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Advancing an energy justice perspective of fuel poverty: Household vulnerability and domestic retrofit policy in the United Kingdom

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ABSTRACT

The concept of energy justice has brought philosophies of ethics and principles of social justice to bear on a range of contemporary energy issues. More inter-disciplinary and applied endeavours are now needed to take this field forward. One such application is to the issue of fuel poverty and the challenge of retrofitting inefficient housing stock. An energy justice perspective sees fuel poverty as a fundamentally socio-political injustice, not just one of uneven distribution. Starting from this premise, we highlight the multiple injustices faced by two groups who are regarded by policymakers as being particularly vulnerable to fuel poverty: disabled people and low-income families. In the UK, these groups are nominally prioritised within fuel poverty policy, but their complex situations are not always fully appreciated. Building on the theoretical foundations of energy justice, we present an inter-disciplinary dialogue that connects this approach with wider vulnerability research and domestic energy efficiency policy. Specifically, we discuss 'within group' heterogeneity (recognition justice), stakeholder engagement in policy and governance (procedural justice) and the overlap of multiple structural inequalities (distributional justice). In each section we illustrate the added value of combining justice and vulnerability conceptualisations by linking them to domestic energy efficiency schemes.

1. Introduction: understanding vulnerability to fuel poverty from a justice perspective

A number of academic books, journal issues and articles have sought to elaborate a history of, and future for, the notion of energy justice (e.g. [1]). Drawing on the more established traditions of social and environmental justice, they apply a range of philosophical principles and social science concepts to analyse contemporary issues related to energy systems, applying them to specific scales of governance and to the global political economy of energy as a whole [2–5]. Recent meta-reviews of this emerging field of research call for even greater synthesis across nations, and a whole systems approach [6,7], whilst others focus on household and community level issues [8–10]. Aligning more with the latter, our contribution brings the energy justice literature into dialogue with the broad notion of 'vulnerability' to offer some specific policy recommendations with regards to domestic energy efficiency.

Recent fuel poverty research has sought to engage with a more dynamic notion of 'energy vulnerability' in order to consider the social and political – in addition to the technical and economic – drivers of energy inequalities [11,12]. In social policy studies the concept of vulnerability is used to understand systemic drivers, and household level experiences, of deprivation. By drawing on this literature we open up another avenue of interdisciplinary work for the energy vulnerability concept, encouraging more consideration of the social and political drivers of certain groups' vulnerability to the experience of fuel poverty. Broadly, this work cuts across all four levels of energy social science set out by Spreng [13]: linking values and norms with pragmatic questions about the empirical reality of fuel poverty and inefficient housing. Specifically, we seek to extend reading of fuel poverty as injustice – first set out by Walker and Day [14] – by drawing on social policy insights about the nature of vulnerability and applying this to two groups that are disproportionately represented in fuel poverty statistics, but under-represented in research.

The rationale for focussing on disabled people and low-income families comes from both policy and research. In the UK's fuel poverty strategies, these two groups – along with older people – are officially recognised as being the most vulnerable [15,16]. This was reflected in the adoption of more stringent targets for eradicating fuel poverty among these groups,[1] as well as in the design of specific policy instruments. However, historically, the dominant political and public

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[1] Previously the target was to eradicate fuel poverty among these groups sooner than in the general population. Although this target was abandoned in 2015, targeting the most severely fuel poor and vulnerable is still an explicit 'guiding principle' for policymakers.

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discourse of fuel poverty has focussed on older people, resulting in relatively more policy instruments targeted at this group and a narrow stereotype equating fuel poverty with images of the 'old and cold' [17]. As Snell et al. [18] and Guertler and Royston [19] have already shown, disabled people and low-income families tend to be under-represented in these debates and in policy decisions, sometimes worsening the inequalities they face. As such, this review article contributes to achieving greater parity for these groups.

Disabilities studies and the literature on child poverty have a rich history of analysing injustice and vulnerability. They share a number of key concerns with regards to the causes and impacts of multiple forms of deprivation. The prevalence of poverty, and also fuel poverty, among disabled people is high due to various socio-economic barriers and is exacerbated by limitations around finding adequate housing and energy services [18,20,21]. Similarly many low-income families facing financial constraints live in poor quality housing, which has negative consequences for their children's well-being, psychological development and social mobility [22,23].

In the UK, economic austerity has hit both groups particularly hard. Both have seen significant cuts to their welfare provision as part of the government's agenda to 'get people off benefits and into work' [24]. However, this has led to thousands of disabled people being inappropriately declared 'fit for work' and suffering severe health consequences [25], and two thirds of children living in poverty continue to come from households where someone is employed in precarious or low-pay work [26,27]. These sorts of macro level pressures on income cross over with household level pressures (e.g. energy needs) to produce high levels of fuel poverty. Clearly then, a much more detailed understanding of the multiple drivers of these groups' vulnerability is needed in order to inform multiple policy agendas that have the potential to mitigate the pressures they face.

Following theories of social and environmental justice, energy justice is usually conceptualised as incorporating three distinct but interrelated forms of inequality: distribution (of goods and services among groups), procedure (for determining and contesting distribution), and recognition (of different groups' needs and rights) [5]. Each refers to specific aspects of injustice, but they are often co-extant and mutually reinforcing; or in Schlosberg's words 'one cannot simply talk of one aspect of justice without it leading to another' ([28]: 527). Illustrating this, Walker and Day [14] apply them to the issue of fuel poverty (see Fig. 1), arguing for greater consideration of recognition and procedural issues in order to remedy the fundamental distributional inequalities that typically define fuel poverty i.e. low income, high-energy costs, and inefficient dwellings [29]. Such an integrated view of justice raises questions about how differing levels of energy needs are recognised and addressed in society.

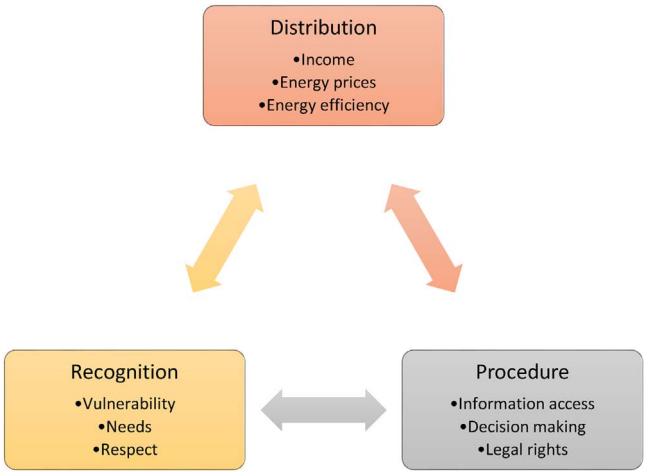

Fig. 1. Fuel poverty as thee types of interrelated energy justice (based on [14]).

Beginning from the same basic assumption of interrelatedness, that meaningful recognition and fair procedures are prerequisites to distributional justice, we set out to enhance the energy justice perspective of what makes fuel poor households vulnerable and to apply this understanding to the policy challenge of improving their dwellings' energy efficiency. First, we focus on the issue of heterogeneity within groups, arguing for a more nuanced *recognition* of energy needs and their link to vulnerability. Then, with regards to due process in *procedural* issues, we note the various barriers to participation faced by some households, highlighting tensions between prominent policy discourses of vulnerability and self-reliance. Lastly, we explore the prevalence of the main *distributional* inequalities of fuel poverty (income, energy costs and efficiency) among the two groups, considering the way they overlap with other structural drivers of vulnerability and marginalisation.

At the end of each section we link the theoretical discussion to government policies intended to address fuel poverty in the UK. Given the UK Government's prioritisation of domestic energy efficiency as the primary solution to fuel poverty [30,31], this is where we focus our attention. On the one hand these policy instruments are increasingly attractive to governments because of their potential co-benefits e.g. reducing greenhouse gas emissions and creating jobs [32,33]. On the other hand, they often struggle to reach the most vulnerable households, raising fundamental questions about who pays for, and who benefits from, these policies [34,35]. This analysis offers valuable insights for the UK, where energy efficiency policy is currently being revised, and also for other countries seeking to address inequalities in their energy systems. As Sovacool et al. [36] and Heffron and McCauley [37] have recently argued, clearly articulated energy justice principles are essential for enabling policymakers and planners to create fairer systems that protect the most vulnerable now and in the future.

2. Recognising the links between energy needs and vulnerability

Recognition justice acknowledges the various needs, rights and experiences of different groups, often setting out a rationale for social and political action. As Silvers ([38]: 254) explains 'to differ from the majority—that is, to be in the minority—is not itself sufficient to justify the imposition of social disadvantage, nor does their benefiting the majority excuse public policies that cause minorities to be worse off'. Therefore, justice based policies ought to do the opposite; redress disadvantage to provide a level playing field. This principle is at the heart of the social contract philosophy of Rawls [39] and in the capabilities approach of Sen [40] and Nussbaum [41]. Drawing on recent debates around the politics of recognition, we build on these fundamental ethical principles to advance a critique of fuel poverty as an instance of recognition injustice.

Justice theorists in the social contract tradition of Rawls and the welfare economics of Sen, seek to articulate, and base policy on, a set of entitlements and capabilities that underpin a fulfilling life. Among the widely cited list of ten 'central capabilities' with universal appeal put forward by Nussbaum [41], energy plays an important role in at least five, including: bodily health and integrity, social affiliation, play, and political participation. This link has been picked up by energy justice scholars and applied to multiple contexts. In designing energy systems, Sovacool et al. [4] claim that energy services should be considered a right if they are instrumental in ensuring access to the basic goods people are entitled to under universal human rights frameworks (such as clean water, food and shelter). At the household level, Walker et al. [42] and Davis et al. [43] have provided qualitative and quantitative accounts of what such a 'minimum standard' of energy services should be, as well as the negative consequences of not attaining it.

Energy can be described as an 'instrumental good', inasmuch as it enables the fulfilment of services such as thermal comfort, indoor lighting, cooking and washing. However, the amount of energy needed by any one person or household to achieve the same level of services

can differ dramatically, as can the consequences of not achieving them [14,42,18]. For example, the amount of energy required by someone with circulatory problems or a family with young children in order keep warm and comfortable can be significantly higher than the national average [44]. In a just world these differences would be recognised and the costs of energy provision adjusted accordingly (see: [45]). In reality, energy is treated primarily as a 'private good' that is traded competitively through markets i.e. linking sufficient access to a households' capacity to pay rather than their basic needs.

2.1. Vulnerable groups

Building on this view of energy as instrumental to a fulfilling life, a recognition-based approach can help to identify the particulars of energy injustice for different groups and strengthen a political response. More than simply acknowledging the existence of 'vulnerable groups' it would seek to recognise their internal heterogeneity [46]. This could help to reduce some of the stigmatisation around (fuel) poverty and avoid simplistic assumptions about the needs and lives of vulnerable households such as the 'old and cold' discourse [47,17,48]. Where such levels of recognition are lacking, injustices manifest in two ways: through social *structures* and institutions that ignore, misrepresent or reinforce inequalities, and through social *processes* that limit possibilities for expression and ostracise minorities [49].

When the particular energy needs of disabled people and families with young children go unmet this could be interpreted as an instance of recognition injustice, and an expression of their vulnerability, which can be understood – and perhaps remedied – by analysing the social structures and processes that shape their fuel poverty.

Leading the way, the field of disabilities studies has pushed beyond a paternalistic approach to recognition that reinforces a label of 'special needs'; focussing on the way these needs are overlooked because of a lack influence and self-expression afforded to disabled people in various institutions of civic and political life [50,51]. As Snell et al. [18] and George and Graham Lennard [52] have shown, this can lead to policies and governance arrangements that do not take account of their specific impairments and vulnerabilities, resulting in an 'energy penalty' for disabled people.

Similarly, with regards to low-income families with young children, it has been argued that their entrenched disadvantage in social and political life is partly due to insufficient recognition of the multiple dimensions and varied forms of poverty that exist (see: [53–55]). Interestingly, common to most definitions and conceptualisation of poverty is a profound lack of entitlement and a disempowering experience at the hands of social structures [56]. In the context of fuel poverty this may take the form of financial, physical and contractual barriers faced by families wanting to move to better quality dwellings [12].

In order to avoid an instrumentalist approach to recognition justice that focuses on formal institutional arrangements (at the expense of equally important informal social processes) other sites of politics, power and influence should be considered [57]. For disabled people finding it difficult to navigate social norms around energy use and domestic practices, and for low-income families facing uncomfortable trade-offs between energy services and other basic needs, the socially marginalising effects of fuel poverty are particularly acute. Ensuring that social interactions and processes recognise, and respond to, these vulnerabilities can be empowering e.g. through more inclusive practices such as user-led design of services [58,59] and more deliberative or direct forms of political expression [60,46].

Many valuable lessons about the social structures and processes of injustice can be learnt from existing literature to develop a more robust recognition of what makes households vulnerable to fuel poverty. Something akin to the radical shift in thinking brought about by the social model of disability (see: [51]) is needed in the context of energy politics and vulnerable groups. With regards to low-income families and the experience of poverty for young children, focussing on multiple forms of deprivation highlights the instrumental importance of energy in achieving certain social goods e.g. where rationing of energy is common it is linked to experiences of social exclusion and, inversely, sufficient access to energy services such as heating, lighting and travel can strengthen families internal and community-facing relationships [61,62,12].

2.2. The retrofit challenge

The formalised and experiential recognition of vulnerable groups and their needs in energy efficiency policies and schemes is crucial. In the UK, various means of calculating eligibility have been used – and are continually being revised – in an attempt to manage the tension between achieving ambitious policy targets, keeping costs down, and prioritising the most severely fuel poor (see: [30]). Further complicating this situation is the fact that energy efficiency policy in the UK, and more widely, is not solely intended to reduce fuel poverty; it is also intended to reduce overall energy consumption and the associated carbon emissions and demand on supplies. Even when it is primarily targeting the fuel poor, Walker et al. [63] have estimated that relying on simplistic proxies, such as being in receipt of social welfare payments or being a certain age, can actually miss 40–60% of the fuel poor. Similarly, relying on geographical eligibility criteria such as Indices of Multiple Deprivation across communities is problematic, given that many fuel poor households do not necessarily live in deprived areas while many who do, and are thus eligible, are not necessarily fuel poor [29].

Policy evaluations have shown that flexibility in scheme design and localised implementation, which makes use of trusted intermediaries such as charities and community networks, have the potential to increase uptake and improve targeting [30]. For example, referral procedures and collaborative working between health and social workers and energy scheme providers – such as providing 'boilers on prescription' through health care organisations – can ensure vulnerable groups get access to suitable retrofit measures [64]. As well as increasing opportunities to raise awareness among practitioners and uptake among marginalised groups, such schemes can challenge stereotypes by ensuring households' own views and needs are at the heart of scheme design and delivery. However, it is not just through such trusted intermediaries that households' needs are recognised, and direct forms of participation are also able to increase policy legitimacy and efficacy.

3. Participating in the social and political life of energy

There are three key aspects to procedural justice: 1) who gets to access to decision-making processes, 2) how decisions are made and contested, and 3) how impartial these processes are [5]: 208, [14]. Political theorists have developed a number of participatory ideals that can offer guidance for our analysis of these issues. Building on the politics of recognition outlined above, Fraser [65] argues for a 'parity of participation' in social life based on independence and equal respect for all voices. In the context of politics and decision-making, Habermas [66] and Dryzek [67] argue that such parity depends on the creation of 'ideal speech communities' and 'deliberative democracies' respectively, stressing the importance of discursive interactions for the production of legitimate and accountable decisions. Ultimately, each aims for a standard of 'due process', through which all stakeholders have sufficient opportunity to assess options and to influence outcomes.

As with all ideal types, reality always falls short. But that does not make them redundant. Typologies of participation, based on real-world examples, can be analysed based on their approximation to these ideals, as well as on their case-specific successes and failures. To illustrate, Fung [68] offers an assessment of various institutional spaces for participatory governance, with a specific focus on their capacity to

bring about social justice. Perhaps unsurprisingly he argues that equity can best be enhanced by shifting decision making powers away from powerful individuals or elites towards citizens, and by ensuring adequate space for exerting public pressure and exercising scrutiny over officials and their decisions. Specifically in the context of energy systems and low-carbon transitions, Chilvers and Longhurst [69] and Gillard et al. [70] have demonstrated the importance of inclusive participation for governing changes to complex socio-technical systems. In this vein, the increased availability of technical information and the digitalisation of government processes represents new opportunities for civic engagement and greater procedural justice [71], especially among previously disengaged or hard-to-reach groups [72]. Nevertheless, critics warn that, in practice, many such initiatives amount to a form of token participation, or 'clicktivism' that does little to overcome socio-politically embedded forms of marginalisation [73,74].

Arguably, information technology and the rise of non-state – or what the UK Government termed 'Big Society' – forms of governance have created more opportunities for civic engagement and participation in the policy process [75,76]. In the case of energy this includes community energy schemes, voluntary sector initiatives and micro-generation opportunities. For example, with regards to household level energy demand, there is a strand of research that sees procedural justice as a way of fostering collective values for, and practical engagement with, low-carbon living i.e. reducing energy consumption (see contributions to the special section edited by Mulugetta [77] and Walker [9]. However, the procedural equity of some of these initiatives has often been found wanting when they are put into practice (e.g. [78–80]). In the UK, Aiken [81] highlights the restrictive impact of contingent funding for community energy schemes, and Catney et al. [82] directly challenge the Big Society agenda on justice grounds, arguing that its reduced role for the state actually undermines opportunities for genuine political participation, instead redirecting citizens towards the markets and self-reliance.

3.1. Vulnerable groups

Procedural justice is a prominent theme in disability studies. It means different things to different people, and its form and expression varies depending on the context [83,58]. Historically, at least in the UK, disabled people have faced significant barriers to engagement with mainstream political activities such as voting, campaigning, and competing for election [58]. Partly as a response to this, during the 1990s there was increased interest in identity politics and a search for focal points through which disabled people could directly seek to influence decisions [46,51].

This activity was gradually formalised through routine consultations and partnerships with Non-Governmental Organisations (NGOs) (e.g. Disability Rights UK) and through government agencies (e.g. the Equalities and Human Rights Commission). As Boyce [84] has shown in numerous case studies, the benefit of this formal approach is its direct influence on the political-legal-economic structures that constrain disability politics. However, Oliver and Barnes [51] argue that, because it aggregates variations in impairments and overlooks the interpersonal self-expression of disabled people, this approach risks undermining more radical attempts to create an equal and enabling society. For instance, disabled people's participation in UK politics and policy-making depends, to a large extent, on how their interests are represented by NGOs and the degree of institutional space afforded to them by different mechanisms of government.

Protecting the interests of a minority of disabled citizens in a majority-rule democracy is certainly no easy task [85]. Although some organisations are effective at securing political expression (for a typology see [58]:162), there are certainly limitations imposed by 'rules of engagement' with government e.g. the UK Lobbying Act, which restricts charities who are beneficiaries of public finance from lobbying government [86]. Therefore, we should not be too quick to equate certain mainstream forms of political expression with wholesale procedural equity; some groups face additional political, practical and personal barriers to ensuring their voice is heard during decision-making processes.

As for many disabled people, governments in welfare states play an important role in providing a financial safety net of key entitlements such as food and energy for families living on low-incomes [56]. Yet, even in rich democracies with mature welfare systems, there are a number of socio-economic risks afflicting low-income families e.g. tension between family and work life, lone parenthood, long-term unemployment and 'in work poverty' [87,27]. There are a variety of reasons for this persistent vulnerability effect, but the 'politics of poverty' plays a large part.

Simplistic understandings of why poverty exists (typically described as one or all of: a lack of money, morals or employment), and the lack of voice given to alternative perspectives during policymaking, can generate inadequate or ineffective policies [88,89]. To illustrate, recent social policies in the UK targeting the children of low-income families exhibit a fundamental contradiction; seeking to encourage *self-realisation* and independent participation in society on the one hand, whilst seeking to *control* their behaviour in-line with expectations about their productive contribution to the future of the economy on the other [90,91]. A related example that affects the parents of young children is the rise of welfare sanctions, a punitive conditionality attached to welfare support that has added to the vulnerability of many families [92].

Partly in response to such policy shortcomings, there have been efforts to include the perspectives of those with first-hand experience of living with disabilities or living in poverty in policymaking (see: [93,60] respectively). Some of the reasons for their limited results attest to a lack of procedural equity for certain groups e.g. difficulties around capacity building (e.g. in low-income communities), unequal access to decision makers (e.g. for marginalised groups), and a lack of understanding of – or disillusionment with – party politics (e.g. among young people) [94,95].

In summary, for disabled people and low-income families and their children, the barriers to effective participation and due process are manifold. In the first instance, their means of self-expression are limited and they are generally treated as the targets – not curators – of policies. On top of this, their ability to access information and to navigate political processes, whether through representatives or personally, is limited by the entrenched structural power imbalances of mainstream politics.

3.2. The retrofit challenge

There is a significant amount of literature addressing procedural justice in the context of energy policies (for an overview see: [1]). Much of it focuses on the role of energy in reducing poverty, or on the level of influence the public has over large-scale infrastructure decisions [1,80]. Comparatively little has been written about energy efficiency, where the emphasis is usually on participation-as-uptake of retrofit measures rather than the more political aspects of scheme design and procedures.

The importance of access to information is frequently stated in energy efficiency policymaking and research, usually with the intention of making energy consumption – and by extension, the economic and environmental costs associated with it – more conspicuous. For example, in the UK, Energy Performance Certificates for dwellings are a legal requirement, and there is a strong interest in the behaviour change potential of smart meters and energy saving campaigns that introduce a real-time display of energy consumption costs into the household [96]. How individuals react to these specific initiatives, and to retrofit incentives more generally, is affected by scheme designs, information provision and financial incentives [97,98], as well as by particularities of the household itself [99–101]. Echoing findings from disabilities studies regarding user-led design, there is evidence to

support engaging energy technology users earlier in the design and decision-making process to boost uptake and engagement [59]. More *ex post* policy evaluations and practice-oriented research are needed to learn from vulnerable households about their specific experiences of – not just reasons for – managing their energy consumption and getting involved in energy efficiency schemes (e.g. [102–104]).

At the community level, Hoffman and High-Pippert [105] draw on a range of cases studies to argue that fostering a 'civic culture' increases and maintains participation. The Plymouth Energy Community in England is an example of how such success stories can directly benefit the most vulnerable. Here, profits from electricity micro-generation were reinvested into energy efficiency measures and a formal link was established between previously marginalised fuel poor households and local government officials. However, as noted above, building capacity in low-income communities can be slow to yield results, especially when community level schemes fail to take procedural inequalities into account (see: [106]). Evidence from successful schemes point to the importance of building social capital, establishing new norms, and working with pre-existing local governance networks to increase uptake and ensure fuel poor households have a positive experience when engaging with policy [30,107,108].

4. Distributing access to energy services and efficiency

Distributional justice refers to the way certain goods and services are shared across society. As such, fuel poverty is intuitively defined as a distributional issue i.e. a minority of people have less than adequate access to energy services that are typically enjoyed by a majority. Following Boardman [29], fuel poverty is the outcome of three different intersecting distributional inequities (see Fig. 1): the amount of financial resources available, the price of energy and the level of energy efficiency. As with recognition and participation, the prevalence and impacts of these distributional injustices differs across groups (e.g. demographics, dwelling types and geography), leaving some more vulnerable than others. Accounting for these differences is a central theme in policy debates about how to alleviate fuel poverty cost-effectively and equitably.

The foundational work of social contract theorists and rights-based capabilities/entitlements approaches offer compelling arguments for designing energy systems to favour the most vulnerable and to pursue universal access to sufficient energy services [5,14]. To some extent this position is already embedded in fuel poverty policy, where the inclusion of a relative indicator for defining and measuring poverty has been present throughout its evolution in the UK [109]. In practice, this enables policymakers in Scotland to classify households as being in severe or extreme fuel poverty based on their actual expenditure (20% and 30% respectively), or policymakers in England to calculate a 'fuel poverty gap' based on the amount households would need to spend on adequate energy services [45]. The extent to which these metrics under/over represent the scale and distribution of the problem for different groups varies, and this has significant effects for policy design and implementation. For instance, when these measures are inaccurate and policy targeting is poor, distributional inequality can actually be worsened as wealthier households benefit from retrofit schemes while the marginalised miss out or even pay for others' benefits through levies [110,6,34,108].

Typically, in fuel poverty policy and research, 'vulnerable groups' has referred to people over a certain age, disabled people, people with long-term illnesses, and low-income families with young children. The underlying rationale for this is that they share a common vulnerability to the negative health impacts of inadequate space heating [45,44,111,112]. This has a significant impact on the numerical construction of fuel poverty prevalence as well as on specific households' eligibility for policies. For example, official targets for eradicating fuel poverty in the UK were originally differentiated for vulnerable groups i.e. by 2010 compared with 2016 for the general population [16]. When both these targets were missed, a new definition and universal target were established, this time focusing on home energy efficiency ratings as opposed to demographics [15,45]. Early critiques suggest that many vulnerable households will be marginalised by this change and that it effectively sanctions the existence of relative fuel poverty as inevitable in socio-economically unequal societies [112,113,63,18,31].

4.1. Vulnerable groups

Often, theories of justice rely on aggregate categories of vulnerability that do not reflect the heterogeneity of disabilities, and they pursue social norms of work, family, and social life that may be inappropriate for some disabled people [114–116]. The language of disabled peoples' rights and entitlements, which is prominent in so many social justice campaigns, demands recognition for these groups but it also directly challenges the structural inequalities that exacerbate their needs (see: [117]). This line of reasoning is expressed succinctly in the notion of a 'disabling society', which shifts the locus of vulnerability away from disabled people's impairments and on to the lack of fit between these characteristics and current social norms [51,116]. This includes the way certain physical or mental attributes are not well accommodated by the institutions of: education, employment, public space, politics, housing, aesthetics and many more (see: [118]). To take a stereotypical but relevant example, inappropriate housing arrangements may prevent disabled people from moving freely, living independently and accessing various energy services [119,120].

Well-targeted policies have the potential to improve the fit between individuals' needs and their physical and social environments [121,122]. However, this becomes much more difficult at the aggregate level of reforming socio-economic structures [21]. Here, arguments for redistribution or positive discrimination quickly become embroiled in ethics debates and a politics of difference [116]. Instead, the battle to secure legal protection for disabled people's rights should be couched within a broader discourse of tackling society-wide forms of poverty and inequality [50].

A similar story emerges from the child poverty literature. Theories of justice based on economics or mainstream politics tend to ignore the role of children (primarily because they do not work or vote), which leaves very little in the way of guiding principles for ensuring distributive justice for minors [123,124]. Again, a rights-based discourse has attempted to fill this void; evoking the capabilities approach, developmental psychology, and sociological studies of the family to stress the importance of avoiding deprivation at an early age [91]: 57; [125].

Situating child poverty within the family unit and its place in wider social structures has helped develop a body of knowledge that highlights how children are affected by different forms of deprivation and why [126,26,127,56]. In practice this has helped shift political debates away from perceived faults of the poor, on to the functioning of macro-economic structures and the role of public policies ([123]: 165). Despite this, there has been slow progress on remedying these inequalities or improving social mobility in the UK [128,129]. In fact, it can be argued that their vulnerability became clearly visible in the wake of the recent economic depression in Europe, when they were hit hardest by a perfect storm of rising prices, stagnant wages and austerity policies that undermined much of their welfare and public services [130].

However, the conditions and experiences of poverty are not fixed; the vulnerability of disabled people and low-income families fluctuates over time. It is partly a response to external social structures, but it is also as a result of internal social relations and processes [61,127]. This is not to suggest that vulnerability is a proxy for poverty or *de facto* leads to distributional injustices. Rather, it is a reminder that everyone is vulnerable but 'some are more vulnerable than others' and in different ways [131]. Critically, it reminds us that 'problematising' some families and children as vulnerable, through public discourse and

policies, may actually conceal the structural causes of their disadvantage or even promulgate them [61,132,133,90].

4.2. The retrofit challenge

Distributional justice is especially pertinent to energy efficiency policy goals. As Boardman [29] points out, the poorest and most marginalised members of society tend to live in the most inefficient and poor quality housing, and furthermore, they may have the least capacity to engage with retrofitting schemes. Regarding policy design, distributional questions of who pays and benefits are important. In the UK, the costs incurred by energy companies as a result of their regulatory obligation to retrofit a certain number of properties each year are passed on to their consumers. Such a funding arrangement is regressive inasmuch as it raises the average retail price of energy, which hits low-income and fuel poor households hardest [34]. In theory this impact should be ameliorated by the savings enjoyed by fuel poor households whose homes have been retrofitted, but in reality only a portion of these schemes are aimed at poorer households, and only a portion of those actually reach the most vulnerable [108,35].

The potential health benefits of improving vulnerable households' energy efficiency (and thus thermal comfort) are well documented, adding to the evidence base for investing in such policies [111]. These benefits are particularly clear in the case of disabled people and families with young children, who are at risk of suffering chronic respiratory illnesses [22,52]. Further, Fig. 2 illustrates a range of broader co-benefits, many of which resonate with the above comments about entrenched structural inequalities and a lack of social mobility. For example: local spending and employment, as well as increased property values and higher subjective wellbeing associated with improved community appearances (i.e. housing quality) would all contribute to socio-economic development in deprived areas. To some extent this potential is recognised in Welsh and Scottish policy, which stipulates that local supply chains and additional community benefits must be considered as part of retrofit schemes.

Energy efficiency improvements have the potential to rectify the injustice of poorer households living in the poorest quality housing (assuming they actually reach the severest cases first and that there are no financial or material limits to achieving an acceptable level of efficiency – neither of which are true in the UK). Although efficiency gains may lower the overall amount a household needs to spend on energy, this does not take into account the above average levels of consumption required by vulnerable households or the potential increase in consumption due to previously self-imposed rationing (commonly known as the 'rebound effect') [100]. Ultimately, retrofitting is not a panacea for fuel poverty and has to be analysed and delivered within the context of numerous other structural inequalities and causes of vulnerability.

5. Conclusion: combining justice and vulnerability perspectives to generate fairer energy policy

Conceptual developments and a growing body of empirical research around energy justice present an opportunity to develop new policy solutions to the anachronistic issue of fuel poverty in industrialised countries [36]. Walker and Day [14] sketched a first overview of this potential, describing the interrelated distributional-, procedural- and recognition-based injustices faced by the fuel poor in the UK. Throughout this interdisciplinary review we have further refined the three aspects of energy justice in relation to two specific groups, highlighting the importance of developing a nuanced understanding of their vulnerability. Furthermore, these reflections have a significant bearing on domestic energy efficiency policy, raising questions about the equity of its design and implementation. As such, it is an example of the way social science can be utilised to address transdisciplinary considerations in energy research i.e. values and norms as well as pragmatic and empirical issues [37,13]. The findings themselves relate to the global issue of energy access, and as such have wider relevance beyond the UK; deliberately seeking to expand the horizons of the current definition and understanding of fuel poverty and vulnerability.

Rights-based theories of justice have been central to the development of energy justice ideas. They have a long history in the bodies of literature we have drawn on e.g. capabilities, disability rights, and children's rights. If we were to treat energy as a right – because it is instrumental in the realisation of a fulfilling life – then it follows that we must also recognise the differential energy needs of certain groups.

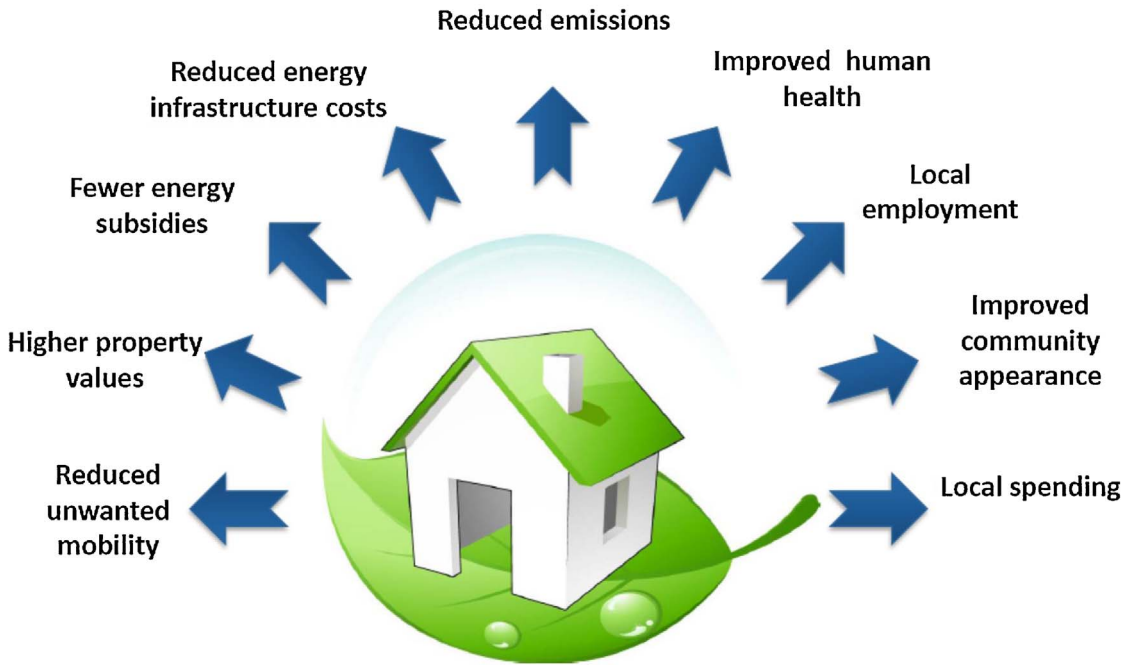

Fig. 2. Potential co-benefits of investing in energy efficiency schemes.
Source: [33].

Social researchers and law experts are beginning to explore the implications of such an approach for our understanding of fuel poverty [134,42]. Put into practice, a rights perspective can be an effective political strategy to draw attention to the structural and social forms of misrecognition faced by disabled people and low-income families. It can also provide guiding principles for policy interventions, ensuring energy efficiency schemes reach these households in a way that responds to their specific needs i.e. validating their entitlement to a range of energy services (beyond just thermal comfort).

With regards to procedural justice, the rise of NGOs and new forms of governance provides both opportunities (more access to information and decision makers) and challenges (persistent power imbalances and lack of resources). Disabled people and low-income families all remain relatively disenfranchised within mainstream politics and policymaking e.g. less representation, less access to decision makers, less resources for mobilisation, and no votes for minors. The outcome is a set of policies that continue to treat these groups as passive recipients of interventions. To increase the uptake of energy efficiency schemes to increase the role of these groups in shaping their design and functioning, there needs to be more understanding of how vulnerable households become aware of schemes, why they choose to get involved and what barriers they have to overcome to do so.

Current fuel poverty policy and discourse in the UK acknowledges the fact that the three main distributional injustices – high energy prices, low incomes, and inefficient housing – disproportionately affect certain 'vulnerable groups'. Despite the dearth of theories of justice that explicitly consider disabled people or children, there is ample evidence from other fields about the additional structural inequalities faced by these groups (see: [135]). Understanding how this manifests for different groups in different contexts requires a 'fully political' conceptualisation of vulnerability i.e. one that goes beyond the confines of an energy-oriented view of household needs and practices (e.g. [11]) to include sensitivity to demographic variation, moral critiques of disadvantage, and engagement with social institutions [131,136,46]. In practice, energy efficiency policies have many potential co-benefits; but they also need to be careful not to reinforce structural or social inequalities e.g. through a limited range of retrofit measures, regressive funding mechanisms, and stereotyping recruitment practices.

The theoretical contributions and policy recommendations in this article are only the beginning of what could be a productive discussion between fuel poverty experts and scholars working on energy justice and vulnerability in the UK and beyond. For instance, the crosscutting themes of within-group heterogeneity, subjectivity, and social structures are central to other areas of poverty research and country contexts e.g. disabilities studies and child poverty. Thus, fuel poverty policy could benefit from looking beyond its current technical purview to incorporate a much wider set of concepts associated with social justice and a 'politics of difference'. Similarly, with regards to energy efficiency policy, there is certainly scope for collecting best-practice examples from multiple country case studies, as well as from complementary areas of social policy, and on-the-ground perspectives from vulnerable households. Together, this sort of research would add a finer grain to our understanding of the energy injustices affecting specific groups, and should be mobilised to ensure the most vulnerable households are treated fairly in discourse and practice.

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