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# Analysis of Energy Poverty in Italy: A Comparative Case Study with United Kingdom

Prof. Simone Mori
Supervisor

Prof. Giuseppe Colangelo
Co-Supervisor

Edoardo Cresti 760951
Candidate

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***Abstract***

*This study explores the phenomenon of energy poverty on a global, European, and Italian level, with the aim of providing a comprehensive understanding and identifying effective solutions to tackle this complex issue. The analysis of global and European dynamics has allowed for the contextualization of the phenomenon within a broader framework, highlighting the specificities of the Italian case. Through a detailed analysis of the Italian context, three key areas of interest have emerged that require special attention: access to support programs, the identification of vulnerable consumers, and the need for an integrated and coordinated approach for intervention. Thanks to the studies conducted in the initial chapters, the United Kingdom has been identified as the best example of an effective approach to these three areas, offering valuable insights for potential applications in the Italian context. Within this framework, the study ultimately aims to assess whether some of the strategies adopted in the United Kingdom can be adapted and implemented in Italy, with the goal of improving the effectiveness of policies against energy poverty.*

***Keywords:*** *Energy Poverty, Global Analysis, European Context, Italian Context, Support Programs, Vulnerable Consumers, Integrated Approach, Policy Evaluation, United Kingdom, Energy Equity, Socioeconomic Factors, Energy Policies.*

## Summary

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## Introduction

Energy poverty is a particularly underestimated phenomenon, both by policies and by literature. According to the International Energy Agency, more than 1 billion people live without access to electricity, while many others cannot afford to adequately heat their homes or access essential energy services. This lack of access to energy not only compromises quality of life but is also one of the main causes of socioeconomic inequalities.

Energy poverty does not only affect developing countries; it is also a daily reality in many industrialized nations, where low-income families struggle to pay their energy bills and often have to choose between heating their homes or meeting other basic needs. This phenomenon, often overlooked, has profound consequences on the health, education, and overall well-being of those affected.

This thesis aims to present an in-depth examination of the phenomenon of energy poverty, providing a definition and analyzing the most relevant underlying factors. The objective is to highlight the key points to guide the analysis toward a proposal for alleviating the problem within the Italian context.

The first chapter explores energy poverty on a global and European scale, defining the concept and analyzing the criteria and measures used to evaluate it. Differences between countries are discussed, highlighting the influence of climatic, economic, and political factors on the approach to the problem. Examples are provided of how the phenomenon varies significantly worldwide, with a focus on extreme cases such as Niger and Bulgaria, and the context of energy poverty within the European Union is provided, highlighting the main causes and the support policies implemented by various member states.

The second chapter focuses on the Italian situation, exploring the various factors that determine energy poverty in the country. The analysis begins with the structure of the Italian energy market, including suppliers, energy prices, and tariff policies. Subsequently, socioeconomic factors such as income and access to energy services, and housing aspects such as the quality of housing and thermal insulation, are examined. The chapter concludes with a review of national and regional policies aimed at supporting vulnerable families and reducing energy poverty.

The third chapter analyzes the case of the United Kingdom, comparing it with the Italian situation in the identified critical areas (access to support programs, identification of vulnerable consumers, and an integrated and multidisciplinary approach by the State). The context of energy poverty in the United Kingdom is described, with a focus on three fundamental practices: the Energy Company Obligation, data matching practices and risk schemes, and the Fuel Poverty Strategy. The chapter concludes with a synthesis of the main differences and similarities between the two countries and with some recommendations for improving the Italian approach to energy poverty.

The fourth and final chapter analyzes the research design, data collection, and data analysis to evaluate the applicability of the United Kingdom's energy poverty policies in the Italian context. Using the case study methodology, attention was focused on the United Kingdom for its relevance and effectiveness in this area. The research was guided by the question of which aspects of British policies can be implemented in Italy, identifying gaps in the literature on the applicability of such policies. The data was collected through semi-structured interviews with experts and secondary sources. The data analysis, conducted through coding, identified recurring themes that respond to the research questions. The results confirm the relevance of the critical areas for the Italian context. It emerged that, although effective, British practices require specific adaptations for the Italian context. Finally, the chapter discusses the theoretical implications, highlighting the importance of an integrated and structured approach, like the British one, but with local adaptation.

The presentation of the results, subsequently discussed, directs the study towards the conclusion, addressed in the final pages.

# Chapter 1 - Energy poverty: global and European context

## 1.1 Definition of Energy Poverty

Energy poverty poses a issue, influenced by various interconnected factors that result in individuals and families lacking access, to vital energy services necessary for meeting their fundamental needs. It goes beyond the inability to afford energy bills; it also encompasses the struggle to maintain a temperature at home access proper heating or cooling and utilize energy for everyday tasks like cooking and lighting. To grasp the scope of energy poverty we must view it through the perspectives of feasibility, adequacy of home temperatures building energy efficiency and social and economic disparities.

The financial aspect is a feature of energy poverty. It highlights the disparity between the cost of energy services and households' financial capability to sustain them. The "energy burden," which denotes the proportion of household income dedicated to energy expenses serves as a measure in this regard. A high percentage indicates that individuals must make decisions between meeting essential needs like food and heating or allocating a significant portion of their income, towards energy costs.

Another crucial element is the ability to maintain a temperature—a basic human right closely tied to people's health and well-being.

The World Health Organization suggests that households should maintain a temperature of 18°C to decrease the risks associated with weather. Many families facing energy poverty struggle to meet this requirement due to the inefficiency of their homes or the high expenses related to energy thereby increasing their susceptibility to conditions like rheumatism, respiratory illnesses and other health concerns. Energy poverty tends to impact economically disadvantaged groups, including low-income households, senior citizens, unemployed individuals and ethnic minorities. These communities often reside in residences with energy efficiency. Have limited financial means to implement necessary energy upgrades or cope with rising energy prices. To effectively address energy poverty policies should acknowledge these disparities and allocate resources and assistance towards those who're most, at risk.

The implications of energy poverty on health[1] are numerous and well-documented. It leads to an increased risk of depression, arthritis, respiratory problems, and cardiovascular diseases. Homes with consistently low humidity and temperatures can aggravate pre-existing medical conditions and promote the onset of new ones.

Energy poverty has negative effects not only on physical health but also on mental health[2], causing stress, worries, and a sense of helplessness in individuals who find it difficult to keep their homes comfortable.

Eurostat and various global organizations define energy poverty as the challenge faced by families or individuals who're unable to access a set of essential energy products and services required for a decent quality of life. These services encompass not just heating, cooling and lighting. The provision of electricity, for essential household tasks. The criteria used to gauge energy poverty differ significantly reflecting the complexities of this issue. These criteria include the proportion of household income spent on energy expenses the level of heating or cooling in residences the quality of insulation and the overall energy efficiency of buildings. It is crucial to assess these metrics within climatic contexts to gain an accurate understanding at both national and regional levels.

It is important to distinguish between energy poverty and economic hardship. Energy poverty can arise in situations where incomers adequate to meet basic needs; however, inefficiencies in home energy usage or high energy costs can prevent access to necessary energy services. Addressing this challenge requires an integrated approach that considers both factors and infrastructure issues. This need is underscored by factors such, as increasing costs associated with market trends or government policies that impact energy expenses.

According to the World Economic Forum[3], in 2020, about 13% of the world's population lived in energy poverty. This figure highlights the urgency of addressing the problem with targeted policies and effective interventions on a global scale. In previous years, energy poverty has seen significant variations. In 2010, the number of people without access to electricity was about 1.2 billion, reducing to 759 million in 2019 thanks to global

[1] Energy poverty, health and education outcomes: Evidence from the developing world (2021)
[2] Energy Poverty and Personal Health in the EU (2022)
[3] The World Economic Forum (WEF) is an international organization that engages leaders from business, politics, and other sectors to address global, regional, and industry challenges.

electrification efforts. Future forecasts indicate that despite progress, 700 million people could still live in energy poverty by 2030 if efforts to improve energy access are not intensified. This highlights the need for significant investments in energy infrastructure, renewable technologies, and inclusive policies to ensure universal and sustainable energy access.

### 1.1.1 Criteria and measurements

To precisely and contextually assess the scope and character of fuel poverty, it is necessary to apply specific criteria and dependable measuring procedures for understanding and diagnosing the issue[4]. These resources are crucial for defining intervention programs, locating households that are at risk, and assessing how well the actions being taken are working.

Below, the most used criteria and measurements in the context of fuel poverty are described.

To identify and understand energy poverty, it is essential to establish specific criteria for assessing a household's energy situation. Among these main criteria, we can highlight:

- Energy Expenditure versus Income: The percentage of household income allocated to energy expenses is a crucial factor. 10% of a household's income is the generally acknowledged cutoff point for determining whether they are energy poor. If this barrier is exceeded, the household may be deemed energy impoverished. This criterion directly reflects the economic burden that energy costs represent for the household budget.
- Living Temperature Standard: Another crucial sign is the capacity to keep one's house at a temperature that is both comfy and healthful. Minimum temperatures of 18°C are advised by the World Health Organization to reduce the health hazards associated with cold weather. As a result, thermal deficiency starts to indicate energy poverty.
- Energy Efficiency of Buildings: It is crucial to evaluate the home's energy efficiency using methods such as thermal insulation, heating systems, and the existence of buildings that stop heat loss. Insufficient energy efficiency leads to

[4] Energy poverty in developing countries: A review of the concept and its measurements (2022)

increased energy usage to attain sufficient comfort levels, hence exacerbating household expenditures.

To practically apply the defined criteria and obtain an accurate assessment of energy poverty, several measurement methodologies are used. These techniques include:

- Surveys and Household Surveys: Tools that are vital for getting information straight from households on their incomes, energy costs, and opinions about how comfortable their homes are. These statistics offer insightful information on the dynamics of energy poverty on both a personal and a societal level.
- Energy Consumption Analysis: An objective basis for identifying energy poverty may be established by examining the data given by energy providers to discover patterns of excessive usage and link them with family income.
- Energy Efficiency Assessments: The energy quality of a house is evaluated using energy audits and building certifications, which also help identify the necessary changes to lower expenses and increase efficiency.
- Geographic Mapping and Socioeconomic Analysis: Geographic and socioeconomic data are used to assist identify populations and places that are more likely to experience energy poverty, allowing for more focused and contextualized interventions.

Adopting precise standards and metrics is essential to effectively combating energy poverty. To properly comprehend this complicated phenomenon and create focused, long-lasting intervention methods, a comprehensive, multifaceted strategy that considers household energy efficiency as well as economic situations is needed.

### 1.1.2 Differences in definition across countries

Energy poverty, a complex phenomenon with implications for quality of life, is understood and addressed differently depending on the national environment. These variations are reflected not only in the adopted definitions, but also in policy approaches and targeted actions.

There are a few key factors that make this phenomenon different around the world.

- Climatic and geographic factors: in Finland, a country marked by long, harsh winters, the ability to keep homes adequately warm becomes the backbone of the fight against fuel poverty. Here, the government hands out home heating subsidies and incentivizes the use of energy-efficient technologies. In sharp contrast, Spain and Italy, with their hot summers, emphasize efficient cooling solutions to counter domestic overheating, an aspect often overlooked in discussions of energy poverty but equally critical to household well-being.[5]
- Income Levels and Economic Development: In Kenya, a known developing country energy poverty is often described as the inability to access electricity affecting, over 40% of the population. To address this issue efforts, focus on expanding power infrastructure and implementing energy solutions like panels for households. In contrast in nations such as Germany, the concept of energy poverty revolves around improving energy efficiency and easing the burden of energy costs on households. These countries also offer government programs to support low-income families with energy upgrades and provide rebates, on energy bills.[6]
- National Energy Policies: In the UK energy poverty is determined by considering three factors; income, energy costs and housing conditions. The "Fuel Poverty Strategy", in the UK focuses on enhancing the energy efficiency of homes for populations as a method to alleviate fuel poverty. On the hand France has introduced the " énergie," which provides direct financial assistance to low-income families to assist with their energy bills showing a prompter approach, to easing financial burdens.

[5] Energy Poverty in Finland: Reality and Challenges in the Face of Climate Change (2022)
[6] Energy poverty in developing countries: A review of the concept and its measurements

- Needs for an International Approach: The importance of a strategy to address energy poverty is apparent considering these variations. Even though the International Energy Agency and the European Union are working towards establishing shared definitions and plans the unique circumstances, in each country call for solutions that suit needs. Collaboration on a level sharing approaches and offering technical and financial aid to developing nations are essential for worldwide advancements, in combating energy poverty.

In sum, the variety of definitions and approaches to energy poverty reflects the complexity of the problem itself.

### 1.2 Energy poverty in the world

From the moment energy poverty is introduced it's evident that its impact varies worldwide affecting countries differently. A deeper look shows that how energy poverty shows up depends heavily on peoples living situations.

In some nations, like Lithuania and Bulgaria where it affects 25% and 30% of the population[7], respectively energy poverty is a significant challenge. This is mainly due to the cost of energy compared to what households earn.

However, in places like Portugal, older individuals and low-income families are most at risk, from energy poverty. This indicates that certain social groups may struggle to afford energy when its widely available. As a result, living conditions could. Vulnerability could increase.[8]

In countries such, as Niger and Burundi energy poverty largely stems from the lack of access to basic energy resources leading to limited options for the public and high energy costs. [9]

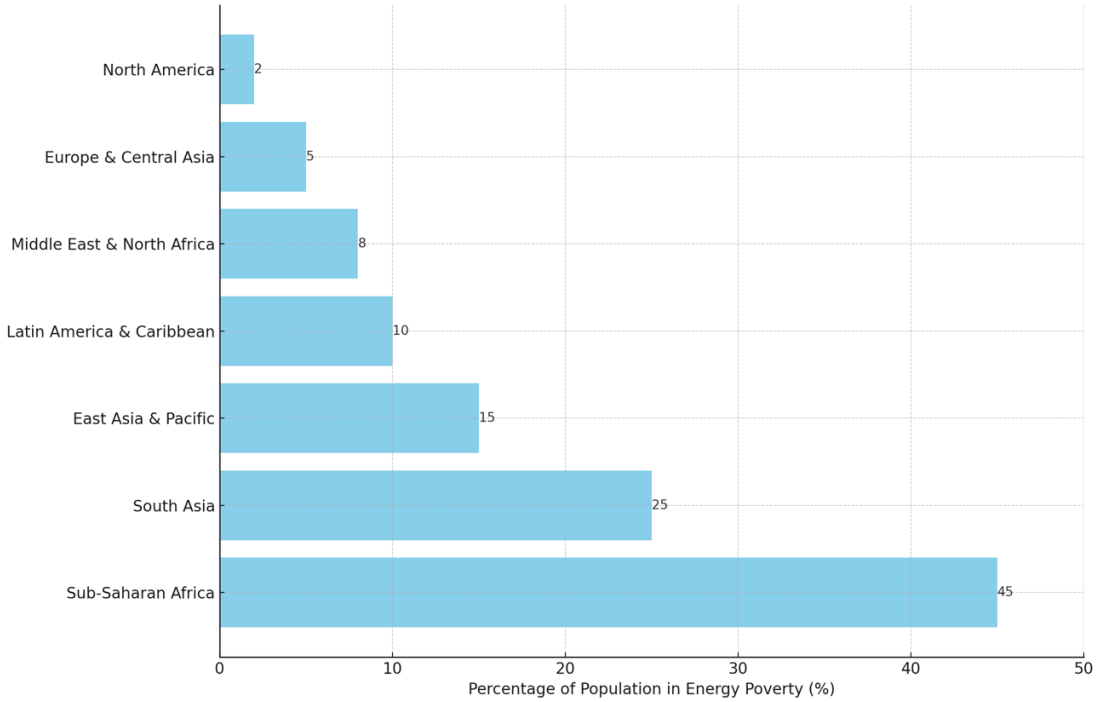
Similarly Asian nations like Ethiopia and Bangladesh face challenges as a significant portion of their populations still rely on traditional energy sources impacting access to vital services like healthcare and education.[10]

[7] Energy poverty advisory Hub (EPAH)
[8] Understanding energy poverty drivers in Europe (2023)
[9] Energy poverty assessment: Indicators and implications for developing and developed countries (2024)
[10] Studying financial inclusion, energy poverty, and economic development of South Asian countries (2023)

The issue of power supply also affects Southeast Asian and American countries such as Haiti and Cambodia particularly in rural areas directly affecting people's quality of life by hindering social and economic progress while increasing community vulnerability. These diverse scenarios underscore the complexity of energy poverty shaped by a mix of geographic factors, across different regions. Tailored solutions are essential to address the needs and challenges presented globally. Ultimately the primary concern, in Africa and certain parts of Asia revolves around infrastructure and essential energy supplies. Conversely energy poverty in Europe often stems from accessibility to energy resources due, to soaring costs.

### 1.2.1 Global Statistics

**Figure 1 - Energy poverty around the world**




Sources: Author's calculation based on data from The World Energy Outlook (WEO) of International Energy Agency (IEA)

According to the World Energy Outlook[11] 2023, published by the International Energy Agency (IEA)[12], approximately, about 760 million [13] people worldwide do not have access to electricity now, and the majority of them reside in South Asian and sub-Saharan African countries (approximately 80% of those without access to electricity). The countries in Asia - Bangladesh, Nepal, and India - and Africa - the Democratic Republic of Congo, Niger, and Burundi - are the most affected by this situation. Most people who don't have access to electricity live in remote and rural areas, where there is usually no

[11] Report providing in-depth analysis and projections on the energy sector globally.
[12] International intergovernmental organization founded in 1974 following the oil shock of the previous year. It aims to coordinate energy policies among member weights and ensure the stability of energy supplies.
[13] Number up from previous years, mainly due to the ongoing energy crisis and the impacts of the Covid-19 pandemic.

infrastructure for energy. These factors are frequently associated to a lack of power access.

The absence of power supply, in these areas significantly impacts the lives of people. Many communities still depend on energy sources, such as coal and firewood to fulfill their energy requirements leading to increased air pollution and various health issues. For instance, the extensive use of fuels for cooking in Ethiopia has been linked to respiratory illnesses and premature death particularly among women and children exposed to indoor air pollution.

Nevertheless, the lack of electricity access is one aspect of energy poverty; other factors include the reliability and quality of energy services. Power failures hinder productivity. Limit access to essential services like healthcare and education even in numerous developing countries with advanced electrical infrastructures. As an illustration in Nigeria – the country, in Africa – only 45% of the population has electricity access.[14]

As a result, frequent power blackouts present a challenge, for individuals and businesses striving to improve their quality of life. Further investigation shows that than 60% of the population resides in rural regions, where infrastructure is often less developed compared to urban areas leading to a lack of electricity access.[15]

The disparity in power access among communities perpetuates poverty and marginalization.

According to the World Health Organization (WHO)[16] 20% of the world's population still relies on cooking methods due to limited access to modern energy sources such as gas or electricity. This indicates that, then 2.9 billion people cook using firewood, coal or biomass which poses risks to both their health and the environment.

Moreover, the World Bank calculates that the economic impacts of energy poverty, in developing countries amount to 1% to 2% of their GDP on a basis. These costs arise from

[14] Infrastructure for sustainable energy access in Sub-Saharan Africa: Leveraging social factors and natural capital

[15] Access to Energy (2019) - OurWorldInData.org

[16] Specialized agency of the United Nations responsible for international public health. Its primary role is to direct and coordinate health efforts worldwide to combat diseases and promote health.

factors, including reduced work efficiency due to the lack of energy sources and electricity along with the additional health risks associated with using traditional fuels for cooking.

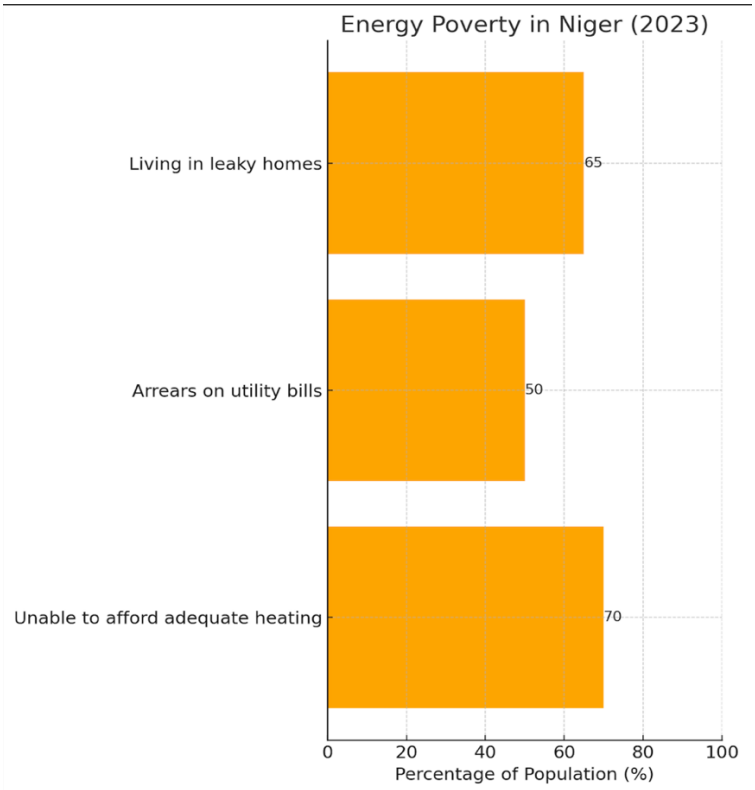
Based on data from the IEA regions like South Asia and sub-Saharan Africa experience levels of access to electricity compared to other parts of the world making them particularly susceptible to the challenges posed by energy poverty. While disparities exist between rural populations within these areas overall electricity access rates are considerably higher in Europe and North America.

The World Energy Outlook underscores the importance of implementing inclusive energy policies to ensure reliable access to energy for all individuals, especially those who are most vulnerable. This involves increasing investments in energy sources enacting regulations that promote energy efficiency and enhancing access to energy technologies, for rural and isolated communities.

### 1.2.2 African and European example

As of right now, energy poverty is a problem that poses a danger to social and economic stability across a wide range of global regions. Its main feature is that it is caused by several factors and presents differently depending on the location. Now let's look at two case examples that demonstrate this variety: Bulgaria in Europe and Niger in Africa.

**Figure 2 - Energy poverty in Niger**




Source: Author's calculation[17] based on data from World Bank

Currently the issue of energy poverty is a concern affecting economic stability in various global regions. It is characterized by causes and manifests depending on the specific location.

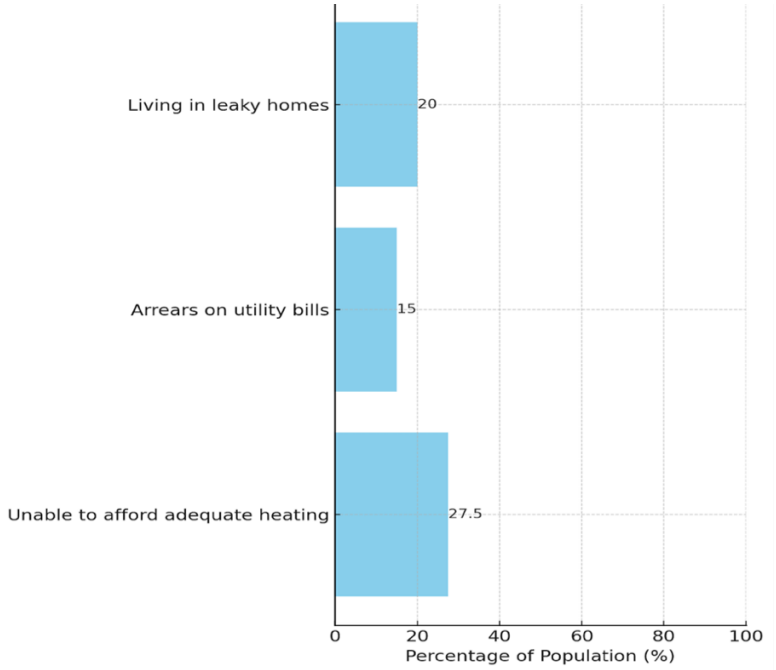
To illustrate this diversity let's consider two case studies: Bulgaria, in Europe and Niger in Africa.

[17] Since some data from Niger is outdated or sometimes missing, some calculation are based on data from neighboring countries.

Niger, situated in West Africa stands out as one of the countries most impacted by energy poverty. According to data from the World Bank 80% of Niger's population lacks access to electricity. The lack of infrastructure and energy sources has led to a heavy reliance on traditional fuels like firewood and coal for essential needs such as cooking and heating. To highlight the severity of the situation recent World Bank figures, reveal that 19.1% of dwellers and a mere 1.9% of rural residents in Niger had electricity access last year.

This heavy dependence on fuels do not hinder economic development but also gives rise to significant environmental and public health challenges. For example, indoor use of firewood can lead to ailments and air pollution. Moreover, the regular purchase of firewood places a burden on households reducing funds for essentials, like food, education and healthcare. Despite that the country aims to reduce energy poverty by 2026 with a $30 billion development strategy. This plan focuses on resources, inclusivity and unity to address challenges, like security and climate change, in society. [18]

**Figure 3 - Energy poverty in Bulgaria**




Source: Reports by Eurostat and the European Energy Poverty Observatory

[18] Energy Poverty and Economic Development in Nigeria: Empirical Analysis (2020)

Shifting to Europe, Bulgaria's problems are mainly caused by excessive energy costs relative to the average household income.[19] Over 27% of Bulgarian households, according to Eurostat, struggle to maintain an adequate temperature in their homes as a large part of their income is allocated to paying energy bills. This is partly caused by the structure of energy prices, which is influenced by energy efficiency and housing quality, as well as variables such as tariffs and taxes. To summarize the context, according to some global databases[20], the per capita energy consumption in Niger is 0.145 tons of oil equivalent (toe[21]), well below the African average of 0.66 toe and the corresponding global average of 1.86 toe.

Using information from the annual household budget survey by ISTAT for the years 2014-2019[22], the Economic Research Institute (ERI) of the Bulgarian Academy of Sciences recently completed a study in which it evaluated 12 variables[23] to measure energy poverty. Bulgaria has adopted an official definition of energy poverty based on this study. Bulgarian households, especially low-income ones, often face financial difficulties in paying energy bills. As a result, they may have to choose between meeting other essential needs and adequately heating their homes during winter. In Bulgaria, where average residential energy rates are over 37% higher than the European average, energy expenses represent a significant portion of household budgets, according to data from the International Energy Agency. The Bulgarian government has launched the Renewable Energy and Energy Efficiency Fund (EERSF)[24] to combat energy poverty. This fund finances projects that improve the energy efficiency of public and private buildings. One aspect of this is the increased use of renewable energy sources such as solar, geothermal, and hydrothermal energy.

The main goal is to reduce the energy consumption of buildings, which will reduce residential energy bills and increase the capacity of occupants to manage energy expenses.

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[19] Multiple faces of poverty. Exploring housing-costs-induced energy poverty in Central and Eastern Europe (2023)

[20] Our World in Data.

[21] A tonne of oil equivalent (toe) is a unit of energy measurement that represents the energy released by burning one ton of crude oil. It is used to compare different energy sources in terms of the amount of energy they contain, making it possible to directly compare, for example, coal, natural gas, nuclear energy, and renewable energies with oil.

[22]The analysis took into account macroeconomic indicators such as household income, GDP, inflation, employment, and energy resource prices.

[23]Indicators studied following the recommendations of the EU and the Energy Poverty Observatory in Brussels.

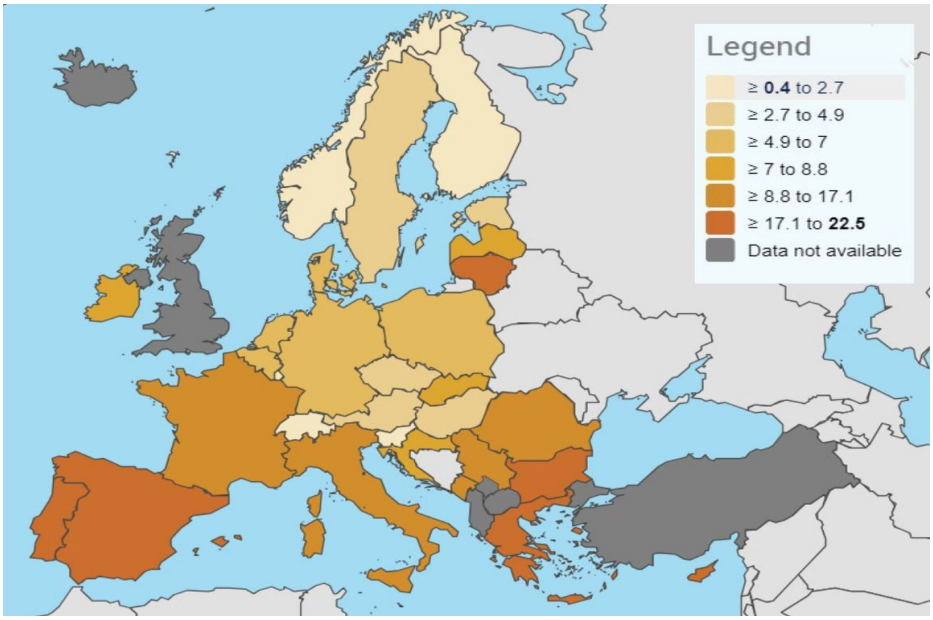
[24] In Bulgaria, it funds projects to improve energy efficiency and promote the use of renewable energy.

The EERSF is an effort to bridge the gap between the demand for affordable energy and the realities of often outdated and inefficient energy infrastructure that exists today. In addition to helping reduce energy poverty, the fund's support for renewable energy helps the nation achieve its broader goals of carbon emission reduction and developing an ecologically sustainable economy. This is in line with EU directives and goals for renewable energy and climate change mitigation.

These two case studies demonstrate how many socio-economic and infrastructural elements, which differ significantly between regions of the world, can influence energy poverty. In general, the phenomenon manifests and is considered differently globally. Niger faces challenges related to inadequate infrastructure and severely limited electricity availability, while Bulgaria has to deal with high energy costs and low domestic energy efficiency, both intensified by historical and political circumstances of the past. These different contexts highlight the need for diversified approaches to tackle energy poverty. In summary, the phenomenon of energy poverty manifests in different ways worldwide, depending on the specific socio-economic and infrastructural conditions of each country.

### 1.3 Contextualization in the European Union

**Figure 4 - Population unabel to keep home adequately warm by poverty status (%)**




Source: Eurostat

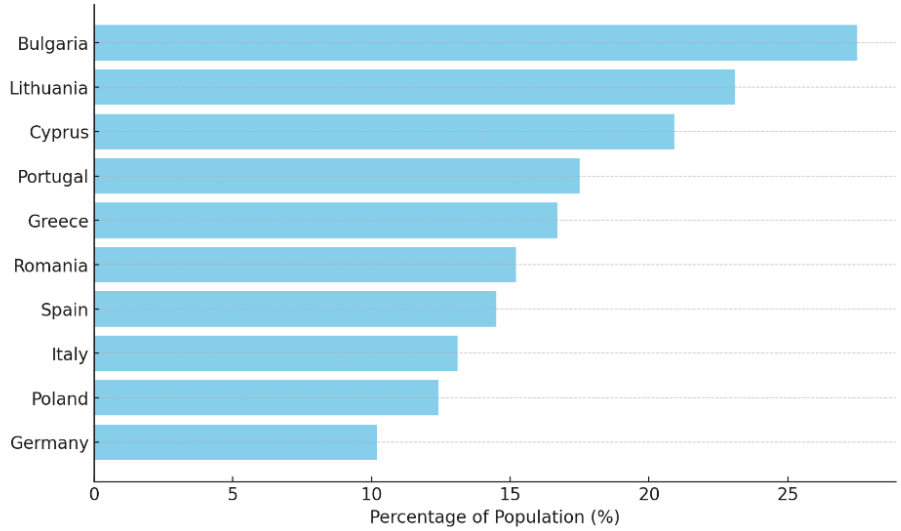
Through consultation of Eurostat[25], The Energy Poverty Dashboard[26], and the European Parliament Briefing on Energy Poverty[27], it was possible to lay the foundations for an initial contextualization of the phenomenon in the European continent. In 2022, over 41 million people in the EU, equivalent to 9.3% of the population, were unable to adequately heat their homes. By comparison, the 2021 rate was 6.9%[28].

During 2023, the spike in energy prices and the Russian invasion of Ukraine worsened the situation for millions of citizens.

This phenomenon is accompanied by further difficulties, with nearly 7% of EU citizens having overdue utility bills and almost 15% living in homes with leaks (data from 2020). Despite the EU making progress in integrating renewable energies into its energy mix over the decade from 2009 to 2019, with the share more than doubling from 6.4% to 15.8%, energy poverty remains widespread and persistent in Europe. In 2020, over 34 million people in EU countries were still struggling to adequately heat their homes due to high gas and electricity costs. This phenomenon has significant consequences for the health, well-being, and dignity of those affected. In Italy, for instance, 8% of families were in this situation, highlighting how, despite being one of the main European countries, it must face a critical challenge. Regarding the distribution of energy poverty, the variation between member countries is very significant, primarily in numerical terms.

[25] Data collection and processing from the member states of the European Union.
[26] The Energy Poverty Dashboard (EPD) offers online maps to show the geography of energy poverty, with data available at national, regional, and sub-regional levels. It also includes an interactive map of policies related to energy efficiency.
[27] The European Parliament Briefing on Energy Poverty provides a detailed overview of the phenomenon of energy poverty in the EU.
[28] Data source: Eurostat

**Figure 5 - Population reporting difficulties in heating homes adequately in EU (%)**




*Note: Only a few countries have been chosen for graphic clarity. The selected countries best represent the trend in the EU context*

Source: Eurostat and Energy Poverty Advisory Hub 2023

According to research carried out by Eurostat and the Energy Poverty Observatory[29] of the European Commission, Bulgaria stands out as the impacted country with 27.5% of participants, in the survey mentioning that they struggle to afford heating during winter. Other nations facing energy poverty levels are Lithuania (23.1%) Cyprus (20.9%) Portugal (17.5%) and Greece (16.7%). These statistics underscore the nature of this issue. Emphasize the necessity for targeted interventions.

In a context Italy ranks among the countries with energy poverty rates with 13.1% of its population affected by this challenge compared to the EU average of 8%. While this percentage is lower than in cases mentioned it is still alarming that a significant economic powerhouse within the EU experiences disparities in energy access and lacks support policies.

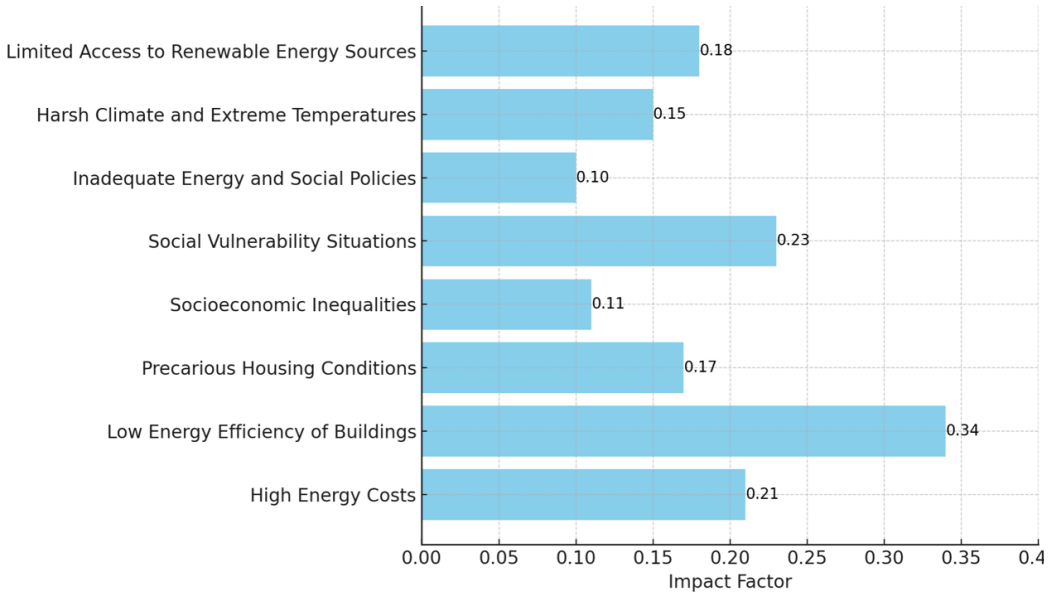
Conversely countries reporting levels of energy poverty include Austria (1.5%) Finland (1.8%) Czech Republic (2.2%) Netherlands (2.4%) and Poland (3.2%). Noteworthy

[29] The Energy Poverty Observatory is an initiative of the European Commission aimed at monitoring and addressing energy poverty. It collects and analyzes data from various European countries to provide a clear picture of the energy poverty situation and the policies implemented to address it.

percentages falling within ranges but still noteworthy are observed in countries, like France (6.5%) and Germany (9%).The differences, in energy poverty between Europe and other parts of the world are quite apparent. While high energy costs are a concern across the continent Europe stands out for its better infrastructure and electricity access compared to other regions. Despite this consistency the challenges of energy poverty vary significantly within Europe influenced by factors such as conditions, energy policies and climate diversity, in countries.

### 1.3.1 Causes and factors in Europe

**Figure 6 - Cause and factors of energy poverty in Europe**




*Note: The x-axis uses a continuous measurement scale ranging from 0 to 0.35*[30] *(0=low impact, 0.35=significant impact).*

*This factor represents the relative impact of each factor on energy poverty.*

Sources: Graph created by the author for illustrative purposes, combining data from annual reports official publications[31] and organizations' databases[32].

[30] A scale of 0 to 0.35 was used for statistical convenience. A scale from 0 to 1 might have suggested equally contributing factors, so they are normalized, and comparison is easier.
[31] Eurostat, IEA, European Commission, UNDP, FAO, EBRD, IRENA
[32] Energy Poverty Observatory

The graph illustrated in Figure 6 provides a visual representation of the main factors contributing to energy poverty in Europe. Using an impact scale ranging from 0 (low impact) to 0.35 (significant impact), the graph highlights how the energy efficiency of buildings, high energy costs, and social vulnerability situations are the primary contributors to this phenomenon. Notably, the energy efficiency of buildings emerges as the factor with the greatest impact (0.34), followed by high energy costs (0.21) and precarious housing conditions (0.17).

The main causes and factors, deserving of a more in-depth analysis and contributing to the spread of this phenomenon in the continent, are:

- High Energy Costs: According to Eurostat, in 2020, the average electricity price in the EU was about 0.21 € per kilowatt-hour, but this figure varies significantly from country to country. For example, in Germany, one of the largest energy consumers in the EU, the average electricity cost was about 0.30 € per kilowatt-hour, while in Bulgaria, a country with one of the highest rates of energy poverty, the cost was about 0.11 € per kilowatt-hour. These high energy costs can endanger the well-being of low-income families, who must allocate a significant part of their household budget to paying energy bills.
- Low Energy Efficiency of Buildings: Another important cause of energy poverty is the low energy efficiency of buildings. Many European countries have an aging building stock characterized by structures that are not energy-efficient, requiring an excessive amount of energy for heating and cooling. For example, in Romania, 34.2% of the population lives in energy poverty, and many homes are equipped with outdated and poorly insulated heating systems. This leads to increased energy costs for families, who often must choose between adequately heating their homes and meeting other basic needs.
- Precarious Housing Conditions: Precarious housing conditions are a significant factor contributing to the spread of energy poverty in Europe. Many individuals and families live in homes lacking proper thermal insulation, with windows that lose heat and inefficient heating systems. In countries like Greece, where 16.7% of the population is involved in energy poverty, homes often do not have adequate

heating systems, making it difficult to maintain a comfortable indoor environment during the winter months.

- Socioeconomic Inequalities: Socioeconomic inequalities play a significant role in the spread of energy poverty in Europe. Low-income families are particularly vulnerable to energy price increases and often face difficult choices between adequately heating their homes and meeting other essential needs such as food and healthcare. For example, in Italy, where 11% of the population lives in energy poverty, many families face increasingly burdensome energy bills, which can represent a significant portion of their disposable income.
- Social Vulnerability Situations: Energy poverty is often associated with situations of social vulnerability, including unemployment, illness, and social isolation. In countries like Lithuania, where 23.1% of the population lives in energy poverty, the elderly and children are particularly at risk, often struggling to maintain a comfortable and safe home environment. People with chronic health issues can also be at higher risk, as precarious housing conditions and prolonged exposure to extreme temperatures can worsen their symptoms and increase the risk of complications.
- Inadequate Energy and Social Policies: Inadequate energy and social policies can contribute to the spread of energy poverty in Europe. The lack of support programs for low-income families, the lack of incentives for energy efficiency in buildings, and the lack of regulations to ensure equitable access to energy can exacerbate the problem and create disparities in social and energy protection. For example, in Spain, where 10.1% of the population lives in energy poverty, the lack of incentives for installing solar panels and other renewable energy sources can hinder efforts to reduce energy costs and improve building energy efficiency.
- Harsh Climate and Extreme Temperatures: In some regions of Europe, harsh climate and extreme temperatures can exacerbate energy poverty. For example, in the Baltic States, where winter temperatures can drop well below zero, families face higher energy costs to keep their homes warm and comfortable. The need for supplemental heating can lead to increased energy bills and a higher risk of energy poverty for low-income families.

- Limited Access to Renewable Energy Sources: In some areas of Europe, limited access to renewable energy sources can contribute to energy poverty. Countries with poor renewable energy infrastructure or underdeveloped energy policies may have a greater dependence on costly and unsustainable energy sources, increasing the risk of energy poverty for local communities. For example, in Poland, a country with a high dependency on coal and other fossil energy sources, the average electricity cost can be higher than the European average, endangering the well-being of low-income families.

(Analysis conducted against the review of some journal articles[33] and online articles[34])

### 1.3.2 Policies to support households

European countries have implemented strategies to assist households in accessing energy in a sustainable manner regardless of their situation. These initiatives involve actions to lower energy expenses enhance building efficiency and encourage the use of energy sources.

A notable approach, to addressing energy poverty in Europe is the introduction of social energy tariffs in countries. These tariffs aim to provide discounted rates or benefits on energy bills for individuals with incomes. For instance, France offers the Tarif de Première Nécessité (TPN) scheme that reduces energy costs for recipients of assistance while the United Kingdoms Warm Home Discount program provides aid directly to vulnerable consumers[35].

Moreover, different European nations have initiated programs focused on improving building quality and insulation to reduce energy expenses for low-income households. In Germany the KfW program promotes building energy renovations through subsidized loans and grants for installing insulation and efficient heating systems.[36]

Additionally backing energy sources is crucial in addressing energy poverty by offering incentives and tax advantages for adopting technologies, like solar panels and other

[33] Understanding energy poverty drivers in Europe (2023)
[34] Why energy poverty is rising among low-income households in the EU (2022) -
[35] Commission publishes recommendations to tackle energy poverty across the EU (2023)
[36] How EU funded projects help citizens escape the energy poverty trap (2023)

renewable solutions. In Spain the Integrated National Energy and Climate Plan (PNIEC) offers benefits, for households generating their energy while Italy's Conto Energia promotes investments in energy with incentives and tax advantages.[37]

Bulgaria serves as an example of support policies in combating energy poverty in Europe.[38] Various initiatives have been implemented to assist households, such as discounted electricity and gas rates for families funding for building insulation and encouragements for using energy technologies. These efforts have led to a decrease in the number of families facing energy poverty and an enhancement, in the well-being of its residents.

### 1.4 EU policies and directives

The European Union (EU) has introduced a series of policies and directives to address this issue, guided by core principles, like unity among member states fostering competition and innovation and protecting the environment. The EUs energy regulations focus on ensuring sustainable access to energy for everyone while also working to greenhouse gas emissions and promote energy efficiency.

The Clean Energy Package consists of directives and rules designed to support the shift towards a sustainable energy system. This package includes actions such as setting targets for cutting greenhouse gas emissions enhancing energy efficiency and encouraging energies.[39]

Among the main directives and regulations included in the package are:

- The Renewable Energy Directive (EU) 2018/2001 which establishes an EU goal of reaching a minimum of 32% energy by 2030.
- The Energy Efficiency Directive (EU) 2018/2002 which sets a binding target to improve energy efficiency by 32.5% by 2030.

[37] What are European countries doing to reduce the impact of rising energy prices on homes and businesses? (2022)
[38] How EU funded projects help citizens escape the energy poverty trap (2023)
[39] Commission publishes recommendations to tackle energy poverty across the EU (2023)

- The Regulation on Risk Preparedness in the Electricity Sector (EU) 2019/941, which aims to ensure the security of energy supply through risk readiness plans.[40]

Additionally other important policies include:

- Regulation (EU) 2018/1999, on Governance of the Energy Union and Climate Action. This rule sets up a structure, for coordinating and overseeing the energy and climate goals of the EU until 2030 and beyond. It mandates that member states develop National Energy and Climate Plans (NECPs) outlining strategies to meet emission reduction targets boost energy usage and enhance energy efficiency. These plans should also address considerations, such as minimizing the impact of the energy transition on populations to ensure inclusivity
- Strategy for Energy System Integration (2020); The EUs Energy System Integration Strategy aims to establish an energy system with renewable energies and energy efficiency at its core. The objective is to enhance connectivity among energy sectors (electricity, heat, transport, industry) to maximize resource utilization efficiency. This strategy advocates for the adoption of technologies like hydrogen and energy storage while supporting the digitalization of the energy sector for optimized distribution and consumption.
- Just Transition Fund (2021); As part of the European Green Deal this fund is designed to assist regions most affected by the shift, towards an economy.
  With a budget exceeding €17 billion allocated for the period of 2021 2027 the fund supports initiatives that boost employment in eco industries, aid, in worker retraining and enhance the energy efficiency of households. It plays a role in ensuring that the shift towards energy is not only environmentally conscious but also socially equitable.[41]
- The Electricity Market Directive (EU) 2019/944 aims to establish a adaptable and consumer centric electricity market. It includes provisions to safeguard consumers and combat energy poverty by mandating member states to define criteria for identifying vulnerable consumers and implement measures for their protection.[42]

[40] Energy poverty – European commission website
[41] Energy poverty – European commission website
[42] National fiscal policy responses to the energy crisis (2023)

- As part of the Clean Energy Package, the Energy Efficiency Directive (EU) 2018/2002 sets a target to increase the EUs energy efficiency by 32.5% by 2030. It encourages the adoption of practices that enhance energy efficiency in residences leading to reduced energy expenses for households and contributing to efforts, against energy poverty.[43]
- The Renovation Wave Strategy seeks to double the rate of building renovations within the decade. Its focus lies on enhancing the energy efficiency of both private buildings those inhabited by individuals facing vulnerabilities. The strategy includes incentives and technical assistance to promote energy building upgrades.[44]
- The European Social Climate Fund was set up to help those most affected by the shift, to a low carbon economy aiding handle the costs linked to decarbonization efforts. Its goal is to ensure that the transition to energy is just and fair aiming to lessen socio gaps.[45]
- The Regulation (EU) 2020/852 on Activities outlines criteria for determining if an economic activity is environmentally sustainable. It encourages investments in activities that help combat climate change, such as energy and energy efficiency ultimately working towards reducing energy poverty and promoting an economy.[46]
- The LIFE Program serves as the tool in the EU for environmental and climate initiatives. It backs projects that boost energy efficiency and renewable energy usage enhancing living standards and tackling energy poverty. The program also includes activities aimed at raising awareness among citizens and involving them in energy policies.[47]
- Climate Regulation (EU) 2021/1119 commonly referred to as the EU Climate Law enforces the EUs commitment, to achieving climate neutrality by 2050 through means. It sets goals to decrease greenhouse gas emissions and advocates

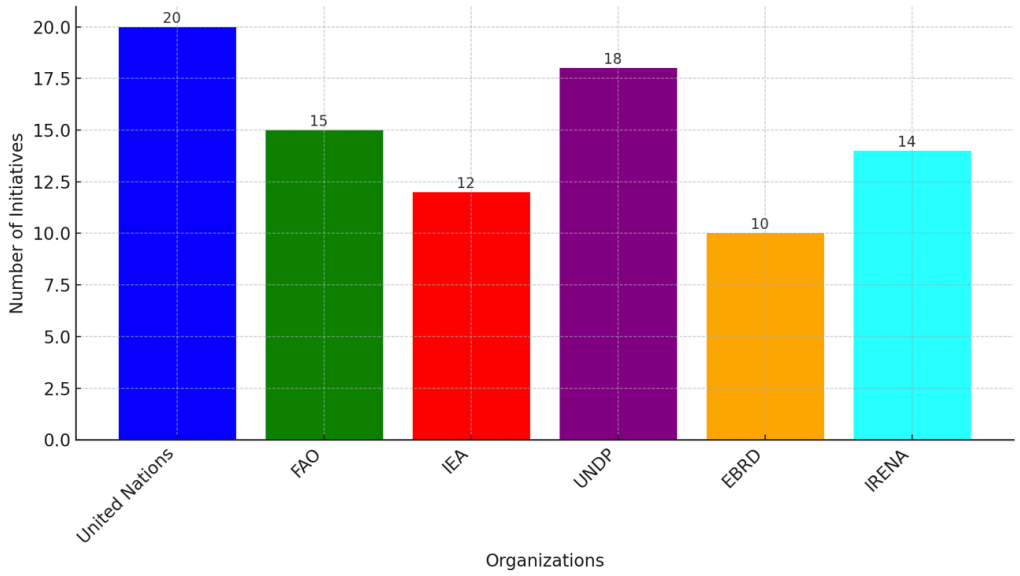
[43] Commission publishes recommendations to tackle energy poverty across the EU (2023)
[44] What are European countries doing to reduce the impact of rising energy prices on homes and businesses? (2022)
[45] Energy poverty – European commission website
[46] What are European countries doing to reduce the impact of rising energy prices on homes and businesses? (2022)
[47] How EU funded projects help citizens escape the energy poverty trap (2023)

for actions that tackle energy poverty by shifting towards energy sources and improving energy efficiency.[48]

### 1.5 Role of supranational organizations

International organizations, like the United Nations (UN) and the Food and Agriculture Organization (FAO) play a role in advancing energy access and addressing energy poverty on a scale. These institutions through their dedication and wide range of programs aim to ensure that all communities those in need can enjoy fair and sustainable access to energy.

**Figure 7 - Initiatives by supranational organizations in energy poverty mitigation**




*Note: The number of initiatives is based on a cumulative historical estimate.*

Source: Data prepared by the author for illustrative purposes, based on annual reports, official publications, and databases from the organizations[49].

[48] Energy poverty – European commission website

[49] UN: SE4All Global Tracking Framework, UNDP Human Development Reports
FAO: FAO State of Food and Agriculture Reports, FAO Statistical Yearbook
IEA: World Energy Outlook, Energy Technology Perspectives
UNDP: Human Development Reports, Annual Report
EBRD: Transition Report, Annual Sustainability Report
IRENA: Renewable Energy Statistics, Global Renewables Outlook

*UN, United Nations*

The UN, including initiatives like Energy for All (SE4All) is instrumental in fighting energy poverty and advocating for access to modern energy sources. Launched in 2011 by UN Secretary General Ban Ki moon SE4All strives to achieve energy access enhance energy efficiency and boost the use of renewable energy worldwide by 2030. The United Nations is committed to promoting energy efficiency encouraging energy usage and enhancing energy accessibility— in remote or disadvantaged areas.

The Sustainable Energy for All program stands as an effort that prioritizes access, to sustainable energy as a key sustainable development objective.
This ambitious initiative focuses on three objectives.

- Ensuring access, to energy for everyone; SE4All strives to provide reliable and sustainable energy sources to people particularly those in rural and underprivileged communities. Currently 789 million individuals worldwide lack access to electricity while many others depend on traditional energy sources like firewood and coal.
- Enhancing energy efficiency; The second aim of SE4All is to boost energy efficiency across sectors such as industry, transportation, construction and agriculture. By cutting down on energy consumption and enhancing energy processes effectiveness there's potential to lower impact and energy expenses while boosting competitiveness and security.
- Promoting energy adoption; SE4All advocates for the increased use of energy sources like power, wind power, hydroelectricity and biomass. Renewable energies play a role in reducing greenhouse gas emissions addressing climate change concerns and ensuring access, to clean energy. SE4All works towards overcoming financial and technological obstacles that impede the development and adoption of renewable energies.

To meet these objectives SE4All partners, with governments, international organizations, the private sector and civil society to craft policies, investments and initiatives that support energy access and the shift towards a cleaner and more efficient energy

infrastructure. While operating globally the program also concentrates on tackling the issues faced by underserved communities and regions.

Through programs and projects SE4All has made a worldwide impact by enhancing energy accessibility advocating for energy efficiency and promoting the adoption of renewable energy sources across numerous nations.[50]

*FAO, Food and Agriculture Organization*

The Food and Agriculture Organization (FAO) is an agency of the United Nations dedicated to advancing food security and sustainable agricultural progress on a scale. Within this context FAO recognizes the role of energy in strengthening activities and improving living standards in rural areas. Addressing energy access in settings—where energy poverty's often more pronounced—is a key focus area, for FAO. The organization promotes farming practices that leverage renewable energy sources to combat this issue.

FAO is working towards helping farmers access water for irrigation independently of power sources by promoting the use of powered irrigation systems. These modern technologies aim to reduce reliance, on non-renewable energy while boosting productivity. Additionally, FAO advocates for the adoption of energy stoves in areas to decrease the use of wood and fossil fuels for cooking. These stoves facilitate a utilization of energy resources reduce harmful emissions and enhance air quality and health in households. FAO also focuses on sharing food preservation methods that consume energy enabling communities to store their produce effectively and minimize wastage. For instance, the promotion of solar refrigeration systems or dryers can aid farmers in preserving fruits, vegetables and other goods without depending on electrical appliances.

Furthermore, FAO collaborates with governments and organizations to design tailored policies and initiatives addressing energy challenges in regions. This involves implementing community-based energy projects facilitating microcredit access for purchasing energy solutions well as educating communities, about the benefits of renewable energy sources.[51]

[50] Sustainable Energy for All – United Nations (website)
[51] FAO website, Energy Access

*Other Supranational Organizations*

Other supranational institutions, in addition to the UN and FAO, play an important role in advancing energy access and battling energy poverty.

For example, the World Bank[52] finances projects aimed at promoting the installation of off-grid solar systems in rural areas of sub-Saharan Africa[53], thus providing clean and accessible energy to communities otherwise without access to the traditional electrical grid. In addition to the previously mentioned organizations, several other supranational agencies play a significant role in the fight against energy poverty and the promotion of universal access to energy. These include:

- **International Energy Agency (IEA)[54]**: The IEA provides in-depth analysis, data, and policy recommendations aimed at promoting energy security, energy efficiency, and the development of renewable energy sources. It collaborates with governments and other organizations to address challenges such as energy poverty and climate change.[55]
- **United Nations Development Programme (UNDP)[56]**: The UNDP implements local-scale projects to improve energy access in rural and urban communities in developing countries. These projects include the installation of decentralized energy systems, such as home solar systems and mini grids, to provide clean and accessible energy to populations otherwise without energy services.[57]
- **European Bank for Reconstruction and Development (EBRD)[58]**: The EBRD provides funding and technical assistance to support sustainable energy projects and energy infrastructure in Eastern Europe and Central Asia. These projects may

[52] An intergovernmental international organization founded to control the distribution of economic aid among member nations and to provide loans in times of financial crises. Its main objective is to combat poverty by offering development assistance to middle and low-income countries.
[53] Off-Grid Solar Market Trends Report (2020)
[54] An intergovernmental organization that supports countries in their transition towards a sustainable energy future. The IEA provides analysis, data, policy recommendations, and solutions to ensure energy security and promote the adoption of renewable energies.
[55] International Energy Agency (IEA) - website
[56] A subsidiary body of the United Nations General Assembly established in 1966. It assists beneficiary countries in implementing economic and structural reforms, promoting the development of the private sector, and integration into the international economy.
[57] UNDP website - Sustainable Energy Hub
[58] An international financial institution operating in the countries of Central and Eastern Europe and Central Asia. It supports the implementation of economic and structural reforms, promoting the private sector and integration into the international economy

include upgrading existing electrical grids, promoting energy efficiency, and developing renewable energy sources.[59]

- **International Renewable Energy Agency (IRENA)[60]**: IRENA is an intergovernmental organization that promotes the adoption and use of renewable energies globally. It provides technical assistance, data, and analysis to support the development of renewable energies in member countries, thus contributing to reducing dependence on traditional energy sources and improving access to sustainable energy.

To address the issue of energy poverty and promote sustainable energy access worldwide these groups work together with governments, financial institutions and non-governmental organizations. Their initiatives involve creating energy on a scale promoting energy conservation and establishing decentralized energy systems in rural areas.

[59] EBRD website – Energy section
[60] It assists countries in the transition towards a sustainable energy future. It operates as a platform for international cooperation, a center of excellence, and a source of policies, technologies, and financial resources on renewable energy

# Chapter 2 - Determinants of Energy Poverty in Italy

As mentioned before energy poverty shows variations, from one country to another shaped by geographical, political and social factors within each nation. In the case of Italy, it is crucial to explore concepts to understand the factors contributing to this issue define its extent and grasp its implications on the economy and the daily routines of citizens.

Beginning with an analysis of the energy market the investigation delves into examining political and housing aspects. The goal of this exploration is to offer a view that can guide the formulation of targeted solutions aimed at addressing the problem.

It is essential to acknowledge that while energy poverty poses a challenge Italy's situation presents features compared to other global contexts. Hence addressing the specifics of the scenario requires an approach that considers the nuances of the national setting.

A thorough examination of factors influencing energy poverty in Italy forms a foundation for devising strategies that not only alleviate immediate impacts but also foster a sustainable evolution in the countrys energy landscape – promoting fairness, accessibility and resilience, against future uncertainties.

## 2.1 Structure of the Energy Market in Italy

The energy sector, in Italy has a setup, influenced by policies promoting competition, local laws and the impact of guidelines especially those related to environmental sustainability. The structure of the market involves steps like producing energy transmitting it distributing it and selling it. All of which are crucial for the countrys energy framework.

When it comes to generating power in Italy there is a mix that includes sources like natural gas alongside an increasing use of renewable sources like solar, wind, water-based hydropower and geothermal energy. Italy stands out in Europe for its progress in developing energy sources due, to weather conditions and government initiatives that encourage eco-friendly power generation.

According to the GSE Statistical Report 2023[61], renewables accounted for about 41% of total electricity production in Italy in 2022, a figure that is steadily increasing in line with the decarbonization goals set by the European Union.

The management of the transmission grid is entrusted to Terna, which operates as the high-voltage transmission network operator, ensuring the stability and efficiency of the national electricity system.[62] The distribution networks, which transport energy from transmission stations to end-users, are managed by various regional and local operators.

According to Terna's 2023 National Transmission Grid Development Plan, further investments are planned to improve the resilience of the grid and integrate a growing share of renewable energy.

The Regulatory Authority for Energy, Networks, and Environment (ARERA) plays a central role in regulating the energy market. ARERA is responsible for setting tariffs, promoting competition and efficiency among various market players, protecting consumer rights, and encouraging investments in infrastructure and innovative technologies. Additionally, ARERA monitors the market to prevent anti-competitive practices and ensure that access to energy networks is fair and non-discriminatory. The ARERA Annual Report 2023[63] highlights how the authority has implemented new measures to support the energy transition, with particular attention to the protection of vulnerable consumers and technological innovation.

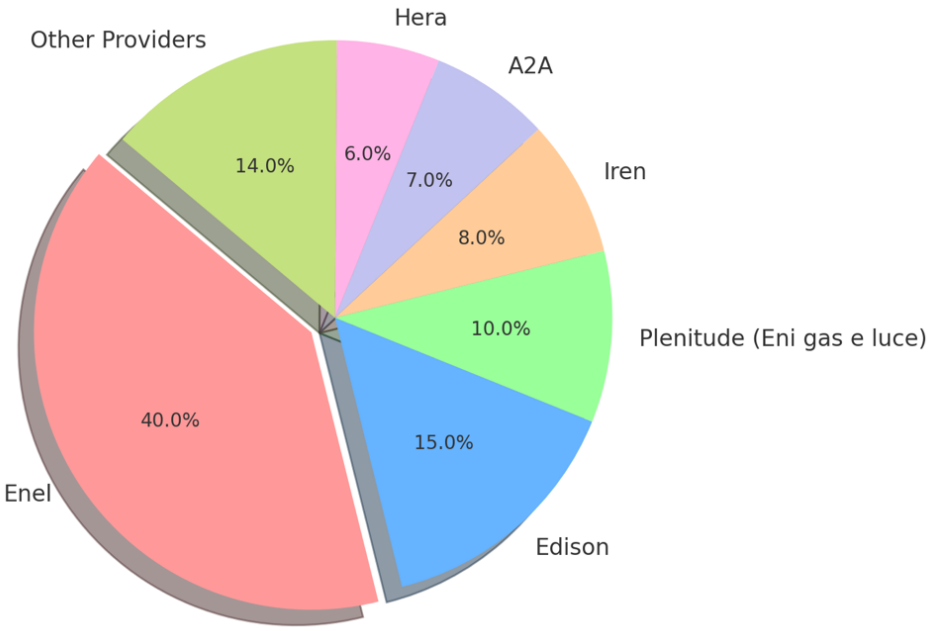
The existing market setup reflects an equilibrium, between the demands of the market environmental requirements and the need to guarantee energy security and accessibility for all individuals. This framework undergoes adjustments and enhancements to maintain its strength in dealing with obstacles, such, as those arising from climate change and advancements in energy technologies.

[61] Annual publication providing a detailed overview of renewable energy production, consumption and development in Italy.
[62] Terna's National Transmission Grid Development Plan 2023
[63] Official publication that provides a detailed analysis of regulatory activities in the Italian energy market, including tariffs, competition, energy efficiency and consumer protection.

### 2.1.1 Suppliers

In Italy the energy sector sees suppliers providing electricity and gas services across the country. Since the 1990s market liberalization has brought about a range of suppliers including established companies and emerging players offering attractive deals and cutting-edge services.[64]

**Figure 8 - Market share of major energy providers in Italy**




Source: ARERA Annual report[65], GSE Statistical report[66], Statista report on energy providers in Italy[67]

As highlighted in Chart 8, Enel stands out as the largest supplier, holding a 40% market share. Enel not only dominates the electricity production and distribution market but also plays a significant role in the renewable energy sector through Enel Green Power. Its extensive offerings include solutions for energy efficiency, self-consumption with storage systems, and electric mobility.

[64] ARERA Annual report 2023
[65] Provides an overview of the Italian energy market, including the market share of the main suppliers.
[66] Details on the energy mix and the distribution of suppliers in the Italian market.
[67] These reports provide information on companies' financial and strategic performance, detailing sustainability initiatives, technological innovation, and their market shares in the energy transition.

Edison, representing 15% of the market and part of the French EDF group, operates in both the natural gas and electricity markets. Edison is known for its commitment to developing renewable energy projects and environmental sustainability solutions, in addition to offering traditional energy services.[68]

Plenitude (Eni gas e luce), with a 10% market share, is also a major supplier, particularly recognized for its natural gas and electricity services. The company recently rebranded to reflect its commitment to renewable energy and the circular economy.[69]

Other significant suppliers, such as Iren, A2A, and Hera, cover 8%, 7%, and 6% of the market, respectively. These multi-utility companies[70] operate in various Italian regions and provide a wide range of services, from electricity and gas distribution to waste and water management, demonstrating a strong commitment to environmental sustainability policies.[71]

In addition to the major suppliers, the Italian market includes numerous smaller companies, which collectively hold 14% of the market. These operators often focus on specific niches, such as green energy or innovative tariff offerings, contributing to a dynamic and constantly evolving market.[72]

### 2.1.2 Energy Prices

Energy prices, in Italy are famously known for their unpredictability impacted not by shifts in oil and gas markets but also by internal regulations and adaptations to European energy and environmental standards. This instability can greatly affect consumers, who might encounter rises in energy expenses.

The Italian energy market is split into two segments: the market and the regulated tariff system. Understanding this division is crucial to grasp how Italian consumers buy energy and the choices they have at their disposal.

In the market, which was introduced in the 1990s as part of a broad liberalization effort across Europe consumers have the freedom to select their own energy provider. In this

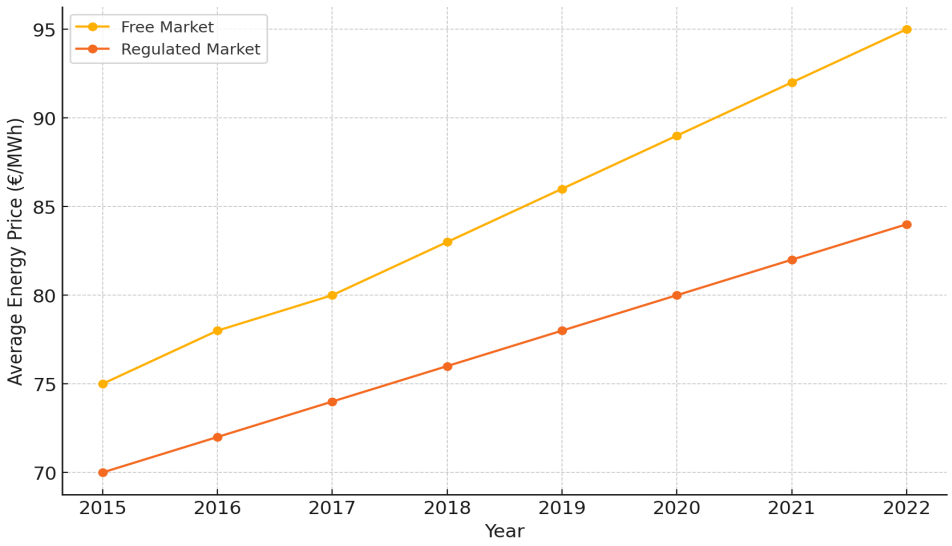
[68] Edison sustainability report
[69] Plenitude Sustainability Report 2023
[70] Multi-utility companies are enterprises offering a diverse range of public services, including the distribution of electricity, gas, water, waste management, and sometimes telecommunications.
[71] Iren sustainability report 2023, A2A sustainability report 2023, Hera sustainability report 2023
[72] ARERA Annual report 2023

sector state authorities do not dictate energy prices; instead, they are influenced by competition among suppliers. As a result, energy companies can propose pricing and exclusive offers to entice customers based on marketing strategies and procurement costs. However, this liberty also brings about some price fluctuations as rates can vary in response to shifts in energy markets and supplier business tactics.

On the contrary regulated tariffs or "maggior tutela" is a system established by the Regulatory Authority, for Energy, Networks and Environment (ARERA).

Before the market opened this service was the option, for consumers. It is still in place for those who haven't made the switch to the market. Prices are. Overseen by ARERA to prevent price changes and ensure fair energy access for consumers. These rates are adjusted based on energy procurement costs and economic factors providing stability compared to the open market. However, these regulated prices tend to be higher, than the deals offered in the market.

**Figure 9 - Changes in energy prices in Italy (2015-2023)**




Source: ARERA – Annual report 2023[73] and GSE (Gestore dei Servizi Energetici) - Statistical Report 2023[74]

[73] Information on average energy prices in the different segments of the Italian market.
[74] Data on the composition of the Italian energy mix and the evolution of the energy market.

Chart 9 shows the changes, in electricity costs for the market and the regulated market in Italy between 2015 and 2023. Both markets exhibit a trend with the open market generally having higher average prices compared to the regulated rates. This trend is primarily influenced by the markets exposure to oil and gas price fluctuations, as well as national energy policies and European energy and climate regulations.

The rise in prices in the market is also intensified by increased competition among suppliers. While this competition offers consumers a range of pricing options it can also result in price fluctuations.

Over time the chart demonstrates how the price gap between the two markets has widened, underscoring the growing instability of the market during periods of significant turmoil, in global energy markets.

Regional dynamics and local energy policies further contribute to the variability of energy prices in Italy. Regions with higher adoption of renewable energy, such as Puglia and Sicily, tend to benefit from greater price stability, thanks to reduced reliance on imported fossil fuels.[75] Conversely, areas that rely more heavily on fossil fuels, such as industrialized Northern Italy, may be more vulnerable to fluctuations in global energy costs.

Looking ahead, the evolution of renewable technologies and adaptation to European climate policies will be crucial in mitigating price volatility and ensuring a more sustainable and accessible energy supply.[76] The transition to a low-carbon energy system, in line with the objectives of the European Green Deal, will play a key role in defining the stability and competitiveness of the Italian energy market.

### 2.1.3 Tariff Policies

Tariffs, in the energy sector play a role in ensuring a fair and sustainable energy market for both individuals and businesses. ARERA oversees the setting of energy tariffs based on factors such as production and distribution costs alongside efforts to promote energy efficiency and renewable sources. The structure of energy tariffs in Italy aims to incentivize usage by adjusting rates based on consumption levels, location and time of

[75] GSE Statistical report 2023
[76] European Green Deal

day. This approach helps alleviate strain on the grid during peak periods while encouraging the adoption of energy solutions. Through this tariff system consumers are encouraged to be more conscientious, about their energy usage contributing to Italy's environmental sustainability goals.

For domestic consumers, particularly low-income and vulnerable families, the Italian government has introduced various support measures. Among these, the Social Energy Bonus[77] is a key measure that provides a discount on electricity and gas bills for families that meet certain economic requirements, such as an Equivalent Economic Situation Indicator (ISEE) below a certain threshold.[78] This policy aims to reduce the burden of energy expenses on household budgets, helping to combat energy poverty.

Businesses implement tariff policies to promote energy efficiency and the use of energy sources. As an illustration companies that consume a lot of energy can enjoy reduced tariffs by investing in eco-friendly technologies. These incentives play a role, in enhancing the competitiveness of businesses cutting down on operational expenses over time and playing a part, in lowering greenhouse gas emissions.[79]

Public organizations also find advantages, in tailored tariff strategies providing reduced rates for initiatives that support sustainability. A notable instance is the adoption of LED lighting systems by governments, which bring about significantly improved energy efficiency compared to traditional methods. These investments, backed by discounted rates and government incentives not operating expenses for public bodies but also play a role in lessening environmental impact.

The tariff policies are crafted to be versatile and responsive addressing the challenges brought about by fluctuations in the energy market and advancements in technology. By conducting tariff evaluations and maintaining vigilance, over the system ARERA ensures that the Italian energy sector remains equitable and accessible while encouraging sustainable energy consumption practices.

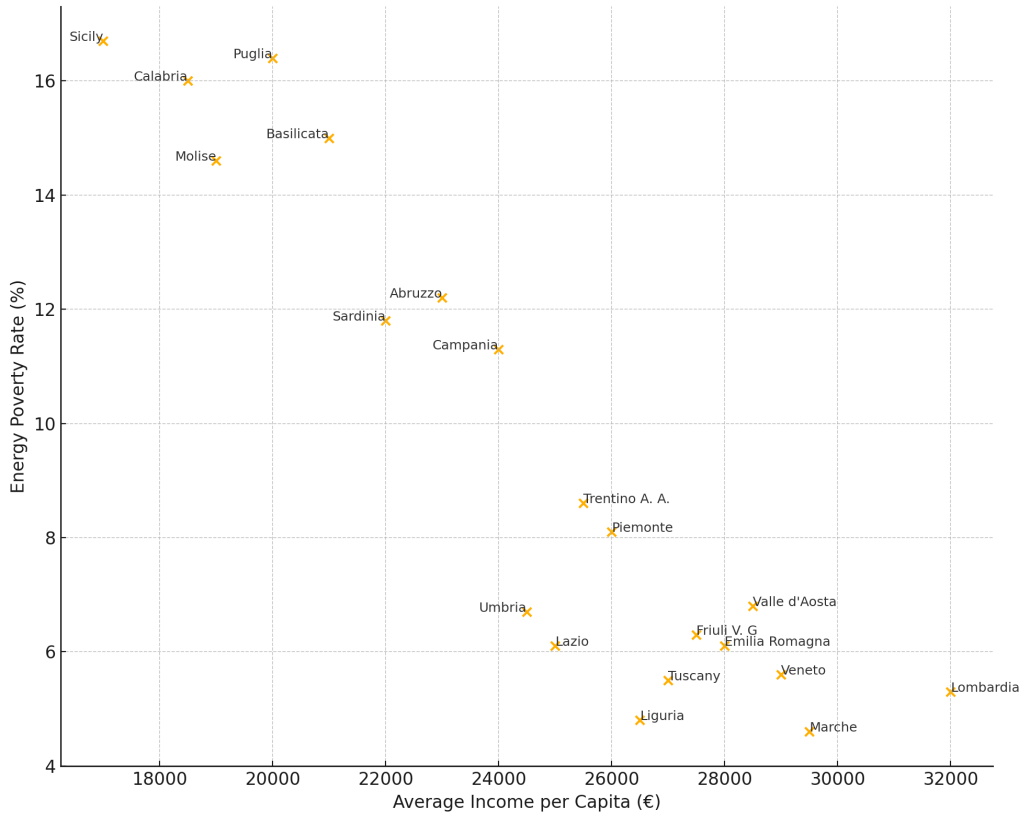
[77] Envisaged by the government and made operational by the Regulatory Authority for Energy Networks and Environment (ARERA)
[78] ARERA website – Social Bonus section
[79] Ministry of Ecological Transition – Annual report

## 2.2 Socioeconomic Factors

In Italy, as in other nations, changes in socioeconomic conditions can greatly affect energy fairness and the well-being of individuals. Economic markers like earnings, disparity and community integration offer a perspective, on the obstacles various groups may encounter in securing energy access. These elements do not impact individuals' lifestyles. Also determine the approaches needed to guarantee long lasting and equitable energy access.

### 2.2.1 Income – energy poverty relationship

**Figure 10 - Relationship between average income and energy poverty rate**




Sources: Author's calculations obtained from the 2023 Report of the Italian Observatory on Energy Poverty (OIPE)[80], ISTAT, Eurostat[81].

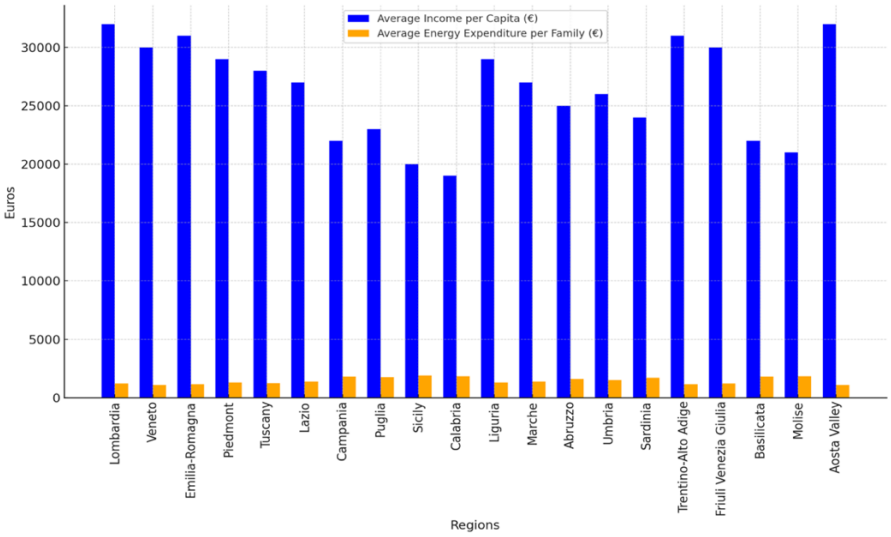
[80] From the OIPE it was possible to extract data on the energy poverty rate of Italian regions. This report provides a detailed estimate of the incidence of energy poverty in the various Italian regions.
[81] Using ISTAT or specific reports such as those published by Eurostat, it was possible to derive the average income per capita.

According to the data, in Graph 10 the income distribution across regions in Italy reveals that Northern areas generally have per capita income compared to those in the South and the Islands. This disparity in income levels influences access to energy services and the ability of households to afford expenses leading to varying rates of energy poverty.

Graph 10 demonstrates a link between per capita income and energy poverty rates. Regions like Lombardy and Veneto in the North with incomes exhibit energy poverty rates below 12%. In contrast Southern regions such as Sicily and Calabria with incomes face energy poverty rates exceeding 25%. The economic gap between North and South significantly impacts energy poverty across parts of Italy.

The established infrastructure and strong industrial presence in Northern Italy does not create more economic opportunities but also ensure more stable household incomes resulting in improved access, to efficient modern energy services. On the hand Southern regions and the Islands characterized by an economic structure and higher unemployment rates encounter substantial challenges.

**Figure 11 - Comparison of average income and energy expenditure by region**




Sources: Author's calculations obtained from ARERA[82] reports, other studies such as those mentioned in the OIPE 2023 report, ISTAT and Eurostat[83].

[82] From ARERA (Energy, Networks and Environment Regulatory Authority) it was possible to obtain data on the average energy expenditure per household.
[83] From ISTAT and Eurostat it was possible to obtain data on Average Income Per Capita.

Energy infrastructure, in these areas may not always meet needs. As indicated in Graph 11 households in these regions tend to spend on energy compared to their income making the situation worse.

The lack of access to affordable energy services in the regions and Islands can make living conditions more challenging putting families at a higher risk of energy poverty. A shortage of heating in winter can have negative impacts on people's health. Additionally inefficient energy usage leads to bills, further impacting income as highlighted by the significant energy costs relative to lower incomes in certain southern areas.

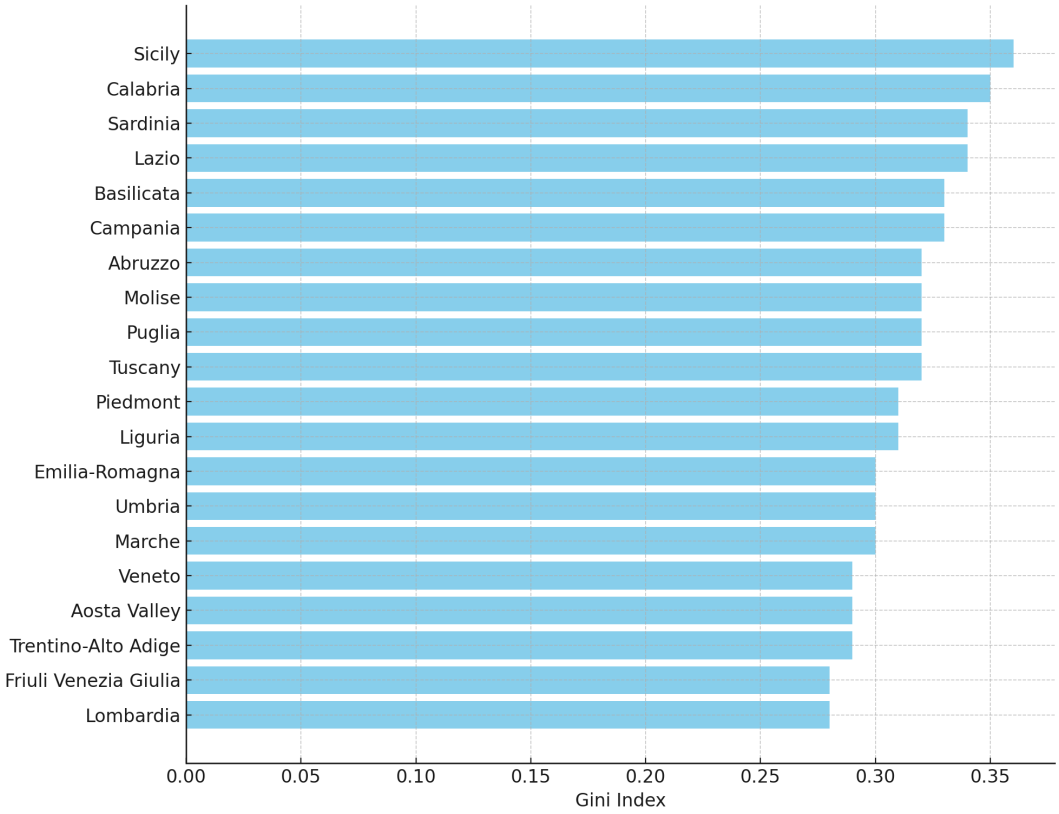
In essence tackling energy poverty in the South and Islands involves not addressing income disparities but also ensuring access to cost effective energy sources. The graphs illustrate that addressing this issue effectively necessitates an understanding of dynamics and a united effort involving government bodies, local authorities and private sectors to ensure that everyone has access to reliable and affordable energy. While national regulations govern energy tariffs local factors such as distribution costs. Which are often higher in island or mountainous regions due, to challenges. Can influence prices at a level. This places a strain, on low-income households making it harder for them to handle energy expenses efficiently. The influence of income on living standards goes beyond paying bills. Energy poverty can result in outcomes, such as decreased ability to properly heat homes leading to adverse effects on physical well-being.

Moreover, the substandard housing quality, in regions can worsen the situation by escalating the energy needed to sustain adequate living conditions.

### 2.2.2 Inequality: The Gini Index and Access to Energy Services in Italy

The Gini index is a measure that assesses the disparity, in income levels among people in a community. A Gini index of 0 signifies equality, where everyone earns an income whereas an index of 1 suggests extreme inequality with one individual holding all the income while others have none. In Italy examining Gini indices in regions shows differences that may be associated with access, to energy resources and challenges related to energy poverty.

**Figure 12 - Gini index by region in Italy**




Sources: Data from ISTAT[84], World Inequality Database (WID)[85], Knoema data platform[86].

With the data illustrated in Graph 12, it is possible to analyze the situation in Italy. Northern regions tend to show a lower Gini index, indicating less inequality, while the South and the Islands show higher values, associated with greater energy poverty. From the analysis carried out (represented in the graph), it was possible to highlight some examples among the Italian regions:

- Lombardy (Gini Index: 0.27 - 2020 Data): Lombardy, one of the most industrialized and economically robust regions in Northern Italy, shows a relatively low Gini index. This translates into greater income uniformity and more

[84] The Italian National Institute of Statistics provided regional income distribution data and Gini indices.
[85] Additional data and context on income inequality across Italy
[86] Aggregated data from various global institutions on the Gini index and other socio-economic indicators for Italy

equitable access to energy services. The region benefits from well-developed energy infrastructure and widespread adoption of energy efficiency technologies, resulting in lower rates of energy poverty.

- Sicily (Gini Index: 0.36 - 2020 Data): Conversely, Sicily, characterized by a less diversified economy and a high unemployment rate, records one of the highest Gini indices in the country. This high inequality is reflected in unequal access to energy services, with many households facing difficulties in affording energy costs, exacerbated by less efficient energy networks and fewer local support programs.
- Veneto (Gini Index: 0.28 - 2019 Data): Veneto, similar to Lombardy, has a low Gini index and a strong economy. Access to energy is generally good, with a high prevalence of renewable energy solutions and energy efficiency initiatives that help reduce energy poverty.
- Campania (Gini Index: 0.33 - 2020 Data): In Campania, the situation is more critical, with a high Gini index indicating marked income inequality. The region shows significant difficulties in ensuring equitable access to energy, with a large portion of the population struggling to pay energy bills, aggravated by inadequate infrastructure and limited access to energy aid programs.

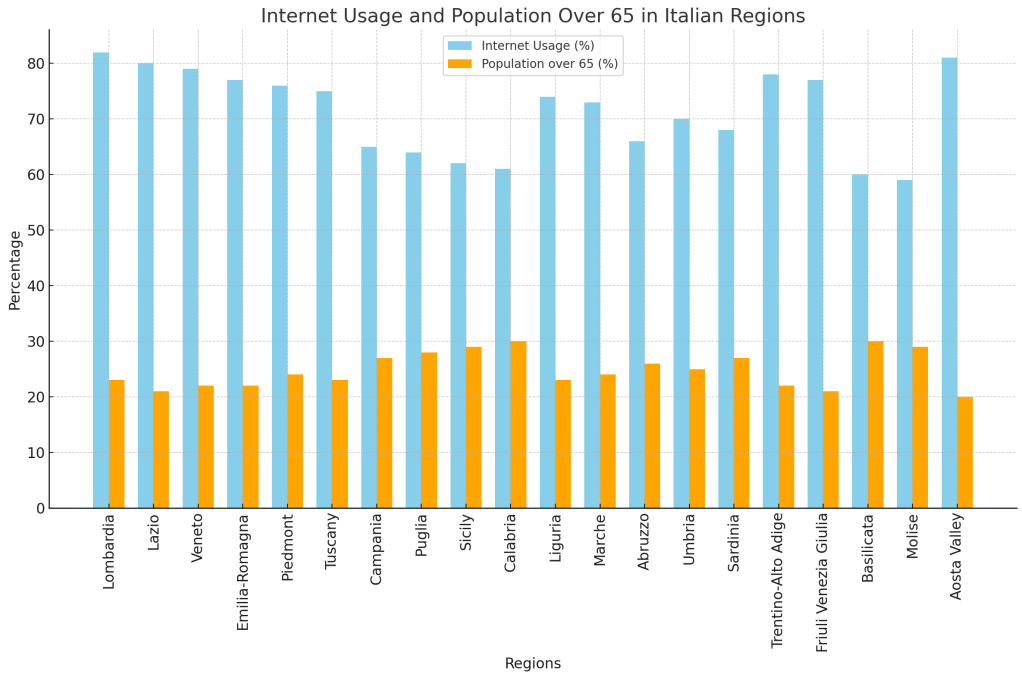
The differences in the Gini index between Northern and Southern Italy require a differentiated approach in formulating energy policies. For regions with a high Gini index (Sicily and Campania), it is essential to raise awareness, implement support policies, and invest in infrastructure. For regions with a lower Gini index (Lombardy and Veneto), the focus should be on maintaining constant investments, the distribution network, and monitoring policies.

### 2.2.3 Access to Energy Services: Digital Barriers and Access Disparities

Using platforms to access energy services has become a part of managing energy resources in Italy. Despite progress there are differences that hinder certain groups from taking advantage of these advanced services. These discrepancies are especially

noticeable, among individuals and communities in regions with access, to technology, where the infrastructure may be inadequate or outdated.

**Figure 13 - Internet usage and population over 65 in Italian regions**




Source: Reports by ISTAT[87] and Eurostat[88]

As Chart 13 shows, the elderly population in Italy represents a significant percentage of the total and shows a marked disparity in access to and use of digital technologies. According to ISTAT data, less than 40% of Italians over 65 use the Internet, compared to a national average of over 70%.[89]

This lack of connectivity and digital literacy not only further isolates the elderly, but also limits their ability to effectively manage energy consumption, access subsidised tariffs and take advantage of energy efficiency programmes.

Rural and mountainous areas in Italy often suffer from a severe digital divide. Regions such as Molise, Calabria and Basilicata have significantly lower broadband internet

[87] Data on the population and their breakdown by age (ISTAT – Population data).
[88] Data on Internet access and use in different European countries and regions, with a focus on Italy (Eurostat – Digital economy and society).
[89] ISTAT - "Digital Divide and Internet Usage in Italy 2023"

coverage than more developed regions such as Lombardy or Lazio. This prevents the inhabitants of these areas from accessing online services, including the management of their energy needs, leading to a dependency on more traditional and less efficient methods of communication with energy suppliers.

The digitisation of energy services offers potential benefits in terms of efficiency and sustainability, but when access to these digital services is limited, it creates economic and social inequalities. [90]

The elderly and residents of disadvantaged areas may find themselves paying more for energy due to a reduced ability to proactively monitor and manage consumption. Moreover, these populations are often the least able to take advantage of energy efficiency incentives or variable tariffs that could significantly reduce their energy costs.

### 2.3 Housing aspects

The condition of housing the level of insulation and the strength of the structure all play a role, in determining how much energy is needed to keep a home. Homes with insulation or made from low quality materials tend to use energy to regulate temperatures during different seasons resulting in higher utility bills that can strain the finances of families with limited income.

Furthermore, in areas or dilapidated buildings where renovations are often restricted due to architectural or financial limitations this issue becomes even more severe. This situation puts residents of buildings at a risk of struggling with energy costs.

This section aims to delve into how the quality of housing in city centers affects energy usage and economic challenges related to energy. It will analyze the energy efficiency obstacles faced by these structures and discuss the economic impacts of these living conditions. Additionally, it will explore strategies being utilized and potential solutions for enhancing this situation while balancing preservation efforts, with energy needs.

[90] ENEA - "Digitalization and Energy Efficiency in Italy 2022"

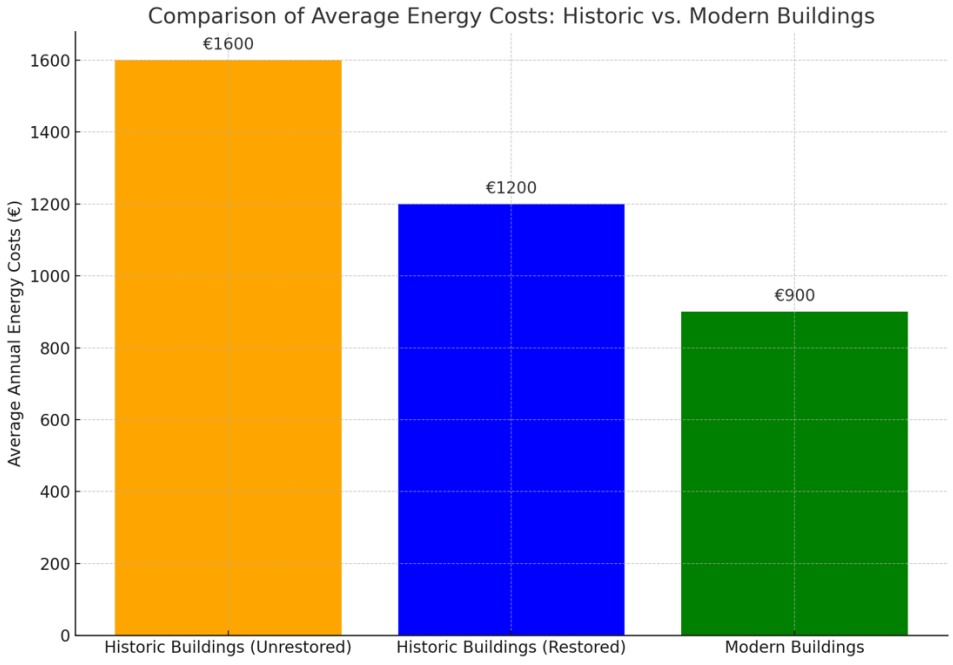
### 2.3.1 Housing quality

The housing situation, in Italy is quite complex in urban areas like Florence, Venice and Rome where ancient buildings coexist with modern comfort and energy sustainability needs. While these historic buildings hold value many lack energy efficiency considerations creating challenges for residents and current energy policies.

In these city centers preserving architectural heritage clashes with the push to lower energy usage and enhance living conditions. Strict regulations often limit changes that can be made to buildings making it tough to improve energy efficiency without affecting their structure or appearance. Balancing preservation with progress is an aspect of managing housing quality in settings.

The quality of housing directly impacts the health and well-being of residents. Substandard housing can result in issues ranging from living conditions, to high energy expenses.

**Figure 14 - Comparison of average energy costs: historic vs modern buildings**




Source: ENEA report on the energy efficiency of historic buildings[91]

[91] This report provides an overview of the differences in energy consumption between historic and modern buildings, and between renovated and unrenovated historic buildings

Figure 14 clearly shows the contrast, in energy expenses among historical structures renovated historical structures and contemporary buildings. It is evident that unrenovated historical buildings have energy costs compared to modern buildings averaging €1600 per year versus €900 for modern structures. With renovations that can bring down energy expenses to around €1200 per year historical buildings still present challenges in terms of energy efficiency.

Structures constructed in periods often utilize materials that, while durables' not as efficient in insulation as modern materials. For instance, the solid stones and bricks commonly found in the cores of cities like Rome and Venice absorb heat throughout the day and release it slowly. This characteristic can be advantageous in winter but problematic during summer months leading to a reliance on cooling systems and increased energy consumption.

Many of these buildings are equipped with outdated boilers or central heating systems that do not consume amounts of energy but also struggle to adequately control indoor temperatures. This results in energy usage and high operational costs, for occupants.

The incorporation of technologies, like insulation or advanced HVAC systems can pose challenges in historical structures because of architectural and regulatory limitations. As a result, numerous buildings lack updates, contributing to energy inefficiency cycles. The inefficiency of energy, in buildings do not affect the environment by raising resource usage but also carries notable socio-economic consequences:

- According to the *ENEA Energy Efficiency Report 2022*[92], unrenovated historic buildings have inefficiencies that can lead to energy costs up to 30% higher than modern buildings. This represents a significant burden on low-income households, contributing to the spread of energy poverty.
- A report by the *Politecnico di Milano* in 2022 (Politecnico di Milano - Energy Efficiency Report 2022)[93] shows that historic buildings in Italy, due to their energy inefficiency, can have heating costs up to 35 per cent higher than modern

[92] This report provides a detailed analysis of energy issues in Italy, with a focus on historic and modern buildings.

[93] This report, published by the Energy & Strategy Group of the Politecnico di Milano, analyses in detail the differences in energy costs between historic and modern buildings, as well as the socio-economic impact of energy inefficiency.

buildings. This significantly aggravates the economic hardship of poorer households, increasing the risk of energy poverty.

- According to a World Health Organisation (WHO) report (*Housing and health guidelines*)[94], poor housing conditions, including poor indoor air quality and inadequate thermal insulation, are closely linked to chronic respiratory diseases and allergies. Dampness and the presence of mould, which are common in poorly insulated buildings, increase the risk of asthma and other respiratory diseases, exacerbating the burden on national health systems.
- An analysis by the Ministry of Cultural Heritage (*Report on the State of the Architectural Heritage in Italy*)[95] showed that, despite their cultural value, the energy inefficiency of historic buildings can accelerate urban decay if families prefer to move to more modern and sustainable housing. This process can undermine social cohesion and jeopardize the conservation of architectural heritage, with a significant impact on local communities.

Improving the quality of housing in historic urban settings is crucial not only to reduce energy poverty, but also to improve the health and general well-being of citizens.

### 2.3.2 Thermal Insulation

Closely linked to the concept of housing quality is thermal insulation, which is essential for minimizing heat loss in buildings, significantly reducing the need for energy for heating in winter and cooling in summer. According to a 2022 report by ENEA (*Thermal Insulation and Energy Demand*)[96], effective thermal insulation can decrease the energy demand of buildings by up to 55%, with direct impacts on energy costs and greenhouse gas emissions.

In Italy, inadequate thermal insulation is responsible for about 30% of energy losses in residential buildings, as reported by the Ministry of Economic Development in 2021

[94] A document providing evidence-based guidelines on the influence of housing conditions on people's health.

[95] These reports examine the condition of historic buildings, their cultural importance and the problems associated with their preservation.

[96] ENEA report on the energy efficiency of buildings. ENEA provides annual reports examining the impact of thermal insulation on energy demand.

(*Energy Losses and Potential Savings*)[97]. Improving insulation in existing buildings, especially those built before the 1990s, which make up about 60% of Italy's housing stock, could result in estimated annual energy savings of over 6 billion € nationwide.

According to ENEA studies (*Reduction of CO2 Emissions and Impact on National Goals*)[98], improving insulation in buildings can reduce CO2 emissions by up to 7 million tons per year, equivalent to nearly 4% of Italy's total emissions from domestic energy consumption. This improvement would significantly contribute to the country's goals of reducing greenhouse gas emissions, in line with international agreements such as the European Green Deal.

Good insulation improves indoor air quality and stabilizes humidity, reducing the prevalence of mold and other pollutants. This has direct health implications; for example, a study by the University of Turin highlighted a 25% reduction in respiratory illnesses in adequately insulated homes. Additionally, a thermally comfortable environment is essential for preventing illnesses related to thermal stress, particularly among the elderly and children.

Energy poverty affects about 15% of Italian households[99], with a higher concentration in southern regions where insulation quality is often lower. Families living in poorly insulated homes are forced to spend an excessive portion of their income on energy bills, often choosing between adequately heating their homes and other basic needs such as food and medication. Therefore, thermal insulation is not just a matter of comfort or sustainability but represents an urgent social priority to ensure energy equity and reduce the economic vulnerability of less affluent families. Improving the thermal insulation of buildings in Italy is essential to address rising energy costs, environmental impact, and to combat energy poverty.

[97] Ministry of Economic Development (MiSE) - Report on energy savings in Italian homes. This 2021 report discusses energy losses due to inadequate insulation and estimates the savings that could be achieved by improving insulation in older buildings.

[98] This figure is based on ENEA projections and studies of Italy's emission reduction targets, in line with the European Green Pact.

[99] Data on energy poverty in Italy and the impact of poor thermal insulation are discussed in reports by MiSE and other research bodies such as Istat.

### 2.3.3 Impact on Energy Demand: Urban and Rural Contexts

The analysis of energy demand between urban and rural dwellings in Italy reveals significant disparities, influenced by a variety of structural, geographical, and socio-economic factors. These differences are not only indicative of the technological and infrastructural divide but also reflect regional energy policies and the living conditions of residents. Understanding these disparities is essential for developing targeted interventions that can effectively reduce energy consumption and improve environmental sustainability.

In Italian urban areas, where population density is high and infrastructure is generally more modern, energy consumption per dwelling tends to be lower than in rural areas. According to a 2022 ENEA report[100] (*Report on the Energy Efficiency of Urban and Rural Buildings*), urban buildings show an average energy consumption for heating that is about 20-30% lower than that of rural buildings. This is partly due to the more frequent use of centralized heating systems and the adoption of technologies such as district heating, present in 18% of urban dwellings compared to less than 1% in rural ones.

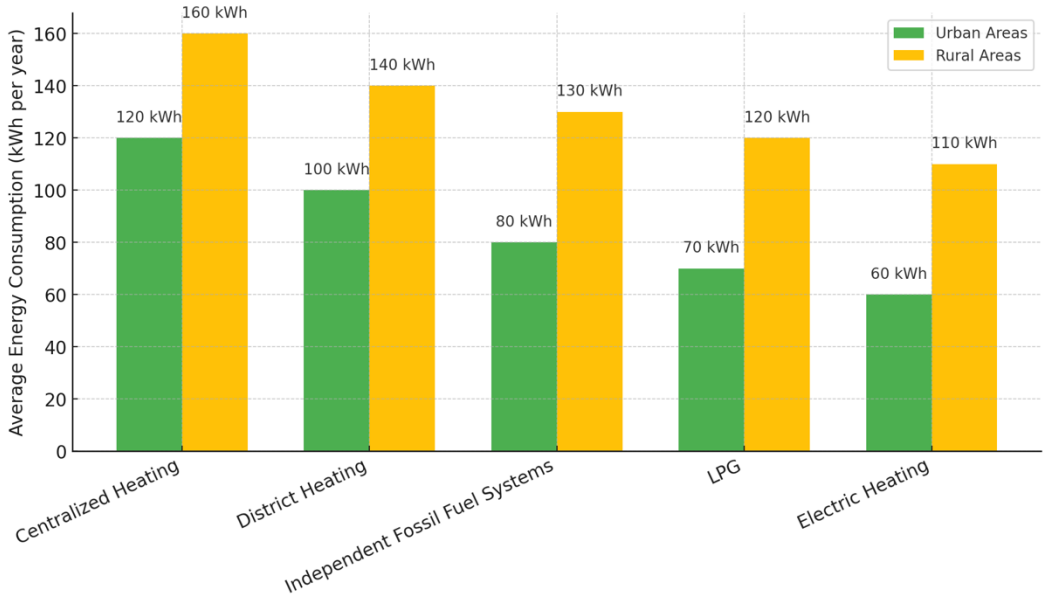
Another contributing factor to this difference is the better energy efficiency of urban buildings, many of which were built or renovated after the introduction of Italian thermal insulation regulations in the 1990s. For example, in Milan, the renovation of residential buildings in compliance with energy efficiency standards has led to an average 40% reduction in energy consumption for heating, according to data from the Municipality of Milan in 2021[101] (*Data on the Energy Efficiency of Residential Buildings*).

In contrast, in rural areas, the situation is often more complicated. Many buildings are old and lack adequate insulation, with outdated and inefficient heating systems. An ISTAT report[102] (*Report on Heating Systems in Rural Areas*) indicates that over 65% of rural homes use independent fossil fuel heating systems, which are notoriously less efficient and more expensive compared to modern alternatives.

[100] Analysis of energy consumption in Italy, highlighting the differences between urban and rural buildings and proposing solutions to improve energy efficiency.
[101] Results and statistics on energy renovations in Milan, showing the impact of new energy efficiency regulations.
[102] Data on the use of heating systems in rural Italy, highlighting the prevalence of fossil fuels and the associated energy challenges.

Furthermore, the lack of access to natural gas in many of these areas forces inhabitants to rely on more expensive energy sources such as LPG or electric heating. For example, in some rural areas of Umbria and Sicily, heating expenses can represent up to 10-15% of the average household income, a figure much higher than the national average of 5%.

**Figure 15 - Energy consumption in urban vs rural buildings by heating system**




*Note: The abscissas show the different heating systems that were analysed to compare the average energy consumption between urban and rural dwellings in Italy.*

Source: Data from ENEA[103], the Municipality of main Italian cities[104] and ISTAT reports[105]

The significance of these disparities is further demonstrated in Figure 15, which presents a direct comparison of medium-term energy consumption for various types of risk-sharing systems between urban and rural areas. The graphic clearly illustrates how rural homes tend to have significantly higher energy consumption, particularly in systems of risk management dependent on fossil fuels and electric risk management due to lower efficiency and lack of access to more modern options.

[103] ENEA - Report on the energy efficiency of urban and rural buildings
[104] Municipality of main Italian cities - Data on the energy efficiency of residential buildings
[105] ISTAT - Report on heating systems in rural areas

## 2.4 National and regional policies

In Italy, the fight against energy poverty and support for vulnerable households are high on the political agenda, addressed with both a national and regional approach. This commitment is realized through a series of government interventions and specific programmes, including the Energy Bonus, a key instrument to provide direct economic support to households in difficulty. In addition, regional policies play an essential role in adapting assistance to local peculiarities, ensuring that support is distributed in a fair and targeted manner, responding to the different energy needs of different territories. By analyzing these efforts, one can better understand how Italy is addressing the challenges related to energy poverty and what the prospects are for further improving the effectiveness of these interventions.

### 2.4.1 Government intervention: Energy Bonus and regional implementation

The Italian government has adopted several significant interventions to support households and promote energy sustainability, ensuring fair access to energy. These measures are crucial to mitigate the impact of rising energy costs and to facilitate the transition to a more sustainable energy system. Among the most relevant initiatives, besides the well-known Energy Bonus, are programmes such as the Conto Termico and incentives for self-consumption of energy, which aim to promote energy efficiency and the use of renewable sources.

- The Conto Termico (Thermal Account), introduced by Legislative Decree No 28 of 2011 and updated in 2016, is a tool that incentivises interventions for energy efficiency and the use of renewable sources. This programme offers an economic contribution to cover part of the costs for the installation of solar thermal systems, heat pumps, biomass systems, and thermal insulation interventions. Since 2016, the Conto Termico has distributed more than € 900 million, supporting around 30,000 projects each year, benefiting private homes, public entities, and small businesses.[106]

[106] Gestore dei Servizi Energetici (GSE) - 'Annual Report 2022'.

- Ecobonus and Sismabonus are crucial tax instruments for infrastructural renovation and building safety. The Ecobonus, introduced by Law No 296 of 2006 and subsequently extended, allows tax deductions from 50% to 75% for energy efficiency improvements, such as the replacement of window frames or the installation of condensing boilers. The Sismabonus, active since 2017, offers similar deductions for interventions to reduce seismic risk. These incentives have stimulated investments of more than € 2 billion, promoting the seismic and energy adaptation of the Italian building heritage.[107]
- Incentives for self-consumption of energy, promoted by the Renewables Decree of 2019, support the installation of storage systems and the production of energy from renewable sources for domestic use. These incentives are especially crucial in areas less connected to the national grid. To date, they have supported the installation of more than 10,000 domestic storage systems, with a total investment of more than € 100 million.[108]
- The Energy Bonus, established in 2009, is one of the main instruments to combat energy poverty in Italy. This bonus provides a discount on electricity and gas bills for vulnerable households, helping to reduce the impact of energy costs on the household budget. In 2021, the Italian government has earmarked more than € 1.5 billion for the Energy Bonus, with the aim of reaching more than 2.5 million households.[109]

The distribution of the Energy Bonus varies significantly among Italian regions, influenced by economic, infrastructural, and demographic factors.

In Northern Italy, regions like Lombardy, Piedmont, and Veneto show a high adoption of the Bonus due to efficient administrative systems and greater awareness among the population.[110] In Lombardy, for example, over 85% of eligible families benefit from the bonus, with an average annual discount exceeding 200 €.[111]

[107] CRESME (Centro Ricerche Economiche Sociali di Mercato per l'Edilizia e il Territorio)-'Economic and Forecast Report 2022'.
[108] Ministry of Ecological Transition (MITE) - 'Renewable Energy Report 2021'.
[109] Regulatory Authority for Energy Networks and Environment (ARERA) - 'Annual Report 2021'.
[110] ARERA Report 2021, Section 'The Social Bonus: Territorial Distribution and Access'.
[111] Lombardy Region - Annual Report on Social Bonus

In Central Italy, regions like Lazio effectively integrate fiscal systems with the databases of energy companies, allowing for rapid verification of eligibility and timely disbursement of the bonus. However, household participation in the program is lower than its potential, often due to a lack of information.[112]

In the South and the Islands, the distribution of the bonus is hindered by bureaucratic complexities and less effective communication. In Sicily, only about 50% of eligible families benefit from the bonus, mainly due to difficulties in accessing information and understanding the application process.[113]

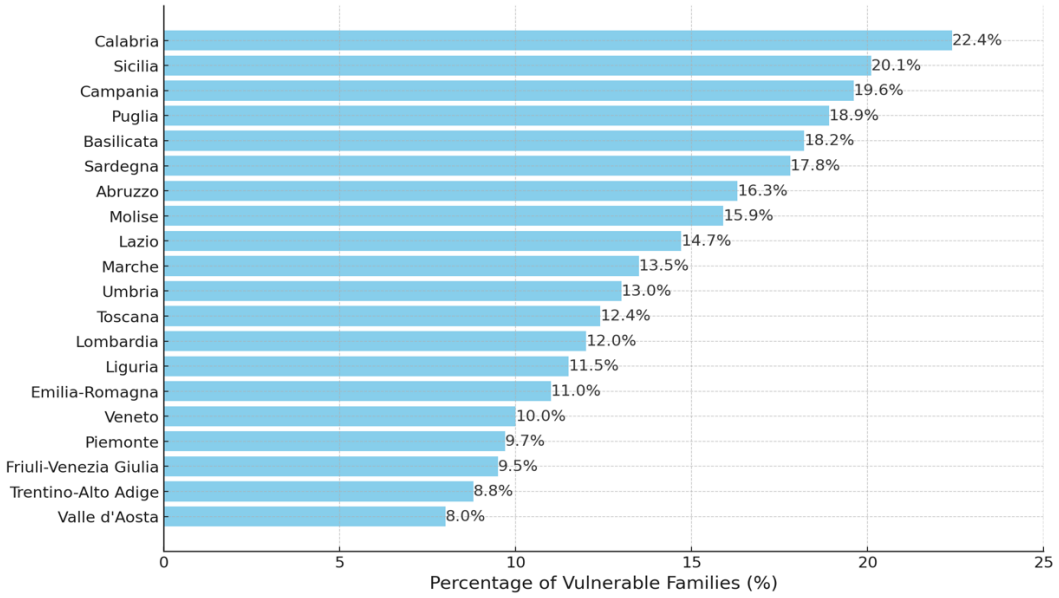
Despite the overall effectiveness of the Energy Bonus[114], its uneven application highlights the need for more targeted and personalized regional strategies. Greater coordination and standardization could improve the effectiveness of the bonus, ensuring that support reaches all vulnerable families equitably. Moreover, increased efforts in raising awareness and the use of digital technologies to simplify the application process could enhance the bonus utilization rate, thereby maximizing its social and economic impact.

### 2.4.2 Support for Vulnerable Families, Regional Programs

In Italy, the term "vulnerable families" refers to those households that, due to unfavorable socio-economic conditions, face significant difficulties in accessing essential services, including energy. These families are often characterized by low income, high unemployment rates, the presence of elderly individuals or people with disabilities, and they live in homes with low energy efficiency. Energy vulnerability is particularly severe in these families, who spend a disproportionate share of their income on adequately heating or cooling their homes. According to ISTAT data, about 15% of Italian families are considered vulnerable, which means that approximately 4 million families struggle to afford proper heating or cooling for their homes.[115]

[112] ARERA Report 2021, Section ‘Social Bonus Management in Central Regions’.
[113] Utilitalia - Social Bonus Distribution Report 2021
[114] Ministry of Economic Development (MISE) - Report on Energy Bonuses
[115] ISTAT. ‘BES Report 2022: Fair and Sustainable Welfare in Italy.’

**Figure 16 - Distribution of vulnerable families by region**




Source: Data from ISTAT[116] and OIPE[117]

Figure 16 highlights the distribution of vulnerable families, those living in conditions of energy poverty, across the different regions of Italy in 2023. As observed, there is a marked disparity between the northern and southern regions of the country. Southern regions such as Calabria (22.4%), Sicily (20.1%), Campania (19.6%), and Puglia (18.9%) record the highest percentages of vulnerable families.[118]

Conversely, northern regions such as Trentino-Alto Adige (8.8%), Valle d'Aosta (8.0%), and Friuli-Venezia Giulia (9.5%) show significantly lower percentages of families in conditions of energy vulnerability. These regions benefit from a more stable socioeconomic context, better infrastructure, and a greater adoption of energy efficiency measures.

There are several regional programs in Italy that provide support to vulnerable families in the energy sector, including:

[116] Living conditions and household income - Year 2023, Absolute poverty and consumption expenditure - Year 2023

[117] Italian Observatory on Energy Poverty (OIPE): Studies and reports on energy poverty in Italy

[118] Energy Poverty in Italy: Regional Disparities and the Need for Tailored Policies"

- **Lombardy**: The Lombardy Region launched the "Bonus Energia Lombardia" program (2022), which supplements the national Social Energy Bonus with additional regional subsidies for low-income families. This program has achieved a high adoption rate thanks to an efficient administrative system and targeted information campaigns.[119]
- **Emilia-Romagna**: In Emilia-Romagna, the "Energia Sicura" project (2021) offers free energy retrofit interventions for vulnerable families, financed by regional and European funds. This program has significantly reduced energy bills for thousands of families while improving the energy efficiency of their homes.[120]
- **Campania**: Campania has activated the "Bonus Energia Campania" (2022), a program that provides economic contributions for families in financial difficulty, aimed at covering part of their energy expenses. This bonus complements the national one, with the goal of providing additional support to alleviate the pressure of energy bills on vulnerable families.[121]
- **Calabria**: Calabria has launched several calls for applications (Calabria Renewable Energy, 2021 – Energy Efficiency in Housing, 2022) to encourage energy efficiency in homes, particularly for low-income families. The program includes incentives for the installation of solar panels, thermal insulation of homes, and the replacement of old heating systems with more efficient and sustainable solutions.[122]
- **Sicily**: The Sicily Region has developed the "Sustainable Energy" project (2021), which aims to promote energy self-consumption through the installation of photovoltaic systems and other green technologies in low-income households. This program has been funded by European and regional funds and focuses on the rural and mountainous areas of the island.[123]
- **Puglia**: Puglia has promoted a series of calls for applications (Puglia Active Network, 2022 – Casa Puglia, 2021) aimed at improving the energy efficiency of homes, with particular attention to vulnerable families. The calls fund

[119] Lombardy Region. 'Energy Plan 2022-2023,'
[120] Emilia-Romagna Region. 'Safe Energy Project'
[121] Campania Region. 'Decree no. 254/2022: Bonus Energia Campania'
[122] Calabria Region. 'Calabria Renewable Energy'
[123] Sicily Region. 'Sustainable Energy Project'

interventions for thermal insulation, replacement of windows, and installation of condensing boilers.[124]

The disparity shown between the different regions, in terms of the percentage of vulnerable families, demonstrates that standardized interventions are not sufficient to effectively address the problem. It is necessary to develop and strengthen localized programs that can adapt to the socioeconomic and structural characteristics of each region.

[124] Puglia Region. ‘Puglia Active Network'

# Chapter 3 Analysis of the UK case on energy poverty

## 3.1 Introduction

After conducting an in-depth analysis of the phenomenon of energy poverty on a global and European scale, attention was focused on the Italian context, which constitutes the core of the analysis of this thesis. Through a detailed investigation, the phenomenon was broken down and defined based on various critical factors, offering a more comprehensive overview and allowing for the identification of the main challenges characterizing energy poverty in Italy.
This analytical process has enabled not only an understanding of the specific dynamics of the Italian territory but also a comparison with the solutions adopted in other European countries. In particular, the United Kingdom emerged as a significant case study, offering insights and strategies that could be effectively applied to address the critical issues in Italy.

### 3.1.1 Purpose of the chapter

This chapter aims to examine in detail the case of the United Kingdom in relation to energy poverty, with the objective of comparing British policies with Italian ones in the identified critical macro-areas. After studying the phenomenon on a global, European, and Italian scale, this chapter focuses on the analysis of a specific case, the United Kingdom, which will subsequently be explored through targeted interviews.
The analysis aims to assess the extent to which British policies and strategies can be implemented to bridge the gaps identified in the Italian context, particularly regarding access to support programs, identification of vulnerable consumers, and the approach of an integrated and multidisciplinary system. The interviews, which will follow this phase of analysis, are intended to verify the feasibility and effectiveness of applying the key factors found in the United Kingdom to improve the effectiveness of interventions in Italy.

### 3.2 Identification of Critical Macro-Areas in Italy

In the analysis of energy poverty in Italy, several determinants of the phenomenon were examined, including socioeconomic factors (income, inequality, and access to energy services), housing aspects (housing quality, historical urban contexts, thermal insulation, and disparities between urban and rural contexts), and national and regional policies, particularly government interventions and support for vulnerable families.
From this starting point, it was possible to gather various perspectives, leading to the conclusion that three main macro-areas emerge, some of which encompass more than one factor analyzed in the previous chapter. These areas, which will be explored in the following paragraphs, are:

- Access to support programs: In Italy, bureaucratic barriers and the inability of many families to anticipate the necessary costs make it difficult to benefit from energy incentives and allowances. Sometimes, this is also driven by significant misinformation about the actual existence of these programs.
- Identification of vulnerable consumers: Currently, in Italy, there is no national system to identify vulnerable consumers, a fundamental step to intervening promptly in the phenomenon.
- Approach to an integrated system: In Italy, there are various programs with the potential to effectively address the problem, but their effectiveness is limited by the lack of coordination between the various initiatives and the actors involved, resulting in a fragmented approach that reduces its overall impact.

These three macro-areas represent the pillars of the analysis that will follow, aimed at identifying solutions applicable to the Italian context, through the examination of the model adopted in the United Kingdom.

### 3.2.1 Access to support programs

It was possible to outline how in Italy, the main support instruments to promote energy efficiency and alleviate energy poverty are the Ecobonus and Superbonus 110%[125].
These incentives allow a significant percentage of the expenses incurred for energy improvement interventions on buildings to be deducted from taxes, such as the installation of solar panels, the replacement of windows, and thermal insulation.
However, despite the wide dissemination and apparent generosity of these bonuses, many vulnerable families find themselves unable to benefit from them.
Not being able to access these programs means not being able to take advantage of the tax breaks, bonuses, or incentives available, which could significantly improve the energy efficiency of homes or reduce the burden of energy bills.
This problem is particularly acute for low-income families, who often lack the necessary resources to advance the costs of interventions, are unaware of the opportunities available, or face complex and discouraging bureaucracy.
Support programs, therefore, encounter critical issues, the main ones being:

- Financial Accessibility: Many low-income families, who would be the main beneficiaries of such incentives, do not have the financial resources needed to cover the upfront costs of the interventions, despite the promise of future tax deductions. This issue is especially critical for the Superbonus program as it mandates initial investments that are, beyond the means of many families.[126]
- Bureaucratic Complexity: Access to the Superbonus involves a process that includes submitting several documents, like the APE (Energy Performance Certificate) CILA (Certified Notice of Commencement of Works) and meeting specific technical and time related requirements that are stringent.
  Having an Energy Performance Certificate (APE) is crucial to verify the energy efficiency of a building both and after any renovations are done and should be handled by a qualified professional at a cost of around €150 to €300 range. As for the Certified Notice of Commencement of Works (CILA) it's important for

[125] The Superbonus 110% was reduced to 90% as from 2023
[126] What is the Superbonus and how to benefit from it, even if you don't pay Italian income tax (2023)

obtaining approval for renovation projects and needs to be submitted to the Municipality with an additional cost ranging from €200 to €600, on average.

Meeting the bureaucratic demands can be quite burdensome for families who are less savvy or have limited administrative capabilities in terms of time and finances. Access to these programs becomes difficult due to the necessity of providing documentation and adherence to strict standards. A challenge, for individuals lacking the expertise or means to navigate through such processes.[127]

- Regional Disparities: The accessibility and impact of these programs can differ greatly across regions because of variations in local administrative capabilities and information availability. Certain areas excel in promoting and enabling access, to these benefits efficiently; meanwhile some struggle more which puts families in underserved regions at a disadvantage further. [128]
- Limited Impact on the Most Vulnerable Families: Even the Social Bonuses for electricity and gas, introduced to alleviate the energy expenses of economically struggling families, present several issues that limit their effectiveness. These bonuses, designed to reduce the cost of bills, require the submission of the ISEE (Equivalent Economic Situation Indicator), which must not exceed certain thresholds. In 2024, to access the bonuses, the ISEE must be less than €9,530 for families with up to three dependent children, or less than €20,000 for families with at least four dependent children.[129]

To enhance the availability of assistance programs for individuals in need of support services like financial or social aid programs; it is important to implement a strategy that simplifies processes while offering more adaptable eligibility requirements and actively promoting the various benefits that these programs offer to those in need. Furthermore, integrating these initiatives with long term solutions that tackle the underlying issues contributing to energy poverty on a level would ensure sustained and reliable assistance for at risk families, in the long run.

[127] Italy's Superbonus tax credit: Key changes in 2023 (2023)
[128] Italy's home bonuses 2024 (2024)
[129] Arera website – "A quanto ammontano". Section explaining how much the bonus amounts to for the characteristics of each applicant

### 3.2.2 Identification of vulnerable consumers

It is now impossible to identify families at risk of energy poverty in Italy in a proactive or timely manner due to the absence of a centralized, systematic framework. Due to this disparity, there is now a fragmented strategy whereby towns and regions independently test out pilot programs to identify consumers who are at risk. These programs frequently make use of cross-referenced data from many sources, including social services, local government agencies, and energy providers.
In Italy, the economic, social, and health criteria set forth by ARERA are the main factors used to determine a consumer's vulnerability. Among the requirements are:

- Families with an Equivalent Economic Situation Indicator (ISEE) below a certain threshold, which varies depending on the type of bonus or support requested.
- People suffering from serious health problems that require life-saving equipment, the operation of which depends on electricity.
- Families with disabled members, who may have higher energy needs.
- People over the age of 75, recognized as particularly vulnerable.[130]

By 2024, clients who turn 75 years old will be automatically identified by the integrated information system every month, providing enhanced safety for this demographic. While this is undoubtedly a step in the right direction, the system only incorporates one of the traits that set susceptible clients apart.
Using various data sources, some towns and regions have started local campaigns to identify families that may be at risk. Unfortunately, the efficiency of these programs is limited, and many families are left without the support they need because these systems are not standard at the national level and frequently depend on the resources and desire of local administrations.
In certain places, local social agencies and energy companies work together to make it easier to report instances of struggling families. Nevertheless, rather than being

[130] ARERA - Social bonuses

implemented preventively, this strategy is frequently dispersed and reactive, happening mostly after a family has already encountered difficulties.[131]

According to 2023 data reported by the Energy Poverty Advisory Hub, about 8.5% of Italian households are in a condition of energy poverty.[132]

This figure represents a slight increase compared to previous years, due to the rise in energy prices and generalized economic difficulties. Estimates for 2024 could indicate a further increase if more effective measures are not adopted for identifying and supporting vulnerable families.

It is possible that a significant portion of these families is not being properly mapped due to gaps in the current identification systems, with regional differences further amplifying this problem.

According to the policies outlined by the European Commission, it is essential that Member States develop national plans that include integrated strategies for identifying and supporting vulnerable consumers.

These strategies should ensure that all families at risk of energy poverty receive the necessary support through coordinated measures and improved energy efficiency, in line with the goals of the European Green Deal and initiatives for the energy transition.[133]

To address energy poverty in Italy more effectively, a centralized system that can quickly and proactively identify families at risk must be put in place. It becomes quite difficult to create focused and efficient support programs in the absence of such a system. Lack of a cohesive framework makes it more difficult to allocate resources appropriately and to quickly and effectively address the needs of the most disadvantaged families.

### 3.2.3 Integrated Support and Multidisciplinary Approach

In Italy it has been noted that there are initiatives capable of tackling the problem of energy poverty effectively; nonetheless their impact is restricted due to insufficient coordination among different programs and parties involved leading to a fragmented approach that diminishes the overall effectiveness of these efforts. This lack of alignment

[131] CESISP Study - Collaboration between Organisations
[132] Energy Poverty Advisory Hub - Interactive Database
[133] European Commission - Empowering vulnerable consumers in the energy transition (2022)

frequently results in an irregular response towards the requirements of disadvantaged families where interventions that may be valid, in specific instances fall short at establishing a continuous and cohesive support network.

In Italy's fight against energy poverty today a diverse range of initiatives exist; however, lack of collaboration among stakeholders often results in scattered efforts and inadequate support, for addressing the genuine needs throughout the region.

In Italy community initiatives receive backing from programs like the Cohesion and Development Fund ( FSC ) which funds ventures to enhance energy efficiency and assist families in need. One instance is the " Energy for All " initiative, which has introduced energy consultations and educational schemes to raise awareness and decrease consumption. Nevertheless, despite their effects these initiatives are typically confined to specific regions and time frames leading to a decrease, in their lasting impact.

In Italy as well NGOs and social cooperatives play a role too! They provide services that blend aid with tailored energy advice to help underprivileged families enhance their homes energy efficiency and cut down on energy expenses. However, these efforts are usually. Lack nationwide coordination which hinders their potential, for making a widespread and lasting difference. Relying on financial support like donations and grants can leave these programs exposed to changes in available resources which raises doubts, about the consistency of the services provided.

Moreover, the lack of a set of regulations, at the national level prevents the establishment of standardized best practices and the exchange of resources that could potentially enhance the effectiveness of these efforts on a broader scope.

In this setting, it is apparent that a systematic response to this phenomenon is impeded by the lack of national coordination. Although individual initiatives have merit, they are too dispersed and far from a cohesive framework that might guarantee ongoing and sufficient assistance to the most disadvantaged families.

### 3.3 Case Study of the UK in the Identified Macro Areas

Until now and up to this point in time we have managed to identify key categories that are crucial for understanding the evolution of energy poverty within Italian households. The comprehensive analysis presented in the chapter not only provided a detailed

overview of this issue on a global and European level but also paved the way, for devising a tailored approach to tackle the specific challenges that Italy is currently encountering.
The United Kingdom stands out as an example to study due to its successful handling of important matters like providing support programs accessibly identifying consumers in need and implementing a holistic approach, to energy assistance.
So this part of the chapter is about looking into the situation in the UK and diving deep into the issue of energy poverty there to see how their strategies could help tackle similar problems, in Italy.
The case study will be divided into several parts, after an initial introduction, the following key aspects will be covered: *definition and measurement of the phenomenon*, *geographical and demographic distribution*, *impacts and consequences*, *interventions and policies adopted*.
The section will conclude with final considerations summarizing the main findings from the analysis, which will be further explored in the next chapter through interviews with industry experts.

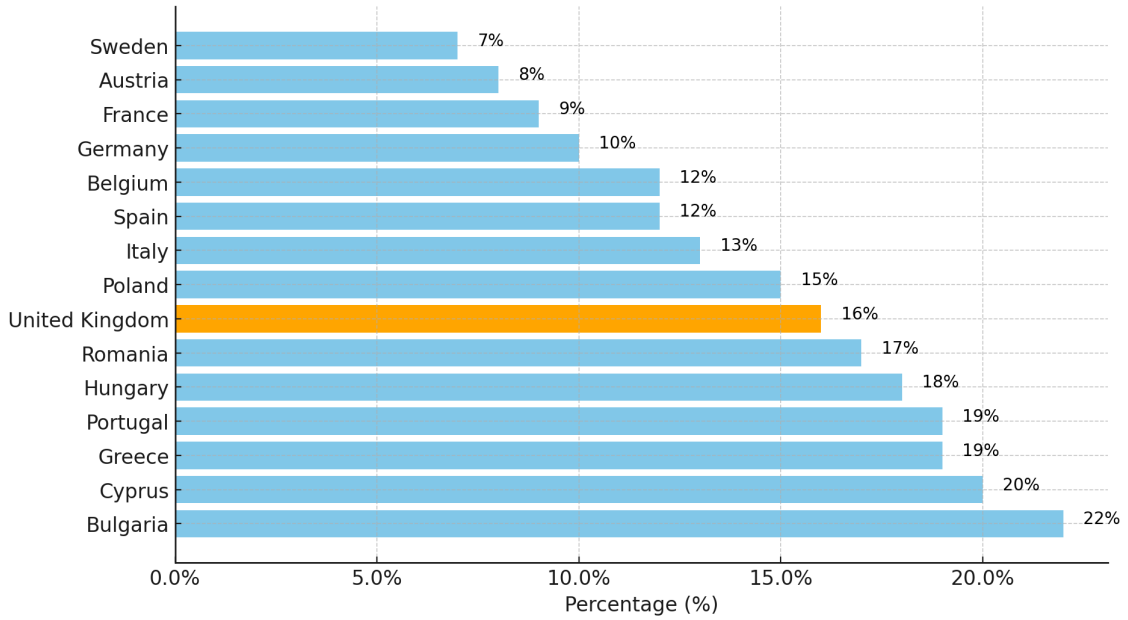
### 3.3.1 Report on Energy Poverty Report in the UK

Many families in the United Kingdom face energy poverty issues as they struggle to cover the expenses needed to keep their homes warm and comfortable during winter months. This problem is evident in the 2024 Annual Fuel Poverty Statistics for England[134] which reveal that 13% of households (equal to, about 3.17 million families ) are impacted by energy poverty. However its concerning that this issue persists despite being relatively stable compared to the year.
The situation gets more complex due to the rise in the "fuel poverty gap," which's the additional money required to effectively warm a house above the energy poverty level threshold in 2023 saw a 20 percent rise compared to 2022. A sign of deteriorating conditions, for numerous households. On a day-to-day basis this implies that typically every household experiencing energy poverty would have to find a way to set aside a £417 each year to break free from this situation. This underscores the increasing

[134] The Annual Fuel Poverty Statistics in England, 2024 is a report published by the UK government that provides a detailed overview of the fuel poverty situation in England. It explores recent trends and

mismatch, between the expenses of energy and families' ability to afford them comfortably.

**Figure 17 - Energy poverty in EU**




*Note: Only a few countries have been chosen for graphic clarity. The selected countries best represent the trend in the EU context with a focus on the situation in the UK.*
Source: Eurostat and EPOV – European Energy Poverty Observatory

*Definition and Measurement*

The criterion currently used to define and measure energy poverty is the "Low Income Low Energy Efficiency" (LILEE), officially introduced in 2021. This method replaces the previous 10% indicator, which was criticized for not adequately considering differences in housing quality.
The LILEE criterion considers a household to be in energy poverty if it meets both of the following conditions:

1. Home Energy Efficiency: The house in which the family lives must have an energy efficiency rated as band D or lower according to the Energy Performance

Certificate (EPC). Homes classified in bands D, E, F, or G require more energy to maintain a comfortable indoor temperature. In the United Kingdom, a significant percentage of homes fall into these categories, with older and less efficient homes being a critical issue. The energy efficiency of the home is a determining factor because it directly affects the cost of energy bills. For example, homes in band D require on average 20% more energy than those in band C, and this can make a significant difference in a family's budget.

2. Low Residual Income: A household is in energy poverty if, after spending to keep the home at an adequate temperature, the available income falls below 60% of the national median income. This approach highlights not only the impact of energy expenses on disposable income but also how these expenses can push families below the poverty line. It is important to emphasize that this measure does not simply look at overall income but at disposable income after covering necessary energy expenses. This reflects a deeper understanding of the financial difficulties faced by families in energy-inefficient homes.[135]

Prior to the implementation of the LILEE criterion in the United Kingdom to assess energy poverty levels of the previous "10 percent Indicator " households were categorized as experiencing energy poverty if they spent over 10 percent of their income on heating their homes adequately. This approach was straightforward. Had drawbacks as it overlooked factors, like home energy efficiency and how energy costs affected a household's disposable income.[136]

After shifting to the LILEL criterion in place of the standard criteria in the United Kingdom a more intricate strategy was embraced that mirrors the actual challenges faced by households. This shift was driven by the necessity for a metric that not just determines individuals, in energy poverty but also delves deeper into comprehending the factors behind this situation facilitating precise targeted actions and solutions.

The LILEEN standard carries consequences for government policies as it acknowledges that energy poverty is influenced by both income levels and the effectiveness of housing structures. This approach advocates for a two strategy. Enhancing home energy efficiency

[135] Department for Business, Energy & Industrial Strategy - Fuel poverty detailed tables (2021)
[136] Department for Energy Security & Net Zero – Annual Fuel Poverty Statistics in England, 2023 (2022 data)

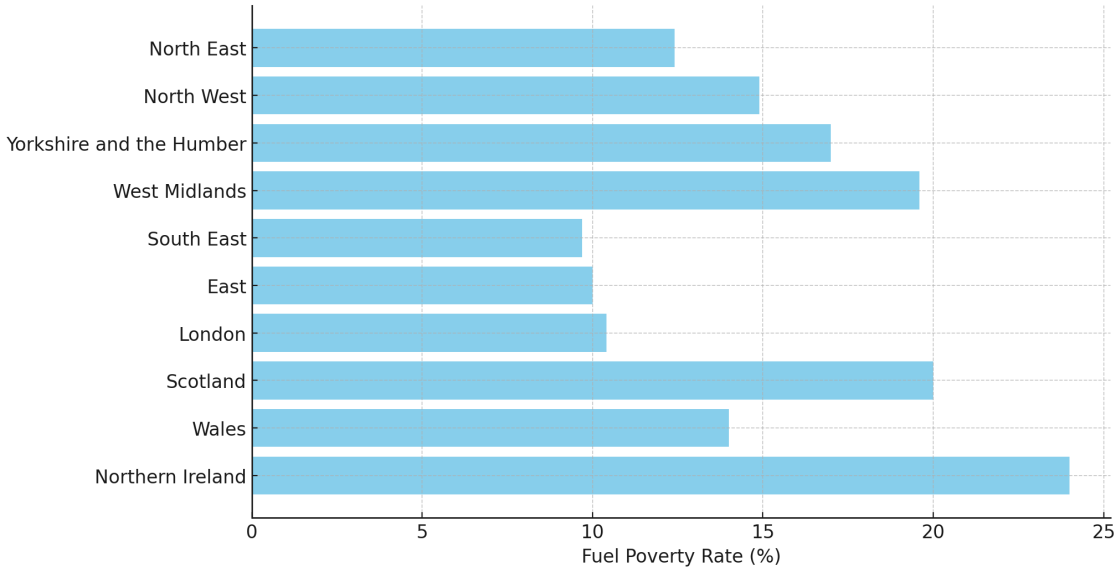
through renovation initiatives and offering financial assistance directly to families, in need.

In the United Kingdom countryside and areas with buildings houses frequently receive low energy ratings. Efforts like the Green Homes Grant strive to boost home energy efficiency. However, the success of these initiatives' hinges, on families being able to participate which could involve upfront costs. [137]

Furthermore, the LILEE criterion has facilitated a better understanding of the geographical areas and demographic groups most affected by energy poverty, allowing public policies to be more targeted.

*Geographical and Demographic Distribution*

**Figure 18 - Distribution of energy poverty in the UK (2023)**



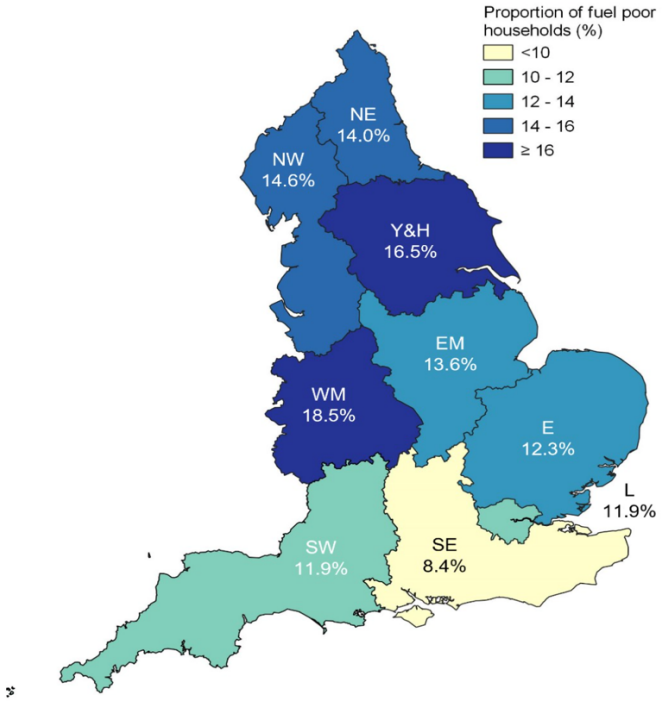

Source: Data from UK Government's Annual Fuel Poverty Statistics[138], National Energy Action (NEA) Reports[139] and House of Commons Library[140].

[137] House of Lords Library - Rising energy costs: the impact on households, pensioners and those on low incomes (2021)
[138] This report provides detailed regional data on energy poverty in the West Midlands (19.6%), Yorkshire and the Humber (17.0%), in the South East (9.7%), East of England (10.0%), and London (10.4%)
[139] This report highlights energy poverty rate in Northern Ireland (24%) and Scotland (20%)
[140] This source provides energy poverty rate in Northern Ireland's (24%)

Energy poverty in the United Kingdom is unevenly distributed across regions and demographics as shown in Chart 18 from the House of Commons Library report. According to the report findings mentioned in Chart 18 and other charts depicting energy poverty trends over time in parts of the UK show that Northern Ireland and Scotland are among the most affected regions with rates peaking at 24% and 20% respectively. Despite some fluctuations over time in these regions energy poverty levels as illustrated by the charts provided in the report continue to show an impact, on these areas.

In Chart 18 it is evident that the northern regions of England like the Northeast and Northwest face levels of energy poverty compared to other parts of the country.

**Figure 19 - Proportion of households in fuel poverty, by region, 2022**



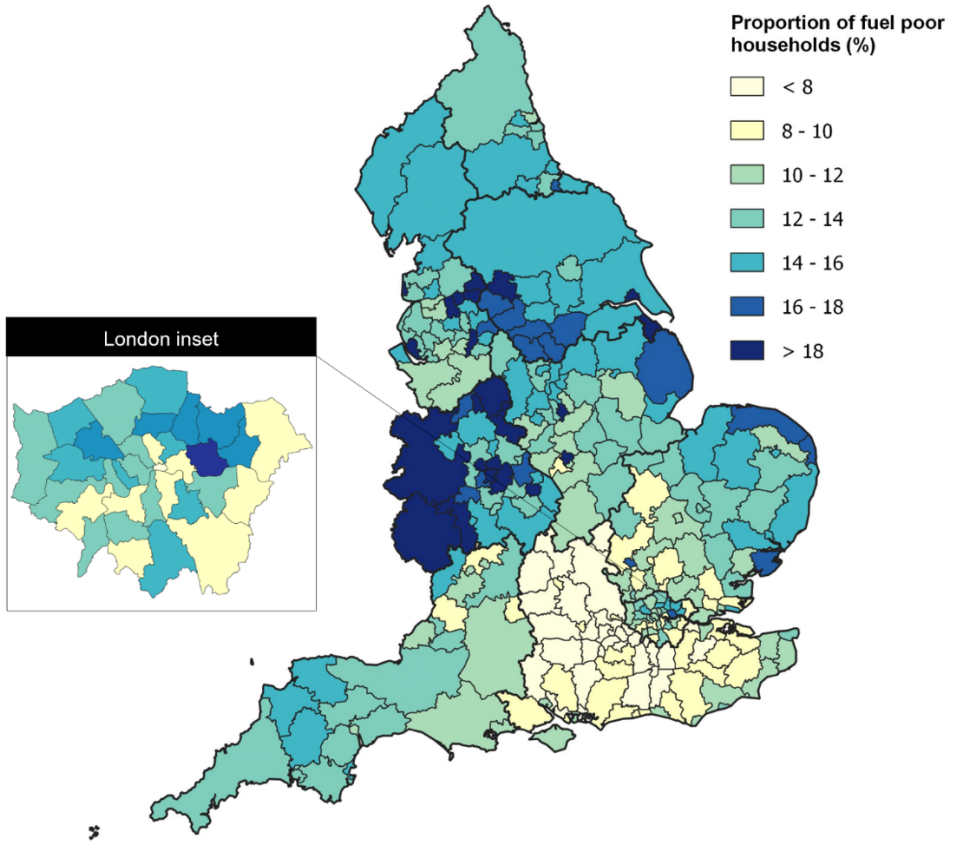

Source: Sub-regional fuel poverty in England, 2024 (2022 data)

Chart 19 delves deeper into the issue of energy poverty on a scale, within the United Kingdom and points out notable disparities across different regions of the country. The West Midlands (19.6%) and Yorkshire and the Humber (17.0%) stand out with the rates

of energy poverty which seem to align with their median incomes after housing costs falling below £25,400 and energy efficiency ratings (FPEERs) below the national average of 68.

In areas like these regions where homes tend to be bigger but less energy efficient than others in places such as the South East (9.7%) the East (10.0%) and London (10.4%) the rates of energy poverty are lower due to median incomes. Above £27,400 and improved energy efficiency measures in place This shows that energy efficiency and available income play significant roles in how susceptible households are, to experiencing energy poverty.

**Figure 20 - Proportion of households in fuel poverty by Local Authority, 2022**

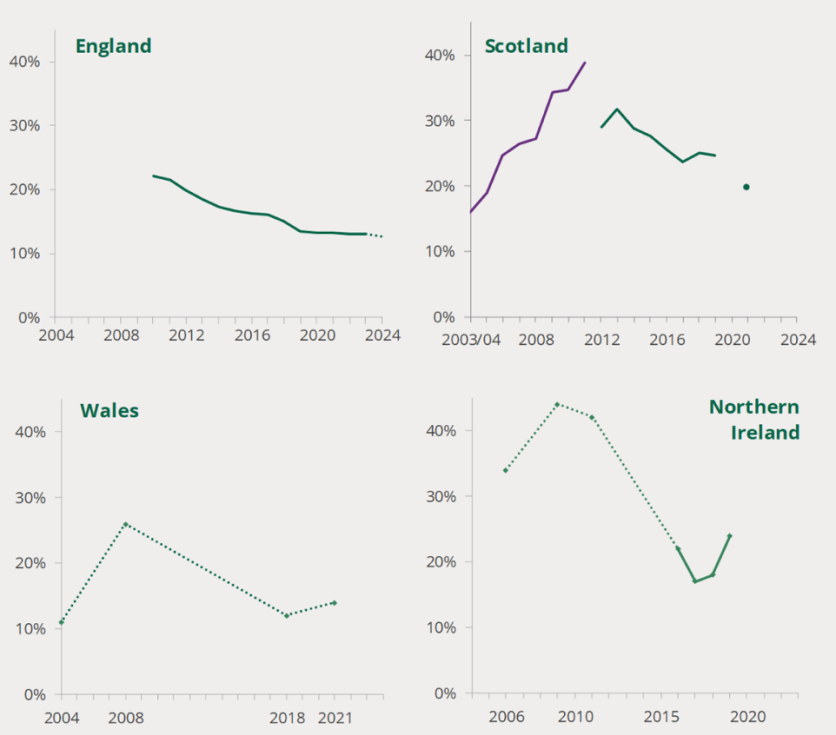



Source: Sub-regional fuel poverty in England, 2024 (2022 data)

Chart 20 goes in depth into the matter by illustrating how energy poverty is spread across local areas controlled by authorities. It highlights those 28 local authorities such as Stoke

on Trent (24.7%) Birmingham (24.0%) and Wolverhampton (23.0%) have energy poverty rates surpassing 18%. These regions in the West Midlands and Yorkshire and the Humber face challenges due to various reasons, like limited incomes inadequate housing conditions and increased energy requirements. In contrast to that is the difference in energy vulnerability rates among certain regional entities like the City of London (5.3%) and Wokingham (6.0%) suggesting less susceptibility to energy related challenges. The detailed breakdown provided in the report highlights disparities in energy poverty rates even within these regions; for instance, the West Midlands exhibits the most striking internal divergence with disparities exceeding 20 percentage points between areas, with the highest and lowest impact levels.

**Figure 21 - Trends in energy poverty within UK**




Source: Fuel poverty in the UK (2024)

Chart 21 provides an overview of the evolution of energy poverty in the four nations of the United Kingdom between 2004 and 2024. By analyzing the temporal trends, it is observed that:

- England: Energy poverty has shown a steady decline over time, reflecting, in part, government efforts to improve the energy efficiency of homes and provide financial support. However, the most recent data suggest a stabilization of energy poverty rates, indicating that despite improvements, significant pockets of vulnerability remain.
- Scotland: Energy poverty saw a significant increase until 2013, reaching peaks of over 30%. Subsequently, there was a slight reduction, but the rates remain high, indicating the persistence of structural problems, such as harsh climatic conditions and the quality of the building stock.
- Wales: Energy poverty in Wales has shown significant fluctuations. After peaking in the early 2010s, the rate decreased, but recent trends indicate a slight increase, suggesting that the measures taken may not be sufficient in the long term.
- Northern Ireland: The region presents the most critical situation, with energy poverty reaching 44% in 2011. Although there has been a significant reduction in the following years, the rates remain high, highlighting the challenges faced by families in this region, including reliance on expensive energy sources like oil.

In urban areas, as indicated in Chart 18, the situation has different but no less critical characteristics. Although they have access to more modern energy infrastructure, families in cities face high heating costs due to population density and the poor energy efficiency of historic buildings. For example, in London, energy costs can be exorbitant due to the need to heat buildings constructed before the implementation of modern energy regulations. Nevertheless, the chart shows that London has one of the lowest energy poverty rates, suggesting that the combination of generally higher incomes and newer infrastructure has a mitigating effect.

From a demographic perspective, as also highlighted by the National Energy Action (NEA), the most vulnerable families include the elderly, people with disabilities, and families with young children. These groups, present in all regions and nations of the United Kingdom, are particularly at risk due to their specific energy needs and limited financial resources. Often, these families are forced to choose between heating their homes and meeting other basic needs, such as purchasing food and medicine, a situation exacerbated by the energy inefficiency of homes and rising energy costs.

In conclusion, the charts and data demonstrate that while some regions of the United Kingdom have seen improvements in reducing energy poverty, others continue to struggle with concerning levels of this phenomenon. The trends vary significantly between the different nations of the United Kingdom, reflecting a combination of economic, climatic, and infrastructural factors. Targeted policies and specific interventions are essential to addressing these disparities and protecting the most vulnerable families, especially during the colder months of the year.

*Impacts and Consequences*

The struggles of energy poverty have significant impacts on families it affects by affecting both their physical health and mental well-being greatly. Research from the National Institute for Health and Care Excellence (NICE) suggests that around 10% of winter illnesses can be traced back to living conditions. Therefore, it's not unexpected that in England each year 9 700 deaths occur prematurely due to poor housing conditions where extreme cold, in homes plays a crucial role.

Living in homes with heating can lead to a higher likelihood of respiratory issues such as asthma and bronchitis according to a study conducted by the Health Foundation[141] group which shows there is a 30% greater risk associated with energy poverty's impact in this area. Furthermore, the British Heart Foundation,[142] prolonged exposure to temperatures may result in elevated blood pressure and an increased vulnerability, to heart attacks and strokes.

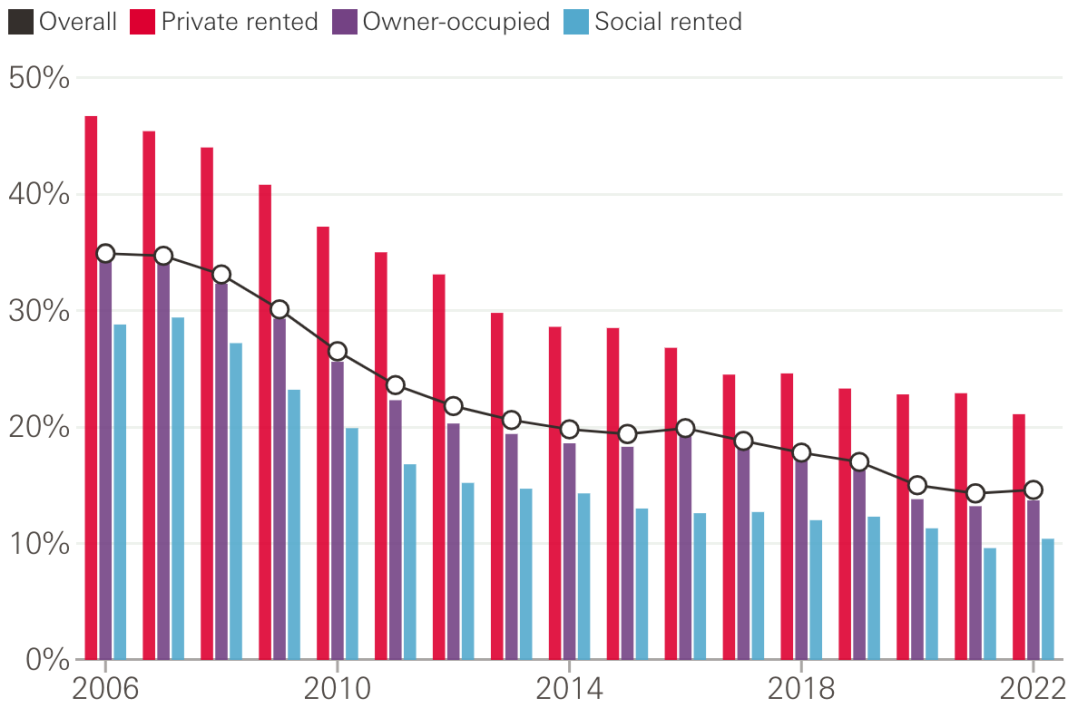
Living in a home without energy can not only affect one's physical well-being but also take a toll on mental health significantly. Being in an environment may lead to heightened stress levels, increased anxiety and even depression. The Mental Health Foundation has found that approximately a quarter of individuals living under circumstances experience notable negative consequences on their mental health. This issue is further worsened by feelings of isolation since individuals often refrain from hosting friends or family at home due to embarrassment, about their living conditions.[143]

[141] The Health Foundation - Moving to healthy homes (2023)
[142] How cold weather affects your heart (2022)
[143] Mental Health Foundation - Poverty and mental health

Even on an economic level, energy poverty can trap families in a cycle of deprivation. Low-income families living in energy poverty spend on average, about 15% of their total income on energy, compared to a national average of 7%. This leaves them with fewer resources to cover other necessities, such as purchasing food and medicine.[144]

The lack of energy efficiency in homes in the United Kingdom exacerbates the issue more. Data suggest that 60 percent of homes fall into categories D or below in terms of energy efficiency. This implies that these residences need energy for proper heating hence leading to higher expenses, for families already facing financial challenges.[145]

**Figure 22 - Percentage of non-decent homes by tenure: England, 2006–22**




Source: The Health foundation - Moving to healthy homes (2023)

Chart 22 showcases the connection between housing quality and public health in the UK by illustrating how substandard housing conditions in the private rental sector can lead to various health issues such as respiratory diseases and mental health challenges. Over the

[144] Office for National Statistics (ONS) - Average annual household energy costs from 2019 to 2023
[145] Department for Business, Energy & Industrial Strategy (BEIS) - Energy Performance of Buildings Certificates

period from 2006 to 2022 analyzed by property type reveals an improvement in unhealthy housing conditions but with a continuous presence of issues in the private rental sector. This underscores the need, for housing strategies aimed at addressing disparities and enhancing public health outcomes.

In the rental sector unhealthy housing is a common issue more so than, in other property types. This poses a challenge as the tenants here often face vulnerability and lack the means to enhance their living conditions.

Homes that are owned by their occupants demonstrate a pattern of enhancement over time; however, problems may arise in situations where ownership is prevalent among individuals, with lower incomes.

Social housing often offers living conditions, then private rentals; however, there is still a notable percentage of homes that do not meet safety and health requirements.

The chart and the analysis from, before emphasizing two factors.

- There is a link between substandard living conditions and health issues, like respiratory and mental ailments. Poor housing conditions worsen health disparities. Disproportionately affect the most vulnerable members of society.
- The evident necessity for strategies to enhance housing situations is apparent. Implementations of housing initiatives that specifically tackle these disparities have the potential to bring about enhancements, in community health and lower the expenses linked to healthcare provisions.

These themes will be delved into thoroughly in the upcoming chapters.

*Intervention and policies*

Addressing energy poverty effectively has been a focus for the British Government as they have introduced various initiatives to enhance the well-being of numerous households. The implementation of a range of policies aimed at boosting home energy efficiency and offering aid to the most disadvantaged families is at the forefront of these

efforts. Noteworthy among these measures are the Energy Company Obligation (ECO) and the Warm Home Discount schemes which are under scrutiny, in this research study. Some other important policies to consider are:

- Winter Fuel Payment: A subsidy provided during winter in the UK to support individuals with their heating costs ranging from £100 to £300 per person based on age and family circumstances 11 million people received this assistance in 2023 automatically enrolled for those receiving state pension or other age-related benefits ensuring widespread and prompt support, for a vulnerable segment of society. Ensuring this action is vital to safeguard one of the at risk demographics from the threat of energy poverty, in the winter months.[146]
- Cold Weather Payment: Financial assistance is given to families and vulnerable individuals in the UK during severe cold spells to help with heating costs in winter months when temperatures dip below freezing for seven days or more consecutively at a time with an amount of £25 per period of 7 days starting from November 1st until March 31st This scheme mainly benefits those who're recipients of benefits, like Pension Credit Income Support or Universal Credit.[147] In the winter of 2022 and 2023 in the UK many families benefited from the Cold Weather Payment as temperatures plunged below freezing. This help was especially important, in areas where winterers harsh helped prevent energy hardships during the coldest times. While generally well received some concerns were raised about whether the activation requirements matched the heating needs in various parts of the country.[148]
- Energy Price Cap: isn't a form of payment; it's a rule set by the government to restrict how much energy companies can charge customers on standard tariffs at most This rule aims to shield consumers from sudden spikes in energy prices and guarantee that families. Specifically, those who are low income or vulnerable. Aren't charged excessively for their energy usage The 2023 Price Cap limited the

[146] UK Government - Winter Fuel Payment
[147] Welfare programmes in the UK that offer financial support to people on low incomes
[148] UK Government - Cold Weather Payment

maximum yearly average cost to around £2 500 This safeguarded countless families from facing unreasonable price increases, for their energy needs.[149]

- Fuel Poverty Strategy for England: This doesn't just revolve around one policy; it's a strategy designed to make a big dent in energy poverty by 2030. This plan builds upon efforts, like the Energy Company Obligation (EC) the Warm Home Discount program while also introducing fresh objectives and upcoming projects. The plan is to enhance the energy efficiency of households by implementing upgrades such as insulation and boiler enhancements alongside helping to families in need to guarantee they can keep their homes warm.

  In line with the European Green Deals objectives the plan aims to lower carbon emissions and combat energy poverty while also supporting environmental objectives by serving as a central coordinating force that strengthens programs such, as ECO and Warm Home Discount to ensure that interventions are both accessible and enduring.

  This comprehensive plan incorporates strategies to tackle energy poverty in a manner while prioritizing alignment, with international climate objectives.[150]

As mentioned earlier, the Energy Company Obligation (ECO) and Warm Home Discount initiatives deserve particular attention, as they represent key elements of this analysis. These programs, crucial in the fight against energy poverty, will be examined in detail in the following paragraphs of the report.

*Conclusions*

Thanks to the overview of the phenomenon in the United Kingdom, it was possible to understand the extent of energy poverty in the country, a fundamental aspect for continuing with the analysis. It is particularly useful to understand the magnitude of this phenomenon before delving into the country's approach in the three key areas covered in this chapter [151].

[149] UK Government - Energy Price Cap
[150] UK Government - Fuel Poverty Strategy for England
[151] Access to support programmes, identification of vulnerable consumers, integrated support and multidisciplinary approach by the country

What has emerged so far reinforces the relevance of the UK's example, particularly because it shows characteristics that are particularly like those of Italy.

The United Kingdom and Italy share significant similarities in the fight against energy poverty, particularly related to the quality of housing, which is often old and inefficient, especially in rural areas and those with historic buildings. Both countries have developed policies to address the problem: in the UK, measures such as the Energy Company Obligation (ECO) and the Warm Home Discount provide direct support to struggling families, while in Italy, the Superbonus 110% incentivizes renovations to improve energy efficiency, although it often requires significant initial investments. Additionally, while the UK already uses the LILEE criterion to measure energy poverty, Italy is still in the process of developing a unified indicator.

In summary, the comparison between the United Kingdom and Italy highlights significant similarities in the fight against energy poverty, particularly related to the structural conditions of housing, the volatility of energy prices, and the challenges associated with policy implementation. These parallels not only underline the importance of the UK's case study for this analysis but also suggest that an integrated approach could emerge by combining the strategies adopted in the two countries. The British approach, in fact, could complement and enrich the Italian one, creating a more effective and cohesive model for tackling energy poverty.

(These considerations are deferred to paragraph 3.4.1, which will aim to highlight the similarities and divergences of the two countries on this aspect.)

### 3.3.2 Analysis of the Identified Macro Areas in the UK

Upon preliminary examination of energy poverty in the UK, it is evident how pertinent this case study is to the field's findings. The next stage is to narrow the scope of investigation by delving deeper into the examination of areas of interest after determining the extent of the issue in the British environment. Thus, to give a more thorough knowledge of the tactics used and direct the study toward conclusions, this paragraph will concentrate on the UK's approach in the major areas to be reviewed.

#### 3.3.2.1 Access to Support Programs

Important efforts like the Warm Home Discount and the Energy Company Obligation (ECO) have made it easier for vulnerable energy consumers in the UK to receive support programs. Of the energy efficiency initiatives, the former is the more pertinent, whilst the latter provides direct financial assistance. These initiatives, which work to lower energy costs and increase residential energy efficiency, are essential in the fight against energy poverty.

One important measure is the Warm Home Discount, which provides needy families with an initial £150 reduction on their energy bills, thereby increasing accessibility and speeding up support. Three primary characteristics set it apart: fast and focused support, identification of particular groups, and automatic application.[152]

- Automatic Application: The automatic application mechanism is among the Warm Home Discount's most important advances. This system significantly lowers access barriers by enabling many qualifying families to obtain the discount without having to submit an application. The government's and energy providers' cooperation, which cross-references income, pension, and other benefit data with energy company data, makes automation possible.

  This technique is especially efficient since it guarantees timeliness by eliminating the need for families to wait for requests to be processed, which cuts down on bureaucracy and expedites the delivery of assistance to those in need.[153]
- Identification of Specific Groups: The Warm Home Discount is designed to reach specific groups of vulnerable people, such as low-income pensioners. A crucial aspect of this identification is the Pension Credit Guarantee, a social benefit for pensioners with very low incomes. This credit is divided into two main components: Guarantee Credit (which supplements pensioners' income up to a minimum threshold, making them eligible for the Warm Home Discount) and Savings Credit (an additional payment for those who have saved for retirement beyond the State Pension).

[152] Ofgem wbesite – Warm Home Discount (WHD)
[153] UK Goverment- Warm Home Discount Scheme

Thanks to data sharing between the Department for Work and Pensions (DWP) and energy providers, these vulnerable groups are identified automatically, ensuring that the discount is applied without any further action required from the beneficiaries. This method is essential to prevent the most at-risk individuals from being excluded from the program due to access difficulties or lack of information.[154]

- Rapid and Targeted Support: The Warm Home Discount is designed to provide rapid and targeted support, responding immediately to the energy needs of families during the coldest months. Thanks to automation and the precise identification of vulnerable groups, the support is automatically applied to the energy bill, eliminating the need to wait for the approval of applications or fund transfers. This is crucial during winter when heating expenses can become unaffordable for low-income families. Additionally, the program is flexible and proactive, adapting to changes in families' needs, such as income variations or new vulnerabilities. [155]

The Energy Company Obligation (ECO**)** is a central element of the UK's energy policy, aimed at improving the energy efficiency of homes, especially among vulnerable families. This program requires major energy companies to finance a series of interventions that reduce energy consumption and, consequently, costs for consumers.
Characterized by three key aspects of the program: targeting vulnerable consumers, facilitated access, and program continuity.

- Targeting Vulnerable Consumers: The ECO program is designed to support vulnerable consumers, meaning those living in difficult economic conditions and in homes with low energy efficiency. This support is realized through targeted interventions such as thermal insulation, which reduces heat loss, improves living comfort, and lowers energy bills. Additionally, many families with old, energy-intensive boilers can benefit from their replacement with more efficient models, reducing energy consumption by 20-30%. In addition to boilers, heating systems

[154] UK Government - Warm Home Discount Scheme
[155] UK Government - Warm Home Discount Scheme

are also upgraded to ensure more efficient heat distribution throughout the house. These interventions not only improve the residents' quality of life but also help reduce carbon emissions, in line with the UK's sustainability goals.

- Facilitated Access: Unlike many other support programs that require families to cover costs upfront and then request reimbursement, ECO directly covers the costs of interventions. Families do not have to worry about finding funds to start the work, as the costs are borne by energy companies. This approach is crucial because it eliminates financial barriers, allowing vulnerable families to access improvements without facing large upfront expenses or going into debt. Additionally, the benefits are immediate: families can immediately enjoy energy savings and reduced bills without having to wait for cost recovery through tax deductions or other means.
- Program Continuity: The success of ECO largely depends on its continuity, ensured by regulatory obligations imposed on energy companies. It is not a time-limited program but a long-term strategy that ensures a constant flow of investment in energy efficiency. This continuity is essential to guarantee the stability of support, allowing vulnerable families to rely on continuous assistance, not subject to interruptions due to political or economic changes. Moreover, the certainty of available funds each year allows for the planning of more ambitious and long-lasting interventions, such as the energy retrofitting of entire neighborhoods. [156]

The Warm Home Discount (WHD) and the Energy Company Obligation (ECO) demonstrate how well-structured public policies can effectively address energy poverty through automation, targeted identification, and timely support. Both programs ensure that help reaches those in need quickly, minimizing bureaucratic barriers and optimizing effectiveness through collaboration between the public and private sectors.

The WHD, with its automatic disbursement, and the ECO, which facilitates access to energy efficiency improvements without initial financial burdens, represent valuable models for improving support policies in other contexts, such as Italy. In summary, these

[156] Energy grants in 2024 and how to get them (2024)

programs are not only British successes but also examples from which lessons can be drawn to combat energy poverty on an international level.

#### 3.3.2.2 Identification of Vulnerable Consumers

Identifying consumers in the United Kingdom through data matching practices and risk recognition schemes is crucial, in addressing energy poverty effectively.

The British government utilizes data matching as a method to pinpoint families facing potential energy poverty concerns automatically. By checking information from different sources like the Department for Work and Pensions (DWP) and energy suppliers enables the proactive identification of families who might qualify for assistance, without necessitating them to submit applications.

This method works well because it merges details about earnings and job status along with perks, with energy information to pinpoint families in need before things get too tough to manage effectively. For instance, households that receive Pension Credit or other types of aid are automatically evaluated for energy assistance schemes to ensure timely help and support.

Recognition programs for risk assessment rely upon a strategy to pinpoint families in need of support services. The criteria for these programs extend beyond aspects to encompass various vulnerability markers like joblessness, disease prevalence, among family members, seniority and inadequate living conditions.

Authorities use these markers to create risk profiles that help them pinpoint individuals vulnerable to energy poverty with greater accuracy. Once these individuals are identified tailored interventions can be implemented, such as offering access to energy saving initiatives or providing targeted assistance. For instance, families with members facing long term health conditions or disabilities could be given priority, for insulation upgrades or direct aid when extreme cold weather strikes.[157]

These tools improve the efficiency of support measures. Play a crucial role in ensuring a fair allocation of resources by prioritizing assistance to those, in genuine need when resources are scarce.

[157] Ofgem website - Consumer vulnerability protections

#### 3.3.2.3 Integrated support and multidisciplinary approach

The United Kingdom's Fuel Poverty Strategy serves as a plan to combat energy poverty by implementing a variety of targeted measures involving multiple sectors and societal stakeholders The strategy goes beyond offering financial assistance by establishing a supportive environment that tackles the underlying issues of energy poverty through enhancements in housing conditions education, on energy consumption and raising consumer awareness.[158]

The rationale behind the approach of the Fuel Poverty Strategy to advocate for multidisciplinary assistance is rooted in its capacity to align various forms of interventions in a cohesive and complementary way. It merges measures like providing direct financial aid with enduring structural enhancements such as enhancing the energy efficiency of residences. Moreover, than working in isolation the strategy promotes cooperation, among governmental bodies businesses, private entities and non-profit organizations to establish a comprehensive support system that caters to the multifaceted needs of families facing hardships.[159]

The characteristics of the Fuel Poverty Strategy that make it an integrated support strategy are:

- Personalized Energy Consulting: This service is exceptional for its capability to offer personalized guidance to families in reducing energy usage and enhancing their homes efficiency. The energy consultation doesn't just provide technical advice but is tailored to the unique circumstances of each family and their residence. The consultation encompasses not technical recommendations but also provides access to financial incentives and links, to other energy assistance initiatives making the intervention more efficient and focused.

  Based on the information available families that have received guidance of this kind have managed to lower their energy usage by a substantial margin ranging from 10% to 30% depending on the effectiveness of the advice given and actions

[158] UK Government - Committee on Fuel Poverty annual report: 2024 (2024)
[159] UK Government – Fuel poverty strategy for England (2021)

taken. This decrease not results, in immediate financial benefits but also helps in the long run by reducing the risk of energy hardship. [160]

- Public-Private Partnerships: The United Kingdom promotes collaboration between public and private entities to raise community awareness and improve families' energy management. This partnership materializes in educational campaigns and workshops that, in 2023, involved over 150,000 families, helping them reduce energy consumption and bills. This cooperation allows for the maximization of resources and the expansion of the reach of interventions, ensuring that more families can access energy support programs.[161]
- Multifaceted Support: The strategy against fuel poverty incorporates a range of support measures such as aid and initiatives to enhance household energy efficiency alongside educational campaigns to raise awareness on energy matters for families in need of assistance economically and educationally alike with the aim of fostering a sustainable home environment and diminishing reliance, on long term subsidies over time.[162]

### 3.4 Main Findings

The examination of the case, in the United Kingdom has unveiled crucial discoveries that provide valuable perspectives for enhancing strategies to address energy poverty issues in Italy specifically.

In the battle against energy poverty the impact of automated schemes, like the Warm Home Discount (WHD ) and the Energy Company Obligation ( ECO ) has become crucial. By distributing assistance and accurately identifying recipients these initiatives show how efficient and specific aid can be given by cutting down on administrative hurdles. The automated setup at WHS has proven to be highly effective, in cutting down the support delivery time and making sure that families in need get the help they require at moments throughout the year.

A notable discovery involves the application of data matching methods in the United Kingdom to detect individuals proactively by correlating information from various

[160] How fuel poverty is measured in the UK: March 2023 (2023)
[161] UK Government - Committee on Fuel Poverty annual report: 2024 (2024)
[162] UK Government - Fuel poverty strategy for England

government bodies and energy suppliers without the need for them to fill out forms. This system enables assistance and lowers the chances of overlooking families in dire need due to administrative red tape.

The Fuel Poverty Strategy in the United Kingdom is a rounded support system that incorporates economic measures as well as changes in infrastructure and education initiatives to combat energy poverty effectively. This comprehensive strategy emphasizes the significance of tackling energy poverty through not economic means but also by enhancing housing quality and encouraging responsible energy usage. Measures like tailored energy advice and collaborations, between private sectors have contributed to establishing a holistic support network that caters to the needs of families facing challenges.

The results do not validate the success of the measures implemented in the UK but also offer useful guidance for improving intervention tactics in different nations like Italy. The combination of automated systems, identification of beneficiaries and a holistic approach can substantially boost the efficacy of strategies addressing energy poverty enabling more reliable and tailored assistance, to families in need.

### 3.5 Summary of Main Differences and Similarities

The analysis of the United Kingdom case has highlighted a series of significant similarities and differences compared to the situation in Italy in the fight against energy poverty.

In both countries, the quality of housing represents a crucial challenge. In both Italy and the United Kingdom, many homes, especially older ones, are characterized by low energy efficiency, making it difficult for families to maintain adequate indoor temperatures without incurring high energy costs. Another similarity concerns the barriers to accessing energy support programs. In Italy, vulnerable families often encounter difficulties related to bureaucratic barriers and the complexity of administrative processes, as seen in the case of the Superbonus 110%. In the United Kingdom, despite a more automated system, issues remain regarding the complete identification of beneficiaries.

However, there are also substantial differences. One of the most relevant differences concerns the approach to measuring energy poverty. The United Kingdom has introduced the "Low Income Low Energy Efficiency" (LILEE) criterion, which considers both the

energy efficiency of homes and the residual income of families. In Italy, however, a unified and shared indicator is still lacking, thus limiting the effectiveness of intervention policies. Furthermore, in the United Kingdom, programs like the Warm Home Discount automate the allocation of benefits, simplifying access to support. In Italy, by contrast, access to benefits is often complicated by manual processes and bureaucratic requirements. Finally, the United Kingdom stands out for greater coordination among the various actors involved, thanks to a multidisciplinary strategy that makes interventions more effective, while in Italy, fragmentation among programs and institutions limits the overall impact.

### 3.6 Recommendations

When we look at the situation, in the United Kingdom, it prompts us to consider changes that could be implemented in Italy to address issues related to energy poverty.
Implement a measure like the UKs LILEE in Italy to better pinpoint at risk households and enhance the impact of government initiatives. Streamlining assistance schemes could play a role in facilitating beneficiaries access to aid drawing insights from successful programs, like the Warm Home Discount that cut through administrative hurdles hindering intervention efficiency in Italy. Italy could see advantages from collaboration among the various participants by establishing a national platform that aligns resources and guarantees a cohesive and enduring strategy, in addressing energy poverty concerns.

# Chapter 4 Research Design, Data Collection, and Analysis Framework

## 4.1 Case Study Design

This paragraph is intended to explain how the research, on the strategies implemented by the United Kingdom to address energy poverty was carried out in alignment with the goals of my study project. It will detail the criteria chosen to guarantee an meticulous examination. Will include an exploration of the importance of the case study the procedures undertaken during the evaluation and the different resources utilized for data collection. This part aims to offer a defined and organized overview of the approach employed in the study while underscoring the significance of each choice made and how it influences the accuracy and dependability of the outcomes achieved.

### 4.1.1 Theoretical foundation of case study methodology

Robert K Yins book titled "Case Study Research and Applications; Design and Methods" presents an adaptable method, for investigating issues in practical scenarios. This approach proves valuable for delving into subjects that are intricately connected to their real life settings – making it particularly suited for studies necessitating an exploration of the background context. Yin underlines the significance of this methodology in tackling queries such, as "how" and "why " demanding scrutiny.

According to Yins definition a case study involves an examination of an occurrence, within its real world setting particularly when it is challenging to separate the incident from its surrounding circumstances. This method proves valuable in disciplines, like sciences where variables are intricately linked to the context in which they emerge, posing challenges in their isolated examination.

When looking at research approaches, like experiments or surveys and analyzing documents in comparison to case studies advantages become clear. They excel at capturing intricate phenomena intertwined with specific contexts.

In his work Yin emphasizes the significance of structuring the case study by selecting cases and implementing systematic data gathering techniques alongside establishing clear criteria to interpret findings effectively to maintain coherence and alignment, with the research goals.

Studying how the UK addresses energy poverty provides an example of strategies the country utilizes in this important area.

In research work, like this one by Yin It's key to gather evidence to win. Documents and interviews play part Observations too are an art. By keeping a link in this chain Researchers can. Gain. Every stage of the study so dear Enhancing integrity, with each gear. In brief Yins approach to case studies provides a framework, for comprehending real life scenarios by meticulously organizing data collection and conducting thorough analysis resultant in valuable understandings that can be extended to broader settings.

### 4.1.2 UK case study insights

To explore how the United Kingdom addresses energy poverty through its policies, this thesis adopts an in-depth case study methodology. This approach allows for a comprehensive and detailed examination of the UK's strategies and policies, using it as an example of national intervention in a context of the growing global spread of the phenomenon.

The choice of the United Kingdom as a case study is justified by its strong position in the European landscape, where it has implemented a set of distinctive policies aimed at combating energy poverty, making it a significant example for the analysis of social and energy policies. This makes it a useful subject for studying the intersection between energy policies, social vulnerability, and government interventions.

In particular, this choice allows for an in-depth exploration of the specific policies adopted in the United Kingdom, providing valuable insights into the complex interaction between public policies and socioeconomic conditions. Alternative approaches, such as the study of multiple national cases, were considered but ultimately deemed less effective in capturing the detailed contextual nuances necessary for this research.

The methodological approach adopted to analyze this case study is based on a thorough analysis of various sources, in order to fully understand the motivations and effectiveness of the UK's policy strategies. The sources were selected for their relevance and authority, covering a wide range of perspectives on UK energy and social policies from 2010 to 2024. The analysis of each source was guided by a series of research questions aimed at

identifying the strategies adopted and the results achieved. Each source provided different types of data and insights, each offering a unique understanding of the UK's policies:

- Academic Journals: Articles from peer-reviewed journals offer theoretical perspectives on social and energy policies and their application in contexts of vulnerability.
- Government Reports: Annual reports and public documents from the UK government provide an overview of strategic priorities and policy responses, offering a baseline of truth against which other sources can be validated.
- Media Publications: Articles from reputable international news outlets provide real-time updates on operational challenges and how the UK manages new issues related to energy poverty, offering a narrative of public perception and media representation.
- Interviews and Speeches: Public interviews with policymakers and UK government representatives, available in video format and transcription, serve as primary sources of self-representation and strategic government communication.

### 4.1.3 Case study protocol in a nutshell

A detailed protocol for the case study was developed to guide the entire research process. This protocol includes:

- Case Study Overview: Description of the phenomenon in the United Kingdom and focus on policies to address energy poverty, with an emphasis on strategies adopted to mitigate the effects of the crisis on the most vulnerable segments of the population.
- Research Questions: Clearly defined questions, as indicated in section 4.2.1, aimed at exploring the effectiveness and transferability of British policies to the Italian context.
- Data Collection Procedures: Detailed steps for collecting data from various sources, such as academic journals, government reports, media publications, and interviews with experts.

- Data Collection Tools: Guides for semi-structured interviews and document analysis templates used to gather and organize relevant information.
- Data Management: Procedures for data storage and security, maintaining confidentiality and considering ethical aspects related to the research.
- Data Analysis Plan: Techniques for analyzing the collected data, including pattern matching and explanation building to interpret the results consistently with the research questions.

### 4.1.4 Case study source overview

The sources were chosen because they are relevant and authoritative and provide a variety of viewpoints, on the United Kingdoms initiatives to combat energy poverty.

- Relevance: The sources needed to directly address aspects of the UK's energy policies, with particular attention to the strategies adopted to mitigate energy poverty and their potential impact in the Italian context.
- Authority: Preference was given to peer-reviewed academic journals, official reports from the UK government, and publications in reputable news outlets to ensure the reliability of the information collected.
- Diversity: Various types of sources were included to ensure a comprehensive view of the phenomenon, such as academic articles, government reports, media articles, and interviews with experts. Each source was evaluated for its contribution to answering the research questions, using triangulation to validate the data collected.

The research investigation was structured based on Yins principles, for investigating problems in depth and detail This strategy facilitated a comprehension of the policies in the UK and how they could be adapted for use in Italy Every bit of information underwent a rigorous assessment following a set procedure for gathering and analyzing data to guarantee that the findings could be replicated and trusted This method enabled a thorough grasp of how the nation tackles energy challenges while also offering valuable suggestions, for handling comparable situations in various settings.

## 4.2 Methodology

The paragraph delves into the strategy used to tackle the research by explaining how the research question was crafted and the gap, in literature pinpointed before selecting the appropriate methodological approach to follow through with the study plan.Stage by stage will be an in depth discussion of the research strategy employed study design research quality data collection and analytical processes each aimed at offering an insight into the decisions and their significance, in guarantee validity and trustworthiness of the outcomes achieved.

### 4.2.1 Clarification of research question

The main research question guiding the case study and the research is:

*RQ: "Which aspects of UK policies against energy poverty can be implemented in Italy?"*

The research question (RQ) is designed to seek out world and efficient methods to tackle a social problem with a particular emphasis, on exploring the potential transfer and customization of the approaches and policies of the United Kingdom that are being reviewed.
This query directs the inquiry by delving into how the knowledge and successful strategies, from the United Kingdom could make an impact, in addressing energy poverty in Italy. The sub-questions related to the main one include:

- What are the main factors of energy poverty in Italy?
- Which European country has an effective approach to energy poverty?
- What are the main policies implemented in the United Kingdom to tackle energy poverty?
- What structural and socioeconomic differences exist between the United Kingdom and Italy that could affect the applicability of the policies?
- What results have the UK's policies achieved in reducing energy poverty?
- Which aspects of UK policies are most relevant to the Italian context?

- What could be the challenges and opportunities in adapting UK policies to the Italian context?

These sub-questions are designed to divide the question, into parts to examine the methods used in the United Kingdom and compare them with those, in Italy while exploring the potential benefits of introducing similar policies in Italy.
The sub-questions aim to examine each aspect of the question in order to establish a strong base, for discovering viable and applicable solutions that can be successfully implemented within the Italian setting.

### 4.2.2 Literature gap

Upon conducting an examination of the references, to us it has become apparent that there are noticeable deficiencies in the existing literature pertaining to energy poverty. These gaps are evident not in discussions but also, in the realm of public policy. Specifically we have pinpointed two areas where these shortcomings are most pronounced;

1. In-depth study o energy poverty in Italy:
   Energy poverty, in Italy is often overlooked in discussions and public debates.The existing literature mainly focuses on describing the issue without exploring its underlying factors or the potential long term impacts.Few in depth studies investigate the scope and reasons behind energy poverty in Italy compared to countries.There is a gap, in analyzing this problem within the context.
2. Applicability of UK policies in the Italian context:
   There is another area, in the research that needs attention regarding how energy policies implemented in the United Kingdom (and other countries well) could be viable and suitable for the situation assessment as well. Even though the UK has put in place up to date approaches to address energy poverty issues there is a lack of studies exploring the adaptation and successful implementation of these policies, in Italy.

There are voids, in the existing research that highlight the necessity for an investigation into energy poverty in Italy and an assessment of the feasibility of adopting policies from

other nations like the United Kingdom to tackle Italys unique challenges in this area. This upcoming study endeavors to address these gaps by laying the groundwork, for research efforts that can enrich both understanding and practical applications in the realm of energy and social policies.

### 4.2.3 Research approach

The choice of research methodology, for this thesis is heavily impacted by how theory and research're intertwined and the distinction commonly made between deductive approaches.[163]

Qualitative research often uses an approach to develop theories, from observations made in the real world; whereas quantitative research leans towards a deductive approach, by starting with established theories and testing hypotheses using data.

In this study presentation I'll be going over the analysis of energy poverty policies, in the United Kingdom to determine their advantages and benefits; a subject that poses challenges when it comes to quantification due to its intricate complexities at a global level. With our research being exploratory in essence it's important to note that neither of the methods perfectly suits our needs ; the inductive approach is somewhat limited as the field is not entirely novel while the deductive method doesn't quite align, with our studys goals.

In this scenario we decided to take an approach merging aspects of both methods to blend data and theories seamlessly. This approach is well suited for overcoming the constraints of induction and deduction providings the needed adaptability, in a field such as energy policies. By choosing this method we open up avenues for exploring paths and gaining insights into how UKs policies could be implemented in Italy making the abductive approach a perfect fit, for our research.

[163] Business Research Methods (2022)

#### 4.2.3.1 Research strategy

The approach taken for this thesis research mainly focuses on methods to delve into the issue of energy poverty by conducting an, in depth case study, in the United Kingdom. This plan seemed like the choice to meet the research goal effectively.
Qualitative research is especially appropriate, for this study as it centers on grasping the thoughts and experiences of individuals and groups engaged in resolving a problem. This method enables the gathering of in depth and elaborate information using techniques like interviews and document examination that enable a comprehension of the subject. Although quantitative data offers a perspective the qualitative approach permits a focused investigation necessary, for addressing the research query.

#### 4.2.3.2 Research quality

Ensuring the quality of research is crucial, in any study. This thesis follows the standards set for research such as credibility applicability, to other contexts.
Achieving credibility involved using triangulation by combining data sources like interviews, with individuals in the field of energy poverty as well as policy documents and academic research papers to accurately depict the situation and gauge the impact of policies, in the UK.
Transferability was considered by providing detailed descriptions of the research context and the specificities of the British and Italian contexts. This allows other researchers to determine the applicability of the findings to different settings.
Ensuring reliability was maintained through monitoring of the research process which encompassed explaining the reasoning, behind decisions and data analysis methods used in the study. This openness enables researchers to recreate the study thereby boosting trust in the results.
Confirmability was addressed by acknowledging potential researcher biases and ensuring that the data, rather than personal opinions, guided the analysis. Reflexivity was practiced throughout the research process, with regular reflections on how the researcher's background and perspective might influence the interpretation of the data.

### 4.2.4 Data collection

In this research both primary and secondary data are utilized for gathering information. Primary information will be collected by conducting formal interviews, with managers and industry professionals which fits nicely with the research design chosen for this study purpose These discussions are crafted to thoroughly investigate the subject matter being studied.

In addition, to this method of research used in the thesis to gain a comprehension of the subject being studied and incorporating data as well as secondary sources like academic articles, for the literature review and other pertinent empirical materials will be utilized simultaneously.

#### 4.2.4.1 Primary data

Due, to the nature of the subject being studied semi formal discussions were chosen as the approach for gathering firsthand information. This method enables an comprehensive examination with participants permitting flexibility in their responses while upholding a framework that eases comparison of the gathered data. Semi formal discussions are especially well suited for delving into the reasons and fundamental elements of policy tactics, within the realm of energy scarcity. This technique enables the inclusion of probing inquiries when to improve the quality and significance of the gathered responses to study questions more effectively and precisely managed through a crafted interview guide designed to minimize deviations from the main topic and maintain focus during discussions contributing to making semi formal interviews more advantageous, than informal ones, for conducting a comprehensive data comparison and evaluation process.

#### 4.2.4.2 Interview process

In order to follow the semi-structured interview method closely a tailored interview guide was developed for the interviews. The participants included experts and practitioners, from the energy and social policy sectors, such, as professors, researchers and executives. Given the backgrounds of the participants the interview guide was adjusted to ensure that the questions addressed their experiences and knowledge areas.

The interview questionnaire consisted of a set of organized inquiries aimed at delving into the obstacles faced in Italy. Views, on the initiatives carried out in the UK. The queries were crafted to probe the approaches taken their advantages and disadvantages the hurdles faced and potential upcoming developments, in energy policies.
To enhance the efficiency and adaptability of the interviews conducted remotely through video calls or phone conversations to overcome limitations without requiring any travel involved in the process. Furthermore the discussions were captured for transcription purposes to enable a concentrated examination of inquiries and responses, throughout the interviews resulting in an enhancement, in the standard and precision of the gathered information.

*(The question framework can be found in the appendix A: Interview guide)*

#### 4.2.4.3 Sampling

Unlike quantitative research, where sampling aims to generalize the results to the entire population, qualitative sampling focuses on collecting data from individuals who can provide relevant information to answer the research question. The main goal is to understand a specific phenomenon rather than extend it to a broader population. Qualitative sampling can be conducted through various strategies: convenience, theoretical, and purposive sampling.
Convenience sampling is the least expensive and is based on the ease of access to subjects. Theoretical sampling, on the other hand, involves an iterative process where the choice of new subjects is guided by the emerging theories from the already collected data. Purposive or judgmental sampling involves the active selection of subjects who are likely to provide the most productive responses for the research. This type of sampling is particularly useful for gathering a diverse and informative sample, essential for in-depth exploration of the issue under study.
In this study, a purposive sampling strategy was adopted to explore the impact of innovative energy policies in the United Kingdom on energy poverty, in line with the abductive research approach.

The sample consisted of experts and practitioners in the energy sector with different roles, backgrounds, and, most importantly, differing opinions. This allowed for varied and in-depth perspectives to be obtained. The purposive approach ensured that only high-profile figures in the field were selected, significantly enriching the perspectives explored.

*(The profiles of the interviewees can be found in the appendix B: Interview partecipants)*

#### 4.2.4.4 Secondary data

In addition to the empirical data collected through interviews, secondary data was used to gain a more comprehensive understanding of the phenomenon under study, with particular attention to energy support policies and the adoption of sustainable technologies.

The search for relevant literature involved the use of online scientific databases such as Google Scholar, Scopus, and the Library of Congress, as well as other search engines like Web of Science and Science Direct when necessary.

The initial research primarily examined the impact of energy policies on social well-being, identifying this as a valid starting point for the collection of secondary data. Subsequently, the focus shifted to specific studies on energy poverty and policy responses, with a particular emphasis on innovations in the energy field. This section of the research was significantly influenced by the primary data collected, as the selection of literature and the themes that emerged from the interviews guided the theoretical choices. Consequently, the literature and empirical data influenced each other, allowing the development of new theories and the adaptation of keywords to the themes that emerged during the research process.

In selecting the articles for this research, various factors were considered, such as the importance of digitalization and recent technological developments, generally preferring recent publications. However, for some fundamental political or sociological concepts, older studies that are still considered relevant due to their solid theoretical foundation were included. A strict age limit was not imposed on the literature used; the choice was guided by the relevance of the studies in the research area. For topics such as new technologies and energy policies, more recent studies were prioritized due to the rapid

changes in these sectors in the last decade. However, the limited availability of research on some topics led to the use of some older sources that are still considered valid.

### 4.2.5 Data analysis

The data analysis in this study followed a systematic approach to ensure a thorough understanding of the research question and to address the gaps identified in the existing literature.

Extensive explanation was provided regarding the analysis process initiation that involved gathering secondary data sources such, as interviews and pertinent documents. Primary data encompassed formal interviews conducted with key stakeholders while secondary data comprised academic papers corporate reports and other applicable publications.

The evaluation began by transcribing the interviews to maintain the essence of the participants viewpoints before progressing to a coding analysis to pinpoint common themes and trends in the data through multiple rounds of categorization and refinement to ensure a comprehensive and thorough examination, in addressing the research query.

Various data sources were combined to enhance the accuracy of the results through triangulation in this study process. The approach involved an examination of interview data, alongside information obtained from sources. The comparison analysis supported the confirmation of interview outcomes. Offered a perspective, for understanding the results.The incorporation of data sets led to a thorough and dependable analysis that facilitated a deeper comprehension of the research subject matter.

#### 4.2.5.1 Coding analysis

Coding analysis is a key methodology in qualitative research, used to analyze and interpret large amounts of textual data, such as interviews or transcripts. This process involves breaking down content into meaningful units, assigning 'codes' to text segments that represent relevant concepts or themes. Coding analysis allows for the identification of patterns and relationships in the data, facilitating the understanding of complex phenomena and the construction of theoretical models.

Coding develops at various levels. First-order codes represent specific concepts that emerge from the text, while second-order codes group the first-order codes, reducing complexity and highlighting thematic connections. The themes, derived from the second-order codes, directly address the research questions, offering a broader view of the phenomenon under study. Finally, aggregated themes synthesize the research findings, linking them to broader theories or practical implications, and contribute significantly to the conclusions of the thesis.

Moving on to the specific coding analysis presented in Table 1, it clearly emerges how the first-order codes (not presented in the table for graphical clarity), including 'automatic energy support,' 'single energy strategy,' and 'energy poverty benchmark,' represent fundamental ideas identified during data analysis, revealing their relevance to the research objectives.

Through a grouping process, the first-order codes were organized into second-order codes, such as 'access to bonuses,' 'access and information,' and 'role of energy bonuses.' This step highlights the connections between the initial concepts, allowing for the identification of significant relationships among the various dimensions of the phenomenon under study.

Subsequently, the emerging themes, such as 'identification and support for the vulnerable' and 'evaluation and quality of energy policies,' represent integrated categories that directly respond to the research questions. These themes not only synthesize the collected evidence but also show how the data aligns with the three central research areas: access to support programs, implementation and identification of vulnerable clients, and the lack of a unified strategy by the State.

Finally, the aggregated themes, such as 'access to resources' and 'energy efficiency,' confirm the alignment between the collected evidence and the initial research hypotheses and clearly summarize the main findings of the analysis.

This synthesis process allowed for the creation of a coherent and structured overview, connecting empirical data to the research objectives and formulated hypotheses. In this way, coding analysis contributed not only to organizing the data but also to validating and reinforcing the research hypotheses, demonstrating the relevance of the three areas of investigation concerning the studied problem.

The use of coding analysis proved useful in addressing the complexity of data analysis in qualitative studies. This approach allowed for the identification of recurring patterns and themes, which were essential not only for accurately answering the research question but also for building a solid theoretical framework capable of interpreting the analyzed context in a coherent and integrated manner. The resulting structure from the analysis helped clarify the underlying dynamics of the phenomenon under study, providing a solid foundation for the research conclusions and suggesting possible practical implications and future directions for further studies. [164]

[164] The coding analysis process was carried out using two programmes: QDA Miner and Taguette.

**Table 1 - Data Analysis**

| 1st Order Codes | 2nd Order Codes | Themes | Aggregate Themes |
|---|---|---|---|
| 100+ Codes | Identification of the Vulnerable | Identification and Support for the Vulnerable | Support for the Vulnerable |
| | Access to Bonuses | | |
| | Partnerships and Collaborations | | |
| | Awareness and Energy Education | Harmonization of Energy Policies | |
| | Harmonization of Energy Policies | | |
| | Family Incentives | | |
| | Technological Barriers | Technological Barriers and Access to Information | Access to Resources |
| | Access and Information | | |
| | Identification of Fragile Categories | | |
| | Energy Poverty Benchmark | Support for At-Risk Groups | |
| | Independence of Support Systems | | |
| | Role of ESCOs | | |
| | Bureaucracy and Access to Benefits | Bureaucracy and Access to Benefits | Energy Policies |
| | Exclusion of Public Housing | | |
| | Energy Poverty Indicators | | |
| | Energy Mapping of Buildings | Indicators and Mapping of Energy Poverty | |
| | National Energy and Climate Plan | | |
| | Access to European Funds | | |
| | Overestimation of Energy Poverty | Evaluation and Quality of Energy Policies | Energy Efficiency |
| | Quality of Energy Policies | | |
| | Impact of Climatic Conditions | | |
| | Regional and Socio-Economic Gaps | Impact of Climatic and Regional Conditions | |
| | Effective Policy Mix | | |
| | Role of Regulatory Authorities | | |
| | Role of the Third Sector | Third Sector and Public-Private Collaboration | Territorial Variability |
| | Support for Vulnerable Families | | |
| | Public-Private Collaboration | | |
| | Optimizing Energy Use | Energy Efficiency and Resource Management | |
| | Efficiency Monitoring | | |
| | Financial Resource Management | | |
| | Critique of Energy Poverty | Critique of Energy Poverty and Political Pricing | Collaboration and Mapping |
| | Importance of Purchasing Power | | |
| | Resource Management Freedom | | |
| | Energy Market Efficiency | Market Efficiency and Purchasing Power | |
| | Critique of Political Energy Pricing | | |
| | Role of Energy Bonus | | |

Source: Author's own elaboration

### 4.3 Results

The presentation of the results is organized according to the areas covered by the interviews, namely: Study validity, exploration of opinions on the Italian context, and inquiry and collection of information regarding the Validity of the UK approach in Italy. The interview questions were divided into areas to facilitate the direction of the study, the organization of the results, and the readability of the findings.

#### 4.3.1 Study validity

The validity of the study was the first topic addressed in the interviews, as it emerged from the gap in the literature that the subject had not been adequately explored. Consequently, it was essential to gather expert opinions on some of the practices adopted in the analyses, particularly on the relevance of the three critical macro-areas identified for Italy (Access to support programs, Identification of vulnerable consumers, and Lack of a unified state approach), which were used as a tool to examine the UK approach. The interviews clearly revealed that all three macro-areas are extremely significant and consistent with the dynamics of the phenomenon, thereby covering the main critical aspects to be analyzed.

*"These areas touch on the nerve centers of the problem: the difficulty in accessing effective support, the inability to accurately identify the neediest households, and the lack of a unified strategy to coordinate the various interventions."*

Proceeding in order, regarding access to support programs, it was highlighted through the interviewees' opinions that bureaucratic complexity and fragmented information represent limits to accessing the benefits provided by support programs. In many cases, people in vulnerable conditions do not have access to the necessary information to understand and effectively use the available supports. More than one interviewee specified that the confusion generated by the multitude of available incentives further exacerbates the problem, making it difficult for citizens to identify which benefits are accessible. The lack of clear communication and the complexity of the incentive system

were identified as barriers that need to be overcome to improve the effectiveness of these programs. The second macro-area, related to the identification of vulnerable consumers, was characterized by various opinions that highlighted the need to develop more precise tools and criteria to correctly identify needy households. It was emphasized that the current use of the ISEE as the main indicator for accessing benefits is not sufficient to capture all dimensions of energy poverty, which includes not only income but also factors such as building energy efficiency and energy costs. Francesca Bellisai proposed the adoption of a more comprehensive indicator that could offer an integrated view of the situation of households, recognizing that energy poverty does not always coincide with economic poverty.

*"Often the indicators used for access are based on the ISEE, which is the main indicator. However, the ISEE does not always encapsulate all dimensions of energy poverty, which, in addition to income, includes the price of energy and the overall efficiency of buildings."*

(Francesca Bellisai)

The third macro-area, concerning the lack of a unified strategy by the state, was unanimously recognized as an obstacle to the effectiveness of policies to combat energy poverty. The interviewees expressed how the fragmentation of policies and the absence of an overall vision constitute structural problems that limit the ability to intervene. It was observed that, without an integrated strategy coordinating efforts at the national, regional, and local levels, interventions risk being ineffective and inconsistent. Additionally, the importance of involving the third sector and non-profit organizations was emphasized, as they often fill the gaps left by public and private interventions. One interviewee explicitly mentioned the role of religious organizations and the third sector in reaching the most vulnerable segments of the population, a task that the state, due to resource limitations, cannot always fully accomplish. This suggests that a truly effective strategy should integrate and value the contribution of these actors, promoting greater collaboration between the public and private sectors. In addition, the interviews raised fundamental aspects regarding the role of the market and environmental policies in the context of energy poverty. One interviewee discussed the importance of not distorting price signals

through direct energy subsidies, as this could undermine the effectiveness of environmental policies, such as the carbon tax, which aims to internalize environmental costs into energy prices. In conclusion, these findings not only confirm the relevance of the three macro-areas in the Italian context but also suggest that a coherent approach to these areas can significantly contribute to reducing existing inequalities.

### 4.3.2 Italian context

Regarding the exploration of the Italian context, it was deemed essential to formulate questions aimed at thoroughly exploring the three key macro-areas. The main objective was to gain a deeper understanding of the obstacles, potential areas for improvement, and specific advantages related to the Italian context. This information not only confirms the data gathered from the literature but also offers valuable insights based on practical experience, which are essential to achieving the analysis objectives.

The responses to the key questions reveal various elements for understanding the difficulties that vulnerable Italian families face in accessing energy support programs, in implementing methodologies for identifying at-risk families, and in the need for a unified strategy to improve the effectiveness of support systems.

The interviewees identified several obstacles that vulnerable families encounter in accessing support programs in Italy. A recurring theme is the difficulty in obtaining clear and accessible information about the available benefits.

*"Often, those who really need help cannot obtain the necessary information, getting lost in bureaucracy."*

(Michele Governatori)

The lack of communication and excessive bureaucratization of processes were highlighted as barriers that prevent these families from benefiting from the support they might be entitled to. It was noted that some programs, although available, fail to effectively reach the neediest families, as they often are not able to navigate the bureaucratic complexities or fully understand the opportunities offered. This situation is

exacerbated by the fragmentation of information, which arrives in an indistinct manner, mainly favoring those who have greater access to resources and knowledge.
One interviewee noted how more affluent people are often the primary beneficiaries of such programs, leaving vulnerable families excluded from the intended benefits. Additionally, the excessive emphasis on digitalization, without considering the limited capabilities of elderly families or those less technologically literate, represents another issue that requires careful evaluation.

*"Digitalization is crucial, but it must be accompanied by measures that support those who are not familiar with technological tools."*

(Carlo Andrea Bollino)

Regarding opinions on the identification of at-risk families, the interviewees suggested an approach that goes beyond traditional economic indicators, such as the ISEE. It was proposed to also consider climatic variables, family composition, and local socioeconomic conditions, which can significantly influence families' energy needs.

*"We must rely on a multiplicity of variables that are not just related to traditional ones, such as disposable household income, but also include the number of family members, which is an essential element, and the climatic conditions of the geographic areas in which they live."*

(Stefano Pareglio)

In this context, the role of CAFs (Tax Assistance Centers) was mentioned as potentially central in supporting families in applying for bonuses and in automating the identification process, thereby reducing the bureaucratic burden. One interviewee emphasized the importance of meeting people "where they are," meaning not just providing information through institutional channels, but implementing a support network that can effectively reach the most isolated and vulnerable families. The need for continuous support and a greater presence of support structures in the territory was reiterated as a factor to ensure that aid policies are effectively accessible to those who need them most.

Finally, the last aspect analyzed was the fragmentation of support systems in Italy, which limits the effectiveness of interventions against energy poverty. The interviewees agreed on the need for greater integration of existing policies, emphasizing that without a unified strategy that coordinates efforts at the national, regional, and local levels, the results risk being inconsistent and ineffective. It was noted that energy policies must be harmonized with other opportunities related to energy efficiency and that there is a need for greater awareness of the continuous evolution of the energy sector. In particular, the lack of coherence and a clear identification of the recipients of policies was pointed out as one of the main weaknesses of the current approach. The need to systematically evaluate the outcomes of policies, to ensure that they actually work, was reiterated as an essential step to improving the effectiveness of interventions. Furthermore, the collaboration between the public sector and the third sector, as well as with non-profit organizations, was indicated as an opportunity to avoid duplication of efforts and to create synergies that can maximize the impact of interventions.

*"It is essential to emphasize the role of non-profit entities, the third sector, and religious organizations. It is not just about the public sector or companies, but also about these entities that play a crucial role. The State can intervene up to a certain point, but due to obvious spending limits, it cannot meet all needs, and this is where these entities come into play, which can fill the gaps left by public interventions."*

(Alessandro Caffi)

In conclusion, the findings confirm that the three macro-areas analyzed are strongly correlated with the real challenges that the Italian context presents. The obstacles related to information and bureaucracy, the need for more inclusive identification criteria, and the fragmentation of support policies are all aspects that require interventions to improve the effectiveness of strategies against energy poverty. A unified and integrated strategy, supported by continuous accompaniment and collaboration between the public and private sectors, therefore, seems essential to effectively address these challenges and ensure equitable and sustainable access to energy for all Italian families.

### 4.3.3 Validity UK approach in Italy

The final area of interest that emerged from the interviews concerned the applicability of practices adopted in the United Kingdom to address the problems identified in the Italian context, with a specific focus on the three macro-areas previously analyzed. Through the analysis carried out in the previous chapters, it was possible to more precisely identify the British practices that were discussed in the final phase of the interviews: the Energy Company Obligation (ECO), data matching practices and risk schemes, and the *Fuel Poverty Strategy*. As emerged from the interviews, the United Kingdom has developed tools that could offer significant benefits in Italy as well, provided they are adequately adapted to local specificities.

*"The United Kingdom has developed tools that could offer significant benefits in Italy as well, provided they are adapted to our specificities."*

(Francesca Bellisai)

This reflects the importance of an analysis to ensure the effectiveness of such tools in our country. During the interviews, it emerged that the ECO program could offer significant advantages in Italy, especially if adequately adapted to the specificities of the local context. A particularly appreciated aspect of the program is its ability to distribute burdens equitably among operators of different sizes.

*"It would be an equitable incentive that would allow even small operators to participate actively, with a burden proportional to that of large operators."*

(Gregory Audetto)

For the implementation of the ECO in Italy, a robust regulatory framework would be necessary, enabling authorities to recognize in tariffs initiatives aimed at reducing consumption, with particular attention to economically vulnerable categories. This could include interventions not only aimed at large consumers but also at those clients who are maximally inefficient or have lower spending capacity. Moreover, equity in the use of resources is an equally crucial issue, as was highlighted during the interviews: ensuring a

positive impact on the weakest segments of the population would allow them to reduce energy costs through solidarity-funded interventions. However, one interviewee pointed out that to achieve this goal:

*"It requires clear and stable political direction, capable of guiding the use of resources effectively and ensuring that interventions are adequately compensated."*

(Stefano Pareglio)

The data matching practices and risk recognition schemes used in the United Kingdom offer powerful tools to improve the effectiveness of interventions in Italy, particularly in urban areas where identifying at-risk families is often more complex. These tools enable targeted interventions, avoiding resource dispersion and improving the efficiency of aid. In the British context, matching practices are not limited to considering the simple ISEE or traditional factors such as age and disability, but include additional aspects that broaden the concept of vulnerability. These include the integration of data from various government sources, such as the Ministry of Work and Pensions and energy suppliers, allowing for the development of more complete and accurate risk profiles. However, in Italy, collaboration between different government entities represents a substantial obstacle, given the historical difficulty of coordination between ministries and between local and central authorities. Another relevant aspect is the possibility of introducing a national digital platform that centralizes information and better coordinates interventions, but this would require significant investments and a strong political commitment. Finally, regarding the possibility of adopting a unified national strategy to address energy poverty, it emerged that the British model of integrated support stands out for its advanced and well-structured approach, providing a coherent and long-term framework to effectively combat this phenomenon. In Italy, where policies are often characterized by instability and fragmentation, such a model could lead to a more equitable and inclusive system, capable of responding to the diverse needs of vulnerable families.

*"In Italy, there is a lack of long-term planning capability, and this can represent an obstacle to adopting advanced models like the British one."*

(Stefano Pareglio)

The lack of a culture of medium and long-term planning, combined with political instability, makes it difficult to implement stable and coherent policies. Moreover, resistance to change and intersectoral collaboration has historically been a significant problem in Italy. Overcoming these barriers would require not only strong political commitment but also a structural reform that promotes collaboration between different levels of government and stakeholders. A very important point that emerged from the interviews concerns the role of *Energy Service Companies (ESCo)* in technical and operational consultancy. In the Italian context, ESCos could play a fundamental role, not only in managing the industrial problems of large companies but also in developing personalized consultancy for vulnerable families (Carlo Andrea Bollino). This approach would allow advanced technical expertise to be used to address the challenges of energy poverty, offering tailored solutions that take local specificities into account. In conclusion, the interviews highlighted that the application of British models and practices in Italy presents significant potential for improving the fight against energy poverty. However, this clearly requires a deep adaptation to the local context, as well as the willingness to overcome significant cultural, bureaucratic, and political obstacles. The key to success lies in the ability to customize these tools and approaches for the Italian context, while ensuring political commitment and an adequate regulatory framework that can support an efficient and sustainable transition.

### 4.4 Discussion

After conducting an extensive analysis of the literature and the information collected through the interviews, this paragraph guides the study towards its conclusion.
In the following subparagraphs, the discussion of the received data will address the theoretical implications and outline the limitations of the research, thereby paving the way for future studies.

### 4.4.1 Theoretical implications

This paragraph aims to analyze the theoretical implications derived from the obtained results, seeking to highlight how they fit into the existing academic debate and how, starting from this, they offer perspectives for the expansion of theory. Therefore, starting from the obtained results, an appropriate discussion will be created based on these results.

From the interviews, it clearly emerged that one of the main limitations in accessing support programs in Italy is the bureaucratic complexity and fragmentation of the available information. *"Many families are unable to access the benefits because they are not adequately informed about the available programs or because the procedures to request such benefits are too complicated"* (Francesca Bellisai). This problem is further aggravated by the multitude of available incentives, which generates confusion among citizens about which benefits are actually accessible. In Italy, support is distributed through a myriad of programs, each with different access criteria, making it extremely difficult for vulnerable families to navigate the system and access the benefits to which they are entitled (Gregory Audetto). These obstacles prevent the most vulnerable families from accessing the supports they would be entitled to, highlighting the need to simplify and centralize the information and procedures related to support programs. This observation integrates the criticisms present in the literature regarding the inefficiency of the Italian welfare system in providing simple and direct access to essential services, confirming the need for a more centralized and coordinated system.

Another crucial aspect that emerged concerns the limitations in the current Italian system for recognizing the vulnerable. Doubts were expressed regarding the use of the ISEE as the sole indicator to identify families in difficulty, defining it as *"excessively restrictive and incapable of capturing all dimensions of energy poverty"* (Michele Governatori). Following the same opinion, energy poverty is not simply a matter of income, but also includes factors such as the energy efficiency of buildings, local climatic conditions, and family composition. A view confirmed, stating that *"the ISEE is too limited a tool to identify who is truly vulnerable from an energy standpoint. It is not enough to look at income; one must consider the energy efficiency of the dwelling, access to energy services, and other factors such as local climatic conditions"* (Stefano Pareglio). A suggestion involves the inclusion of variables such as the presence of chronic illnesses,

advanced age, and precarious housing conditions in the process of identifying the vulnerable (Francesca Bellisai). This expansion of the concept of vulnerability is seen as essential to fully understand who is at risk and to provide targeted and adequate support. These positions reinforce the idea regarding the need to expand the concept of energy vulnerability to include not only economic factors but also environmental and infrastructural ones.

Opinions on the Energy Company Obligation (ECO) emerged as particularly positive, especially in terms of equity in the distribution of burdens. *"A similar program in Italy could offer significant advantages, provided it is adapted to the specificities of the local context"* (Alessandro Caffi). Emphasizing the ECO's ability to equitably distribute burdens among operators of different sizes, allowing small operators to actively participate as well, *"with a weight proportionate to that of the large operators"* (Gregory Audetto). *"A similar initiative could really make a difference in Italy, especially if small energy operators could also be involved, ensuring an equitable distribution of burdens"* (Stefano Pareglio). It is added that *"the success of the ECO in the United Kingdom is probably also due to the fact that it is supported by a robust and stable regulatory framework, something that Italy desperately needs"* (Stefano Pareglio). However, it is emphasized that the implementation of a program like the ECO would require a robust regulatory framework in Italy, allowing authorities to recognize initiatives aimed at reducing consumption, especially for the most vulnerable categories, in tariffs. These observations highlight a gap in the literature regarding the importance of a solid regulatory context for the success of similar energy policies. Many academic analyses tend to focus on the technical and operational effectiveness of programs without considering the importance of political and regulatory stability.

Data matching practices and risk recognition schemes, widely used in the United Kingdom, have been recognized as powerful tools for improving the effectiveness of interventions in Italy, especially because they would also cover the broader concept of recognizing the vulnerable class, managing to combine characteristics from different data sources, thus creating a broader concept of the vulnerable consumer. *"The expansion of the concept of vulnerability is essential to truly understand who is most at risk"* (Francesca Bellisai), a fundamental aspect to create more accurate risk profiles. However, several interviewees recognize that the implementation of these tools in Italy would require a

significant reform of data management, currently fragmented and uncoordinated at the national level. Focusing on the importance of data matching and risk schemes as tools to improve the effectiveness of energy policies in Italy. More than once, it has emerged that the success of such practices depends on the ability to integrate data from different sources, which in Italy is still a major obstacle due to administrative fragmentation. This approach could greatly improve the effectiveness of support policies in Italy, but it would require closer collaboration between different government entities and greater centralization of information. This position amplifies discussions in the literature on the potential of big data and predictive analysis in the context of social policies, filling a gap related to the concrete application of these technologies in a fragmented context like Italy's.

The unique strategy adopted by the United Kingdom to combat energy poverty, known as the Fuel Poverty Strategy, has been widely recognized as an advanced and well-structured model of reference, capable of offering consistent and long-term support to effectively address the problem. As emerged from the interviews, this approach is viewed favorably, especially for its ability to *"offer an integrated and articulated framework"* that could be an important source of inspiration for Italy.

A relevant aspect that emerged is that, although Italy works hard to achieve positive results, in England the practices adopted are still more effective, emphasizing the need to adopt measures similar to those in the United Kingdom, especially in terms of family policies that could also include electricity (Gregory Audetto). This suggests that an approach like that of the United Kingdom could be implemented in Italy, *"not exactly the same, but certainly adaptable"* to improve support for families.

The Fuel Poverty Strategy has been described as a *"structured and ongoing program for years"*, recognizing that the stability and articulation of this strategy represent an example in absolute terms compared to the less structured and more unstable forms that characterize the Italian context (Carlo Andrea Bollino). However, some traditional obstacles that could limit the adoption of a similar model in Italy have also been highlighted, such as *"political instability"* and the *"lack of a culture of medium and long-term planning"* (Stefano Pareglio).

Despite these challenges, another interviewee expressed strong agreement on the possibility of *"providing a favorable view of using this type of strategic approach in Italy*

*as well"*. In particular, it was suggested that ESCOs, already present in the Italian landscape, could expand their role to include a section dedicated to supporting vulnerable families, developing personalized consultations that respond to local specificities (Carlo Andrea Bollino). This operational approach could represent an interesting concrete evolution of the British model, adapted to Italian needs and conditions.
The British model of integrated support, therefore, could also be effective in Italy, offering a consistent framework for combating energy poverty. However, resistance to change and the historical difficulty of cross-sectoral collaboration in Italy represent significant obstacles. To overcome these barriers, strong political commitment and a structural reform promoting collaboration between different levels of government and stakeholders would be necessary.

Additionally, other key points emerged, aimed at enriching the study's information by bringing new perspectives.

From the interviews, an aspect emerged regarding the categorization of energy poverty as a problem distinct from general economic poverty. Arguing that this distinction risks fragmenting welfare policies, which should instead focus on improving the overall spending capacity of families. This point of view suggests that social policies should consider poverty as a unitary phenomenon, treating energy poverty as a subcomponent of general economic poverty (Michele Governatori). Moreover, it highlights an important interaction between energy price policies and environmental policies. Artificially lowering energy prices to support families in energy poverty can compromise the effectiveness of environmental policies, such as the carbon tax. According to this view, altering energy prices can incentivize excessive and inefficient consumption, going against environmental sustainability goals. This theory enriches the debate on the intersections between environmental economics and social policies, suggesting that interventions aimed at reducing energy poverty must be designed in such a way as not to compromise existing environmental policies (Michele Governatori).

Finally, there was strong consensus on the importance of the third sector, non-profit organizations, and religious entities in filling the gaps left by public policies and private entities in combating energy poverty. These actors play a crucial role in reaching the most vulnerable segments of the population, often inadequately covered by state or market interventions. This observation amplifies the existing debate on the need for partnerships

between public and private sectors in the fight against energy poverty, suggesting that an integrated approach involving non-governmental actors is essential for an effective mitigation strategy (Alessandro Caffi).

In conclusion, the interviews confirm many of the criticisms and observations already present in the literature regarding the limitations of the Italian system in combating energy poverty, but at the same time offer insights to fill some gaps. The collected opinions highlight the importance of adopting a more integrated and structured approach, similar to that of the United Kingdom, but with strong adaptation to the Italian context, which includes a reform of the regulatory and administrative framework. Moreover, they expand the academic debate by introducing the need to consider a broader range of indicators to identify the vulnerable and the importance of using advanced tools like data matching and risk schemes to improve policy effectiveness.

### 4.4.2 Limitations & future research

This study provided an in-depth evaluation of the practices adopted in the United Kingdom to combat energy poverty and explored their potential application in the Italian context. However, some limitations must be considered. Firstly, the research was based on a theoretical analysis, without practical experimentation in the Italian context. The feasibility and effectiveness of these policies could vary significantly when applied in Italy, given the political, cultural, and environmental differences between the two countries. Additionally, the study focused exclusively on the United Kingdom, limiting the comparability of the policies examined. Although multiple contexts were studied, the focus on a single country does not provide a comprehensive view of the various strategies that could be adopted in Italy. Another limitation concerns the fact that only three critical macro-areas were analyzed, deemed the most relevant, leaving out other possible activities, national strategies, policies, or support programs that could influence the fight against energy poverty in Italy.

The interviews conducted with professionals in the energy sector provided valuable insights. However, the analysis is based on a small sample of six experts, representing a limited group of realities, which limits the generalizability of the results and calls for caution in extending the conclusions to a broader context. It is important to note that it was challenging to obtain a larger number of interviews due to the limited time available

and the focus on specific profiles within the energy sector, who were not always familiar or well-informed about UK initiatives. Another limitation was that, having interviewed only Italians, many respondents were unaware of all the UK initiatives, so it was often necessary to explain some aspects further. Profiles more aligned with and updated on UK initiatives would be of great value. Despite efforts to interview profiles closer to the UK context, it was not possible to obtain such contributions. Moreover, with interviews as the main data source, the process might have incorporated some degree of bias, both from the interviewer and the interviewees, who, being high-profile professionals, may have wanted to represent their organizations in a favorable light, thus limiting the objectivity of the responses. The validity of the results could therefore have been influenced by responses that reflect an internal perspective.

Therefore, to answer the research question more comprehensively and overcome the identified limitations, future research could adopt different approaches. Firstly, it would be useful to conduct studies that assess the practical feasibility of UK policies in the Italian context, examining the political and environmental implications of such interventions. A comparative analysis that includes a larger number of countries, both European and non-European, would offer a more comprehensive overview of global best practices in the fight against energy poverty and allow for a comparison of their success rates. Another step forward would be to increase the number of interviews, diversifying the backgrounds of the interviewees as much as possible and including experts more familiar with the UK context, to better understand the scope of the practices analyzed. Additionally, the inclusion of qualitative and quantitative studies directly targeting Italian households in situations of energy vulnerability could provide valuable information on their actual needs and the impact of the proposed policies. Although it was not the primary focus of this work, future research could integrate citizens' perspectives through surveys and focus groups, and it would be crucial to combine the qualitative approach with a quantitative method to more effectively measure the impact of the hypothetical adoption of the analyzed initiatives. These research areas could bring new contributions to the academic literature and provide a broader and more detailed understanding of the role of initiatives, especially by identifying their scope and effectiveness in the Italian context.

## Conclusion

*Answer to Research Question*

To adequately conclude the Project, it is important to answer the Research Question,

*RQ: 'Which aspects of UK policies against energy poverty can be implemented in Italy?'.*

The results obtained highlight significantly positive feedback, which not only confirms the validity of the research but also offers further insights for future investigations, expanding theoretical perspectives (as discussed in paragraph 4.4.1 Theoretical implications).
Therefore, thanks to the analysis of the three practices examined, it can be affirmed that: *the policies against energy poverty adopted in the United Kingdom represent an excellent starting point for implementing similar measures in the Italian system*.
However, as already emphasized, this statement should be taken with caution and, as indicated in the research limitations, requires further studies to assess its actual political feasibility.

*Final Consideration*

The main objective of this project was to highlight how energy poverty is a widely underestimated phenomenon, mainly due to the lack of adequate data in the analysis of fundamental aspects. For example, as emerged from the interview results, Italy uses insufficient tools to identify vulnerable consumers, who are primarily defined through the ISEE (Equivalent Economic Situation Indicator). Although this criterion is not entirely incorrect, it represents only part of the definition. It is limiting to define a person as energy vulnerable based solely on income, as economic poverty is only one aspect of energy poverty. On the contrary, vulnerable consumers should be identified using broader criteria, such as the presence of chronic diseases, poor housing conditions (as is done in the United Kingdom through risk assessment programs), access to energy services, and other equally important factors like local climate conditions (as suggested by the

interview results). This would constitute a starting point for a more effective approach to the phenomenon.

A similar discourse applies to access to support programs. In Italy, there is a tendency to believe that adequate means are available to combat energy poverty, but these often fail to effectively reach the most needy families. The main obstacles encountered are of an informational, bureaucratic, and economic nature. This is often also due to a high rate of digital illiteracy. From a bureaucratic and economic point of view, many programs require complex procedures (such as the submission of specific documents at non-negligible costs) and the upfront payment of intervention costs, with the promise of subsequent tax deductions. It is evident that those who need to improve the efficiency of their home because they live in adverse conditions are not able to advance a significant sum of money, which contradicts the principle of energy vulnerability, currently defined almost solely by income.

Therefore, it might be consistent to adopt practices such as the Energy Company Obligation, which would simultaneously solve financial and bureaucratic problems. This practice would offer an additional advantage, creating benefits both for vulnerable consumers, who would receive support to improve the efficiency of their homes for free, and for small operators, who could participate actively with a role proportionate to that of the large operators.

These two aspects represent fundamental points for an effective state strategy in the fight against energy poverty. Such a strategy should respond to the observation, confirmed by the analysis of the literature and interviews, that valid tools exist in Italy to address energy poverty, but these are disconnected from each other and little known by citizens. Therefore, an approach similar to that of the Fuel Poverty Strategy, at least in terms of a unified strategy, could significantly improve the Italian approach to energy poverty.

As can be seen from what has been said so far, this study does not represent an endpoint, but rather a starting point. The objective has been, from the beginning, to provide an articulated explanation of the phenomenon of energy poverty, sounding an alarm on a particularly underestimated and extremely complex problem, presenting a project rich in information from different perspectives.

In conclusion, after enthusiastically and curiously conducting this study, I would like to provide a quotation that perfectly defines the concept of this phenomenon, as current as it is complex.

*'The invisibility of energy poverty lies in its complexity, as it intertwines with health, housing, and social exclusion, making it hard to address with simple policies."*

*Stefan Bouzarovski*
Professor at the University of Manchester

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## Appendix

### *Appendix A: Interview guide*

| Theme | n. | Question |
|---|---|---|
| Study validity | Q. 1 | Are the three identified areas of interest consistent with the phenomenon of energy poverty in Italy ? |
| In-depth analysis of the Italian context | Q. 2 | What are the main obstacles encountered by vulnerable families in accessing support programs ? |
| | Q. 3 | What methodologies could be implemented to identify and support at-risk families in Italy ? |
| | Q. 4 | Do you believe that support systems in Italy are too independent of each other and in need of a unified strategy ? |
| Validity of the UK approach in Italy | Q. 5 | How do you evaluate the applicability of the Energy Company Obligation program in Italy ? |
| | Q. 6 | How do you evaluate the applicability of the matching practices and risk recognition schemes used in the United Kingdom in Italy ? |
| | Q. 7 | How do you evaluate the applicability of the British model of integrated support in the Italian context ? |
| General advice | Q. 8 | What further suggestions could you provide to improve my work ? |

***Appendix B: Interview partecipants***

| ID | Organization | Position | Date | Duration | Method |
|---|---|---|---|---|---|
| Gregory Audetto | OV Energy SpA | CEO | 05/09/24 | 25 min | Phone interview |
| Francesca Bellisai | ECCO - The Italian Climate Change Think Tank | EU Policy Advisor | 07/09/24 | 30 min | Phone interview |
| Michele Governatori | ECCO - The Italian Climate Change Think Tank | Responsabile Elettricità & Gas | 11/09/24 | 30 min | Video call |
| Stefano Pareglio | Università Cattolica SC - Deloitte | Full Professor - Chairman Climate & Sustainability | 12/09/24 | 35 min | Video call |
| Alessandro Caffi | Conferenza Episcopale Italiana | Head of investment | 13/09/24 | 35 min | Videocall |
| Carlo Andrea Bollino | AIEE - LUISS – KAPSARC * | President - Professor - Visiting Reseacher | 14/09/24 | 40 min | Video call |

*: AIEE, Associazione Italiana Economisti dell'Energia – KAPSARC, King Abdullah Petroleum Studies and Research Center (Riyadh, Saudi)