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# Understanding Energy Poverty Characteristics at the Local Level

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Date: March 2022

Deliverable 2.3: Local state of the art on energy systems, energy poverty and assessment of preferred business model options for local energy players – Part 1: Understanding Energy Poverty Characteristics at the Local Level

Dissemination Level: Public

Key Words: Energy Poverty; Energy Communities; Multi-Scalar Analysis

Cover picture: Sharon McCutcheon on Unsplash



This project has received funding from the European Union's Horizon 2020 research and innovation program under Grant agreement No. 101033940

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# Executive Summary

Energy poverty is a condition in which a person is unable to secure materially and socially necessitated energy services in their home, and is a highly context-specific phenomenon. Renewable energy communities have considerable potential to enable citizens' participation in the energy transition, increase access to clean, safe and affordable energy, and thus alleviate energy poverty.

This report, prepared as Part A of Deliverable 2.3 (Local state of the art on energy systems, energy poverty and assessment of preferred business model options for local energy players) for the POWER UP! project, presents and analyses the energy poverty situation at both a national scale for each of the project partners' countries – Belgium, Czech Republic, Italy, Netherlands, North Macedonia, and Spain – as well as at the local level where the pilot projects will be implemented.

A literature review of EU, national and local level academic and policy documents, bilateral meetings with pilot projects and a group exercise provided the data from which this report is built. Challenges to tackling energy poverty in each location, and a summary analysis of key features to create a local typology of energy poverty are also provided. Challenges identified across the pilots were varied, and fell into two key categories; institutional or informational. Common issues faced included poor energy efficiency/quality of the housing stock, lack of transparency, widespread lack of knowledge on energy poverty and its causes/consequences, and issues with energy suppliers

# Introduction

Energy poverty is a term defined as a condition in which a person is unable to secure materially and socially necessitated energy services in their home, encompassing security of supply, affordability and access (Bouzarovski & Petrova, 2015; Bouzarovski et al., 2021). Once attributed primarily to low incomes, high energy prices and poor household energy efficiency, academic research has revealed that energy poverty is an inherently systemic challenge, linked to social, governance and technical structures, and is highly context-specific (Halkos & Gkampoura, 2017; Trinomics, 2016).

Currently, there is no EU-level definition of energy poverty, although the phenomenon has captured significant attention, particularly in the Clean Energy for All Europeans, the EU Green Deal and the Fit for 55 packages, which have linked tackling energy poverty to a just and fair energy transition. Nevertheless, policy action and attention at the level of individual Member States is varied, with discrepancies in definitions, the capacity to combat energy poverty, as well as the extent and quality of the measures and strategies in place (Bouzarovski et al., 2021). As a result of its multiplicity and complexity, energy poverty is unable to be captured by a single measure or indicator, although several composite indicators exist based on available data, which itself is limited and fragmented in some areas (Thomson et al., 2017a). In addition, as aforementioned, the causes, understandings and characteristics of energy poverty are situational, and thus any actions to tackle the issue must consider and be adapted to local conditions; what works well in one place doesn't necessarily succeed elsewhere, or may require significant moderation.

The UN Sustainable Development Goal #7 calls for "access to affordable, reliable, sustainable and modern energy for all", through which it will double share of renewable energy, ensure universal access, and double the rate of efficiency improvement (Pueyo, 2017). Renewable energy communities have considerable potential to enable citizens' participation in the energy transition, increase access to clean, safe and affordable energy, and embed the concepts of energy justice and the right to energy into policy and frameworks (Hanke et al., 2021).

This report, prepared for the POWER UP! project, will present and analyse the energy poverty situation at both a national scale for each of the project partners' countries – Belgium, Czech

Republic, Italy, Netherlands, North Macedonia, and Spain – as well as at the local level where the pilot projects will be implemented. The report will first review European level research and data on energy poverty and local energy cooperatives, and will then delve down into the specificities of the issue in the individual countries and locales involved in the project.

# Methodology

## Data Collection

In order to carry out this research, the following methodology was used.
Firstly, a desk-based literature review was carried out on European-level energy poverty research from academic papers, policy documents and other EU-funded project findings to give a broad level overview of the current situation based on the following search terms:
*"EU"/"European Union";*
AND
*"Energy Poverty"/"Fuel Poverty"/"Energy Vulnerability"; "Energy Communities"*.

Following this review, between October and December 2021, each of the project partners were asked to compile documents for their countries pertaining to energy poverty at national, regional and local scales. These documents included government reviews, policies, laws and regulations, project documents and reports, statistical data, definitions of vulnerable consumers, and scientific articles. The documents provided were primarily produced in the local languages, and required translation. These were then systematically reviewed to obtain relevant data and information pertinent to energy poverty in the pilot countries and local areas. It should be noted that around 1/3 of the 70 documents and scientific articles collected are from before the Covid-19 pandemic, the socio-economic consequences of which are likely to have influenced energy poverty across Europe. Where available, the most recent information has been used.

In December 2021 and January 2022, bilateral meetings were conducted with representatives from each of the pilots to find out more about energy poverty in their countries and project areas, to delve deeper into local understandings of energy poverty. These meetings covered

the drivers and characteristics of energy poverty in the project regions, the presence of and methodologies for identifying vulnerable groups, and other contextual information on the case study areas, as well as the opportunity to query any data uncovered by the document review. The questions asked in the meetings are outlined in Table 1. These meetings lasted between 1 and 2 hours, and were undertaken in a semi-structured format, with time given to allow the pilots to ask questions and share information that they felt that was important and not covered by the designed questions.

| Topic | Question |
|---|---|
| The Pilot Project and the Project Area | What is the pilot project area like?<br>Demographics<br>Building types, ages<br>Types of families<br>Proportion of renters, social housing and homeowners<br>Rural/urban characteristics |
| Understandings of Energy Poverty, its Characteristics and Causes | How do you understand energy poverty in a) your country, b) your local area?<br>How is it expressed and characterised?<br>What drives energy poverty in your area? |
| Vulnerable Groups | Which vulnerable groups reside in the project area?<br>What data exists to identify them?<br>What specific challenges do they face? |
| Organisations/Networks | Are there organisations in the region that work on tackling energy poverty?<br>How do they engage with the issue?<br>What solutions do they use? |

| | |
|---|---|
| Addressing Energy Poverty and Challenges | How will you address energy poverty in your planned pilot?<br>What challenges do you envisage?<br>How do you plan to engage vulnerable groups? |

Findings from the bilateral meetings are referenced in the report using the following codes:

- BM1 (Bilateral Meeting 1 – Rožnov – conducted 17/12/21 with one representative from SEMMO)
- BM2 (Bilateral Meeting 2 – Skopje – conducted 20/01/21 with one representative from MPPS, and three from AD GES Skopje)
- BM3 (Bilateral Meeting 3 – Eeklo – conducted 11/01/22 with two representatives Stad Eeklo)
- BM4 (Bilateral Meeting 4 – Heerlen – conducted 11/01/22 with two representatives from Gemeente Heerlen)
- BM5 (Bilateral Meeting 5 – UCSA – conducted 18/01/22 with two representatives from Comune di San Giuseppe Vesuviano and one social worker)
- BM6 (Bilateral Meeting 6 – Valencia conducted 20/01/22 with one representative from Las Naves)

The last element of the data collection involved a group exercise at the POWER UP Consortium Project Meeting on 9th February 2022. The pilot projects were paired (see Table 2) together based on some identified similarities of contexts as uncovered during the bilateral meetings, which could prompt discussion. They were then asked to discuss the challenges they faced with regards to energy poverty in their pilots – for example, with regards to identifying vulnerable groups, engagement strategies, communication, political or legal restrictions and so on.

Each of the groups then fed back to the Consortium their key discussion points on their individual challenges, as well as some potential strategies that overcome these, and any experience in this domain that might assist the other pilots.

| Project Pairing | Reasoning |
|---|---|
| Eeklo & Heerlen | Both are post-industrial towns (Heerlen - mining and Eeklo - textiles), with resultant unemployment, poor quality workers' houses and clusters of isolated ethnic minority groups. Energy efficiency a key issue. |
| Skopje & UCSA | Both experienced earthquakes in the mid-late 20$^{th}$ century, altering housing stock. Similar homeownership/private renter levels. |
| Valencia & Rožnov | High energy price increases affecting socially vulnerable groups. Both pilot projects go beyond the national plan for tackling energy poverty. |

It should be noted that some case studies are more detailed based on the available information at both the national and local level. This report is intended to be a living document throughout the duration of the POWER UP project, and thus will be added to as new information comes to light.

# Analytical Framework

Following the review of the documents, bilateral meetings and other information collected, the data was synthesised and collated. Then, utilising typologies of energy poverty developed by Bouzarovski and Petrova (2015), the existing situation in each of the pilot project countries at national and regional to local levels were summarised according to the following analytical framework - see Table 3.

| Factor | Driving Force |
|---|---|
| Access | Poor availability of energy carriers appropriate to meet household needs |
| Affordability | High ratio between cost of fuel and household income (incl. tax systems and assistance schemes)<br>Inability to invest in construction of new energy infrastructure |
| Flexibility | Inability to move to a form of energy service that is most appropriate to household needs |
| Energy Efficiency | Disproportionately high loss of useful energy during conversion in the home |
| Needs | Mismatch between requirements and available services (e.g for health or cultural reasons) |
| Practices | Lack of knowledge about support available or ways of using energy efficiently in the home |

# Energy Poverty at the European Level

This section provides an overview of European-level energy poverty research, including academic papers and policy documents. It is split into four sections: measuring energy poverty, drivers of energy poverty, impacts of energy poverty, and the potential of energy communities to overcome energy poverty.

## Measuring Energy Poverty

In 2020, it was estimated by the European Commission that around 36 million people in the EU were unable to keep their homes adequately warm, although this number is likely to be much higher if different indicators and facets of energy poverty are taken into account (EC, 2022). The 2009 European Directive on common rules for the internal gas and electricity market called on Member States to establish criteria to define and identify vulnerable consumers, although the extent to which energy poverty is defined, discussed and tackled varies considerably across the EU. As aforementioned, the EU energy poverty observatory (EPOV) uses an array of four primary, and nineteen secondary indicators to capture different aspects of energy poverty, which are calculated based on EU-SILC data, which captures self-reported experiences of limited access to energy, and Household Budget Survey (HBS) data, which uses household income and expenditure data (Thema & Vondung, 2020).

The four primary indicators are as follows:
Arrears on utility bills: the share of the population with arrears on their utility bills
Low absolute energy expenditure: the share of household whose absolute energy expenditure is below half the national median
High share of energy expenditure in income: the proportion of households whose share of energy expenditure in income is more than twice the national median share
Inability to keep the home adequately warm: the share of the population unable to heat their homes as necessary

The secondary indicators include gas, coal and energy prices, dwelling density, the number of people at risk of poverty, the presence of a leak, damp and/or rot in the home and excess winter deaths, among others.

Table 4 presents data for the EU average, and for the national level for each of the pilot countries, for a number of energy poverty indicators to allow for cross-comparison. The EU average is obtained from EPOV data, whilst the individual country data is extracted from the Energy Poverty Dashboard. The most recent year available for each indicator is presented; all data is from 2019, unless otherwise indicated in the table. Some data is missing for North Macedonia. Units are % of population.

| Indicator | EU Average | Belgium | Czech Republic | Italy | Netherlands | North Macedonia | Spain |
|---|---|---|---|---|---|---|---|
| Arrears on Utility Bills | 6.6 (2018) | 3.62 | 1.74 | 3.77 | 1.61 | 34.4 | 5.75 |
| Inability to Keep Home Warm | 7.3 (2018) | 4.21 | 3.22 | 11.62 | 3.63 | 33.1 | 7.68 |
| Presence of Leak, Damp, Rot | 15 (2016) | 17.19 | 7.01 | 13.77 | 15.11 | 13.9 | 14.57 |
| Dwelling Not Comfortably Cool (2012) | 20.9 | 13.01 | 21.83 | 25.95 | 19.32 | | 24.82 |
| High Share of Expenditure in Income (2015) | 16.2 | 12.97 | 10.77 | No data | 10.73 | | 14.15 |
| Poverty Risk | 23.5 (2016) | 15.55 | 11.01 | 20.32 | 15.57 | 21.6 | 19.46 |

# Drivers of Energy Poverty

Academic work in the sphere of energy poverty has identified several factors at a household level that influence the likelihood of experiencing the phenomenon, including tenure status, rural/urban location, dwelling typology and age and income (Bouzarovski & Tirado Herrero, 2017). Ethnic group, gender, class, disability, and age are all factors which can increase vulnerability to energy poverty (Hernandez et al., 2016; Petrova & Simcock, 2021; Oliveras et al., 2021). For example, women tend to have lower incomes and significantly less savings on average than men across Europe, reducing their capacity to cope with high energy costs and utility bills (Botti et al., 2012). The number of single parent households unable to heat their homes – who are overwhelmingly female-headed – is 6.12% higher than the European average (Sunikka-Blank & Galvin, 2021). With regards to tenure status, the private rented sector has emerged in research as the least energy-efficient of all housing sectors in Europe, particularly concerning due to its growth, especially in Northern and Western Europe, and the prevalence of young people and lower-income groups remaining in the sector for longer due to inaccessibility of the housing market and social housing cuts (Hoolachan et al., 2016; Ambrose & McCarthy, 2019). Vulnerabilities to energy poverty can be intersectional, that is to say that belonging to two or more categories of vulnerability (for example, being a single mother living with a disability in the private rental sector), can compound the impacts and affect experiences of energy poverty (Sunikka-Blank & Galvin, 2021).

Energy (un)affordability is a key factor which drives energy poverty. Europe as a continent is particularly dependent on primary energy imports, and as such is very sensitive to price increases in commodity markets. This has been particularly seen in the widespread energy price spikes in the latter half of 2021 and into 2022, the impacts of which will be further discussed in later sections. The below graph replicated from Bouzarovski & Tirado Herrero's (2017) study shows the cost of a) electricity and b) gas and the risk of poverty – two key factors in determining if a household is in energy poverty – against the EU average, with prices adjusted to Purchasing Power Units[1] (PPS). Five of the POWER UP project pilot countries are demarcated in red for reference. Although the data is slightly outdated (2007-13), the graph serves to show the spatial variation in energy cost and poverty rates, as well as highlighting the relationship between the two variables. Unfortunately, North Macedonia is not included in this dataset.

[1] PPUs are an artificial reference currency created by Eurostat to provide a comparative average of what households in each EU Member State need to pay for each unit of energy used.

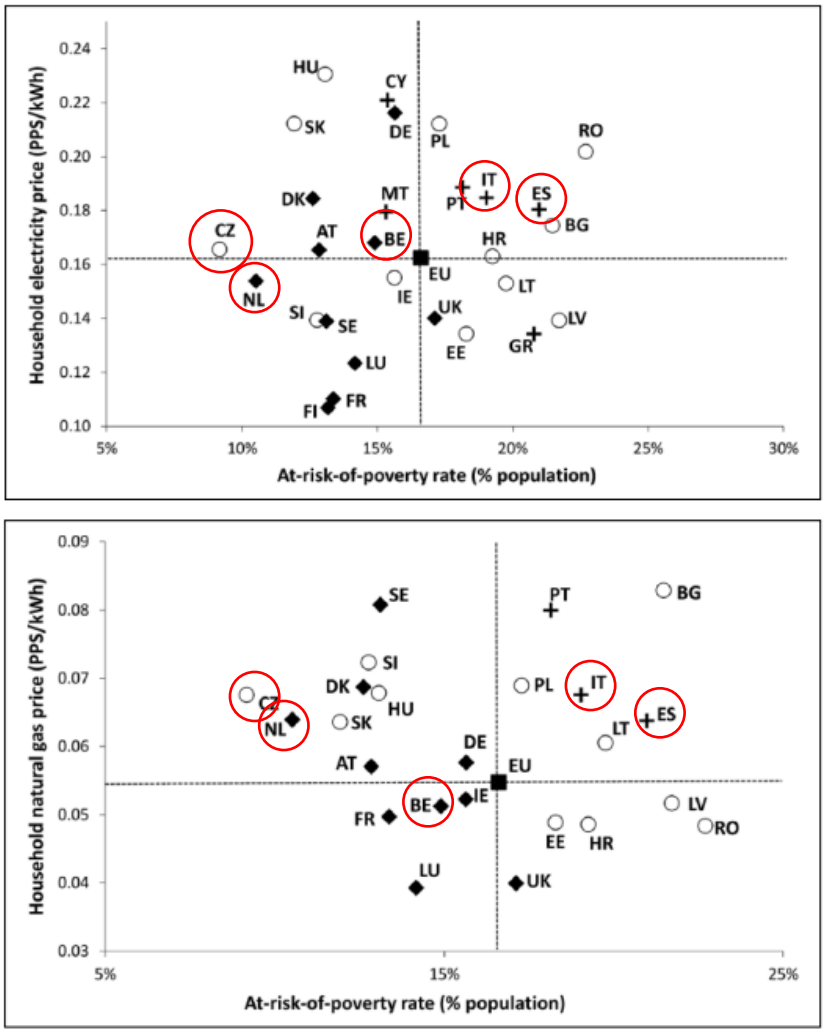


*Figure 1 - Spatial variation in energy prices a- electricty and b- gas plotted against at-risk-of-poverty rate (Source - Bouzarovski & Tirado Herrero, 2017)*

Energy poverty also has different drivers in different European regions: energy poverty in Northern and Western Europe is primarily linked to the inability to afford energy for heating, particularly in low-income households in inefficient housing (Boardman, 2010). Central and Eastern Europe experience the highest levels of energy poverty in Europe, due to the legacies of the centrally planned economy and the later transition to a liberalised market (Bouzarovski & Tirado Herrero, 2017). The Southern Mediterranean region, despite experiencing milder winters than other European countries, experiences higher levels of people unable to keep their homes warm in winter, due to inadequate heating systems and poor efficiency of buildings, as well as greater inability to keep the home cool in summer. These regional specificities will be discussed in greater detail in subsequent sections.

## Impacts of Energy Poverty

Living in energy poverty can severely impact daily life, including negatively impacting health, educational attainment, job opportunities, standard of living and emotional welfare (Halkos & Gkampoura, 2021). Indeed, research has found clear links to increased risks of poor mental and physical health as a result of an individual being in energy poverty, which could be causing the premature deaths of thousands of people each year. The 2012 European Quality of Life Survey found statistically significant differences in the physical health of those who were in energy poverty and those who were not, including each of the 6 pilot project countries, with a difference of 30.8 percentage points observed in the Netherlands (Thomson et al., 2017b). Poor mental wellbeing in this study was also found to be more prevalent for those in energy poverty than not, with the highest overall prevalence being found in Central and Eastern Europe. Negative impacts on health due to excessive cold can range from increased risks of asthma and other respiratory conditions, to strokes and heart disease (Thomson & Snell, 2013), as well as elevated rates of depression and anxiety.

Once a household falls into energy poverty, it can be difficult to 'escape' from this phenomenon. An analysis of 17 countries which looked at the rate of 'escape' from energy poverty (which included Czech Republic, Italy, Belgium and Spain), found that a younger age, gaining employment, being a home-owner, having a renovated building and higher education significantly increased the probability of a person or household exiting energy poverty. By contrast, being of old age, a single-person household, and being a rental tenant all impede the ability to leave energy poverty (Karpinska & Smiech, 2021). These factors should be considered by the pilot projects when identifying participants from vulnerable groups in their areas.

## Energy Communities to Overcome Energy Poverty

Due to the threat of energy poverty, vulnerable groups are often excluded from, or less likely to engage with, the energy transition (Hanke et al., 2021). Renewable energy communities (RECs), defined as activities concerned with the collective production, supply, distribution, sharing and consumption of renewable energy by citizens, often with SMEs and local authorities, have been posited as a way to tackle energy poverty and reduce emissions in the European context (Verde & Rossetto, 2020). RECs can lower energy costs, increase participation and empowerment with regards to energy and decision-making, with considerable social

innovation potential (Caramizaru & Uihlein, 2020). As well as providing access to renewable energy, communities can also help to advance energy efficiency at the household level to reduce costs and consumption.

Although average investment costs to become a member of a cooperative can be high, which means that members are predominantly middle class, innovative ways to combat this issue to make RECs more inclusive and deliver social benefits have been implemented by existing communities. For example, Énergie Solidaire (France) encourages producers to donate their surplus production, and consumers can also donate money on their bill which is distributed to associations that combat energy poverty. In the case of Som Energia (Spain), the cooperative works with the local municipality to identify fuel poor households, and allows members to share their membership with others to benefit low-income households. Other cooperatives use profits as a rolling fund to purchase memberships for low-income households. Enostra (Italy) delivers trainings for social operators on energy poverty and awareness raising campaigns.

Nevertheless, Campos et al.'s review of regulatory frameworks for energy communities in several European countries (including Spain, Netherlands, Belgium and Italy), suggests that citizen energy communities, which have the potential to involve a wide range of groups in the energy transition, are currently relatively ignored and underprovided for in self-consumption laws (Campos et al., 2019[2]). Some key challenges are outlined by the report, for example, in Italy, each prosumer must have its own meter, and it is not possible to sell energy produced by one household to another, meaning collective self-consumption is impossible. In the Netherlands, cooperatives and communities are allowed to exchange electricity between themselves, however, members must share the same postal code. In Spain, installations of 15-100kW must process a connection point with a distribution company, and the self-consumer must be within 500m of the energy installation, although new laws permit compensation for surplus energy to be shared amongst neighbours. Exceptionally, in Flanders, the law was updated in 2021 so that from 2022 onwards, residents are able to conduct peer-to-peer energy selling from energy that they generate from solar panels, as well as between different residents of the same apartment building, on the condition that each participant has a digital meter and keeps an individual connection to the grid (Fluvius, 2022).

[2] Note that this text was correct at time of writing. Legislation is constantly changing and updating so research on the latest information should be undertaken before referencing.

In addition, energy poverty in is currently inadequately addressed by RECs; a study by Hanke et al. (2021) found that in their sample, only 18% of RECs addressed the issue, and only 42% reported addressing underrepresented groups. Many RECs expressed a willingness to engage with energy poverty, but their capacity and knowledge of vulnerability was limited and hindered their ability to implement adequate procedures. Nevertheless, recognition of the situations of vulnerable households, social inequality and energy injustice is key to developing inclusive and empowering energy communities that can work for all.

# Challenges To Tackling Energy Poverty in the Pilot Areas

Challenges to tackling energy poverty in the different pilot areas covered by the POWER UP project were numerous. The Word Cloud presented below shows in visual form the challenges which were raised in the Bilateral Meetings.

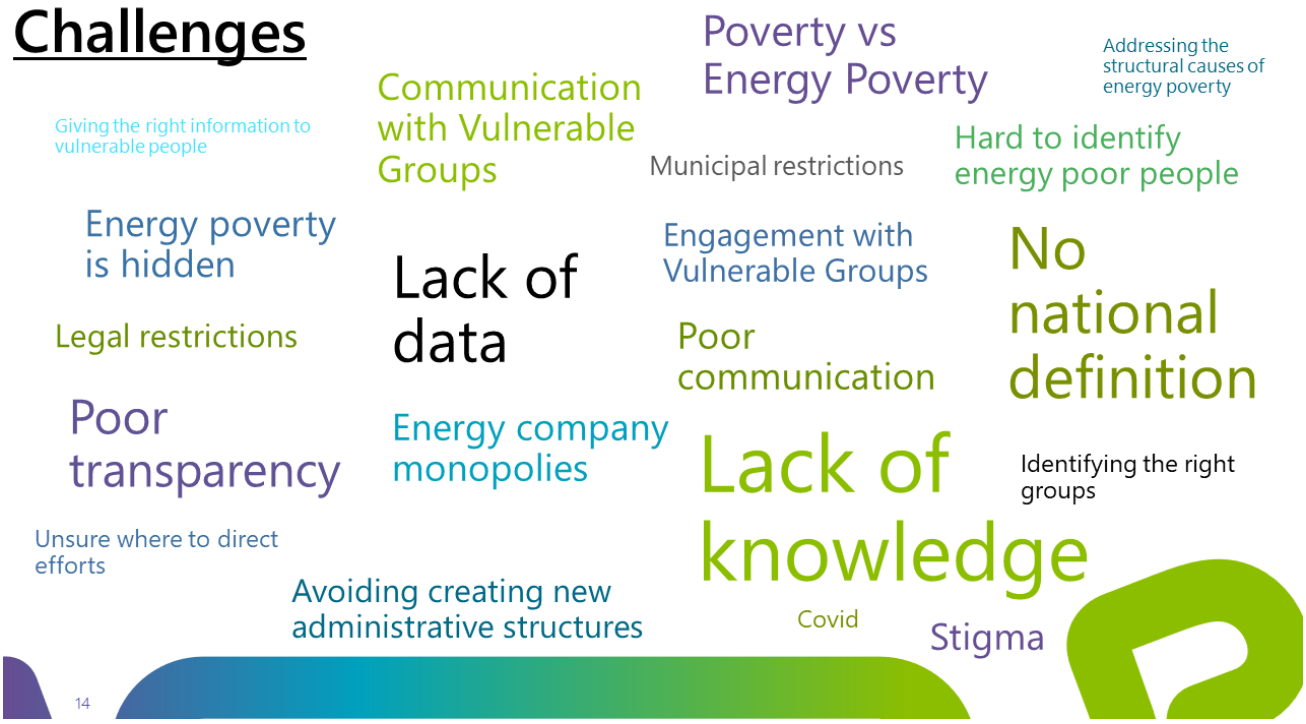


*Figure 2 - Word Cloud of challenges identified by the Pilots during the bilateral meetings*

For example, lack of knowledge – in this case, lack of knowledge and municipal, national government levels, by organisations, by social workers, by the general public on energy poverty – was the most common challenge faced by the pilots. A lack of data, poor transparency (from suppliers, governments or projects), lack of national definitions of energy poverty, and issues with energy companies were also common challenges. We can categorise these challenges as either Institutional – lying with governance structures, private companies or organisations - or Informational – regarding data, communications and knowledge – although these two categories can have some overlap (for example, a lack of data on energy poverty is institutional if not collected by governing bodies, but can lead to an informational deficit). Covid-19, which is acknowledged to have worsened energy poverty in Europe (Scottish Government, 2020; EPAH, 2020; EFPC, 2020), is rather external to these two categories, and is its own separate challenge. The challenges are categorised and presented in Table 5.

| Institutional Challenges | Informational Challenges |
|---|---|
| No definition of energy poverty | Communication with vulnerable groups (incl. using sensitive and appropriate language, giving people the correct information) |
| Data on vulnerable groups/energy poor groups not collected or lacking | Stigma – removing stigma and shame around seeking help |
| Energy company issues – lack of transparency, monopolies, inability to switch supplier | Engaging vulnerable groups (incl. providing incentives) |
| Legal barriers to creating energy communities or installing RES | Lack of knowledge or awareness of energy poverty issues (by governing bodies, healthcare/social workers, households themselves) |
| Addressing the structural causes of energy poverty | Identifying energy poor/vulnerable groups – energy poverty being hidden |
| Governmental disinterest | Removing the binary between energy poverty and poverty as completely separate issues |
| Lack of funding | |
| Administrative and bureaucratic barriers | |

| | |
|---|---|
| Government binary between energy issues and poverty | |
| Lack of resources and low incomes | |

Following the group exercise which took place in the POWER UP Consortium meeting, as described in the methodology section, some preliminary strategies for overcoming the above challenges were proposed and shared, which are summarised here. Further documents and information that can assist with identifying and engaging with vulnerable groups are summarised in Annexe 1.

- Identifying vulnerable groups:
  - Especially if data on energy poor/vulnerable groups is scarce, establishing and cultivating collaborations with key partners who have direct contact and trust with vulnerable people – such as doctors, healthcare workers and social workers – can be crucial in gaining access.
  - If data is not readily available, cross-checking databases from different sources which use different indicators (such as people in receipt of certain benefits and those on a social tariff for example), can be useful for identifying energy poor groups.
- Communication with vulnerable groups:
  - Avoidance of so-called 'scary' terms which can be stigmatising or uncomfortable, such as 'poverty', and instead reframing it in terms of problems with paying energy bills or feeling cold, can help to be more approachable.
  - Transparency is very key as well as consistent communication
  - Acknowledgement of the amount of time that this participation will take up and that people might have limited time and capacities due to their situation. Providing childcare in the form of a creche can be particularly valuable for single parents and women.
- Building relationships with vulnerable groups:
  - People can sometimes need someone to listen to their problems and want answers – by starting with low hanging fruits, such as providing space to share issues and help people to feel listened to, this can be a good way to build trust.

However, as the contexts and drivers of energy poverty in each pilot are different, so are the challenges and the solutions to overcome them. Pilot-specific further strategies for overcoming challenges related to energy poverty will be discussed in more detail in a future Deliverable for the POWER UP project.

In light of this, in the following sections, we will now analyse the energy poverty situation and challenges, and generate a typology in each pilot country and locale of the POWER UP project, to increase knowledge and capacity on energy vulnerability, and thus contribute to reducing energy injustice in the REC process. A summary of the national and local situation is built from findings from document analysis, the bilateral meetings and the group exercise.

# Belgium

## National

Around 1 in 5 people in Belgium were reported to suffer from energy poverty in 2021, a number which has not decreased in recent years (BEPB, 2021). The key drivers of the condition were identified to be the high cost of energy, as well as the age, poor efficiency and low quality of the housing stock; Belgium has the fourth-worst insulated housing stock in Europe (BM3). Energy poverty was highest for people living in the private rented sector, who had the highest vulnerability to arrears on bills, and the highest inability to keep their homes warm. However, social housing tenants, according to the Belgian Energy Poverty Barometer, particularly suffered from low energy performance and a high share of energy expenditure in income (BEPB, 2021). People in urban areas struggled the most with keeping homes adequately warm (suggested due to higher living costs in urban areas and a higher share of low-income groups), whilst those in rural areas tended to score higher for those with arrears on utility bills, particularly households with detached and semi-detached properties (suggested due to poor efficiency and heat dissipation) (EU, 2020).

Regionally, Wallonia suffered from the highest levels of energy poverty at 28.3% of households, followed by the Brussels region (27.6) and then Flanders (15.1%). The disparity occurs as Wallonia has a higher reliance on heating oil which has no social tariff, as well as a colder climate and higher gas prices, Brussels has a high share of single-parent and rented households, whilst Flanders has the lowest gas prices. Vulnerable groups across all regions include single-parent households, people with chronic health conditions, female-headed households and the elderly – 42.8% of elderly single and 31.7% of single parent households are in energy poverty, the vast majority of whom are women. 19% of households with an income are in energy poverty (BEPB, 2021).

At a national level, Belgium is active with regards to research, policies and measures to tackle energy poverty, with a definition for protected and vulnerable consumers. Vulnerable consumers are defined as where at least one member of the household is in receipt of a benefit or allowance from the government (e.g. disability allowance or those with no income) or be a social renter with communal gas/electricity (Viviers & Feron, 2021). During COVID-19, this was

also expanded for people with health conditions who received allowances for healthcare (BM3). There is a national social tariff, introduced by the Belgian government in 2003, for heating and electricity for these identified vulnerable consumers, and regional governments each have a form of disconnection protection system to prevent households in debt from having no heating in the winter. Around 7-8% of total customers in the commercial energy market in Flanders are classified as protected, although a 2020 amendment – as a result of COVID-19 - to include as protected consumers those who receive an increased allowance from the government for healthcare, this number has risen temporarily to 15% of the population, or almost 1 million households (VREG, 2020; Economie, 2022). This measure is foreseen to remain in place until Spring 2023. Nevertheless, many people who are in poverty are not in the categories required to receive the social energy tariff. Energy and renovation grants are also available to improve building energy efficiency ratings (EU, 2020). On the whole however, most of the initiatives in place to combat energy poverty are designed to prevent or repay debt, however many people who suffer are not in debt, which can make these groups difficult to identify and help (BM3).

Furthermore, if a person/household gets into debt with their commercial supplier, they are transferred onto the Distribution System Operator (DSO) which charges a higher rate than the commercial tariffs (BM3). If a household continues to accrue debt, they are then transferred to a prepaid meter, which you are only able to leave when your debt with the DSO is cleared. In addition, non-protected customers are charged costs for notice of default (VREG, 2020). Around 30% of prepaid meter users are protected customers. As the social tariff is coupled with the market rate, if costs increase, vulnerable groups must also pay more in tandem with the price uplift, although this tariff will still be considerably lower than any commercial rate. In 2019, 9.25% of Flanders household customers received at least one notice of default from their supplier, with 105,715 starting repayment plans (up by 7.51% compared with 2018), which are deemed by VREG to be a concrete indicator of financial difficulties to pay energy bills. Around 9% of those who received default notices in 2019 were socially-protected customers.

# Pilot-Level: Eeklo

Eeklo, a small city in Flanders, between Ghent and Bruges, is home to approximately 21,000 people. The city experiences relative poverty compared with the surrounding area, with lower-than-average incomes, and 17.9% of inhabitants are in receipt of social benefits. There is an

ageing population, and many younger people are leaving to find employment elsewhere. The number of non-Belgian born migrants to the town has increased since 2016, partially due to a refugee centre in the town; 12% of the foreign-born population are refugees or asylum seekers. 14% of the population are non-Belgian born, primarily from the Netherlands, Poland, Romania, Bulgaria and Syria (BM3).

The housing stock in Eeklo is mainly terraced houses and small apartment blocks, with some family homes, 30% of which are over 50 years old. In the 20th century, Eeklo was a textile industry hub, which has left a legacy of small streets with terraced workers' houses in the city centre. These are now primarily inhabited by low-income people due to cheap rent and very small living areas. 40% of households in Eeklo are private renters, 8.5% are social renters, and another 7% are on the waiting list for social housing. This leads to a phenomenon called 'emergency buying', whereby people on the waiting list will buy the cheapest houses on the market, which are often of poor quality and are unsuitable for their needs, but are cheaper than renting (BM3).

*Figure 3- Housing in Eeklo (Source: City of Eeklo)*

The city of Eeklo has its own subsidy programme for energy-saving measures and renovations, which have been in place since 2008, including for roof and wall insulation, and installing double glazing. In 2013, the subsidy was reduced to EUR80, which reduced the number of applications, as people did not want to have the administrative burden to apply for such a small amount. Another update was approved in 2021 to combine premiums to better utilise available budgets, extend the subsidy and make the system more effective (City of Eeklo, 2021).

# Summary

A summary of the energy poverty situation in Eeklo is provided in the following Table.

| Pilot | Factor | Summary of Energy Poverty Situation |
|---|---|---|
| Eeklo | Access | Energy access is fairly universal; regional disconnection protections in place in winter |
| | Affordability | High energy costs<br>National social tariff<br>Low income/protected consumers still getting into debt even on social tariff. |
| | Flexibility | Commercial and liberalised energy market; however, if households get into debt they lose access to the commercial market – move to the DSO then a prepayment meter[3]. Unable to switch or move until debts are cleared, paying highest rate until this is cleared. |
| | Energy Efficiency | Poor energy efficiency and quality of housing (4th worst in Europe) |
| | Needs | High rates of energy poverty in those who are chronically ill<br>Low integration rates of some ethnic minority groups – poor participation in initiatives |

[3] This legislation will change with effect from July 2022, whereby all those with arrears on the commercial market who are moved onto the DSO will be given a prepaid meter from the start of their transfer.

| | | |
|---|---|---|
| | | Purchase of inadequate housing for needs whilst waiting for social housing |
| | Practices | Insufficient subsidies, administrative burdens preventing application to subsidies |

Key challenges in Eeklo with regards to tackling energy poverty were both 'informational' and 'institutional', and were identified as follows:

- Communication and engagement with vulnerable groups
- Avoiding creating new administrative structures for people in energy poverty when applying for subsidies or grants.
- Addressing the structural causes of energy poverty rather than implementing palliative measures.
- It can be hard to identify energy poor people; as people in debt are the primary targets of many Belgian initiatives, it means that people in energy poverty who aren't in debt can go undetected and unaided.

# Czech Republic

## National

Energy provision in the Czech Republic is linked to legacies of infrastructure development and the centrally-planned economy, with the state playing a key role in the energy sector during the Communist era, as well as key dependence on fossil fuels supplied by the Soviet Union (Bouzarovski & Tirado Herrero, 2017). Coal currently supplies around 60% of the Czech electricity supply and a large proportion of heat via district heating systems, which is used in 40% of households. Renewables as a share of the energy mix are increasing, but remain a minority energy source, despite subsidies (Ministertvo Prumyslu A Obchodu, 2016).

In the post-Communist era, the energy sector was liberalised, costs increased, and many consumer protections removed. Unemployment levels rose rapidly during the 1990s, with labour force downsizing, and movement of workers into lower paid, less stable jobs, creating a group of 'working poor' in Eastern bloc countries, including in the Czech Republic (Bouzarovski & Tirado Herrero, 2017). Poor energy efficiency, which was not a priority when much of the housing stock was built, has meant that a number of factors have combined to create a situation of increasing energy poverty in the country.

According to Eurostat, the Czech Republic does not have a national definition of energy poverty, although interest and engagement with the issue have gained traction in the last decade. The country performs better than the EU average for population-reported and expenditure-based indicators: the number of households with arrears or unable to keep their homes warm has decreased gradually to 2.7% between 2005 and 2017 and 10.8% of households spend more than twice the median share of their income on energy (EU, 2020).

The greatest contributing factors to energy poverty are poor condition of housing, the inability of low-income households to cope with unexpected costs and market fluctuations, and the dependence of these groups on the private rented sector; nearly 1/3 of Czech households in poverty live in the private rented sector (Pašek, 2016). Single-parent households and elderly people are identified to be particularly vulnerable to energy poverty, although there are inequalities along gender and ethnic lines with regards to income and discrimination

(Bouzarovski & Tirado Herrero, 2017). Energy poverty in the private rented sector is the highest out of all tenure types, whilst those living apartments and semi-detached dwellings are the most vulnerable to an inability to keeping their homes warm or having arrears on their utility bills. Urban areas have the lowest performance for both indicators, due to having the oldest building stock and having high proportions of poor populations living in cities (EU, 2020).

Although as outlined above, levels of energy poverty are on the whole rather low in the Czech Republic when compared with the European average using standardised Eurostat indicators, considering a regional picture shows significant differences, for example, far higher levels in the coal-mining Ustecky and Moravskoslezsky (Moravia-Silesia) regions (14% in these areas compared with 2.8% on average) (Matousek, 2020). Bouzarovski and Tirado Herrero's analysis finds that levels are highest in the Zlin region, with over 30% over the population classed as energy poor under the Low Income, High Cost Indicator. In addition, Matousek (2021) argues that the Eurostat indicators do not adequately capture the Czech situation, with over 25% of households having problems paying unexpected expenses, such as fuel costs in a cold spell, of over EUR450. The elderly are particularly affected by large expenses, as pensions are relatively low. The reason for this disparity, suggest Koďousková and Lehotský (2020) is that there are large differences between the statistics for the entire population and for specific socio-demographic groups – for example, housing costs make up 36.3% of unemployed people's net income, compared with 15.9% on average. They also link energy poverty to the technical characteristics of the building stock, with national government policies in place failing to mitigate the issue.

In addition, Bouzarovski & Tirado Herrero (2017) argue that increases in domestic energy prices have not been offset by gains in purchasing power or energy efficiency improvements, which has led to increasing levels of energy poverty in the Czech Republic, despite increasing household incomes since 2015. Household energy costs have increased gradually in the Czech Republic for both electricity and gas since 2008, and then spiked in 2021 due to the energy price increases seen across Europe. Several energy companies went bankrupt, forcing people to transfer to new providers, which then saw them placed on unfavourable tariffs which charged much higher rates for energy. This has left many more people, especially lower paid workers, struggling to pay their energy bills, and has increased awareness of energy vulnerability as more people notice the impact of high prices (BM1).

A Right to Energy Coalition report, which analysed a number of Member State National Energy and Climate Plans (NECP) and Long-Term Renovation Strategies (LTRS), which are required by EU law, including the Czech Republic, found that the country's submission fell short on addressing energy poverty. Although it had submitted an LTRS, it did not include an overview of measures which would tackle energy poverty, the NECP did not include an energy poverty reduction goal, an energy policy impact assessment or any scope for monitoring the issue (LIFE Unify, 2020). Currently, energy poverty is addressed by the Czech government through social policies such as the Living Allowance, Household Allowance and the Housing Supplement, although only the poorest households are eligible for these programmes (Pašek, 2016). Indeed, the Czech Centre for Social Issues estimates that 1/3 of households with 'very low incomes' in receipt of benefits face energy poverty, with the number likely to be much higher, although these groups are hard to identify due to a lack of data and the limitations of the welfare system.

The national building renovation strategy is financed from the sale of emissions allowances and EU-funds, and state subsidies for energy efficiency investments and heat-source replacements do exist, but they are primarily taken up by those in family houses, which are inhabited generally by better-off households. There are many programmes in the country focused on energy efficiency renovations for most building types, although these are inadequately targeted at low-income and energy poor households (Pojar & Karásek, 2019). In addition, the application process is reportedly arduous, time consuming and bureaucratic and is done online, which can exclude certain groups, such as older people (BM1). Beyond the government, there are no networks or organisations that work with energy poverty – there are NGOs that tackle poverty and social issues, but these organisations, and indeed municipal social workers, can struggle to see the relevance of energy issues to the work that they do.

Proposed policies and measures suited to the Czech context were formulated in a report conducted by the Centrum Ekonomiky Regulavanych Odvetvi (2021). These included a separate allowance for energy independent of the state housing allowance, prohibition of disconnection, increasing and expanding the availability of renovations to low and medium-income households, and increasing education on financial and energy literacy to help prevent debt and arrears.

# Rožnov pod Radhoštěm

Rožnov pod Radhoštěm, hereafter referred to as Rožnov, is a town of approximately 16,000 inhabitants in the Radhošte massif in the Moravian region of the Czech Republic, an area which experiences higher than national average energy poverty rates (Matousek, 2020). The average annual temperature of the area is 8.65°C, with 80-100 average number of snow days per year. In summer, thermal radiation images show that the higher density built-up areas of the town see the hottest average surface temperatures, particularly in the western and city centre areas.

The town's energy and electricity is primarily generated by gas and combustion power plants, with some solar PV generation. It is estimated that around 4400 buildings in the town have useable installation areas for solar PVs, and it is also predicted that installation of heat pumps will increase. There are no water, wind, biogas, energy from waste or geothermal plants in the area. In the majority of the town's apartment blocks, heat and water is centrally delivered, with no individual meters for the different apartments. This means residents are charged a bill for the whole building, regardless of the amount of energy they have used; as they can't control their neighbours' behaviour, there is little incentive to use less energy or make efficiency improvements. However, electricity is largely metered and charged based on consumption. Under this system, although people have access to energy, and are not disconnected from the supply, they can end up with very high bills as a result (BM1). There are also issues with transparency with the heat supplier; the municipality has trouble communicating and thus making changes, and the cost of heat is calculated at the end of the year, so people don't know how much they are paying upfront. Furthermore, as there is only one heat supplier in the city, there is no possibility to switch to get a better rate.

Energy poverty is not mentioned in the Rožnov 2021-2030 strategy or the 2018-2028 housing strategy, although energy and poverty separately are given detailed attention. By and large, people in Rožnov reportedly do not see themselves as energy poor; the concept is not understood well, is not properly defined, and is not a phenomenon commonly discussed, even at the municipal level. Colloquially, poverty is seen as belonging to socially excluded groups or related to low income, rather than linked to energy affordability (BM1). Four groups were however identified by the Rožnov Strategy in the section on the development of social policies; families with children, people with disabilities, seniors (pensioners over 65), and people at risk

of social exclusion, which could include minority ethnic groups and migrant workers (Hruška et al., 2021).

Housing in northern Rožnov is characterised by multi-storey panel blocks, whilst in the southern area, the housing developments tend to be more mixed, with family houses, with the majority of inhabitants owning their homes. The municipality owns 327 social housing apartments; people inhabiting these flats tend to be well supported and their situation monitored. It is estimated that around 80% of the town's family homes are uninsulated (Rožnov Municipality, 2017), with barriers to renovation identified as cost and lack of awareness (BM1); it is energy poor groups in this housing type who are difficult to identify, and who therefore may fall through the cracks, and thus struggle to access the support they need.

*Figure 4 - Housing in Rožnov (Source: SEMMO)*

The city's energy-related plans to 2028 include introducing Energy Performance Certificates (EPCs), increasing support for renewables, promoting modern heat sources via subsidies and improving energy literacy, as well as a plan for renovation that could see up to 75% of homes being insulated to meet energy performance standard legislation. Despite the absence of energy poverty in the city strategies, it should be noted that Rožnov is unusual in its involvement with sustainable energy – only 40 out of the Czech Republic's ~5000 municipalities have energy managers (BM1).

# Summary

A summary of the energy poverty situation in Rožnov is provided in the following Table.

| Pilot | Factor | Summary of Energy Poverty Situation |
|---|---|---|
| Rožnov | Access | Access to energy is fairly universal; people connected to district heating systems. Disconnection from this is uncommon. |
| | Affordability | Lower than average energy prices compared with elsewhere in the EU until price surges in 2021/22. Bills can be very high as there is no individual billing for those connected to district heating, cost of heat unknown until end of the season. |
| | Flexibility | Ability to switch electricity providers under usual circumstances but due to current energy crisis, many providers are going out of business and new tariffs are very high. Inability to switch heat providers as there is only one in Rožnov. Transparency issues with this provider in terms of changes and costs. |
| | Energy Efficiency | Efficiency of privately owned buildings is low – 80% uninsulated, but municipal buildings including social apartments have been renovated. |
| | Needs | No data available |
| | Practices | Knowledge of energy poverty is very low. Subsidies and programmes insufficiently targeted to low income households, administrative barriers to applying. |

Key challenges in Rožnov with regards to tackling energy poverty were both 'informational' and 'institutional', with institutional challenges posing the most critical barriers to tackling energy poverty. Challenges were identified as follows:

- There is no national definition of energy poverty in the Czech Republic which creates challenges tackling the issue, and causes a data gap which in turn makes energy poor people difficult to identify.
- Energy poverty can be hidden as people do not identify with, or even know, about the causes of energy poverty.
- Energy and poverty are discussed in separate realms.
- Lack of knowledge at the municipal level with regards to energy poverty and its relevance to social workers' work
- Energy supplier monopoly with regards to heating; inability to switch providers
- Poor transparency from energy companies with regards to pricing and changes.

# Italy

## National

According to the official measure of energy poverty for Italy, around 2.2 million households (8.6% of the total population) suffer from energy poverty (Faiella & Lavecchia, 2021). The identified key drivers of energy poverty in Italy are low-income, high-energy costs and high consumption due to the poor energy performance of residential buildings (Supino & Voltaggio, 2021). In 2015, the price of energy was higher than the European average, for both electricity and gas prices, as a result of a 30% tax burden, coupled with a high dependence on imports. Energy prices rose by 30% for electricity and 37% for gas between 2000 and 2013, with the share of energy expenditure in income highest for those with low incomes. The energy market is largely controlled by one major company, which generates, distributes and supplies electricity (BM5, 2022), creating a de facto monopoly and maintaining high bills. The recent energy price spikes of 2021-22 have also had an impact with greater public media attention as more people are affected by cost surges and struggle to pay their bills.

The depth of energy poverty in Italy offers a mixed report in comparison to EU averages. Energy poverty in Italy varies between regions, with around 8% on average suffering from the condition, but as many as 14% of families in the southern regions (Supino & Voltaggio, 2021). The tenure type with the highest rates of energy poverty is the private rented sector, followed by the social housing sectors, although the majority of Italian households are homeowners, who are at lower risk of energy poverty and energy related issues in general. Energy poverty is not especially correlated with urban areas in Italy, with poorer populations spread across all areas and fairly evenly across all dwelling types (EU, 2020). Research found that in the Italian context, energy poverty has a geographical dimension, with households in the coldest climates experiencing higher rates, with socio-demographics and housing characteristics acting as sub-layers (Besagni & Borgarello, 2019). The researchers note however, that in this study, absolute poverty could not be used to estimate energy poverty in the Italian context, an important reflection given the more prevalent poverty rates in the southern areas of the country.

64% of Italian residential properties were constructed prior to 1980, before energy efficiency laws and regulations came into play, and thus a large proportion of housing is inefficient.

The number of households unable to keep their homes warm is significantly higher than the EU average, although the number unable to pay their bills is lower than average, with better performance than average for expenditure-based indicators (EU, 2020). The number of households unable to keep their homes warm increased dramatically following the global financial crash in 2008 with corresponding increase in energy costs, although the number of households with arrears on utilities has remained relatively constant.

Although Italy discusses energy poverty in its 2017 National Energy Strategy, it neither has a holistic definition of energy poverty, nor a complete action plan to tackle, nor a public system for monitoring and measuring the extent of the phenomenon (Supino & Voltaggio, 2021). In addition, discussions on energy poverty have only come to the fore relatively recently, in comparison to the UK or France for example, where the problem has been recognised since the 1990s. It is also suggested that the term remains rather limited to academia and projects, rather than an accessible term that people engage with outside of these contexts (BM5, 2022). Supino and Voltaggio (2021) posit that the absence of a regulatory definition of energy poverty makes it extremely difficult to identify energy-poor consumers, and thus to provide specific policies and measures to help them.

Nevertheless, the country did set out targets and policies to tackle energy poverty in its NECP in 2019, and has some existing policies and measures to tackle the issue, including electricity and gas social bonuses and tax deductions, discounts on bills, and subsidies for building renovations, as well as many EU-funded projects being implemented related to energy poverty (EU, 2020). The most significant measure currently in place is the "social bonus", which reduces the bill cost for electricity and gas for vulnerable consumers. However, this only accounts for family size and bill cost, and does not incorporate the energy efficiency or dwelling quality[4]. Until 2021, however, only ⅓ (around 1.2m households) of eligible people applied for the bonus due to administrative burdens, so that now the bonus is automatically applied to all those entitled to it. It is illegal for those in receipt of the social bonus to be disconnected from their energy supply, even if they are in arrears.

A measure to improve energy efficiency of dwellings is the "Eco-Bonus", which is a tax deduction for those carrying out renovations, allowing recovery of up to 65% of upfront costs

[4] Information provided in Group Exercise on 9th February 2022.

over 10 years, although energy auditing of lower-income households is uncommon (Faiella & Lavecchia, 2021). From 2020, Italy also launched the "Super-Bonus" as an extension of the "Eco-Bonus", a tax advantage for energy and seismicity upgrades, where people can claim 110% of qualifying expenses on the cost of renovations (Daunton, 2021). Nevertheless, these schemes have been criticised for excluding energy poor households, as those who are tax-exempt (often very low-income people and those in receipt of welfare support) are ineligible.

# Pilot-Level: The Municipalities of San Giuseppe Vesuviano, Palma Campania, San Gennaro Vesuviano and Striano

San Giuseppe Vesuviano, Palma Campania, San Gennaro Vesuviano and Striano are four municipalities that are part of the contiguous broader Naples metropolitan area. Poverty and deprivation, as well as unemployment are social issues present in the pilot area, as well as being problems found in the broader Campania region. The main employers in the municipalities are food processing, and clothing manufacture and distribution industries.

The large majority of people in the area own their homes as is fairly characteristic across Italy, but vulnerable groups, especially ethnic minority groups, which make up 1/5 of the population, tend to rent, and often live in overcrowded housing that doesn't meet their needs.

The housing stock is newer, consisting mainly of houses or small apartment blocks, due to an earthquake in the area in the 1980s. However, the removal of planning regulations following this, and a lack of knowledge of energy efficiency at the time, mean that many of the houses are earthquake proof, but not energy efficient and need renovation (BM5, 2022). Energy efficiency of both older and newer houses is a key issue in this region, and progress on renovation remains slow; despite new government incentives to improve efficiency, these are seen as inaccessible to low-income families and those with poor credit history, as the banks will not lend the money for renovation to these groups.


*Figure 5 - Housing in San Giuseppe Vesuviano (Source: Google Maps)*

Related to their industrial past and present, the four municipalities have struggled with unemployment, lower incomes, and less access to regular work than other parts of Italy, which contribute to elevated rates of poverty, an issue which is also present across the wider Campania region. With regards to energy poverty, people in general are not familiar with the term, being more concerned with income poverty rather than energy issues, including social workers and those working with vulnerable groups, although this is beginning to change thanks to increasing awareness (BM5). Identified vulnerable groups in the area by the San Giuseppe municipality were the elderly, particularly those who live in older buildings, families with children, private renters and ethnic minority groups. COVID-19 was emphasised in the bilateral meetings to have worsened the depth and extent of energy poverty, due to creating additional cost burdens, such as the need to have internet and schooling equipment at home, and increased energy and utility costs.

# Summary

A summary of the energy poverty situation in the four municipalities is provided in the following Table.

| Pilot | Factor | Summary of Energy Poverty Situation |
|---|---|---|
| UCSA | Access | Access to energy is fairly universal in Italy |
| | Affordability | High energy costs, worsened by the recent energy crisis. Reliance on energy imports |
| | Flexibility | Lack of market competition for gas and electricity mean that consumers are unable to switch providers, and bills remain high |
| | Energy Efficiency | Energy efficiency is poor due to lax planning regulations, despite newer housing stock. |
| | Needs | Renters, particularly ethnic minority groups, live in overcrowded housing that is insufficient to meet their needs.<br>Covid-19 has increased energy demand and utility bills in the home |
| | Practices | Energy poverty is poorly understood, energy efficiency and energy issues not really thought of as a priority ahead of other household needs.<br>Inaccessible renovation loans for low-income/those with poor credit history |

Key challenges in the municipalities with regards to tackling energy poverty are both 'informational' and 'institutional', with institutional challenges posing the most critical barriers to tackling energy poverty. Challenges were identified as follows:

- Legal restrictions with regards to setting up energy communities
- There is no holistic definition of energy poverty, and no structural government action, work on energy poverty doesn't really exist outside of academia/specific projects, which means that municipal action and awareness of the issue is also low.

- There is a lack of knowledge, in terms of data and awareness of energy poverty among practitioners and the general public.
- The lack of market competition for energy companies prevent switching for consumers.
- Covid-19 has worsened the extent and depth of energy poverty in the area.
- It is hard to identify vulnerable groups, and difficult to communicate/engage with groups.

# Netherlands

## National

The Netherlands lacks a national definition of energy poverty, although this is generally understood as households who spend more than 10% of their disposable income to heat their home and other energy costs (BM4). The phenomenon is calculated by Straver et al. (2020) to affect around 650,000 households, or around 8% of the population. According to 2019 data, the Netherlands performed better than the EU average on population-reported and expenditure-based indicators, although this is argued to hide considerable differences when data is disaggregated. For example, social renters tend to experience the highest levels of energy poverty, particularly in apartment blocks – 16% compared with a national average of 2.6%. Urban areas have the lowest ability to keep homes warm compared with rural areas (EU, 2020). Similarly, the national average of those with high energy expenditure in income is 11%, but rises to as high as 58% in the lowest income decile. Severe energy poverty was found by Mulder et al. (2021) to be spatially concentrated, particularly in the north-east of the Netherlands, much more so than general income poverty – 13% of neighbourhoods had energy poverty levels twice as high as the national average.

In addition, Dutch statistics struggle to account for as many as 900,000 households with 'circumstances that make it difficult to access expenditure', such as houses in multiple occupancy, student households and shared residences, who are more likely than average to suffer from energy poverty (Cauvain & Bouzarovski, 2016; Feenstra et al., 2021). A TNO report estimates that an additional 140,000 households could be living with hidden energy poverty, as they consume less energy than they would like due to financial difficulties (Mulder et al., 2021).

Identified vulnerable groups in the Netherlands are families with children, those in receipt of social assistance, the elderly (particularly elderly women) and private renters, with single-person households and single-parent families significantly overrepresented amongst energy poor households (22% of single-parent families are energy poor). Work by Woonbond (2019) found that coping strategies employed by Dutch households to cope with energy poverty included

heating restricted areas of the home, waking up later/going to bed earlier than preferred or limiting family visits due to living in too cold, draughty or mouldy living spaces.

Most Dutch homes are heated with gas boilers, which has been especially problematic given price increases in 2021-22, leading to increasing unaffordability. Currently natural gas supplies 86% of energy used for heating, cooking and hot water. The government announced progressive taxes on natural gas for household consumption over the coming decade to accelerate a phase-out; in 2020, Dutch consumers paid the second most expensive gas prices in the EU, after Portugal (Feenstra et al., 2021). With regards to governance, energy poverty is gaining increasing attention in the Netherlands, although this is skewed to a concern with a just energy transition, particularly the affordability and distributional effects of gas phase-outs. Energy poverty is mainly addressed through the social welfare system, in particular strong housing and income support policies, although there is no dedicated Dutch national policy on energy poverty. A disconnection protection measure is in place from 1st October to 1st April which prevents vulnerable consumers being without heat and electricity in the winter.

A number of policies to improve housing efficiency have also been introduced, much needed since 61% of Dutch homes are in energy efficiency bands C to G (PBL, 2018); with around half of people living in these homes unable to improve their situations, the majority of which are private tenants (Mulder et al., 2021). Less than 10% of people living in houses built after 1990 experienced energy poverty, compared with 50% living in houses built between 1950-75.

There are earmarked funds for local municipalities from national government to spend on combatting energy poverty, however local and regional action is inconsistent, due to the lack of a national-level framework (Feenstra et al., 2021). This decentralised model can lead to highly context specific, effective and tailored policies, but can conversely lead to under-provision of services.

# Pilot-Level: Heerlen

Heerlen is a town in the Limburg region of around 86,000 people, with around 250,000 in the wider metropolitan area. Formerly a coal-mining hub, which saw large expansion of the town in the early 19th century, Heerlen is left with a legacy of older, inefficient buildings, relative

unemployment and deprivation. Average income is around EUR 23,700, lower than the national average, and many young people leave to find employment elsewhere. According to statistics calculated by the city, 11.8% of households are classed as low-income, 18.6% struggle to make ends meet, and 36.7% suffer from a chronic illness (BM4).

With regards to the housing stock, 93% of homes were built before 2000, most prior to 1970, and many need insulating and renovating. 37% of households are private renters, and 16% socially rent. Around 45% are terraced homes, 36% are apartments and the remainder are semi- and detached houses (BM4). Heerlen's apartment buildings are deemed to be the most efficient of the housing stock, with significantly less demand for space heating than the terraced/semi-detached houses, which make up 70% of the energy used by the city's housing stock. Due to their age and condition, many of these houses need renovating. The city's energy transition report estimates that the most important energy saving intervention is to improve the thermal insulation of the building envelope, which can lead to energy demand for heating dropping by half. The second component is deemed to be reducing electricity and hot water consumption, which are behavioural measures, rather than technical interventions (Parkstad Limburg, 2015). It is worth noting that the term 'energiearmoede' (energy poverty) is not present in this report.

*Figure 6 - Housing in Heerlen (Source: Google Maps)*

Energy poverty in the area is driven by high energy prices and the poor quality of the housing stock, an issue which has worsened with the increasing costs of gas and electricity (BM4). The map here shows energy poverty levels calculated by district across the Netherlands by Mulder et al. (2021). The circle delineates the city of Heerlen and its environs, showing it to be one of the most energy poor areas in the country. Around 1440 households in Heerlen were calculated by the Dutch TNO to be in energy poverty in 2020, the highest proportion of which are in the lower-income northern part of the city (BM4).

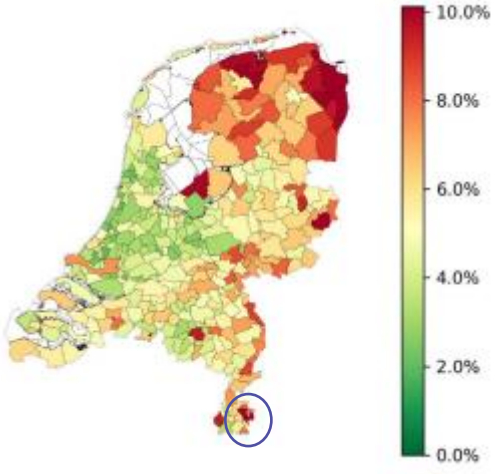


*Figure 7 - Heerlen highlighted on a district-level energy poverty map of the Netherlands (Source - Mulder et al. 2021)*

# Summary

A summary of the energy poverty situation in Heerlen is provided in the following Table.

| Pilot | Factor | Summary of Energy Poverty Situation |
|---|---|---|
| Heerlen | Access | Access to energy services is fairly universal |
| | Affordability | High energy prices, worsened by recent price spikes. |
| | Flexibility | Liberalised energy system allows consumers to choose and switch |
| | Energy Efficiency | Poor efficiency, age and quality of the housing stock drives energy poverty in the area. Lowest efficiency in non-apartment buildings, which dominate Heerlen's housing stock. |
| | Needs | There are clusters of poorly-integrated ethnic minority groups who may not be participating or benefitting from projects and subsidies.<br>High numbers of chronically ill people in the area |

| | | |
|---|---|---|
| | Practices | Decentralised model can lead to fragmented or insufficient services or provision to tackle energy poverty |

Key challenges in Heerlen with regards to tackling energy poverty were primarily 'informational' and were identified as follows:

- Communication and engagement with vulnerable groups
- Ensuring that vulnerable people are receiving the right information
- Energy poverty can be hidden – low expenditure on energy in income due to not turning down heating to save money, statistics and data doesn't cover certain groups
- An institutional challenge is a lack of a clear national definition, and reliance on municipal efforts mean that support to vulnerable groups can be fragmented and insufficient.

# North Macedonia

## National

North Macedonia does not have a precise or legally-embedded definition of energy poverty, nor does it collect data on the number of households facing energy poverty, either at a national or local level. Some estimates however place energy poverty as affecting as many as 60% of households, including low-income and sections of the middle-class; in 2009, only 58.4% reported that they could keep their homes adequately warm, a figure that was markedly lower in the four lowest-income deciles (Bouzarovski et al., 2011; Buzar, 2007), one of the highest levels in Europe. Due to large 'grey' economy, traditional definitions such as 10% of income spent on energy do not apply in many cases due to households' irregular incomes, which increases the complexity of defining the energy poverty concept in North Macedonia[5]. Income poverty and unemployment are high (22%), and the country has weak social protections and strict criteria for welfare recipients which means that many vulnerable families do not receive support from the state (Stojilovska et al., 2021). Research by Stojilovska et al. (2021) into energy poverty in Skopje found that procedural barriers to applications for social welfare support led many people to withdraw due to fear of stigma or information deficits.

Restructuring of the energy sector following the Communist era saw the country undergo mass disconnection from district heating, instead transferring to electricity for heat. Country-wide, 64% use fuelwood, 25% use electricity and 9% rely on district heating for their heat sources. The electricity supply is monopolised and under private ownership, with extremely high costs for electricity: price per unit rose by 82% between 2008 and 2018, in addition to electricity for heating being hugely inefficient (Turai et al., 2021). Low income households rely on fuelwood for heating, or other unsafe and polluting materials such as plastic rubbish, detrimental to both health and local air quality. Fuelwood however is culturally important as once it is purchased it can be used at any time to suit the needs of the household, unlike the district heating system (Stojilovska, 2020).

[5] Information provided in Group Exercise on 9th February 2022.

Citizens with irregular incomes are often not connected to central heating as they cannot continuously pay their bills – around 3.5% of the population were disconnected in 2018 due to arrears on bills, some without warning after just one missed payment. They are then forced to pay a reconnection fee on top of their outstanding debt. Paying to stay connected to a district heating system is only tenable for households on regular incomes, so many people disconnect voluntarily to avoid paying for energy they can't afford. This means that other people in the same building must pay more to compensate for the loss in income to the energy company, leading to further disconnections, and more people using unsafe and healthy fuel sources for heating[6]. Even those who are disconnected from the system still have to pay a rate for 'passive' use, with no ability to control the time or temperature of the heat (Stojilovska, 2021).

Coping strategies practiced by households in energy poverty included leaving the home as it was too cold inside, heating only one room or heating sporadically, or paying bills over buying food due to fear of being disconnected. Inadequate cooling in the summer is also an issue, particularly severe for those living in high rise apartments, notably in Skopje. Those unable to cool their homes are often not the same groups of households who cannot keep their homes warm in winter (Thomson et al., 2019).

More than 95% of households in N. Macedonia are privately owned (owner-occupied), and although renting is gaining in popularity, the rental sector is primarily used by students and households with poor credit history who are unable to purchase a home[7]. Only 18% of households are insulated, which continues to drive energy poverty, and large proportions of the population use inefficient appliances, including incandescent lightbulbs (Stojilovska, 2020).

With regards to governance, energy poverty was mentioned in the most recent set of energy laws from 2018 as an issue that must be considered. References to energy poverty and a need for indicators to measure the extent of the problem were made in the Macedonian National 2011-2021 Program for Development of Social Protection and the 2010-2020 Strategy for Reduction Poverty and Social Exclusion, which defined energy poverty as "the inability of a household to meet its energy needs to provide a decent life and equal opportunities". Some attempts to tackle it have included subsidising energy bills and building social housing,

[6] Information provided in Group Exercise on 9th February 2022.
[7] Information provided in Group Exercise on 9th February 2022.

although these have not effectively alleviated the problem (Bouzarovski et al., 2011). The national Energy Efficiency Strategy is not fully implemented – under this strategy each municipality is obliged to develop an efficiency programme, however in 2015, ¼ still had not developed one.

# Pilot-Level: Skopje

Skopje, the capital of North Macedonia, is the largest city in the country, home to around 580,000 people. The urban area is administratively divided into ten municipalities, each characterised by a more urban and more rural section, which are in turn made up of village-like neighbourhoods. Each municipality is different, ethnically diverse and a spread of incomes, which can make the city difficult to characterise, although there are high levels of inequality between different areas of the city (BM2).

All of the country's multi-family apartment buildings supplied by district heating are in Skopje, which is run by a private company. Despite being more efficient than fuelwood and electricity, the district heating system is characterised by high energy losses and deterioration due to low water quality, as well as a lack of consumption-based billing (Turai et al., 2021).

With regards to housing characteristics, the city is dominated by panel block apartments, many of which were constructed following the earthquake in 1963, which destroyed up to 80% of the city's buildings. Some families live in derelict buildings, where it is acknowledged that improving efficiency or providing renewable energy will not help their situation; total rehousing is needed in these cases[8]. Around 80% of people in Skopje are owner-occupiers, although private renting is increasing in the city (BM2).

[8] Information provided in Group Exercise on 9th February 2022.

*Figure 8 - Housing in Skopje (Source: Google Maps)*

Identified vulnerable groups are families with more than three children, particularly single-parent households, those with low economic activity such as people on precarious/short-term/no contracts, households who depend on a single salary particularly those who live in old buildings, and pensioners. Due to the issues with fuelwood and rubbish burning discussed in the above section, there is a correlation between areas of the highest air pollution and high-risk areas for energy poverty (BM2).

# Summary

A summary of the energy poverty situation in Skopje is provided in the following Table.

| Pilot | Factor | Summary of Energy Poverty Situation |
|---|---|---|
| Skopje | Access | Issues with disconnections are common, even after just one missed payment.<br>Not everyone connected to supply; reliance on fuelwood or rubbish burning for heat. |
| | Affordability | High energy bills particularly following market liberalisation, extremely high for electricity. |

| | | |
|---|---|---|
| | | Disconnection from expensive district heating by some apartments can lead to higher bills for the rest of the buildings, which leads to further disconnection rates. |
| | Flexibility | Energy supply is monopolised and under private ownership, no ability to switch or choose provider. Burning fuelwood and/or rubbish can help families control energy costs as it is burned when needed rather than paying to be connected to a constant supply. |
| | Energy Efficiency | Poor energy efficiency of buildings, despite the newer age of the housing stock following the 1963 earthquake.<br>District heating characterised by high energy losses and deterioration. |
| | Needs | Inadequate social welfare system means families do not get enough support, particularly with regards to energy. |
| | Practices | Lack of knowledge on energy poverty and how it affects households. Lack of support, subsidies or renovation access. |

Key challenges in Skopje with regards to tackling energy poverty were both 'informational' and 'institutional', with institutional challenges posing the most critical barriers to tackling energy poverty. Challenges were identified as follows:

- No national definition of energy poverty, a lack of data and government action on energy poverty leads to a lack of knowledge at multiple levels and a difficulty in identifying energy poor households.
- Communication and engagement with vulnerable groups can be challenging due to a lack of knowledge of the issue, and a lack of awareness by practitioners/social workers of how the issue affects those they work with.
- Energy company monopolies/inflexibilities, poor transparency and issues with the energy market.

# Spain

## National

Energy poverty in a Spanish context is defined by law as "a situation in which a home cannot satisfy its basic energy needs as a consequence of insufficient income, which may be aggravated by having an energy inefficient home" (Spanish Government, 2019). It also defines a vulnerable consumer as "a consumer of electrical or thermal energy that is in a situation of energy poverty, and is a beneficiary of support measures established by the government administration". According to the Spanish Asociacion de Ciencias Ambientales (ACA)'s 2018 report on Energy Poverty in Spain, around 6.8m people, or around 15% of the population, are calculated to be suffering inadequate temperatures in the home, arrears on utility bills, or both, while in 2016, around 16% of Spanish households reported the presence of leaks, damp or rot in their homes. Government figures from 2019 suggest around 17% of homes have a high share of energy expenditure in income and 10% with low absolute energy expenditure (Spanish Government, 2020). 25% of residents reported being unable to afford a sufficiently cool temperature in the home in the summer, an important issue which receives less attention than the ability to keep the home warm in the winter. Electricity prices steadily increased from 2008-2018 by 65%, with costs for electricity in Spain being the fourth highest in Europe including all taxes, and the highest before tax, although gas prices are comparatively low. A significant part of the final cost includes tolls such as for access to the network, transmission losses and rental of meters, which are passed on to the consumer in their energy bills (Tirado Herrero et al., 2018).

The ACA report also highlights significant regional inequality with regards to the incidence of energy poverty, with Castilla-La Mancha, Andalusia, Murcia and Valencia the most affected, despite having warmer climates than average. Analysis of households' socio-demographic characteristics also confirms patterns of vulnerability to energy poverty that are related to education level, employment status, country of origin, those with poor health and disabilities and those in receipt of social assistance. Incidence of energy poverty in 2016 was higher than in 2007 among the lowest income deciles, showing a deepening of inequality alongside a general increase in energy poverty levels. Two groups are particularly highlighted by Tirado Herrero et al.'s report; single mother households, for whom the incidence of arrears and

disconnections are double the Spanish average, and seniors, especially those living alone, due to the ageing population, and thus an increase in the size of this group in the coming decades. Other identified vulnerable groups are families with three or more children, and households where the main earner was born outside of Spain.

According to Spain's Member State Report, in 2019, Spain had a lower performance than the EU average on population-reported indicators, but better than average on expenditure-based indicators. The number of Spanish households unable to keep their homes warm increased between 2008-2014, largely due to the financial crisis, but has since decreased from its peak to 2018, although was still in 2016 the Member State where prices had increased the most since 2008. The tenure type with the largest number of households unable to keep their homes warm was the social housing sector, closely followed by private renters, with those living in apartments being most vulnerable to energy poverty. People living in apartments with more than ten floors are most vulnerable, regardless of indicator – perhaps due to this building type's prevalence in the most deprived areas, such as city suburbs, and which were built to accommodate high levels of immigration in the mid-20$^{th}$ century, with poor construction standards and energy efficiency qualities. Rural areas in Spain had the lowest ability to keep their homes adequately warm (EU, 2020).

There has been much activity, research and policy produced in Spain on the topic of energy poverty for the past decade, with many organisations, NGOs and advocacy groups active on the issue. A law identifying protection measures for vulnerable consumers was passed in 2016, another in 2017 establishing protections against supply disconnections. A national strategy 2019-2024 was approved by the Spanish government to reduce as a minimum, each of the four main energy poverty indicators by 25% by 2025, and to guarantee access to safe, affordable, sustainable and modern energy for all (EU, 2020). Measures implemented at a national level to address energy poverty include a social bonus for electricity, emergency financial support, building renovations, and there are also smaller scale regional and local initiatives, such as energy advice points.

However, critiques of the Spanish approach suggest that on the whole measures tend to be palliative; providing emergency financial aid to households, rather than addressing structural causes of energy poverty, such as building stock energy efficiency (BM6). The ban on energy

disconnection is limited to the most vulnerable groups, and on the condition that the social services assume at least 50% of the outstanding bill – which is in turn conditional on the existence of such a municipal fund or budget. The Spanish energy Ombudsman expressed that as a lack of electricity can lead to social exclusion, access to energy should be a right protected and supported by public authorities, a recommendation which has not been adopted by the Spanish state to date (Tirado Herrero et al., 2018).

# Pilot-Level: Valencia

Valencia is a city on the east coast of Spain inhabited by about 800,000 people, and is the country's third largest metropolitan area. Housing is typically characterised by 5-7 storey apartment blocks, with some family houses in the proposed pilot areas.

*Figure 9 - Housing in Valencia (Source: Google Maps)*

A case-study of energy poverty carried out in Valencia adds to the definition of energy poverty put forwards by the Spanish state, dividing the causes of energy poverty as internal to the home – low income, inefficiency, misinformation and so on – and external to the home caused by the energy market – high costs, insufficient subsidies, market complexities and so on (Municipality of Valencia, 2016). The municipality also reportedly tries to go beyond the requirements of the Spanish government, treating energy as a right, and working to remove stigma and other barriers to their services to improve engagement. with households (BM6, 2022). It is particularly noted the impact of high energy prices on energy poverty, something which is omitted from the national government definition.

The results of the Valencian study found that 32.7% of Valencians experienced feeling too cold and/or too hot at home, which affected their day-to-day lives negatively, 12.2% spend more than 10% of their income on energy bills, and 18.2% allocate more than twice the national median share of energy expenditure in income on their energy bills. Another 15% are deemed to be at risk of energy poverty – i.e. they would fall into energy poverty if energy costs increased or income decreased (Municipality of Valencia, 2016). As also identified at the national level, the inability to keep cool in the summer is a key issue in Valencia. Due to the warmer climate, the winters are relatively mild, and thus people tend to suffer more discomfort from the heat in the summer, rather than the cold in winter (BM6, 2022).

Due to the ongoing energy crisis which started in 2021 in Europe, energy prices have continued to increase, with an increasingly volatile energy market. In Valencia, it was frequently advised to those who struggled to pay their energy bills to use energy for washing clothes etc. off-peak to get a cheaper rate, but due to the crisis, circumstances are frequently changing (in Spain, many people have tariffs for energy which are variable depending on time of day). This is particularly confusing and disrupting, causing anxiety for those who relied on these cheaper rates to save money.

Four key strategies to tackle the issue in the city were identified by the case-study:
1. Intervention – including no disconnections, subsidies for renovation, encouraging self-consumption of renewables. In Valencia, there is an agreement with the largest energy company in the city, that they cannot disconnect electricity from a home without informing the

council first. If the household in question is vulnerable, then the council will assume the cost of their outstanding debt.

2. Training – including awareness raising, training for social workers and welfare staff on energy poverty. Frontline workers and social workers have recently (within the last ~2 years) started being trained to identify and work with people in energy poverty, and refer them to the appropriate services. A key beacon for this work has been the Energy Office in Valencia (Valencia Clima i Energia).

3. Network strengthening – including interdepartmental coordination, leadership in the Covenant of Mayors. As part of the Well-Based project, the municipality has started to work with healthcare providers and doctors to be able to identify and refer people who may be in energy poverty when they use a health service, and to be able to more effectively diagnose conditions that can be caused by being in energy poverty.

4. Measurements – including the creation of statistics and establishing a database of vulnerable households.

A fuel poverty map of Valencia was produced by Gomez-Navarro et al. (2021), based on the municipality-commissioned study, and is shown in Figure 1, demonstrating clear inequalities in levels of fuel poverty between the districts of the city.

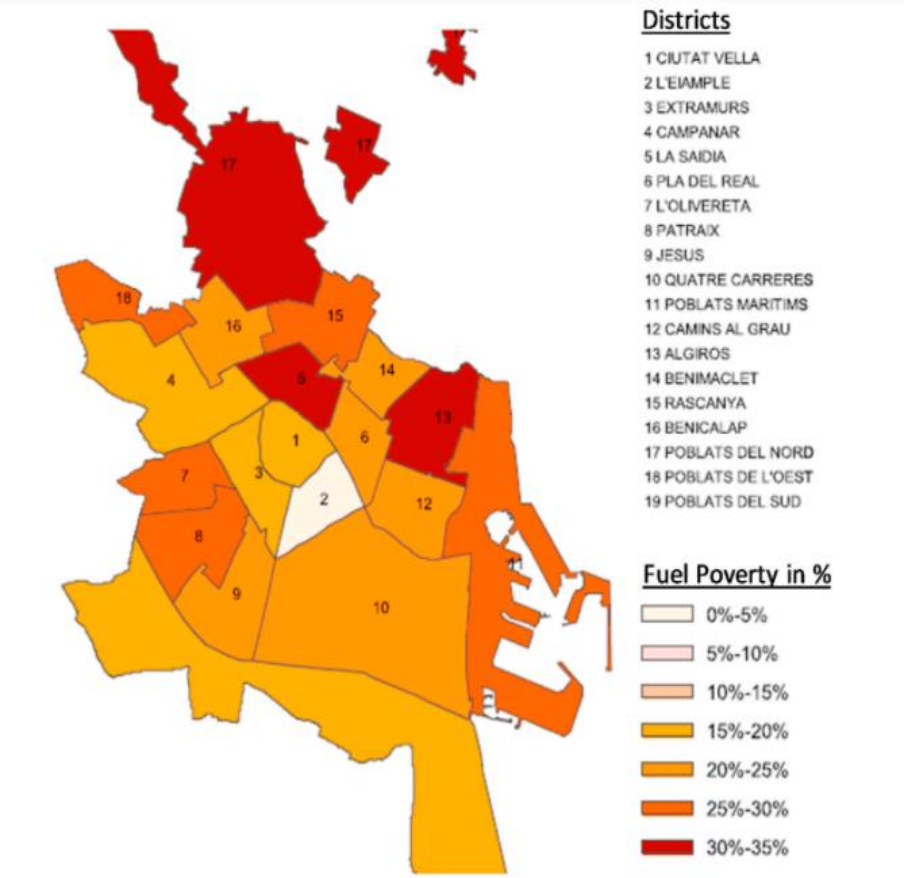


*Figure 10- Fuel Poverty Map of Valencia (Gomez-Navarro et al., 2021)*

The pilot project location was discussed in detail during the bilateral meeting with Las Naves. The project is likely to be carried out and implemented in three of the city's districts, each of which have different socio-demographic characteristics.

1. The first project is in the neighbourhood of Castellar-Oliveral, which is a medium-income area of the city, characterised by older housing, inhabited by older people and a number of households who struggle to pay their energy bills.

2. The second project is centred around a secondary school in Malvarrosa, a very deprived area of the city inhabited by many low income families, ethnic minorities, including traveller families, and socially excluded people. The majority of buildings are socially-owned, and are in a bad condition, with poor energy efficiency.

3. The third project is located in a cemetery which spans the Cabanyal, Campanar and Creu Coberta neighbourhoods, where solar panels will be installed on the graves to generate energy which can be used for vulnerable groups. As no-one lives there, there is no conflict on space and costs are lower.

The implementation details of these projects will be confirmed during the development of POWER UP's WP2, until August 2022.

# Summary

A summary of the energy poverty situation in Valencia is provided in the following Table.

| Pilot | Factor | Summary of Energy Poverty Situation |
|---|---|---|
| Valencia | Access | Access to energy is fairly universal<br>Disconnections only banned for the most vulnerable consumers |
| | Affordability | High cost of energy (1st in Europe for electricity prices before tax)<br>Added extras on energy bills |
| | Flexibility | Energy market is liberalised, there is technically the ability to switch and choose between providers, although choice can be limited. |
| | Energy Efficiency | Energy efficiency of buildings is relatively poor.<br>Winters are not so cold – challenge lies in summer with people unable to keep homes cool due to poor efficiency |
| | Needs | Energy poverty rates are disproportionately high among those with ill health and disabilities |
| | Practices | Misinformation on energy use and efficiency practices is common but being combatted by projects and programmes in the city.<br>Energy poverty aid is financial rather than structural; subsidies are insufficient. |

Key challenges in Valencia with regards to tackling energy poverty were primarily 'informational', and were identified as follows:

- Legal restrictions in setting up energy communities.
- Communication and engagement with vulnerable groups.
- No clear practical ways to ensure that vulnerable households directly benefit from local renewable energy production.
- Stigma around energy poverty and debt within vulnerable groups means people are reluctant to access services.
- Addressing the structural causes of energy poverty rather than implementing palliative measures, which is currently commonplace in Spain.

# Conclusions

As demonstrated by this research and analysis, the energy poverty situation between each pilot participating in the POWER UP project is highly variegated and context-specific, with many challenges and obstacles identified to tackling the issue. The continuing increases in energy costs across Europe were identified by all the pilots to be contributing to energy poverty, and increasing the number of households who will fall into the condition in 2022. Covid-19 is also likely to have worsened the extent and depth of energy poverty in each of the pilot locations, and indeed elsewhere in Europe.

The bilateral meetings revealed that a binary of discussing energy and poverty, rather than energy poverty, remains pervasive in policy at both national and municipal levels, although awareness of the issue of energy poverty is beginning to make inroads outside of academia, with practitioners and social workers in several pilots beginning to be educated on how to identify energy poor households.

As much research recommends, a structural approach to tackling energy poverty in addition to existing palliative measures are needed, alongside more research and data in several areas and regions. Training, information and awareness raising, as well as the empowerment of vulnerable consumers can all play a role in alleviating energy poverty, removing administrative barriers and improving communication between government, energy suppliers and end users.

This analysis underlines the different groups of people most likely to be affected by energy poverty in the pilot locations. This document provides a knowledge base from which the pilots can take account of vulnerable groups' specific needs when involving them in project activities, including the cocreation of interventions, developing local and affordable energy projects and implementing energy poverty mitigation measures.

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# Annexe:

## List of useful documents and links

COMACT project – Reports & Findings
Clean Energy for All Information and Legal Documents
Empowering Narratives in Energy Poverty Workshop (video)
EMPOWERMED project – Gender specific information
Energy Poverty Atlas (EPAH)
Energy Poverty Dashboard
ENPOR project – Stakeholder engagement strategy
EU Member State reports on energy poverty - 2019
Guide to energy poverty indicators
Guide to Participation in the Neighbourhood Approach (in Dutch)
Information on collective counselling and advice (in Spanish)
Innovate Project – Info on One Stop Shops
Learnings from the Barcelona Energy Advice Points project
NEON – National Energy Ombudsmen Network
Overview of energy poverty in the EU
Papillon Project
POWERPOOR project – Toolkit and Deliverable Materials
SCCALE 203050 project
SHARES project
SocialWatt project – reports and documents
UP-STAIRS project
WELLBASED project

www.socialenergyplayer.eu

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This project has received funding from the European Union's Horizon 2020 research and innovation program under Grant agreement No. 101033940