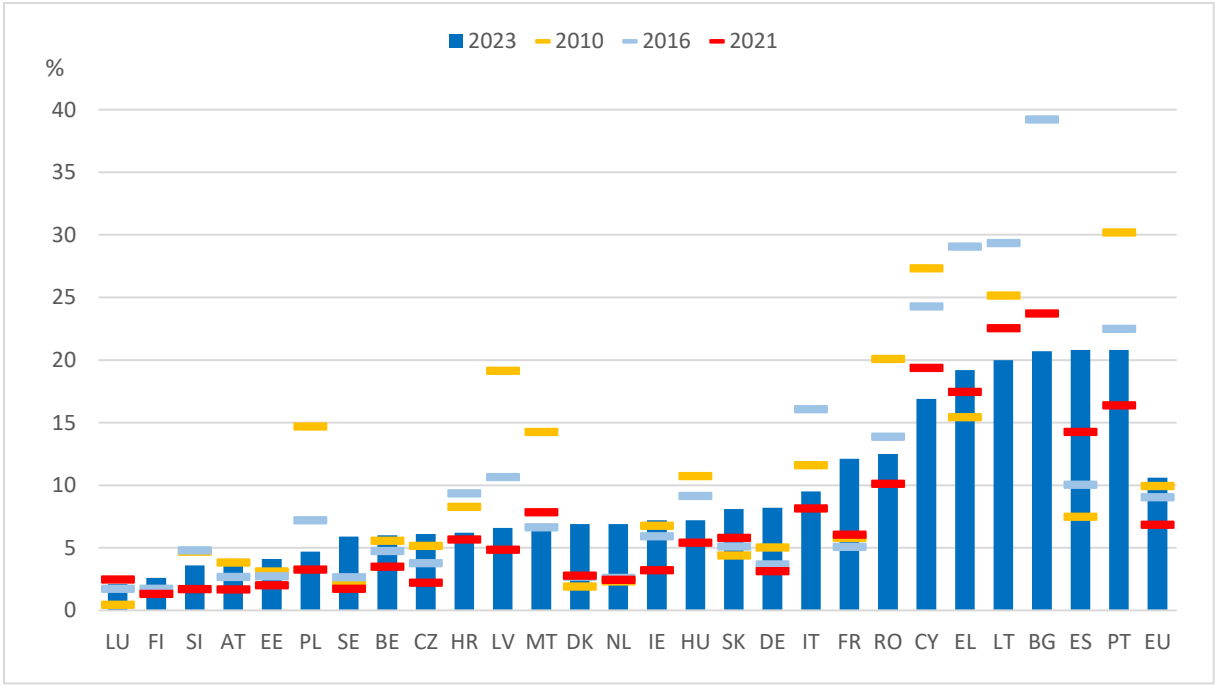
3.1.2 Inability to keep the home adequately warm

In 2023, the proportion of individuals in the EU who reported an inability to keep their home adequately warm was 10.6%, marking an increase of approximately 3.8 percentage points from 2021 (**Figure 14**). This uptick contrasts with the steady decline observed from 2012 to 2019, signalling structural social issues that generate pressure on this indicator between 2019 and 2023 (**Figure 17**). Covid-19, the war in Ukraine and energy inflation impacted heating difficulties of households but at the same time EU Member States channelled billions in energy subsidies and social assistance programmes while Europe experienced mild winters.

Spain, Portugal, Romania and Lithuania had the highest rates in 2023, with over one-fifth of their population unable to heat their homes adequately. Cyprus and Greece both had also significant high rates above 15%. By contrast, only 2.1% of individuals in Luxemburg reported inadequate heating, with fairly low rates (bellow 5%) also observed in Finland, Slovenia, Austria, Estonia and Poland.

Over the longer term, the EU has seen a significant reduction in the proportion of individuals unable to heat their homes adequately, with Bulgaria experiencing a 43 percentage point decline from 2010 to 2021. Meanwhile, Lithuania, Greece and Luxembourg have seen their rates increase over the same period. Between 2021 and 2022, 17 Member States saw at least a 1 percentage point rise in the proportion of individuals unable to keep their homes warm, with eight countries experiencing increases of 2 percentage points or more (Romania, France, Ireland, Germany, the Netherlands, Spain, Denmark, Latvia). Conversely, Bulgaria and a few other Member States continued to see decreases, though marginal, in this period.

Figure 14. Individuals unable to keep the home adequately warm, 2010-2023



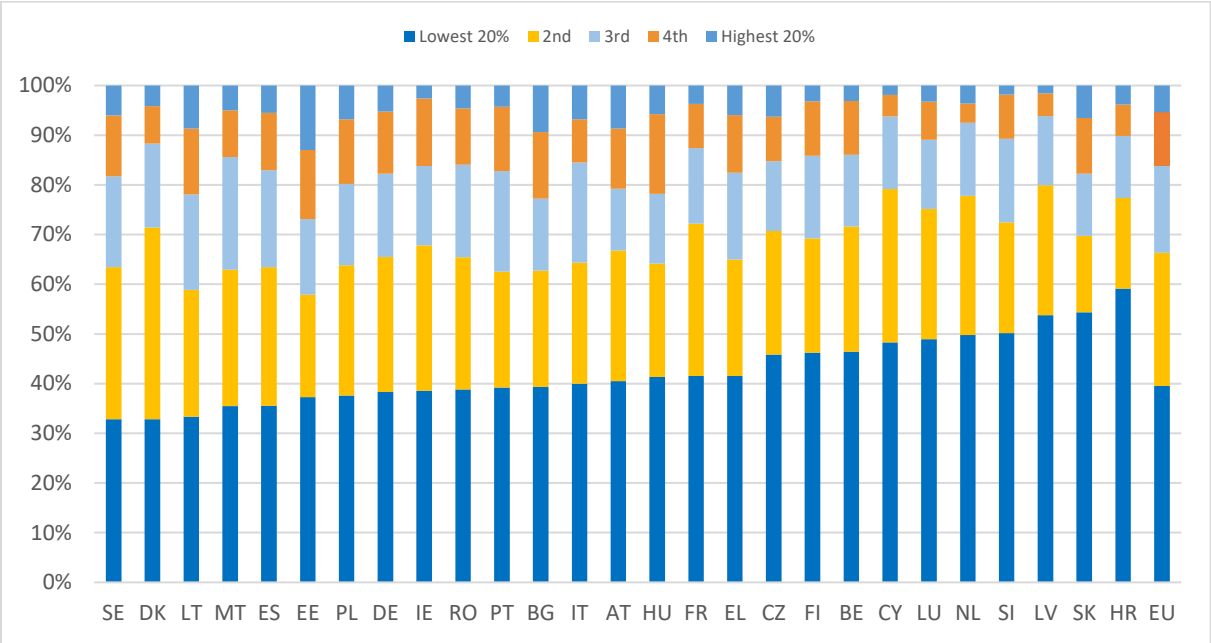
Note: BG 2010 = 66.5%

Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation, and Eurostat Economic Strain (ilc_mdes01)

3.1.2.1 Income levels, poverty, material deprivation and migration

Income levels remain a strong marker of energy poverty, with the majority of those unable to heat their homes falling within the two lowest income quintiles (**Figure 15**). In the EU, two-fifths of the energy poor were in the lowest income quintile, and together with the second quintile, they represented two-thirds of the affected population. Croatia, Slovakia, Latvia, Slovenia and the Netherlands had more than half of their energy poor in the lowest quintile, while Sweden, Denmark, Lithuania and Malta had lower proportions. Denmark, uniquely, had a higher share in the second quintile, and Estonia stood out with over one-tenth in the highest quintile.

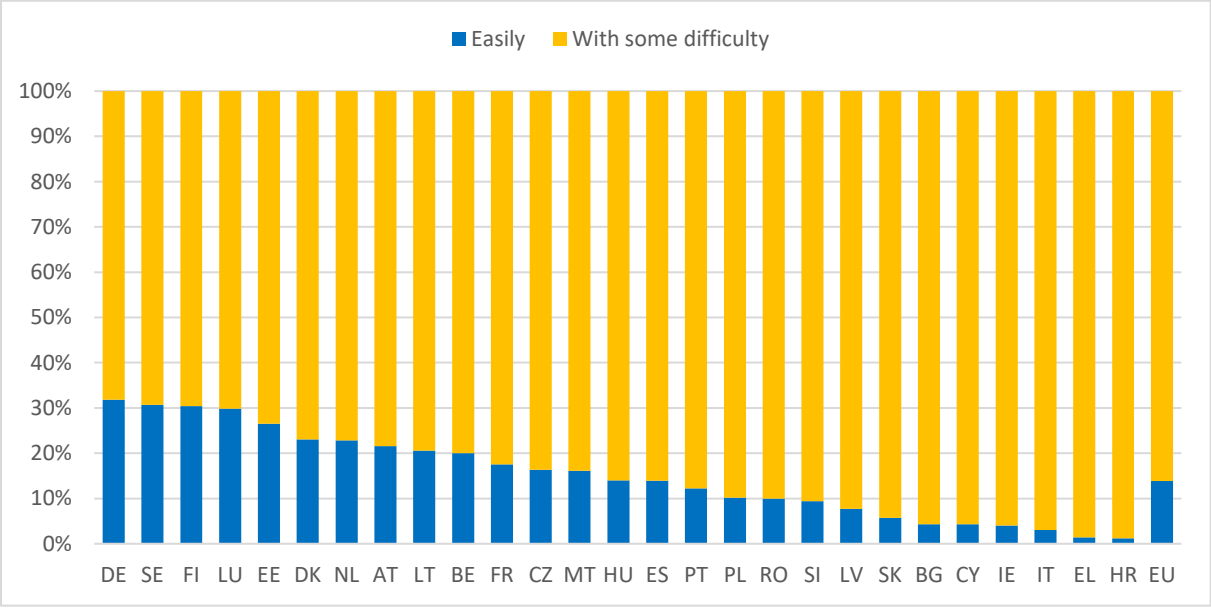
Figure 15. Distribution of individuals unable to keep their home adequately warm by equivalised disposable income quintiles, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

The 2022 analysis indicates that the vast majority of individuals unable to adequately heat their homes in the EU are those who face difficulties making ends meet. This group accounted for 86% of those in energy poverty across the EU as a whole (**Figure 16**). In Croatia and Greece, a negligible proportion (1-1.5%) of individuals able to easily make ends meet were also unable to heat their homes, with similar low figures observed in Italy, Ireland, Cyprus and Bulgaria. In stark contrast, in Germany, Sweden, Finland and Luxembourg, over 30% of those unable to warm their homes reported that they could easily make ends meet, with more than 20% in Estonia, Denmark, the Netherlands, Austria, Lithuania and Belgium. A moderate inverse correlation exists between the inability to warm homes adequately and the share of people who can make ends meet easily within this population (Pearson's R^2 is -0.508).

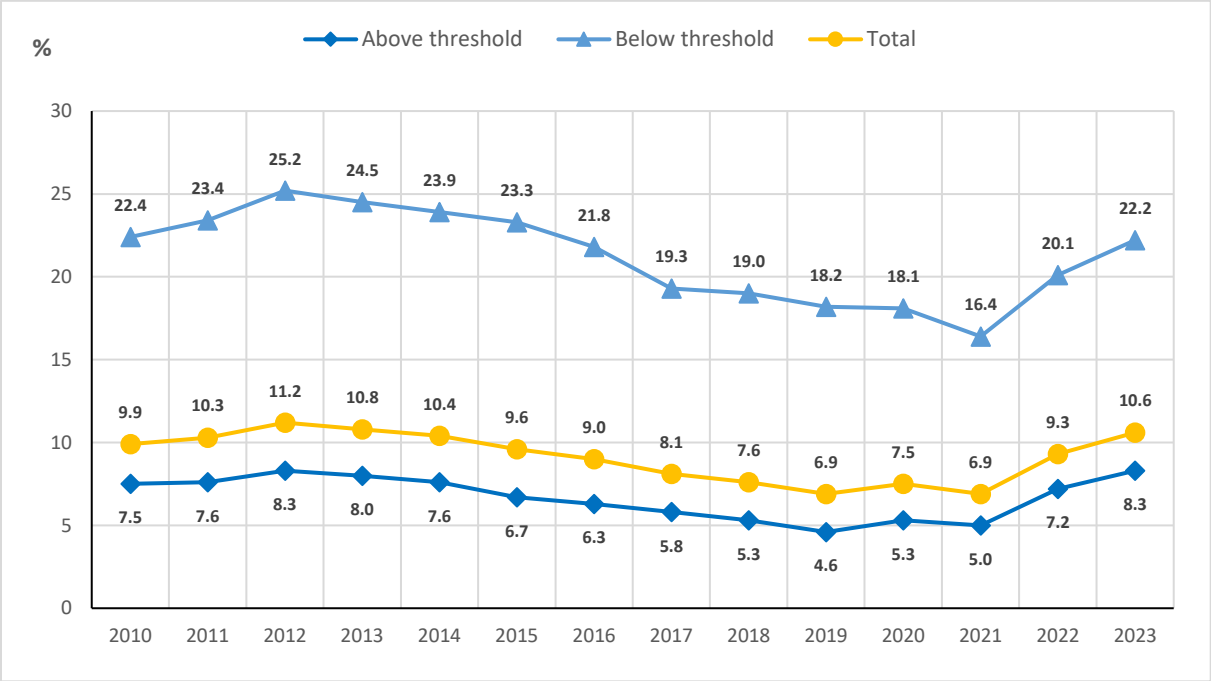
Figure 16. Distribution of individuals unable to keep the home adequately warm by being able to make ends meet, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

The data also indicates that individuals below the at-risk-of-poverty threshold are significantly more likely to struggle with heating their homes than those above the threshold (**Figure 17**). Throughout the 2010-2022 period, the gap between these two groups was never less than 10 percentage points, though it narrowed after 2017. In 2023, the rate of inadequate heating among those below the poverty threshold was 22.2% in the EU, a 2.3 percentage points decline since 2013, but showing a sharp increases since 2021.

Figure 17. Individuals unable to keep their home adequately warm by at-risk-of-poverty threshold status, 2010-2023



Note: at-risk-of-poverty threshold status is 60% of national median

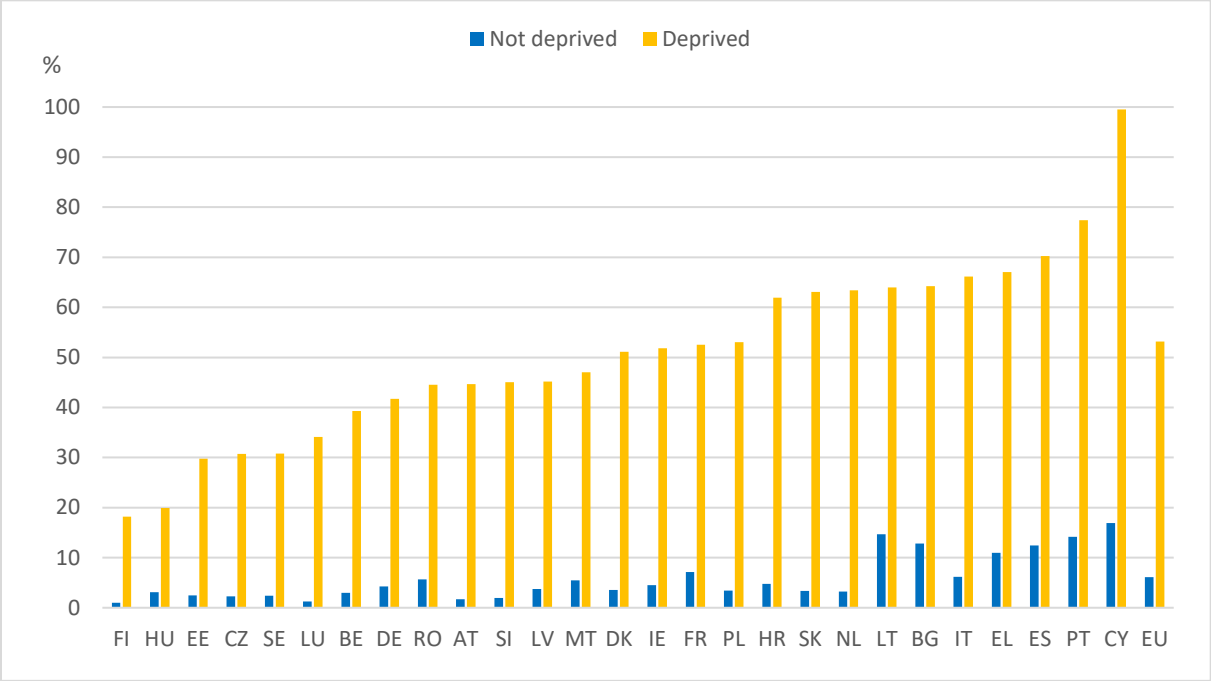
Source: Eurostat Economic Strain (ilc_mdes01)

A strong association exists between severe material deprivation and the inability to heat one's home, with over half of individuals facing severe material deprivation also unable to keep their homes warm in 2022. The findings suggest a very strong association between being severely materially deprived and being unable to keep the home adequately warm (**Figure 18**) ([7]). Cyprus had an extreme rate of overlap, with almost no severely materially deprived individuals able to heat their homes adequately. By contrast, less than one-fifth of the severely deprived populations in Finland and Hungary faced inadequate heating.

Migration background is another significant factor. In the EU average for 2022, those without native-born adults in the household were almost twice as likely to face heating difficulties as those with at least one native-born adult (**Figure 19**). This trend was consistent across most Member States, with Greece, Bulgaria, Lithuania, Cyprus and Spain showing particularly high proportions for migrant households. The Netherlands, Finland and Slovenia had the largest relative disadvantage for migrants.

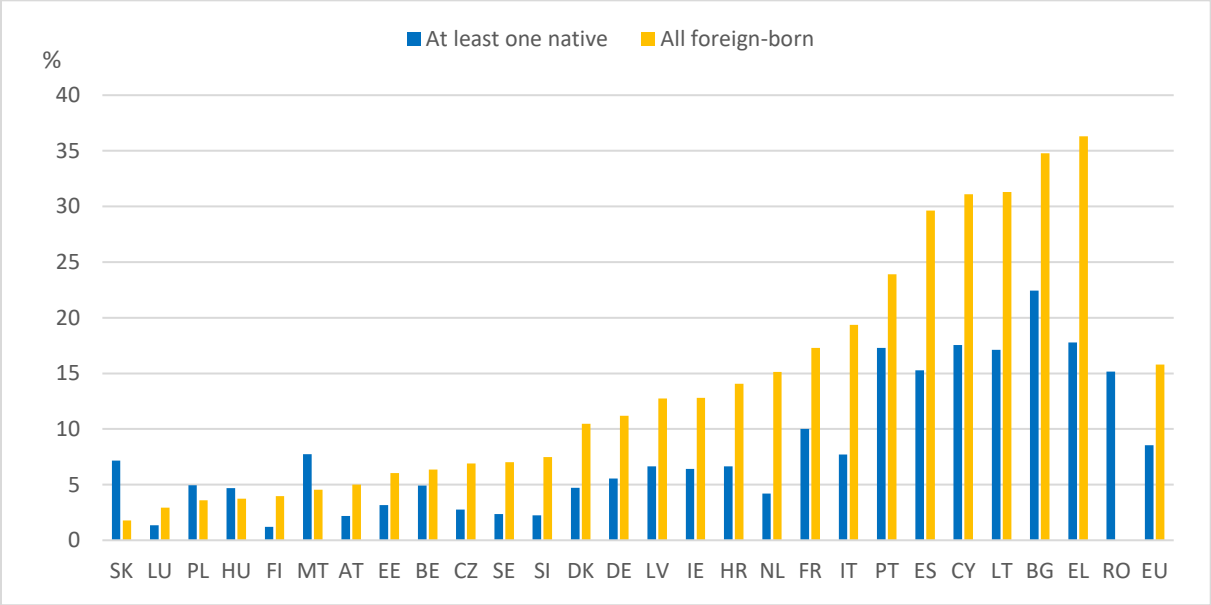
[7] An inability to keep the home adequately warm is one of the nine economic strain variables used in the calculation of the severe material deprivation rate indicator (Eurostat c).

Figure 18. Individuals unable to keep the home adequately warm by material deprivation status, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

Figure 19. Individuals unable to keep the home adequately warm by the country of by the country of birth of adult household members, 2022



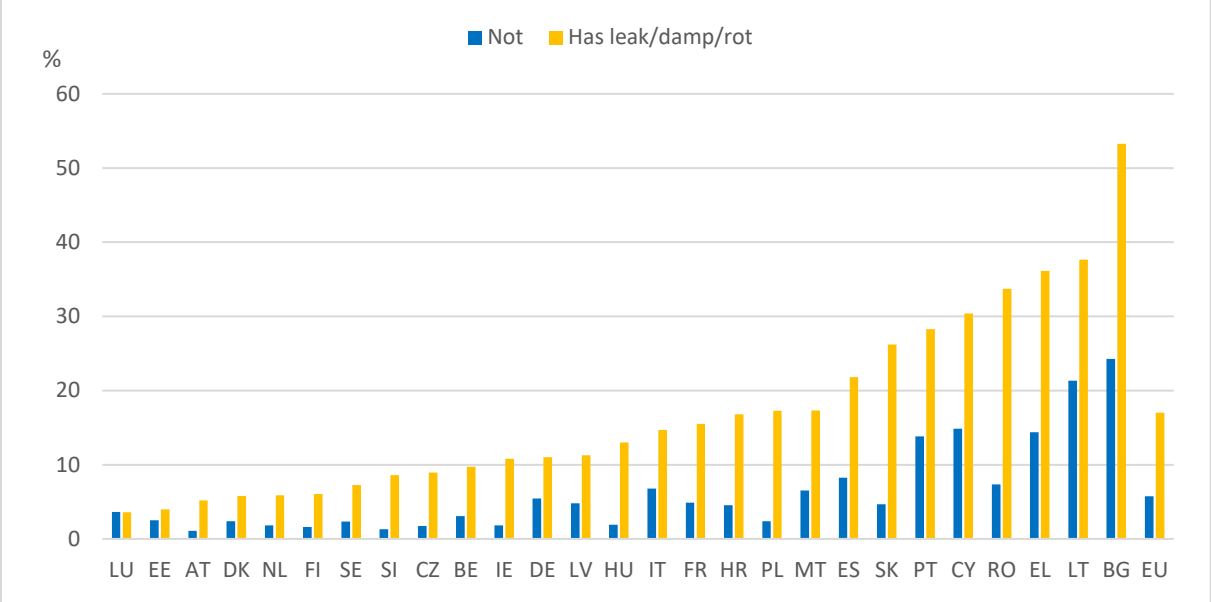
Note: In RO, the figure for the "All foreign-born" category is unviable due to an insufficient number of cases. In BG, the finding for the same category has low statistical reliability due to the small number of observations.

Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

3.1.2.2 Housing condition, tenure status and dwelling types

Although the relationship of housing conditions with energy poverty has been demonstrated in literature and it has been among the recommended energy poverty measures of Energy Poverty Advisory Hub (EPAH) (see Gouveia et al. 2022), the question asking whether there is any leak, damp or rot in the dwelling was removed from the EU-SILC survey after 2020. This limits our ability to analyse the ongoing impact of housing conditions on energy poverty. However, 2020 data showed that 17% of EU residents with such housing issues faced heating challenges, with particularly high rates in Bulgaria, Lithuania, Greece and Romania (**Figure 20**). This underscores the importance of building conditions in energy poverty and the need for continued monitoring and inclusion of these variables in future analyses.

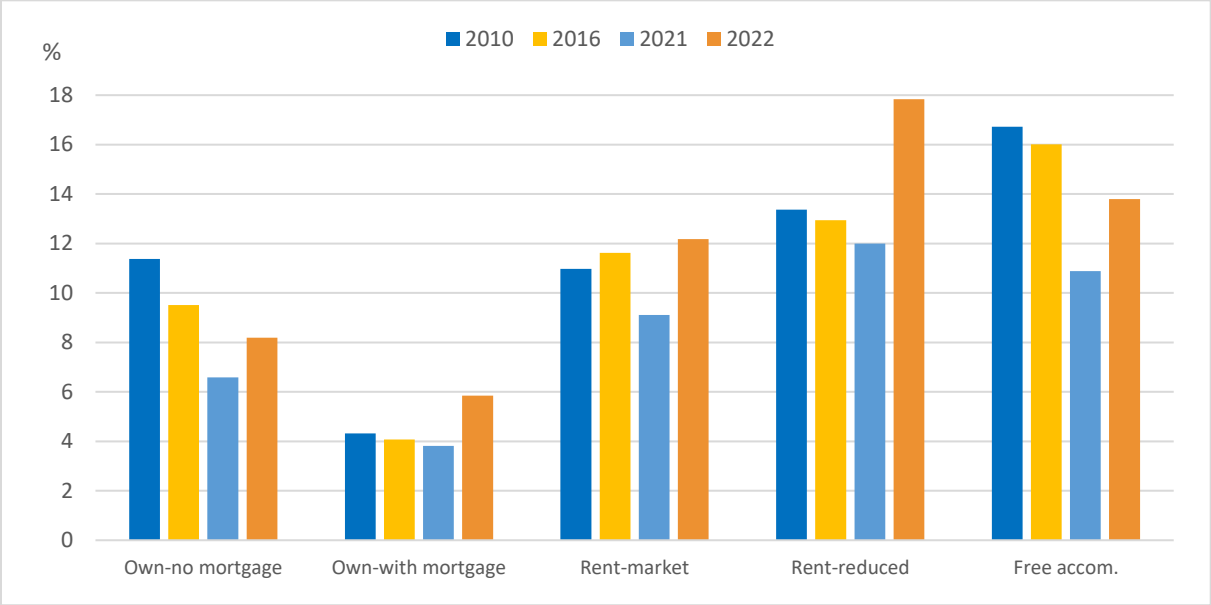
Figure 20. Individuals unable to keep the home adequately warm by having leak/damp/rot in the dwelling, 2020



Source: EU-SILC cross-sectional microdata data sets (version 05/10/2023), JRC C.7 own calculation

Tenure status has also shown varying patterns of association with the ability to keep homes warm from 2010 to 2022 (**Figure 21**). While individuals with outstanding mortgages on owned dwellings consistently reported the lowest rates of inadequate heating, those owning their homes outright saw significant improvements. However, the relative disadvantage of individuals in reduced-rent housing compared to other tenure statuses has increased, as has the rate among market-rate tenants. In 2022, 18% of those in reduced-rent housing and 12-14% of those with free accommodation or paying market rent struggled with heating, compared to much lower rates among homeowners.

Figure 21. Individuals unable to keep the home adequately warm by tenure status, 2010- 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

The 2022 data illustrates substantial variation across EU Member States concerning the ability of individuals within different tenure statuses to adequately warm their homes. In Slovakia, Bulgaria, Portugal and Cyprus, more than half of those paying reduced rent faced difficulties in home heating. This heating challenge was predominantly observed among those in free accommodations in Romania (**Table 4**). The proportion of individuals in reduced-rent housing unable to adequately heat their homes was also notably high in Greece and Lithuania, approaching 50%, while Spain and Romania saw around one-third facing this issue. Conversely, this figure was as low as 2.5% in Luxembourg, and below 5% in Austria, Finland and Estonia.

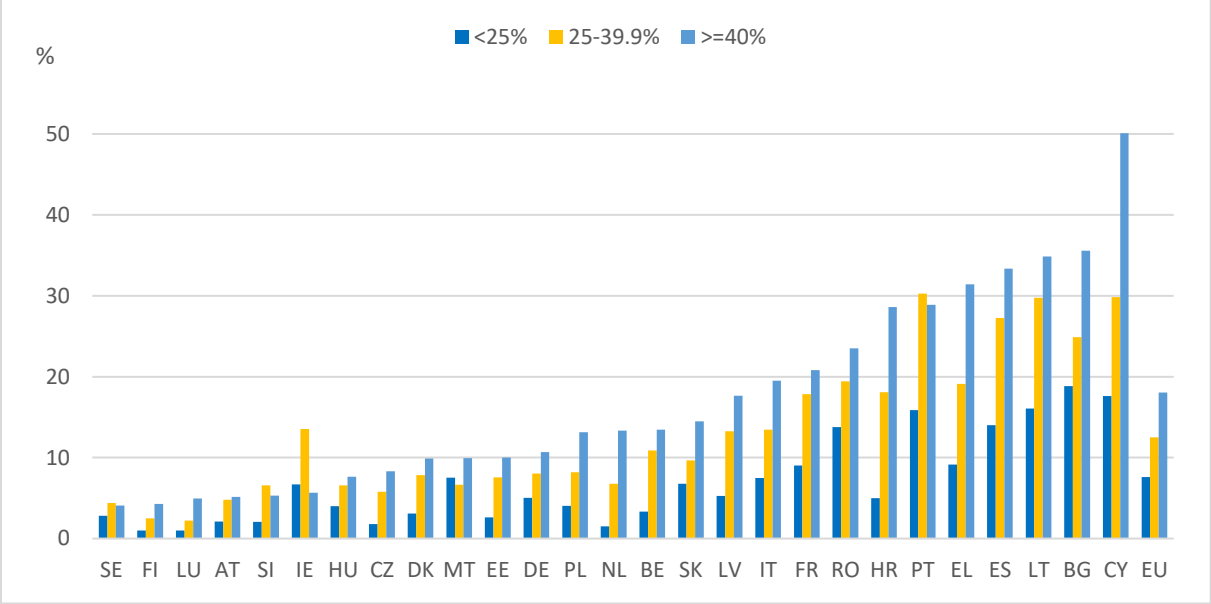
For those living in free accommodations, the proportion struggling with adequate heating reached 30% in Bulgaria and 20-25% in Greece, Cyprus and Portugal. In Ireland, Finland, Slovenia, Czechia, Estonia and Luxembourg, the rates were below 4%, although they were above the country average in the latter three Member States.

In Cyprus, 31% of market-rent tenants had difficulty heating their homes; Lithuania and Spain also reported high rates in this category. Conversely, Finland, Hungary, Luxembourg and Austria had rates below 4% for market-rent tenants. Homeowners, whether with or without mortgages, generally reported lower rates of heating difficulties, but around one-fifth in Bulgaria and Lithuania still struggled, with Spain, Romania, Cyprus, Greece and Portugal also reporting significant percentages.

The ability to heat one's home also correlates with the level of housing cost burden. In the EU overall, individuals with housing costs consuming at least two-fifths of their disposable income were 10 percentage points more likely to struggle with heating compared to those with lower housing costs **(Figure 22)**. This pattern holds true in 22 Member States, though Slovenia, Sweden, Portugal and Ireland displayed the highest rates among those with medium-level housing cost burdens. Interestingly, in Ireland, those with the highest housing cost burden had the smallest proportion of heating difficulties.

In Cyprus, 50% of those with high housing costs faced heating challenges, with Bulgaria, Lithuania and Spain also experiencing high rates. Conversely, Sweden and Finland had the lowest rates at 4%. Portugal, Cyprus and Lithuania saw about 30% of individuals with medium housing cost burdens unable to heat their homes adequately, while Bulgaria and Spain also reported high proportions.

Figure 22. Proportion of individuals unable to keep house adequately warm by the ratio of total housing costs relative to total disposable household income



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

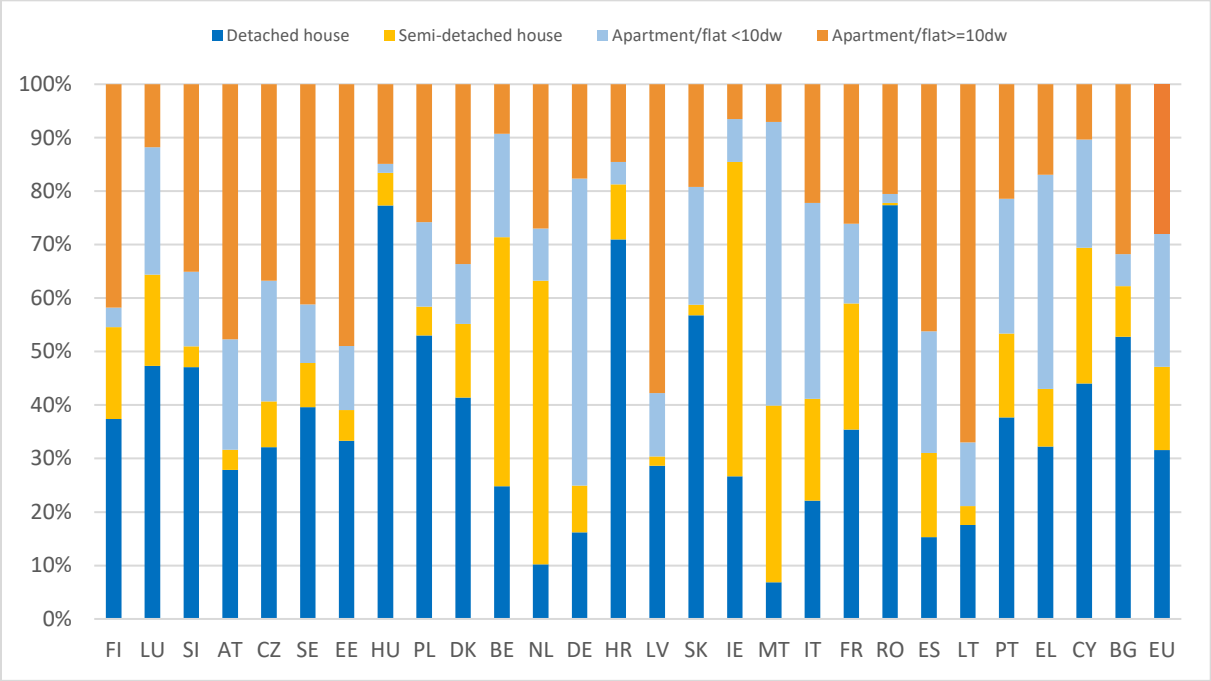
Detached houses represented the largest share (32%) of dwellings where residents could not keep their homes adequately warm in the EU in 2022 (**Figure 23**). Residents of apartments or flats in larger buildings with 10 or more units made up 28%, while those in smaller buildings with fewer than 10 units comprised 25%. Individuals in semi-detached houses accounted for approximately one-sixth of those in energy poverty.

Across Member States, the distribution varied. In 12 Member States, those in detached houses were the largest group; in eight countries, it was residents of larger apartment buildings, and in four countries, individuals in smaller apartment buildings were the most affected. In Romania and Hungary, over three-quarters of those struggling with heating lived in detached houses, while in Ireland and the Netherlands, over half resided in semi-detached houses.

However, when analysing the rates of energy poverty within each dwelling type, the picture shifts. The highest rates of energy poverty were found among those living in apartments or flats in buildings with fewer than 10 units in 18 of the 27 Member States (**Figure 24**). In the EU average, this rate was 13.5% in 2022, with Lithuania (23%) reporting the highest rate. Cyprus, Spain, Slovakia, Greece and Bulgaria also recorded high rates of energy poverty among residents of smaller apartment buildings.

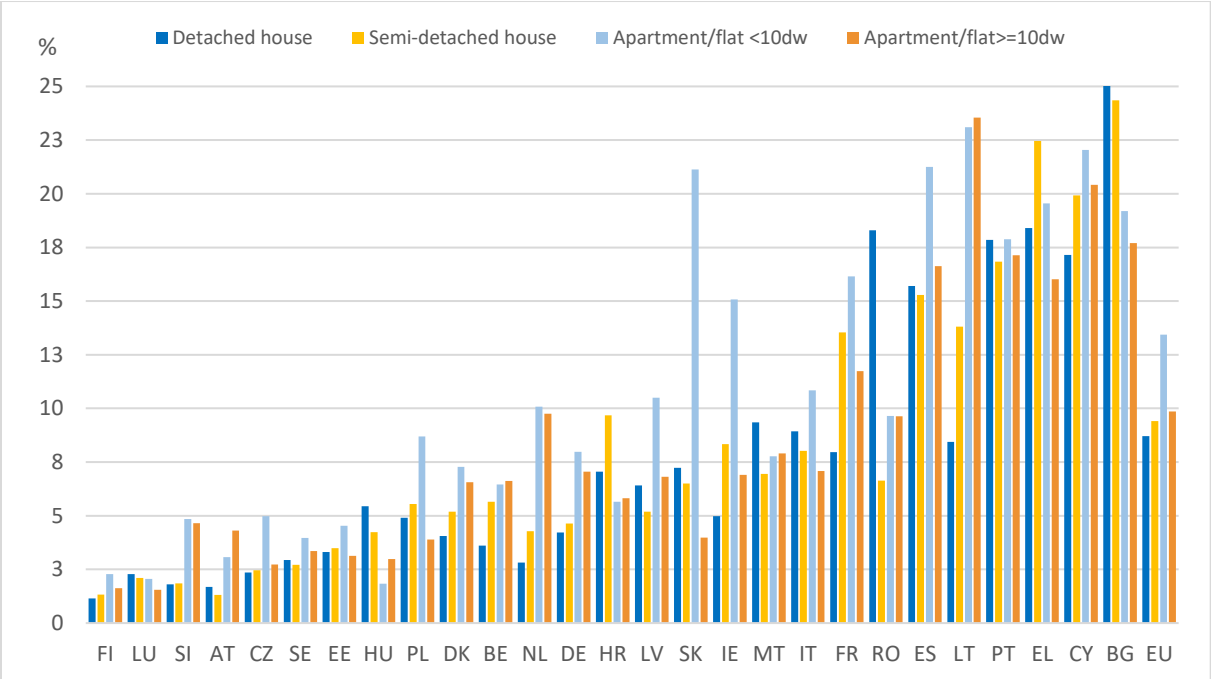
For those living in apartments or flats within larger buildings containing 10 or more units, the EU average was 10%, with Lithuania and Cyprus exceeding 20%, and Bulgaria, Portugal, Spain and Greece showing rates between 16% and 17.5%. Semi-detached and detached houses had similar rates of energy poverty within the EU, at 9.4% and 8.7% respectively, although certain Member States like Bulgaria and Greece had notably higher rates.

Figure 23. Distribution of individuals unable to keep house adequately warm by dwelling type, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

Figure 24. Individuals unable to keep house adequately warm by dwelling type, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

3.1.3 High share of energy expenditure in income (2M)

This section presents findings based on the "high share of energy expenditure in income" (2M) indicator. A household is classified as energy poor under this indicator if its equivalised energy expenditure relative to equivalised disposable income exceeds twice the national median. The Household Budget Survey (HBS) datasets, which focus on households as the unit of analysis (as opposed to individuals in the EU-SILC), serve as the basis for this analysis. As detailed in the "Data and Methodology" section, HBS microdata are available for the years 2010, 2015 and 2020, with some Member States' datasets unpublished.

The analysis reveals that from 2010 to 2020, the proportion of households with a high share of energy expenditure in household income surpassed 10% in all Member States with available data except for Slovakia in 2015 and Hungary across all years (**Table 1**). In 2020, Hungary demonstrated the lowest rate at 8.5%; Slovakia and the Netherlands were around 11%. Estonia and Denmark had the highest rates, with over 20% of households facing high energy expenditure. Austria, Lithuania and Germany had relatively higher rates, ranging from 16% to 16.5%.

In 2015, Sweden had the highest rate, with nearly 30% of households classified as energy poor due to high energy expenditure. Finland, Malta and Estonia also saw high rates, exceeding 20%, while Denmark was just under 20%. Hungary and Slovakia had the lowest shares, around 9%, with the Netherlands, Czechia, Luxembourg, Bulgaria, Croatia and Cyprus ranging between 10% and 12%.

The trend of households with high energy expenditure varies across Member States. Estonia and Denmark experienced significant increases between 2010 and 2020 (more than 4 percentage points), while Lithuania saw a decrease of around 4.5 percentage points overall, with an initial decline followed by a subsequent increase. Fluctuations were also noted in Slovenia, Latvia, Spain and Bulgaria to a lesser extent. In Slovakia and Greece, increases in one period outpaced declines in another, leading to an overall upward trend. In 10 Member States with available data, the 2015 figures were at least 1 percentage point higher than those of 2010, while seven countries saw decreases of 1 percentage point or more. Notable decreases between 2015 and 2020 were only observed in two out of 15 Member States with available data.

In 2020, the highest proportion of energy poor households, according to the relative high share of energy expenditure, was observed in the lowest income quintile in all countries. The rates decreased with rising household income levels. Estonia had the highest rate within the lowest income quintile, with over 60% of such households facing a high energy expenditure ratio. Croatia, Germany, Denmark, Austria, Luxembourg, Greece, the Netherlands and Latvia also reported high proportions, while Hungary had the lowest at 18%. In 11 of 15 Member States, the highest income quintile had rates of 2% or less, though Denmark and Hungary were exceptions with higher figures. The gap between the lower income quintiles and the higher ones was significant in most countries. The income level's relation to the high share of energy expenditure remained consistent across 2010 and 2015, with some exceptions in Finland and Sweden.

In 2020, all households identified with a high share of energy expenditure in disposable income allocated at least 10% of their income to housing energy costs in several Member States, including Bulgaria, Greece, Croatia, Latvia, Lithuania, Hungary, Slovenia and Slovakia (**Table 2**). This was also the case in 13 out of 25 Member States in 2015, and 12 out of 23 in 2010. Conversely, in Belgium, Spain, Luxembourg, the Netherlands and Austria in 2020, the majority of households with high energy expenditure ratios spent less than 10% of their income on housing energy.

Table 2 shows the proportion of households whose energy expenditure relative to net household income is twice as higher or more than the national median (2M indicator). In Bulgaria, Greece, Croatia, Latvia, Lithuania, Hungary, Slovenia and Slovakia the majority of households spent more than 10% of their income on housing energy in 2020. This was also the case in 13 out of 25 Member States in 2015, and 12 out of 23 in 2010. Conversely, in Belgium, Spain, Luxembourg, the Netherlands and Austria in 2020, the majority of households with high energy expenditure ratios spent less than 10% of their income on housing energy.

These results suggest variations in the average burden of energy expenditure across Member States, with some countries having comparatively lower median energy costs. Belgium, for instance, showed a downward trend from 2010 to 2020 in the proportion of households spending at least 10% on energy. Similar trends were observed in Denmark, Germany, Spain, Luxembourg and the Netherlands. In contrast, Germany, Greece, Spain, Cyprus, Lithuania and Portugal saw notable increases in the average share of energy expenditure

within household income, indicating fluctuations in both energy expenditure inequality and the actual burden on household income in these countries.

Table 1. Proportion of households with ratio of energy expenditure relative to net household income is twice as higher or more than the national median (2M) by equivalised net household income, 2010-2020 (%)

	2010						2015						2020					
	1st	**2nd**	**3rd**	**4th**	**5th**	**Total**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**	**1st**	**2nd**	**3rd**	**4th**	**5th**	**Total**
BE	38.8	17.3	9.6	4.7	2.2	**14.5**	35.2	17	7.6	3.5	1.8	**13**	36.1	19.3	10.2	6.5	1.6	**14.7**
BG	26	21	14.3	8.3	2.6	**14.5**	24.8	15.2	11	4.3	2.2	**11.5**	34.6	20.3	9.6	3.9	1	**13.9**
CZ	31.4	10.7	7.1	1.8	0.3	**10.3**	31.7	13.2	5.5	2.6	0.7	**10.7**						
DK	39.9	26.9	12.4	9.5	4.1	**18.6**	41.6	28.7	12.4	8.9	4.7	**19.3**	46.7	29	19.6	13.0	5	**22.7**
DE	41.7	17.9	11.5	8.6	5.7	**17.1**	42.5	19.2	12.1	8.1	5.1	**17.4**	46.4	16.4	8.3	5.3	2.8	**15.8**
EE	37.7	26.6	16.4	6.8	1.4	**17.8**	56.9	30.6	12.4	2.4	0.2	**20.7**	62.1	32.5	13.7	3.9	0.8	**22.6**
IE	54.1	25.1	11.2	3.1	0.5	**18.8**	44.9	26.4	10.2	4.9	1.8	**17.6**						
EL	39.8	17.6	5.6	2	0.3	**13.1**	42.7	19.1	13	4.8	1.6	**16.3**	41	17.7	7	3.4	1.5	**14.1**
ES	36.7	18.7	11.9	6.5	2.8	**15.3**	35.4	17.1	10.8	5.4	3.2	**14.4**	37.6	16.7	10.5	5.9	2.6	**14.6**
FR	36.9	23.8	15.2	6.9	4.4	**17.4**	36.4	19.6	12	5.6	2.2	**15.2**						
HR	36.2	9.4	3.7	3.1	1.8	**10.8**	37.9	12.4	5.3	2.7	1.7	**12**	48.2	13.2	3.6	2.3	1	**13.7**
IT																		
CY	27.2	16.6	9.3	5.3	2.7	**12.2**	28.4	14.2	10.6	5.6	1.3	**12**						
LV	38.5	22.3	11.7	3.8	0.3	**15.3**	33.2	17.1	8.3	4.4	0.7	**12.8**	40.4	16.6	7.8	1.1	1.4	**13.5**
LT	35.5	30.8	22.7	12.5	4.4	**21.2**	22.6	17	16	10.2	3.6	**13.9**	39.4	21.8	11.1	8.4	2.2	**16.6**
LU							30.7	11.9	7.8	2.1	3.6	**11.3**	43.6	18.6	4.8	1.6	0.3	**13.8**
HU	21.5	8.2	3.2	1.4	0.4	**7**	24	8.5	6.2	5.3	1.1	**9**	18.3	8.5	6.6	5.7	3.7	**8.6**
MT	45.9	22.1	11.3	6.2	3.7	**17.8**	45.1	27	17.3	8.9	2.3	**20.1**						
NL							40.5	9.1	3.2	1.1	0.7	**10.9**	41.6	9.9	4.2	1.4	0.5	**11.5**
AT													46.3	19.2	11.8	4.8	1.3	**16.7**
PL	30.4	22.7	17.8	12.6	6.4	**18**	30.6	20.7	15.5	10.4	5.9	**16.6**						
PT	40.9	20.5	14.8	8.3	3.4	**17.6**	43.2	14.9	9.5	5.3	2.7	**15.1**						
RO	24.3	23.5	20.6	15.6	7.2	**18.2**	24.2	21.6	19.7	13.5	5.7	**16.9**						
SI	48.6	20.5	7.6	4.1	2	**16.6**	40.8	15.2	8.2	3.9	1.2	**13.9**	37	20.1	8.3	3.5	1.9	**14.2**
SK	26.2	13.8	5.2	3	1.8	**10**	25.3	12.6	6	1.6	0.9	**9.3**	33.1	13	5.9	2.1	0.3	**10.9**
FI	21.5	24.2	19.7	13.1	10.1	**17.7**	20.6	26.5	28.9	22.5	13.2	**22.3**						
SE	30.5	33	32.7	22.1	12.4	**26.1**	30.3	31.6	33.1	30.4	19	**28.9**						
EU	36.2	20.3	13.6	8.3	4.6	**16.6**	36.2	18.7	12.4	7.6	4	**15.8**	41.7	16.5	8.8	5.1	2.3	**14.9**

Note: Empty cells refer to no data or unpublishable findings due to insufficient number of cases. 1st quintile represent the households lowest income quintile (20%) and 5th at the highest

Source: HBS microdata sets, JRC C.7 own calculation

Table 2. Distribution of energy-poor households according to 2M indicator by the absolute share of energy expenditure in the net household income, 2010-2020 (%)

	2010		2015		2020	
	<10%	*>=10%*	*<10%*	*>=10%*	*<10%*	*>=10%*
BE	0.0	100.0	23.4	76.6	61.2	38.8
BG	0.0	100.0	0.0	100.0	0.0	100.0
CZ	0.0	100.0	0.0	100.0		
DK	0.0	100.0	8.7	91.3	35.3	64.7
DE	16.7	83.3	8.2	91.8	24.9	75.1
EE	0.0	100.0	0.0	100.0	34.3	65.7
IE	29.7	70.3	50.2	49.8		
EL	39.0	61.0	0.0	100.0	0.0	100.0
ES	59.8	40.2	49.7	50.3	65.1	34.9
FR	64.5	35.5	63.8	36.2		
HR	0.0	100.0	0.0	100.0	0.0	100.0
IT						
CY	75.3	24.7	67.3	32.7		
LV	0.0	100.0	0.0	100.0	0.0	100.0
LT	3.8	96.2	0.0	100.0	0.0	100.0
LU			80.4	19.6	91.9	8.1
HU	0.0	100.0	0.0	100.0	0.0	100.0
MT	82.1	17.9	88.8	11.2		
NL			24.8	75.2	56.3	43.7
AT					62.2	37.8
PL	0.0	100.0	0.0	100.0		
PT	14.1	85.9	0.0	100.0		
RO	0.0	100.0	0.0	100.0		
SI	0.0	100.0	0.0	100.0	0.0	100.0
SK	0.0	100.0	0.0	100.0	0.0	100.0
FI	72.9	27.1	84.3	15.7		
SE	65.9	34.1	76.4	23.6		
EU	30.2	69.8	27.1	72.9	35.1	64.9

Note: Empty cells refer to no data or unpublishable findings due to insufficient number of cases.

Source: HBS microdata sets, JRC C.7 own calculation

3.2 Multivariate analysis and determinants

Building upon the descriptive insights into energy poverty, this section uses a multivariate analysis to uncover the determinants and factors that statistically influence the likelihood of households facing energy poverty. Utilizing logistic regression models, we analyse the relationship between various independent variables—ranging from demographic characteristics to socioeconomic status—and the key indicators of energy poverty. This approach allows us to control for confounding factors and to ascertain the relative importance of each determinant. The findings from this analysis will not only contribute to a more sophisticated understanding of energy poverty but will also inform the development of targeted policies aimed at mitigating its effects and preventing its occurrence.

The analysis utilises EU-SILC cross-sectional microdata sets from 2010, 2016 and 2020. Notably, this time span includes data on the presence of leaks, damp, or rot within dwellings—a factor excluded from EU-SILC after 2020. Four different regression models used with increased usage of selected socio-demographic and socio-economic independent variables describing the individual, households and dwelling characteristics. The full list of the independent variables used in each of the logistic regression models can be found in the Annex **(Tables 5 and 6)**.

3.2.1 Factors influencing heating inadequacy

The logistic regression analysis for the EU as a whole shows that the full set of independent variables significantly explains the variance in the likelihood of being unable to keep a home adequately warm (**Table 5** in annex). The inclusion of socio-economic and dwelling-related characteristics substantially increases the variance explained by the models (see pseudo R^2 in models 2, 3 and 4 in **Table 5**).

Basic **socio-demographic characteristics** exhibit limited overall effects on the likelihood of inadequate heating. Initially, women were found more likely to experience heating issues. However, after controlling for other socio-economic variables, the influence of sex is not statistically significant. Similarly, age shows significance in a simple model but becomes insignificant when controlling for all variables in the full model (Model 4). Household composition does affect this energy poverty indicator, with individuals from households other than single-parent families showing a higher likelihood of heating inadequacy. Households with two adults and children are less likely to encounter heating problems compared to single-parent households. The presence of foreign-born adults in a household significantly raises the risk of inadequate heating, especially in families composed entirely of foreign-born adults. Education level also plays a role; households with lower educational attainment are at the greatest risk.

Socio-economic factors are pivotal. Individuals in the lowest income quintile are nearly twice as likely to struggle with heating compared to those in the highest quintile. Households reliant on benefits or without positive disposable income are more at risk, while those with income from property or pensions are less likely. Arrears on utility bills, low work intensity, student composition, material deprivation, and difficulty making ends meet all correlate with a significant higher likelihood of inadequate heating. The deprived individuals have an odds ratio of 4.7, whereas the other socio-economic characteristics mentioned have odds ratios of approximately two each. An unexpected pattern emerges concerning housing cost burden; the likelihood of inadequate heating decreases with increasing housing cost burden, though the difference between medium and high burden categories is minimal.

Dwelling characteristics show significant variation in heating adequacy. Homeowners with mortgages are less likely to have heating issues, while renters and those in free accommodation are more at risk. The presence of leaks, damp, or rot increases the likelihood of heating inadequacy. Apartment dwellers are less likely to have heating issues compared to those in detached houses, while no difference is observed between residents of semi-detached houses and detached houses.

Geographic location influences heating adequacy, with those in sparsely populated areas more likely to be able to keep their homes warm compared to densely populated areas. The likelihood of inadequate heating was higher in 2010 and 2016 compared to 2020.

Several factors affecting energy poverty at the country level within EU, consistently show similar patterns across all countries. These factors include variables such as gender, age, utility bill arrears, material deprivation, ability to make ends meet, and dwelling conditions, as indicated in the table referenced in the annex (**Table 5**). Regardless of the specific country, these factors consistently influence the likelihood of experiencing energy poverty in a similar manner. However, there are significant differences among member states in terms of how other variables impact the likelihood of energy poverty. Thus, Member States may

need to prioritise different policy areas or interventions based on their specific circumstances and the unique factors contributing to energy poverty within their borders.

Country-specific analysis reveal variations in the likelihood of inadequate heating across Member States, suggesting that the socio-demographic and socio-economic variables used are insufficient to fully account for cross-country differences. For instance, Bulgaria, Romania, Lithuania and Cyprus show significantly higher odds compared to Finland, the reference country. These differences indicate that factors beyond the ones studied, such as specific national policies, infrastructure and geographical considerations, may play significant roles in determining the extent of energy poverty in each country. These differences highlight the need for collaborative efforts and common policies to address energy poverty across the EU.

3.2.2 Determinants of arrears on utility bills

The EU-level regression findings for having arrears on utility bills demonstrate that the explanatory power of the full model including all selected socio-demographic and socio-economic independent variables is considerably high like in the models for the analysis on being unable to keep home adequately warm (**Table 6**).

However, there are some notable differences in the effects of basic **socio-demographic characteristics** on the likelihood of having arrears compared to their effects on the inability to warm a home. Women are less likely to have arrears than men, and younger individuals have a higher likelihood than those aged 65 or over. Single adults and those in two-adult households without children have lower odds of having arrears compared to households with children. Though, as also shown in the logistic regression models for being unable to keep home warm, households with foreign-born adults and lower educational levels are more prone to arrears.

Socio-economic status plays a significant role. Higher household income and primary income sources from pensions or property rental reduce the likelihood of arrears. Conversely, reliance on benefits, low work intensity, inability to keep a home warm, material deprivation, difficulty making ends meet and poor dwelling conditions increase the risk of arrears. In contrast to the findings on heating inadequacy, households composed of students aged 18-24 are less likely to have arrears. A higher housing cost burden correlates with increased odds of arrears. Tenure status also impacts the likelihood of arrears, with all categories more at risk than homeowners without a mortgage, although market renters show slightly lower odds than other renters.

Geographic location is influential; individuals in sparsely populated areas are less likely to have arrears. Over time, the risk of arrears has decreased, with 2010 and 2016 showing higher likelihoods than subsequent years. Cross-country variations in arrears are smaller than those for heating inadequacy once socio-demographic and socio-economic factors are considered. Moreover, dwelling type affects the likelihood of arrears, with apartment and semi-detached house residents more likely to experience arrears than those in detached houses.

Country-specific analysis highlight considerable differences in the impact of selected variables on arrears likelihood. While sex is not a strong determinant, deprivation in economic strain items, heating inadequacy, very low household income, dwelling conditions and financial difficulties remain influential factors. However, the patterns of impact for other explanatory variables differ widely across countries while the country-level models indicate substantial variation in the impact of survey year on the likelihood of both heating inadequacy and arrears.

Additional models including EU-SILC 2022 data show that the long standing decreasing trend in the likelihood of inadequate heating has ceased by 2022 (see annex **Table 5**). Individuals interviewed in 2022 were more likely to struggle with heating compared to those in previous survey years, with earlier years showing significantly lower odds after controlling for other variables. In contrast, the risk of having arrears in 2022 was lower than in 2010 and 2016, with no significant difference from 2020 (see annex **Table 6**). These findings underscore the complex interplay of socio-demographic and socio-economic factors influencing energy poverty and suggest that tailored policy interventions are necessary to address the specific needs and circumstances within each Member State.

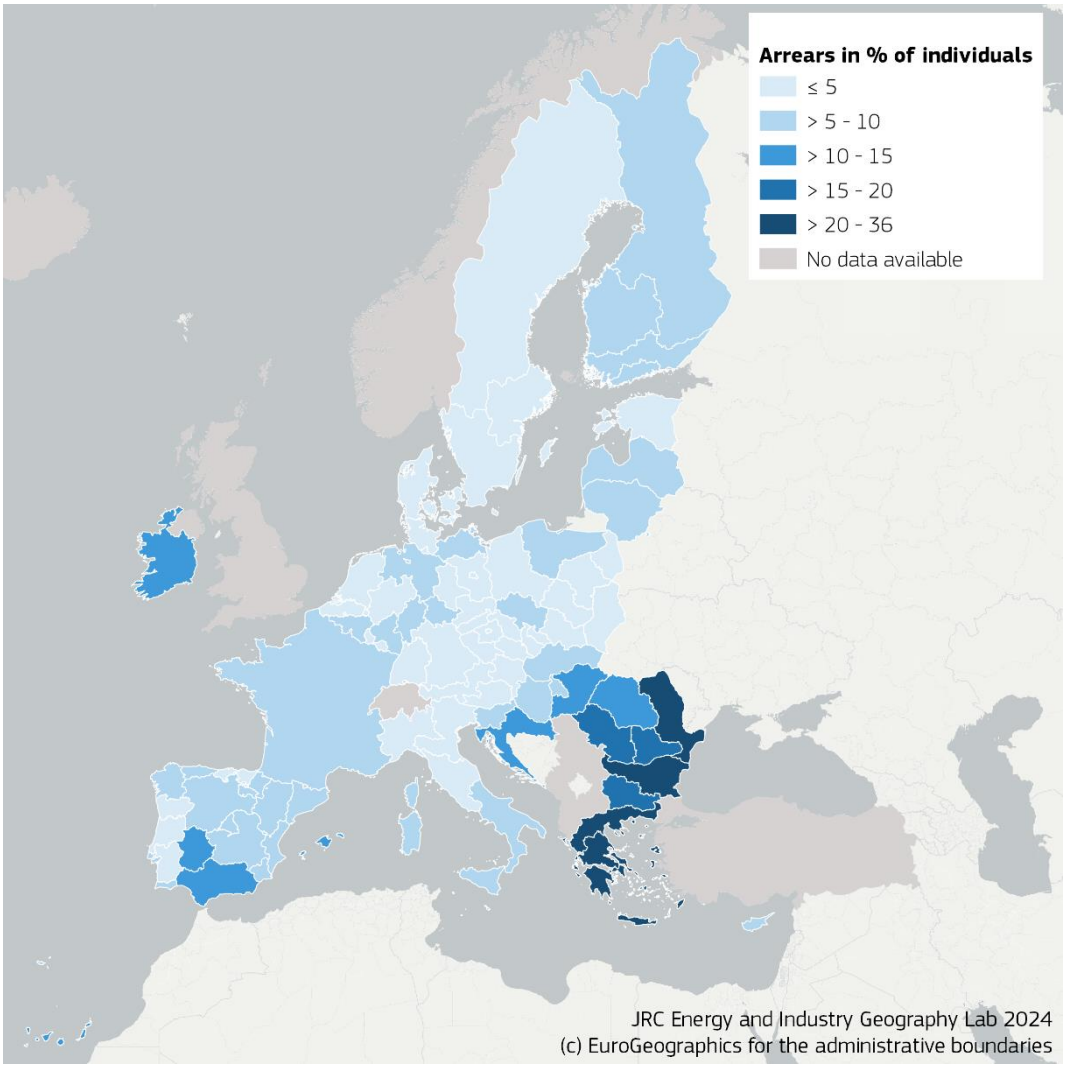
4 Regional variations of energy poverty in the EU

Energy poverty remains a pressing challenge within the European Union, manifesting in diverse forms across its regions. The following sections discuss the regional dimension of energy poverty in the EU and hosts a mapping exercise. Eurostat's microdata provides geographical information at NUTS2 level ([8]). However, data is not always complete; and reliable statistics can be produced for some countries at NUTS1 or NUTS0 level only. We have excluded data where only a small number of observations were available. The analysis is anchored in the two main SILC indicators: arrears on utility bills and the (in)ability to keep the house warm. In addition, we look at the 2M variable from HBS which looks at households with disproportionate high expenditures for energy compared to the national median.

Regional incidence and distribution of arrears on utility bills

Figure 25 shows the proportion of individuals having arrears on utility bills in 2022. For France, 2022 data was still missing. The highest share of individuals with arrears was observed in Greek regions (between 32 % and 35 %), in Romania (Macroregiunea Doi, 24 %), Bulgaria (Severna i Yugoiztochna Bulgaria, 21 %) and Spain (Ciudad de Melilla, 20 %).

Figure 25. Individuals with arrears on utility bills per region, 2022



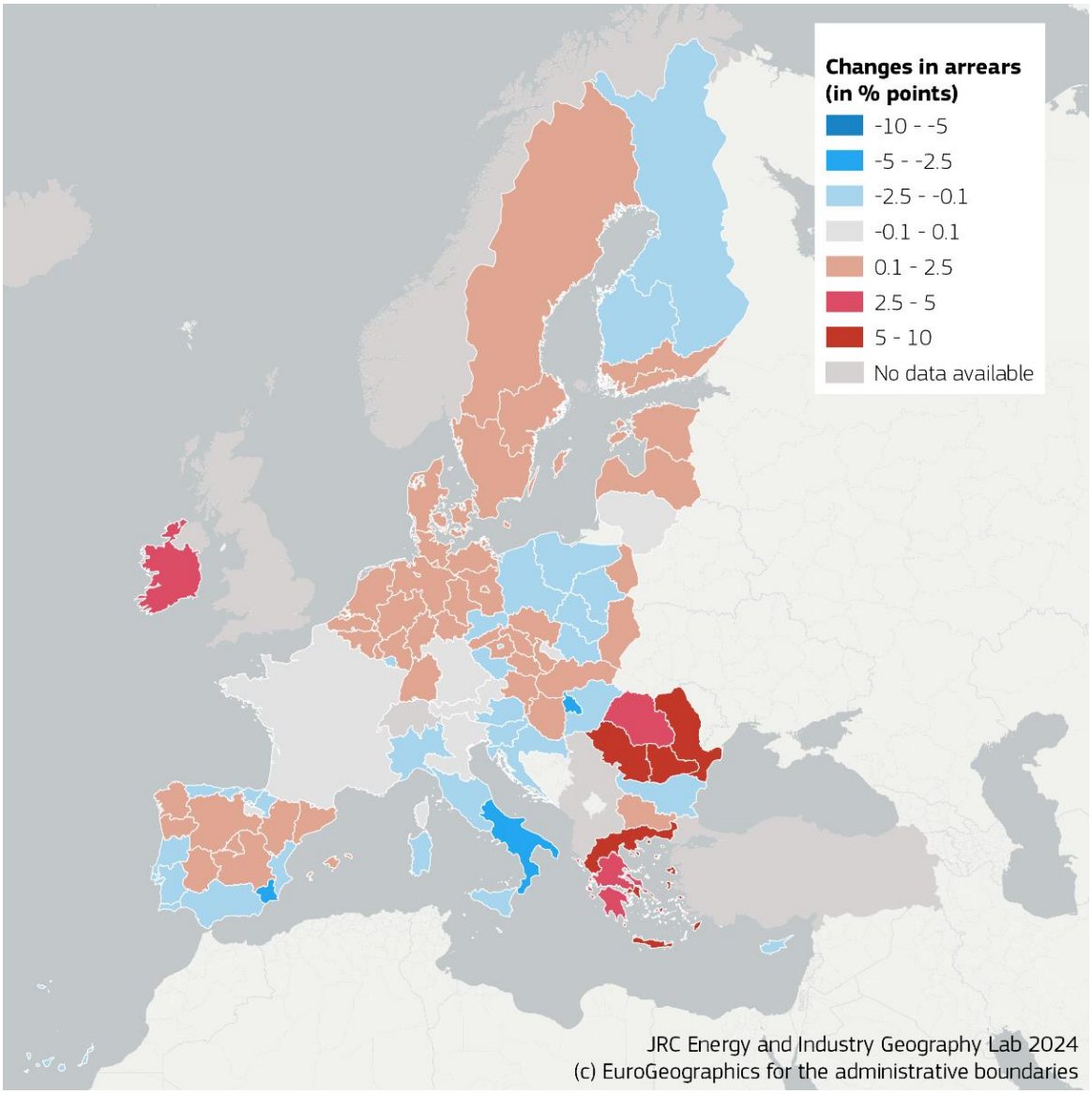
Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

[8] See: https://ec.europa.eu/eurostat/web/nuts

A year-on-year comparison (2021-2022) reveals that 58 out of the 122 regions mapped witnessed an uptick in the proportion of individuals with arrears in 2022 (**Figure 26**). Notably, this includes regions in Germany and Sweden, which previously exhibited lower shares. Alarmingly, regions already grappling with substantial arrears in 2021, including those in Greece (Attiki, Nisia Aigaiou, Kriti, Voreia Elláda, Kentriki Elláda), Romania (Macroregiunea Unu, Macroregiunea Doi, Macroregiunea Trei, Macroregiunea Patru) and Ireland, experienced exacerbations exceeding 2.5 percentage points.

Conversely, in 42 regions, a decline in the proportion of individuals in arrears was recorded when compared to 2021. This positive trend spanned regions in Spain, Italy, Portugal, Poland and Finland, with most reductions being modest (up to 2.5 percentage points).

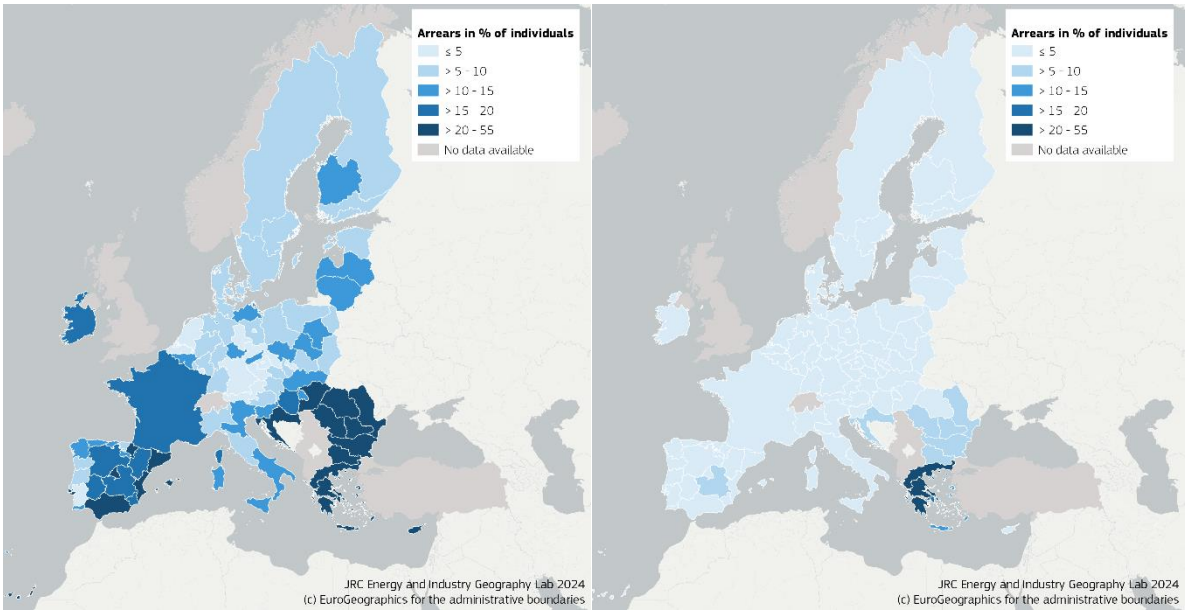
Figure 26. Change of individuals with arrears on utility bills per region, year-on-year comparison, 2021-2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

An examination of household income quintiles reveals a stark disparity. The lowest income quintile frequently endures a high percentage of arrears on energy bills, with figures soaring to 55% in certain regions (**Figure 27**). But interestingly, in some regions, especially in Greece, also the highest income quintiles show high levels of energy poverty.

Figure 27. Arrears in % of individuals per region according to income quintiles, 2022



Note: Left: lowest income quintile, Right: highest income quintile

Source: EU-SILC cross-sectional microdata data set, JRC C.7 own calculation

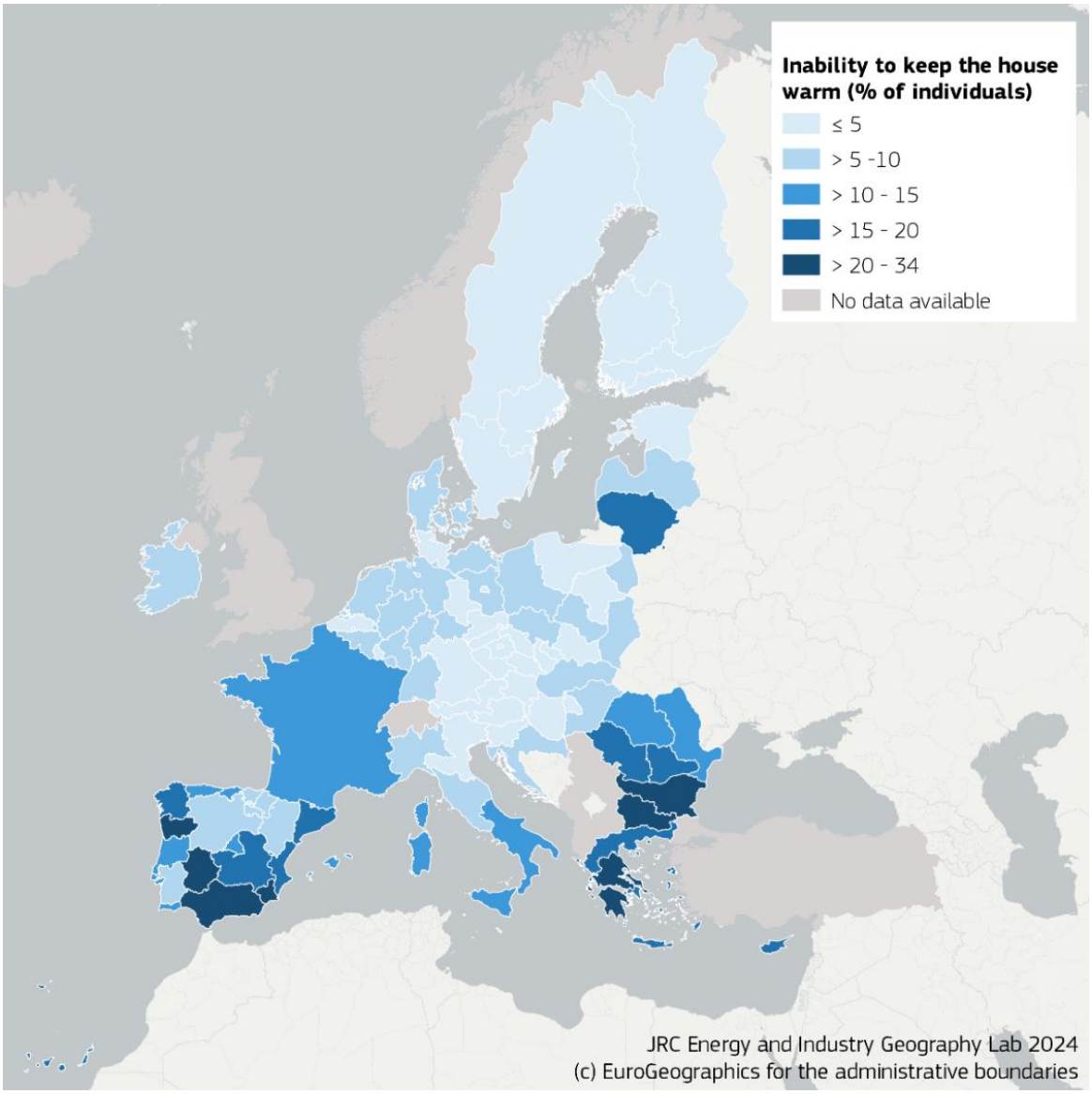
4.1 Regional incidence and distribution of inadequate heating

The ability to keep one's home adequately warm is a fundamental aspect of energy poverty, and the latest findings illustrate this challenge within the European Union. **Figure 28**, shows the share of individuals that are not able to keep the house adequately warm in 2022. For France, 2022 data was still missing. The highest share of individuals was observed in Bulgaria (21 % to 24 %), Greece (Kentriki Elláda, 20 %), Spain (Extremadura, Andalucía, Región de Murcia, Ciudad de Ceuta, Ciudad de Melilla, between 20 % and 26 %) and Portugal (Norte, Região Autónoma dos Açores, Região Autónoma da Madeira, between 23 % and 26 %). Other regions with relatively high shares are located in Cyprus, Spain, Greece and Lithuania. In general, the inability to keep the house warm seems even more common than the individuals having arrears on utility bills.

The temporal analysis reveals a concerning trend: the proportion of individuals struggling to heat their homes increased in 78 out of 122 regions between 2021 and 2022 (**Figure 29**). Only 22 regions exhibited a decrease. The most significant rises, exceeding 5 percentage points, occurred in Spain (Galicia, Castilla-La Mancha, Extremadura), Germany (Saarland) and Romania (Macroregiunea Patru). Notably, reductions were observed in nations that had high levels in 2021, including Bulgaria, Greece, Spain and Hungary. Central European regions, such as Germany, Austria, Czechia, Croatia and Poland, experienced low to moderate increases.

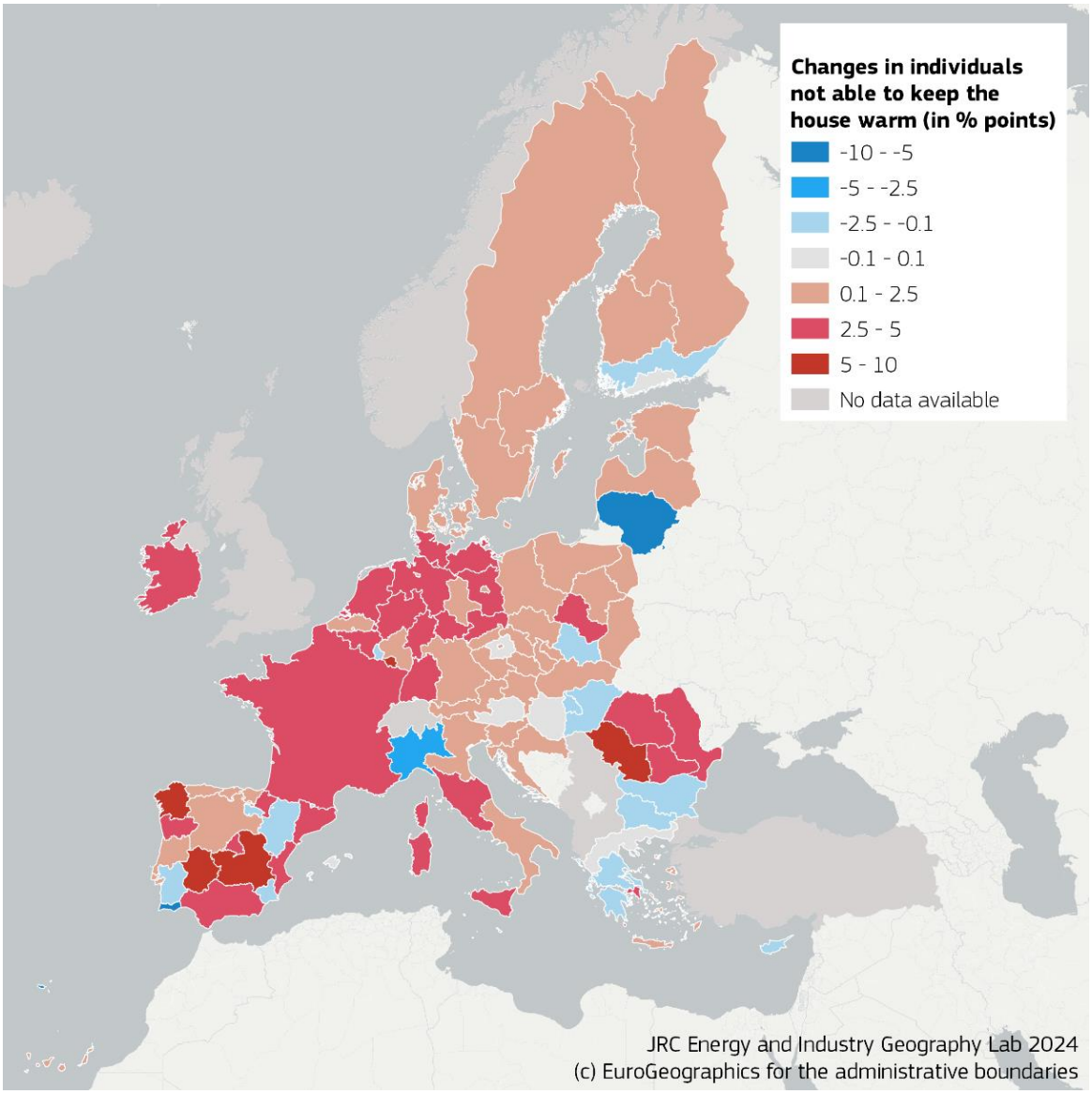
The distribution of heating adequacy issues across income quintiles presents an intriguing picture. In some regions, even the highest income quintiles struggle with maintaining warmth in their homes, particularly in Bulgaria, Greece and Spain (**Figure 30**). The regional variations contrasts with the patterns seen in utility bill arrears where in fewer regions high-income households face difficulties. For the lowest income quintile, the challenge of keeping homes warm is more acute than managing arrears on utility bills.

Figure 28. Proportion of individuals unable to keep the house adequately warm per region, 2022



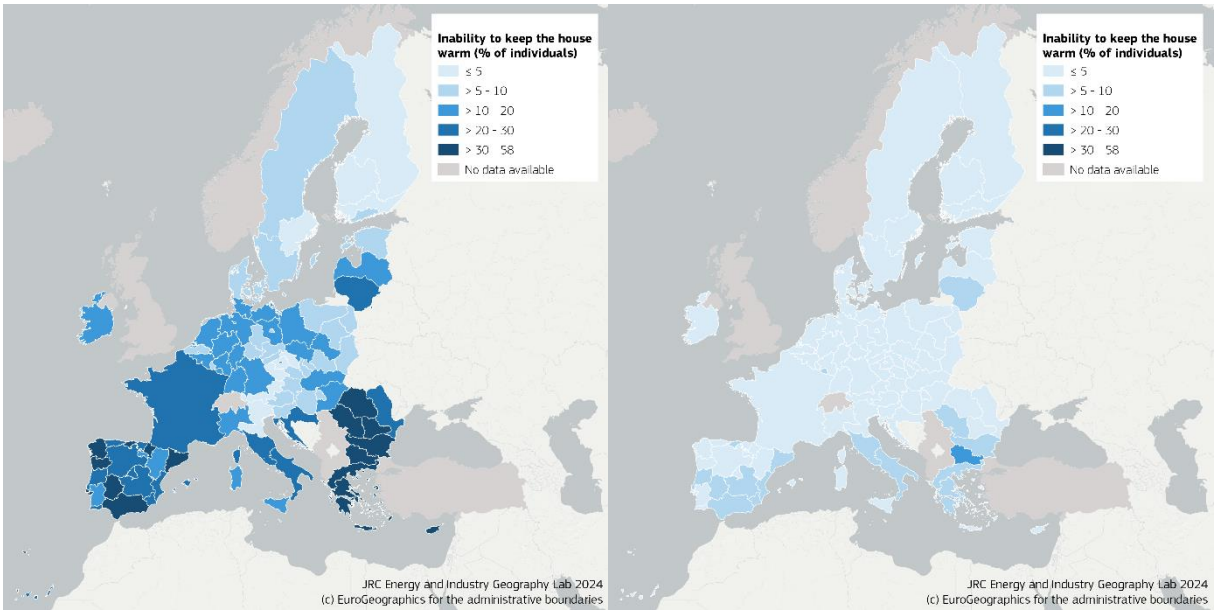
Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

Figure 29. Changes in inability to keep the house warm per region, year-on-year comparison, 2021-2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

Figure 30. Proportion of individuals unable to keep the house adequately warm per region, according to income quintiles, 2022



Source: EU-SILC cross-sectional microdata data sets, JRC C.7 own calculation

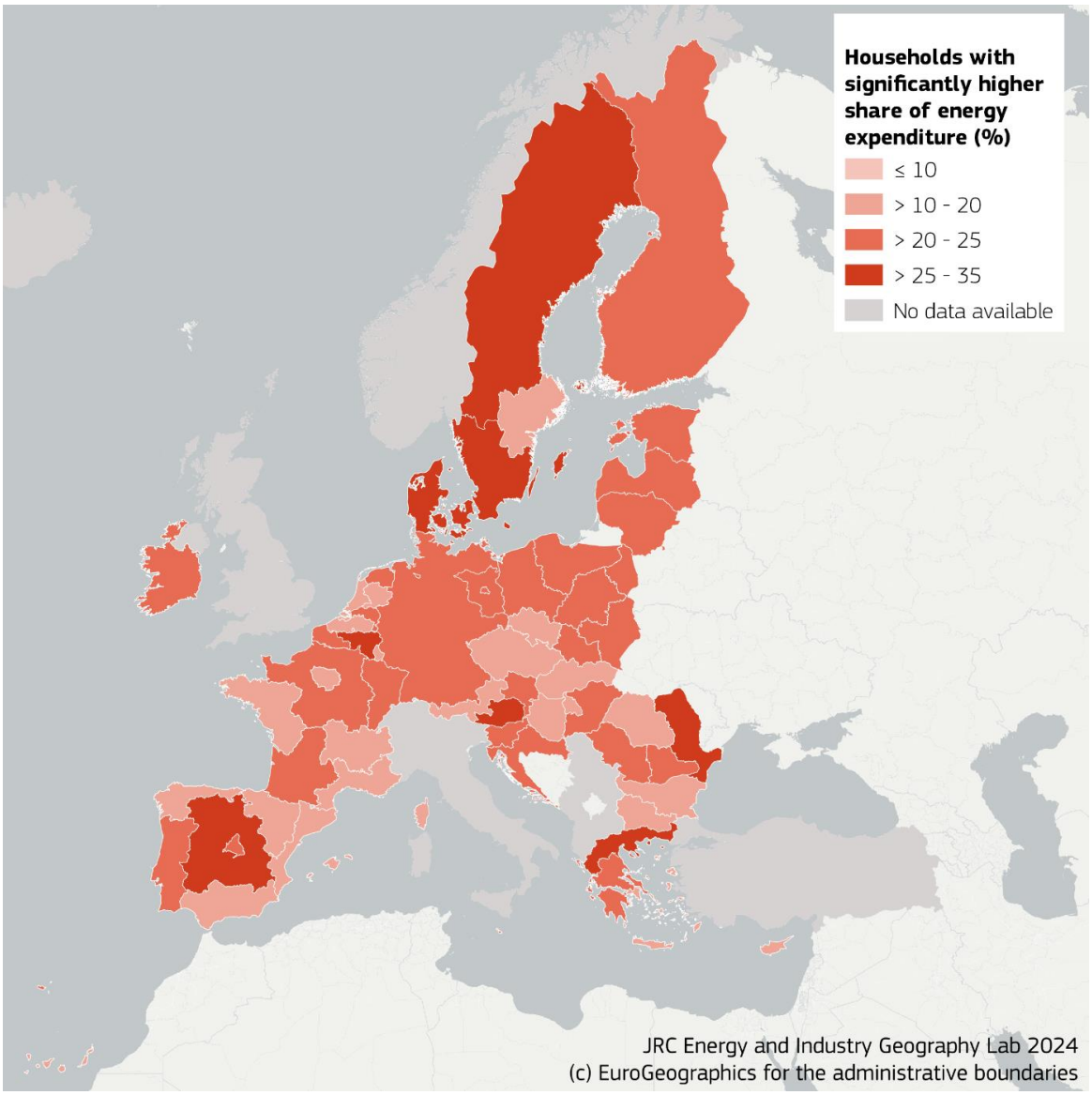
4.2 The 2M variable: a measure of disproportionate energy expenditures

The HBS provides regional statistics for the variable 2M which captures the proportion of households with energy expenditures, after housing costs, at least double the national median. Latest data for the 2M variable is from 2020 but only available for 16 countries. For 10 countries, only data for 2015 is available (Cyprus, Czechia, Finland, France, Ireland, Malta, Poland, Portugal, Romania, Sweden). Data is missing for Italy and regions in Germany.

As can be seen from **Figure 31** the variability in the 2M variable is not as pronounced as with the EU-SILC indicators. Sweden (19% to 39%) and Finland (22% to 28%) present higher values for the 2M variable. Conversely, Greece, Hungary and Spain show lower values, ranging from around 5% to 6%.

In conclusion, the regional analysis of energy poverty within the European Union reveals a complex landscape of disparities, underscoring the necessity for nuanced and region-specific policy approaches. The variations observed in indicators such as arrears on utility bills, the ability to keep homes adequately warm, and the proportion of household income spent on energy expenses (2M) highlight the differential impact of energy poverty across the regions.

Figure 31. Households with high ratio of energy expenditure in relation to income per region



Note: Proportion of households with ratio of energy expenditure relative to total monetary household income after housing costs (incl. dwelling related insurances) is twice as high as or more than the national median (2M), 2015-2020 (%)

Source: HBS microdata data sets, JRC C.7 own calculation

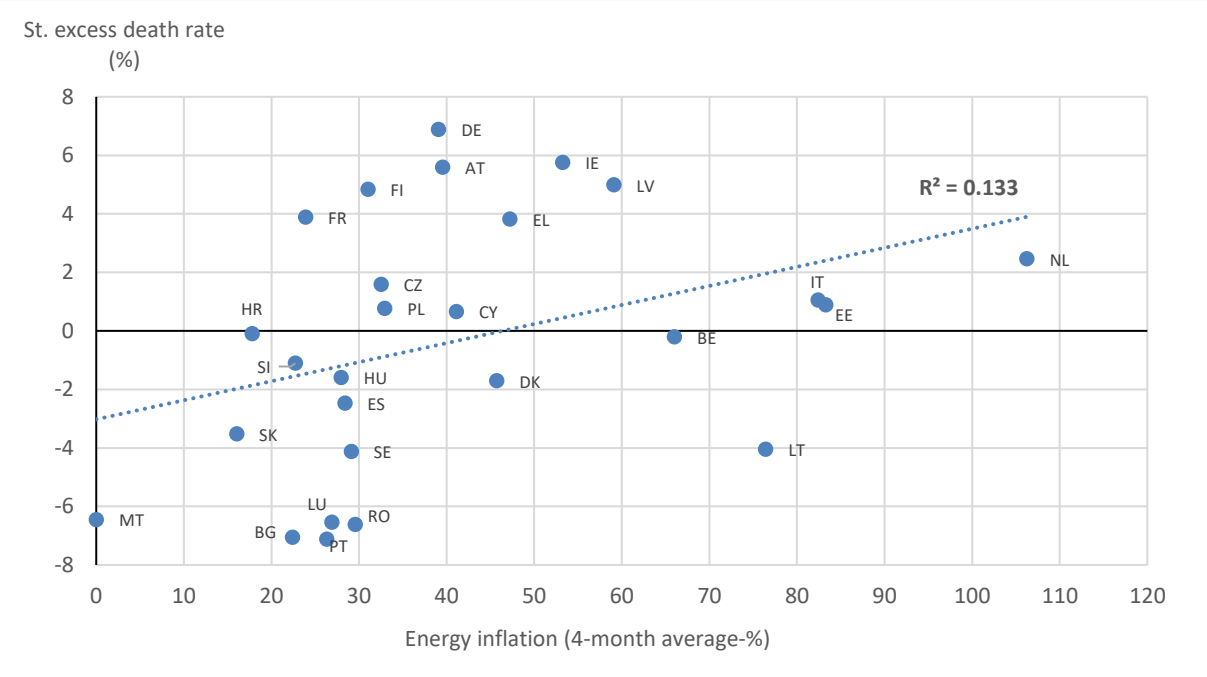
5 Special considerations in energy poverty

Energy poverty extends beyond the immediate access to affordable energy and has far-reaching implications for public health, social welfare and sustainable development. This section explores additional dimensions of energy poverty, including the impact of energy price fluctuations on health outcomes, particularly excess winter mortality, and the persistence of energy poverty within the EU. It examines the potential correlation between rising energy costs and increased mortality rates, acknowledging the methodological challenges in establishing a definitive causal link. The analysis also looks into the long-term nature of energy poverty, assessing the rate at which individuals in the EU remain consistently unable to access adequate energy services over time. By highlighting these considerations, we aim to provide a deeper understanding of the consequences of energy poverty and inform more effective, holistic strategies to address this social issue.

5.1 Energy prices and trends in excess mortality

Recent discussions and studies have highlighted the potential relationship between energy poverty and mortality rates (Recalde et al. 2019 in Polimeni et al. 2022), with the subject gaining public attention following drastic energy price hikes (Economist, 2023). However, methodological challenges arise when analysing this relationship within the EU using available data. Eurostat's published data on monthly excess death rates and weekly number of deaths are not standardised, failing to account for age, sex distribution and population size changes. Our analysis compares crude and standardised excess death rates for January-December 2022, June-October 2022 and November 2022-February 2023 against the 2016-2019 average to assess the impact of fluctuating energy prices on mortality during the 2022 and 2023 winter months. Crude rates indicate an overall increase in mortality throughout 2022, during the summer, and in the winter months of 2022-2023, with EU averages of 11%, 12.2% and 8.4%, respectively (**Table 7**). Yet, standardised rates are considerably lower across all Member States and periods. For November 2022-February 2023, the standardised rate was just under 1.5% for the EU average, with 13 of 27 Member States reporting negative rates. Additionally, rates for this period were lower than those of summer 2022 in all Member States except Latvia.

Figure 32. Relation between standardised excess death rate and energy inflation, Nov. 2022-Feb. 2023



Note: No available age-specific weekly deaths data for Ireland. No sex-specific available weekly deaths data for Germany. The age-specific weekly deaths are available for 10-year age groups while the data for other countries with available age-specific data are for 5-year age groups.

Source: Eurostat Population Weekly Deaths (demo_r_mwk), Population (demo_pjangroup) and Monthly Price Indices (prc_hicp_mv12r), JRC C.7 own calculation

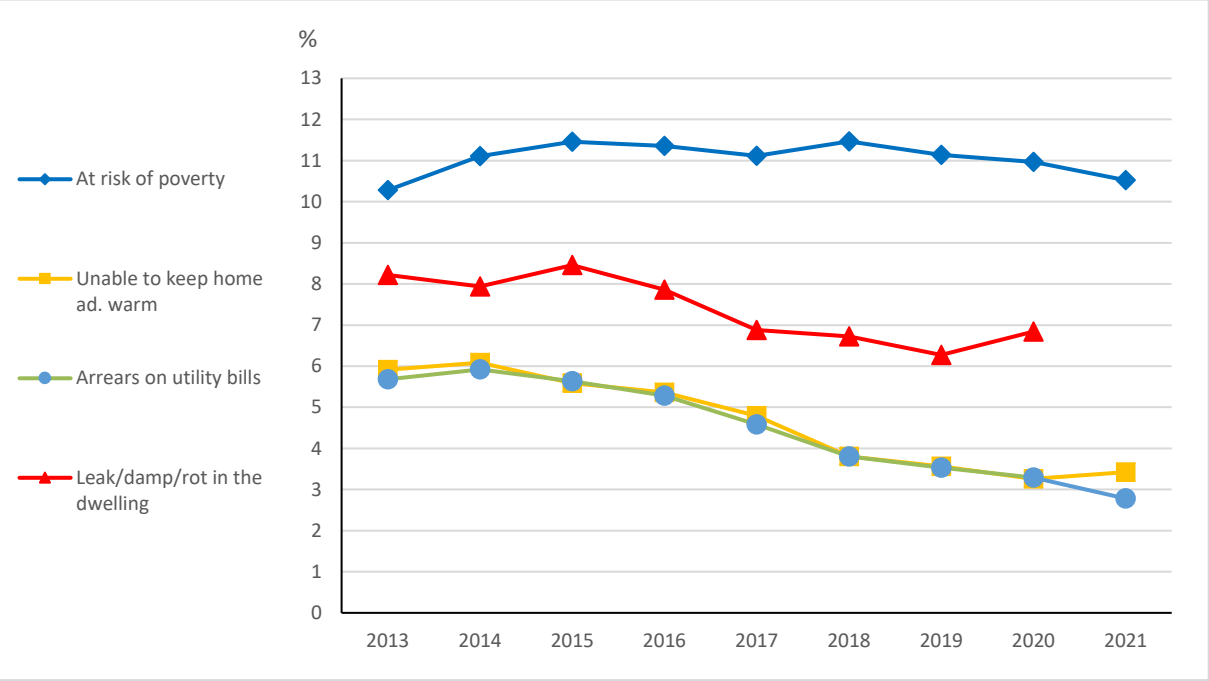
The analysis reveals a very weak positive correlation between energy price changes and excess death rates, with several Member States as outliers, suggesting mixed implications regarding the nexus of price increases and standardised mortality rates in EU countries during November 2022-February 2023 (**Figure 32**). Furthermore, cause of death data for 2022 and 2023 is limited to Czechia, Spain Lithuania, Luxembourg, Poland, Austria and Slovakia. Preliminary data indicates at least 5% of deaths in 2022 were COVID-19 related, highlighting ongoing pandemic influences on mortality and morbidity rates (Kuhnbandner and Reitzner, 2023). This underscores the necessity for improved methodologies in calculating excess death rates and further research into the external factors influencing winter mortality and its relation with energy poverty beyond energy price fluctuations.

5.2 Persistency of energy poverty in the EU

The persistent at-risk-of-poverty rate is a key indicator of long-term monetary poverty and socio-economic inequalities in the EU. Defined by Eurostat, it represents the percentage of the population whose equivalised disposable income was below the at-risk-of-poverty threshold in the current year and at least two of the preceding three years (Eurostat g). EU-SILC longitudinal datasets, which encompass variables related to energy poverty, offer a means to measure its persistence across EU countries. While research in this area is scarce (see Karpinska and Smiech 2020; Drescher and Janzen 2021; Pourkhanali, et al. 2023; Halkos and Kostakis, 2023) this box provides a descriptive analysis of the persistency of energy poverty indicators within the EU. A comprehensive report on this subject will be published by the authors shortly.

Our findings show that in 2021, just over 3% of individuals in the EU persistently struggled to keep their homes adequately warm (**Figure 33**). The proportion persistently facing arrears on utility bills was slightly below 3%, and around 7% persistently dealt with leaks, dampness, or rot in their dwellings during 2020 and at least two years between 2017 and 2020. All three energy poverty measures exhibited a downward trend in persistency rates, although the decrease for dwelling conditions was less pronounced and more variable. The persistent at-risk-of-poverty rate remained relatively stable at 10-11% from 2013 to 2021.

Figure 33. Persistency rates for monetary poverty and energy poverty indicators, 2013-2021 (%)



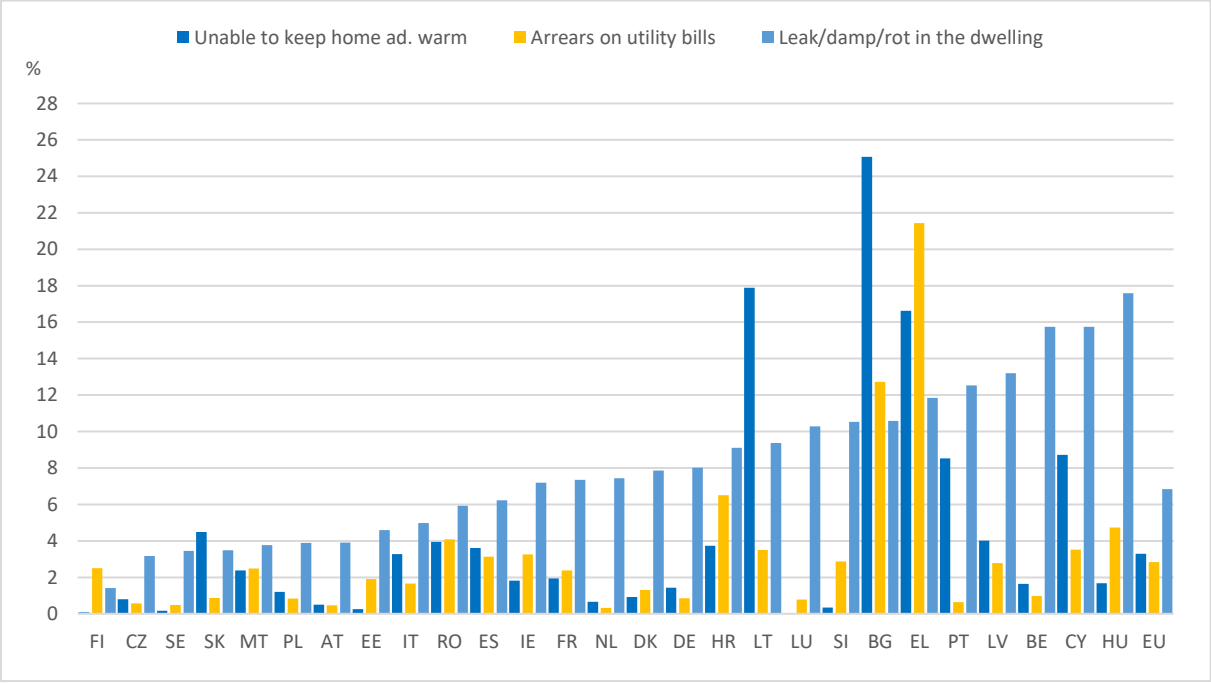
Note: DE is excluded from the EU total because of the absence of the data in seven of 9 years in the given period. Values for SK in 2017 and PT in 2020 are estimated based on the trends in the other years to obtain EU average in these years. For PT, 2021 persistent at risk of poverty rate is obtained from Eurostat database webpage. No leak/damp/rot in the dwelling data in 2021.

Source: Eurostat and EU-SILC longitudinal microdata sets, own calculation

Significant variation in persistency rates is evident across Member States. From 2018 to 2021, Bulgaria had a quarter of its population unable to adequately heat their homes, with Lithuania at 18% and Greece at 16.5%.

Rates were minimal in Luxembourg, Finland, Sweden, Estonia and Slovenia. Over one-fifth of individuals in Greece persistently faced arrears, with Bulgaria at 12.5%, and under 1% in nine other Member States. At least one-tenth of the population in nine EU countries persistently experienced leaks, dampness, or rot from 2017 to 2020, often exceeding rates of heating inadequacy and arrears. Bulgaria and Greece were the only countries with over 10% persistency in all three measures (**Figure 34**). The persistency analysis underlines that individuals in certain Member States endure longer periods of energy poverty than those in other EU regions. The persistence of energy inefficiency (leaks, dampness, rot) tends to be more common than affordability issues (heating, arrears) in most Member States. Moreover, trends in persistency rates differ across the energy poverty indicators. The evidence points to the need for long-term energy poverty measures alongside cross-sectional indicators to facilitate more effective policymaking and reduce energy-related inequalities within the EU.

Figure 34. Persistency rates for monetary poverty and energy poverty indicators, 2018 - 2021 (%)



Note: DE is excluded from the EU total because of the absence of the data in seven of 9 years in the given period. The values for unable to keep adequately warm and having arrears on utility bills refer to 2019 for DE and they refer to 2020 for PT. Having leak/damp/rot in the dwelling data refer to 2020; the figure for this indicator for DE refer to 2019.

Source: EU-SILC longitudinal microdata sets, own calculation

6 Conclusion

Energy poverty represents a challenge within the European Union, extending beyond the realm of energy policy into the broader spectrum of social justice, public health and sustainable development. The findings of this report underscore the complex nature of energy poverty, with varying degrees of prevalence and determinants across the EU's regions and Member States. They provide vital insights into the patterns, trends and drivers of energy poverty in the EU, offering a robust evidence base with which to inform policy interventions.

The persistence of energy poverty, despite all progress achieved, reveals the entrenched nature of this issue within certain segments of the population. High rates of energy poverty in countries like Bulgaria, Greece, Lithuania and Cyprus highlight the need for targeted support and interventions to alleviate the burden on the most vulnerable groups. Moreover, the recent upticks in the proportion of individuals facing difficulties in heating their homes and managing utility bills in some regions indicate the critical importance of timely and effective policy responses.

Energy poverty indicators, such as the inability to keep a home adequately warm and the incidence of arrears on utility bills, not only reflect the immediate hardships faced by households but also have broader implications for public health. The weak positive correlation between energy price changes and excess death rates during the 2022-2023 winter months suggests that energy poverty can exacerbate health risks, particularly in extreme weather conditions. While a definitive causal link remains to be established, this association needs further attention and investigation.

The report's findings also emphasise the significance of socioeconomic factors in determining the likelihood of energy poverty. Households with low income, reliance on social benefits, low work intensity, comprised of foreign-born adults or with lower educational levels are particularly susceptible to energy poverty. These variables are consistent across most EU Member States, indicating common policy areas that require attention to address the needs and circumstances within each region.

Policy insights:

- Targeted support: Design and implement targeted financial support programmes for vulnerable populations, including low-income households, single-parent families and households with foreign-born adults. These programmes should address both immediate financial needs and longer-term energy efficiency improvements.
- Energy efficiency: Invest in energy efficiency measures for residential buildings, with a focus on retrofitting homes to reduce energy consumption and improve thermal comfort. This will not only alleviate energy poverty but also contribute to climate change mitigation efforts.
- Monitoring and data collection: Enhance the collection of standardised data on energy poverty, including the development of indicators for persistent energy poverty. This will facilitate the monitoring of long-term trends and the effectiveness of policy interventions.
- Public health integration: Integrate energy poverty considerations into public health policies, particularly those related to combating excess winter mortality. Prioritise interventions in regions with higher correlations between energy price changes and mortality rates.
- Education and awareness: Increase public awareness of energy poverty and its consequences through educational campaigns. Encourage households to take advantage of available support programmes and energy-saving measures.
- Cross-sectoral collaboration: Foster collaboration between energy providers, social services, housing authorities, and health agencies to provide comprehensive support to households affected by energy poverty.
- Flexible policy frameworks: Develop flexible policy frameworks that can quickly adapt to changing energy market conditions, such as sudden price hikes, to prevent a rise in energy poverty rates especially after the introduction of the ETS2.
- Research and (social) innovation: Support research and innovation in affordable renewable energy solutions and energy-efficient technologies that can be deployed in low-income households. Utilise the potential of social innovation and grassroots initiatives such as energy communities to diffuse these technologies to the public (see Mikkonen et al.., 2020; Koukoufikis et. al., 2023).

In conclusion, the fight against energy poverty in the EU requires a concerted and multi-dimensional approach, involving cooperation across policy domains, levels of governance and stakeholders. The insights provided by this report could assist the EU and Member States in formulating and refining strategies that not only address the symptoms of energy poverty but also tackle its root causes, ensuring a just and inclusive energy transition for all citizens.

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List of abbreviations and definitions

EED	Energy Efficiency Directive
EPAH	Energy Poverty Advisory Hub
EPBD	Energy Performance of Buildings Directive
EU	European Union
EU-SILC	European Union Statistics on Income and Living Conditions
HBS	Household Budget Survey
HH	Household
HHWI	Household Work Intensity
NUTS	Nomenclature of Territorial Units for Statistics

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Table 3. Proportion of individuals having arrears on utility bills by tenure status, 2022 (%)

Country	Own-no mortgage	Own-with mortgage	Rent-market	Rent-reduced	Free accommodation
BE	0.8	2.0	7.1	10.0	0.5
BG	18.6	14.9	13.7	32.3	20.3
CZ	1.0	1.3	4.5	9.6	3.4
DK	1.4	2.0	5.8		
DE	2.4	3.2	5.4	8.4	1.8
EE	5.0	3.4	6.1	6.5	5.5
IE	7.0	6.9	17.1	21.5	11.1
EL	30.0	43.3	38.0	65.8	42.3
ES	4.4	8.7	21.3	23.1	10.4
FR	2.2	4.2	11.3	17.2	3.6
HR	13.9	19.0	15.6	12.8	17.0
IT	3.4	7.1	5.2	20.5	7.9
CY	5.7	8.1	13.9	34.9	9.4
LV	4.9	5.9	10.8	17.5	7.5
LT	3.7	2.6	19.9	38.3	18.1
LU	1.8	4.9	9.4	2.7	0.4
HU	8.0	8.5	6.4	17.4	19.9
MT	4.3	4.4	6.0	18.6	11.2
NL	0.5	0.6	5.6	3.7	0.0
AT	0.7	2.9	4.7	1.8	0.5
PL	3.5	4.7	7.2	8.6	13.3
PT	2.0	4.5	10.9	9.7	9.4
RO	17.2	11.4	21.3	38.8	30.2
SI	4.6	7.2	10.0	24.4	7.5
SK	5.6	5.4	10.1	18.9	4.1
FI	1.8	5.6	9.5	10.2	7.1
SE	1.8	1.8	7.0		4.5
EU	6.0	4.8	8.6	14.1	10.0

Note: Empty cells refer to no data or unpublishable findings due to insufficient number of cases.

Source: EU-SILC cross-sectional microdata data sets (version 05/10/2023), JRC C.7 own calculation.

Table 4. Proportion of individuals being unable to keep home adequately warm by tenure status, 2022 (%)

Country	Own-no mortgage	Own-with mortgage	Rent-market	Rent-reduced	Free accommodation
BE	2.4	3.1	11.5	11.2	5.1
BG	21.2	9.8	15.5	55.1	30.7
CZ	2.2	2.4	5.2	7.9	3.2
DK	2.6	3.5	7.8		0.0
DE	3.3	4.4	8.8	12.2	4.8
EE	3.7	2.1	5.7	4.8	3.5
IE	5.0	4.2	15.1	13.0	1.8
EL	17.2	16.9	21.6	48.5	26.2
ES	13.9	14.6	26.6	36.2	19.6
FR	7.5	5.8	16.6	19.5	10.7
HR	7.0	1.8	6.7	13.9	11.2
IT	6.8	5.3	15.7	16.2	14.6
CY	14.1	18.6	30.9	50.4	24.1
LV	6.2	3.8	8.3	19.2	13.1
LT	19.0	7.8	28.3	48.0	15.0
LU	0.6	2.7	3.0	2.4	3.9
HU	4.6	4.2	2.4	8.8	7.9
MT	7.2	2.3	13.7	22.7	5.6
NL	2.7	1.9	11.0	13.6	10.1
AT	1.6	1.8	3.9	3.1	4.5
PL	4.4	3.6	6.3	22.1	9.4
PT	18.6	11.0	23.1	50.6	20.8
RO	14.0	1.7	14.5	33.0	55.4
SI	2.2	0.7	8.3	8.7	2.6
SK	6.6	4.3	12.8	56.5	19.6
FI	0.8	0.9	1.5	3.9	2.3
SE	1.9	2.4	4.8		8.3
EU	8.2	5.8	12.2	17.8	13.8

Note: Empty cells refer to no data or unpublishable findings due to insufficient number of cases.

Source: EU-SILC cross-sectional microdata data sets (version 05/10/2023), JRC C.7 own calculation.

Table 5. Logistic regression models odds ratios, standard errors and model summaries for being unable to keep the house adequately warm (models including leak/damp/rot in the dwelling), 2010-2020

	Model-1 Only year and country		*Model-2 Socio-demographics*		*Model-3 Socio demographics and socio-economics*		*Model-4 Full with dwelling characteristics*	
	Estimate	**S.E.**	**Estimate**	**S.E.**	**Estimate**	**S.E.**	**Estimate**	**S.E.**
Sex								
Female			1.062***	(0.011)	1.022*	(0.011)	1.024*	(0.011)
Male (ref.)								
Broad age groups								
<=17			1.342***	(0.029)	0.981	(0.025)	0.985	(0.026)
18-24			1.510***	(0.035)	1.039	(0.029)	1.037	(0.029)
25-49			1.342***	(0.023)	1.016	(0.023)	1.019	(0.023)
50-64			1.347***	(0.021)	1.051*	(0.021)	1.070**	(0.022)
65+ (ref.)								
HH type								
Single adult			0.796***	(0.022)	1.291***	(0.039)	1.296***	(0.040)
Two adults-no child			0.508***	(0.014)	1.100**	(0.032)	1.092**	(0.032)
Two aduls with 1-2 child(ren)			0.459***	(0.011)	0.851***	(0.023)	0.878***	(0.024)
Two aduls with 3+ children			0.718***	(0.021)	0.935*	(0.030)	0.951	(0.031)
Other with child(ren)			0.701***	(0.018)	1.063*	(0.030)	1.065*	(0.030)
Other			0.684***	(0.018)	1.258***	(0.037)	1.242***	(0.037)
Single parent (ref.)								
C. of birth comb. of 18+ HH members								
At least one native and one foreign-born			1.337***	(0.029)	1.060*	(0.025)	1.039	(0.025)
All foreign-born			2.167***	(0.046)	1.327***	(0.030)	1.244***	(0.029)
At native-born (ref.)								
Highest ed. lev. of 18+ HH members								
Low			4.524***	(0.073)	1.399***	(0.025)	1.324***	(0.024)
Medium			2.260***	(0.030)	1.104***	(0.016)	1.090***	(0.016)
High (ref.)								

Eq. disp. HH inc. quintiles						
Lowest 20%			1.996***	(0.048)	1.863***	(0.046)
2nd			1.592***	(0.036)	1.523***	(0.035)
3rd			1.314***	(0.029)	1.285***	(0.029)
4th			1.135***	(0.026)	1.122***	(0.026)
Highest 20% (ref.)						
Main source of HH income						
Property			0.714**	(0.089)	0.723**	(0.090)
Pensions			0.946*	(0.022)	0.936**	(0.022)
Benefits+other			1.166***	(0.025)	1.125***	(0.024)
No positive income			1.340***	(0.099)	1.354***	(0.102)
Employment (ref.)						
HH work intensity						
Low HHWI			1.287***	(0.028)	1.289***	(0.028)
Not exposed-student HH			0.525***	(0.067)	0.510***	(0.066)
Not exposed-senior HH			1.037	(0.029)	1.070*	(0.030)
No low HHWI (ref.)						
Arrears on utility bills						
HH has arrears			2.057***	(0.028)	1.942***	(0.026)
No arreas (ref.)						
Deprivation of other items						
Deprived			5.038***	(0.074)	4.763***	(0.071)
Not deprived (ref.)						
Ability make ends meet						
With some difficulty			2.435***	(0.051)	2.396***	(0.050)
Easily (ref.)						
Ratio of housing costs on disp. HH inc.						
25-39.9%			0.958**	(0.014)	0.956**	(0.015)
>=40%			0.948**	(0.017)	0.946**	(0.018)
<25% (ref.)						
Leak/damp/rot in the dwelling						
Yes					1.867***	(0.024)
No (ref.)						
Tenure status						
Own-with mortgage					0.780***	(0.014)
Rent-market					1.144***	(0.022)
Rent-reduced					1.008	(0.027)
Free accom.					1.082***	(0.023)
Own-no mortgage (ref.)						
Dwelling type						
Semi-detached house					0.983	(0.018)
Apartment/flat <10dw					0.951**	(0.017)
Apartment/flat>=10dw					0.922***	(0.015)
Missing-DE					0.445***	(0.028)
Detached house (ref.)						

Degree of urbanisation								
Intermediate			0.925***	(0.012)	0.949***	(0.014)	0.937***	(0.014)
Sparsely			0.925***	(0.011)	0.895***	(0.012)	0.849***	(0.013)
Missing			0.853***	(0.038)	0.993	(0.047)	1.637***	(0.094)
Densely populated (ref.)								
Year								
2010	1.468***	(0.019)	1.336***	(0.018)	1.179***	(0.017)	1.227***	(0.018)
2016	1.352***	(0.018)	1.302***	(0.018)	1.126***	(0.017)	1.204***	(0.018)
2020 (ref.)								
Country								
BE	3.105***	(0.159)	2.514***	(0.131)	2.389***	(0.133)	2.032***	(0.115)
BG	50.840***	(2.297)	51.267***	(2.351)	29.541***	(1.482)	27.190***	(1.407)
CZ	2.407***	(0.121)	2.365***	(0.119)	1.987***	(0.107)	1.829***	(0.100)
DK	1.522***	(0.098)	1.379***	(0.090)	1.900***	(0.129)	1.620***	(0.112)
DE	2.798***	(0.136)	3.009***	(0.167)	3.203***	(0.189)	2.669***	(0.160)
EE	1.771***	(0.103)	1.681***	(0.099)	1.131*	(0.070)	0.996	(0.063)
IE	3.481***	(0.189)	3.121***	(0.172)	1.840***	(0.107)	1.671***	(0.099)
EL	16.193***	(0.737)	15.012***	(0.692)	7.241***	(0.366)	6.665***	(0.347)
ES	6.481***	(0.302)	5.046***	(0.239)	3.841***	(0.196)	3.470***	(0.180)
FR	3.790***	(0.182)	3.186***	(0.155)	2.862***	(0.149)	2.501***	(0.131)
HR	5.171***	(0.251)	4.418***	(0.218)	1.965***	(0.103)	1.736***	(0.094)
IT	8.580***	(0.390)	6.253***	(0.287)	5.357***	(0.266)	4.527***	(0.229)
CY	19.968***	(0.932)	18.984***	(0.901)	12.455***	(0.641)	9.824***	(0.520)
LV	8.625***	(0.405)	8.045***	(0.383)	4.042***	(0.206)	3.429***	(0.180)
LT	21.439***	(1.018)	23.227***	(1.125)	14.126***	(0.755)	12.631***	(0.696)
LU	1.250**	(0.100)	0.728***	(0.059)	1.311**	(0.113)	1.157	(0.101)
HU	5.430***	(0.257)	5.020***	(0.240)	2.338***	(0.119)	1.893***	(0.099)
MT	6.338***	(0.317)	4.280***	(0.220)	5.026***	(0.281)	4.685***	(0.268)
NL	1.408***	(0.086)	1.433***	(0.107)	1.618***	(0.128)	0.813*	(0.071)
AT	1.694***	(0.100)	1.365***	(0.081)	1.551***	(0.098)	1.354***	(0.086)
PL	5.975***	(0.277)	6.066***	(0.284)	3.826***	(0.193)	3.351***	(0.174)
PT	19.213***	(0.878)	14.005***	(0.653)	16.099***	(0.819)	13.694***	(0.710)
RO	10.734***	(0.504)	8.748***	(0.416)	4.475***	(0.229)	3.963***	(0.210)
SI	2.681***	(0.134)	2.858***	(0.192)	1.635***	(0.117)	0.738***	(0.059)
SK	3.320***	(0.168)	3.418***	(0.174)	2.057***	(0.112)	1.951***	(0.108)
SE	1.472***	(0.091)	1.200**	(0.075)	2.079***	(0.141)	1.990***	(0.137)
FI (ref.)								
Constant	0.013***	(0.001)	0.009***	(0.000)	0.002***	(0.000)	0.003***	(0.000)
Pseduo R2	0.082		0.133		0.274		0.284	
N	1,550,592		1,550,592		1,550,592		1,550,592	

Note: Significant at "***" p<0.001; "**" p<0.01; "*" p<0.05. For DE, no available data for dwelling type and degree of urbanisation in EU-SILC 2016 and 2020; and for NL and SI, no available data for dwelling type and degree of urbanisation in all EU-SILC waves.

Source: EU-SILC cross-sectional microdata data sets (version 05/10/2023), JRC C.7 own calculation.

Table 6. Logistic regression models odds ratios, standard errors and model summaries for having arrears on utility bills (models including leak/damp/rot in the dwelling), 2010-2020

	Model-1 Only year and country		*Model-2 Socio-demographics*		*Model-3 Socio demographics and socio-economics*		*Model-4 Full with dwelling characteristics*	
	Estimate	**S.E.**	**Estimate**	**S.E.**	**Estimate**	**S.E.**	**Estimate**	**S.E.**
Sex								
Female			1.000	(0.010)	0.962***	(0.010)	0.961***	(0.011)
Male (ref.)								
Broad age groups								
<=17			2.481***	(0.057)	1.498***	(0.041)	1.423***	(0.039)
18-24			2.609***	(0.066)	1.484***	(0.043)	1.425***	(0.042)
25-49			2.418***	(0.048)	1.479***	(0.036)	1.411***	(0.034)
50-64			2.040***	(0.038)	1.285***	(0.030)	1.271***	(0.029)
65+ (ref.)								
HH type								
Single adult			0.463***	(0.013)	0.680***	(0.021)	0.693***	(0.021)
Two adults-no child			0.356***	(0.009)	0.752***	(0.021)	0.776***	(0.022)
Two aduls with 1-2 child(ren)			0.488***	(0.011)	0.930**	(0.023)	0.944*	(0.024)
Two aduls with 3+ children			0.785***	(0.020)	1.132***	(0.032)	1.141***	(0.033)
Other with child(ren)			0.683***	(0.016)	1.094**	(0.029)	1.157***	(0.031)
Other			0.507***	(0.013)	0.906**	(0.026)	0.962	(0.028)
Single parent (ref.)								
C. of birth comb. of 18+ HH members								
At least one native and one foreign-born			1.580***	(0.033)	1.253***	(0.029)	1.201***	(0.028)
All foreign-born			2.230***	(0.049)	1.265***	(0.029)	1.188***	(0.029)
At native-born (ref.)								
Highest ed. lev. of 18+ HH members								
Low			4.066***	(0.069)	1.268***	(0.024)	1.243***	(0.024)
Medium			2.401***	(0.032)	1.201***	(0.018)	1.206***	(0.018)
High (ref.)								

Eq. disp. HH inc. quintiles						
Lowest 20%			1.429***	(0.036)	1.444***	(0.037)
2nd			1.188***	(0.028)	1.200***	(0.028)
3rd			1.100***	(0.025)	1.109***	(0.025)
4th			0.978	(0.022)	0.979	(0.022)
Highest 20% (ref.)						
Main source of HH income						
Property			0.446***	(0.069)	0.491***	(0.076)
Pensions			0.766***	(0.018)	0.783***	(0.019)
Benefits+other			1.159***	(0.025)	1.143***	(0.025)
No positive income			0.833*	(0.066)	0.857	(0.068)
Employment (ref.)						
HH work intensity						
Low HHWI			1.183***	(0.026)	1.188***	(0.027)
Not exposed-student HH			0.422***	(0.059)	0.410***	(0.058)
Not exposed-senior HH			0.744***	(0.023)	0.774***	(0.024)
No low HHWI (ref.)						
Ability to keep the house adequately warm						
Unable to keep the house warm			2.064***	(0.028)	1.939***	(0.026)
Able to keep the house warm (ref.)						
Deprivation of other items						
Deprived			4.403***	(0.061)	4.121***	(0.058)
Not deprived (ref.)						
Ability make ends meet						
With some difficulty			3.633***	(0.080)	3.527***	(0.078)
Easily (ref.)						
Ratio of housing costs on disp. HH inc.						
25-39.9%			1.249***	(0.018)	1.218***	(0.018)
>=40%			1.353***	(0.025)	1.329***	(0.025)
<25% (ref.)						
Leak/damp/rot in the dwelling						
Yes					1.703***	(0.022)
No (ref.)						
Tenure status						
Own-with mortgage					1.381***	(0.024)
Rent-market					1.219***	(0.025)
Rent-reduced					1.329***	(0.035)
Free accom.					1.299***	(0.029)
Own-no mortgage (ref.)						
Dwelling type						
Semi-detached house					1.083***	(0.020)
Apartment/flat <10dw					1.187***	(0.022)
Apartment/flat>=10dw					1.209***	(0.020)
Missing-DE					0.708***	(0.052)
Detached house (ref.)						

Degree of urbanisation								
Intermediate			0.895***	(0.012)	0.926***	(0.013)	0.978	(0.015)
Sparsely			0.788***	(0.010)	0.758***	(0.010)	0.825***	(0.013)
Missing			0.909	(0.048)	1.128*	(0.064)	1.612***	(0.111)
Densely populated (ref.)								
Year								
2010	1.485***	(0.019)	1.381***	(0.019)	1.154***	(0.017)	1.179***	(0.017)
2016	1.292***	(0.017)	1.272***	(0.017)	1.045**	(0.015)	1.087***	(0.016)
2020 (ref.)								
Country								
BE	0.672***	(0.022)	0.466***	(0.016)	0.290***	(0.011)	0.276***	(0.010)
BG	5.192***	(0.121)	4.690***	(0.115)	1.211***	(0.036)	1.466***	(0.047)
CZ	0.405***	(0.014)	0.346***	(0.012)	0.179***	(0.007)	0.186***	(0.007)
DK	0.414***	(0.019)	0.357***	(0.017)	0.322***	(0.016)	0.309***	(0.016)
DE	0.413***	(0.013)	0.375***	(0.017)	0.261***	(0.013)	0.246***	(0.012)
EE	1.117***	(0.035)	1.006	(0.032)	0.556***	(0.019)	0.576***	(0.021)
IE	1.587***	(0.049)	1.232***	(0.040)	0.566***	(0.020)	0.578***	(0.021)
EL	5.551***	(0.127)	5.142***	(0.122)	1.640***	(0.048)	1.808***	(0.056)
ES	1.157***	(0.030)	0.828***	(0.023)	0.388***	(0.012)	0.368***	(0.012)
FR	0.862***	(0.024)	0.657***	(0.019)	0.389***	(0.012)	0.370***	(0.012)
HR	3.794***	(0.093)	3.022***	(0.078)	1.162***	(0.035)	1.414***	(0.046)
IT	1.231***	(0.030)	0.830***	(0.021)	0.410***	(0.012)	0.407***	(0.012)
CY	2.073***	(0.059)	1.574***	(0.047)	0.524***	(0.017)	0.531***	(0.019)
LV	2.323***	(0.059)	1.979***	(0.052)	0.714***	(0.021)	0.741***	(0.024)
LT	1.292***	(0.046)	1.249***	(0.046)	0.369***	(0.014)	0.404***	(0.017)
LU	0.390***	(0.021)	0.188***	(0.011)	0.240***	(0.014)	0.227***	(0.014)
HU	2.537***	(0.061)	2.234***	(0.055)	0.794***	(0.022)	0.820***	(0.025)
MT	1.068	(0.036)	0.641***	(0.023)	0.480***	(0.019)	0.517***	(0.022)
NL	0.230***	(0.012)	0.186***	(0.014)	0.126***	(0.010)	0.086***	(0.008)
AT	0.525***	(0.020)	0.375***	(0.014)	0.305***	(0.013)	0.298***	(0.013)
PL	1.375***	(0.034)	1.277***	(0.033)	0.542***	(0.016)	0.594***	(0.019)
PT	0.772***	(0.024)	0.491***	(0.016)	0.228***	(0.008)	0.211***	(0.008)
RO	3.163***	(0.079)	2.433***	(0.064)	0.830***	(0.026)	1.022	(0.034)
SI	2.193***	(0.052)	1.890***	(0.110)	0.982	(0.062)	0.725***	(0.054)
SK	0.938*	(0.028)	0.847***	(0.026)	0.340***	(0.012)	0.395***	(0.014)
SE	0.420***	(0.018)	0.319***	(0.014)	0.426***	(0.020)	0.418***	(0.020)
FI (ref.)								
Constant	0.061***	(0.001)	0.036***	(0.001)	0.017***	(0.001)	0.012***	(0.001)
Pseduo R2	0.077		0.137		0.276		0.283	
N	1,550,592		1,550,592		1,550,592		1,550,592	

Note: Significant at "***" p<0.001; "**" p<0.01; "*" p<0.05. For DE, no available data for dwelling type and degree of urbanisation in EU-SILC 2016 and 2020; and for NL and SI, no available data for dwelling type and degree of urbanisation in all EU-SILC waves.

Source: EU-SILC cross-sectional microdata data sets (version 05/10/2023), JRC C.7 own calculation.

Table 7. Excess death rate estimations for the given periods, 2022-2023 (%)

	Jan 2022-Dec 2022		June 2022-Oct 2022		Nov 2022-Feb 2023	
	Crude	Standardised	Crude	Standardised	Crude	Standardised
BE	6.6	0.8	7.7	1.9	6.3	-0.2
BG	9.4	9.6	2.6	2.9	-6.9	-7.1
CZ	8.3	2.2	7.7	1.6	9.0	1.6
DK	10.5	-0.5	11.1	0.0	10.7	-1.7
DE	14.3	3.9	17.7	7.4	18.1	6.9
EE	11.3	4.2	11.6	4.5	8.9	0.9
IE	12.6	5.5	14.7	7.2	15.1	5.8
EL	15.3	10.8	13.0	8.9	8.3	3.8
ES	10.6	3.3	17.5	10.0	4.7	-2.5
FR	11.5	5.1	11.1	4.9	10.7	3.9
HR	9.1	7.7	6.7	5.5	1.4	-0.1
IT	11.0	5.4	12.9	7.3	7.1	1.0
CY	22.8	8.0	15.7	1.9	16.6	0.7
LV	6.7	4.9	5.2	3.5	7.3	5.0
LT	7.0	3.8	6.5	3.2	-0.4	-4.0
LU	5.9	-4.1	7.0	-3.1	4.5	-6.5
HU	5.1	3.1	5.6	4.1	-0.7	-1.6
MT	17.9	1.5	19.1	3.2	8.8	-6.5
NL	12.3	2.0	15.6	5.0	14.2	2.5
AT	13.1	6.0	14.8	7.7	13.4	5.6
PL	11.2	6.6	9.2	5.1	4.9	0.8
PT	11.9	-2.2	16.5	2.1	7.6	-7.1
RO	3.7	4.6	1.3	2.2	-7.1	-6.6
SI	10.8	1.2	9.6	0.2	9.7	-1.1
SK	11.4	4.4	10.3	3.4	3.9	-3.5
FI	17.2	6.9	16.5	6.5	15.8	4.8
SE	2.9	-5.0	3.3	-4.7	5.1	-4.1
EU	11.0	4.3	12.2	5.7	8.4	1.4

Note: No available age-specific weekly deaths data for Ireland. No sex-specific available weekly deaths data for Germany. The age-specific weekly deaths are available for 10-year age groups while the data for other countries with available age-specific data are for 5-year age groups.

Source: Eurostat Population Weekly Deaths (demo_r_mwk), Population (demo_pjangroup), own calculation.

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