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# The 2022 energy and inflationary crises: data, experiences and opinions of Spanish energy vulnerable households

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## Abstract

The 2022 Russian invasion of Ukraine has caused a profound socio-economic impact in Europe. The EU and its Member States implemented different mitigation strategies in this energy and inflationary crisis context.

However, European households' situation and response to these shocking crises were unknown when these policies were implemented. This paper aims to shed light on what this emergency has meant for vulnerable groups by focusing on the impact of energy poverty on their socio-economic condition. The study explores the situation of the households assisted by the Spanish Red Cross using a mixed methodology of quantitative (primary data survey, N=1557) and qualitative (focus groups, N=45) research. Thus, this article combines data and experiences of these vulnerable communities with opinions from the NGO technical staff and experts from academia.

The results unveil complex and ambivalent circumstances concerning energy vulnerability in this population. Their most pressing problem is the inability to maintain thermal comfort at home in winter and summer. These two seasonal faces of energy poverty are linked to the poor quality of their dwellings and energy services. Moreover, other contributing factors are their socio-economic situation and the 2022 high energy prices, which pushed more than 90% of them to cut off or reduce heating consumption during the 2022-2023 winter. Finally, this paper highlights how this population employs different coping strategies affecting their quality of life. Eventually, the paper's findings and recommendations might support relevant stakeholders in addressing energy poverty during emergencies, thus contributing to pursuing a just energy transition.

**Keywords:** Energy poverty; Lived experience; Fuel poverty; Energy vulnerability; Energy crisis; Mixed methods

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# 1. Introduction

Energy poverty (EP) could be defined as a situation where a household does not have the resources to meet its basic energy needs (1). In the global north, this can result in households being obliged to spend an excessive part of their income on this type of service (disproportionate expenditure) (2) or underconsuming energy for affordability issues (Hidden Energy Poverty - HEP) (3). These are just one definition and two related examples of EP dimensions, but we can find many alternatives from different authors and entities in the literature (4). When we refer to basic energy needs, the literature usually includes space heating and cooling, domestic hot water, and the energy consumption of household appliances such as cookers or refrigerators (5).

According to the latest data published by Eurostat (6), in 2023, 10.6% of people in the EU could not afford to maintain an adequate temperature in their homes during the winter, while 6.9% of Europeans had arrears on utility bills (7). In the same year, 21.3% of the EU population was at risk of poverty or social exclusion (8), which highlights the overall severe situation of economic, material and social deprivation in Europe after the passage of two global emergencies such as the COVID-19 pandemic and the energy and inflationary crises of 2022.

## 1.1 The EU and Spanish policy and action frameworks

The European Commission (EC) has set up several action and policy frameworks to fight against energy poverty. Within these, the EU Energy Poverty Advisory Hub (EPAH) is the collaborative network of actors officially tasked by the EC to guide the fight against this social issue and accelerate the transition to a sustainable and just energy policy. This consortium of entities also promotes identifying and monitoring this social problem at the national (9) and local levels (10). In this sense, the EPAH continued the work of the previous European Energy Poverty Observatory (EPOV) by reorganising the classification and enlarging the scope of energy poverty indicators, thus providing a guide to measure this social issue (11). Besides, an official EU document that addresses both the diagnosis and treatment of energy poverty is the ‘European Commission Recommendation on Energy Poverty’. It provides guidance to EU Member States on how to tackle this problem. The first recommendation - Commission Recommendation (EU) 2020/1563 - was issued in October 2020 as part of the Renovation Wave strategy, which aims to boost the structural renovation of buildings and reduce emissions. The document also encourages Member States to share best practices and experiences in the fight against energy poverty and to cooperate with the Commission and other EU institutions and bodies in this field. The document builds on the principles of the European Pillar of Social Rights, the European Green Pact and the Clean Energy for All Europeans package. After three years (October 2023), the Commission ‘recast’ this recommendation - Commission Recommendation (EU) 2023/2407 - by structuring its suggestions into eight main pillars, ranging from implementing the legal framework to the issue of financing. One of the main novelties of the 2023 document is the promotion of fair and equitable access to energy for all households through, for example, energy community schemes. Moreover, this document promotes the engagement and empowerment of vulnerable people and all stakeholders.

In Spain - the paper’s case study - the National Strategy against Energy Poverty 2019-2024 (ENPE) is the roadmap introduced by the Government to tackle this issue in the country. This document incorporates many of the contributions submitted by civil society, the Third Sector, business and academia to the public consultation held during the first quarter of 2019. The main proposals span from providing an official definition of energy poverty and vulnerable consumers to proposing measures to raise public awareness of energy poverty (12).

However, when analysing the last years’ trend, since 2020, Spain has been experiencing a progressive worsening across almost all the EP indicators (13), most especially in HEP and inadequate temperature, which points to a more complex scenario of energy deprivation. The last

impactful global event was the 2021-2022 energy crisis, which is described in the following section.

## 1.2 The energy crisis and its impact on society

The conflict in Ukraine, which began in March 2022, together with the pre-existing COVID-19 crisis and tensions in the international gas market, has exacerbated the already difficult situation of finding affordable energy for certain households. These developments are of particular concern for less developed countries and in specific areas with fewer resources. The steady rise in gas prices has significantly impacted energy prices and demand patterns. It is precisely this situation that poses a challenge for continuing to pursue a just energy transition (14).

The abovementioned war has had a significant effect on global energy markets and political relations in a scenario where fuel prices have already started to rise in 2021. However, not only nations and governments were affected by this crisis. Using energy (particularly natural gas) as a tool of geopolitical competition has overwhelmed impoverished neighbourhoods, especially those already struggling with energy poverty (15). These communities rely heavily on fossil fuels for heating and other daily activities (16), and fluctuations in prices and supply can make it difficult for them to access the resources they need to live a decent life. This can result in increased energy costs, resource rationing and even blackouts, further aggravating already dire living conditions in these neighbourhoods. Besides, to fill the natural gas import gap, some EU governments have opted to revert the electricity generation to more polluting energy sources, such as coal or oil. On the other hand, in 2022, reductions in emissions from natural gas were particularly pronounced in Europe (-13.5%) compared to 2021 (17).

In this context, it is essential to understand the broader implications of the energy crisis and its impact on the most vulnerable in society. In the paper's country case study, the increase in energy prices due to the shortage of available natural gas has meant that Spanish consumers have been forced to pay higher electricity and gas bills. Consequently, there has been a decrease in energy consumption (13), which has aggravated or confirmed the already severe energy poverty situation of 2021 (18). Indeed, in 2022, Spanish households with inadequate temperature rose to 17.1% (against 14.3% in 2021), and the arrears on utility bills remained at around 9%. The 2M disproportionate expenditure indicator worsened by 1.6 points, reaching 16.8% of households, while that based on the minimum income standard (MIS) was the only one to improve by almost the same proportion. Hidden energy poverty remained at very high but stable values (around 31%), which is remarkable in the context of such high energy prices as the one in 2022. Behind this mitigated worsening, there is the package of social protection measures deployed by the National Government, highlighting the increase in the amounts of electricity and thermal social tariffs, which managed to reduce the energy poverty gap in the most disadvantaged households (the difference between their actual and required energy expenditure) by 13%.

In addition, the increase in the price of energy has led to a decrease in the purchasing power of citizens since, with inflation and the rise in electricity bills, they have had less money available for other expenses. This has led to a decrease in the quality of life of families in Spain, who have been forced to reduce their electricity consumption or other expenditures on essential goods (19). According to Celasun and Iakova (20), electricity prices during the summer of 2022 were 7.5 times higher on average than in early 2021. A report by the Bank of Spain (21) analyses how this cost increase has been passed through to selling prices and the impact this has had on output, wages, employment and unit labour costs in non-financial firms. On the other hand, the Spanish Institute of Statistics (INE) estimates that the rise in energy prices has increased the cost of living in Spain by more than 6% between January and December 2022, mainly due to energy costs this year, between direct and indirect causes.

## 1.3. Literature review

### 1.3.1 Definition and scope of energy poverty

Energy poverty in the global north is a multi-dimensional issue beyond the mere inability to afford energy (22). It is a specific and complex face of the general poverty issue and encompasses aspects such as inadequate access to energy services, inefficient housing, and the broader socio-economic context (23). Boardman (1991) (24) was among the first to define the concept, focusing on households that spend more than 10% of their income on energy. More recent definitions emphasise the role of energy in achieving a decent standard of living and participating in society (25), thus connecting energy poverty with other aspects of human deprivation. In this sense, the scope of the research and policy agenda on this topic has been broadened in different directions (26). What was an issue mostly related to the winter season, ended as a more climate-dependent problem, raising the concept of summer energy poverty, especially in Southern European countries (27), but also looking at northern ones (28). The gender dimension has also been demonstrated as key when studying energy poverty from a demographical and socio-economic perspective (29). Some studies have even crossed these “new dimensions” by studying summer energy poverty from a gender perspective (30). Another demographic that has been considered significant in energy poverty incidence is ethnicity or the fact of being a migrant. Wang et al. (31) found that the residential energy burden in the U.S. is very dependent on the racial group, with African-American households being more vulnerable than the other studied races. A recent study (32) concluded that refugees are susceptible to the main factors that make a person vulnerable to energy deprivation (described in Section 1.2.2).

Thus, previous literature has demonstrated that energy poverty does not affect all demographics equally. Indeed, gender, age, ethnicity, and geographic location play significant roles in determining a household's vulnerability to energy poverty. Women, the elderly, and ethnic minorities are often more severely affected due to their lower income levels and higher likelihood of living in substandard housing (33), (34). Additionally, the geographical inequalities of this phenomenon have also been pointed out by several studies (e.g. among regions (35), (36)), also suggesting the need for more disaggregated data to explore this dimension further. Besides, rural areas usually face higher energy costs and lower energy efficiency than urban areas (37).

As EP can be described as a specific face of general poverty, it is significant to investigate the correlation between the former and the latter situation in a population. However, only a few studies have cross-related energy poverty to poverty indices, such as the At Risk Of Poverty or social Exclusion (AROPE) index (38). In one of these studies, Menyhért (39)-(40) concludes that the relationship between energy poverty and headline poverty or social exclusion varies significantly depending on the measures used: subjective energy poverty shows substantial overlap with AROPE households, whereas objective energy poverty primarily affects non-AROPE households. However, it has to be noted that two of the components of the severe material and social deprivation indicator of the AROPE are also subjective energy poverty indicators, as highlighted by Maier and Droni (41), i.e. the Arrears on utility bills and the Inability to keep home adequately warm, which might partially justify Menyhért results. Other studies have also introduced the first component of the AROPE (i.e. the ‘At risk of poverty’ rate) in composite EP indices (42) or as an income threshold (43). Finally, the EPAH included the AROPE among the energy poverty indicators dashboard (44), thus confirming the importance of this connection.

### 1.3.2 Drivers and effects of energy poverty

Although energy poverty is a multidimensional problem that depends on many conditioning factors, the main identified critical drivers are the triad: low income, high energy prices, and poor housing conditions. The interplay between these factors creates a complex web that traps

households in a cycle of poverty and deprivation. Studies by Hills (2012) (43) and Thomson et al. (2017) (45) highlight the significant role of income and housing quality in exacerbating energy poverty. More recently, scholars have been studying the correlation of energy poverty with other socio-demographic issues, such as employment precarity (46), (47) and tenure status (48), (49). The recent inflation and energy crises have intensified these issues mainly due to the extreme energy prices, pushing more households into energy poverty (15).

On the other hand, several consequences of energy poverty have been identified and studied in the literature. The main economic ones are the energy-related financial hardship or indebtedness (50) and the reduction of other fundamental expenses (e.g. food, with the ‘heat or eat dilemma’ (51)). Besides, in some cases, energy poverty can cause work and school absenteeism, poor performance (52) or job insecurity related to extreme temperatures (53). Moreover, energy poverty might affect the level of participation in social life (54) and can produce or exacerbate family conflicts (55).

Additionally, some topics have been identified as both drivers and effects of energy poverty. The education level of household members is one of these dichotomy aspects, and some studies have demonstrated that multidimensional energy poverty is negatively associated with the education status of households (56), (47). Curiously, the same studies have pointed out another driver/effect of energy poverty, i.e. precarious health. The health impacts of energy poverty are well-documented, ranging from respiratory and cardiovascular conditions due to inadequate heating and cooling to mental health issues stemming from stress and social isolation (57). A study by the Marmot Review Team (2011) (58) found that cold homes significantly contribute to excess winter deaths in the UK. Similarly, inadequate cooling during hot weather has been linked to heat stress and health complications (59). More structured research on the connection between energy poverty and health has been carried out in recent years, e.g. associating energy deprivation with health, health care utilisation and medication use (60). Along the same line, the extreme health consequence of seasonal extreme temperatures, i.e. seasonal mortality, has also been investigated, related to both cold in winter (61), (62) and heat in summer (63), (64).

Finally, a house aspect correlated to energy poverty, mainly in mass media pieces of news, is the fire risk. Even if the literature on the topic is scarce, the Forum for European Electrical Domestic Safety (FEEDS) encouraged ‘a more consistent approach to integrate fire safety considerations into initiatives addressing energy poverty and energy efficiency, or more generally to address inadequate housing from all angles, including energy and safety’ (65).

## 1.4 Bridging the data and understanding gaps

Despite the efforts carried out by EPOV, EPAH and scholars to understand and measure energy poverty, the data gap still affects the formulation of effective energy poverty strategies in most of the EU countries (11). This is particularly important during emergency scenarios such as the 2021-2022 global energy crisis (66), where the need to act in a very short period should be supported by primary data analysing the issues and the reaction of vulnerable populations during these events. This resource, together with more profound qualitative research on the experiences and opinions of these people, might help enhance the understanding of the complex correlation between energy poverty and its drivers/effects. Conversely, some research has criticised existing energy poverty measures, suggesting that purely quantitative approaches may overlook critical qualitative factors influencing households' experiences (67).

Several research works applied qualitative methodologies to characterise energy poverty (68). Still, very few have applied mixed qualitative and quantitative research approaches to energy poverty analysis. Almost none of these analysed the impact of the 2022 energy and inflationary crises on vulnerable households' daily lives. Indeed, the recent critical literature review by

Hihetah et al. (69) concludes that ‘there is a need for more context-specific, mixed-methods and longitudinal studies’ in the energy vulnerability area. Clavijo-Núñez et al. (70) added that these studies should be decentralised and transdisciplinary. In this regard, O’Sullivan and Howden-Chapman (71) used community-based mixed methods research to explore the outcomes of interventions and people’s behaviour in indoor environments. They also suggested future directions for mixed methods policy-focused energy poverty research. More recently, Flipo et al. (72) employed a mixed-methods design with data from demographically representative surveys in 4 EU MSs (Denmark, Germany, Italy and Latvia), as well as in-depth interviews with participants from intentional communities. On the other hand, Valdorff Madsen et al. (73) used data from a survey questionnaire (quantitative) and household interviews (qualitative) conducted during Winter 2022/2023 to elucidate the complex links of energy vulnerability in Denmark. Carrere et al. (74) conducted a quasi-experimental study to evaluate the effectiveness of an energy counselling home visit intervention targeting the vulnerable population in Barcelona in alleviating energy poverty and improving health. The study consists of a quantitative assessment of indoor temperature maintenance and primary care visits and a qualitative analysis using participants’ self-reported health and anxiety/depression levels. Sawyer et al. (75) used a mixed-method approach to investigate the impact of a local programme that funded the installation of heating/insulation measures in areas of high energy poverty incidence on the health and well-being of programme beneficiaries. Outside Europe, Hernández and Molina (76) use semi-structured surveys alongside quantitative measures to assess energy poverty and carbon emissions in a Chilean social housing complex. Yao et al. (77) examine the impact of the coal-to-gas policy on rural energy poverty using a mixed-methods approach, analysing economic and welfare dimensions using data from five villages in northern China, revealing different impacts across social groups.

Within this literature area, this paper adds novel insights into the 2022 situation of energy-vulnerable households in Spain. This group has been analysed by investigating a sample of the vulnerable population assisted by the Spanish Red Cross (CRE<sup>2</sup>, Spanish acronym), which can represent vulnerable households nationally, given the high coverage of CRE programs across deprived collectives (78). In particular, this work addresses how the 2022 energy and inflationary crises impacted vulnerable households’ situation of monetary, material and personal deprivation, social exclusion and energy poverty. This provides valuable insights for policymakers and offers an example for replication in other countries. Indeed, the paper’s approach goes beyond official national statistics (e.g. the SILC and HBS) by providing primary data on energy vulnerability and how it impacts vulnerable households’ lives.

To do that, this study presents mixed-method research analysing the energy poverty impacts on their socio-economic vulnerability in the above-mentioned context: quantitative analysis (primary data survey) and qualitative analysis (focus groups). Thus, this paper offers a comprehensive understanding of energy and socio-economic vulnerabilities by integrating quantitative data with qualitative insights. Since energy and other goods prices soared and income levels stagnated in 2022, vulnerable populations were disproportionately affected. Thus, it is imperative to understand the underlying factors and implications of energy poverty in their daily life (social interactions, health, etc.) to inform effective policy measures.

The first objective of this research is to obtain and leverage a new set of verified data that will enable evidence-based decision-making and enhance Spanish Red Cross intervention, particularly

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<sup>2</sup> *Cruz Roja Española* (CRE) is a Non-Governmental Organization (NGO) strongly rooted in Spanish society, which aims to provide comprehensive responses to vulnerable people from a perspective of human and community development by strengthening their individual capacities. Therefore, they work with people in situations of extreme vulnerability and focus on three areas: economic vulnerability, residential exclusion of the homeless and the population living in disadvantaged areas.

in emergency contexts, such as the energy and inflationary crises. This ultimately aims to detect emerging needs and develop innovative and comprehensive initiatives against energy poverty.

The second objective is to contribute to a better understanding of the impact of energy poverty on the socio-economic vulnerability of the disadvantaged population in Spain to provide the different actors involved in responding to their needs with information on their current situation.

The rest of the article is organised as follows: Section 2 shows the methodology of the mixed-methods approach applied in this study. Section 3 describes and discusses the primary outcomes. Section 4 points out the conclusions and policy implications that derive from analysing the paper's results from both short-term and long-term perspectives.

## 2. Methodology

This research employs a mixed-methods approach, combining quantitative and qualitative data to understand energy poverty among the CRE-assisted vulnerable population in a comprehensive way. With this mixed perspective, we achieve greater consistency in triangulation, complementarity, and enhanced clarity in the results (79), (80).

We are employing a cross-sectional design (81) for the collection of both quantitative and qualitative data to obtain a concrete view, at a specific point in time (2022), of the impact of the inflationary and energy crises on the population assisted by the Spanish Red Cross, who can be considered as a sample of the vulnerable population in Spain. Figure 1 shows the overall methodology flow and contribution of this work. The latter, which includes applying a Mixed-methods approach, Cross-sectional and Joint design, is shown in the upper part of the chart. The rest of the chart is dedicated to the methodological process, which spans from the Quantitative data collection to extrapolating the Policy recommendations.

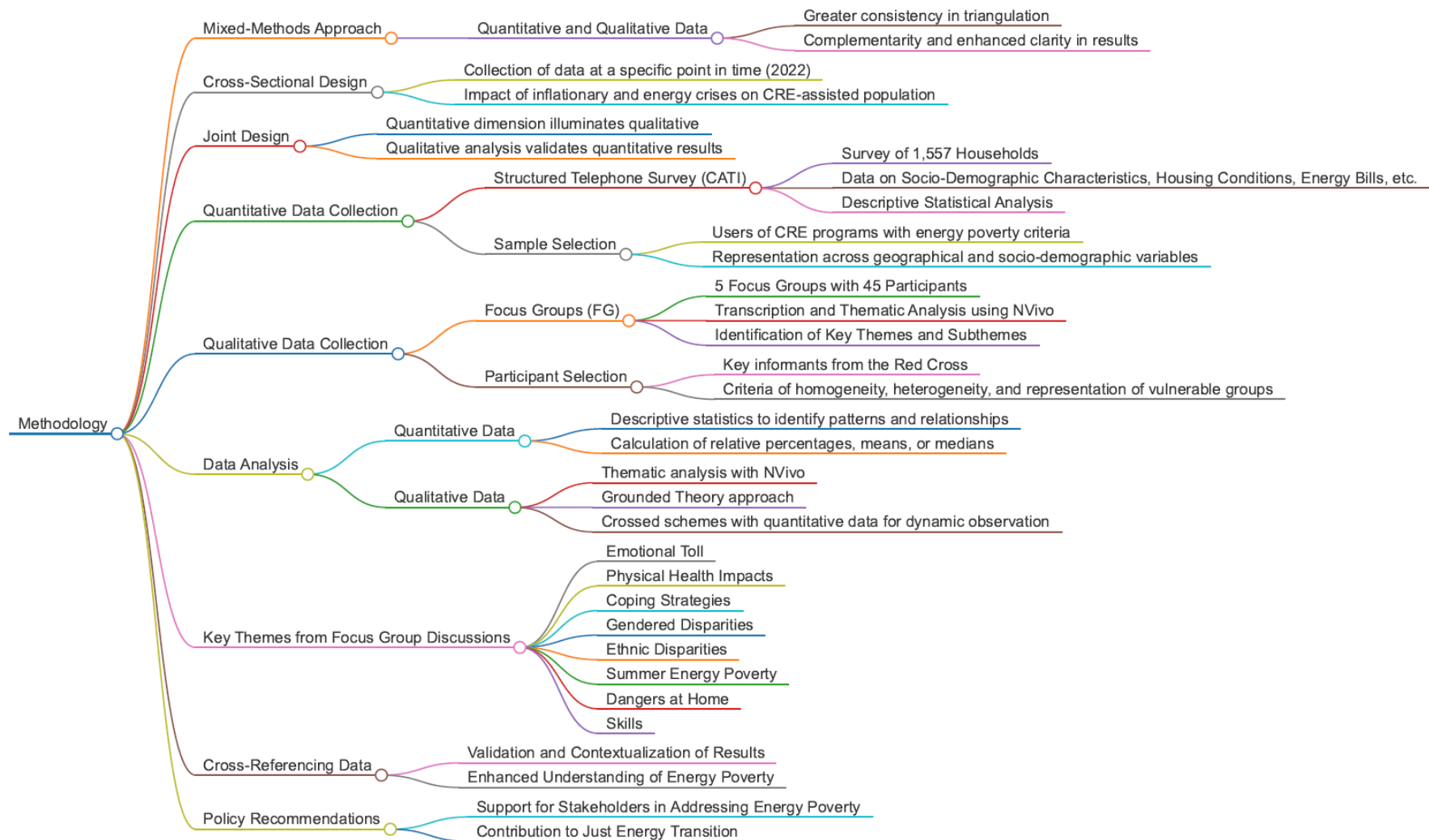


Figure 1. Flow chart of the contribution and methodology of this paper

## 2.1 Quantitative data collection

Quantitative data were collected through a Computer-Assisted telephone interviewing survey (CATI) carried out by a specialised company to a sample of over 1,500 households assisted by the CRE in the NGO's programs. The following sections present the methodology used for the two main steps of this data collection, namely the sample and the survey design.

### 2.1.1 Sample design

The sample of households was drawn from users of CRE programs with energy poverty criteria, ensuring representation of the Spanish vulnerable population across significant geographical and socio-demographic variables. The pre-screening criteria for the household panel considered crucial characteristics that determine energy poverty in Spain (82), (83). In practice, the statistical sampling used defines the number of households to be included in the panel (hereafter, 'records') according to the EP extent (i.e. how many families are affected (3)) in their geographical or demographical group. Specifically, the sample of 1,557 households was selected from the CRE database (approximately one million records) according to the general population results of the inadequate temperature indicator in winter 2021. In particular, this Stratified Random Sampling was based on two types of criteria:

1. Geographical criteria and extent of Energy Poverty: a certain number of records have been chosen in each region according to the proportion of households in EP in the territory in question concerning the total number of households in EP at the national level. Table A 1 shows the number of EP households in the general population and their distribution in each region.
2. Socio-demographic criteria and extent of Energy Poverty.
  - 2.1. Gender perspective: The records of the sub-sample in question have been distributed depending on the proportion of households in EP (at the national level) according to the sex of the primary breadwinner.
  - 2.2. Age perspective: The records of the sub-sample in question have been distributed according to the proportion of EP households (at the national level) according to the age of the primary breadwinner.

Table A 2 and Table A 3 show the national number of EP households and their distribution according to the sex or age of the primary breadwinner, respectively.

Starting from that distribution, Table 1 shows the number of records (households) included in each region-sex-age cluster of the study's sample.

Table 1. Number of records included in each region-sex-age cluster of the study household panel

REGION	AGE / SEX						TOTAL
	18-29		30-64		65-99		
	Man	Woman	Man	Woman	Man	Woman	
ANDALUCIA	4	4	112	114	49	50	333
ARAGON	1	1	8	8	4	4	26
CANARIAS	1	1	27	28	12	12	81
CANTABRIA	1	1	6	6	3	3	20
CASTILLA LA MANCHA	1	1	25	25	11	11	74
CASTILLA-LEÓN	1	1	19	19	9	9	58
CATALUÑA	3	3	90	92	40	41	269
CEUTA	1	1	2	2	1	1	8
COM. FORAL NAVARRA	1	1	4	4	2	2	14
COM. MADRID	2	2	54	56	24	25	163
COMUNIDAD	2	3	61	62	27	27	182
EXTREMADURA	1	1	15	15	7	7	46
GALICIA	1	1	27	28	12	12	81
ISLAS BALEARES	1	1	13	13	6	6	40
LA RIOJA	1	1	3	3	1	1	10
MELILLA	1	1	1	1	1	1	6
P. ASTURIAS	1	1	12	12	5	5	36
PAIS VASCO	1	1	15	16	7	7	47
REG.MURCIA	1	1	21	21	9	10	63
TOTALS	26	27	515	525	230	234	1557

### 2.1.2 Survey design

The survey, designed by the authors of this paper, focused on the 2022 panellists' situation and explored various household characteristics, beginning with socio-demographic data such as household size, age range, sex, and nationality of the members. It also investigated efficiency and housing conditions, including the age or energy certification of the dwelling and the types of equipment or appliances present.

Furthermore, the survey assessed 2022 household energy bills, focusing on the respondents' level of knowledge and average characteristics. The occupational and educational status of the main breadwinner, along with household income, were also examined. The risk of poverty and/or social exclusion (AROPE) was evaluated, also addressing the inability to afford to maintain the dwelling at an adequate temperature during the winter and/or the summer (Inadequate temperature) and delays in paying housing-related expenses (Arrears on utility bills).

Moreover, additional subjective indicators of energy poverty not covered by the AROPE index were included, such as interruptions of usual energy sources for economic reasons and increased difficulty in paying energy bills in 2022. The survey further investigated households' forced savings and adaptation strategies to combat energy poverty, specifically during colder months, and strategies to cope with the rising energy costs in other essential services.

The consequences of energy poverty were also assessed, covering issues like indebtedness, reduction of essential expenses (e.g., food), absenteeism or poor performance in work and school, and impacts on physical and psychological health, comfort levels, social participation, and family conflict.

Lastly, the survey examined access to social protection systems and measures taken to mitigate the socio-economic impacts of the pandemic and inflation, particularly for vulnerable consumers, as well as perceptions of energy poverty-related benefits within vulnerability programs.

Table 2 shows the survey thematic groups and corresponding question subgroups. The complete CATI survey questionnaire is shown in the Annex.

*Table 2. Thematic groups and corresponding question subgroups of the CATI survey questionnaire*

<b>Thematic group</b>	<b>Question subgroups</b>
Socio-demographic data	<ul style="list-style-type: none"> <li>• Age, sex and nationality of the main breadwinner</li> <li>• Occupational and educational status of the main breadwinner</li> <li>• Household size and composition</li> </ul>
Socio-economic data	<ul style="list-style-type: none"> <li>• Risk of poverty and/or social exclusion (AROPE)</li> <li>• Additional subjective indicators of energy poverty</li> </ul>
Housing efficiency and conditions	<ul style="list-style-type: none"> <li>• Type, size and age of the dwelling/building</li> <li>• Housing regime</li> <li>• Energy retrofitting interventions</li> <li>• Equipment/appliances and energy supplies</li> </ul>
Household energy bills	<ul style="list-style-type: none"> <li>• Level of knowledge</li> <li>• Average characteristics (consumption/expenditure)</li> <li>• 2022 energy bill arrears</li> </ul>
Forced household savings or adaptation strategies	<ul style="list-style-type: none"> <li>• Forced savings or adaptation strategies for the cold months</li> <li>• Strategies to "adapt" to the lack of affordability of energy in other services</li> </ul>
Energy Poverty consequences	<ul style="list-style-type: none"> <li>• Indebtedness and/or reduction of other essential expenses (e.g. food)</li> <li>• Absenteeism or poor performance at work and school</li> <li>• Physical and/or psychological health, discomfort and/or lack of comfort</li> <li>• Levels of participation in social life</li> <li>• Conflict within the family and the home environment</li> <li>• Risk analysis (fires, poisoning, etc.)</li> </ul>
Social protection	<ul style="list-style-type: none"> <li>• Access to social protection schemes</li> <li>• Perception of these schemes</li> </ul>

## 2.2 Qualitative data collection

The method used for collecting qualitative data was through focus groups (FG) (84). These made it possible to understand lived experiences regarding energy poverty, household coping strategies, and the perceived effectiveness of existing support measures. Through group interactions, FGs allow for the revelation and validation of latent imaginaries on the impact of energy poverty, perceptions of social stigma, and the different gender roles in households affected by energy poverty,

FGs have proved to be a sensitive method of obtaining information about the experiences, feelings, and opinions of vulnerable people and those excluded from formal academic and policy debates (85), as is the case for those suffering from energy poverty. From this perspective, in addition to understanding the phenomenon, FGs stimulate the critical involvement of participants, experts, and individuals affected by energy poverty (86).

For the sample design, we used the theoretical method of convenience sampling. As is done in this method, the number of groups is not stipulated in advance but depends on the saturation of the group discourse. Saturation is defined, following Fusch & Ness (2015) (87), as the point at which the researcher understands that the theoretical categories are sufficiently "rich" and "dense" for the research object. The selection of the number of groups responds to structural rather than statistical criteria. Most scholars agree that three to five focus groups are usually sufficient to achieve "rich and dense" categories, as more focus groups rarely yield new insights (84). The analysis of the five FGs results did not require the development of additional groups because it was considered that narrative saturation had been reached, as indicated above. Regarding the number of participants in the FGs, we remained within the range considered optimal in the literature. No group had fewer than six participants or more than twelve (88).

Thus, five FGs were conducted (Table 3), in which 45 people participated: 16 men and 29 women. Participants were selected through "key informants" (84) from the Red Cross, who facilitated connections with experts, Red Cross Technical staff, and individuals affected by energy poverty who participated in the organisation's programs.

For selecting FGs participants, we considered criteria of homogeneity, heterogeneity, and significant representation of particularly vulnerable groups. The research design began with a pre-existing homogeneity, as all group participants were related to energy poverty in vulnerable contexts—whether as experts, staff, or individuals affected by energy poverty. Secondly, regarding the experts and staff, homogeneity was further ensured by requiring a minimum of one year of experience working in energy poverty programs. This criterion aimed to establish a shared perception and broad knowledge base, avoiding excessively disparate views, which can be problematic in FG studies. These focus groups were conducted online, allowing for greater accessibility while maintaining methodological rigour and consistency in the virtual format (89).

The homogeneity criteria for individuals affected by energy poverty were defined by their participation in Red Cross programs. In contrast, the heterogeneity criteria were based on gender, age, and region of residence (Autonomous Communities of the Canary Islands, Extremadura, and Andalusia). The regions were chosen considering specific climatic criteria: the Canary Islands and Extremadura have opposing heating and cooling needs due to their winter and summer climate severity, and Andalusia led many statistics on energy poverty indicators in 2021, being the worse performing in two out of three regional energy poverty indicators shown in the study of Barrella & Romero (82), i.e. Hidden Energy Poverty (HEP) and Minimum Income Standard (MIS). On the other hand, Extremadura and the Canary Islands led the regional ranking of the third indicator: Inadequate temperature in winter. The vulnerable groups represented included dependent individuals, single-parent families, older adults and immigrant families. Finally, a gender perspective was applied, encouraging greater participation of women. The last two criteria reflect the research's focus, which does not aim to study energy poverty in general but rather in the most vulnerable groups. These FGs were conducted in person.

Table 3. Qualitative study sample

Focus Groups	Modality	Number of persons	Gender of Participants
Experts	Online	7	4 women 3 men
Red Cross Technical staff	Online	11	7 women 4 men
Families/Users (Canary Islands-Tenerife)	In-person	6	4 women 2 men
Families/Users (Extremadura-Cáceres)	In-person	11	7 women 4 men
Families/Users (Andalucía-Cádiz)	In-person	10	7 women 3 men

The contributions made by the participants in the focus groups were transcribed verbatim, and the resulting text was subjected to qualitative analysis software (NVivo), which identified the main themes and subthemes based on content and thematic saturation criteria (Table 4).

Table 4. Key themes from the focus group discussions

Theme	Description
Emotional Toll	Feelings of shame, failure, and stress related to energy poverty
Physical Health Impacts	Respiratory and cardiovascular issues due to inadequate heating/cooling
Coping Strategies	Reducing energy consumption, seeking financial assistance, prioritising energy use
Gendered Disparities	Women disproportionately affected by energy poverty
Ethnic Disparities	Ethnic minorities facing unique challenges
Summer Energy Poverty	Inadequate cooling during hot weather leading to heat stress
Dangers at Home	Poisoning, fires due to unsafe energy practices
Skills	Empowerment, Situational awareness, Resilience

## 2.3 Data analysis

Quantitative data were analysed using descriptive statistics to identify patterns and relationships among variables. In particular, the method for statistically exploring most household panel characteristics (collected through the survey) has been to calculate the relative percentages of each response to the corresponding query in the questionnaire. On the other hand, the mean or median of that characteristic has been calculated for questions whose answers are numerical values.

Regarding the at-risk-of-poverty and/or social exclusion rate (AROPE), it has been calculated using the new definition introduced in 2021 (38), which identifies in AROPE that population that is in at least one of these three situations:

- At risk of poverty or relative poverty.
- Severe material and social deprivation (social deprivation was added in 2021).
- Low employment intensity (new definition in 2021).

Therefore, the paper's 2022 AROPE and energy poverty indicators results are compared to the ones of a 2017 study on the Spanish Red Cross vulnerable population and to the results for the

general population (both from the same year and 2017). This analysis was carried out to highlight the impact of the 2022 energy crisis on relative poverty, social exclusion and energy vulnerability in the vulnerable population and compare it with the one in the general population.

Qualitative data were transcribed and analysed thematically (Table 4), with key themes identified and explored in depth (90). From the Grounded Theory approach (86), we sought significant concentrations through generalisations and iterative discourses. To find and construct these significant concentrations, we followed two interrelated paths: interviews were analysed by developing categories that emerged from the discourses using specialised software (NVIVO 11PRO), and, secondly, we deepened these categories by presenting them through “crossed schemes” with the quantitative data, allowing for a more dynamic observation (e.g. Figure 8). The “crossed schemes” in this context have three objectives. The first is to serve as a triangulation mechanism to provide greater consistency to the research. The second aims to give more expressiveness to the quantitative data through the narratives of people experiencing energy poverty. The third objective is to visually present the situation in a more global and expressive way. For these three objectives, the “crossed schemes” are presented without sociodemographic segmentation to present the most significant global generalisations.

In this qualitative part of the study, we investigated primarily ‘hidden energy poverty’, assessing how the lack of knowledge and information on energy use in the home or family can affect the following matters: (1) intensity of energy poverty, (2) access to national public energy consumption subsidies such as the social electricity tariff and thermal social allowance, (3) the access to the other resources and protection systems to meet the costs of supplies and housing (from NGOs or local administrations), but above all (4) the causes and consequences of all this in the different spheres of their lives – e.g. physical, psychological and emotional health of children, people with functional diversity or dependents and older people.

## 2.4 Integration of the two analyses: the mixed method approach

From the beginning of the research, a joint design was made between the quantitative and qualitative approaches so that the quantitative dimension would illuminate the qualitative and vice versa. The quantitative analysis helped to elaborate the study design, and the qualitative analysis was used to validate and complement the quantitative results. It is standard practice in sociology to use both analysis methods to achieve a more global perspective. The quantitative perspective offered a standardised view that allowed us to delimit the scope, compare it with other research (e.g., Section 3.1.2), and follow up over time with statistical consistency. From another perspective, the qualitative analysis helped us to contextualise energy poverty in a more global context (political, cultural, social intervention, etc.) and, from its symbolic charge, has given greater expressive force to the reality experienced by people suffering from energy poverty (e.g. see Section 3.2). For instance, Figure 8 shows how energy poverty impacts individuals and families with great expressive intensity. Furthermore, and this has been of particular importance, qualitative research has revealed situations that do not appear clearly in quantitative analysis. For example, it has shown how energy poverty is gender-biased and clearly shows, especially in single-parent families (Section 3.3.2), life situations of extreme intensity that in the quantitative analysis are blurred. Additionally, as shown in Table 4, the qualitative perspective highlights the emotional aspect of the impact of energy poverty (feelings of shame, failure, and stress related to energy poverty) and the resilience dimension of households. Particularly revealing has been how the qualitative perspective has better explained the adaptive preferences of women-led and migrant families investigated in the subjective energy poverty indicators of the quantitative analysis (Section 3.3.2). Moreover, the qualitative criteria made it impossible to detect certain cases, such as intra-household inequalities or the feminisation of energy poverty when women are

not the main breadwinners, as in (91). Finally, the qualitative approach could also capture the social relationships and family and social support networks essential for understanding family strategies in response to energy poverty (92).

Both approaches were critical to the process, allowing us to collect holistic information. Sometimes, we used this combination of both for some questions that could not be answered using only one, especially when we needed a complete understanding of a complex topic, thus obtaining more detailed views from the information collected. In this paper, both analyses will appear combined, although there are fundamentally qualitative sections and others that are quantitative. The aim has been to maintain the interpenetration of both perspectives from their form of expression.

## 3. Results and discussion

### 3.1 Results from the quantitative and qualitative analyses

#### 3.1.1 The situation of energy poverty and vulnerability

The 85.6% of the people in the survey database are at risk of poverty and/or social exclusion (AROPE – Figure 2). The criteria that contribute most to this result are "at risk of poverty" (62.9%) and severe material and social deprivation (68.1%). On the other hand, low employment intensity affects 'only' 17% of the people in the sample.

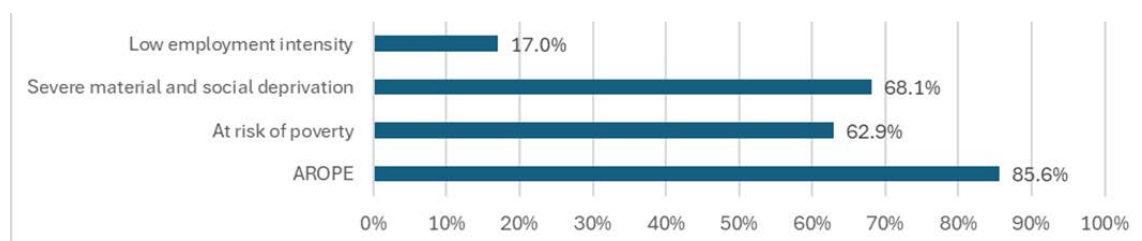


Figure 2. Proportion of the survey population according to the fulfilment of the conditions of the AROPE rate

Regarding the overlap of the AROPE conditions, Figure 3 shows that 12.8% of the population is at risk of poverty & low employment intensity, 12.2% in severe material and social deprivation & low employment intensity and 46.8% in risk of poverty & severe material and social deprivation. Finally, 9.4% of the study population meets all three conditions of the AROPE, thus being at the highest risk of poverty and severe social exclusion.

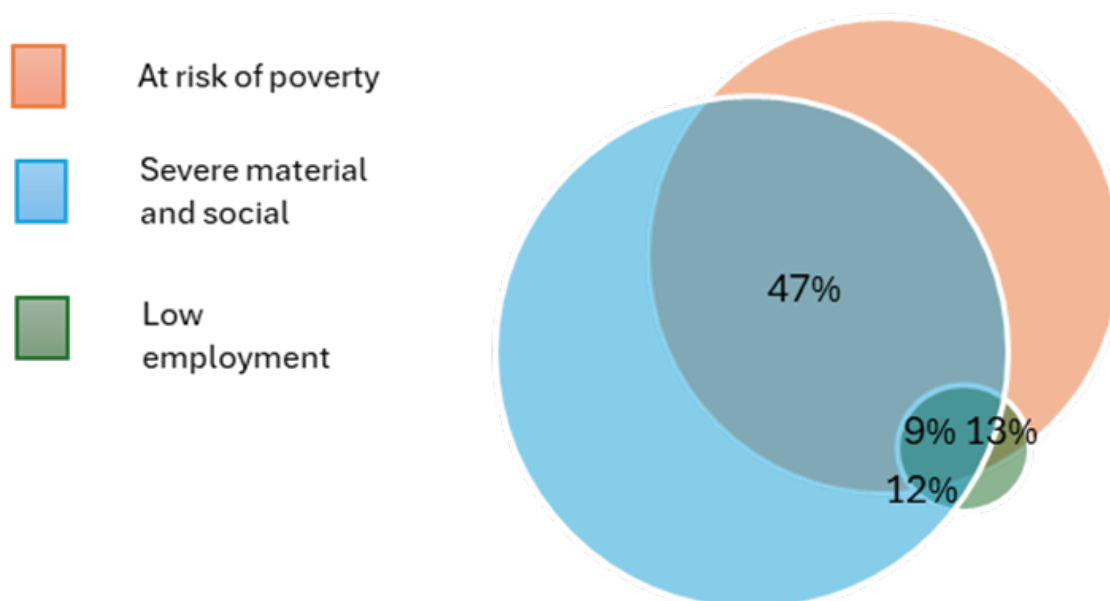
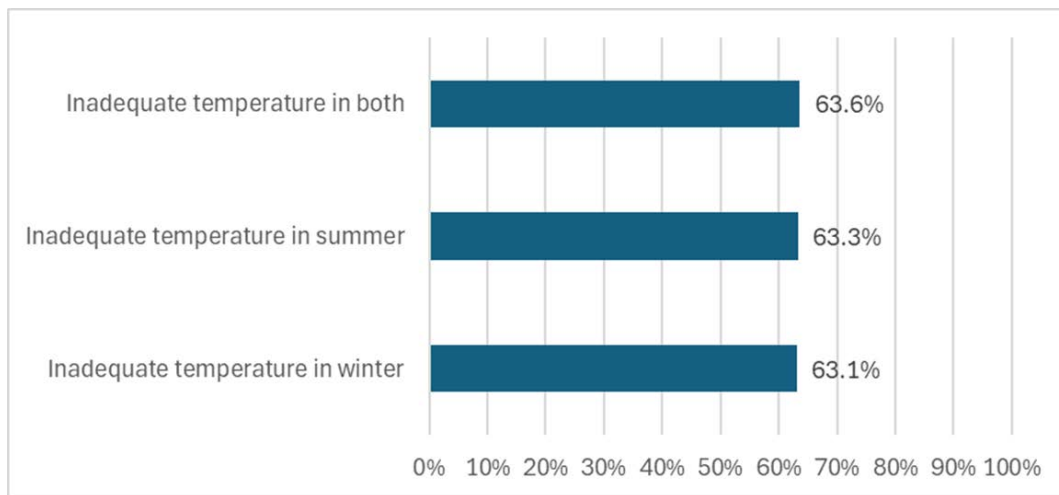


Figure 3. Proportion of the survey population with overlapping AROPE rate conditions

The sex of the ‘main breadwinner’ only determines around two percentage points difference, with women-led households being slightly more affected. On the other hand, households whose ‘main breadwinner’ is a foreign person have an AROPE rate more than 10% higher than when the primary breadwinner is of Spanish origin, 92.8% compared to 82.4%. Table A 4 summarises the results of the AROPE indicators.

Regarding the housing energy quality, 45.2% of surveyed households live in dwellings built before the entry into force of the first energy efficiency regulation in Spain (NBE-CT-79), while 47.4% reside in buildings constructed between 1981 and 2007. Thus, only 7.4% of households live in buildings built after 2007, when the Technical Building Code (CTE) came into force, this norm being the one that imposed the highest standards for energy efficiency. Moreover, 45.2% of the surveyed households use appliances such as stoves and heaters to heat their dwelling, and 33.1% have an individual system that supplies the entire dwelling (e.g. a boiler with wall radiators in all rooms). In comparison, only 4.7% have a centralised system that provides this service to the entire block of flats. Finally, 17% of the households in the study have no heating system. On the other hand, one-third of the surveyed households do not have any cooling system to alleviate the summer heat. All those with a system have fans, while only a quarter of the households in the study have air-conditioning equipment in their home.

Regarding indicators related to thermal comfort in the dwelling, Figure 4 shows that 63.6% of the households interviewed cannot afford to maintain an adequate temperature in both winter and summer. The two specific questions for the winter and summer seasons have very similar results to the previous one.



*Figure 4. Proportion of survey households that cannot afford to keep the dwelling at an adequate temperature in winter*

In terms of geographical breakdown, Figure 5 shows that Andalusia (80.2% and 81.1%) and the Community of Madrid (85.3% and 86.5%) are the regions with the highest proportion of surveyed households reporting not being able to afford to maintain an adequate temperature in winter or summer. On the other hand, just under a third (31.1%) and a quarter (23.9%) of households in Castile-La Mancha and Extremadura, respectively, reported being cold in their homes during the winter due to affordability issues. These percentages remain almost unchanged (32.4% and 23.9%) if the summer indicator is considered in these two regional clusters.

Finally, considering the inability to afford to maintain the temperature in the dwelling in both seasons, Andalusia (82%) and the Autonomous Community of Madrid (87.1%) continue to be the regions with the highest proportion of households in this situation. In contrast, Extremadura and Castile-La Mancha are the best positioned (the same proportion as the summer indicator).

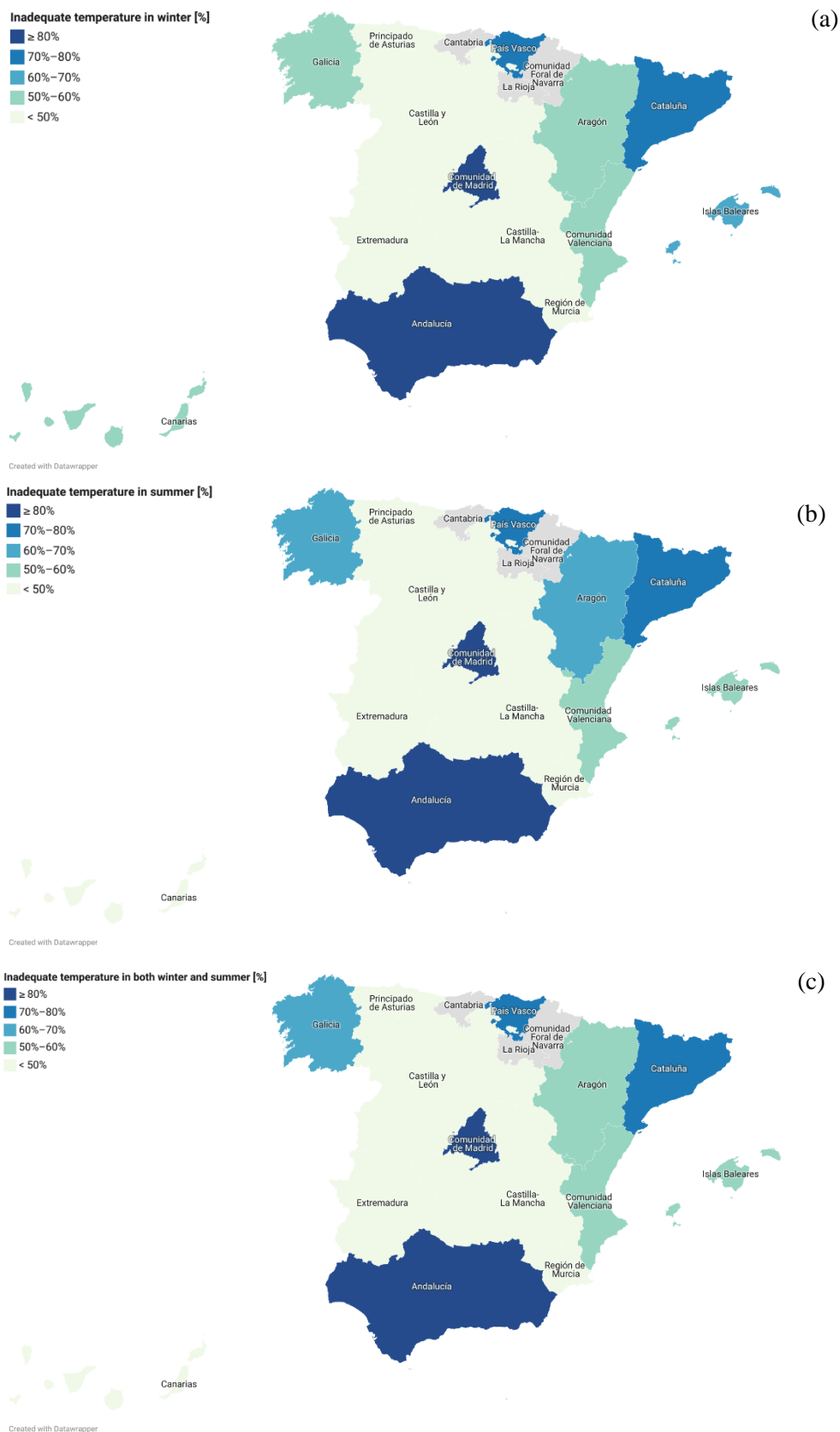


Figure 5. Proportion of indicators of inadequate temperature in winter (a), in summer (b) and in both seasons (c) among survey households by region of residence

Around 61-62% of female main breadwinner households report inadequate temperature in the dwelling in all three cases compared to 64-65% of male breadwinner households, thus showing a slightly better performance of women-led households. Households whose main breadwinner is a foreigner have a significantly lower proportion of inadequate temperature indicators (10 points) than when the primary breadwinner is of Spanish origin, 55-57% compared to 66-67%. In terms of age, households in which the primary breadwinner is over 65 years old are the most affected by cold and heat in their dwelling, around 69%, compared to 60-61% of households whose primary breadwinner is between 31 and 65 years old and 52-54% of those whose main breadwinner is under 30 years old. Table A 5 - Table A 9 summarise the results of the Inadequate temperature indicators.

Regarding problems with bills, 27.8% of the people surveyed have delayed paying bills in the last 12 months. In the peak year of the energy crisis (2022), 6.6% of households stopped using one of their usual energy sources for economic reasons and most of the surveyed population (almost 60% of all households) had greater difficulty paying energy bills than in previous years.

To corroborate the indicators that give form and content to the situation of energy poverty in which these families/users find themselves, the people participating in the qualitative study were asked about their ability to keep their homes at an adequate temperature, whether they had a disproportionate expenditure on energy, insufficient and/or late payment of their housing supply bills.

*"Electricity comes a bit less, now it is less because I changed company and it went down to a hundred and something euros, plus 300 euros for rent, even so, I have problems paying it, and I am always late in paying the bills. In summer, it is hot and humid, and in winter, it is cold and very humid"* (Marta<sup>3</sup>, FG Cádiz).

The situation of energy poverty suffered by the families is clear, as they show the typical problems that orbit around the energy poverty situations themselves, such as their economic and employment saturation and the problematic relationship with the energy companies and even the administrative and bureaucratic barriers that they encounter when they apply for social protection in this situation.

*"I, for example, I don't know if anyone passes it on, but I, for example, in my house when you have accumulated bills or you try to talk to them, to the companies. They don't get to say hey, you have the voucher, they don't inform you. Of course, if you see that you are in trouble, you are even telling them that I am waiting."* (Demetrio, GF Cáceres).

*"In living conditions, among the factors that have to do with the economic and employment situation, there is the issue of housing, all the welfare policies. Also because of the climate, it is no longer just about protection from the cold, but also from the heat. Moreover, it is also related to the characteristics of the dwellings themselves, which are generally the most precarious dwellings, in all aspects, the heating is less efficient, it consumes more, so the cost is higher, or the windows are less well insulated, so they also consume more"* (Esther Raya, FG experts).

### 3.1.2 Comparison with previous studies and national data

Comparing the results of 2017 and 2022 shown in Table 5, the 'Inadequate temperature in winter' indicator has an upward trend both in the population served by the Spanish Red Cross ('vulnerable

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<sup>3</sup> It has to be noted that the names of the persons participating in the focus groups are figurative, for reasons of confidentiality.

population’) and in the general population, going from 37% to 63% in the former and from 8% to 17% in the latter. Another aspect to highlight is that in both years there is a significantly higher incidence - about 4 times higher - of this indicator in the population served by the NGO than in the global Spanish population.

On the other hand, the ‘Arrears on utility bills’ indicator has improved significantly in vulnerable households in the CRE database, while it has risen by almost two points in the general population. This might be due to emergency measures that were adopted by the National Government in 2022 (93), which supported vulnerable consumers much more than the rest of the population. Moreover, these consumers usually benefit also from local public and private bill support programmes. However, this group was still more affected by late bill payments than the Spanish general population.

*Table 5. Comparison of the results of the energy poverty subjective indicators: Spanish Red Cross Vulnerable population in 2017 ((94)) and in 2022 (this paper), and general population values retrieved from the Spanish SILC 2017 and 2022*

Indicators	Vulnerable population (2017)	Vulnerable population (2022)	General population (2017)	General population (2022)
Arrears on utility bills	42.6%	27.8%	7.4%	9.2%
Inadequate temperature (winter)	37.0%	63.1%	8.0%	17.1%

Comparing the vulnerable population’s AROPE results in 2017 and 2022 with the national data from the 2017 and 2022 SILC (Table 6), slightly contrasting results are obtained. Between 2017 and 2022, the AROPE rate of the population served by the Spanish Red Cross grew slightly, while that of the general population decreased by 1.5 percentage points. Overall, the rate for the first-mentioned group is more than three times higher than the national rate. The same is true for one of the three AROPE conditions, namely ‘At risk of poverty’, which, on the other hand, has a downward trend in both surveys. However, this improvement is more significant in the Spanish Red Cross population, where this indicator goes from 79.9% to 62.9%. Moreover, the ‘Low employment intensity’ decreased between 2017 and 2022 in both samples, with the values of the vulnerable population remaining slightly more than double those of the general one. Finally, the condition of ‘Severe material (and social) deprivation’ is not directly comparable because of the methodological change introduced in 2021. The sharp increase in this indicator in 2022 for the Spanish Red Cross sample could be partially justified by including aspects of social deprivation typical of the vulnerable households that make up that sample.

*Table 6. Comparison of the results of the AROPE index: Spanish Red Cross Vulnerable population in 2017 ((66)) and in 2022 (this paper), and general population values retrieved from the Spanish SILC 2017 and 2022*

Indicators	Vulnerable population (2017)	Vulnerable population (2022)	General population (2017)	General population (2022)
AROPE	83.3%	85.6%	27.5%	26.0%
At risk of poverty	79.9%	62.9%	21.6%	20.4%
Severe material and social deprivation	47.8%	68.1%	8.3%	7.7%
Low employment intensity	29.5%	17.0%	12.8%	8.7%

### 3.1.3 Coping and saving strategies and their consequences on health

Among the 'forced' savings strategies (summarised in Figure 6), the first expenses to be cut in 2022 were clothing (73.5% of households cut back), energy bills (70%) and leisure (67.2%). Cuts in food (almost 63%) and mobility (59.3%) were also a (forced) option for most households in the panel. On the other hand, between 30% and 40% of households opted to reduce their spending on health (mental - 28% - and physical - 31%), sport (39%) and education (32%). Finally, among "Other expenses cut", a wide variety of responses were found, most related to the abovementioned aspects (e.g. light, leisure, cosmetics and food).









Forced savings strategies (cutbacks)	
 Clothing: 73.5%.	 Mobility: 59.3%
 Energy bills: 70% use household appliances only when it is extremely necessary.	 Health: 40%
 Leisure: 67.2%.	 Sport: 39%.
 Food: 63%.	 Education: 32%.

Figure 6. 'Forced' savings strategies implemented by the surveyed households

Regarding strategies to cope with the lack of energy affordability, both those related to winter (heating) - Figure 7 - and summer (cooling) were analysed. Other coping strategies generally employed throughout the year were also analysed (lighting, cooking, hot water, etc.), but they were not as significant as the ones related to thermal comfort.

Regarding the management of heating in the household, only 9% of the respondents used heating without restrictions during the winter before the survey (2022-2023). Most households have implemented some strategy to avoid or reduce heating consumption, including heating only one or two rooms (52.3%), lowering the thermostat temperature to an uncomfortable level (56.5%) or turning the heating off often (53.8%).









Coping strategies	
 Heating only one or two rooms: 52.3%.	 Keeping warmer with indoor clothing: almost 80%.
 Lowering the thermostat temperature to an uncomfortable level: 56.5%.	 Use of hot water bottles: 37.9%.
 Turning off the heating often: 53.8%.	 Took refuge in the sunny rooms of the house: 36.3%.
 Ingestion of hot drinks: 68,1%	 Spent more time in bed or shared a bed to alleviate the cold: 23.3%.

Figure 7. Coping strategies implemented by the surveyed households

Among the other strategies surveyed households used to alleviate the cold in their dwelling in winter 2022-2023, the most frequently mentioned were those related to drinking hot drinks (68.1%) and the habit of keeping warm with clothes inside the dwelling (almost 80%). In fact, in the open response option, mentioning warmer clothes or blankets was very common. On the other hand, more than a third of the population used hot water bottles and/or took shelter in the sunny rooms of the dwelling. The alternatives are more residual, although it is worth noting that a quarter of the respondents spent more time in bed or shared a bed to alleviate the cold.

To include this perspective in the qualitative analysis, focus group participants were asked how they spend the warmer and colder months, what they do to spend them in acceptable conditions and whether they use thermal clothing or blankets and appliances to alleviate the heat and cold at home. In addition, they were asked if they had implemented any other measures to reduce their energy consumption (e.g. in the use of household appliances, hot water or cooking), if they had suffered from fires, poisoning or power cuts.

Related to the effects of climate change, the longer summer seasons with predominantly hot months with high temperatures and heat waves, and cold months with low temperatures and storms exacerbate the situation of energy poverty for families for whom maintaining the right temperature in the home and managing or controlling energy costs becomes a challenge and a challenge for them.

*"In the summer I use a fan and in the winter I take a blanket or something to keep us warm, because the house where I live now, which I recently moved into, is also very humid. The area where we live near the beach makes the houses very damp and they deteriorate very easily, there are even problems with damp. Cold, heat, here there is 100% humidity". (Marta, GF Cádiz).*

*"I find it hard to spend the hot summers without air just with a fan and the winters without heating just with blankets and an electric heater. In summer we open all the windows and the heat comes in. I have to cut back on other things to be able to survive in summer and winter, it's hard because there are things I can't afford". (Mariana, GF Cádiz).*

These families generally spend the colder and warmer months making the most of their resources. In winter, they keep clothes indoors, use blankets in the living room and electric heaters for the

common areas or during the shower. In summer, they ventilate, put mattresses in cooler rooms of the house or use electric fans. The problem is that the small electrical appliances used have a high energy consumption. At the same time, modern heating/cooling systems (such as pellet stoves or heat pumps) allow for energy savings in the long term but have a high investment cost. Households cannot afford to purchase and install more sustainable heating or cooling systems. In addition, their installation would require permission from landlords, which, in many cases, they would not have. It should be noted that the higher energy consumption of the participating households due to the electrical appliances used is also caused by poor insulation of the dwellings, which maintains and reproduces energy poverty.

In terms of the evidence collected in the quantitative analysis, slightly less than a quarter of the panellists have stated that the “coping” strategies to the lack of affordability (Section 3.1.4) have impacted the health of their household members. In particular, almost half of these (10.9% of all respondents) have had their mental health or that of a cohabitant significantly affected by the above strategies. The rest of the panellists who report some negative effect on health have seen the physical integrity of a member of the household diminished (4.7%) or have faced both physical and mental health problems (7.6%). In addition, about 30% of these households have cut spending on physical and/or mental health.

### 3.2 Additional qualitative insights

In recent years, it has become increasingly evident that quantitative approaches are insufficient to address the complexity of energy poverty (68). As we have cited, there is a greater understanding of the gender perspective and social relations. Furthermore, as we expressed in Table 3, qualitative contributions have been highly significant in understanding phenomena such as difficulties in accessing leisure, poor relationships at home due to energy poverty, the meaning attributed to coping strategies, or the resilience and empowerment capacities of vulnerable families.

The importance of summer poverty has also been very clearly demonstrated, showing a significant impact on families. The emotional dimension of shame and its effects on physical and mental health has been strongly present in the discussions within the focus groups. In general, the participants highlight physical health problems of a respiratory and skeletal nature related to living in environments with humidity, foul odours or mould. Stress and anxiety derived from worries about being unable to meet household expenses also stand out. A significant proportion of the focus group participants have incurred debts to pay basic household expenses, including energy and air conditioning. This increases their psychological distress as well as their fragility. Some people take on any kind of work to pay off debts. Particularly relevant is understanding the subjective perception of energy poverty among migrants and women. The impact of energy poverty is perceived by these groups to be less severe than by others. The phenomenon of adaptive preferences (adapting to the environment due to the inability to achieve reasonable goals, generating non-rational preferences to break cognitive dissonance) operates powerfully within these groups. On the other hand, in most cases, focus group participants (primarily women) mentioned having to reduce other basic household expenses such as food, clothing or education to meet energy payments. It is feared that non-payment of bills will lead to energy cuts and indebtedness. Monthly accounts are made as to which expenses to meet and which not to meet, prioritising some and postponing others. This imprints anxiety and stress on families.

*“We know that, in summer, when the children are at home, consumption is higher and then comes the expense of the student's tuition and then comes the place where they have to buy books, etc. Exactly, we do magic, to fill the fridge and pay the expenses and we are left with nothing at the end of the month. Trying many times to distribute the little money there is at home to cover all expenses, electricity is a right should not be deprived and should be covered in the end affects coexistence.” (Antonia, GF Tenerife).*

*“The salary is €645, which is wonderful, but to pay for food you have to cut back on other expenses or other necessities. But I can't do that. I can't afford it. And my friend can't either, without help, so sometimes we're on pasta and tomato. It worries me and keeps me awake at night. The main thing is to pay the bills, electricity and water, washing, cooking.” (Mar, GF Tenerife).*

*“Another thing, I tried, but I have no help, for example, for the children and for me, to learn more, because I would like to do the courses, but I have neither computer nor internet, and my daughter could not participate in school during the pandemic because she did not have internet. So I think that this is something that they should have, like the Wifi for my daughter, but we cannot have it because we prioritise other things like eating, it is a luxury, I wonder (Miriam, GF Cadiz).*

Referred to the above-mentioned situations, Karine from the Red Cross staff (participating in the FGs) commented that: 'In the end, it's like a chain reaction, you can't separate physical health from emotional health because, many times, the comfort of the home, as you measure it by energy savings or because emotionally the person feels cared for that it's very important also that someone pays attention to them.' To combat these issues, Mónica from the expert FGs suggested creating 'a space for mutual support, but more focused on resolving the material reality and its many effects on situations of depression, anxiety, many episodes of telephone harassment, which generate absolute destruction in families and individuals'.

The social and personal impacts of the copying and forced-saving strategies and energy poverty in general, from a quantitative and qualitative perspective, are summarised in Figure 8 from six different dimensions: the impact on mental and physical health, the risk of poisoning, fires or power cuts, indebtedness and delays in bill payments (arrears on bills), the reduction of social, leisure and entertainment life, the increase in family conflict and the impact on school and work life.

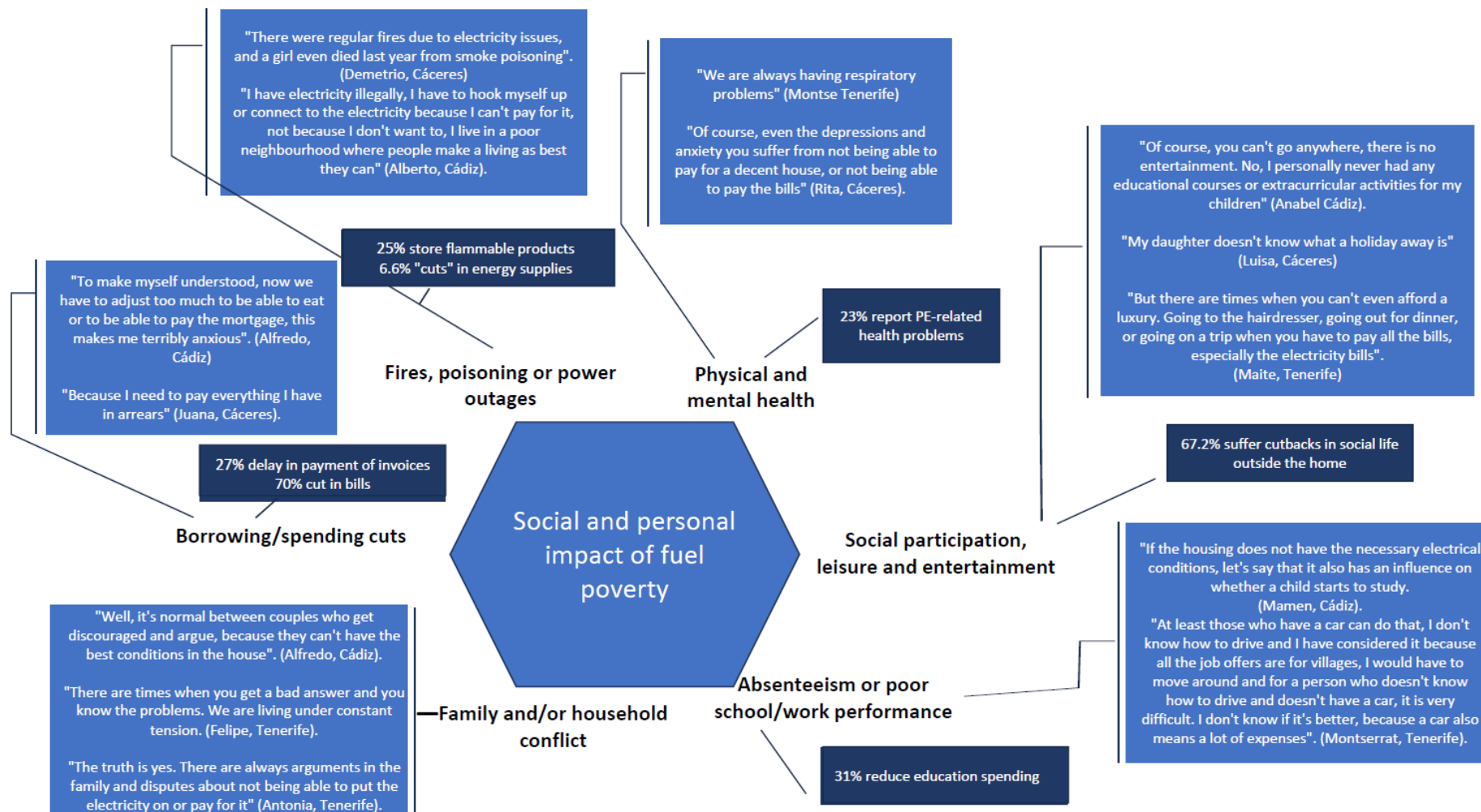


Figure 8. Summary diagram of the personal and social impacts of energy poverty on the vulnerable population. Own elaboration based on the results of the study - EP: Energy poverty

## 3.3 Discussion

### 3.3.1 The multi-dimensional nature and impact of energy poverty

The research underscores the multi-dimensional nature of energy poverty, highlighting its interconnections with income, housing, health, and social inclusion. The findings align with existing literature, emphasising the complex interplay of factors contributing to energy poverty (25). For instance, the generalised lack of comfort emerging from the study can primarily be related to the poor condition and low energy efficiency of most of their dwellings. The qualitative analysis shows that the electricity expenditure of these families is disproportionate and far beyond their actual economic and financial possibilities. Delays in the payment of electricity bills are common when expenditure is disproportionate, worsening the situation of energy poverty due to non-payment. On the other hand, the quantitative results and the reflections of the Red Cross's technical staff paint a picture of energy precariousness that falls mainly within the framework of what has been highlighted at the national level as the most pressing aspect of this social scourge: hidden energy poverty (36), (82). Indeed, both the quantitative and qualitative research findings point out that the studied households tend to consume less energy than necessary and apply copying and forced-saving strategies due to their economic inability to meet this expenditure.

One of the issues that stands out most in this research is the impact that the experience of energy poverty has on people's lives, with consequences that include physical and emotional health, physical risk (fire or poisoning), repercussions on social relations, on the employment search, on children's schooling, and even on family conflicts, dimensions that are not usually considered when analysing the EP phenomenon. The feeling of shame and personal failure of many of the people interviewed, as well as the consequences that energy poverty has in all areas of their existence, highlight the need to continue working to improve living conditions, accompanying them in the knowledge of and access to resources and protection systems, from the perspective of the right to decent housing. Besides, among the factors that directly influence the profiles of the people affected, both experts and CRE technical staff highlighted those determined, for example, by the employment situation, housing conditions in the cold and heat, access to social protection related to these situations, the digital divide in terms of access to information experienced by many of these families, and even the emotional factors that arise from suffering from this situation. It should be noted that experts and CRE technical staff highlighted a transversal factor, which revolves around the information barrier these families encounter, the lack of understanding and knowledge of energy resources and services as a basic and fundamental right of citizens today.

### 3.3.2 Gender and ethnic dimensions

Cross-referencing the data provided in the two analyses (quantitative-qualitative) has shown how energy poverty has a gender and ethnic bias. In this sense, the qualitative analysis clearly shows these groups' extremely fragile life situations - especially in single-parent families, which are not fully unveiled in the quantitative research. However, the paper's findings on the subjective indicators of energy poverty (which placed the immigrant population and women in a better position than Spanish people and men) seem counterintuitive, given that the former collectives suffer a higher proportion of poverty and social exclusion (AROPE). Also, in some studies mentioned in Section 1.2, women and migrants are more affected by energy poverty. It should be borne in mind that, in this study, we are analysing subjective perception, i.e. personal experience of temperature inadequacy. Interestingly, the fact that women and migrants show a lower incidence may correlate with adaptive preferences that indicate that the most vulnerable groups accept unfair situations as normal and natural. In the case of women, Nussbaum has analysed this in depth in the politics of development (95). Elster does so in the context of rational choice theories and argues that, sometimes, adaptation to the environment due to the inability to achieve reasonable achievements generates non-rational preferences to break cognitive dissonance (96).

In the focus groups, these adaptive preferences exhibited by women, as well as by migrants, tend to disappear upon further analysis of the discourse. Women demonstrate a more significant impact of energy poverty through the generalisation and iteration of narratives, with congruent and shared examples among women, in contrast to the greater dispersion observed in the male narratives. Furthermore, this internal validity of the discourse is consistent with data triangulation where subjective perception is not involved.

### 3.3.3 The emerging concern of summer poverty

Another significant result of this study refers to a topic that is making its way into the literature on energy poverty: the so-called ‘summer energy poverty’. The headline could be that ‘in the population served by the Red Cross, heat is as much of a concern as cold’. This statement is amply justified by the two analyses, where being cold in winter is comparable to the summer discomfort that affects the same proportion of the population. On the one hand, most households turn off or drastically reduce space heating in winter and cooling in summer. On the other hand, both the survey and the focus groups firmly and equally emphasise the relevance of heat and cold adaptation strategies. Finally, from an age perspective, households with the main breadwinner over 65 suffer more from the cold and heat in their dwelling, thus highlighting a higher seasonal vulnerability of older adults compared to other age groups.

Thus, the study adds to the growing body of evidence on the seasonal aspects of energy poverty, particularly the challenges of maintaining adequate cooling (97). As climate change leads to more extreme weather conditions, adequate cooling will become increasingly important. Policy measures should consider seasonal variations in energy needs and ensure that support is available year-round (97).

### 3.3.4 The impact of the energy and inflationary crises

Comparing the 2017 and 2022 data on energy poverty and AROPE indicators reveals significant trends, highlighting the profound impact of the 2022 energy and inflationary crisis on vulnerable people in Spain.

One of the most striking findings is the sharp increase in households experiencing inadequate temperatures in winter, which underscores the growing difficulty in maintaining adequate heating, likely exacerbated by rising energy costs and economic instability. Besides, the fact that the incidence is about four times higher in the vulnerable population compared to the general population highlights the disproportionate impact of the energy crisis on those already at risk. On the other hand, the data on arrears on utility bills presents a mixed picture. The improvement of this indicator among the vulnerable population could be attributed to targeted interventions and support from the public administration and organisations like the Spanish Red Cross. However, the higher proportion of households in arrears within the vulnerable group than the general population indicates ongoing financial struggles and the persistent challenge of affording essential utilities.

The AROPE index provides further insight into the socio-economic conditions of the populations studied. While some progress has been made nationally (general population), almost all vulnerable people studied continue to be at risk of poverty or social exclusion. On the other hand, the ‘At risk of poverty’ indicator (one of the three indicators included in the AROPE) shows a notable improvement in the vulnerable population, which is more pronounced than the slight decrease in the general population. This could reflect the effectiveness of poverty alleviation measures targeted at the most at-risk groups. Moreover, both the vulnerable and general populations saw a decrease in the ‘low employment intensity’. However, the ‘Severe material and social deprivation’ indicator shows a sharp rise for the vulnerable population (more than 40% increase), while it slightly decreased for the general population. This increase could be partially

due to 2021 methodological changes but also reflects the deepening material and social hardships faced by vulnerable households, which are confirmed by the qualitative study and the response to the specific survey questions on the impact of the 2022 energy and inflationary crises.

Indeed, another piece of information that can be related to these crises is the fact that most of the surveyed population has had to cut back on other types of spending for economic reasons, in particular: mobility/transportation, food, clothing/clothing and social life outside the home (eating out, going to the movies, etc.). These last two cutbacks are particularly significant because about 70% of the surveyed households have had to resort to them.

## 4. Conclusions and policy implications

The paper's results, derived from a mixed-methods approach, provide a complex and ambivalent picture of the vulnerable population served by the Spanish Red Cross (CRE), particularly in relation to energy poverty during the peak year of the energy crisis and the subsequent inflationary crisis.

The most pressing problem experienced by these households in 2022 was the inability of the majority (over 60%) to maintain comfort in their homes in both winter and summer, a fact that can be related to multiple causes and conditions. The first cause pointed out by this study is socio-economic: more than 85% of the households in the survey are in one of the conditions set out in the AROPE rate, i.e. they are at risk of poverty or social exclusion. This result is mainly justified by the low income level of the population analysed (almost 63% of people are in relative poverty) and their severe material and social deprivation (68%). The first condition is traditionally identified as one of the leading causes of energy poverty. On the other hand, the lack of comfort can also be related to the poor condition and low energy efficiency of most of the dwellings analysed. Finally, such a high value of the inadequate temperature indicator is most likely related to a growing tendency of many households to restrict heating for fear of the bill. This was undoubtedly exacerbated in 2022 due to the high-price scenario that Spain (and Europe in general) experienced. This phenomenon hit the vulnerable people the hardest: only 9% of the vulnerable people surveyed used their heating without restrictions during the 2022-2023 winter.

On the other hand, qualitative research helps to understand situations that do not appear clearly in quantitative analysis or results in (apparent) opposition to the general trend in the literature. For example, the cross-checking of data from the two research analyses has shown how energy poverty is gender and ethnic-biased and clearly shows, especially in single-parent families, extremely fragile life situations that in the quantitative research are blurred in the overall analysis. In particular, the quantitative study shows that around 61-62% of households whose main breadwinner is a woman report inadequate housing temperature compared to 64-65% of those whose primary breadwinner is a man. Similarly, the survey highlights that households whose main breadwinner is a foreigner have a 10% lower proportion of inadequate temperature indicators than those whose primary breadwinner is Spanish, 55-57% compared to 66-67%. This finding of women and migrants with a lower perception of thermal discomfort in the home, which doesn't match with most of the previous literature on the gender and ethnic gap of energy poverty, may correlate with adaptive preferences or other major concerns (e.g. children) that are intuited from the transcripts of the focus group meetings.

The comparative analysis with 2017 and general population data highlights the severe and growing impact of the energy crisis on vulnerable populations in Spain. While some indicators show improvement, the overall trend points to increasing difficulties in maintaining adequate living conditions and financial stability, highly related to the 2022 energy and inflationary crises. Moreover, these phenomena have worsened the quality of life of the surveyed population in other

aspects. The aforementioned cutbacks have translated into poorer quality (or lower quantity) of mobility, food, clothing and social life in these households. This situation is reflected in the statements of experts and CRE technical staff and the experiences of vulnerable people participating in the focus groups. Social life is perceived in the vast majority of cases as a luxury that the household cannot afford due to the need to pay other types of “more necessary” expenses - such as energy - which have increased due to the crises mentioned above. In particular, this research highlights that energy poverty is related to lower socialisation of children in the school environment. Often, the payment of energy bills is prioritised over extracurricular activities, excursions or leisure.

The study's findings have significant policy implications. Effective interventions must address both the immediate financial burdens of energy poverty and the long-term structural issues related to housing and energy efficiency. Financial assistance programs, while crucial, are not sufficient on their own. Policies should also focus on improving the energy efficiency of housing, promoting renewable energy sources, and enhancing social protection measures (98). The role of national and local authorities and third-sector entities is critical in implementing and scaling these interventions. On the other hand, the gender and ethnic dimensions of energy poverty require targeted policy responses. Women and ethnic minorities face unique challenges that exacerbate their vulnerability to energy poverty. Policies should address these disparities by ensuring equal access to support measures and promoting gender and ethnic equity in energy policy (33), (37). Ensuring access to adequate energy is crucial for improving vulnerable communities' overall well-being and resilience. Eventually, the findings of this study highlight the urgent need for comprehensive and inclusive policy interventions to mitigate energy poverty and enhance social resilience. Another key emerging point is the need for studies and plans involving many actors. In this case, the perception of CRE professionals and the proximity to users has made it possible to obtain results that would not be possible with a purely academic working group. Moreover, this paper might inspire similar studies by other scholars and stakeholders and provide insights into the variables needed to collect energy poverty data better in official statistics.

This work ultimately unpacks the situation of Spanish vulnerable households in 2022, thus offering a picture of their socioeconomic and energy vulnerability in a specific year. Nevertheless, it doesn't analyse the persistence of these social issues and their dynamics over time. Further work might focus on longitudinal studies to monitor the long-term effects of energy poverty and the efficacy of interventions. Moreover, a more advanced statistical exploration, such as inferential analysis or hypothesis testing, would be a valuable avenue for future research. Additionally, exploring the impacts of emerging energy technologies and policies on vulnerable populations will provide useful insights. Expanding the scope to include more diverse geographic regions and demographic groups in the qualitative analysis will further enhance understanding and inform better policy-making.

Eventually, collaborative efforts between academic researchers, policymakers, and community organisations will be essential in developing and implementing practical solutions to energy poverty.

## Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT to create the first structure of the paper, then they modified it according to their own criteria. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the publication's content.

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## GDPR Disclaimer

The study was conducted in full compliance with the European Union’s General Data Protection Regulation (GDPR, Regulation (EU) 2016/679) and Spanish Personal Data Protection Law (Ley Orgánica 3/2018) under a formal Data Processing Agreement (DPA) between Cruz Roja Española (Data Controller) and Universidad Pontificia Comillas (Data Processor), which regulated the lawful collection, treatment, and deletion of data in accordance with GDPR requirements, including the secure storage and pseudonymisation of sensitive data within the European Economic Area (EEA). In addition, the companies ESCODE and SONMERCA S.L. signed in their contract with Cruz Roja Española an agreement for confidential treatment of the data in accordance with the same Law.

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# Annex

Table A 1. Number of households with inadequate temperature in winter and its distribution in each region in the Spanish general population - Source: Own elaboration based on (82)

Region	Number of households with inadequate temperature	Distribution [%]
Andalucía	629883	22.0%
Galicia	152503	5.3%
Asturias	63402	2.2%
Cantabria	30246	1.1%
País Vasco	83250	2.9%
Navarra	17808	0.6%
La Rioja	12645	0.4%
Aragón	41074	1.4%
Madrid	305217	10.7%
Castilla y León	104284	3.6%
Castilla la Mancha	136625	4.8%
Extremadura	82729	2.9%
Catalunya	508657	17.8%
Comunidad Valenciana	341719	11.9%
Baleares	69957	2.4%
Murcia	116442	4.1%
Ceuta	10073	0.4%
Melilla	3694	0.1%
Canarias	150311	5.3%
<b>TOTAL</b>	<b>2860520</b>	<b>100.0%</b>

Table A 2. Number of households with inadequate winter temperatures and their distribution according to the sex of the 'main breadwinner' in the Spanish general population - Source: Own elaboration based on (82)

Sex	Number of households with inadequate temperature	Distribution [%]
Man	1413128	49.5%
Woman	1442259	50.5%

Table A 3. Number of households with inadequate winter temperatures and their distribution according to the sex of the 'main breadwinner' in the Spanish general population - Source: Own elaboration based on (82)

Age	Number of households with inadequate temperature	Distribution [%]
18-30	63341	2.2%
31-65	1944190	68.1%
> 65	847856	29.7%

Table A 4. AROPE indicators' rate in the Spanish Red Cross (CRE) population [%]

Indicator	Rate in CRE population [%]
AROPE	85.6%
At risk of poverty	62.9%
Severe material and social deprivation	68.1%
Low employment intensity	17.0%
At-risk-of-poverty & Low employment intensity	12.8%
Severe material and social deprivation & Low employment intensity	12.2%
At risk of poverty & Severe material and social deprivation	46.8%
All three conditions	9.4%

Table A 5. Inadequate temperature indicators' rate in the Spanish Red Cross (CRE) population [%]

Indicator	Rate in CRE population [%]
Inadequate temperature in winter	63.1%
Inadequate temperature in summer	63.3%
Inadequate temperature in both	63.6%

Table A 6. Inadequate temperature indicators' rate according to the region in the Spanish Red Cross (CRE) population [%]

Region	Winter	Summer	Both
Andalucía	80.2%	81.08%	81.98%
Aragón	53.8%	61.53%	50%
Canarias	51.9%	38.27%	41.97%
Cantabria	nonrepresentative	nonrepresentative	nonrepresentative
Castilla y León	44.8%	41.38%	43.10%
Castilla-La Mancha	31.1%	32.43%	32.43%
Cataluña	73.5%	74.26%	73.53%
Comunidad de Madrid	85.3%	86.50%	87.11%
Comunidad Foral de Navarra	nonrepresentative	nonrepresentative	nonrepresentative
Comunidad Valenciana	52.7%	53.29%	54.39%
Extremadura	23.9%	23.91%	23.91%
Galicia	55.6%	64.19%	64.19%

Islas Baleares	60.0%	55%	57.5%
La Rioja	nonrepresentative	nonrepresentative	nonrepresentative
País Vasco	70.2%	70.21%	70.21%
Principado de Asturias	47.2%	47.22%	44.44%
Región de Murcia	38.1%	41.27%	41.26%
Ceuta	nonrepresentative	nonrepresentative	nonrepresentative
Melilla	nonrepresentative	nonrepresentative	nonrepresentative

*Table A 7. Inadequate temperature indicators' rate according to the sex of the 'main breadwinner' in the Spanish Red Cross (CRE) population [%]*

<b>Sex</b>	<b>Winter</b>	<b>Summer</b>	<b>Both</b>
Man	65.1%	64.31%	64.97%
Woman	61.2%	62.37%	62.37%

*Table A 8. Inadequate temperature indicators' rate according to the nationality of the 'main breadwinner' in the Spanish Red Cross (CRE) population [%]*

<b>Nationality</b>	<b>Winter</b>	<b>Summer</b>	<b>Both</b>
Spanish	66.7%	66.14%	66.79%
Other	55.0%	56.93%	56.51%

*Table A 9. Inadequate temperature indicators' rate according to the age of the 'main breadwinner' in the Spanish Red Cross (CRE) population [%]*

<b>Age</b>	<b>Winter</b>	<b>Summer</b>	<b>Both</b>
18-30	53.7%	51.9%	51.9%
31-65	60.6%	61.3%	61.6%
>65	69.1%	69.1%	69.5%

## Questionnaire of the CATI survey

CONTACT PERSON

**F.0 ID** \_\_\_\_\_

**F.1 Sex:**

1. Man
2. Woman
3. Another

**F.2 Nationality**

1. Spanish
2. Another

**F.3 Age** \_\_\_\_\_

**F.3.1 Codify:**

1. 18-25
2. 26-35
3. 36-45
4. 46-65
5. More than 65

**F.4 Level of education completed**

1. Uneducated
2. Primary education
3. Compulsory secondary education
4. High school
5. Medium grade
6. Higher degree (University)
7. Master
8. PhD

**F.5 ZIP code:** \_\_\_\_\_

**F.6 Municipality:** \_\_\_\_\_

**F.7 Province:** \_\_\_\_\_

<b>SOCIO-ECONOMIC CHARACTERISTICS OF THE</b>
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**P.1** Total persons in the household \_\_\_\_\_

**P.2** No. of adults up to 64 \_\_\_\_\_

**P.3** No. of minors \_\_\_\_\_

**P.4** No. of people over 64 years old \_\_\_\_\_

**Q.5 Are you the person who regularly contributes or has contributed the most income to the household?**

- 1. Yes, it's me
- 2. No, it's someone else
- 98. Don't know
- 99. No answer

**Q.6 Do you make decisions regarding household finances (budget management, applying for benefits, etc.)?**

- 1. Yes, always
- 2. Yes, from time to time
- 3. No
- 98. Don't know
- 99. No answer

**Q.7 What is the household's net monthly income level in 2022?**

Exact figure: \_\_\_\_\_ €mes;

or income band:

- 1. Less than €500
- 2. Between €500 and €750
- 3. Between €750 and €1000
- 4. Between 1.000 and 1.500 €
- 5. Between 1,500 and 2,000 €
- 6. More than €2,000
- 98. Don't know
- 99. No answer

Work intensity index

**P.8 Number** of persons of working age (1) \_\_\_\_\_

**Q.9** How many people of working age have worked in 2022? \_\_\_\_\_

**Q.10** Number of months worked full-time (counting all household members of working age:):  
\_\_\_\_\_

**Q.11** Number of months worked part-time (counting all household members of working age):  
\_\_\_\_\_

For hourly jobs, please indicate:

**Q.12** Number of hours per week worked \_\_\_\_\_

**Q.13** Number of months worked in the last year: \_\_\_\_\_

(1) A person of working age is defined as a person between 18 and 64 years old, who is not a student between 18 and 24, retired or retired, or inactive person between 60 and 64 years old with pensions as the main source of household income. Households consisting only of children, students under 25 and/or persons aged 60 and over are excluded from the calculation of the indicator.

Severe material and social deprivation

Could you tell me whether or not the following circumstances apply:

<b>Q.14 At home</b>	<b>YE S</b>	<b>NO</b>
1. Cannot afford to go on holiday for at least one week a year.	1	2
2. Cannot afford a meal of meat, poultry or fish at least every other day.	1	2
3. Cannot afford to keep the dwelling at an adequate temperature in winter	1	2
4. Cannot afford to keep the dwelling at an adequate temperature in summer	1	2
5. Cannot afford to keep the dwelling at an adequate temperature in both rooms.	1	2
6. No ability to meet unforeseen expenses (of 650 euros).	1	2

7. You have had delays in the payment of expenses related to the main dwelling (mortgage or rent, gas bills, community fees, etc.) or instalment purchases in the last 12 months.	1	2
<b>7.1 (If Yes in item 7)</b> In which payment have you been late? (multiple answer)	YES	NO
1. Mortgage or Rent	1	2
2. Electricity, gas or other fuel bills	1	2
3. Water bills	1	2
4. Community fees	1	2
5. Rubbish and property taxes	1	2
6. Hire purchase	1	2
7. Other (Specify which):	1	2
8. Cannot afford a car.	1	2
9. Cannot replace damaged or old furniture.	1	2
<b>Q.15 On a personal level (the respondent)</b>	<b>YES</b>	<b>NO</b>
1. He cannot afford to replace damaged	1	2

clothes with new ones, or to have two pairs of shoes in good condition.		
2. Cannot afford to meet friends/family for a meal or a drink at least once a month.	1	2
3. Cannot afford to participate regularly in leisure activities.	1	2
4. It cannot afford to spend a small amount of money on itself.	1	2
5. Cannot afford internet connection	1	2

Ability to make ends meet

**Q.16. Has your household been able to meet its monthly expenses in 2022 (household energy bills, transport, food, etc.)?**

1. Very easily
2. With ease
3. With some ease
4. With difficulty
5. With some difficulty
6. With great difficulty

Forced" savings strategies.

**Q.17 At the household level, which of these expenditures have you had to cut in 2022 for economic reasons?**

	YES	NO
1. Household energy bills	1	2
2. Mobility/transport	1	2
3. Feeding	1	2
4. Clothing/clothing	1	2
5. Education	1	2
6. Sport	1	2
7. Physical health	1	2
8. Mental health	1	2
9. Social life outside the home (eating out, going to the cinema, etc.)	1	2
Other (Specify which) _____		

**Strategies to "adapt" to the lack of affordability of energy (high electricity and gas prices) in winter (heating).**

**Q.18 How did you manage the heating in your home last winter?**

	YES	NO
1. We often turn off the heating, even though we would have preferred to keep it on.	1	2

2. We turned down the heating, although we would have preferred it to be warmer.	1	2
3. We heat and use only one or two rooms in the house with plug-in or other electric heaters and turn off the radiators in the other rooms.	1	2
4. Unrestricted use of heating	1	2

**Q.19 What other strategies did you use to cope with the cold in your home last winter (multiple choice)?**

	<b>Y E</b>	<b>N O</b>
1. We use only sunny rooms	1	2
2. We spend as much time as possible away from home in order not to spend on heating (travelling by public transport, sitting in libraries, being with family and friends, staying longer at work, etc.).	1	2
3. We did more exercise to keep warm and to distract us from the cold.	1	2

4. We wrap up warmer (wear extra clothing including outerwear, wear thermal underwear, wrap up warm with blankets or duvets, etc.).	1	2
5. We spend more time and/or share a bed (Early to bed/Sharing a bed)	1	2
6. We use hot water bottles.	1	2
7. We had hot drinks.	1	2
Other_____	1	2

Strategies to "adapt" to the lack of affordability of energy (high electricity and gas prices) in other services (refrigeration, lighting, cooking, hot water, etc.).

**Q.20 Which of these energy reduction strategies did you use in 2022 (multiple choice)?**

	<b>Y E</b>	<b>N O</b>
1. We reduced cooking consumption (e.g. we ate cold food from cans or pre-cooked food so as not to spend money on cooking).	1	2
2. We reduce lighting consumption (we turn off the lights in our house, even though we would have preferred to have them on).	1	2
3. We reduce hot water consumption (We use less hot water than we would have preferred or turn down the thermostat more than we would like).	1	2
4. We reduce consumption for cooling the house (we take showers more often in summer to cool down, we do not use the air conditioning or the fan, etc.).	1	2
Other: (Specify)_____	1	2

Health impact.

**Q.21 Have "coping" strategies to address the lack of energy affordability impacted the health of household members?**

1. If the physical health of any of them has worsened (chronic diseases, cardiovascular, respiratory, etc.).
2. Yes, it has generated or exacerbated mental health problems (anxiety, depression, stress) for any of them.
3. Yes, it has impacted on the physical and mental health of some of them.
4. No

<b>HOUSING EFFICIENCY AND CONDITIONS</b>
--

**P.22 Type of dwelling:**

1. Single-family
2. Block

**P.23 Size of dwelling (usable floor area); exact: ..... m<sup>2</sup> ; or by tranches:**

1. Less than 61 m<sup>2</sup>
2. Between 61 m<sup>2</sup> and 105 m<sup>2</sup>
3. More than 105 m<sup>2</sup>

**P.24 Housing Regime:**

1. Property
2. Rent at market price
3. Social renting, with subsidies
4. On loan from family or friends
5. I live in the street/settlement/
6. I sublet a room from an owner
7. I sublet a room to a person who has rented the flat.
8. Flat belongs to a social entity
9. I live in a residence/shelter

**P.25 Age of the dwelling:**

1. Pre-1981
2. Between 1981 and 2007
3. Post-2007
4. I don't know

**Q.26 How much time per day are you usually occupied in the dwelling in winter (night hours are not counted)?**

1. All day
2. Most of the day (more than six hours)
3. Few hours in the day (less than six hours)
4. Never, we are only at night (when there is no light).

**Q.27 How much time per day do you usually spend in the house in summer (not counting the night hours)?**

1. All day
2. Most of the day (more than 6 hours)
3. Few hours in the day (less than six hours)
4. Never, we are only at night (when there is no light).

**Q.28 What express energy retrofitting interventions have you carried out in the household in the last 10 years (multiple answer)**

Boiler/heating appliance repair (e.g. heaters)	1
Replacement of boiler/heating appliance (e.g. heaters)	2
Installation / replacement / repair of water heaters (water heaters)	3
Replacement of household appliances	4
Installation of LED bulbs	5
Sealing of doors and windows (with weather-stripping or similar)	6
Replacement of shutters / box insulation	7
Installation of awnings	8
Wall insulation	9

Roof insulation	10
Replacement of windows (glass and carpentry)	11
Replacement of glass	12
Solar panels	13
None of them because I don't have the financial capacity to renovate (Home ownership)	14
None of them because the landlord has not carried out the works (rental housing).	15
Not applicable	16
I don't know	98

*Do if P28=4*

**Q.29 Which appliances did you replace in the last 10 years (multiple allowed)? response)**

Electric cooker (cooker)	1
Electric oven	2
Washing machine	3
Dryer	4
Refrigerator	5
Freezer	6
Dishwasher	7
Microwave	8
I don't know	98

If you have made any intervention in Q.28 codes 1 to 12

**Q.30 How have you been able to meet the cost of the energy refurbishment mentioned? previously? (multiple answers allowed)**

1. With own savings
2. With a bank loan
3. With public aid
4. With support from the Red Cross
5. With grants from other NGOs or foundations
6. Payment by the lessor

None of the above, otherwise (Specify how: \_\_\_\_\_)

**Q.31 Do you have any of the following problems in your usual residence? (accept multiple choice)**

	<b>YE</b>	<b>NO</b>
Leaks, dampness in walls, ceilings or foundations, rotting of floors, window frames, doors, etc.	1	2
Windows that do not insulate against heat and cold	1	2
Doors that do not insulate against cold and heat	1	2
Housing with more than 3 storeys without lift	1	2
Old or deteriorated wiring and/or electrical switchboard (more than 15 years old, less than 5 sockets, etc.)	1	2
None of these problems	0	

**Risk of fire in the dwelling.**

**Q.32 Do you have any of these habits? (multiple choice is acceptable)**

	YES	NO
Smoking inside the dwelling	1	2
Frequent use of candles at home	1	2
They store some of these products at home: paint, bleach, glue, diesel oil or cardboard.	1	2

**Q.33 Do you have home insurance?**

1. Yes
2. No
3. I don't know

HOUSING EQUIPMENT AND ENERGY SUPPLIES
---------------------------------------

**P.34 Equipment, you have .....**

<b>P34.1 Heating</b>	<b>YE</b>	<b>NO</b>
<b>Equipment / Type of main system:</b>		
Individual: Individual heating system for the whole house.	1	2

Central: Centralised heating system for the whole building.	1	2
Appliances: Portable systems or systems that are only in one room.	1	2
None	0	
<b>Energy supply:</b>		
Natural gas	1	2
LPG (Butane or propane)	1	2
Diesel	1	2
Biomass	1	2
Charcoal or firewood	1	2
Electricity (accumulators)	1	2
Electricity (radiators or cookers)	1	2
Electricity (heat pump)	1	2
<b>P34.2 Domestic Hot Water (DHW)</b>	<b>YES</b>	<b>NO</b>
<b>Equipment:</b>		
Individual: Only for my home.	1	2
Central: Centralised system for the whole building.	1	2
None	0	
<b>Energy supply:</b>	<b>Energy</b>	
Natural gas	1	2
LPG: Butane or propane	1	2
Diesel	1	2
Biomass	1	2
Coal	1	2
Electricity	1	2

<b>Q34.2.2 When was the boiler last inspected (in years)</b>	
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<b>P34.3 Cooling</b>	<b>YES</b>	<b>NO</b>
Fan	1	2
Air conditioning	1	2
None	0	

<b>P34.4 Kitchen</b>	<b>YE</b>	<b>NO</b>
Electric glass-ceramic or induction cooker	1	2
Electric cooker, cooker/stove	1	2
Butane gas cooker	1	2
Natural gas cooker	1	2
Wood cooker	1	2
Cooking in the institution where I live	1	2
I don't usually cook	0	

<b>P34.5 has at home.....</b>	<b>YE S</b>	<b>NO</b>	<b>YES, BUT I DON' T</b>
Electric oven	1	2	3
Microwave	1	2	3
Washing machine	1	2	3
Dryer	1	2	3
Dishwasher	1	2	3

Chest freezer	1	2	3
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#### HOUSEHOLD ENERGY BILLS

Q35 Do you understand electricity and gas bills?

1. Yes
2. No

**Q.36 Are you the holder of the electricity and gas bills (if applicable)?**

1. Yes
2. No, it is in the name of another member of the household/cohabitation unit.
3. No, the landlord does not want to change the ownership of the contracts.
4. No, they are on behalf of a public or private body (NGOs).
5. Light only
6. Gas only

Expenditure on energy supplies billed (electricity, natural gas) in 2022  
(in 2023 if you do not have previous invoices).

**Q.37 Do you have the latest invoices in front of you?**

1. Yes, Luz's
2. Yes, that of Gas Natural
3. Yes, electricity and natural gas
4. No

**P.38 Billing periods of the last electricity and gas bills (if applicable)**

1. Light: (day/month/year - day/month/year)
2. Natural gas (if applicable): (day/month/year-day/month/year)

**Q.39 Expenditure on last electricity and gas bill (if applicable) (preferably 2022)**

1. Luz  
 \_\_€month Natural Gas\_\_  
 \_\_€month

**P.40 Consumption on electricity  
 and gas bills Light**

1. Consumption on current bill [kWh/month] \_\_\_\_\_
2. Maximum monthly consumption in the consumption history graph (bill) [kWh/month] \_\_\_\_\_
3. Minimum monthly consumption in consumption history graph (bill) [kWh/month] \_\_\_\_\_

Natural Gas (if applicable)

1. Consumption on current bill [kWh/month] \_\_\_\_\_
2. Maximum monthly consumption in the consumption history graph (bill) [kWh/month] \_\_\_\_\_
3. Minimum monthly consumption in consumption history graph (bill) [kWh/month] \_\_\_\_\_

**Q.40 What is the contracted power in your electricity bill in both periods?**

1. Peak (kW) \_\_\_\_\_
2. Valley (kW) \_\_\_\_\_

**Q.41 What is the name of the trading company (logo on the invoice):**

\_\_\_\_\_

Expenditure Consumption of energy supplies without invoicing

Q.42 Use you..... (quote one by one the elements of the picture)

Q.42.1 How many cylinders in cylinders/month, kilogrammes/month, or litres/month

**Q.43 What is the expenditure in cylinders/month, kilograms/month, or litres/month?**

	<b>P4 2 us es</b>	<b>P42.1 unit litres kilos</b>	<b>P43 €m o nth</b>
LPG: Butane or propane	1		
Diesel	2		
Fuel oil	3		
Coal	4		
Wood	5		
Peat	6		
Others_			

**Q.44 In 2022, was there any occasion when, due to economic hardship, the household did not have any of its usual sources of energy (2)?**

1. Yes If yes, **Q44.1** Which one? \_\_\_\_\_
2. No

<sup>2</sup> Both not being able to buy any type of fuel necessary for daily life and having had an energy supply cut should be taken into account. Include electricity, natural gas, butane, propane, diesel, fuel oil, coal, wood, peat, etc.

**Q.45 In 2022, did you have more difficulty paying energy bills than in previous years?**

1. Yes, much more
2. Yes, something else
3. No

UPTAKE OF THE SOCIAL BONUS OR OTHER AID FOR ENERGY BILLS
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**Q.46 Have you received the social bonus in 2022?**

1. Yes, I have noticed

1.1 What discount did you receive on your last invoice? 1. 40%

2. 65%

3. 80%

4. I did not have to pay the invoice amount.

5. Don't know

1.2. What consumer category were you assigned?

1. Vulnerable

2. Severely vulnerable

3. At risk of social exclusion

4. "Energy Justice" (low-income working households)

5. Don't know

1.3 Have you received the bank transfer of the thermal social voucher?

1. Yes

2. No

3. I don't know

2. No, I didn't notice it ..... 2

**Q.47 Do you know the procedure for applying for the bono social?**

1. Yes

2. No

3. I don't know

**Q.48 Do you have a large family card?**

1. Yes

2. No
3. I don't know

**Q.49 Are all income-earning members of the household pensioners in the social security system for retirement or permanent disability, receiving a minimum pension?**

1. Yes
2. No
3. I don't know

**Q.50 Do you receive the Minimum Living Income (MMI)?**

1. Yes
2. No
3. I don't know

**Q.51 Is any member of the household a victim of gender-based violence, a victim of terrorism, has a disability of at least 33%, is in a situation of recognised grade 2 or 3 dependency, or are they a single parent or single-parent family?**

1. Yes
2. No
3. I don't know

**Q.52 Have you received other types of assistance (municipal, social services or NGOs/foundations) for the payment of your household's electricity, gas or other fuel bills?**

1. Not in the past, but yes in 2022.
2. Yes, I have received in the past and in 2022
3. YES, I have received in the past, but not in 2022.
4. No, I have never received them (**Skip to Q.54**)

**Q.53 From whom are you receiving assistance?**

1. Local administration (City Council or Social Services)
2. Red Cross
3. Caritas or other NGOs/foundations
4. Other