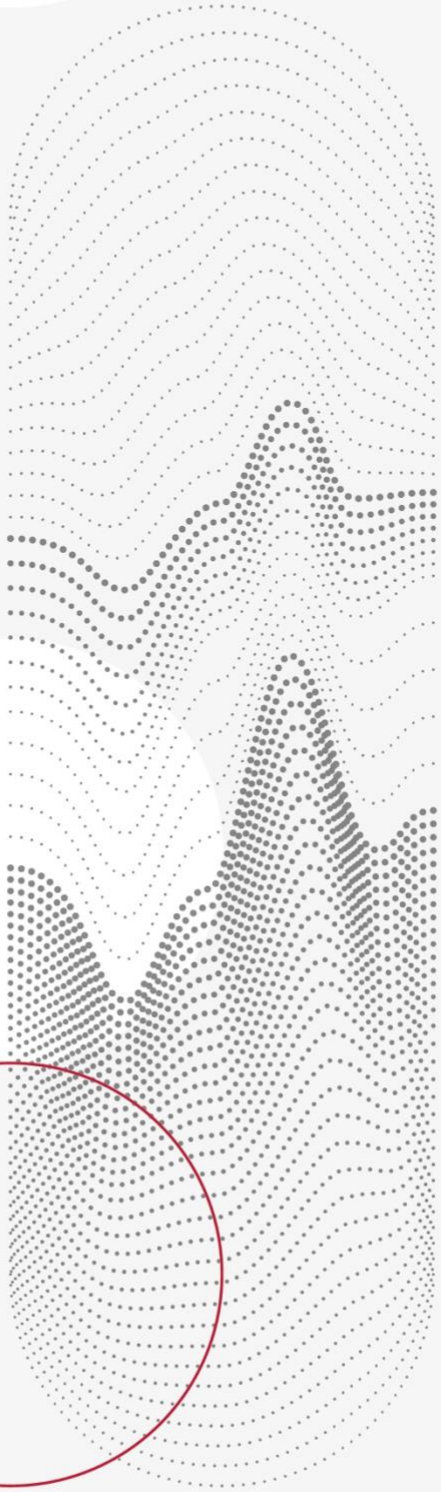
instytut badań strukturalnych

IBS RESEARCH REPORT 01/2023

March 2023

Energy poverty among women in Poland



Joanna Mazurkiewicz
Aleksandra Prusak
Jakub Sokołowski
Jan Frankowski

IBS Research Report 01/2023

March 2023

Energy poverty among women in Poland[•]

Joanna Mazurkiewicz[♦]

Aleksandra Prusak[♥]

Jakub Sokołowski[♠]

Jan Frankowski[♣]

Abstract

Women who independently manage households constitute a social group particularly vulnerable to energy poverty. In Poland, over 12% of female-led households face this challenge. This vulnerability stems from several factors, including low income levels associated with gender pay and pension gaps. Additionally, the increased risk of energy poverty is shaped by specific energy needs and traditional household roles often assigned to women, such as caregiving for children and elderly family members. Addressing energy poverty requires targeted measures to improve housing conditions. Key strategies include (1) pre-financing thermal modernization investments for low-income households, (2) supporting local governments in constructing and modernizing public housing, and (3) developing alternative housing solutions for individuals experiencing poverty crises.

Keywords: energy poverty, housing conditions, social inequality

JEL: D10, I14, I32, R29

• This report was funded by the European Climate Foundation. The contents of this publication express the views of the authors and do not necessarily represent the position of the Institute for Structural Research. The usual disclaimers apply. All errors are our own.

♦ Institute for Structural Research, e-mail: joanna.mazurkiewicz@ibs.org.pl

♥ Institute for Structural Research, e-mail: aleksandra.prusak@ibs.org.pl

♠ Institute for Structural Research; University of Warsaw, email: jakub.sokolowski@ibs.org.pl

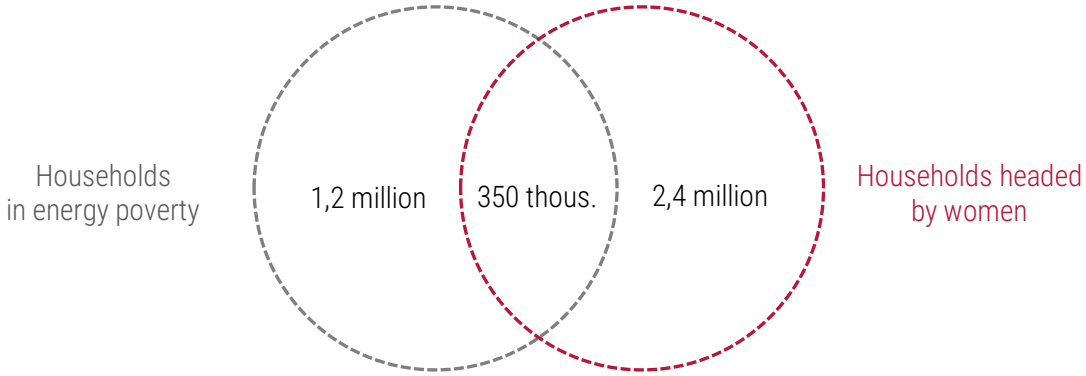
♣ Institute for Structural Research, e-mail: jan.frankowski@ibs.org.pl

Table of contents

1. Introduction

Every fifth household in Poland is headed by a woman, meaning that nearly 3 million households consist of a single woman living alone or a mother raising children independently (Statistics Poland, 2021). Among these households, 12% (i.e., 350 thousand) face the problem of energy poverty, and this report focuses on this group (Figure 1).

Figure 1. The scale of female energy poverty in Poland



Source: Own elaboration based on Household Budget Survey 2021 (Statistics Poland, 2022)

Energy poverty is a situation in which households cannot provide adequate heating in their home or apartment and access to electricity to power appliances. This problem arises from the overlap of three factors: (1) low income, (2) high energy expenditures, and (3) poor technical condition of the building. The risk of energy poverty is higher in specific energy needs and requirements (e.g., related to household members' age or health condition). In 2021, energy poverty affected 1.5 million (12%) of all households in Poland. Nearly one in four of these households (23%) was led by a single woman living alone or a single mother.

Energy poverty lowers the quality of life and increases the risk of health issues due to living in underheated and damp spaces. It is also associated with prolonged stress and deteriorating mental health. The consequences of energy poverty may include social withdrawal and exclusion. Reducing the scale of this phenomenon is essential for improving housing conditions and air quality by modernizing heating systems and replacing outdated stoves.

In research on energy poverty in Poland, the issue of this phenomenon among women has not been sufficiently explored. Public attention and discussions primarily focus on the scale and prevalence of energy poverty without differentiating the situations of individual household members. However, findings from recent studies (Feenstra and Özerol, 2021; Grossmann et al., 2021; Heredia at al., 2022; Middlemiss, 2022) indicate that experiences of energy poverty differ for each family member. Incorporating a gender perspective allows for capturing the specific circumstances of both women and men and recognizing inequalities in experiencing energy poverty. These disparities may stem from factors such as household roles, areas of decision-making, thermal comfort needs, responses to crises, or coping mechanisms, including access to social capital resources. Understanding these inequalities can help design public policy instruments to reduce the phenomenon's scale and mitigate its impact more effectively. A fundamental assumption is that individuals in an energy poverty crisis cannot escape it alone. Systemic reduction of this issue can only occur through collaboration with institutions that provide or facilitate household access to energy services and assist in improving housing conditions.

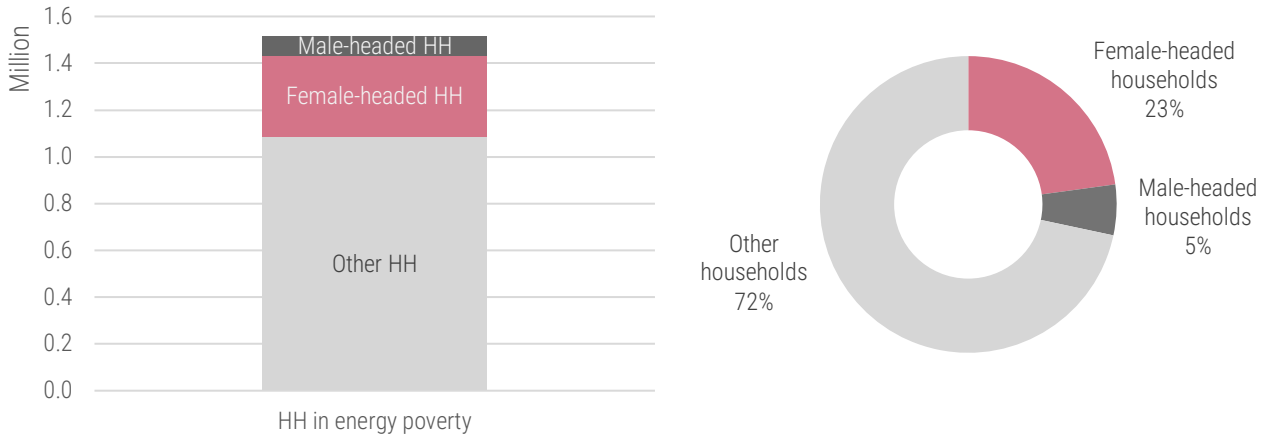
This report describes the scale and severity of energy poverty experienced by women managing households independently. It is based on data collected from the Household Budget Survey (Statistics Poland, 2021). These data have been supplemented with insights from interviews with women experiencing energy poverty conducted by the Institute for Structural Research as part of an energy poverty study in 2020, as well as existing literature on this subject.

This report consists of five sections. Section 2 presents a statistical overview of energy poverty in households headed by women. Section 3 analyses the severity of the problem based on qualitative research findings. Section 4 is dedicated to the coping strategies adopted by women facing energy poverty. In Section 5, we present conclusions and recommendations.

2. Energy poverty among women in statistical data

In 2021, 1.5 million families in Poland were affected by energy poverty. Difficulties in adequately heating homes, paying bills on time, managing household budgets, and health deterioration caused by living in overly cold and damp spaces are some of the problems associated with experiencing energy poverty. Among all households affected by energy poverty, those led by single women living alone or single mothers accounted for 23%, representing 350,000 households (Figure 2). At the same time, households headed by men living alone accounted for 6% (over 80,000) of households in the energy poverty crisis.

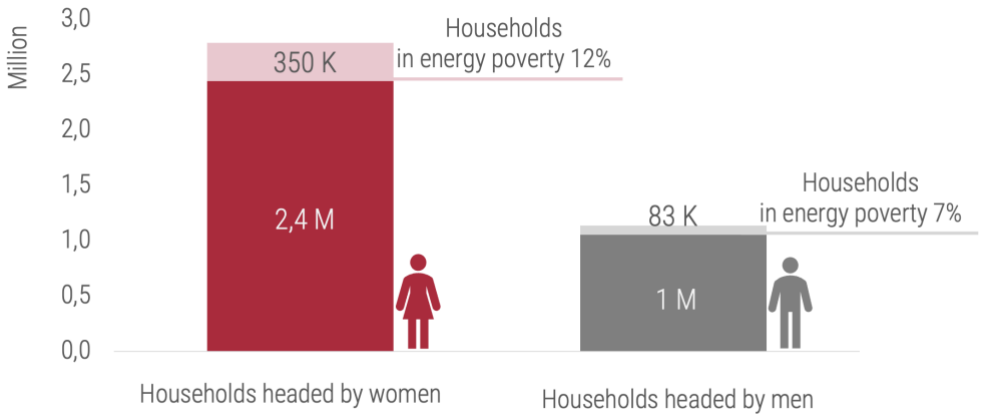
Figure 2. Structure of households in fuel poverty by gender



Source: Own elaboration based on Household Budget Survey 2021 (Statistics Poland, 2022)

Energy poverty more frequently affects households headed by women than those headed by men. In 2021, in Poland, 12% of all households independently managed by women were energy-poor. In comparison, energy poverty affected 7% of households headed by men (Figure 3).

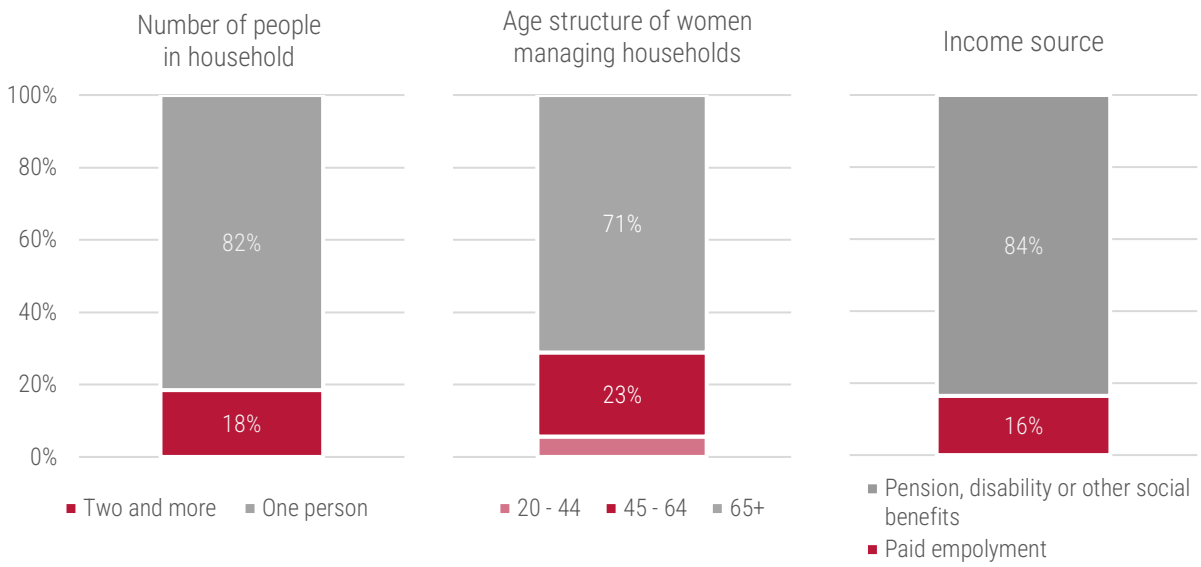
Figure 3. Households facing energy poverty



Source: Own elaboration based on Household Budget Survey 2021 (Statistics Poland, 2022)

Women experiencing energy poverty are predominantly older individuals living alone. Over 80% of women-led households affected by energy poverty are single-person households (Figure 4). More than 70% of women experiencing poverty in independently managed households are over the age of 65. The age structure of women in energy poverty is also reflected in their primary sources of income. For 84% of women in energy poverty, the primary source of income is a pension, disability benefit, or other social benefits. The remaining 16% of women sustain themselves through paid employment.

Figure 4. Characteristics of women-headed energy-poor households

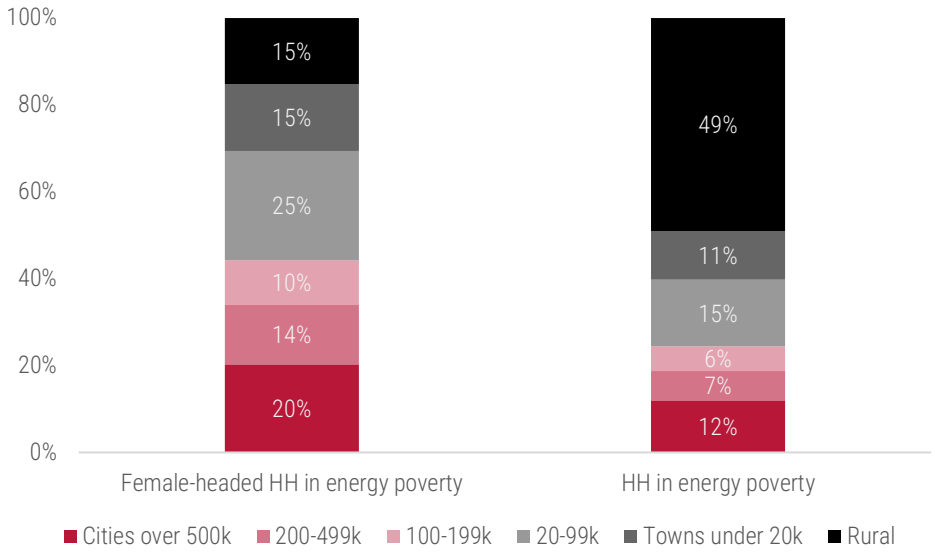


Source: Own elaboration based on Household Budget Survey 2021 (Statistics Poland, 2022)

Low-income households, including those relying on non-wage sources of income, are particularly vulnerable to the risk of energy poverty. In Poland, the higher risk of this phenomenon among women compared to men is influenced by several factors, including:

- **The gender pay gap** which results from a range of factors, such as differences in salaries for women and men working in similar positions, women being more likely to work in lower-paying professions, the frequent performance of unpaid caregiving work by women, lower wage expectations, as well as greater aversion to risk and negotiation (Magda, 2020; Magda and Sałach, 2021; Birgi et al., 2021);
- **The structure of the pension system** which differentiates the statutory retirement age for women and men, resulting in a shorter period for women to accumulate pension capital (pension contributions and individual savings). Additionally, the amount of the pension is affected by employment breaks related to maternity leave and childcare responsibilities (Magda et al., 2019);
- **Demographic factors**: In Poland, women live on average 8 years longer than men (Statistics Poland, 2022), which impacts the pension benefits amount. Longer life expectancy also means that older women are more likely to live alone and manage their households independently.

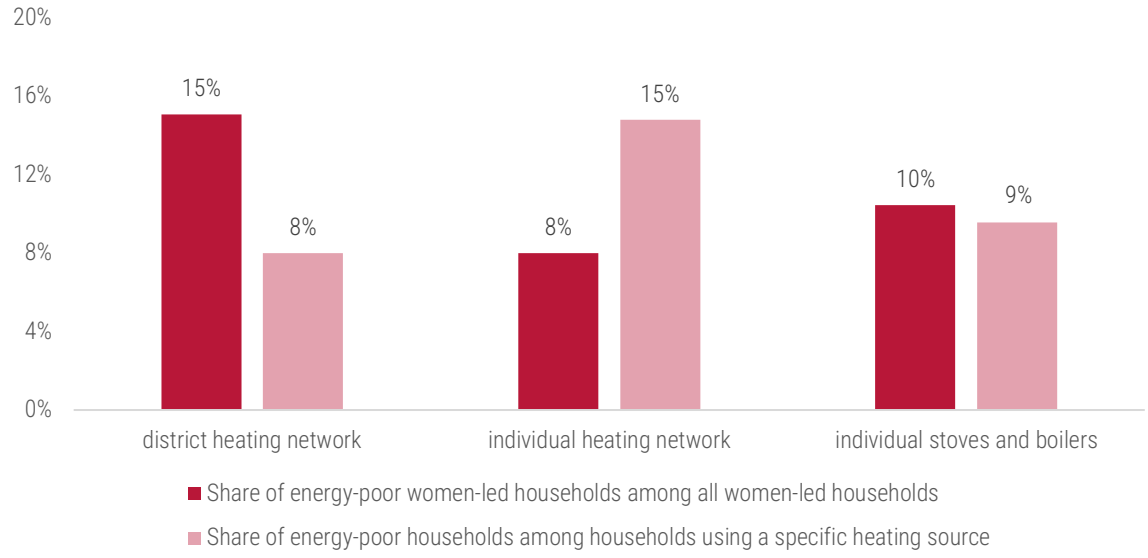
Figure 5. Energy-poor households by the place of residence



Source: Own elaboration based on Household Budget Survey 2021 (Statistics Poland, 2022)

Women experiencing energy poverty are more likely to live in urban areas than the average energy-poor households. Over two-thirds of women-led households in energy poverty are located in cities with populations exceeding 20,000 (Figure 5). The urban location influences the structure of heating sources used in these households, with district heating systems being the most common source. At the same time, energy-poor women-led households were slightly more likely to use solid fuel stoves and other individual heating sources (Figure 6).

Figure 6. Heating sources in energy-poor households



Source: Own elaboration based on Household Budget Survey 2021 (Statistics Poland, 2022)

3. The severity of energy poverty in women-led households

Statistical data do not fully capture the severity or consequences of energy poverty. The criteria for monitoring energy poverty in public statistics cover only specific dimensions of this phenomenon. As a challenge for public policy, energy poverty is primarily discussed through the lens of indicators and trends within the population rather than the daily experiences of individuals facing this issue. Those experiencing energy poverty do not form a homogeneous group, which means that statistical data only partially explain the severity of energy poverty. Moreover, quantitative data fail to reflect the extent of the problem, including the health consequences of living in a cold home, the burdensome tasks related to ensuring warmth, individual energy needs, or social roles and the associated time spent at home. There is also evidence suggesting that women perceive energy poverty as a more acute issue, and due to systemic factors, they are and will continue to be more vulnerable to this problem.

Women prefer higher indoor temperatures than men and are more sensitive to thermal discomfort (cold and heat) than men. The thermal comfort assessment is subjective and depends on various factors, with gender being one, though not the only, influencing category. Women perceive the quality of the indoor environment—measured by factors such as air quality, thermal comfort, and lighting—differently from men, which is linked to physiological characteristics (Haselsteiner, 2021; Sintov et al., 2019; Eon et al., 2017; Karjalainen, 2007). Energy needs also change with age. The highest demand for warmth is observed among young children and older adults. Additionally, people with disabilities and chronic illnesses may have specific energy needs, including spending more time at home or using medical and rehabilitation equipment, which results in higher energy consumption and demand (Birgi et al., 2021). The above means that thermal comfort and the quality of indoor environments are evaluated differently by women and men and are further influenced by factors such as age and health status. As a result, energy poverty is particularly severe among older individuals, who constitute the majority of women experiencing energy poverty in Poland.

Properly heating a home is particularly burdensome for individuals relying on coal or wood-burning stoves. Using such stoves requires additional labour and physical effort, including purchasing, storing, and regularly

replenishing fuel, which is particularly challenging for older adults. The lack of access to affordable heating and the need to economize leads energy-poor individuals to use outdated stoves and portable electric heaters. Additionally, energy-poor households are less likely to conduct technical inspections of stoves and ventilation systems due to the costs of repairs or attempt to handle these tasks on their own (Sokołowski and Frankowski, 2021). In the case of electric heating, the technical condition and inadequacy of electrical installations often cause network overloads and increase the risk of fire. Therefore, replacing stoves and enabling connection to a district heating network is a way to reduce the burdensome tasks associated with heating (Frankowski and Herrero, 2021).

The severity of energy poverty is closely linked to the amount of time spent in a cold home. Since women are more likely than men to take on caregiving roles, they tend to spend more time in poorly heated spaces and are, therefore, more exposed to health risks associated with energy poverty. These factors increase the likelihood of developing respiratory, musculoskeletal, and circulatory diseases and exacerbating chronic illnesses (Sokołowski et al., 2023). Energy poverty also impacts mental health. Experiencing energy poverty is associated with heightened stress caused by the need to pay high energy bills or the accumulation of debts difficult to repay (Longhurst and Hargreaves, 2019). Furthermore, limited social interactions resulting from reluctance to invite family or friends to one's home due to poor living conditions can harm mental health (Grossmann and Trubina, 2021). Studies also indicate that emotions such as fear, embarrassment, and stigma often accompany decisions to seek social assistance, which can make it more challenging to access support (Grossmann et al., 2021).

Such experiences are reflected in the accounts of women experiencing energy poverty, presented here as case studies. The Institute for Structural Research developed this simplified method of presenting qualitative research findings as part of the 2020 energy poverty study. The cases represent the most common challenges faced by women in energy poverty. The descriptions have been crafted to illustrate the typical situations of women struggling to live in cold homes. Each story focuses on a different aspect of experiencing energy poverty. The objective is to highlight the complexity of this issue, its typical causes and consequences. Each case describes the family, income, and housing situation. Attention is also given to the actions taken by individuals in energy poverty crises and their coping mechanisms under challenging circumstances. The stories also identify barriers that hinder the ability to escape poverty. Each description is enriched with quotes from interviews conducted during the qualitative research. The purpose of presenting research findings in this way is to highlight the complexity and severity of energy poverty among women. Analysing the presented cases can be instrumental in developing tools and initiatives to support women in achieving lasting improvements in their housing conditions. The findings also underline the need for systemic actions to reduce the prevalence of energy poverty among women in Poland.

Janina, a single pensioner living in a single-family building in a large city

Janina is a disabled pensioner who has suffered a stroke. As a result of her illness, she has mobility limitations. After the death of her husband and the relocation of her grown children, Janina now lives alone in a house she built years ago with her husband. The family lived together for over 30 years, but now all the responsibilities of maintaining the home rest solely on the older woman.

The house is constructed from brick blocks, and many elements require renovation. The main issues include the lack of insulation and damage to the roof and gutters. These defects cause room dampness and mould, leading to further damage. Due to her financial situation, Janina struggles not only to pay bills on time but also to carry out minor repairs and purchase essential equipment for the house.

> *(…) My husband did the electrical work because he was an electrician. When he passed away, dying, he did not pass on any secrets to me, so when I have problems, I ask for help. Usually, a neighbour helps me. Regarding the distribution box, I have the plugs described on the cards: which ones are responsible for what, so I can also fix them myself.*
>
> *(...) I put polystyrene foam in the attic and did not put a single layer. For financial reasons, I laid one along the length and one along the width; in other words, I covered the gaps that formed between the polystyrene. However, this is only thanks to the neighbours. The men said, 'maybe I would do it that way, that is better'. Now I have made myself half woman and half man - no job scares me. Because I know I am mostly on my own. If the boys [sons] are not here, cannot come, I am alone or with the neighbours. So I try to help myself as much as I can.*

Despite her challenging situation, she is very resourceful. Having spent many years working for her local community, including serving as a neighbourhood and district councillor, Janina has built a vast network of acquaintances. As a result, although she runs the household alone, she does not feel isolated and can count on support from many people in her community. She frequently asks neighbours, family, and friends for help, and they are happy to assist her in difficult situations (e.g., by finding information for her online, helping replace essential home equipment, or donating extra clothing). Thanks to this support, she has replaced some appliances with energy-efficient ones, installed a new boiler, stockpiled firewood, and regularly refilled her gas cylinder. With her cousin's help, she also replaced a coal-heated furnace with an oil-fired boiler. However, she heats the house using a wood stove and only uses the oil boiler during extreme cold. She tries to heat the house sparingly, avoiding heating rooms she rarely uses.

Reducing expenses and energy consumption are not her only strategies. She constantly seeks new ways to improve her living and financial situation. Whenever possible, she buys energy-efficient devices and eagerly looks for information on new solutions she can implement in her home and potential subsidies for these initiatives. Janina also takes advantage of benefits available to her due to her health condition and financial difficulties. She actively seeks information on using her existing equipment more effectively and explores various forms of additional support.

> *(...) I like to observe, and I know that if there is a big layer of ash on the grates, even if [the fire] is only smouldering, it will smoulder longer and keep my stove warm longer. I'm learning all the time.*
> *(...) Now, I am also trying to find out if I could benefit from the EU programmes that are in place here. I have asked for information about the 'Clean Air' programme, and someone has to explain how it works because I am 'green' in this regard. However, if taking advantage of something is possible, why shouldn't I?*

Anna, a mother of two daughters living in a house in a small town

Anna is a middle-aged woman who is divorced and raising two daughters alone. She is a seamstress by profession but currently works in a store due to the lack of job opportunities in her field. Her earnings are minimal. She manages all responsibilities by herself, supporting her household and children with a modest salary, child support, and the government's 500+ benefits. Although she would like to take on additional work, finding extra employment in her small town is difficult, as the area, once reliant on the textile industry, has been severely impacted by economic transformations.

> *(...) Electricity is very expensive, fuel is very expensive, salaries are very low, and it all goes in circles. (...) Who wouldn't want to live differently? We used to live here, in central Poland, in this very town, at a really decent level. Fifteen years ago. There was industry here, and there was money. Nobody worried about not being able to pay for electricity. (...) This is just patching up bills. You pay one, and other hangs over you waiting to be paid. So, you're chasing bills just to make ends meet.*

About seven years ago, her apartment was roughly adapted for family use. The building previously served as a commercial property with a workshop. It is old, made of brick, uninsulated, and regularly suffers damage to the walls and roof, making it very difficult to heat. Despite her efforts to maintain the building, Anna faces ongoing repair challenges, primarily caused by dampness, which adds to her expenses.

The apartment is heated by an eco-pea coal furnace, but Anna uses additionally an electric heater to warm the most frequently used spaces during the coldest days. She wishes her home could be connected to the gas network. Still, she is aware that such a change would increase her utility bills and require additional installation costs—an investment she cannot afford.

The household's biggest challenge is maintaining financial stability due to the ever-increasing energy cost. Despite receiving some social benefits, the family struggles with financial difficulties. As a result, paying all essential bills on time is sometimes impossible.

Anna has had negative experiences with social assistance. When seeking help from a social welfare centre in the past, she felt humiliated and unheard, and her efforts yielded little tangible support. Since then, she has been reluctant to seek assistance, fearing being dismissed or judged by officials, neighbours and acquaintances. Despite her difficult financial and life circumstances, Anna takes excellent care of her home and tries to live as frugally as possible. She also teaches her daughters how to save energy.

Maria, an older pensioner caring for an adult son with a disability

Maria and her adult son, Łukasz, have been living in their home in a small town for over 40 years. Łukasz has a disability, so Maria devotes much of her time and money to his care. Maria herself also faces health challenges. After several strokes, she has vision problems and is not fully physically able.

The health issues of both Maria and Łukasz significantly affect the family's financial situation. Maria is a disability pensioner and the care allowance she receives for looking after her son is very low, insufficient to cover his medical expenses and the family's daily needs. Maria struggles to pay all the bills. She prioritizes paying the electricity bill and handles others only when she has the means.

(...) I pay one bill on time, another one late, and somehow, I manage. Right now, my phone is blocked because I didn't pay. I pay for one thing, but not for another. (...) First, I pay for electricity because that's the most important. Then for coal. And gas, so there's something to heat or cook with.

Their house, built by Maria's parents more than 50 years ago, is in inferior condition. The walls are only partially insulated, the roof leaks, the chimney is cracked, and the heating is inefficient. Heating the entire large house is nearly impossible. Additionally, the building was recently affected by a fire. Maria and her son are still dealing with the aftermath, repainting and cleaning rooms and trying to repair the damage independently. However, they must extend the renovations for longer, as they cannot afford to pay for all the work, materials, and new household equipment. They continue to live in harsh conditions. For some time after the fire, in the middle of winter, the house had no heating. Now, they rely on two outdated and inefficient coal stoves.

(...) Last year, we sat in -3 degrees here in the house. Because it happened in January. And the entire January was a particularly freezing month. (...) We sat in coats, hats, and covered ourselves with blankets so we wouldn't breathe in the cold air. It wasn't until February that I bought that furnace – a second-hand one, because, obviously, a new one would have cost 5-6 thousand.

Due to financial difficulties, Maria cannot afford essential services necessary for ensuring safety in the house, such as regular chimney inspections, which she postpones because they cost too much. To improve their financial situation, Maria sought additional benefits from the Social Welfare Center but was rejected because her income exceeded the eligibility threshold. As a result, managing the household budget is a constant challenge, with repairs, heating, and upkeep consuming increasing amounts of money.

Because of her age and numerous health problems, Maria dislikes the frequent need to carry coal. She wishes her home could be connected to the municipal heating network, mainly since it is located close to a housing cooperative. This solution would also enhance her sense of safety following the recent fire. However, installing central heating is financially out of reach for the family. Despite receiving invitations to information meetings about furnace replacement programs, Maria does not participate. She knows that despite her willingness, she cannot afford such an investment and cannot take advantage of the offers.

(...) Well, the water would be warm, of course. However much it used, it would stay warm all the time. And [in the apartment], it would always be warm, just like in apartment blocks. Because the radiators would be warm. But right now, we are cold.

4. Coping strategies used by women facing energy poverty

Women experiencing energy poverty take various actions to alleviate the burden of this issue. Limited ability to respond to rising costs through investments in building and system modernization to reduce energy consumption compels them to seek alternative ways to reduce expenses. Qualitative research has identified four primary strategies.

- First, **concerns about the cost of energy bills lead to very frugal energy use and shape energy consumption patterns**. Women experiencing energy poverty maintained lower temperatures in their homes and avoided heating less frequently used rooms while being careful with lighting use. If their financial situation allowed, they utilized energy-efficient appliances, tried to improve insulation in their homes, and applied other measures to enhance thermal comfort. They also organized daily activities, such as cooking or laundry, in ways that minimized energy costs (e.g., by leveraging different energy tariffs). Thus, poverty played a significant role in defining consumption patterns both in quantity and timing.
- Second, women in energy poverty often **forego professional services and undertake urgent household repairs themselves**. While these actions save money, they require other investments, such as time spent researching solutions and physical effort. Energy poverty imposes additional burdens, requiring time-consuming actions that reduce financial costs.
- Third, women experiencing energy poverty **relied on informal support networks**. They often turned to close family, friends, or neighbours for help. This support included assistance with obtaining fuel, making minor home repairs, and sharing information about available funding programs. Financial assistance to cover energy bills was also part of this informal support, though its scale is difficult to quantify.
- Fourth, women in energy poverty **sought institutional support through social assistance programs**. This strategy supported them in the most challenging situations but was often insufficient due to the formal access requirements. Moreover, using institutional aid was associated with negative emotions such as shame or embarrassment and depended on the trust these persons placed in the institutions.

5. Summary and conclusions

The analysis of the severity of energy poverty among vulnerable social groups faces several challenges due to the complexity of the issue and the lack of disaggregated statistical data. Quantitative studies in Poland used to assess the scale of energy poverty do not fully capture the severity of the problem experienced by individuals within households. This report focused on women managing households independently. Recognizing the limitations of quantitative data, we illustrated the seriousness of the phenomenon through in-depth interviews with women facing energy poverty. In Poland, this group primarily comprises older women living alone.

During this study, it was essential to understand the multidimensional nature of energy poverty. The challenges associated with the inability to maintain adequate warmth at home intertwine with the broader consequences of poverty, such as deteriorating physical health and emotional well-being. These challenges also carry further negative social impacts for individuals struggling with poverty crises.

Numerous factors influence the severity of energy poverty among women and serve as a lens highlighting broader forms of discrimination in other areas of life. The primary cause of energy poverty among women lies in the consequences of the gender pay gap, including lower income levels during employment and the resulting lower pension benefits. Additional factors increasing women's exposure to risks associated with energy poverty include more significant energy needs and the caregiving roles they often fulfil within households.

Reducing the scale of energy poverty requires action across multiple fronts. Solutions to decrease the prevalence and severity of energy poverty should address its root causes while supporting those directly affected. Key investment-oriented measures include:

- Full pre-financing of investments in building insulation, replacement of heating sources, and modernization of energy installations within existing thermal modernization programs would enable low-income individuals to access these investments and increase the effectiveness of these programs in reducing energy poverty.
- Income-based eligibility criteria for short-term assistance programs to alleviate the effects of changes in energy markets could ensure that aid is prioritized for those in the most challenging circumstances.
- Investments in the construction of social housing and the modernization and energy efficiency improvements of existing housing stock are needed. This policy requires increased financial resources for local governments and the inclusion of social criteria in planning the modernization of public housing buildings (Frankowski et al., 2022);
- Development of alternative housing solutions for individuals in energy poverty crises, such as offering accommodations within community housing systems (co-housing). A pilot project of this type is being conducted by the City of Rybnik, targeting women in energy poverty who are facing difficulties in independently maintaining their homes.

Achieving lasting improvements in the situation of women in energy poverty also requires comprehensive efforts to eliminate forms of discrimination in the labour market, which extend beyond the scope of this report.

Social support networks play a crucial role in the strategies we identified for coping with difficulties in meeting energy needs. These include informal networks, such as connections with family, friends, neighbours, or other social groups, and formal institutions to assist individuals in energy poverty crises. In the case of institutional support, it is essential to increase funding for social assistance workers, whose responsibilities increasingly involve comprehensive assistance, including energy use counselling and improving the technical condition of buildings. Additionally, connections and access to assistance are essential in formal and informal support networks. Equally significant is the level of trust, shaped by experiences with receiving support.

To better understand the situation of women in energy poverty, including those managing households jointly with others, in-depth research is needed to reflect inequalities related to social roles. Such research should consider factors such as health status, dependents, and time spent on caregiving tasks as factors shaping the energy needs of households. Incorporating non-financial aspects of household functioning into the energy needs assessment would enable better targeting of assistance to individuals experiencing energy poverty crises.

References

Birgi, O.G., Fuhrmann, A., Habersbrunner, K., Stock, A., 2021. Energy poverty and gender – Facts and arguments, EmpowerMed.

Eon, C., Morrison, G.M., Byrne, J., 2017. Unraveling everyday heating practices in residential homes. Energy Procedia, Improving Residential Energy Efficiency International Conference, IREE 2017 121, 198–205.

Feenstra, M., Özerol, G., 2021. Energy justice as a searchlight for gender-energy nexus: Towards a conceptual framework. Renewable and Sustainable Energy Reviews 138, 110668.

Frankowski, J., Herrero, S.T., 2021. "What is in it for me?" A people-centered account of household energy transition co-benefits in Poland. Energy Research & Social Science 71, 101787.

Frankowski, J., Sokołowski, J., Mazurkiewicz, J., 2022. How to ensure a just approach to retrofitting social housing? IBS Policy Paper 02/2022, https://ibs.org.pl/en/publications/how-to-ensure-a-just-approach-to-retrofitting-social-housing/.

Grossmann, K., Jiglau, G., Dubois, U., Sinea, A., Martín-Consuegra, F., Dereniowska, M., Franke, R., Guyet, R., Horta, A., Katman, F., Papamikrouli, L., Castaño-Rosa, R., Sandmann, L., Stojilovska, A., Varo, A., 2021. The critical role of trust in experiencing and coping with energy poverty: Evidence from across Europe. Energy Research & Social Science 76, 102064.

Grossmann, K., Trubina, E., 2021. How the Concept of Dignity Is Relevant to the Study of Energy Poverty and Energy Justice. Frontiers in Sustainable Cities 3.

GUS, 2022. Life expectancy tables of Poland 2021. [WWW Document]. stat.gov.pl. URL https://stat.gov.pl/en/topics/population/life-expectancy/life-expectancy-tables-of-poland-2021,2,15.html.

Haselsteiner, E., 2021. Gender Matters! Thermal Comfort and Individual Perception of Indoor Environmental Quality: A Literature Review. In: Andreucci, M.B., Marvuglia, A., Baltov, M., Hansen, P. (Eds.), Rethinking Sustainability Towards a Regenerative Economy, Future City. Springer International Publishing, Cham, pp. 169–200.

Heredia, M.G., Sánchez, C.S.-G., Peiró, M.N., Fernández, A.S., López-Bueno, J.A., Muñoz, G.G., 2022. Mainstreaming a gender perspective into the study of energy poverty in the city of Madrid. Energy for Sustainable Development 70, 290–300.

Karjalainen, S., 2007. Gender differences in thermal comfort and use of thermostats in everyday thermal environments. Building and Environment 42, 1594–1603.

Longhurst, N., Hargreaves, T., 2019. Emotions and fuel poverty: The lived experience of social housing tenants in the United Kingdom. Energy Research & Social Science 56, 101207.

Magda, I., 2020. Increasing female labour force participation in Poland. IBS Policy Paper 01/2020, https://ibs.org.pl/en/publications/increasing-female-labour-force-participation-in-poland/.

Magda, I., Lewandowski, P., Sawulski, J., 2019. Will the Polish pension system go bankrupt? IBS Policy Paper 02/2019, https://ibs.org.pl/en/publications/will-the-polish-pension-system-go-bankrupt/.

Magda, I., Sałach, K., 2021. Gender pay gaps in domestic and foreign-owned firms. Empir Econ 61, 2237–2263.

Middlemiss, L., 2022. Who is vulnerable to energy poverty in the Global North, and what is their experience? WIREs Energy and Environment 11, e455.

Sintov, N.D., White, L.V., Walpole, H., 2019. Thermostat wars? The roles of gender and thermal comfort negotiations in household energy use behavior. PLOS ONE 14.

Sokołowski, J., Frankowski, J., 2021. How to improve the quality of life of the energy poor? IBS Policy Paper 01/2021, https://ibs.org.pl/en/publications/how-to-improve-the-quality-of-life-of-th-energy-poor/.

Sokołowski, J., Frankowski, J., Lewandowski, P., 2023. Energy poverty, housing conditions, and self-assessed health: evidence from Poland. Housing Studies 1–30.

www.ibs.org.pl