



Original research article

# A global perspective on domestic energy deprivation: Overcoming the energy poverty–fuel poverty binary



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## ABSTRACT

This paper offers an integrated conceptual framework for the research and amelioration of energy deprivation in the home. It starts from the premise that all forms of energy and fuel poverty – in developed and developing countries alike – are underpinned by a common condition: the inability to attain a socially and materially necessitated level of domestic energy services. We consider the functionalities provided by energy demand in the residential domain in order to advance two claims: first, that domestic energy deprivation in its different guises and forms is fundamentally tied to the ineffective operation of the socio-technical pathways that allow for the fulfilment of household energy needs, and as such is best analyzed by understanding the constitution of different energy services (heating, lighting, etc.) in the home. Second, we emphasize the ability of vulnerability thinking to encapsulate the driving forces of domestic energy deprivation via a comprehensive analytical matrix. The paper identifies the main components and implications of energy service and vulnerability approaches as they relate to domestic energy deprivation across the world.

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## 1. Introduction

When Boardman [1] published her seminal book on fuel poverty in the UK, this predicament was almost unknown within mainstream academic and policy-making domains. More than 20 years later, fuel poverty ‘has come of age’, as highlighted by the editors of a special section of the journal *Energy Policy* dedicated to the historical development and present state of the art of scientific work on the issue [2]. The plight of developed-world households suffering from inadequately heated homes has been widely publicized in the extensive amount of scholarly attention and advocacy work dedicated to such problems, including a number of papers published in this journal [3]. From an ‘occasional area of interest amongst a tiny group of demographers and survey statisticians’ [2] that failed to garner mainstream political acknowledgement for a long time, fuel poverty has gradually become a widely recognized societal challenge among key academic, practitioner and policy-making circles.

Problems of energy deprivation in the home are also commonly described via the term ‘energy poverty’. This concept has traditionally been used to capture problems of inadequate access to energy in developing countries, involving a host of economic,

infrastructural, social equity, education and health concerns [4,5]. Addressing the technological and economic aspects of energy poverty is otherwise a key component of the wider relationship between energy and development [6], in terms of both governance aspects and everyday life [5,7,8]. At the same time, a number of authors have been using energy poverty frameworks to encapsulate developed-world issues at the nexus of energy efficiency and affordability [9–12]. ‘Energy poverty’ is widely used to describe issues of domestic energy deprivation in many European countries, including Germany [13], Belgium [14], Greece [11], Spain [15], Poland [16] and Slovakia [17], while the notion of ‘energy precariousness’ has become enshrined in official policies and discourses in France [18]. The term ‘energy poverty’ is also incorporated in the European Union’s ‘Third Energy Package’ as well as a number of policy documents adopted by the various bodies of this organization [19]. It is being employed in contexts where domestic energy deprivation has not received scientific or policy attention to date, such as the US and Australia [9,10].

As a result of these developments, there is an increasing need for exploring the conceptual relationship between the energy and fuel poverty paradigms, and the governance implications of the emergent terminological diversity surrounding the lack of energy services in the home. Based on an extensive review of existing scholarship in the domains of energy, poverty, human geography, environmental policy and social practices, this paper investigates the possibility of cross-pollinating the fields of ‘energy poverty’ and

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'fuel poverty', as well as other ways of approaching domestic energy deprivation. Its overarching purpose is to contribute towards the formulation of a genuinely global and integrated perspective on the driving forces and systemic impacts of inadequate domestic energy delivery, in its multiple guises and forms. In the first instance, therefore, we aim to identify the commonalities that underpin existing approaches towards the study of domestic energy deprivation, and can help develop a more nuanced and inclusive framework. The paper then focuses on the material and social aspects of the relationship between 'energy services' [20,21] and poverty, as one of the entry points for articulating a global perspective on the issue. We subsequently move onto an exploration of this relationship via 'vulnerability' thinking, with the aim of introducing the wider systemic drivers of deprivation as they vary across time and space. The paper concludes by highlighting the implications of such approaches for policy and science.

## 2. Unpacking the dichotomy between fuel and energy poverty

The recognition of 'fuel poverty' as a significant systemic problem is best established in academic and policy discourses within the UK and Ireland – states that have developed the longest tradition in researching and addressing problems of cold and energy-inefficient homes in particular, with their associated impacts for well-being and health [22–31]. In the UK, fuel poor households were initially defined as needing to spend more than 10% of their income on energy in order to keep the home in a satisfactory condition ([www.poverty.org.uk](http://www.poverty.org.uk)). A more recent definition, principally used in England, sees households as fuel poor if required energy costs are higher than those of the nation-wide median, while pushing them below the 'official poverty line' ([www.gov.uk](http://www.gov.uk)). In this geographical context, therefore, fuel poverty-related debates and discussion have principally been motivated by, and focused on, the poor affordability of energy for space heating (and other related domestic services) as a result of low household incomes or energy inefficient homes.

Recent years have seen the expansion of scholarship and policy on these topics onto the post-socialist countries of Eastern and Central Europe [12,32–38], as well as France [39–41], Germany [42–45], Spain [46–48], Austria [49], Italy [50,51], Greece [11,52–54], Australia [9,55], New Zealand [56] and even the US [10]. The diversity of this body of work means that it does not easily lend itself to cumulative summaries. Nevertheless, many such studies have sought to highlight the broad range of systemic circumstances that lead to the emergence of domestic energy deprivation: institutional factors, political economies, infrastructural legacies, housing structures, income differentials and changes in the affordability of utility services. With national-scale policy measures being developed in many of these national settings, transnational bodies such as the European Union have become increasingly interested in formulating agendas that can provide wider and more comprehensive frameworks to address the problem [57]. The diversity of geographical perspectives on developed-world energy deprivation has also been associated with a greater awareness on its health impacts and amelioration policies, with issues such as mental health and well-being becoming recognized as important in this context alongside the more traditional focus on respiratory and circulatory morbidity and 'excess winter deaths' [[29,58,59] also see Table 1].

At the same time, a number of international development organizations and scholars have been focusing on the persistent deficiency of energy infrastructure provision across large parts of Africa, Asia, and South America. Despite a long history of international involvement and high profile political attention, more than 1.2 billion people across the world still lack access to electricity,

**Table 1**  
Principal elements of 'energy poverty' and 'fuel poverty' frameworks in traditional understandings of the two concepts.

Element	Developing world 'energy poverty'	Developed-world 'fuel poverty'
Recognition	Explicitly acknowledged in isolated documents during the early 1970s [95]. Subsequent debates mainly focused on technological expansion. More recent research addresses participation and governance challenges.	First mentions date back to the late 1970s and 1980s, principally referring to rising energy costs and 'the right to fuel' in countries like the UK [96,97]. Later research allowed for a wider understanding of the problem [1].
Driving forces	Primarily low levels of electrification and other forms of networked energy provision due to economic under-development and non-functional institutions.	High or rising energy prices vs. low household incomes. Inefficient housing, heating systems and appliance stocks.
Expression	Lack of access to adequate facilities for cooking, lighting and electric appliances, but also other services such as space cooling and heating.	Mainly inadequate heating in the home; importance of other services (particularly space cooling, lighting, appliances, IT) is increasingly recognized in recent years.
Consequences	Detrimental impacts on health, gender inequality, education and economic development more generally.	Long and short-term mental and physical health, inadequate participation in society.
Principal policies	Support for transitions to 'modern' energy fuels, investment in power grid expansion or micro-scale renewables; income support.	Combination of income support, provision of energy at lower costs, and energy efficiency investment.

while a further 2.8 billion have no choice other than traditional biomass for cooking and heating [60]. Termed 'energy poverty', this condition has received significant academic and policy attention [4,61,62], often as a result of its extensive impacts on well-being and health: the inability to access modern fuels in the home means that households are often forced to rely on open fires, which in leads in high levels of indoor air pollution. Thus, fumes and smoke from open cooking fires are estimated to contribute to the deaths of 1.5 million people per year, predominantly women and children [60]. Developed-world energy poverty also has significant impacts on issues such as personal safety, household time budgets, labour productivity and income [63]. It is a highly gendered problem, with women bearing the brunt of the consequences of inadequate energy access while suffering from systemic discrimination as well decreased access to resources and decision-making [64,65].

Traditionally, energy poverty research in the developing world has been mainly focused on supply-side issues, emphasizing the need for expanding electricity grids based on the experience of developed world countries [66,67]. Work undertaken by organizations such as the World Bank in particular has highlighted the benefits of extending the coverage of power grids into rural areas [68–71], as well as the economic, social and technical barriers to modern energy access [72] including the lack of adequate institutional infrastructures and financial capital [73–78]. This has been demonstrated in case studies from Africa, South America and Southeast Asia alike. The principal policies to address energy poverty have been largely driven by the 'electrification for development' imperative, as has been the mainstream identification of the driving forces and consequences of the problem.

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