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Living with Energy Poverty

Perspectives from the Global North and South

Edited by Paola Velasco-Herrejón,
Breffní Lennon, and Niall P. Dunphy

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Chapter 1

The Global Face of Energy Poverty

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Introduction

1 The Global Face of Energy Poverty

Paola Velasco-Herrejón, Breffní Lennon and Niall P. Dunphy

1.1 Introduction

For the first time in decades, the price pressures and economic upheaval primarily caused by the global energy crisis – sparked by Russia's invasion of Ukraine and post-COVID pandemic supply chain stress – have led to a rise in the number of people without access to energy (IEA, 2022).

Although there has been a steady increase in the global availability of electricity over recent years, with access rates increasing from 83% in 2010 to 91% in 2020, it is estimated that the number of people without access to what is increasingly an essential resource is likely to reach 774 million in 2023 (UN, 2022). Of those without access, 80% live in sub-Saharan Africa, where the number of people excluded from the electricity grid is almost back to its record high from 2013. At the same time, the number of households that spend at least 10% of their disposable income on energy has increased by 160 million from 2019 to 2022 (IEA, 2022).

In 2020, 4 billion people still relied on inefficient and polluting cooking systems, with 40% of these households in sub-Saharan Africa and 55% in developing Asia. Surging fuel prices have caused an estimated 100 million people to switch back from LPG to cooking with dirtier fuels such as traditional biomass, coal, and kerosene in 2022 (UN, 2022).

Whilst this situation markedly affects emerging markets and developing economies, energy poverty is also to be found in more developed countries (albeit in somewhat different manifestations), particularly in marginalised communities. For instance, the problem of energy poverty is widespread in Europe, with an estimated 50–125 million people (depending on the source) who are energy poor (Economidou et al. 2019). We can expect this estimation to worsen when data for 2022 is published.

The human consequences of energy poverty include a significant deterioration in physical health and mental well-being, along with premature death due to severe winter and summer conditions, unhealthy and/or restricted lifestyles, and social exclusion (Thomson et al., 2016). There have been efforts to reduce energy poverty in both developing and developed countries over the past few decades. While there have been substantial efforts to analyse energy poverty at the macro and meso levels, there remains a gap in our collective knowledge of how best to understand and engage with energy-poor households at the local level. This is true across both the Global South and the Global North.

This book aims to engender a conversation that builds an understanding of the lived experiences of energy poverty primarily at the household level across developed and developing contexts. This includes exploring a range of methods to identify energy-poor households, measure energy poverty, and characterise those most at risk or vulnerable to energy poverty, including instances of so-called "hidden energy poverty". Finally, the book will also discuss

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the most appropriate practices for supporting energy-poor households across various regions, explore the links between energy poverty and sustainability, and outline actions to achieve SDG 7 – *Ensure access to affordable, reliable, sustainable, and modern energy for all* (UN, 2022). Addressing the worsening energy poverty crisis will be essential to achieve people-centred, just energy transitions.

1.2 Energy poverty in the Global North and South: is the divide still relevant?

The need for electricity grid expansion has long been articulated in developing and developed contexts since the first half of the 20th century (Harrison, 2013; Hughes, 1993). More recently, global energy markets and their effects on energy availability and prices, as well as pressing environmental concerns, have induced a surge in research on energy deprivation, a condition that previously had little public recognition. The relationship between energy use at the household level and well-being is now a prevalent topic that has been widely explored in different ways within academic analysis, policy, and advocacy work. These views have tended to differ in Global North and Global South contexts.

1.2.1 Expressions of energy poverty in the Global North

Even with increased access to energy, concerns about the under-consumption of energy gained momentum in the Global North in the 1980s. This phenomenon was first described through the concept of "fuel poverty", coined in the United Kingdom by Brenda Boardman in 1991, who sought to raise awareness about the affordability of heating services and its relationship with its negative effects on health (Boardman, 1991). Fuel-poor households were initially defined as needing to spend more than 10% of their income on heating and other energy services (Boardman, 2013) and moved on to also refer to the inadequacy of the energy efficiency of homes, heating systems, and appliances (Boardman, 2013; Bouzarovski & Petrova, 2015). The "fuel poverty" term was influential at the time of its origin, and it is still used today in research and policy on energy and well-being in other Global North contexts (Day et al., 2016).

Bouzarovski and Petrova (2015) argue that all forms of household-scale energy deprivation, regardless of it being referred to as fuel or energy poverty, share the same consequence: a lack of adequate energy services in the dwelling. Therefore, they claim that fuel poverty and energy poverty can be considered under the same conceptual umbrella: "*as a set of domestic energy circumstances that do not allow for participating in the lifestyles, customs and activities that define membership of society*" (Bouzarovski & Petrova, p. 32). This points to the obsolescence of the notion of "fuel poverty" as placing emphasis on the supply of energy carriers to the home is not aligned with new conceptual debates about the phenomenon. Therefore, there is reason to advocate for the worldwide adoption of the term energy poverty.

More recently, notions of energy poverty have driven research in the Global North to investigate a wider configuration of material, socio-economic, and political conditions. For instance, the introduction of the term "energy vulnerability" (Bouzarovski & Petrova, 2015) has raised awareness that energy needs can be flexible and temporal and vary from one household to another. Also, fuel poverty has varying impacts on different people within a household such as the elderly, the disabled, and the very young (Day et al., 2016).

Support for energy vulnerability has been exemplified by the development of the ENGAGER Cost Action[1] in 2017 and the establishment of the EU Energy Poverty Observatory (EPOV) in 2018,[2] which are seen as pivotal moments for the advancement of a policy agenda addressing this societal challenge within the European Union (Middlemiss et al., 2018).

Moreover, there has been significant funding for Horizon 2020 projects[3] that address energy vulnerability, including EnergyMeasures. However, these new approaches and support measures are still rare and need further development (Bouzarovski & Petrova, 2015; Day et al., 2016; Day & Walker, 2013).

Overall, the main discourse around energy poverty in the Global North tends to converge on thermal comfort, primarily warmth through household heating as a critical energy service. Concerns largely focus on poor health and excess deaths during the winter season. However, the focus on fuel poverty might weaken the relationship between energy poverty and wider understandings of well-being deprivation (Day et al., 2016). This link could be strengthened by exploring perspectives and approaches to energy poverty in the Global South, which will be briefly explored in the following section.

1.2.2 Manifestations of energy poverty in the Global South

Energy poverty manifestations in the Global South have mainly been focused on supply-side issues related to inadequate access to clean and reliable energy, particularly for lighting, cooling, and cooking. Despite high political attention, 2.4 billion people in African and Asian developing countries are still using traditional biomass for cooking and heating (IEA, 2022). This situation is referred to in research, policy and advocacy spaces as energy poverty and has been associated with other development dimensions including economic productivity, infrastructure, health and education, and social equity (Bazilian et al., 2014; Modi et al., 2005; Pachauri et al., 2004). This reflects how energy poverty in the Global South signifies a more comprehensive understanding of how energy and energy services relate to well-being and quality of life (Day et al., 2016).

Outcomes of energy poverty in the Global South are often associated with the burning of biomass and the use of low-grade fuels (wood, coal, dung, and waste material) for cooking and heating. These fuels are usually burned directly in the home with highly inefficient devices (Pachaurai & Spreng, 2011). Lighting needs are also met using candles and kerosene lamps. These practices have substantial effects on health as they are associated with high levels of indoor air pollution, which is responsible for numerous respiratory and cardiovascular diseases, as well as cases of lung cancer. Women, children, and the elderly, who spend more time in dwellings and are more exposed to harmful concentrations of pollutants resulting from the incomplete combustion of biomass fuels, are thereby more likely to suffer obstructive pulmonary diseases and acute infections of the respiratory system (Bruce et al., 2000; Rehfuess, 2006; Pachaurain & Spreng, 2011). Research shows that more people die from indoor pollution than from malaria and tuberculosis (IEA, 2010). Furthermore, women and children are also exposed to health-related risks linked to the time-intensive process of gathering fuel. Not only does this activity involve gathering wood and toxic manure, but it can also often carry additional risks including back and foot injuries, wounds, sexual assault, and exposure to extreme weather (Masud et al., 2007).

Energy poverty can also create environmental impacts related to deforestation and changes in land use, as well as the related greenhouse gas emissions from burning biomass. Even when entire trees are not felled, the collection of branches, roots, and bark can deplete forest ecosystems and soils of their nutrients and overall biodiversity (Alam et al., 1991). Conversely, deforestation can result in severe price increases for fuelwood as shown in a study in Bangladesh, that revealed how the increase in the price of wood meant that a typical household was spending about 50% of their annual income on fuel (Biswas et al., 2001).

Increasing access to clean energy in the Global South has been associated with positive developments to well-being. The provision of modern energy services can improve health by

facilitating access to potable water, cleaner cooking facilities, and refrigeration (Larson & Kartha, 2000). Pachauri (2007) provides evidence of a significant correlation between an increase in food calorie intake and access to modern cooking energy sources in India such as kerosene or LPG. In education, statistics show that populations with higher levels of electricity have higher literacy rates, lower student dropouts, and increased study time (González-Eguino, 2015; Porcaro & Takanda, 2005). Electricity can also improve gender equality by saving time on gendered household work and improving women's health (Sovacool, 2012). Modern energy services also expand the opportunities to set up income-generating activities including lighting for factories and shops, power for processing crops, and refrigeration for preserving products (Larson & Kartha, 2000). Providing universal access to modern, cleaner energy sources can be reached by investing 35 billion USD a year for 20 years, a figure that is not high in relation to the 1 trillion USD given annually in subsidies to fossil fuels (IEA, 2022).

1.2.3 The global access-affordability divide

Traditionally, research on the divide between the Global North and South concludes that the driving forces of energy and fuel poverty, and the policies to address them, focus on the lack of heating vs. the lack of access to clean energy, respectively. At the same time, in both cases, though the consequences of domestic energy deprivation are primarily focused on health impacts, fuel poverty is focused on cold air exposure and energy poverty is preoccupied with indoor air pollution (Bouzarovski & Petrova, 2015).

Current research, however, is challenging the access-affordability divide, and the term energy poverty has become the overarching term used to encompass questions of access, infrastructure, affordability, efficiency and equity, and well-being and the environment. For instance, middle-income families can now face both infrastructural access and affordability issues while households in higher-income countries are still facing access problems to clean energy sources. At the same time, questions of justice, security, well-being, and clean energy transitions are becoming prominent in the energy poverty literature as explored below.

1.3 Definitions and perspectives on energy poverty

Experiences of energy poverty in the Global North and South have driven a number of authors to propose frameworks to analyse the concept and its relationship with affordability and efficiency (e.g., Chester & Morris, 2011; Katsoulakos, 2011; Petrova et al., 2013) as well as well-being and development (e.g., Bazilian et al., 2014; Sovacool, 2014; Zulu & Richardson, 2013).

Early definitions of energy poverty referred to levels of energy consumption that are sufficient to meet basic needs, as well as the lack of physical access to modern energy (IEA, 2010; UNDP and WHO 2009 cited in Pachauri & Spreng, 2011). González-Eguino (2015) puts forward a typology that summarises these approaches. The *technological threshold* approach is based on the idea that energy poverty is mainly a problem of access to "modern" fuels. Modern fuels may include kerosene, LPG, biofuels, and electricity, which are seen as more reliable, efficient, and cleaner than other "traditional" fuels such as wood or dung (UNDP, 2005). The idea of the "energy ladder" is commonly used to define a spectrum of fuel cleanliness, where moving "up" the ladder means increasing the level of prosperity in the household (Hosier & Dowd, 1987; UNDP, 2005; Sovacool, 2012). A *physical threshold* approach refers to estimates of minimum energy consumption that are associated with basic needs. Researchers have aimed to define minimum acceptable levels of energy consumption based on a set of goods and services

(e.g., Foster et al., 2000; Modi et al., 2005; Mirza & Szirmai, 2010). Finally, an *economic threshold* approach attempts to establish a maximum percentage of income that is reasonable to spend on energy. Examples of this threshold include the fuel poverty indicator that sets a percentage of 10% of available income; or Barnes et al. (2010) who propose the minimum end-use energy (MEE) that presupposes there is a level of income below which energy consumption does not meet the needs for cooking and lighting. Linked to these thresholds, the concept of hidden energy poverty has also been introduced by Meyer et al. (2018), which refers to circumstances when households self-restrain their energy consumption.

While these approaches have been widely used in the literature of energy poverty, they have also been recently criticised since their highly standardised approach to people's needs can be characterised as simplistic (Day et al., 2016) and, therefore, do not fully capture the intricacies of how households engage with energy to attain well-being. Addressing the technological, physical, and economic barriers to increasing overall levels of consumption can be a necessary measure, but not a sufficient one, to improve people's quality of life. Energy poverty can hamper many forms of well-being and therefore needs to be seen from a more holistic perspective to avoid (re)creating vicious circles of deprivation.

More recently, a number of authors and organisations have moved away from the diagnosis of energy poverty that emphasises sufficiency, efficiency and affordability, to focus instead on securing adequate "energy services" (e.g., Bouzarovski & Petrova, 2015; Modi et al., 2005; Sovacool et al., 2014; UNDP, 2005; Wilhite et al., 2000). These can be understood as "the benefits that energy carriers produce for human wellbeing" (Modi et al., 2005, p. 9), to emphasise that "people do not demand energy per se, but instead, they would like to have access to mobility, washing, heating, cooking, cooling and lighting" (Haas et al., 2008, p. 4013). Focusing on energy services opens the possibility of addressing the demand-side of energy insecurity within an integrated approach to meet the needs of the population (Jansen & Seebregts, 2010). The energy services approach recognises that energy is needed for achieving a range of well-being outcomes. Varying priorities among households, communities, and regions implies that "the driving forces of domestic energy deprivation are multidimensional and hybrid" and therefore extend beyond Global North and South distinctions (Bouzarovski & Petrova, 2015). This multifaceted, hybrid approach can be associated with the multidimensional perspective of energy poverty and development, which provides "a more nuanced approach than 'access' or 'total energy' approaches" (Day et al., 2016, p. 258).

The energy access-consumption matrix introduced by Pachaurai et al. (2004) provides a means to visualise the level of energy services a population can enjoy. Similarly, Nussbaumer et al. (2012) proposed an indicator of Multidimensional Energy Poverty (MEP) using indicators such as modern cooking fuel, access to electricity for lighting, having a TV/radio (for entertainment and education), having a fridge, and having a phone (for communication). In this same line, the NGO Practical Action proposed an indicator of Total Energy Access that measures households against a minimum range of services that people need such as lighting, cooking, water heating, space heating, food cooling, and ICT[4] (Practical Action, 2010).

Reddy et al. (2000) also refer to the access to energy services, while at the same time introducing the idea of the absence of sufficient choice "in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development" (p. 44).

Bouzarovski and Petrova (2015) introduce the idea of energy vulnerability to the concept of energy services, which integrates the temporal dynamics of the phenomenon of energy poverty. This term also encapsulates the risk factors that add to the precariousness of particular spaces and groups of people. To this concept, Middlemiss and Gillard (2015) again suggest integrating

the notion of multidimensionality to encapsulate how people experience energy vulnerability in different ways.

Several authors have proposed the capability approach to transpose ideas of energy needs across different contexts, which moves away from necessary energy sources, amounts, and even services, promoting instead the idea of focusing on sets of outcomes, or capabilities (e.g., Day & Walker, 2011; Jodoin, 2021; Nussbaumer et al., 2012; Sovacool et al., 2014; Walker & Day, 2012). The capabilities approach introduced by Amartya Sen and Martha Nussbaum (Nussbaum, 2001, 2003; Sen, 2001; Sen & Nussbaum, 1993) provides a theoretical justification to pay attention to wider human flourishing, and on what people can do and achieve.[5] Particularly, Day et al. (2016) propose a systematic way of looking at the link between energy needs and capabilities, defining energy poverty as the "*inability to realise essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy services, and taking into account available reasonable alternative means of realising these capabilities*" (p. 260). This novel definition can be adaptable and sensitive to local circumstances as it highlights the diverse ways in which energy can be instrumentally important for acquiring well-being, recognising thus the multiple adverse impacts of being in a situation of energy poverty in both Global North and South contexts.

Similarly, the application of justice theories to the understanding of energy poverty has gained increasing traction in policy and research circles. In their seminal contribution, Walker and Day (2012) argue that at its core, energy poverty is "*fundamentally a complex problem of distributive injustice*" (p. 69), and suggested that this injustice is underpinned by other injustices related to fairness in decision-making procedures (procedural justice) and the degree of respect given to different socio-cultural identities (recognition justice). Further studies have unpacked the philosophical and moral foundations of the emerging concept and framing of "energy justice" that considers poverty as a form of injustice within the broader energy justice paradigm (e.g., Heffron & McCauley, 2017; Jenkins et al., 2016; McCauley et al., 2019) focusing particularly on inequalities between social groups as well as social forms of disadvantage (Bouzarovski, 2018; Heffron & de Fontenelle, 2023).

The diverse understandings of energy poverty reviewed above point to different perspectives on the issue. Analysing energy poverty through the supply or demand side, as well as through outcomes such as energy services, capabilities, and (in)justices, can provide a wide analysis of drivers of energy deprivation at the household level and the risks and vulnerabilities people face as a result.

However, given the increasing incidence of the condition and its relationship to improving other well-being dimensions and tackling environmental degradation, we need to continue expanding our understandings of the phenomenon while innovating with methods and more holistic views that remain under researched.

1.4 Coverage of the book

The overarching purpose of this book is to expand our collective understanding of energy poverty and deepen our recognition of the phenomenon by engaging with the lived experiences of energy-poor households across different contexts.

Understanding how energy poverty is experienced is central to any efforts to alleviate it. This requires a definition that can respond to the flexible spatial and temporal nature of the condition, measurements that align with that definition, and monitoring that speaks to diverse audiences. The book, therefore, gathers the expertise and connectedness of authors from the Global North and South, which provide deep contemporary insights into our everyday relationship with

energy poverty, as well as its well-being and justice implications. Their diverse contributions help move the discussion away from perspectives born in the Global North while also further challenging the Global North and South research divide.

Part I – Methodological approaches – aims to explore new ways of identifying forms of energy poverty which underpin well-known and novel approaches towards the study of domestic energy deprivation. The chapters challenge the existing quantitative methods such as the way energy underconsumption is conceived while also expanding qualitative methodologies such as ethnography and action research, which remain a gap in the energy poverty literature. This allows data to be collected in unstructured ways, which can allow people experiencing energy poverty to introduce their own categories, needs, and ideas into the research. Furthermore, qualitative research is needed to understand the changing experience of energy poverty, with a particular emphasis on how external shocks such as the pandemic or the energy crisis affect people's experiences of the condition.

Chapter 2 opens this part of the book with Dunphy et al. presenting findings from the EnergyMeasures H2020 project in identifying and recruiting energy poor households in seven participating countries across Europe. While the geographic scope may be limited, the range and depth of practical knowledge of participants allowed for the uncovering of a range of nuanced and considered approaches to identifying and recruiting energy-vulnerable households that are cognisant of the historical, cultural, and environmental factors specific to individual locales. In keeping with the overall theme of the book, the chapter considers how to appropriately identify energy poor households and draws from both the literature and experiences in the field.

In Chapter 3, Ibañez Martín et al. highlight the limiting effect the focus on energy expenditure as an indicator has had on developing appropriate policy responses. Using data from Argentina's National Household Expenditure Survey, the authors offer a more nuanced approach for capturing the real numbers for those dealing with energy poverty there.

In Chapter 4, Barrella and Romero critique the quantitative methods used to examine energy poverty in Europe. Using Spain as a test case, they propose using indicators that more accurately capture the complexities of energy poverty at the household level (in particular, how to account for underspending or hidden energy poverty) that are adequately addressed in official statistics.

In Chapter 5, Mejía-Montero and Soriano-Hernández build on earlier work, presented in a recent research paper, and call for greater methodological diversity when studying the topic of energy poverty. They take us through the results of a quantitative characterisation of Energy Poverty (EP) in Mexico.

In Chapter 6, Gayoso Heredia et al. outline the qualitative methods they applied as part of their work for the COOLTORISE H2020 project. Comprising focus group workshops and participatory action research, the authors uncover the lived experiences of Summer Energy Poverty in vulnerable communities in Madrid, Spain.

In Chapter 7, Antadze describes how she coordinated an investigation into the lived experience of energy-vulnerable households in the Republic of Georgia, using video ethnography as a key research method. Her approach, partly in response to travel restrictions arising from the COVID-19 pandemic, generated novel insights from her team's work with energy-vulnerable householders in Georgia.

Part II – Lived experiences – moves the focus to the material and social aspects of lived experiences of energy poverty as a critical way of identifying the different ways in which the phenomenon is lived and experienced in different contexts, and in a particular place. This experience has implications for improving our awareness of vulnerability, which enables a nuanced understanding of complex issues that contribute to and reinforce a situation of energy poverty.

Chapters in this section use a capabilities approach to analyse energy poverty or engage with the framework to reflect on situations in which energy poverty influences people's capabilities in varying contexts. These works provide novel contributions on how to address the methodological challenges that introducing the idea of capability supposes. This section also offers more grounded work on the links between energy justice and the lived experiences of energy poverty, making references not only to distributive justice but also to procedural and recognition justice. These contributions strengthen notions that injustices experienced at the household level can be influenced by mechanisms operated in the wider energy system (Jenkins et al., 2016; McCauley et al., 2013).

This section begins with Chapter 8, where Jodoin and Mang-Benza adopt a normative framework based on the concept of energy justice to analyse gendered experiences of energy poverty in rural areas of three sub-Saharan African countries (Benin, Senegal, and Togo). Their findings point to the importance of operationalising the capability approach to interpret justice principles and identifying how certain groups of people may be more vulnerable to energy system impacts.

In Chapter 9, David and Koďousková analyse the reaction of vulnerable households to the bust of energy suppliers in the Czech Republic and the transfer of these households to a "supplier of last instance" in 2021, resulting in higher energy prices. By doing so, they look at the interplay among households' material culture, practices, and norms (energy cultures framework), highlighting the need to focus on energy poverty prevention by considering external and internal factors that make households more susceptible to falling into the condition.

In Chapter 10, Setyawati draws on the lived experiences of street vendors in Indonesia who must negotiate access to electricity both through formal and informal channels. The author shows that even among the most vulnerable energy users, there is a hierarchy of needs impacting their levels of resilience and empowerment.

In Chapter 11, Mohlakoana and Wolpe outline the social and historical contexts of energy poverty in South Africa. They illustrate through a sample of electrified households how marginalised communities continue to bear the brunt of on-going market ideologies of the state some 30 years after the end of apartheid and the foundation of democratic institutions in the country. The authors also explain how despite policies in place and good intentions government has continued to fail to meet their energy poverty targets and obligations over this period.

In Chapter 12, Robert examines the coping strategies of energy-vulnerable people in France dealing with the three overarching impacts of limited financial resources, rising energy prices, and the poor energy performance of the buildings they occupy. The author applies a capability theory perspective to examine how the instincts of volunteerism and resilience frame the coping strategies of energy-vulnerable communities there.

In Chapter 13, Berger provides a comparative study of the lived experience of energy-vulnerable households in Austria and India and the differing challenges faced by households in each country. Coping with thermal (dis)comfort in energy poor households is a common feature in both countries despite differences in climate, the built environment, and the social configurations they must contend with.

In Chapter 14, Araya et al. document research conducted with indigenous peoples in Argentine Patagonia, a small town in southern Chile, and elderly people from an old neighbourhood in the Chilean capital, Santiago. Looking at the practices and coping strategies of these disparate groups, the authors propose a suite of targeted measures for tackling the specific energy poverty challenges faced in each locale.

This section ends with Chapter 15, where Stojilovska and Feenstra provide a study of women's experience of energy poverty in North Macedonia. Using an energy justice lens, the authors incorporate a strong gendered perspective focusing on the coping mechanisms of women as they pertain to health, age, and ethnicity/migrant status. The authors rightly acknowledge that

climate and energy transition policies in the Global North continue to reflect broader societal inequalities with women's experiences still not adequately addressed or often ignored.

Part III – Practices, policy and sustainability – pushes an analysis of policy practices, government strategy, and sustainability implications of holistic views of energy poverty. Chapters in this section challenge the idea of programmes being focused on service provision that is not in line with the aspirations and realities of the targeted participants and how they exercise choice about fuels, stoves, and retrofit approaches. Provision alone will not imply sustained use and the improvement of comfort levels and well-being. They also look at the nexus between energy poverty and the urban energy transition, which is a nexus that plays a prominent role given the urbanisation processes, particularly in the Global South.

Kenner et al. begin the section (Chapter 16) by describing a relevant practice, the Neighborhood Energy Centers (NECs) to address energy vulnerability in Philadelphia, the United States. Through budget counselling and referrals, energy conservation workshops and supporting applications for energy assistance programmes, NECs are making energy poverty more visible in the United States and while helping those that find it more difficult to ask for assistance such as senior citizens. Drawing from interviews, authors show how NECs can provide an important layer of flexibility amid an existing well-stratified and ossified approach to government energy assistance, offering a network of embedded and responsive care actors.

In Chapter 17, Cornelis et al. investigate two sub-Saharan African countries' (Burkina Faso and Madagascar) experiences of service-based electricity and flexibility/approaches to electrification, particularly energy as a service and demand flexibility, to know to what extent these innovative tools can address energy poverty in the African continent. These experiences shed light on promoting more sustainable consumption practices in Europe, by moving away from a traditional consumption logic to a consumption logic passed on through resource sharing.

In Chapter 18, Dervishi et al. present research on a number of potential retrofit scenarios and building measures available to energy-vulnerable households in residential housing in Albania.

In Chapter 19, Noaman El-Sherbini and Lippert use discourse analysis to examine the European Union member states' National Energy and Climate Plans (NECPs) to discuss whether these indicate ambiguity, complexity, and multidimensionality in the way energy poverty is expressed in their language and frame. They suggest changing the nature of the diagnosis of energy poverty from measuring and defining to one that aims to identify the "vulnerable consumer", reasons for their vulnerability, and measures to tackle specific types of vulnerability.

In Chapter 20, Lamonaca and Batel adopt a lived experience lens to empirically examine the role of recognition justice in smart city projects in social housing in the Global North (Bolzano, Italy). The authors show the role of symbolic and psychosocial aspects in promoting inclusive and democratic accountability when promoting clean energy, as well as highlight the importance of addressing misrecognition to empower citizens to enable a more active and autonomous energy citizenship.

Boatend et al., in Chapter 21, explore factors affecting the use of wood fuels in Ghana to then examine possible uses of cleaner alternative for cooking and how these would affect rural livelihoods. By doing a qualitative survey, they propose having a holistic approach that ensures enhanced access to cleaner cooking fuels in accordance with availability, cost, and culture. In the case of the Ghanaian context, they suggest the use of improved cookstoves as a first step in the pathway to introducing LPG.

Reflecting on the preceding contributions and informed by their experiences in realising the EnergyMeasures project, Dunphy et al. conclude the volume (Chapter 22) with perspectives on the phenomenon of energy poverty and forward ideas on what these might mean for attempts to support the energy poor.

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Notes

1 Energy Poverty Action: Agenda Co-Creation and Knowledge Innovation (ENGAGER 2017–2021) is a research network funded via the European Co-operation in Science and Technology (COST) scheme. https://www.engager-energy.net/
2 EPOV was a project established by the European Commission to improve the measuring, monitoring, and sharing of knowledge and best practices on energy poverty. The observatory has since been integrated into the Energy Poverty Advisory Hub (EPAH), a successor project. https://www.energypoverty.eu
3 Horizon 2020 was a European Union research and innovation funding programme from 2014 to 2020. https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en
4 Information Communications Technology
5 Central to this approach are the concepts of "functionings" and "capabilities". Functionings are "beings and doings" that people value and actually achieve – activities (e.g., reading or dancing) or states of existence (e.g., being in good health or not being ashamed). Capabilities are the actual or real opportunities to realise given functionings, whether one chooses to at any particular time or not. Because the capabilities approach puts a high value on freedom to choose, capabilities, rather than functionings, are the object of concern.

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