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At the Intersection of Housing, Energy, and Mobility Poverty: Trapped in Social Exclusion

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Abstract: The individual debates on housing poverty, energy poverty, and mobility poverty for the most part overlook the interwoven nature of all three cost burdens, especially for low-income households. This study examines how the three cost factors interact on a household level, the consequences for those affected by cost burdens, and how they cope and negotiate their expenses. Our research comprises two sets of semi-structured interviews, one before and one during the energy crisis, to gain insight into household experiences and constraints. We found that the freedom to choose where and how to live largely determines how households heat their homes and organize their mobility. The housing crisis together with housing market mechanisms appears to be the main driver of this cost trap; and from here, a complex interplay of causal factors unfolds. Location, often conceived of in terms of an urban–rural divide, seems to be of secondary importance. The intersection of cost burdens results in stress, anxiety, and social exclusion, further limiting the capacity for coping.

Keywords: affordable housing; energy poverty; mobility poverty; social exclusion; cost burden



Citation: Großmann, K.; Oettel, H.; Sandmann, L. At the Intersection of Housing, Energy, and Mobility Poverty: Trapped in Social Exclusion. *Energies* **2024**, *17*, 1925. <https://doi.org/10.3390/en17081925>

Academic Editor: Brian D. Fath

Received: 24 March 2024

Revised: 12 April 2024

Accepted: 13 April 2024

Published: 18 April 2024



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1. Introduction

The housing affordability crisis is an existential threat for many across Europe [1]. Energy prices have risen sharply for a number of reasons, including the Russian war against Ukraine [2], and fuel prices have been rising for years, as have prices for individual and public transport [3,4]. These expenses are directly related to a household's residential location. Meanwhile, the average household income has not grown in line with the cost of living increase, forcing low-income households in particular to negotiate and make trade-offs between essential goods, affecting not only energy and mobility expenditure, but also food, health, education, and leisure activities [5–8].

In what are at present largely separate debates, scholars point to the overburdening of households with costs for housing, energy, and mobility. Affordable housing and the housing crisis are a longstanding research strand, while energy poverty has been discussed since the early 1990s in the UK and Ireland. More recently, a dynamic European and global debate has developed. Research on mobility poverty and affordable mobility has again largely developed separately from research on energy and housing affordability, with pioneering work having been published in the 2000s and 2010s [9–12].

In these debates, the causes and effects of each dimension of poverty are examined in isolation. However, for a household, the cost burdens associated with the three areas of expenditure interact. The location of a dwelling essentially determines the cost of housing, the dwelling's energy efficiency standard and the heating system used, as well as daily mobility needs and the available modes of transport. There is a long-standing need for integrated analysis of the interrelationship between housing, energy, and mobility costs, the combined effects of cost burdens, their causes, the effects experienced by households, and their coping capacities.

Very little research exists that explores these interdependencies, and when it does exist, it tends to focus on two of the three dimensions. Housing is fundamentally intertwined with energy, but this link is barely addressed in energy poverty research [13,14]. Debates on housing affordability have sidelined energy costs for too long, only recently discovering that energy costs are part of housing unaffordability [5,15]. There is limited work on the “housing, energy and mobility nexus”, but this is mostly from a transition or low-carbon perspective [16–19]. The combination of energy affordability and mobility has recently been taken into account under the banner of “double energy poverty,” but these contributions are limited and mostly relate to the French context, with some references to the UK (overview in [20]). More details are provided in Section 2.4.

This paper aims to address the combined affordability issues in the housing–energy–mobility nexus, the true cost of a residential location, and its consequences for the individual. Through qualitative interviews, 24 conducted prior to the energy crisis and 31 conducted in autumn and winter of 2022–2023, we will show how households from different social and demographic groups manage their expenditures; how their expenditures are embedded in housing markets and energy and transport systems; and the impact of overlapping cost burdens.

The following sections first summarize the state of research on the impact of housing poverty, energy poverty, and mobility poverty, as well as the integrated perspectives on at least two of these three cost factors. After making transparent the data and methods used in the study, the results section will highlight the household impact of interacting cost burdens. It will show how tight housing markets create cost traps in different directions and how, for those experiencing the most severe deprivation, social exclusion is a consequence of the inability to maintain social networks, of shame and of self-restrictive coping strategies, exacerbated by high energy costs during the energy crisis. The conclusion discusses these findings in light of the literature review.

2. Literature Review: The Household Effects of Unaffordable Housing, Energy Deprivation and Mobility Poverty

2.1. Housing Affordability in Crisis

Europe is in the midst of an accelerating housing crisis. Neoliberal housing policies, urban redevelopment strategies, and investment speculation are making inner cities unaffordable and forcing those who cannot absorb skyrocketing market prices out to the city’s edge [21,22]. Housing is not only a necessity, it has also become the greatest monthly expense for households. Between 2010 and 2022, rents in the EU increased by 18% on average, with house prices increasing by 47% [23]. Given the importance of housing, a significant number of people find themselves at risk of marginalization and stigmatization, jeopardizing their socio-economic integration. From critical housing studies to the European institutions, there is broad consensus that housing is a prerequisite for security, and that it shapes relationships and affects social status, health, and life chances [24].

To capture these trends, the keywords “*housing poverty*” and “*housing precarity*” are used to describe a situation where individuals and households experience financial overburdening, stress, and risk (e.g., [25,26]). Housing poverty refers to poverty that results from housing cost burdens, as demonstrated by the research of Stephens and van Steen in the UK and the Netherlands [25]. Today, housing poverty in Europe is on the rise amid a “polycrisis” that includes the lasting effects of the 2008 financial crisis, the COVID-19 pandemic, the war in Ukraine, and the associated energy and inflation crises (e.g., [27]). Across the EU, household debt and “after-housing-cost poverty”, i.e., insufficient funds once housing costs are paid, have increased [21,28]. According to Clair et al. an estimated 15 million EU households experience severe housing precarity, including groups that are typically considered part of the middle class [29] (p. 25). This statement is based on quantitative indicators.

Some households are forced to move or are displaced, while others remain “trapped”, being displaced from their lifestyles or needing to navigate cost burdens by making trade-

offs with other important expenditures [30], ([31] p. 306), ([32] p. 3). Those who are unable to absorb sharp housing price increases find themselves in a state of powerlessness, devoid of alternatives and choices, and without the vital social capital on which they rely for temporary work, help and care [33,34]. Those who live in cities often have no choice but to move to peripheral areas that lack services and that can have poor transport accessibility and high rates of unemployment. This trend also affects smaller cities as more and more households move further away from urban centers in search of affordable housing. Kordell and Naumann even speak of a rural housing crisis where housing precarity may increase due to rising pressure from touristification, real estate speculation, and from middle classes enjoying the freedom of a home office [35].

Long-term housing unaffordability can be a significant source of stress [36–39]. There are distinct correlations between housing and health which have been studied extensively, and *“the connections between poor housing and poor health are unquestioned in housing studies”* [40] (p. 635). Several studies have established links between poor housing quality and negative physical health effects [41], whilst Baker et al. found that the lack of *“affordability [...] affects mental rather than physical health”* inducing financial stress, emotional strains, and existential fears in the face of threats such as eviction and homelessness [42]. They further highlight that individuals who reported pre-existing mental health issues prior to their experience of rental overburdening are more likely to suffer more severely from exacerbated mental health issues [42].

2.2. Energy Poverty

Energy poverty is widely understood as the inability of an individual or household to access energy services in the home, such as heating, cooling, or electrical appliances in order to maintain basic quality of life and wellbeing in line with the social expectations of modern societies [43]. Prior to the energy price crisis, the Energy Poverty Observatory (EPOV, www.energypoverty.eu (accessed on 30 July 2021)) estimated that 50 million European citizens were affected by energy poverty [44]. Common ways to measure this include cost burdens and self-reported difficulty in paying for heating and other bills, as seen in the EU SILC surveys [45]. In academic and policy debates, it is common to hold that energy poverty arises from three main causes: low incomes, high energy prices, and the low energy efficiency of buildings and appliances [46,47]. Some authors, however, argue that the causes are much more complex and that they are intertwined with other societal domains such as the economy, transport, and housing, and that these links have yet to be explored more fully [48–50]. With a focus on the lived experience of energy poverty, Middlemiss and Middlemiss et al. emphasize that energy poverty derives from a complex interplay of personal life circumstances such as material deprivation, age, and disability, as well as structural factors including infrastructure provision, societal expectations, political climate, and power relations [51,52]. Other scholars also highlight power relations (e.g., [53]) as well as structural housing inequalities (e.g., [54]).

Regarding consequences for individuals and households, energy poverty research usually emphasizes physiological and psychological consequences such as respiratory and cardiovascular diseases and depression, even winter mortality. Additionally, patterns of stigmatization, marginalization, and social isolation can be induced by immobility and feelings of shame [55–57]. Confiding in someone and asking for help can provoke feelings of utter dependence, and may be perceived as a loss of dignity and self-determination [58,59]. Surprisingly, *“social relations inside and outside of energy poor households have had minimal attention”* [52], and very few studies on energy poverty address social isolation and exclusion in depth.

2.3. Mobility Poverty

Mobility is considered a merit good with secondary benefits that include access to services, goods, activities, places, and people. Transport (or mobility) poverty—a variety of terms is used here to address household difficulties and mobility burdens, see

Lucas et al. [9]—therefore exacerbates disadvantages such as limited job opportunities and access to housing [9]. Transport poverty is the product of overlapping factors that include inadequate infrastructure, high fare costs, little or no access to a car or public transport, and lack of information. This intersects with other forms of social disadvantage such as unemployment, health issues, low income, and poor housing [11]. Some understandings of transport poverty focus on overspending on transport as a dimension of mobility poverty that *“occurs when a household is forced to consume more travel costs than it can reasonably afford, especially costs relating to motor car ownership and usage”* [60]. *“Forced car ownership”* is a term signaling that owning a private car is forced upon the household by a lack of alternatives. Such households spend more than they can afford on mobility [9,61,62].

Such financial stress demands trade-offs: overspending on mobility can lead to cut-backs in other areas such as food, energy, and leisure [7,63]. Alternatively, overspending on mobility can result in restricted mobility which in turn limits participation in social and political life [64]. Social exclusion is seen as a severe consequence stemming from under-spending on transport. Research suggests that restricting transport use is often the first measure people resort to since other needs, such as those pertaining to housing, nutrition and health, are more essential and urgent [8]. This may involve rationing spending on gas or avoiding trips altogether, which impedes job opportunities, education, leisure, and social life alike, making social exclusion a considerable threat that results from mobility poverty [64–66].

Those most affected are people with low incomes, the unemployed, single parents and large families, disabled individuals, and the elderly. Additionally, children, adolescents, women, students, and ethnic minorities are considered high-risk groups (e.g., [62,65,66]). One of the fringe groups in research on mobility poverty and mobility-induced social exclusion is those who are *“work-rich but time-poor”* [66] (p. 179). Individuals in this group have middle to high incomes and own a private vehicle. However, they experience time poverty due to inadequate transport connections and complex daily activities.

Daubitz conducted a noteworthy qualitative study on the consequences of mobility poverty in Germany. The study revealed that interviewees experienced feelings of isolation, resignation and (self-) exclusion as the main consequences of suppressing mobility [67]. Over time, some individuals even developed mental restrictions: as mobility needs and desires could no longer be articulated, they seemed unable to think beyond their daily struggle [67]. Mattioli and Colleoni report on internal mental-cognitive barriers, such as *“limited travel horizons, reluctance to travel and reduced expectations”*, [66] (p. 174) even when the means for transport are available.

2.4. Linking Debates: Intersection of Housing, Energy, or Mobility Costs

As mentioned previously, to the best of our knowledge, no attempts have been made to integrate housing, energy, and mobility into one perspective. However, a number of studies have combined two of the three factors. In the following section, we will provide some insight into these links.

2.4.1. Energy and Housing Costs in the Energy Poverty Debate

In research on energy transition and energy poverty, the connection to affordable housing is blind in one eye. Rather than embracing the complexity of affordable housing issues and energy poverty, the focus is solely on the impact that housing quality has on energy poverty. For the past 30 years, policymakers and scholars have both generally viewed retrofitting (or *“weatherization”* in the US context) as a measure to fight energy poverty. From Brenda Boardman’s seminal book [46] to recent EU policy, it is assumed that a decrease in the energy demands of dwellings would lead to decreasing energy costs for households. Therefore, energy efficiency programs are created to provide social and ecological benefits. While this may be true in some contexts (e.g., [68–70]) and may hold particularly true in model projects where retrofitting costs are covered by state programs, there is increasing doubt that this win-win effect is automatic. Firstly, improvements to

energy efficiency may displace low-income residents, both directly and indirectly [71,72]. Secondly, investments in the building envelope can increase housing costs [54,73], which is referred to as a “price premium” in housing economy studies [74]. From a household perspective, energy efficiency measures can improve housing conditions, as often reported in the UK and Northern Irish context [70], but they can also threaten to increase housing costs and lower housing security [28,54].

Regarding cost trade-offs, the energy poverty debate rightly highlights the tragic phenomenon of “heat or eat” choices [75], and Martiskainen et al. extend the concern to “eating, heating or taking the bus” [76]. However, trade-offs with housing costs have not yet received sufficient attention. One exception is Burlinson et al., who demonstrate the ways that households experiencing both housing-induced poverty and energy poverty differ from non-housing poor households, for instance, in terms of tenure [13]. In England, housing-poor households tend to cluster in private rental housing, a finding also supported by Papantonis et al. [77]. Burlinson et al. further found that households experiencing housing poverty “are less active in the labor market and tend to be of non-white ethnicity, relative to the fuel-cost-induced-poverty group” [13] (p. 18). They conclude that “spending the required amount of income on energy pushes those households who find themselves in the income-poverty group and housing-cost-induced-poverty group *deeper into poverty*” [13] (p. 18). With recent funding under Horizon Europe for research in the field of housing and energy, it is expected that more work will be done on the intersection of housing and energy affordability.

In these contributions to debates regarding either energy poverty as such or energy poverty as it relates to the quality of dwellings, the causes of housing poverty—of why income-poor households tend to live in low-quality housing—remain out of sight. They may be anticipated as a given, but they are not included in analytical thinking and remain absent from policy debates. The false optimism that energy efficiency renovations will end energy poverty is an expression of this.

2.4.2. Transport and Housing

The link between mobility and housing is extensive as both share a distinctive spatial component and are closely interconnected. In the US context especially, the keyword *location affordability* is used to research the interplay of costs, suggesting that housing affordability should not be considered in isolation, but should also take into account transport costs. This suggests that the true cost of living in a specific location includes not only housing expenses, but also the transport costs required to access essential services, job opportunities, and other amenities. According to Hartell, households can offset housing costs by choosing a location that might increase transport costs [78]. However, Coulombel and Winke demonstrate that this is not the case for the lowest income groups [22,79]. The primary focus of this debate is the ways that households attempt to balance costs and make financial trade-offs. The interrelations between housing and transport costs for households are made visible [79,80].

2.4.3. Energy and Transport

Existing studies on overlapping (domestic) energy poverty and transport poverty are a research field that is still emerging. France has received most of the attention, with some initial international contributions [8,20,79]. The existing studies mainly focus on a quantitative spatial exploration of the overlap between both forms of deprivation or poverty, respectively. Rural (and to some extent peri-urban) municipalities are the most likely to accumulate both forms of energy poverty.

Robinson and Mattioli propose the term “double energy vulnerability” to describe households facing both energy and transport poverty [8]. The authors also demonstrate that rural and peri-urban municipalities are hotspots for double energy poverty. At the intersection of both forms of deprivation, individuals can become trapped in poverty with limited coping capacities [20]. Mattioli et al. demonstrate the overlap between forced car ownership and (domestic) energy poverty in Germany, France, and the UK. Some

households use cars despite being in severe poverty, burdened by both transport and energy costs. Those facing car-dependence in rural or peri-urban areas cannot avoid travel costs and may need to make cuts elsewhere, e.g., on heating [81]. Golubchikov and O’Sullivan refer to the locations where disadvantage accumulates as “energy peripheries” [82].

Ortar provides an interesting insight into household priorities based on a qualitative study. She found that when households are forced to make trade-offs between transport and domestic energy or heating, they often view transport as a fixed and necessary cost, particularly for sustaining income through travel to work [7]. Making changes to heating behavior appears to be the easier option, while relocation seems difficult [8]. The (self-) restriction of energy consumption seems to be a consequence of transport poverty under the condition of expensive central housing—at least for the UK and France.

In summary, integrated housing affordability can be represented as a triangle consisting of housing, energy, and transport costs or cost burdens. Existing studies on the sides of the triangle that connect two of the three components suggest clear cost interrelations: remote housing may be less expensive, but commuting is a costly trade-off. Less expensive housing often comes with high heating expenditures, and energy efficiency measures might lead to dis- or relocation. Households experiencing poverty need to make difficult choices, known as “heat or eat” in energy poverty research. Another such trade-off is keeping a cold home in order to be able to commute to work. With the following case studies, we can shed light on more of the interrelations at work.

3. Methods

Our research contains two sets of data due to the heavy influence of the energy crisis on the discussion of living costs. As a result, we conducted semi-structured interviews both before and amid the energy crisis to investigate the experiences and limitations of those affected, as well as the changes to their situations. Our goal is not to achieve representativeness, but rather to conduct an in-depth exploration [83]. Table A1 in the Appendix A presents an overview of the socio-demographic characteristics, specificities, and places of residence for all interviewees.

3.1. Pre-Energy Crisis Interviews

The first dataset is based on an exploratory study that consisted of 21 semi-structured interviews with low-income households conducted prior to the energy crisis in 2019. The study examines the financial burden on households, particularly for housing (whether it is a house or an apartment, owned, or rented), energy (electricity and heating), and mobility (car and/or public transport). The objective of this study was to comprehend the relationship between cost items and the impact of burdens on households. The interview guidelines were based on five thematic blocks:

- (1) The fixed monthly household costs for housing, energy, and mobility, and interviewees’ reflections on them.
- (2) Housing costs, their development, and how households manage them, including their decision-making process when choosing where to live.
- (3) Electricity and heating costs, their development, and their impact on the respondents.
- (4) Mobility costs, the accessibility of everyday destinations, and changes in personal mobility behavior.
- (5) Savings strategies, consequences, and solutions, including the respondents’ support networks.

We employed a purposive sample [84,85] to identify cost-burdened households, defined as those who perceived themselves to be excessively burdened by one of the three cost factors at the time of the survey. We used social media and existing contacts from previous and ongoing projects to gather a diverse group of people, taking into account their socio-demographic characteristics and areas of residence. The selection process was monitored to ensure variety in age, gender, household size, and geographical spread in Germany. However, it should be noted that the majority of households are urban and most

participants are female (see Table A1). The interviews were conducted between May 2019 and November 2019, in person in public spaces and at participants' homes, as well as by phone. Each interview lasted at least 50 min, and audio was recorded and transcribed for all.

The interviews were subjected to qualitative content analysis using a structured approach to coding and analysis that combined deductive and inductive steps [86]. This led us to identify three groups characterized by their scope for action, as this was the most striking dimension to emerge during the interpretation. The groups were: (1) those severely restricted, (2) those who were rather limited, and (3) those with a modest scope for action. Economic resources, social networks, and state of health emerged as influential for household situations during inductive analysis. The groups are fluid; although they may be stable at present, they are highly vulnerable to moments of crisis. This applies to almost all respondents, meaning that the scope for action is by no means guaranteed and can be further reduced depending on the situation.

3.2. Interviews Amid the Energy Crisis

The second dataset is based on another exploratory study composed of 30 semi-structured interviews with students ($n = 12$), single parents ($n = 9$), and pensioners ($n = 10$). The purpose of this study was to understand the experiences of energy-poor households in the midst of the energy crisis. All three groups are considered highly vulnerable during the energy crisis: while students often have no income of their own and are financially dependent on their parents or state support, single parents typically have only one household income while being responsible for multiple people. Pensioners often receive a limited pension and may experience health problems, with single pensioners being at greater risk. The study attempted to determine the primary concerns of the interviewees, how they were coping with the energy crisis, and the strategies they were developing [87]. We conducted a secondary analysis on this set of interviews with a focus on overlapping burdens regarding housing, energy, and transport burdens—or the fear of them. While this set of interviews provides key insights into perceptions and coping strategies, information on specific costs is missing in some areas; see also Table A1 in the Appendix A.

Again, the study employed a purposive sample to identify households vulnerable to rising costs. The households were approached based on a quota that aimed for similar proportions of students, single parents, and pensioners. Local organizations, print media, social media, and private contacts were used to reach those affected. Due to the location of the authors, the study was limited to the city of (anonymized), Germany. The interviews were conducted in November and December 2022 amid the energy crisis. They were conducted face-to-face at the university, in rooms provided by cooperating organizations, and via an online meeting tool. Depending on whether consent was given, the interviews were either recorded and transcribed or documented afterwards, and they later underwent qualitative content analysis.

4. Interlinkages between Housing, Energy, and Mobility Costs and Their Consequences from Household Perspectives

The complex interplay between a household's expenditures for housing, mobility, and energy was at the heart of our research interest and, as such, provided the main critical reference points for our analysis. In the following, we present our results organized in terms of three core themes: (1) the situation of households regarding their living conditions and related costs, (2) their coping strategies with regard to cost burdens, and (3) the resulting effects on their quality of life and their participation in social and cultural life. For orientation, interviewees from the first dataset are numbered P1–P22. The second dataset is numbered according to socio-demographic groups as ST1–ST12 (students), SP1–SP9 (single parents), and SE1–SE10 (seniors); see also the more detailed information in the Appendix A.

4.1. Household Living Conditions and Related Cost Burdens

The situation of households and their ability to respond to difficult situations is broadly determined by two main factors: individual health and, less surprisingly, income, both of which play a crucial role in differentiating the situations of our respondents. These factors shape the degrees of freedom of choice and self-determination that respondents have, affecting how and where they live, how they heat their homes, and how they move around the cities, towns, and areas in which they live.

Thus, **interviewees with a severely restricted scope for action** are seriously overburdened by the combined costs of housing, energy, and mobility. For example, interviewee P9, a single woman in her mid-50s, has a monthly income of EUR 815 (disability pension), of which 50% is spent on rent. Since public transport is not an option in her small town, she is dependent on a car, and she has limited her fuel costs to EUR 50 per month. To make ends meet, she makes dramatic savings on heating, electricity, and healthy food. She lives in near-total social isolation, except for her dogs. P18, roughly 50 in age, lives in a partially renovated house she inherited in a small rural town. While ownership keeps housing costs low, she has high energy costs due to the building's old material and its old heating system. As the job she was trained for no longer exists, she now has several mini jobs that pay little more than the basic state support. The lack of public transport means she needs to rely on her car.

The interviewees in this group are characterized by their inability to act in several dimensions: they report severe income restrictions with no tangible prospects for escaping the cycle of underqualification and unemployment. In addition, they are severely deprived of social networks, which means a lack of intimate friendships and family support, or the deliberate cutting of ties for personal reasons, as well as physical and mental health that is often impaired. The result is psychological distress and social exclusion. These households—mostly single-person homes in our first dataset—are also characterized by resignation: their resources are usually too limited to take action and improve the situation for the long term. Instead, respondents try to react the best as they can and get on with their lives.

Interviewees with a rather limited scope for action still face excessive expenses for one or more of the main costs related to their housing location and—depending on their living conditions—other factors such as daycare, medication, or an unexpected rise in living costs. At the same time, they experience a stalemate, a “lock-in” in their housing situation, which means that it is nearly impossible to alleviate one cost factor because of its interconnectedness with others. P1, for example, lives on state support but voluntarily pays extra for her centrally located flat because location and environment are very important to her. As such, she has very low mobility costs since she can go anywhere on her e-bike, which she was able to finance through a fundraising campaign. She has low energy costs thanks to selective heating, and she saves money on culture, food, and social contact. She is already in the red at the beginning of each month but is creative in finding solutions.

In contrast to interviewees in the first group, interviewees in this group have a more optimistic view of their lives and are not yet deprived of all their capabilities. In addition, their social networks seem to be somewhat more stable, and interviewees have a better understanding of their place and their worth in society. Some actively seek better jobs or higher education to improve their prospects, such as P4, a single mother in her late 30s who is studying again to improve her career and earning prospects. She has a part-time job to cover her fixed costs and saves on electricity, heating, and fuel costs because moving would mean a reduction in the quality of her accommodation; in any case, she is unlikely to find anything less expensive in a city where rents are constantly rising. This again points to the cost lock-in that households experience.

The third group, **interviewees with a modest scope for action**, has considerably higher income levels than the other interviewees do—yet still below the poverty line, defined in Germany as being below 60% of the national median income, depending on household composition. P3, a freelance musician in his late 30s, made a conscious decision to move in

with his partner in a city center flat to save on commuting costs. Although they now share their living costs, rent for the new flat is so high that monthly housing costs have remained the same for both of them and are slightly above their budget. Thanks to low mobility costs and the building's good energy balance, the couple's costs are still manageable. They pay attention to environmental sustainability when it comes to electricity suppliers, food and mobility, and they pay higher rates voluntarily. They now see difficulties ahead because they are expecting a child. With unpredictable income from freelancing, they have no way to build up reserves. They are part of a very good social network with a culture of mutual exchange.

The cost burdens of housing, energy, and transport are still high for this group, but they appear to be better equipped to deal with these challenges. These people have choices and have actively chosen their current housing situation, unlike respondents with less agency, who were often denied alternatives. They are also more socially integrated, which increases their life chances. They are aware of the fragility of their arrangements, which in some cases causes existential anxiety and emotional distress, and some interviewees, like the example above, are prepared to take risks with housing costs.

In the secondary analysis of the set of interviews conducted amid the energy crises in fall and winter 2022, most interviewees would fall into the third group as households with modest room for maneuvering, at least before the energy crises began. Some of the pensioners interviewed even had incomes slightly above the poverty line. Students can often rely on family networks in the event of unexpected cost increases, or share the risk with flatmates. Some have low housing costs because the buildings they live in are old and are not energy efficient. Fears of rising energy costs were prevalent here, and interviewees reported improvising conservation measures such as sharing hot water in the bath. Interestingly, one student lived in a dormitory and had a contract with a flat rate for energy, which led to a more stable and relaxed situation.

Mobility costs were less of an issue for the interviewees in this dataset because they lived in a larger city with access to public transport at hand. Students, single parents receiving benefits and pensioners all have access to reduced public transport costs through either special tickets (students) or reduced fares (benefit recipients and pensioners). In addition, housing and heating costs are covered for social assistance recipients regardless of changes to heating costs, as was the case for some single parents in the dataset (SP1, SP4, SP8, SP9). Nevertheless, these households were keen to reduce their consumption of electricity, which they pay for out of their limited budgets. Pensioners often have older tenancy agreements and have therefore generally been less affected by rising housing costs in the city. However, this also means that their housing situation needs to be stable to avoid rising costs and that moving is not an option. Many of the students and single parents had recently moved due to changing housing needs. Pensioners reported long-established savings strategies and felt more or less able to cope with the situation. However, the interpretation shows that not all may be fully aware of the potential consequences. SE9, an impoverished man in his 70s living in a detached house, provides a case where anger at government decisions overshadows potential cost burdens ahead. Others, including students and single parents, may be unaware that employing limited measures at a time of spiking energy costs may not prevent overburdening expenses. Strikingly, most respondents also referred to inflation and the associated rise in food costs, and they reported taking steps to limit these costs. This suggests that people react differently to cost increases that are felt in everyday life and recur, while energy cost increases remain hidden in annual utility bills.

Below, we highlight themes that emerged from both sets of interviews, namely, the ways that interviewees manage their cost burdens and what the consequences are.

4.2. Dealing with Cost Burdens and Financial Trade-Offs

The strategies that interviewees employ to cope with burdensome living costs broadly fall into two categories: increasing income, and reducing costs or minimizing expenses. Additionally, help from social networks is sought during times of acute crisis.

To increase income, individuals reported small everyday solutions such as donating blood (plasma) for compensation, selling newspapers, and providing dog-sitting and babysitting services. To reduce expenses, measures such as purchasing car tires that promise lower fuel consumption, unplugging electrical appliances, eating cold food instead of cooking, and cancelling insurance policies and subscriptions were taken—all in the hopes of improving their situation even slightly. This highlights the vulnerability of interviewees to moments of crisis.

It is worth noting that few strategies mentioned in this context have a lasting impact. To avoid feeling completely helpless, many interviewees take risks, such as accepting slightly higher rents or choosing housing with electric heating when no other options are available. This research aligns with studies on the psychology of poverty, which suggest that individuals living in poverty may have limited abilities to engage in complex decision-making processes regarding their life choices. As a result, they may make short-sighted and risk-averse decisions [88]. Therefore, alleviating burdensome life circumstances in the present becomes the priority, often at the expense of long-term goal-directed decisions. However, poverty is caused not only by material deprivation, but also by psychological stress. These factors perpetuate each other, creating a “feedback loop” (ibid.) that traps those affected in poverty and hinders them from developing long-term solutions to their problems.

In terms of minimizing costs, most interviewees are aware that housing costs are the most burdensome. Many would love to relocate to a different apartment in order to reduce their rent, but the lack of affordable housing and the ever rising rents prevent this. Statements like *“I’d have to find something first”* (P19) or *“Every time you move to a new vacant apartment you pay more rent”* (P13) and *“I didn’t really have an alternative, I had to take it [the flat]”* (P13) underline this. P22 illustrates the difficulty: rather than providing relief, moving is a threat linked to rising costs and/or a loss of quality and familiar surroundings. In the second set of interviews, a couple reports that they would like to move in together in order to save on expenses, but *“because the rents are so bad, so high, we just can’t find anything for months”* (SP7).

Since housing costs are considered non-negotiable, interviewees often resort to cutting expenses in other areas, even if housing is the main issue. Many people adopt a frugal lifestyle to save money, cutting their own hair, growing vegetables, buying discounted or cheaper products, and avoiding cultural activities and travel. The interviewees aim to minimize their household expenses to avoid going into debt, although many struggle to do so. One student even moved to a more modern building during the energy crisis to reduce energy costs, and they remain optimistic about the savings. All others are trapped in their current housing situation, trying to adapt to inflation and the energy cost explosion. A pensioner in SE10 regrets moving to an expensive new multi-generational apartment complex that is slightly beyond her means: *“But now I just think that if I’d known this beforehand, I probably wouldn’t have moved into this very expensive flat. Because now it’s completely unclear what’s still to come”* (SE10).

In terms of mobility, cost-saving options include cycling, reducing or avoiding trips, particularly by car or public transport, and making the most of a trip by combining multiple purposes when using a car. Car ownership is considered expensive, and despite the inconvenience of being somewhat remote, not having or using a car is a promising way to reduce permanent stress caused by financial worries. However, this option is only viable in areas with access to public transport. One single mother sold her car during the energy crisis and now limits her destinations to those accessible by public transport (SP8). People choose to *“take the 6 a.m. train instead of the 10 a.m. train because it costs EUR 50 less”* (P15). Some even *“save money by walking”*, despite the fact that *“it takes me longer and . . . I’d need new shoes more often or something”* (P6). Like P1, many consider biking to be the best option: *“I do everything by bike. I don’t need to pay any money”* (P1).

Some interviewees in the second dataset, from amid the energy crisis, adopted cost-saving strategies regarding transport. For instance, SE1, a woman in her 70s, began walking

instead of using public transport, even though she experienced an osteoarthritic flare-up in her knee. Some interviewees consider the interdependence of mobility costs and place of residence and give them careful consideration. In our sample, the weighing usually favors housing in inner city locations. For example, P3 moved to the inner city to reduce daily transport costs. Others choose to remain in the inner city or peri-urban areas because they believe that rents would not be significantly lower elsewhere and transport costs would be much higher.

Energy expenses are reduced through three main strategies. Firstly, minor interventions, such as setting up *“power strips here in my house, where things are plugged in, and in the evening before I go to rest, I switch them off, then I shut everything down”* (P17). A student in the second sample considered switching off the fridge in winter: *“I was really thinking about needing a fridge . . . in winter when it’s cold enough. . . . I have a balcony”* (ST3). Secondly, reducing heating expenses by simply not heating. As is well known from energy poverty research, people choose to live in the cold: *“I try not to turn on the heating for as long as possible. In October I try not to heat at all; in November only a little and keep it at 17°, dress very warmly, and when I’m sitting I put a hot-water bottle on my stomach so that I keep the heating costs as low as possible”* (P9). This leads in some cases to severe exposure to energy poverty and its social as well as health-related consequences. Thirdly, interviewees try to profit from bonus payments and inexpensive contracts by changing their energy provider each year.

It must be clarified that the strategies mentioned above do not come easily for those affected. Many of their comments were accompanied by statements such as *“only if it’s absolutely necessary”*, highlighting the limited resources they are already managing. Additional strategies involve making financial trade-offs with other daily expenses, such as food, healthcare, and social events. These trade-offs can lead to feelings of isolation and exclusion, which will be discussed in more detail.

All short-term solutions aim to alleviate immediate pressure, but fail to bring about structural change. Long-term solutions would instead offer hope for a better future in the long run. As one of the few interviewees who try to find such long-term solutions, P4, a young single mother with training in the care profession, made the brave decision to quit her job and begin a healthcare management study program. This will enable her to apply for more lucrative jobs in the future. The energy crisis, with the threat of skyrocketing prices, has led to structural considerations such as moving, selling one’s car, reducing appliance usage, and spending time in heated public places like libraries. Students may find it easier to make structural changes, while single parents and pensioners may find themselves trapped with costs they cannot reduce. Many report having reached the limit of their saving and resigning themselves. *“So (pause) saving in that respect is not possible for me. I live from the beginning of the month to the end, with all the money I have available”* (SP8).

4.3. Consequences of Interlinked Cost Burdens

Our interviews revealed two far-reaching consequences that result from the burden of interlinked housing, energy, and mobility costs. Firstly, financial and spatial restrictions largely exclude those affected from social participation. Secondly, psychological and physical health consequences are caused or facilitated by financial hardship and savings measures.

By far the most frequently mentioned consequence of a cost-burdened everyday life is exclusion from social and cultural activities. Interviewees reported that they can no longer afford expensive activities, that they need to cancel meetings with friends that involve expenses, and that they need to give up leisure activities and hobbies. *“As a result, participating in social life becomes impossible. If a friend suggests going for ice cream and I decline due to financial constraints, eventually they stop asking”* (P8). Many people affected by financial burdens experience relationship breakdowns. P8 further reports that she can now *“count her social contacts on one hand”* and that *“very few people understand when I say, ‘No, I can’t go with you, I can’t afford it right now’. Some contacts have also been broken off in this way”*. P13 also reports, *“You’re simply out of everything. You have nothing left, you can’t do anything right now,*

so you're out. And especially among intellectuals, you're out very quickly. And then you don't want to deal with them that much". During the interview, the interviewee says she responds to the situation by withdrawing from social interaction, stating, "You become shy towards people. And I don't feel like joining any clubs or answering any questions. . . . I do not feel like meeting new people at the moment". P22 mentions broken relationships with friends and family, the challenges of meeting new people without a budget, and the possibility of discrimination: "You get into a cycle like that. Then you're poor and then others—they're all better and stuff—'Look at the shoes he's wearing' and stuff, they're not new and stuff (mimicking tone of voice). And then, well, that's where it starts, it's a cycle . . . of bullying and low self-confidence" (P22).

The very same effect was observed amid the energy crisis in fall of 2022. Individuals who no longer have options for saving money tended to withdraw from social activities that have costs, leading to a gradual disconnection from their social networks. The ability to maintain social networks depends on the level of consumption involved in communication, meeting friends, and spending leisure time together. The first group in dataset one, whose scope for action is severely limited, had been arranging their daily lives outside of social circles for some time, while interviews conducted during the energy crisis show that an increase in cost burdens can destabilize once dependable practices and social networks. A pensioner reported being frightened by energy costs, causing her to cut back "on leisure activities, i.e., cinema, theatre, concerts (...) It's difficult for me, because I like being connected to culture, and it's also a personal contact that you can maintain, which is no longer there" (SE1). Similarly, a single mother reports that she can no longer participate in the social activities her friends enjoy, which she finds very sad when looking back over the past year or two. "I used to spend a lot of time with my friends, but now I have to take a step back. They don't have the same issues as me, and sometimes they struggle to understand why I have to cancel plans so often" (SP7).

Another dimension that is closely related to the lack of social and cultural participation is loneliness and a lack of interaction. P4, a single mother in her late 30s, expressed gratitude for being able to participate in the interview and for being allowed to share her thoughts. She also appreciated the opportunity to speak freely about her experiences. "As I am alone at home every night, nobody listens to me" (P4). However, inviting others over may not always be feasible. P10 mentioned in follow-up discussion of the recorded interview that his mother does not visit him because his apartment is too cold for her. Interviews with single mothers in the second interview set revealed similar effects. SP7 reports feeling depressed about not being able to participate in activities with her friends. "Then you sit on the couch. You see pictures and videos of friends eating out or partying. They just go out, have a good time and I sit at home and can't experience it" (SP7).

Reflecting on the three identified groups and their varied scopes for action and coping mechanisms, it appears that greater social inclusion corresponds to greater scope for action. However, all the households current situations are instable due to low incomes and high fixed costs, and are susceptible to moments of crisis.

Regarding physical and mental health consequences, some report negative physical effects, such as colds and increased severity of the symptoms of their diseases, due to low temperatures in the home. For those with pre-existing health conditions, the cost burden and the resulting austerity measures appear to have increased health consequences. Furthermore, health costs such as co-payments for medication (e.g., P9, P13) and purchases such as glasses, hearing aids, and shoe insoles (e.g., P13) are delayed as long as possible. For some, special tutoring for children with dyslexia cannot be attained due to the high cost (P4).

Another dimension is healthy food, which some of the interviewees cannot afford, with several reporting a weekly budget of around EUR 20. P9 reports buying "canned fruit, [because] it's sometimes cheaper than when I buy fresh fruit. . . . You're probably not eating a really healthy diet". Healthy activities such as sports and exercise are also restricted for many who would like to do "some real sport, so not just go for a walk, but do some real sport. I would actually really like to go to the gym and, not somehow build up my muscles, but also do cardiovascular training, all sorts of things. I'd just like to be able to do it permanently" (P9).

Aside from the consequences to physical health, the psychological burden for many of those affected also appears to be high. SP7, the single mother who withdrew from her friends' activities (see above), summarizes: *"It makes you really depressed"*. During the energy crises, fear has become a constant companion for those we interviewed. This holds especially true for single parents and some pensioners, while students often feel safer because of family support. SE1 provides an example where the energy crises shook up the once stable life of a pensioner. She stopped going out, has cut expenses and now says, *"Yes, I'm really scared of the next energy bills"* (SE1). A single mother describes the situation: *"Frightening. As I said, you're really scared about what will happen next. People are really, really scared. Prices are rising, rents are rising. We've already received an increase in the post. That was very frightening. And then you wonder where it's going to go from there. . . . And that really scares me"* (SP7).

Fear, anxiety, and insecurity were also issues in the first set of interviews. For instance, some interviewees who depend on state assistance report cuts, untimely or irregular payment, and long periods of assessment. Which can in turn be accompanied by cuts. Even additional money that is earned cannot be spent in good conscience due to the fear of adjustments to monthly benefits. Others do not receive state assistance, but are restricted by low household incomes. Both groups face the need to rethink every expense, have contingency plans in place for unplanned expenditures, and keep a close eye on their finances, which often causes great uncertainty, a state of constant (financial) worry, and permanent stress. P1, who receives state support, has started a part-time job and reports that *"it's a job with social insurance. Yes. That means that the office will FORE SURE deduct all my money at the beginning of June. That means in June I don't know how I'm going to live. Honestly. I don't know, I have no idea. I have no idea what that will be. Because the state funds will definitely come later. . . . So it's the uncertainty factor and that's what drives me crazy"*.

Furthermore, interviewees report restrictions on personal life decisions and diminished quality of life due to dependence on the authorities. P8 wanted a caregiver's license, which is *"normally financed by . . . the job center. I . . . made an application and it was rejected for the simple reason that the distance was 20 km. And they don't cover the travel costs. I then said: OK, I'll pay the travel costs . . . Six months, an exam, and then I'll have better prospects. No, it wasn't accepted"*. Experiences like that cause the interviewees to fall into despair and apathy.

5. Discussion, Conclusions, and Outlook

Using qualitative evidence from two sets of interviews with households who self-identified as having difficulties with their expenses for housing, energy, and mobility, we can see that these costs are interlinked and largely determined by the location and quality of housing. While some literature argues that there are trade-offs between these costs, particularly between housing and mobility costs, others see rising burdens for low-income households [79]. We found that households are often trapped in cost burdens. It appears to be impossible for those with low incomes to completely avoid the three cost traps. Even when they manage to save in one area, they face high costs in another.

Housing costs are typically the least negotiable expenses for households and therefore have significant impact on their overall expenditures and coping strategies. It is important to note that the famous phrases *"heat or eat"* [75] and *"eating, heating or taking the bus"* [76] fail to consider the crucial role of housing costs. Only one of the interviewees, a student, relocated during the energy crisis to save on energy costs. Others found themselves trapped with high housing costs and were unable to find less expensive solutions, with some facing rent increases. Some took the risk of choosing slightly more expensive housing prior to the crisis and now face problems as other cost factors increase, such as energy, mobility, and food, due to the latest inflation. Based on our interviews, it is instead *"dwell first, and then see whether anything is left for eating, heating, or taking the bus"*.

This highlights the need to expand the scope of the debates beyond the existing links described in the literature review. The extensive research on housing affordability should also consider other cost factors related to housing, such as energy and transport. Housing

affordability cannot be determined solely by the ratio between income and housing costs, whether they be rent or a mortgage. As Burlinson et al. [13] noted, housing is indeed “the elephant in the room” in energy, mobility, or double energy poverty research. Therefore, it is crucial to examine integrated housing-cost-related poverty issues. Further qualitative and quantitative research is necessary to better understand these interlinkages in both broader and more in-depth contexts.

While the individual poverty debates have their own narratives regarding the causes of poverty phenomena, taking an integrated view reveals a much greater complexity of factors. Energy poverty may result from low energy efficiency, which may in turn be rooted in housing market inequalities influenced by international trends such as financialization and neoliberalization of welfare policies. It is difficult to establish causal relationships and isolate factors. Looking at the results of the study, the housing crisis seems to be the main driver of cost traps. While housing costs rise steeply, incomes do not. Housing markets have a pivotal role in a redistribution mechanism favoring the already wealthy at the disadvantage of the poor, see also Smith and colleagues [89]. It prevents vulnerable households from finding alternatives and locks them into expensive housing conditions that increase energy and mobility demands. Low-income households are often forced to make a dangerous compromise between these factors, with limited choice due to market constraints, leaving them to acquiesce to their circumstances. Many households report having no alternative to their current living conditions. Due to the fundamental need for housing, they often accept expensive offers, leaving little room for costs such as mobility, energy, nutrition, recreation, and health.

An unexpected finding from this study is that—contrary to arguments that speak of an urban-rural divide—location itself is of secondary importance to the overall experience of cost burdens, at least from the perspective of vulnerable households, although these findings stand on rather shaky legs due to the few interviews from rural locations and clearly need further investigation. But so far, we found across all interviews, that each living location carries a specific risk factor along at least one of the cost dimensions evaluated. Urban areas often have high housing costs, but services are more accessible, which can reduce mobility costs. Lower housing costs in rural areas can be a cost trap when mobility is considered; public transport is often scarce, and car dependence can be a high risk factor for poverty. Energy deprivation can occur in both urban rental housing and privately owned housing in remote locations, contributing to an overall state of deprivation. This issue is not limited to specific areas.

Examining the financial trade-offs that households in housing-cost-related deprivation make, one can observe the ways that they deprive themselves of a minimum quality of living and a decent life. Cost burdens have detrimental effects on well-being and life quality, often leading to social stigmatization and exclusion. When it comes to saving money, the choices available to households are primarily related to expenses that are within their daily control, such as healthy food, energy required for maintaining healthy living conditions, and leisure activities. Over time, the burden of costs can lead to social isolation and exclusion. While all poverty debates do consider this, particularly in mobility poverty, our interviews suggest that social integration is actually at the heart of the cost triangle. Fixed monthly costs may not lead to hunger or misery, but they can result in social exclusion in various forms. In a context where social contact depends on material resources for comfort, mobility, and leisure consumption, people may end up removing these items from their expenses. Social exclusion occurs more quickly and severely when resources are limited, whether that be income, health, or networks. This is particularly important because our two samples suggest that permeability works only one way for the three groups described: with all three cost factors increasing over time, it is more likely for people to fall deeper into deprivation than to escape it. While students may be a different case, single parents struggle to escape deprivation and isolation, and pensioners see little room for maneuver aside from saving or taking on mini-jobs in old age.

Finally, debates on housing poverty, energy poverty, and mobility poverty may benefit from being linked to general poverty studies to better understand coping and “irrational strategies”. Households in poverty often adopt short-term strategies that can exacerbate deprivation instead of addressing structural issues [88]. Understanding solutions can be just as complex as understanding the causal relations that evoke them.

Author Contributions: Conceptualization, methodology, research and formal analysis, writing: K.G., H.O. and L.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. Data are unavailable due to privacy or ethical restrictions.

Acknowledgments: We wish to thank Robert Franke, who supported the conduction of interviews, as well as Isabella Rath, who helped with the formal layout.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Overview of the socio-demographic characteristics (sex, age, household composition) and place of residence for each participant.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
Interviews before energy crisis (2020)				
P1 *	F	57	City	Single-person household; lives in a central location and voluntarily pays more for this; has few mobility costs due to the one-time purchase of an e-bike financed by donations; low energy costs due to economical consumption and selective heating; receives unemployment benefits and has occasional mini-jobs. Saves on culture, going out with friends, food; reduces social contact.
P2	M	38	Rural	Five-person household, patchwork family; lives in a detached house in a rural area and made a conscious decision to keep the house after separation to avoid rental costs, but has renovation costs; depends on a car due to rural location; low energy costs due to savings measures and renovation, is well-informed; has changed jobs to have higher income and be able to cope with costs, now works offshore and is away from home/family for longer; has two rented houses of his own as additional security.
P3	M	37	City	Soon to be a three-person household, family; deliberately chose a central location, which exceeds budget in consideration of increasing mobility costs; low mobility costs, relies on car for professional reasons, otherwise uses bicycle or walks; uses green electricity, has ecological lifestyle overall; self-employed musician, only earns as much as necessary, only one household income due to partner’s current pregnancy, financial reserves barely possible. Has a very good social network with mutual support and exchange culture.
P4 *	F	38	Small town	Two-person household, single mother; lives within walking distance of everyday destinations, has already moved to reduce costs, another move can only be an absolute emergency solution; dependent on a car, has reduced costs to EUR 30 per month, does without an additional public transport ticket; saves on electricity and heating, benefits from the flat being nearly new; in dual study program to increase her future income, has an additional part-time job. Has experienced social decline after divorce and single parenthood, lacks private social contacts and confidants, restricts herself in all areas of life (culture, leisure, etc.).
P5	F	26	Small town	Single-person household; lives in a rented house that belongs to her father, bears rental costs alone (requiring half of her income) after separation, has additional renovation costs; uses an old car, very low costs except for fuel, could do without it if necessary; heats bathroom and living room continuously, the rest moderately, sees herself as a thrifty consumer; works full-time. Has a social network, does not need to consider money when going out.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
P6 *	F	27	Small town	Four-person household, family; evicted for owner's personal use, had to find a flat quickly and take what they could get, now living in less space with additional child, need to move again but not possible due to finances and market conditions; partner commutes by car after changing jobs, therefore mobility expenses are high, otherwise they walk or ride second-hand bicycles; very high energy costs due to night storage heaters and electrical water heating; works part-time, which almost completely goes to high childcare costs, partner works full-time. Saves on clothes, leisure activities, goes without holidays, has a social network.
P8 *	F	54	Small town	Single-person household; lives in a flat after selling share of her house to ex-husband, rent burden over 50%, is spatially flexible and would like to move to reduce rental costs, but is unable to do so, seems resigned; weighs every bus journey, mobility expenditures reduced to the absolute minimum; very economical energy consumption; unable to work following household accident and now receives unemployment benefits. Cannot spend on culture and leisure activities, contacts and friends greatly reduced, no contact with children, seems passive and resigned.
P9 *	F	54	Rural	Single-person household; lives in a rural area for rent, rent burden over 50%, move imminent due to notice of termination, which is likely to increase housing costs further; public transport not an option due to residential location and two dogs, is dependent on her car, limits fuel to EUR 50 monthly; makes extreme savings on electricity, heating and ancillary costs; unable to work due to mental illness, monthly income of only EUR 815, no prospects to increase income. Very socially isolated, the only contact is through walking her dogs.
P10 *	M	49	City	Single-person household; lives centrally with very low rent, always pays rent one month in advance due to subconscious fear of insolvency; mobility costs very low due to near exclusive use of bicycles, no public transport because tickets are too expensive; heating costs paid by the authorities, frugal with electricity consumption; unable to work due to physical limitations, receives a disability pension, which must be reapplied for every three years, no prospects for increase in income. Has contacts via music course that he can afford and a circle of friends.
P11	F	40	Small town	Four-person household, patchwork family; lives in rented flat with good accessibility, rent is affordable with two earners, no alternatives when moving; mobility costs reduced by last move but still quite high due to monthly regional train pass, owns car for special purchases, no daily use; energy costs underestimated and miscalculated when moving due to electric heating, very high cost burden, heats with wood stove to save; two earners with low salaries. No money for spontaneous expenses, clothes, cinema, etc., does a lot of maintenance themselves, improvises, is integrated into the neighborhood.
P12	M	65	City	Single-person household; lives alone in a large, central flat after separating from wife, rent burden very high (approx. 80% of pension), flat in poor condition, mentally not in a condition to tackle moving; no mobility expenses, walks or cycles; according to his own statement, never heats, even in sub-zero temperatures; early retiree, no prospects for increase in income. Lives in extreme social isolation, relies on food donations, contemplates joining a monastery or emigrating.
P13 *	F	54	City	Single-person household; lives in a small two-room flat at the edge of city center after separating from husband; mobility expenses affordable due to EUR 80 annual disability ticket; deliberately set electricity installments slightly higher to avoid additional payments, economical consumption; has received disability pension since 1996, which provides little security as her only income since separation and must be reapplied for every three years, maintenance still negotiated in court, existential fears very present. Receives disability pension, divorce led to precarious situation. Social networks severely restricted after social decline, has high healthcare costs in addition to fixed costs.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
P14	F	59	City	Single-person household; lives in an unrenovated, non-barrier-free flat, unable to move as there are no affordable barrier-free flats available in a comparable location; central location very important due to severely restricted freedom of movement, uses electric wheelchair to get around; high electricity costs due to therapy equipment and wheelchair, high heating costs due to uninsulated windows but this is paid by the authorities; has been unable to work since an accident in 2011, no prospects for increase in income. Deep, abrupt social and financial decline due to accident, very few contacts, family is most important support.
P15 *	M	22	City	Single-person household, shared flat; lives with three people, slight rent increase due to move from student housing to shared flat, rent burden okay due to shared costs and comparatively inexpensive flats in the region; benefits from student discounts, cannot afford spontaneous trips and excursions because train tickets are then more expensive; barely aware of energy costs or need to reduce them; financed as a student by his parents, plans to look for a part-time job.
P16	F	22	City	Two-person household, single mother; lives in an old, unrenovated building with high ceilings, rent burden almost 50%, wants to move to gain space, rent reduction unlikely through moving; mobility only a burden at certain times, benefits from student discounts; cannot estimate energy costs well, compares electricity prices and has switched to less expensive electricity provider, reducing costs to EUR 20; student with several part-time jobs, supported by parents, receives minimal state student support and maintenance payments, has slight credit card debt. Very good social networks, studying creates a high time burden and requires organizational effort in her everyday life.
P17 *	M	48	Big City	Single-person household; lives in a two-room flat in an old, renovated building, feels that rent is reasonable due to location and house community; mobility costs have tripled due to new job in neighboring city, could skip public transport ticket and cycle in the event of great need; high electricity costs, considering switching to another provider; works 25 h per week, has fixed-term annual contracts. Socially well integrated.
P18	F	49	Small town	Single-person household; lives in partially renovated home she inherited, cannot finance urgently needed renovations, moving not an option because it was her grandparents' house; car necessary due to poor public transport, could cycle even more to reduce costs, but car secures her jobs and thus her income; heats with an old oil heating system, heating the house is expensive due to poor building material, therefore she only heats sparingly and selectively, investment in new heating system not possible; has several mini-jobs that earn her just more than basic state income support, just about makes ends meet. Mutual (financial) support from family and friends not an option, as everyone is in a similar situation.
P19 *	F	41	Big City	Single-person household; has lived in a large, central flat since birth, which she took over from her deceased parents, favorable rent for the size due to old rental agreement, cost burden (due to low single income) nevertheless clearly too high and rising, less expensive flats only to be found on the outskirts of the city, relocation therefore not an option, considering subtenants, but this would require renovations and investments; uses public transport exclusively, uses favorable social tariff; moderate electricity consumption despite electric heating system; receives state support and also works within the permitted framework, very little financial scope for action.
P20	F	43	Small town	Single-person household; lives in an old, unrenovated flat in poor condition, was happy to have found something due to time pressure when looking; no mobility costs due to free use of public transport with her adult son's severe disability pass and no car; high electricity bill due to electric heating, had gas cut off for several months due to non-payment by the office responsible; long-term unemployed despite training as a nurse, has various small part-time jobs, complains about job center unreliability. No family and hardly any friendly contacts, two friends made via Facebook.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
P21	F	24	City	Two-person household, couple; lives in an old flat in the city center, does not see moving as financially worthwhile; car indispensable for work and hobbies, tries to cycle for many journeys, public transport too expensive due to loss of student discount; burdened by heating costs, sees not heating at all as the only way to save money; in interim situation after completing studies, waiting to be accepted for doctorate, partner's second degree is financially challenging as he no longer receives state student support and only has a mini-job. Receives support from parents, has lively leisure activities.
P22 *	M	49	City	Single-person household; has moved quite often, plans to move again to be closer to region where he grew up, finds affordable housing almost exclusively in peripheral locations; dependent on expensive public transport tickets, could apply for discount but finds it too complicated; does not save much on water and electricity, sees its use as a luxury, consciously uses green electricity; currently receives unemployment benefits, has had several brief periods of employment, is slightly in debt. He experiences discrimination in his current residence, is optimistic about his move and his future.
Interviews amid energy crisis (2022)				
ST1	F	23	City	Single-person household, student; lives alone in flat; no information on mobility; tries to be economical with energy, heats less than desired, unsure about electricity provider; has two part-time jobs, receives state education support and support from parents, generally breaks even at month's end, cannot afford unscheduled bills himself. Social and financial support from family.
ST2	F	26	City	Single-person household, student; lives alone in a flat with large front windows through which a lot of heat is lost, moving is imminent, worries about rising costs, is afraid of needing to choose lesser options; has barely any additional expenses due to student ticket, uses public transport almost exclusively; heats as late and as little as possible for fear of the bill, dresses warmly at home, rarely uses oven, switches fuses and refrigerator off if away for several days; financed by parents during her studies. Good social network, would ask parents for further financial help in emergencies, but would rather look for a part-time job.
ST3 *	M	22	City	Single-person household, student; lives alone in small flat having moved from larger and more expensive one, but other costs have risen so much that savings are barely visible; walks or uses public transport with student ticket, no mobility costs; stays at library or with friends longer to avoid heating his flat, has considered switching fridge off and storing food on the balcony in winter; financed by his parents, had noticeably more financial scope before the energy crisis, earns extra money busking. Has a good social network, saves on food.
ST4	F	22	City	Two-person household, couple; student living with her partner, has concerns that a move to a smaller, less expensive flat in another area of the city might become necessary if costs continue to rise; tries to avoid car journeys and now uses public transport almost exclusively; only begins heating late in the year since the energy crisis, prefers to either use blankets and wear more clothes at home or stay outside with others; has started a side job to cover fixed monthly costs and everyday expenses. Creates a meal plan in order to shop more selectively.
ST5/6	M	26	City	Single-person household, student; currently lives in a shared flat with three people, will move to reduce costs; uses public transport, bicycle and car share, the latter less now due to increased costs; moves into smaller room to reduce energy costs, the flat has decided against a more expensive tariff with renewable energy for cost reasons; is looking for a part-time job again to be better able to manage costs.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
ST7	M	19–23	City	Single-person household, student; lives in a shared flat in comparatively inexpensive student housing; owns a car that he only uses for spontaneous trips to visit his parents since train tickets are particularly expensive at last minute, travels a lot by tram in everyday life, also to avoid damage to his bicycle; heats little and only for a short time; financed by his parents during his studies, can bear everyday costs well but things become tight in the event of unforeseen costs, can access his savings account in an emergency or ask for further support from his parents.
ST8	M	27	City	Single-person household, student; recently moved into a shared, unrenovated three-bed flat; uses public transport; heats less, dresses more warmly, switches unused appliances off, ventilates more carefully, tries to take shorter showers to save energy; has a part-time job, monthly income is EUR 600, receives financial support from family in case of emergency.
ST9	F	20	City	Single-person household, student; lives in a shared flat with three people; usually walks or uses public transport, owns a car, but it is parked at her parents' and presently unused; rarely heats her home and fears delayed shocks when annual billing assessments are done, takes colder and shorter showers to save energy, dresses more warmly, showers at the gym, stays at university or with friends longer; has a part-time job, receives support from her parents, does not want to ask for more financial support due to feelings of guilt.
ST10	F	23	City	Single-person household, student; lives in a five-person shared flat in the city center; cycles exclusively in daily life; uses green electricity at home, heats less, dresses more warmly at home, showers at the gym to save energy, stays longer with friends; receives state student funding, cost burden noticeable since the energy crisis. Interpersonal tension in the flat due to varying levels of consumption, heating behavior, income situation.
ST11	F	19–22	City	Single-person household, student; lives in a four-person shared flat in student housing, rent was raised by EUR 50 monthly within a short period; walks a lot, otherwise uses public transport, thinks more carefully about when to use the car; pays flat energy rate, no threat of additional payment, turns the heating off when she is away, is generally more economical than before the energy crisis; receives state student support, income of EUR 800 per month, must use some of her reserves to cover the costs of studying and everyday life, has family for (financial) support when necessary.
ST12	F	20–22	City	Single-person household, student; lives in a three-person shared flat in an old building with little daylight, small recent rent increase; no information on mobility; compares and chooses the least expensive electricity provider, heats as late and as little as possible because costs are so difficult to estimate, near continuous electricity consumption due to laptop use and necessary lighting on the ground floor; financed by parents during studies, has a part-time job to build up small reserves.
SP1 *	F	26	City	Two-person household, single mother; lives with her baby in a shared flat for two people; walks more due to increased public transport costs, only buys a single ticket if necessary; needs to heat more than she would for herself because of the baby, heats selectively and only when she is home to save costs; had to interrupt her education due to birth, now receives basic state benefits, monthly income of approx. EUR 1000.
SP2	F	52	City	Two-person household, single mother; rents an old flat in the city center; walks or cycles a lot, does not own a car, rarely uses public transport due to high costs; turns the fridge off and stores food on the balcony in winter, only heats the child's room and kitchen, dresses more warmly at home; has a part-time job, is afraid of having her salary cut to 60% due to a current foot fracture, hardly any support possible in her environment since everyone else is in a similarly strained situation, had no financial worries before the energy crisis.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
SP3	F	39	City	Three-person household, single mother; lives in a small three-room flat in an attic; often uses the car because of the children, fears repairs that she could not afford, walks or cycles if possible, but it's often too dangerous for her alone with two children; only heats the living room and children's room, economical with hot water; works part-time (30 h), barely any financial support from friends and does not want to make use of it or ask for it, before the energy crisis, life was not luxurious but affordable. Saves on leisure spending for herself, invests money in her child.
SP4 *	F	unknown	City	Four-person household, single mother; lives in a partially renovated flat in a peripheral location; does not own a car, mainly travels by foot; very economical with energy from the ground up: almost never switches on the lights, uses battery-powered fairy lights instead, has toggle switches everywhere, has invested in new appliances with a good energy balance, heats sparingly and in individual rooms only; receives basic state benefits, does 30–40 h of care work per week in addition to everyday family life to look after her grandmother, financial support from her mother possible in an emergency, household income of EUR 1100 per month. Saves on leisure expenses for herself, tries to save for holidays or uses money to enable the children to take part in leisure activities.
SP5	F	22	City	Two-person household, single mother; lives in small two-room flat with mold problem, landlord does not care; gave up car for various reasons, only uses public transport and trains; needs to heat so that the mold does not spread further and so that it is warm enough for her child, turns heating off when she leaves home, combines swimming with showering and washing hair; studies, receives state student support, has financial reserves of EUR 1000, could ask parents or grandparents for financial support if necessary. Saves a lot on herself to enable her child to do more.
SP6	F	44	City	Three-person household, single mother; lives in a three-room flat in the city center; at times had to drive to daycare each day, which had high costs, can now do almost everything by foot; seeks the least costly electricity provider each year and signs a new contract, is afraid of possible additional charges, tries to heat economically but freezes quickly; receives basic state benefits, can no longer work in her training profession for health reasons, is afraid of further rising costs as she is already financially strained. According to her own statement, she no longer has a social life in order to pay all of her bills and provide a good life for her children.
SP7 *	F	31	City	Two-person household, single mother; lives in three-room flat, renovation status unknown, recent rent increase, is afraid that she will need to move into a smaller flat if prices continue to rise, trying to find a flat with new partner but this is not possible due to increased rents; owns a car but only uses it for grocery shopping and weekend outings; monthly electricity bill has increased, fears needing to make additional payments, heats less and more selectively; works full-time (38 h), tries to sell clothing online for some additional income, has existential fears due to rising rent, energy and food prices, did well financially before the energy crisis. Has drastically reduced leisure activities for herself, suffers from being unable to do anything and from being home alone a lot.
SP8 *	F	24	City	Two-person household, single mother; rents a three-room flat, only recently moved because she could no longer afford the large flat she originally occupied with her partner; uses her car especially when temperatures are low due to her daughter's illness, also travels by bike or by foot when temperatures are higher, sold her car following the interview to save on insurance and fuel costs; very high monthly electricity bill, barely heats at all, at most heats the living room a little in sub-zero temperatures, uses fairy lights with batteries and candles, no longer sees potential for savings; currently training, was made redundant at her last job because she could no longer manage a full-time job with commuting as a single parent, receives unemployment benefits, housing benefits and child benefits, cannot build up any reserves, could ask her mother for small amounts, she has no financial support for large amounts. High psychological strain due to financial worries, price increases and responsibility for a child, completely forgoes leisure activities for financial reasons and because she is a single parent.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
SP9 *	F	29	City	Two-person household, single mother; rents a one-room flat, insufficient insulation, drafts at the balcony and front door, fears rent increases and possibly needing to move; no information on mobility; can still cope with energy costs with the help of the job center, cooks and heats less to save money, bought energy-saving light bulbs and uses battery-powered fairy lights, goes to public places in order to use less heat; can fall back on a network of family and friends in an emergency.
SE1 *	F	79	City	Single-person household, pensioner; lives alone in a small two-room flat; does everything she can physically manage by foot, rarely uses buses and trains; only heats one room, usually only to watch TV, dresses more warmly, fears final bills, considers attending more senior citizens' meetings to save energy, have social contacts and get help if needed; receives a pension, can get support from her family in an emergency. Gives up holiday trips and cultural leisure activities and therefore also personal contacts to save money.
SE2	M	84	City	Single-person household, pensioner; owns his home, last renovated in 1983; uses his car to get to the tram, which he then takes into town; has LPG heating, costs have risen by more than 50%, has a comparatively low electricity tariff; receives a sufficient pension, weighs what he can still afford more carefully, can fall back on savings in an emergency, currently no problems or restrictions.
SE3	F	81	City	Single-person household, pensioner; owns her home, roof renovation and facade refurbishment in the 1980s; uses public transport, benefits from good connections, buys a monthly pass; uses oil heating, prices have temporarily doubled but she can afford it; receives a pension, is financially well off, partly because she does not need to pay rent, currently no problems or restrictions.
SE4	F	?	City	Single-person household, pensioner; rents a renovated flat on the outskirts of the city, could apply for housing benefits in an emergency if costs continue to rise; uses public transport, buys a monthly ticket; pays high monthly instalments for energy and ancillary costs to avoid additional charges on final bills, does not heat since pipes running through her living room give off enough heat; receives a small pension, just about makes ends meet, lives very frugally, can no longer build up reserves, puts aside EUR 10 per month for her daughter and granddaughter, has savings for emergencies, had no financial problems before the energy crisis.
SE5	F	84	City	Single-person household, pensioner; rents a flat on the outskirts of the city, recent high rent increase; uses public transport, has a reduced senior citizen ticket, appreciates good connections in the city; rarely showers, uses candles and torches in addition to "normal" lighting, heats very little, has become aware of rising energy costs through bills; receives a pension, monthly income under EUR 1000, says she no longer needs new things and lives very frugally, sold her condominium and divided the proceeds within the family, would receive financial support from her son if needed. Goes to cultural events, active social life.
SE6	M	88	City	Single-person household, pensioner; rents a flat on the outskirts of town; travels by public transport or walks, the latter more often now to save costs; uses energy-saving light bulbs, heats little, has always received money back on final bills; receives a pension, has always been a very frugal person due to his own history, therefore makes ends meet, hardly any change in behavior since the energy crisis, support from family would be possible.
SE7	F	>90	City	Single-person household, pensioner with care level; lives in rented accommodation; uses taxis and transport service financed by health insurance due to her illness; new heating was installed a few years ago, heating usage recently reduced by housing association; receives pension and money from care insurance, appears carefree and unbothered by rising prices, generally very frugal even before the energy crisis, manages well financially, does not trust the media, does not know what she can believe. No more contact with family.

Table A1. Cont.

Code	Sex	Age	Area	Household description Household type; housing situation; mobility situation; energy situation; employment status If decisive: social situation
SE8	M	58	City	Single-person household, pensioner; lives in a flat in need of renovation; no information on mobility behavior; thinks about heating behavior but has not yet drawn any conclusions, is a generally frugal person according to his own statement; receives basic state benefits, monthly income of approx. EUR 800, has barely changed his behavior despite rising costs, sees little potential for savings, does not want to ask his son for financial support. Restricts himself but says he is not sad about it, gets food from the food bank.
SE9 *	M	76	City	Two-person household, pensioner; lives with his partner in renovated suburban home they own; no information on mobility; heats with LPG, recent price increase but still affordable, hopes for normalization, heats rooms moderately; receives pension, has reserves, sees no reason to change behavior, has always been frugal according to his own statements, apparently no financial problems.
SE10 *	F	62	City	Single-person household, pensioner; lives in small two-room new-build flat within a multi-generational project, pays high rent, calculated affordability before the energy crisis, now questions her decision due to financial uncertainty, has applied for housing benefits and is waiting for notification; has deregistered her car for cost reasons and because she no longer needs it after moving to the city; generally only heats the absolute minimum, benefits from a good energy balance by moving into a new building, no change in behavior due to the energy crisis; receives disability pension, not much disposable income after rent, even less due to rising prices, may soon be working again on an hourly basis for additional income, no financial problems before moving and the energy crisis, could be supported financially by one of her daughters in an emergency. Sees herself forced to forgo leisure spending, holidays, day trips, seminars.

Note: All information current at the time of the interviews. The use of * in column one of the table highlights those interviewees that are quoted in the chapters above.

References

- Wetzstein, S. The global urban housing affordability crisis. *Urban Stud.* **2017**, *54*, 3159–3177. [\[CrossRef\]](#)
- Barrella, R.; Blas-Álvarez, L. Unpacking the energy crisis impact with a multidimensional vulnerability index: A granular analysis of the Spanish case. *GeoJournal* **2024**, *83*, 34–35. [\[CrossRef\]](#)
- Transport Costs EU Households over €1.1 Trillion. Available online: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20200108-1> (accessed on 3 March 2024).
- Electricity and Gas Prices Stabilize in 2023. Available online: <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20231026-1> (accessed on 3 March 2024).
- Hernández, D.; Phillips, D.; Siegel, E.L. Exploring the Housing and Household Energy Pathways to Stress: A Mixed Methods Study. *Int. J. Environ. Res. Public Health* **2016**, *13*, 916. [\[CrossRef\]](#) [\[PubMed\]](#)
- Bartiaux, F.; Maretti, M.; Cartone, A.; Biermann, P.; Krasteva, V. Sustainable energy transitions and social inequalities in energy access: A relational comparison of capabilities in three European countries. *Glob. Transit.* **2019**, *1*, 226–240. [\[CrossRef\]](#)
- Ortar, N. Dealing with energy crises: Working and living arrangements in peri-urban France. *Transp. Policy* **2018**, *65*, 72–78. [\[CrossRef\]](#)
- Robinson, C.; Mattioli, G. Double energy vulnerability: Spatial intersections of domestic and transport energy poverty in England. *Energy Res. Soc. Sci.* **2020**, *70*, 101699. [\[CrossRef\]](#)
- Lucas, K.; Mattioli, G.; Verlinghieri, E.; Guzman, A. Transport poverty and its adverse social consequences. *Proc. Inst. Civ. Eng. Transp.* **2016**, *169*, 353–365. [\[CrossRef\]](#)
- Lucas, K.; Grosvenor, T.; Simpson, R. *Transport, the Environment and Social Exclusion*; York Publishing Services: Layerthorpe, UK, 2001.
- Lucas, K. Transport and social exclusion: Where are we now? *Transp. Policy* **2012**, *20*, 105–113. [\[CrossRef\]](#)
- Sheller, M. *Mobility Justice, the Politics of Movement in the Ages of Extremes*; Verso Books: London, UK, 2018.
- Burlinson, A.; Giuletti, M.; Battisti, G. The elephant in the energy room: Establishing the nexus between housing poverty and fuel poverty. *Energy Econ.* **2018**, *72*, 135–144. [\[CrossRef\]](#)
- Castaño-Rosa, R.; Martín-Consuegra, F.; Feenstra, M.; Murauskaite, L.; Mengolini, A.; Varo, A.; Hesselman, M.; Horta, A.; Gaydarova, E.; Teschner, N. *Compendium: On Existing and Missing Links between Energy Poverty and other Scholarly Debates*. Stojilovska, A., Zivcic, L., Barbosa, R., Grossmann, K., Guyet, R., Eds.; Working Group 4. 2020. Available online: http://www.engager-energy.net/wp-content/uploads/2020/04/COST_ENGAGER_WG4_Case_Study_Linking_debates_3-April-2020.pdf (accessed on 18 November 2023).

15. Wallace, S.; Lippmann, M. *Implications of Rising Energy Costs on European Housing Affordability*; DWS: Frankfurt am Main, Germany, 2022.
16. Quénard, D. Buildings: The new energy nexus. *C. R. Phys.* **2017**, *18*, 415–427. [\[CrossRef\]](#)
17. Sustainable Mobility for All (Ed.) *Digital Toolkit for Energy and Mobility*; SuM4All: Washington, DC, USA, 2021.
18. Bridging the Gap between Transport and Energy to Achieve Sustainable Mobility. Available online: <https://blogs.worldbank.org/transport/bridging-gap-between-transport-and-energy-achieve-sustainable-mobility#:~:text=Switching%20to%20more%20energy%20efficient,energy%20and%20help%20decrease%20emissions.&text=Expanding%20public%20transport%20helps%20cities%20contain%20their%20energy%20transport%20consumption%20and%20emissions> (accessed on 3 March 2024).
19. Payakkamas, P.; de Kraker, J.; Dijk, M. Transformation of the Urban Energy–Mobility Nexus: Implications for Sustainability and Equity. *Sustainability* **2023**, *15*, 1328. [\[CrossRef\]](#)
20. Simcock, N.; Jenkins, K.E.H.; Lacey-Barnacle, M.; Martiskainen, M.; Mattioli, G.; Hopkins, D. Identifying double energy vulnerability: A systematic and narrative review of groups at-risk of energy and transport poverty in the global north. *Energy Res. Soc. Sci.* **2021**, *82*, 102351. [\[CrossRef\]](#)
21. Nasarre-Aznar, S.; Lambea-Llop, N.; Ftáčnik, M.; Rasnaca, L. *Concrete Actions for Social and Affordable Housing in the EU*; The Foundation for European Progressive Studies: Brussels, Belgium, 2021.
22. Winke, T. Housing affordability sets us apart: The effect of rising housing prices on relocation behaviour. *Urban Stud.* **2021**, *58*, 2389–2404. [\[CrossRef\]](#)
23. Housing in Europe—2023 Interactive Edition. Available online: <https://ec.europa.eu/eurostat/web/interactive-publications/housing-2023#housing-cost> (accessed on 3 March 2024).
24. EU. European Parliament Resolution of 21 January 2021 on access to Decent and Affordable Housing for all (2019/2187(INI)). 2021. Available online: https://www.europarl.europa.eu/doceo/document/A-9-2020-0247_EN.html (accessed on 18 November 2023).
25. Stephens, M.; van Steen, G. ‘Housing Poverty’ and Income Poverty in England and The Netherlands. *Hous. Stud.* **2011**, *26*, 1035–1057. [\[CrossRef\]](#)
26. Bolt, G.; Darling, J. Precariousness and the Right to Housing. In *Precarious Housing in Europe: A Critical Guide*; Münch, S., Siede, A., Eds.; Edition Donau-University Krems: Krems, Germany, 2021; pp. 11–35. [\[CrossRef\]](#)
27. Castaño-Rosa, R.; Pelsmakers, S.; Järventausta, H.; Poutanen, J.; Tähtinen, L.; Rashidfarokhi, A.; Toivonen, S. Resilience in the built environment: Key characteristics for solutions to multiple crises. *Sustain. Cities Soc.* **2022**, *87*, 104259. [\[CrossRef\]](#)
28. FAP—FEANTSA Seventh Overview of Housing Exclusion in Europe 2022. Fondation Abbé Pierre—FEANTSA. 2022. Available online: https://www.feantsa.org/public/user/Resources/reports/2022/Rapport_Europe_GB_2022_V3_Planches_Corrected.pdf (accessed on 18 November 2023).
29. Clair, A.; Reeves, A.; McKee, M.; Stuckler, D. Constructing a housing precariousness measure for Europe. *J. Eur. Soc. Policy* **2019**, *29*, 13–28. [\[CrossRef\]](#)
30. Beran, F.; Nuissl, H. Assessing displacement in a tight housing market: Findings from Berlin. *City* **2023**, *28*, 189–206. [\[CrossRef\]](#)
31. Slater, T. Missing Marcuse: On gentrification and displacement. *City* **2009**, *13*, 293–311. [\[CrossRef\]](#)
32. Keating, D.; Hartman, C.; LeGates, R. *Displacement, How to Fight It*; National Housing Law Project: Berkeley, CA, USA, 1982.
33. Goetz, E.G. Desegregation in 3D: Displacement, dispersal and development in American Public Housing. *Hous. Stud.* **2010**, *25*, 137–158. [\[CrossRef\]](#)
34. Listerborn, C.; Baeten, G. Struggling with Conceptual Framings to Understand Swedish Displacement Processes. In *Socio-Spatial Theory in Nordic Geography*; Jakobsen, P., Jönsson, E., Larsen, H.G., Eds.; Springer International Publishing: Cham, Switzerland, 2022; pp. 207–216.
35. Kordell, S.; Naumann, M. The rural housing crisis: Analytical dimensions and emblematic issues. *Hous. Stud.* **2023**, *30*, 1–18. [\[CrossRef\]](#)
36. Kavanagh, A.M.; Aitken, Z.; Baker, E.; LaMontagne, A.D.; Milner, A.; Bentley, R. Housing tenure and affordability and mental health following disability acquisition in adulthood. *Soc. Sci. Med.* **2016**, *151*, 225–232. [\[CrossRef\]](#) [\[PubMed\]](#)
37. Mason, K.E.; Baker, E.; Blakely, T.; Bentley, R.J. Housing affordability and mental health: Does the relationship differ for renters and home purchasers? *Soc. Sci. Med.* **2013**, *94*, 91–97. [\[CrossRef\]](#) [\[PubMed\]](#)
38. Bentley, R.; Baker, E.; LaMontagne, A.D.; King, T.; Mason, K.E.; Kavanagh, A.M. Does employment security modify the effect of housing affordability on mental health? *SSM Popul. Health* **2016**, *2*, 778–783. [\[CrossRef\]](#) [\[PubMed\]](#)
39. Pollack, C.E.; Griffin, B.A.; Lynch, J. Housing affordability and health among homeowners and renters. *Am. J. Prev. Med.* **2010**, *39*, 515–521. [\[CrossRef\]](#) [\[PubMed\]](#)
40. Baeten, G.; Westin, S.; Pull, E.; Molina, I. Pressure and violence: Housing renovation and displacement in Sweden. *Environ. Plan. A Econ. Space* **2017**, *49*, 631–651. [\[CrossRef\]](#)
41. D’Alessandro, D.; Appolloni, L. Housing and health: An overview. *Ann. Ig.* **2020**, *32*, 17–26. [\[CrossRef\]](#) [\[PubMed\]](#)
42. Baker, E.; Pham, N.T.A.; Daniel, L.; Bentley, R. New evidence on mental health and housing affordability in cities: A quantile regression approach. *Cities* **2020**, *96*, 102455. [\[CrossRef\]](#)
43. Bouzarovski, S.; Petrova, S. A global perspective on domestic energy deprivation: Overcoming the energy poverty-fuel poverty binary. *Energy Res. Soc. Sci.* **2015**, *10*, 31–40. [\[CrossRef\]](#)
44. Thomson, H.; Bouzarovski, S. *Addressing Energy Poverty in the European Union: State of Play and Action*; EU Energy Poverty Observatory: Manchester, UK, 2018.

45. Sareen, S.; Thomson, H.; Herrero, S.T.; Gouveia, J.P.; Lippert, I.; Lis, A. European energy poverty metrics: Scales, prospects and limits. *Glob. Transit.* **2020**, *2*, 26–36. [\[CrossRef\]](#)
46. Boardman, B. *Fuel Poverty: From Cold Homes to Affordable Warmth*; Bellhaven Press: London, UK, 1991.
47. European Commission (Ed.) *Commission Recommendation (EU) 2023/2407 of 20 October 2023 on Energy Poverty*; Official Journal of the European Commission: Brussels, Belgium, 2023.
48. Stojilovska, A.; Guyet, R.; Mahoney, K.; Gouveia, J.P.; Castaño-Rosa, R.; Živčič, L.; Barbosa, R.; Tkalec, T. Energy poverty and emerging debates: Beyond the traditional triangle of energy poverty drivers. *Energy Policy* **2022**, *169*, 113181. [\[CrossRef\]](#)
49. Connon, I.L.C. Transcending the triad, Political distrust, local cultural norms and reconceptualizing the drivers of domestic energy poverty in the UK. In *Energy Poverty and Vulnerability*, 1st ed.; Simcock, N., Thomson, H., Petrova, S., Bouzarovski, S., Eds.; Routledge: London, UK, 2017; pp. 34–45. [\[CrossRef\]](#)
50. Jigla, G.; Bouzarovski, S.; Dubois, U.; Feenstra, M.; Gouveia, J.P.; Grossmann, K.; Guyet, R.; Herrero, S.T.; Hesselman, M.; Robic, S.; et al. Looking back to look forward: Reflections from networked research on energy poverty. *iScience* **2023**, *26*, 106083. [\[CrossRef\]](#) [\[PubMed\]](#)
51. Middlemiss, L. Energy poverty: Understanding and addressing systemic inequalities. In *Inequality and Energy: How Extremes of Wealth and Poverty in High Income Countries affect CO₂ Emissions and Access to Energy*; Galvin, R., Ed.; Academic Press: Cambridge, MA, USA, 2020; pp. 99–114. [\[CrossRef\]](#)
52. Middlemiss, L.; Ambrosio-Albalá, E.; Emmel, N.; Gillard, R.; Gilbertson, J.; Hargreaves, T.; Mullen, C.; Ryan, T.; Snell, C.; Tod, A. Energy poverty and social relations: A capabilities approach. *Energy Res. Soc. Sci.* **2019**, *55*, 227–235. [\[CrossRef\]](#)
53. LaBelle, M.C.; Bucată, R.; Stojilovska, A. Radical energy justice: A Green Deal for Romanian coal miners? *J. Environ. Policy Plan.* **2023**, *25*, 142–154. [\[CrossRef\]](#)
54. Grossmann, K. Energy efficiency for whom? A conceptual view on retrofitting, residential segregation and the housing market. *Sociol. Urbana Rurale* **2019**, *XLI*, 78–95. [\[CrossRef\]](#)
55. Brunner, K.-M.; Christanell, A.; Mandl, S. Energiearmut in Österreich: Erfahrungen, Umgangsweisen und Folgen. In *Energie und Soziale Ungleichheit: Zur Gesellschaftlichen Dimension der Energiewende in Deutschland und Europa*, 1st ed.; Großmann, K., Schaffrin, A., Smigiel, C., Eds.; Springer: Wiesbaden, Germany, 2017; pp. 131–155. [\[CrossRef\]](#)
56. Thomson, H.; Snell, C.; Bouzarovski, S. Health, Well-Being and Energy Poverty in Europe: A Comparative Study of 32 European Countries. *Int. J. Environ. Res. Public Health* **2017**, *14*, 584. [\[CrossRef\]](#) [\[PubMed\]](#)
57. Biermann, P. How Fuel Poverty Affects Subjective Well-Being, Panel Evidence from Germany. Oldenburg Discussion Papers in Economics. 2019. No. V-395-16. Available online: <https://www.econstor.eu/bitstream/10419/148230/1/870933612.pdf> (accessed on 10 October 2023).
58. Großmann, K.; Trubina, E. How the Concept of Dignity Is Relevant to the Study of Energy Poverty and Energy Justice. *Front. Sustain. Cities* **2021**, *3*, 644231. [\[CrossRef\]](#)
59. Großmann, K.; Jigla, G.; Dubois, U.; Sinea, A.; Martín-Consuegra, F.; Dereniowska, M.; Franke, R.; Guyet, R.; Horat, A.; Katman, F.; et al. The critical role of trust in experiencing and coping with energy poverty: Evidence from across Europe. *Energy Res. Soc. Sci.* **2021**, *76*, 102064. [\[CrossRef\]](#)
60. Gleeson, B.; Randolph, B. Social Disadvantage and Planning in the Sydney Context. *Urban Policy Res.* **2002**, *20*, 101–107. [\[CrossRef\]](#)
61. Currie, G.; Delbosc, A. Mobility vs. affordability as motivations for car-ownership choice in urban fringe, low-income Australia. In *Auto Motives: Understanding Car Use Behaviours*; Lucas, K., Blumenberg, E., Weinberger, R., Eds.; Emerald Group Publishing Limited: Bingley, UK, 2011; pp. 193–208.
62. Titheridge, H.; Christie, N.; Mackett, R.; Hernández, D.O.; Ye, R. *Transport and Poverty, a Review of the Evidence*; UCLTI Publications, UCL Transport Institute, University College London: London, UK, 2014.
63. Runge, D. *Mobilitätsarmut in Deutschland? IVP-Schriften 06*; Senatsverwaltung für Stadtentwicklung: Berlin, Germany, 2005.
64. Gašparović, S. Theoretical Postulates of Transport Disadvantages. *Croat. Geogr. Bull.* **2016**, *78*, 73–95. [\[CrossRef\]](#)
65. Martens, K. Role of the bicycle in the limitation of transport poverty in the Netherlands. *Transp. Res. Rec.* **2013**, *2387*, 20–25. [\[CrossRef\]](#)
66. Mattioli, G.; Colleoni, M. Transport Disadvantage, Car Dependence and Urban Form. In *Understanding Mobilities for Designing Contemporary Cities*, 1st ed.; Pucci, P., Colleoni, M., Eds.; Springer: Cham, Switzerland, 2016; pp. 171–190. [\[CrossRef\]](#)
67. Daubitz, S. Mobilitätsarmut: Die Bedeutung der sozialen Frage im Forschungsfeld Verkehr. In *Handbuch Verkehrspolitik*; Springer Fachmedien: Wiesbaden, Germany, 2016; pp. 433–447.
68. Yeganeh, A.; Agee, P.R.; Gao, X.; McCoy, A.P. Feasibility of zero-energy affordable housing. *Energy Build.* **2021**, *241*, 110919. [\[CrossRef\]](#)
69. Avanzini, M.; Pinheiro, M.D.; Gomes, R.; Rolim, C. Energy retrofit as an answer to public health costs of fuel poverty in Lisbon social housing. *Energy Policy* **2022**, *160*, 112658. [\[CrossRef\]](#)
70. Milne, G.; Boardman, B. Making cold homes warmer: The effect of energy efficiency improvements in low-income homes A report to the Energy Action Grants Agency Charitable Trust. *Energy Policy* **2000**, *28*, 411–424. [\[CrossRef\]](#)
71. Bouzarovski, S.; Frankowski, J.; Tirado Herrero, S. Low-Carbon Gentrification: When Climate Change Encounters Residential Displacement. *Int. J. Urban Reg. Res.* **2018**, *42*, 845–863. [\[CrossRef\]](#)
72. Mangold, M.; Österbring, M.; Wallbaum, H.; Thuvander, L.; Femenias, P. Socioeconomic impact of renovation and energy retrofitting of the Gothenburg building stock. *Energy Build.* **2016**, *123*, 41–49. [\[CrossRef\]](#)

73. von Platten, J.; Mangold, M.; Johansson, T.; Mjörnell, K. Energy efficiency at what cost? Unjust burden-sharing of rent increases in extensive energy retrofitting projects in Sweden. *Energy Res. Soc. Sci.* **2022**, *92*. [[CrossRef](#)]
74. Hyland, M.; Lyons, R.; Lyons, S. The value of domestic building energy efficiency—Evidence from Ireland. *Energy Econ.* **2013**, *40*, 943–952. [[CrossRef](#)]
75. Beatty, T.K.M.; Blow, L.; Crossley, T.F. Is there a “heat-or-eat” trade-off in the UK? *J. R. Stat. Soc. Ser. A (Stat. Soc.)* **2014**, *177*, 281–294. [[CrossRef](#)]
76. Martiskainen, M.; Hopkins, D.; Torres Contreras, G.A.; Jenkins, K.E.H.; Mattioli, G.; Simcock, N.; Lacey-Barnacle, M. Eating, heating or taking the bus? Lived experiences at the intersection of energy and transport poverty. *Glob. Environ. Chang.* **2023**, *82*, 102728. [[CrossRef](#)]
77. Papantonis, D.; Tzani, D.; Burbidge, M.; Stavrakas, V.; Bouzarovski, S.; Flamos, A. How to improve energy efficiency policies to address energy poverty? Literature and stakeholder insights for private rented housing in Europe. *Energy Res. Soc. Sci.* **2022**, *83*, 102832. [[CrossRef](#)]
78. Hartell, A.M. Evaluating the Concept of Location Affordability: Recent Data on the Relationship between Transport, Housing, and Urban Form. *Hous. Policy Debate* **2017**, *27*, 356–371. [[CrossRef](#)]
79. Coulombel, N. Why housing and transport costs should always be considered together: A monocentric analysis of prudential measures in housing access. *Transp. Policy* **2018**, *65*, 89–105. [[CrossRef](#)]
80. Li, T.; Dodson, J.; Sipe, N. Examining household relocation pressures from rising transport and housing costs—An Australian case study. *Transp. Policy* **2018**, *65*, 106–113. [[CrossRef](#)]
81. Mattioli, G.; Lucas, K.; Marsden, G. Transport poverty and fuel poverty in the UK: From analogy to comparison. *Transp. Policy* **2017**, *59*, 93–105. [[CrossRef](#)]
82. Golubchikov, O.; O’Sullivan, K. Energy periphery: Uneven development and the precarious geographies of low-carbon transition. *Energy Build.* **2020**, *211*, 109818. [[CrossRef](#)]
83. Sovacool, B.K.; Axsen, J.; Sorrell, S. Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. *Energy Res. Soc. Sci.* **2018**, *45*, 12–42. [[CrossRef](#)]
84. Punch, K.F. *Introduction to Social Research: Quantitative & Qualitative Approaches*, 3rd ed.; SAGE: Los Angeles, CA, USA, 2014.
85. Kelle, U.; Kluge, S. *Vom Einzelfall zum Typus, Fallvergleich und Fallkontrastierung in der Qualitativen Sozialforschung*, 2nd ed.; VS Verlag: Wiesbaden, Germany, 2010.
86. Schreier, M. Qualitative content analysis. In *The SAGE Handbook of Qualitative Data Analysis*; Flick, U., Ed.; SAGE Publications Ltd.: Thousand Oaks, CA, USA, 2013; pp. 170–183. [[CrossRef](#)]
87. Heß, C.; Wemheuer, A.; Chodura, A.; Eisermann, L.; Elmenhorst, J.; Heide, F.; Nemitz, E.; Schmidt, L.; Schneider, E.; Weiß, H. *Heizen: Impossible. Frierst du Noch Oder Heitzt du Schon?* Project Report; University of Applied Sciences Erfurt: Erfurt, Germany, 2023.
88. Haushofer, J.; Fehr, E. On the psychology of poverty. *Science* **2014**, *344*, 862–867. [[CrossRef](#)]
89. Smith, S.J.; Clark, W.A.; Ong Vifor, J.R.; Wood, G.A.; Lisowski, W.; Truong, N.K. Housing and economic inequality in the long run: The retreat of owner occupation. *Econ. Soc.* **2022**, *51*, 161–186. [[CrossRef](#)]

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