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Article

Basing "Energy Justice" on Clear Terms: Assessing Key Terminology in Pursuit of Energy Justice

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Abstract

The Energy Justice framework provides an opportunity to reveal and reduce injustices related to unaffordable household energy and lack of residential energy access. However, little consensus exists among academic researchers, practitioners, and decision makers on the terminology to present and conceptualize problems relating to inadequate residential energy access and affordability, with terms including "fuel poverty," "energy burden," "energy poverty," "energy vulnerability," and "energy insecurity." This diversity of concepts and their varied applications poses a miscommunication risk between researchers, practitioners, and policy-makers who seek to identify injustices along the energy continuum and achieve a just transition to a low carbon future. In an effort to offer clarity, this article compares and defines five common terms used to describe unaffordable or inaccessible domestic energy based on a robust review of existing literature. It then analyses and evaluates each concept in terms of its capacity to achieve distributional, procedural, and recognition forms of energy justice. It concludes by reviewing the benefits, limitations, and nuances of these concepts while highlighting some achievements toward energy justice.

1. Introduction

The *Energy Justice* framework provides a powerful opportunity to reveal and reduce injustices in energy systems, via analysis of recognition, distributional and procedural justice[1]. An inability to attain materially- and socially-necessitated levels of domestic energy services has been identified as a key energy justice concern[2][3][4]. This issue has been described within research, policy and practice via multiple and indeed expanding terminology, including 'fuel poverty', 'energy poverty', 'energy burden', 'energy vulnerability', 'energy precarity' and 'energy insecurity', each with their own history and geographical origin. Given this, it is perhaps surprising that no review comparing these terms has been conducted to date. As noted by Jenkins et al.[5], whilst the existence of multiple terms to describe a similar phenomenon is not problematic *per se* (it can even arguably be beneficial in some respects by enabling locally-appropriate and salient terminology), it does generate a risk of miscommunication between researchers, policy-makers and practitioners[6][7]. Importantly, we would go further to argue that a plethora of terms can also pose a challenge to the achievement of energy justice when there is an absence of work to clarify their similarities and differences. Miscommunication may obfuscate relevant and timely research evidence from being incorporated into policy and practice, potentially hindering effectiveness and leading to the misallocation of resources. Furthermore, having a plethora of terms may prevent those experiencing inadequate domestic energy services from identifying their experience as part of a larger collective of hardship experiences, as well as shifting attention away from the political and structural contexts in which energy-related hardships occur and instead rendering the issue as one of individual responsibility.

A fundamental pre-condition to achieving energy justice is the ability to define and describe the lived experiences of unaffordable or inaccessible household energy in a manner that is aligned with research evidence and provides opportunities for practical responses. As recognition is arguably the first step to achieving energy justice[8], developing a common language and understanding can play a crucial role in establishing the parameters and delivery of justice.

This paper tackles this challenge head on, via two primary aims: 1) to define and compare key terms used to describe energy-related hardship; and 2) to evaluate each concept

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[1] Kirsten Jenkins, Darren McCauley, Raphael Heffron, Hannes Stephan and Robert Rehner. "Energy Justice: A Conceptual Review." *Energy Research & Social Science* 11 (2016): 174-182.

[2] Kirsten Jenkins, Darren McCauley, Raphael Heffron and Hannes Stephan. "Energy Justice, A Whole Systems Approach." *Queen's Political Review* 2 (2014): 74-87.

[3] Benjamin K. Sovacool, Matthew Burke, Lucy Baker, Chaitanya K. Kotikalapudi and Holle Wlokas. "New Frontiers and Conceptual Frameworks for Energy Justice." *Energy Policy* 105 (2017): 677-691.

[4] Benjamin K. Sovacool and Michael H. Dworkin. "Energy Justice: Conceptual Insights and Practical Applications." *Applied Energy* 142 (2015): 435-444.

[5] Kirsten Jenkins, Jennie C. Stephens, Tony G. Reames and Diana Hernández. "Towards Impactful Energy Justice Research: Transforming the Power of Academic Engagement." *Energy Research & Social Science* 67 (2020): 101510.

[6] Stefan Bouzarovski and Saska Petrova. "A Global Perspective on Domestic Energy Deprivation: Overcoming the Energy Poverty–Fuel Poverty Binary." *Energy Research & Social Science* 10 (2015): 31-40.

[7] Kang Li, Bob Lloyd, Xiao-Jie Liang and Yi-Ming Wei. "Energy Poor or Fuel Poor: What Are the Differences?" *Energy Policy* 68 (2014): 476-481.

[8] David Schlosberg. *Defining Environmental Justice: Theories, Movements, and Nature*. (Oxford, Oxford University Press, 2009).

in terms of its capacity to achieve energy justice. We begin by offering a comprehensive summary of key terms presently in operation via a comparative review of extant research and policy documents related to these existing concepts. We then assess these terms via established energy justice tenets – recognition, distributional and procedural – posing key questions in each domain to evaluate the extent to which each concept advances these justice components. Based on the findings, we propose opportunities for using the clarified conceptualizations and connected evidence to tackle energy injustice so as to achieve a sustainable energy future underpinned by fairness, equity and inclusion.

2. Defining and comparing key terms that describe energy-related hardship

We conducted an extensive literature review of terms used to characterize energy-related hardship[9] across academic journals and policy reports with particular emphasis on articles published between 2012 and 2020. We accessed relevant research using a combination of keyword searches on journal databases and cross-referencing cited works. Through this process, we identified five key terms that appear most frequently in the literature: 1) fuel poverty; 2) energy burden; 3) energy poverty; 4) energy insecurity; and 5) energy vulnerability. We then analysed the articles via a process of collective discussion, debate and interpretation among the authors, distilling the salient themes for each key term. This was continued iteratively throughout the writing process as we cross-checked and validated statements to ensure they were evidence-based and accurately represented the cited articles and wider literature.

Some limitations of our approach should be acknowledged. This present paper is not a 'systematic' review of every paper published on energy-related hardship between 2012-2020. Instead, it is a 'narrative' literature review focused on exploring the thematic underpinnings of the terms identified in our search. We focused less on empirical outcomes and more on the terms used to distinguish between their definition, scope and relevance to the energy justice framework. Additionally, most of the scholarship we reviewed were by European or US-based authors writing predominantly about the 'Global North' context (and primarily the US, UK, and the EU), with fewer sources written by authors from or writing about the 'Global South' given the unique differences in how energy justice might be achieved in these varied contexts. The scholarship reviewed for this study reflects a thorough scope of the field within these parameters. A systematic review that includes scholarship from a wider geographical range would build on the insights offered herein.

The concepts also stem from varied disciplines such as the social sciences, public policy, public health, and energy and the environment. In Table 1 below, we organize the terms conceptually with 'fuel poverty' and 'energy burden' primarily describing affordability challenges, 'energy poverty' representing initially a lack of access to energy (particularly in the 'Global South' context) though more recently referring to affordability issues, and finally,

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[9] We use the term 'energy-related hardship' as a 'neutral' term to refer to overarching problem of inadequate energy services in the home, which all five key terms analysed in this paper ultimately focus on.

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'energy insecurity' and 'energy vulnerability' highlighting the structures and processes that produce energy-related hardship along with the adverse consequences associated with this phenomenon.

[INSERT TABLE 1: Comparing the terms across key dimensions]

Looking across the variety of terms used in relation to energy-related hardship, a number of core commonalities and differences can be identified. The first key area of comparison is the particular form of energy-related hardship that the terms usually describe. 'Fuel poverty' and 'energy burden' have tended to focus on *affordability* – they relate to a household being unable to attain sufficient and essential energy services, such as a warm home, at an affordable cost[10]. 'Energy poverty', meanwhile, has had the most diverse usage of all the terms. It has evolved from a focus on inadequate electrification and reliance on solid fuels in the Global South context[11], to now also frequently describing household problems with attaining sufficient energy services for a whole variety of reasons – including, but not limited to, challenges relating to affordability (as with fuel poverty and energy burden)[12-13]. 'Energy insecurity' and 'energy vulnerability' incorporate but extend beyond affordability and access to describe parallel dimensions of energy-related distress. Both concepts highlight the *temporally dynamic* nature of energy-related hardship, with households potentially moving 'in' and 'out' of difficulty over time, and seek to understand the causal factors behind such dynamics.[14] In this regard, 'energy insecurity' distinguishes between 'acute' and 'chronic' instances of energy-related hardship – differentiating, for example, between sudden energy access interruptions (i.e. power outages) with long-term affordability challenges[15]. In this regard, the energy insecurity differentiates between extrinsic factors related to climate change (i.e. extreme heat) that have population-wide impacts and intrinsic vulnerabilities that are more specific to an individual or household (i.e. poverty or chronic health conditions) and represent circumstances that can change over time.[15] It should be noted here that 'energy insecurity', as used in this paper, is somewhat different to the more well-known concept of 'energy security'[16-17]. The latter term has

[10] Brenda Boardman. *Fixing Fuel Poverty: Challenges and Solutions.* (London, Routledge, 2010).

[11] Ambuj D. Sagar. "Alleviating energy poverty for the world's poor." *Energy Policy* 33 (2005), 1367-1372.

[12] Stefan Bouzarovski, Harriet Thomson, Marine Cornelis, Ivana Rogulj, Maria Campuzano, and Stefan Goermaere. "Transforming energy poverty policies in the European Union: second annual report of the European Union Energy Poverty Observatory." *EU Energy Poverty Observatory: Manchester, UK* (2019): 20-01.

[13] Audrey Dobbins, Francesco Fusco Nerini, Paul Deane, and Steve Pye. "Strengthening the EU response to energy poverty." *Nature Energy* 4(1) (2019):.2-5.

[14] Stefan Bouzarovski "Energy poverty in the European Union: landscapes of vulnerability." *WIRES Energy and Environment* 3(3) (2014): 276-289

[15] Sonal Jessel, Samantha Sawyer and Diana Hernández. "Energy, Poverty, and Health in Climate Change: A Comprehensive Review of an Emerging Literature." *Frontiers in Public Health* 7 (2019): 357.

[16] Christian Winzer. "Conceptualizing Energy Security". *Energy Policy* 46 (2012): 36-48.

[17] Andreas Löschel, Ulf Moslener and Dirk TG Rübbelke. "Indicators of Energy Security in Industrialised Countries." *Energy Policy* 38 (2010): 1665-1671.

focused on security of energy supply, typically at the scale of a country or region, often in relation to issues of national security[18] and geopolitics[19].

A second fundamental difference between the concepts is their core theoretical focus. 'Fuel poverty', 'energy burden', and 'energy poverty' are all descriptors of a particular circumstance or state at a particular moment or period of time. In contrast, 'energy insecurity' and 'energy vulnerability' are process-based – they emphasise the conditions and dynamics that *cause* energy-related hardship. Both concepts seek to capture the household-scale circumstances and 'upstream' conditions (e.g. economic, social and physical factors) that lead to energy-related hardship,[20] whilst energy insecurity research has also examined the consequences for human health and wellbeing[21] in the context of climate change.[15]

Third, the concepts each have different geographies and, to some extent, appear in different literatures. The most established concept is 'fuel poverty', which has spanned multiple geographic contexts although has been predominantly used in Britain, Northern Ireland[22] and New Zealand[23]. 'Energy burden' and 'energy insecurity' emerged in the US context, with divergent origins in social policy and safety net benefits on the one hand, and academic research primarily in the fields of public health and the social sciences. 'Energy poverty' has the widest geographical spread, being commonly used in Africa, Europe, North America, South Asia and East Asia[24]. Finally, 'energy vulnerability' has been used largely in the European context, despite its potential to comprehensively capture lived experiences. Therefore, it can be argued that, other than energy poverty, these various terms remain confined within the silos of distinct bodies of literature and geographic contexts – a disjuncture that potentially undermines opportunities to promote more unified scientific and policy advances[25] that transcend geographic and disciplinary boundaries to achieve energy justice.

[18] Qiang Wang and Kan Zhou. "A Framework for Evaluating Global National Energy Security." *Applied Energy* 188 (2017): 19-31.

[19] E. Bompard, A. Carpignano, M. Erriquez, D. Grosso, M. Pession, and F. Profumo. "National Energy Security Assessment in a Geopolitical Perspective." *Energy* 130 (2017): 144-154.

[20] Stefan Bouzarovski, Sergio Tirado Herrero, Saska Petrova, Jan Frankowski, Roman Matoušek and Thomas Maltby 'Multiple transformations: theorizing energy vulnerability as a socio-spatial phenomenon', *Geografiska Annaler: Series B, Human Geography* 99(1) (2017): 20-41.

[21] Diana Hernández and Eva Siegel "Energy insecurity and its ill health effects: A community perspective on the energy-health nexus in New York City." *Energy Research & Social Science* 27 (2019): 78-83

[22] Ryan Walker, Christine Liddell, Paul McKenzie, Chris Morris and Susan Lagdon (2014) 'Fuel poverty in Northern Ireland: Humanizing the plight of vulnerable households', *Energy Research & Social Science* 4: 89-99

[23] Kimberley O'Sullivan et al 'Cool? Young people investigate living in cold housing and fuel poverty. A mixed methods action research study', *SSM – Population Health* 3, (2017): 66-74.

[24] Karl-Michael Brunner, Sylvia Mandl, and Harriet Thomson. "Energy Poverty: Energy equity in a world of high demand and low supply." In Debra J. Davidson and Matthias Gros*s (Eds.), Oxford Handbook of Energy and Society*. (New York, Oxford University Press, 2018): 297-316.

Katrin Großmann and Antje Kahlheber. "Energy Poverty in an Intersectional Perspective: On Multiple Deprivation, Discriminatory Systems and the Effects of Policies." In Neil Simcock, Harriet Thomson, Saska Petrova, and Stefan Bouzarovski (Eds.), *Energy Poverty and Vulnerability: A Global Perspective*. (London, Routledge, 2018).

[25] Elizabeth E. Blakelock, "What Role Did Knowledges of 'Consumers' Play in the Formulation of GB Energy Market Regulation Between 2000 and 2016?," (Ph.D. diss., University of East Anglia, 2020).

3. Evaluating the concepts through the tenets of energy justice

In service to the second aim of this paper, we now describe the tenets of energy justice, which include recognition, procedural and distributional justice. For each of these tenets, we propose a set of normative principles for reducing the injustice of energy-related hardship. We then analyse how the previously outlined concepts align with evaluative criteria that we have established in each of these domains of energy justice. We discuss recognition first because we view it as inherently foundational to achieving procedural and distributional justice[26-27]. Beyond the three tenets, we note that another important evaluative criterion is metrics[28] for measuring policy actions and impact on achieving energy justice.

[INSERT TABLE 2- Comparing the terms across justice dimensions]

3.1 Recognition Justice

Recognition justice refers to the acknowledgment of, and respect for, the complex circumstances and vulnerabilities of individuals and social groups in patterns of cultural value[29]. Misrecognition, the antonym of recognition justice, is the systemic subordination of a person or group's social status in the patterns of cultural value of a dominant group, such that they are unable to participate as an equal in society[30]. Crucially for our paper, language and terminology is central to the communication of recognition and misrecognition[31]. As Clarke and Cochrane state, "How we name things affects how we behave toward them. The name, or label, carries with it expectations"[32]. Therefore, the terminology used to describe energy-related hardship are not innocent, but actively contain certain connotations that are important for recognition justice, and ultimately procedural and distributional justice also. We posed the following four principles/criteria while evaluating the terms in their ability to deliver recognition justice:

1. **Acknowledges the particular (dis)advantages and circumstances of all social groups.** Recognition justice requires respect for the humanity of all people and an acceptance of cultural, social, political, ethnic, racial and gender differences, and associated needs, and circumstances. As it relates to energy-related hardship, this means recognising the differential energy service needs and unequal disadvantages of specific populations.

While low-income households, and to varying degrees, single family home dwellers, tenants, and single parents, are acknowledged as potentially disadvantaged by all of the concepts,

[26] Axel Honneth. "Integrity and Disrespect: Principles of a Conception of Morality Based on the Theory of Recognition." *Political Theory* 20 (1992): 187-201.

[27] David Schlosberg. *Defining Environmental Justice: Theories, Movements, and Nature*. (Oxford, Oxford University Press, 2009).

[28] Siddharth Sareen. "Report and Toolkit." *ENGAGER Training School 2: Mainstreaming Innovative Energy Poverty Metrics.* Available at http://www.engager-energy.net/trainingschool2/

[29] Nancy Fraser. *Justice Interruptus: Critical Reflexions on the "Postsocialist" Condition*. (New York, Routledge, 1997).

[30] Ibid.

[31] Ruth Lister. *Poverty*. (Cambridge, Polity, 2004).

[32] Esther Saraga (Ed.) *Embodying the Social: Constructions of Difference*. (London, Routledge, 1998).

there are also distinctions between them. For instance, the 'fuel poverty' and 'energy poverty' discourses have historically placed emphasis on the vulnerability of those who are elderly, disabled or suffering from a long-term illness[33-34]. In contrast, 'energy burden' and 'energy insecurity', because of their roots in the US context, have highlighted the disproportionate risks faced by racial and ethnic minorities - bringing to the fore an issue that has less frequently been discussed in the fuel or energy poverty literature[35].

2. **Acknowledges heterogeneous energy needs.** Closely related to above is respect for the fact that different individuals or social groups may have different energy service needs.

The dominant discourse around 'fuel poverty' has emphasised space-heating– indeed, in a discursive sense the word 'fuel' tends to draw attention to heating fuel over other energy services (such as lighting)[36]. 'Energy burden', has emphasised the affordability of space heating, but also, perhaps a consequence of its usage in the warm climates of the American south, of space *cooling* during the summer months – an issue also prevalent and often overlooked in Europe[37]. Research into 'energy insecurity', 'energy vulnerability', and 'energy poverty' has been more diverse in recognising multiple types of energy services essential in daily life, although there remains more to do in this regard.

3. **Acknowledges the systemic causes of energy-related deprivation**. A full understanding of, and respect for, the circumstances of households suffering from energy-related distress necessitates an acknowledgement of its underlying causes, including those that extend beyond the home.

Fuel poverty research and policy has been built around the classic triad of causal drivers originally proposed by Boardman[38] (low household income, poor energy efficiency of the home and appliances, and high energy costs), and this has remained dominant in policy discourse and academic research. Although clearly valuable, this triad of factors has been critiqued as too narrow[39], and for centring attention onto the scale of the home and thus failing to connect energy-related hardship to deeper, structural causes and external factors[40-

[33] Rosie Day and Russell Hitchings. "'Only Old Ladies Would Do That': Age Stigma and Older People's Strategies for Dealing with Winter Cold." *Health & Place* 17 (2011): 885-894.

[34] Ross Gillard, Carolyn Snell and Mark Bevan. "Advancing an Energy Justice Perspective of Fuel Poverty: Household Vulnerability and Domestic Retrofit Policy in the United Kingdom." *Energy Research & Social Science* 29 (2017): 53-61.

[35] Diana Hernández amd Stephen Bird. "Energy Burden and the Need for Integrated Low-Income Housing and Energy Policy." *Poverty & Public Policy* 2 (2010): 5-25.

[36] Neil Simcock, Gordon Walker and Rosie Day. "Fuel Poverty in the UK: Beyond Heating?" *People, Place and Policy* 10 (2016): 25-41.

[37] Harriet Thomson, Neil Simcock, Stefan Bouzarovski and Saska Petrova. "Energy poverty and indoor cooling: An overlooked issue in Europe." *Energy & Buildings* 196 (2019): 21-29.

[38] Brenda Boardman. *Fuel Poverty: From Cold Homes to Affordable Warmth.* (London, Pinter Pub Ltd., 1991).

[39] Lucie Middlemiss and Ross Gillard. "Fuel Poverty from the Bottom-Up: Characterising Household Energy Vulnerability through the Lived Experience of the Fuel Poor." *Energy Research & Social Science* 6 (2015): 146-154.

[40] Stefan Bouzarovski and Neil Simcock. "Spatializing Energy Justice." *Energy Policy* 107 (2017): 640-648.

[41]. In contrast, the concepts of 'energy vulnerability' and 'energy insecurity' have sought to provide more comprehensive understandings of the driving forces of energy-related hardship, highlighting factors such as household energy needs[42], energy transitions[43], economic austerity[44] and climate change[15]. More recent research into energy poverty has also begun to explore the wider socio-political processes underpinning the condition[45]. An arguable discursive limitation of 'energy insecurity' is its similarity to the notion of national 'energy security', which could lead to misunderstandings and misdirected focus among policy-makers. On the other hand, the similarity could also be beneficial for highlighting the connections between domestic-scale insecurity and global processes as illustrated by the example of the 1973 oil crisis described below. 'Energy security' research has also begun to consider issues of energy affordability[46-47].

4. **Non-stigmatizing in its representation of households suffering from energy-related hardship**. Cutting across all of the above points is the need for any terminology referring to energy hardship to not stigmatise households.

The terms 'poverty' (as used in fuel and energy poverty) and 'vulnerability' have both been critiqued as having stigmatizing connotations, as it is claimed that both draw attention to the characteristics and 'Otherness' of individuals as the primary causes of hardship[48-49]. Indeed, centering focus on 'disadvantaged households' can be (often unintentionally) stigmatizing, as it contributes to the construction of such households as 'different' from the wider population[50]. Challenging such stigma includes providing space to acknowledge the structural causes of hardship, as well as recognizing the agency of households rather than portraying them as passive victims. In this regard, we would argue that a potential benefit of the language of 'energy insecurity' is that the term 'insecurity' implies a *situation or context* that a person finds themselves within – it thus decenters the individual, and places greater focus on structural drivers.

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[41] Saska Petrova. "Encountering Energy Precarity: Geographies of Fuel Poverty among Young Adults in the UK." *Transactions of the Institute of British Geographers* 43 (2017): 17-30.
[42] Caitlin Robinson, Sarah Lindley and Stefan Bouzarovski "The Spatially Varying Components of Vulnerability to Energy Poverty" *Annals of the Association of American Geographers,* 109, (2019): 1188-1207
[43] Stefan Bouzarovski, Sergio Tirado Herrero, Saska Petrova, Jan Frankowski, Romoan Matoušek and Tomas Maltby. "Multiple Transformations: Theorizing Energy Vulnerability as a Socio-Spatial Phenomenon." *Geografiska Annaler: Series B, Human Geography* 99 (2017): 20-41.
[44] Saska Petrova 'Illuminating austerity: Lighting poverty as an agent and signifier of the Greek crisis', *European Urban and Regional Studies* 25, (2018): 360-372
[45] Katrin Grossmann, George Jiglau, Ute Dubois, Anca Sinea, Fernando Martín-Consuegra, Malgorzata Dereniowska, Robert Franke, Rachel Guyet, Ana Horta, Filiz Katman, Louiza Papamikrouli, Raúl Castano-Rosa, Leona Sandmann, Ana Stojilovska, Anais Varo "The critical role of trust in experiencing and coping with energy poverty: Evidence from across Europe" *Energy Research and Social Science,* 76, (2021)
[46] Benjamin K. Sovacool & Ishani Mukherjee. "Conceptualizing and Measuring Energy Security: A Synthesized Approach." *Energy* 36 (2011): 5343-5355.
[47] Gavin Bridge, Stewart Barr, Stefan Bouzarovski, Michael Bradshaw, Ed Brown, Harriet Bulkeley and Gordon Walker. *Energy and Society: A Critical Perspective.* Abingdon: Routledge
[48] Ruth Lister. *Poverty.* (Cambridge, Polity, 2004).
[49] Carraro, V., Visconti, C. and Inzunza, S. 'Neoliberal urbanism and disaster vulnerability on the Chilean central coast', *Geoforum,* 121, (2021): 83-92
[50] Ruth Lister. *Poverty.* (Cambridge, Polity, 2004).

3.2 Procedural Justice

Procedural justice relates to fairness in decision making processes, including those that develop and deliver policies that impact people's ability to secure energy services[51]. Procedures impacting affordable, accessible energy services apply at multiple levels of governance with international, national, community and hyper-local policies and schemes. Having a recognizable and actionable descriptor for the specific barriers to and challenges of household energy is important for securing commitment from the multiple levels of governance[52] [53] [54]. In this realm, there may be some compromise between acknowledging the complex nature of individual experiences and using a generalized descriptor in decision-making. We evaluate the five concepts with respect to procedural justice along two principles:

1. **Politicizes the issue** to help ensure that the issue is recognized and treated as an inherently political problem that should be incorporated into governance structures and policy-making;
2. **Encourages the inclusion of affected populations in decision-making processes**. As Walker and Day[55] emphasise, procedural justice requires the ability to hold powerful institutions and organisations to account, necessitating opportunities for the representation of affected people in decision-making.

There is wide variability in the politicization of the terms, reflecting differences in the overall conceptualization, evidence-base and policy responses in the respective countries. The terms 'energy poverty' and 'fuel poverty' have achieved political commitments to deliver policies and schemes to support affected households, especially those considered deserving such as the elderly and medically vulnerable.[56,57] The impact of the 1973 oil crisis on low-income and elderly households' ability to meet their energy needs led to the initial beginnings of 'energy burden' and 'fuel poverty' being politicized in the US and UK, respectively. However, the two countries have diverged from that point – whilst 'fuel poverty' as a concept increased in salience in the UK in the 1990s, leading the 2001 Fuel Poverty Strategy, the US still lacks a federal strategy for formally recognizing, defining and reducing energy-related deprivation[58].

[51] Neil Simcock. "Procedural Justice and the Implementation of Community Wind Energy Projects: A Case Study from South Yorkshire, UK." *Land Use Policy* 59 (2016): 467-477.
[52] Stefan Bouzarovski and Saska Petrova. "A Global Perspective on Domestic Energy Deprivation: Overcoming the Energy Poverty–Fuel Poverty Binary." *Energy Research & Social Science* 10 (2015): 31-40.
[53] Kang Li, Bob Lloyd, Xiao-Jie Liang and Yi-Ming Wei. "Energy Poor or Fuel Poor: What Are the Differences?" *Energy Policy* 68 (2014): 476-481.
[54] Harriet Thomson, Carolyn J. Snell and Christine Liddell. "Fuel Poverty in the European Union: A Concept in Need of Definition?" *People, Place & Policy* (2016): 5-24.
[55] Gordon Walker and Rosie Day. "Fuel Poverty as Injustice: Integrating Distribution, Recognition and Procedure in the Struggle for Affordable Warmth." *Energy Policy* 49 (2012): 69-75.
[56] Aimee Ambrose, Will Eadson and Jan Gilbertson "Editorial: PPP special issue – International Perspectives on Fuel Poverty" *People, Place and Policy* 10 (2016): 1-4
[57] EU Energy Poverty Observatory (2021). Available at: https://www.energypoverty.eu/
[58] Dominic J. Bednar and Tony G. Reames. "Recognition of and Response to Energy Poverty in the United States." *Nature Energy* 5.6 (2020): 432-439.

Whilst the term 'poverty' can be stigmatizing, it also carries political weight in a way that more sanitized language may not[59], thus potentially serving as a basis to problematize hardships and call for political action. This point is most evidenced by the long history of policies addressing fuel poverty in the UK, and the rise of various advocacy groups who seek to keep the issue on the political agenda. More recently, the concept of 'energy poverty' has begun to achieve more widespread political recognition in Europe by a growing number of non-governmental agencies, coalitions and grassroots organizations.[60] However, the stigmatizing nature of the term has also functioned as a barrier to direct citizen participation in governance processes and support schemes available 'on the ground', since many people do not relate to the notion of experiencing 'fuel poverty' or 'energy poverty'[61].

'Energy vulnerability' has not been widely politicised and remains predominantly an academic term, with 'energy poverty' the dominant discourse in the European context. The concept of 'vulnerability' has been critiqued as technocratic and managerial and thus depoliticising, but others have defended the term and argued that it does have deeply political roots.[62]

Outside of the UK, other countries are relatively behind in terms of procedural justice. In the US, the concepts of 'energy burden' and 'energy insecurity' have not been sufficiently politicized to inspire widespread social movements and policy initiatives organized around these respective terms. To some degree, this is a manifestation of the nascent nature of these concepts and their correspondingly scant evidence base, and a persistent disconnect between research, policy and advocacy[63]. However, new momentum especially around energy and climate justice may soon close this gap. One key step is the increasing attention paid, including among government sources, to tracking 'energy insecurity' above and beyond fuel assistance[64,65,66]. As a concept that attempts to highlight the underlying structures producing hardship, 'energy insecurity' does have potential as a politicizing notion as seen with food and housing insecurity. Discursively framing energy-related hardship as a 'security' issue can raise its level of importance, helping to make it a 'priority risk' and 'strategic concern' for governments[67]. Moreover, leveraging the potential of 'energy insecurity' and 'energy burden'

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[59] Ruth Lister. *Poverty.* (Cambridge, Polity, 2004).

[60] Right to Energy Coalition (2021) https://righttoenergy.org/

[61] Elizabeth E. Blakelock, "What Role Did Knowledges of 'Consumers' Play in the Formulation of GB Energy Market Regulation Between 2000 and 2016?," (Ph.D. diss., University of East Anglia, 2020).

[62] Carraro, V., Visconti, C. and Inzunza, S. 'Neoliberal urbanism and disaster vulnerability on the Chilean central coast', *Geoforum,* 121, (2021): 83-92.

[63] Liv Yoon and Diana Hernández. "'Energy, Energy, Read All About It': A Thematic Analysis of Energy Insecurity in The U.S. Media From 1980-2019." *Energy Research and Social Science* 74 (2021)*: 101972.

[64] Allie McGranaghan. "Energy Insecurity Workgroup Facilitation: Framework Implementation and Guidebook." (Report for Learning and Action Alliance Framework. Arizona State University, 2020). Available at https://repository.asu.edu/attachments/238167/content/Applying%20the%20Learning%20and%20Action%20Alliance%20Framework-%20Energy%20Insecurity%20in%20Maricopa%20County.pdf.

[65] Iverson, Sally Ann, Aaron Gettel, Carla P. Bezold, Kate Goodin, Benita McKinney, Rebecca Sunenshine, and Vjollca Berisha. "Heat-associated mortality in a hot climate: Maricopa County, Arizona, 2006-2016." *Public Health Reports* 135, no. 5 (2020): 631-639.

[66] University of Minnesota. "Energy Insecurity and Public Health: Going Further through Cross- Sector Collaboration." Interdisciplinary Research Leaders. Available at https://irleaders.org/team/team-arizona/

[67] Gavin Bridge, Stewart Barr, Stefan Bouzarovski, Michael Bradshaw, Ed Brown, Harriet Bulkeley and Gordon Walker. *Energy and Society: A Critical Perspective* (2018), Abingdon: Routledge.

as relatively non-stigmatizing terms may also help encourage the inclusion of affected populations in decision-making processes. As above, a potential risk is conflations between domestic energy insecurity with national energy security, and so academics and advocates will need to carefully communicate the differences – but also the interconnections – between these two issues.

3.3 Distributional Justice

Distributional justice relates to whether material resources and burdens are shared across society and space[68-69]. Arguments about distributional inequities have long been at the forefront of analysis on the impacts of energy systems, is a central issue in energy-related hardship[70-71]. Our analysis of different concepts of energy-related hardship evaluates each in terms of two distributional justice principles:

1. **Comprehensive in the solutions it promotes.** A lack of access to affordable domestic energy is a complex problem driven by multiple and interlinked processes operating at multiple scales. Hence, policy strategies to address the issue need to be comprehensive[72].

Academic recommendations and policy measures to combat fuel poverty, energy poverty and high energy burdens have included: first, financial assistance measures via social welfare payments; second, subsidized grants to help individual households cover the installation cost of energy efficiency retrofits; third, interventions to lower or control energy prices. Energy efficiency policies have been shown to deliver long-term benefits to households, reducing financial burdens, improving home and appliance performance and lessening health risks, thereby tackling the critical driver of household energy problems[73]. Yet, a common limitation of the policy packages currently in place is their emphasis on the household scale and aiding those directly suffering from energy-related hardship, with much less attention being paid to the wider energy system and, even more fundamentally, how energy is situated as a social, political, economic and cultural issue in society[74]. Policies in this vein would challenge 'upstream' factors, such as contending with the right to household energy or the practices of energy companies and markets, as well as issues relating to housing

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market segregation[75], low-wages, and unequal divisions of labour[76-77]. Nevertheless, these fundamental factors are seldom put forward in policy or even discussed in academic literature on fuel or energy poverty[78]. As noted earlier, the notion of 'poverty' does have a history of abstracting the circumstances of deprived households from the wider processes that have created their situation[79]. The terms 'energy insecurity' and 'energy vulnerability' offer the potential for more comprehensive and emancipatory policy packages since they both bring into view the temporal dynamics and structural underpinnings, operating at scales beyond only the household, that reproduce hardship and impede energy transitions[80].

2. **Fairness in the targeting of solutions.** In addition to being comprehensive, it is also important that policy amelioration measures are directed in an 'equitable' manner – typically understood as targeting those in greatest *need[81]*.

Fuel and energy poverty alleviation policies in various parts of the world have typically been targeted at households deemed to be low-income (often via proxies such as being in receipt of means-tested social benefits). It has been argued that such targeting measures miss a large proportion of energy/fuel poor households, by failing to consider other factors that can lead to energy-related hardship, such as the energy efficiency of the home and broader infrastructural problems[82-83]. Indeed, Forrester and Reames[84] propose an 'energy efficiency coverage gap' equation that yields the number of households missed when the sole focus is on income against the federal poverty level as qualification parameters for government-backed efficiency upgrades. This predominant focus on low-incomes may again be partly the result of the dominant connotations of the term 'poverty', which in many societies is strongly associated with low-incomes. Indeed, research has highlighted how in some contexts policy-actors can fail to understand the distinction between 'poverty' and 'energy/fuel poverty'[85]. Furthermore, the focus on *household* income can also obscure intra-

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household inequalities, such as the heightened vulnerability of women to the harmful consequences of energy poverty[86] or the medically vulnerable to climate change[15].

In the US context, policies informed by the 'energy burden' concept have focused predominantly on low-income households, but there has also been a greater acknowledgement of the differential risks experienced by black and ethnic minority communities and the opportunity for greater alignment of housing and energy policy[35]. 'Energy insecurity' has gone further to propose structural interventions including (re)investment in housing through energy efficiency measures to achieve racial/energy justice, given that this phenomenon disproportionately affects people of color across the economic spectrum, especially African Americans.[87-88]

Recent moves to 'area-based' energy efficiency retrofits offer the potential for more equitable targeting solutions to address the spatial concentration of inefficiency and energy cost burdens[89-90]. The energy vulnerability framework may be useful here, as it can highlight a wider range of contingencies that can render places vulnerable to energy hardships than is typically captured through the lenses of energy and fuel poverty[91]. However, Bouzarovski and Simcock[92] argue that when undertaken alone, area-based policies run the risk of presenting this issue as somehow *internal* to particular places or communities – thus creating potential issues around the stigmatization and misrecognition of places[93-94], and marginalizing the wider systems and processes that help to reproduce deprivation. They therefore argue for a comprehensive, multi-scalar strategy, involving not only the targeting of support at vulnerable households, or even communities, but *also* interventions to reconfigure energy systems and deeper social structures[95].

4. Concluding Discussion

The necessity of naming a problem, and thereby identifying a clear objective that facilitates movement from injustice to justice, has been seen previously through the crusade for environmental justice. Without a codified name for the injustices experienced by those unable to meet household energy needs, the comparatively undersized call for energy justice will continue to lack direction and measurable impact. Appropriate labelling can broaden the scope of disputes that may emerge, shift societal views and norms about the centrality of

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energy in everyday life, and cultivate cross-border collaboration and learning among academics, activists and policy-makers.

Our first aim in this paper was to clarify the histories, similarities and differences between five of the main terms (fuel poverty, energy burden, energy poverty, energy vulnerability and energy insecurity) used to describe situations where a household is unable to attain adequate energy services in the home. Table 2 summarises these findings. Our hope is that by clarifying overlaps and distinctions, we can help greater clarity and recognition – an important first step to achieving energy justice.

As we demonstrate above, there is wide variability in the ways in which energy-related hardships have been perceived as an injurious experience, as well as which segments of the population are most adversely affected and deserving of attention and assistance. In this sense, 'fuel poverty' represents the most institutionalized concept as it acknowledges this state/situation as a unique social problem that is particularly detrimental to the elderly and medically vulnerable. Its relatively narrow definition and focus have allowed the concept to rather successfully proceed along the policy course by clearly identifying a problem (low income, high costs), accountable parties (policy-makers) and policy-based remedies (subsidies for target populations). However, broader definitions of the problem that are captured in concepts such as 'energy poverty', 'energy insecurity', and 'energy vulnerability' raise the stakes by acknowledging a wider array of injuries to be acknowledged by a broader base of the population. For instance, 'energy insecurity' encompasses a wider spectrum of harms associated with the loss of power, ranging from utility shut-offs due to non-payment to power outages incited by climate-related disasters. Thus, naming the problem in a more inclusive way casts a wider net on perceived injuries for larger segments of the population leading to various solutions to address this complex issue.

We have also evaluated each concept in relation to eight principles of energy justice. From our analysis, none of the concepts is clearly and unequivocally the 'best' in terms of enabling energy justice. Rather, each brings their own benefits, limitations and nuances. Fuel poverty and energy burden are easy to measure (bills to income ratio), whereas energy poverty has been the most adaptable shifting from a focus on access to encompassing affordability and the just transition in various geographic contexts. Energy insecurity and energy vulnerability reveal the multidimensional causes and manifestations of the inability to meet domestic energy needs, whilst being more inclusive and reflective of the various groups affected by this phenomenon. Moreover, energy insecurity has expanded the conversation to include climate change thereby accounting for individual/household-level factors and external stressors with population-wide impacts. The labels of 'insecurity' and 'burden', use language that is non-stigmatizing compared to 'poverty' and 'vulnerability', thus further contributing to recognition and procedural justice.

Based on the evidence presented here, we would argue that on balance 'energy insecurity', and to a lesser extent 'energy vulnerability' (although this has the limitation of being potentially stigmatising), offer some of the greatest promise for achieving energy justice as concepts that are able to reveal multidimensional causes, manifestations of, and groups affected by, the inability to meet domestic energy needs. By acknowledging diversity in circumstances, needs and systemic causes (recognition justice), these concepts can help to

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politicize energy-related hardship and ensure the representation of affected groups in decision-making (procedural justice), as well as contribute to more comprehensive and better targeted amelioration measures (distributional justice) in their respective contexts.

There is a need, however, to be pragmatic and sensitive to political and social context. For example, due to the extensive work of scientific and advocacy groups the notion of 'energy poverty' has recently gathered political momentum in Europe, with several countries now recognising and developing policies to alleviate it. Given this progress, it would be unhelpful for the achievement of energy justice to wholly change the political discourse from 'energy poverty' with 'energy insecurity/vulnerability' (although these latter concepts will remain valuable within scientific debates). In short, other terms are not without merit and will continue to be useful in particular contexts and circumstances.

Attention to incisive and inclusive labelling, we have argued, provides enhanced opportunities for 'access to justice'. However, those efforts are impeded by social inequality at all levels of this process, especially in the earlier stages where the effects of inequality are 'harder to detect, diagnose and correct'[96]. For instance, advocacy and activist groups in the US have fast-forwarded efforts to advance energy efficiency for all[97] and disparities in utility disconnections[98]. While the urgency to act is a pressing concern, action regarding energy-related hardship should be premised on a comprehensive inventorying of the issues at hand, accompanied by a clear and comprehensive set of goals anchored in a unified voice that elevates a shared consciousness to move towards energy justice and more equitable societies. After all, energy justice is best delivered on clear terms.

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Table 1: Comparing the terms across key dimensions

	Definition	Form of hardship	Conceptual Emphasis	Temporal Variance	Geographic Reference	Primary Disciplines	Key documents
Fuel poverty	Inability to afford household energy services (often focused on heating and warmth); household budget allocation on energy costs in excess of 10% (original definition); low-income and high energy expenditure	Affordability	State/situation of hardship	Temporally static	United Kingdom/ Ireland/New Zealand	Social policy; geography; public health	Boardman, 1991; 2010; Warm Homes and Energy Conservation Act
Energy burden	Low-income, high energy expenditures; household budget allocation in excess of 6% (moderate) and 10% (severe)	Affordability	State/situation of hardship	Temporally static	United States	Social policy	APPRISE, 2005; ACEEE 2016; HHS, 2016; Reames, 2016
Energy poverty	Lack of access to electricity (early usage); inability to afford or attain household energy services (later usage)s	Access/ Affordability/ Multidimensional	State/situation of hardship	Temporally static	Global South (i.e. India, sub-Saharan Africa)/Asia/Europe (Greece)/United States	Development studies; social policy; geography	Bouzarovski 2014; Bouzarovski and Petrova, 2015;
Energy insecurity	Inability to adequately meet household energy needs with physical, economic and behavioral dimensions; trade-offs "heat or eat"	Multidimensional	Structures and pathways leading to hardship and its downstream consequences; relational to other hardships	Temporally dynamic	United States	Public health; social policy	Hernández, 2016; Cook et al., 2008; Murray, 2012 and 2014; EIA, 2017
Energy vulnerability	Factors affecting the likelihood a household will experience inadequate domestic energy services, and the risk of harmful consequences thereafter.	Multidimensional	Structures and pathways leading to hardship and negative health effects.	Temporally dynamic	United Kingdom and Europe		2000 Utilities Act; Bouzarovski & Petrova, 2015; Middlemiss & Gillard, 2015

	Fuel poverty	Energy burden	Energy poverty	Energy insecurity	Energy vulnerability
Recognition *Acknowledges heterogeneous energy service needs*	Relevant to all household energy needs, but historically focused mostly on heating and "affordable warmth"	Relevant to all household energy needs, but has tended to emphasize heating and cooling.	Originally referenced households and geographies lacking electrification; now open to affordability and attainment of domestic energy services broadly defined.	Has emphasised diverse energy services and needs broadly defined, sensitive to householder characteristics.	Has emphasised diverse energy services and needs broadly defined, sensitive to householder characteristics.
Predominantly acknowledged populations	Elderly; low-income; Households with children; renters	Low-income; racial/ethnic minorities; immigrants; renters; southeast region	Low-income; women; households with children; renters	Racial/ethnic minorities; immigrants; low-income; single parents; renters; rural; single family dwellers	Low-income; People with disabilities or pre-existing health conditions (with different energy needs); Households with children; Renters
Acknowledges the systemic causes of energy deprivation	'Triad' of causes influential, but recently critiqued for over-emphasis on household scale	Mostly limited to the efficiency of the home, but not systemic drivers of disadvantage.	Most research maintains focus on household scale, but some recent work focusing on systemic drivers of disadvantage.	Seeks to understand causal pathways from systemic to household drivers of disadvantage. Potential for confusion with national scale 'energy security', but also potential to highlight systemic links.	Maintains some focus on household scale but with a more diverse range of causal factors than fuel/energy poverty. Some recent work focusing on systemic drivers of disadvantage.
Non-stigmatising	The term 'poverty' can have stigmatising connotations and 'other' people suffering hardship. Poverty' can draw focus on the household scale and those suffering from the problem rather than the larger structural forces associated with inequality.	'Burden' is a relatively neutral term – implies an external pressure on the household, rather than internal fault.	The term 'poverty' can have stigmatising connotations and 'other' people suffering hardship	'Insecurity' has structural connotations that implies a pressure beyond households' control. May affect any member of society for different reasons, at different points in time.	'Vulnerability' is sensitive to the circumstances of inequality, but can also be disempowering and suggest the problem is 'internal' to individuals.
Procedural justice *Politicises issue*	The notion of fuel poverty has achieved some political recognition and action in the UK. The term 'poverty' carries political weight, and can act as a basis for political action and dialogue.	Not widely politicized, only used sporadically by practitioners.	The notion of energy poverty is beginning to achieve some political recognition and action in Europe. A long history of informing NGO and intergovernmental action in the Global South.	Not yet widely politicized or adopted by practitioners. Systemic/structural emphasis implies governmental action. A 'security' framing may also increase the political priority of the issue.	Not yet widely politicized or adopted by practitioners 'Vulnerability' potentially a more sanitized, technocratic and less political term than poverty, but energy vulnerability does seek to highlight systemic/ structural issues.

				The term 'poverty' carries political weight, and can act as a basis for political action and dialogue. .	
Encourages inclusion of lived experiences in evidence base and decision-making	Stigmatising connotations of the term 'poverty' can act as a barrier to citizen participation in governance and support schemes.	Mostly economic analysis related to income and energy expenditures.	Stigmatising connotations of the term 'poverty' can act as a barrier to citizen participation in governance and support schemes.	The operationalization of the term is premised on the lived experience, albeit earlier work framed it as a parallel concept to food insecurity without examining its internal dynamics.	Recognises and includes the dynamics and complexity of the lived experience. Some risk of the term 'vulnerability' being interpreted as stigmatising by householders.
Distributional justice					
Promotes comprehensive amelioration policies	Primarily focuses on the household scale and 'redistribution' via social welfare, with less attention to more fundamental structural issues.	Mostly not, as it refers primarily to fuel assistance, though some have argued for coordinated housing and energy policy in the low-income sector.	Primarily focuses on the household scale and 'redistribution' via social welfare, with less attention to more fundamental structural issues.	Thus far used to describe the problem without developed policy measures.. The concept could contribute to more comprehensive changes and as it draws attention to more structural issues beyond the household scale.	Thus far mostly used to describe the problem without developed policy measures. The concept could contribute to more comprehensive changes and as it draws attention to more structural issues beyond the household scale. Some risk that policy understandings of 'vulnerability' will emphasise internal 'faults' of households.
Promotes equitable targeting of amelioration policies	Policy measures often targeted based on income, potentially missing other disadvantaged households.	Policy measures often targeted based on income, potentially missing other disadvantaged households. But also some focus on racial/ethnic minority groups and particular regions that are underfunded due to cold weather bias in policy.	Policy measures often targeted based on income, potentially missing other disadvantaged households.	Early policy proposals in the US context have suggested targeting directly at racial and ethnic minority groups across the income spectrum. May enable more inclusive policy targeting by drawing attention to a wider range of contingencies increase the risk of energy-related hardship.	May enable more inclusive policy targeting by drawing attention to a wider range of contingencies increase the risk of energy-related hardship.

Table 2. Comparing the terms across justice dimensions