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Energy justice discourses in citizen deliberations on systems flexibility in the United Kingdom: vulnerability, compensation and empowerment

Gareth Thomas, Christina Demski & Nick Pidgeon

Understanding Risk Group, School of Psychology, Cardiff University

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Abstract

This article details the application of energy justice as an analytic lens for exploring social acceptability of energy systems flexibility and governance in the UK. Drives towards the uptake of inflexible, low-carbon generation technologies are expected to generate new challenges for balancing energy supply with demand, requiring changes in network management. From the uptake of new storage technologies to shifts in practices and governance, such changes may impact on everyday energy users in a variety of ways. Drawing on data collected from deliberative workshops conducted in England, Scotland and Wales, we examine how members of the public interpret and respond to six models for governing future, more flexible energy systems. In so doing, we illustrate the value of energy justice literature in making sense of the ways citizens identify and balance concerns relating to how distributions of needs, capacities, and benefits, may shape novel forms of energy system participation. We also draw attention to the ways in which alternative discourses about fairness rooted in neoliberal understandings of market exchange may interact with and contradict more socially salient understandings of flexibility justice rooted in concern for vulnerable groups.

Keywords

Energy citizenship; energy justice; energy storage; flexibility; time-of-use

I. Introduction

System flexibility has emerged as a key concern in ongoing debates over transitions to low and zero carbon energy systems. At the root of this issue is the concern that new nuclear and renewable electricity generation will struggle to meet demand profiles which have co-evolved with fossil fuel technologies that allow energy to be easily stored, dispatched, ramped-up and curtailed [1, 2]. While biomass and hydroelectric generation can mimic some of these characteristics, limits on the availability of land and water resources are likely to restrict their use in many cases. Policy makers in the UK and around the world have thus been exploring options to promote flexibility through a range of market reforms aiming to incentivise uptake of energy storage and demand flexibility on the part of end-users, as well as upgrades to and interconnections between national and international energy networks [3-6]. Such changes are needed to absorb greater generation instability and spread its impacts over larger populations. The form such incentives will take remain uncertain but the final policy mix is likely to include: changes to wholesale markets to ensure that costs and benefits producers and consumers impose on the system are better allocated to those responsible for them, and incentives for new services such as the provision of capacity, frequency and voltage regulation and demand response [2, 4, 7, 8].

Given the uncertainty around these changes, it is difficult to predict in advance the effects flexibility will have on everyday energy users. Proposals such as dynamic and time-of-use (ToU) energy tariffs or new network charges designed to recover the costs of providing flexibility, may in turn impose higher or more volatile costs on consumers to which some may struggle to adapt. However, with a few notable exceptions [2, 7, 9], the justice implications of such changes are seldom acknowledged and have yet to be examined in detail. One reason for this is the heterogeneity of ways in which more flexible socio-technical systems for energy may emerge [10]. Some such as interconnection, peak-time thermal energy generation or bulk energy storage may be highly centralised and incorporated into existing billing structures, thus entailing very little change beyond local communities affected by their construction. Alternatively, decentralised or 'user led' options may entail citizens hosting storage in their homes and communities; adjusting energy demands in response to ToU pricing; becoming active 'prosumers'; nodes in aggregated energy networks operated by private or municipally run energy service companies [10, 11]. More broadly, the degree to which transitions towards flexibility are perceived as just, may be shaped by a range of values and concerns rooted in the differentiated roles citizens may take in relation to energy [12, 13], not just as consumers or investors but as citizens, tax-payers, members of community energy and civil society organisations with distinct visions of what future energy systems should look like.

Energy justice matters for system flexibility because to a large extent, the success or failure of various strategies for providing it will be contingent upon the active involvement or passive toleration of lay citizens [14]. Wider literatures on public perceptions of energy systems change have consistently found the fair allocation of risks and benefits, the equitable inclusion of citizens in decision processes effecting their lives to be significant factors shaping how energy technologies and systems are received [15]. Such factors have been shown to be key in shaping how new infrastructure may be received by local communities [16-18], preferences for financing energy system decarbonisation [19-21] and in some instances, uptake of low-carbon practices and lifestyles [22]. Notwithstanding the persuasive normative argument for ensuring energy system transitions should be conducted in a just manner [23], there are thus sound instrumental and substantive reasons for ensuring design of flexibility options takes into account issues of fairness and equity at an early stage.

Our overall aim in this paper is twofold. Firstly, we examine potential justice concerns emerging in relation to drives towards systems flexibility using a bottom-up approach grounded in interactions between citizens with little stake in the UK energy system beyond their everyday participation within it. Secondly, we compare the results of this approach to the more top-down evaluative frameworks employed in the energy justice literature in order to identify convergences and divergences between citizen views and theoretically derived justice concerns. We draw on deliberative workshop data collected in England, Scotland and Wales between July and October 2017 examining public perceptions of a broad range of socio-technical options for managing systems flexibility. Our analysis draws on procedural, distributive and recognition based conceptions of energy justice [24], to illustrate how energy justice literatures intersect with understandings of present and potential future energy systems as more or less exploitative, open to citizen involvement and control and amenable to the distinct needs of vulnerable groups. We then address the emergence within our data of an alternative discourse pertaining to compensation for flexibility services which occurred in parallel with and partial contradiction to energy justice claims. In conclusion we examine the ways in which energy justice scholarship can assist in developing more socially acceptable models of systems flexibility, and the challenges it may face in doing.

II. Justice and Flexibility in UK Energy Policy

In the UK and many other advanced capitalist economies, different conceptualisations of fairness or justice have been advanced in policy over time. Drives towards energy market liberalisation during the 1970s were, in part justified in terms of rebalancing the distribution of benefits from public

energy investments towards consumers via a neoliberal framework of privatisation and competition [25, 26]. This shift also saw the removal of democratic control over energy investment and infrastructure planning, moving these to the purview of businesses and the market. While attending to both distribution and procedure, these shifts did not occur within a social justice framework, but were rather authorised by a conceptualisation of liberty, particularly over property rights as the sole basis upon which individuals can exercise moral choice [27]. In this view, energy market liberalisation was just, to the extent that it extended liberty to invest and own energy assets free from overbearing state regulation and the power of vested interests [28]. As prices rose during the 2000's and climate change rose up the political agenda, new measures were introduced predicated on the recognition of vulnerabilities both on the part of some consumer groups such as the poor and elderly, and on the part of future generations who may be susceptible to climate change impacts. Such changes appeared to herald a more interventionist policy stance, albeit within market frameworks where possible [29, 30]. This stance remains visible in requirements for the system regulator to consider the impacts of its decisions on vulnerable groups and the environment; obligations on energy suppliers to provide subsidised energy efficiency measures to vulnerable households; direct payments to households deemed to be at risk of fuel poverty; and a host of new market and non-market mechanisms to promote the introduction of low carbon generating capacity. Critiques of such measures have focussed on their overall inadequacy [30], as well as the non or deliberate mis-recognition of some vulnerable groups' needs [31], and allocative procedures which inequitably distribute or restrict access to support [32].

Turning to more contemporary debates around energy system flexibility, some interventions such as smart and demand side response technologies have been touted in straightforward liberal terms as empowering consumers [33], providing them with the tools needed to manage and optimise their energy conduct more efficiently [34]. However, should such measures fail to anticipate the needs of groups who lack the ability to engage in flexibility, they may risk exacerbating pre-existing inequalities [9]. Public perceptions research into smart energy networks have consistently found concerns that groups such as the elderly, chronically ill, disabled and low income families may have specific energy needs that are unsusceptible to time-shifting, and may lack the financial and knowledge capacities needed to engage with smart systems designed to automate such processes [35-37]. Other concerns have been identified in the degree of control and autonomy domestic users may need to surrender to distant energy suppliers [35, 38]. Questions have been raised over dominant industry and policy framings around demand side response, which have tended to reduce the role of the end-user either to that of mindless automata responding unthinkingly to external

price signals, or as entirely passive recipients of energy whose use is managed for them by ubiquitous smart technology [39, 40]. As Goulden et al. [40] discuss, both framings pose significant questions for citizens ability to meaningfully influence how their energy service needs are defined and met, and risk closing down opportunities for more economically and socially rewarding forms of energy citizenship from which more democratic and socially just energy systems may emerge.

III. Energy Justice

While the literature on energy justice is relatively new, it is preceded by long standing concerns in social, environmental and climate change research arising from: unequal distributions of costs and benefits associated with new policies and infrastructures; the closure of decision making procedures to input and contestation from affected communities, and; failures to recognise the distinct needs of traditionally marginalised communities [24, 41, 42]. Within this triumvirate of energy justice concerns, distributive, procedural and recognition justice have themselves been expressed in diverse ways.

Although not always made explicit, many approaches to energy justice take as their starting point social justice considerations derived from John Rawls [43], wherein a fair distribution of primary goods forms the foundation from which a free individual may pursue his or her own desired ends [23, 44, 45]. For Rawls [45] and his adherents, this approach has the benefit of specifying general moral principles appropriate to a plurality of needs, and to which any rational person may agree if they were taking that decision in ignorance their own material position. Thus distributive justice can be used to discuss spatial inequalities, such as reductions in social welfare imposed on local communities by infrastructure built for the benefit of larger populations [46, 47]. It can also refer to temporal inequalities, whereby infrastructure benefiting those in the present carries economic and environmental impacts to be borne by future generations [23, 48]. Finally, distributive justice may also point to the potential for inequalities in access to energy services, which may arise from income or position in other social hierarchies, which may itself have spatial or temporal elements [49, 50].

Apart from the distribution of material goods, for Rawls [45] the ability to participate in decision making processes can also be seen as a prerequisite for pursuing one's desired ends, and may thus also be accorded the status of a basic good which ought to be evenly distributed. However to the extent it deals in the means of social organisation rather than its outcomes, procedural justice tends to be treated as a distinct principle in and of itself [23]. Procedural justice goes beyond narrow provisions for consultative or engagement processes to demand equal opportunities to access information, contest and rebut the arguments of others and generally participate on an equal

footing, with the expectation that proposals can be altered or revoked and that decisions will be taken in a fair and transparent manner [42, 51]. Although claims to procedural justice are likely to be particularly acute in instances where unfair procedures give rise to distributive injustices, some formulations argue that exclusions of interested parties or adverse effects on them do not need to be actualised in order for a claim of procedural injustice to be made, rather the potential for such harms to arise is sufficient to constitute an injustice [52]. While primarily associated with decisions over resource extraction, infrastructure siting and redress for affected communities [42], procedural justice has also been deployed as a lens for considering policy processes around energy consumption, for example access to information and representation for disadvantaged consumers [53], and for examining how issues of identity and place attachment may be reconciled with low carbon infrastructures and practices [47, 54].

Drawing on theories of identity and intersectionality, recognition justice begins from the standpoint that significant injustices can arise from a failure to grant equal social status and respect to some groups within society based on our common humanity [55-57]. In so doing, they argue that many procedural and distributive injustices stem from historical failings to recognise and respect differences in the knowledge, values and needs of specific groups within society [53]. Recognition justice thus lies not only in the claim that failure to recognise difference restricts the ability of marginalised groups to pursue goals and lifestyles according to the values and concerns they deem most appropriate, but also that such failings place the marginalised in a relation of subordination in which they are unable to participate fully as equal and respected members of society [56]. In this view, processes of non-recognition, misrecognition and stigmatisation may underpin but are irreducible to inequalities in the distribution of energy services, and the exclusion of marginalised knowledges and values from the processes and institutions through which that system is governed [41, 58, 59]. While recognition based injustices may often be attributable to direct forms of prejudice and discrimination, they can also occur by less deliberate means, for example the provision of energy efficiency measures based on informational provision or financial contributions which may be inaccessible to groups such as the poor, elderly, or disabled, thus preventing them from participating in and receiving the benefits of societal shifts towards decarbonisation [60, 61].

This is not to say all approaches to energy justice are rooted in distributive, procedural or recognition based justice frameworks, nor that anyone should take precedence over others. As Sovacool and Dworkin (2015) point out, energy justice may also be thought of as a 'synthetic concept', comprising a tri-partite framework of distributive, procedural and recognition-based

concerns, which may be informed by a range of moral philosophies. In the following analysis we do not aim to impose any singular justice framework onto the discourse of our participants. Rather we borrow concepts from across the energy justice literature in order to make sense of diverse concerns relating to energy systems flexibility. In so doing our analysis illustrates the emergence of a range of conceptualisations of fairness and justice in lay discourse of energy systems flexibility, of which concerns centred around distributional impacts and recognising difference formed key threads.

IV. Methods

The unfamiliarity of most citizens with the functioning of the UK energy systems [62], combined with the diverse impacts and social values upon which systems flexibility may impinge, required a methodological approach capable of communicating to participants what systems flexibility might involve, while remaining open to a broad variety of responses and value positions to emerge. Deliberative research takes as its starting point a view of democratic governances as requiring not only the trappings of representation and voting, but also a commitment to communicative interaction, held on an equal footing between citizens, allowing for a plurality of possibly conflicting values and ideas to be heard and either condensed into a collective decision [63-65], or at least given voice in order to illuminate the terrain of political debate and contestation [66]. Deliberative approaches have been seen as particularly appropriate in the field of sociotechnical evaluation where the long-term consequences of decisions are unclear, and where the most appropriate course of action may depend as much on ideas and social values as on techno-economic criteria [67-69]. A key benefit of deliberative research is a commitment to the provision of balanced informational inputs which aim to shed light on the issue under discussion to facilitate informed reflection and debate, while at the same time framing discussions in such a way as to leave space for participants have space to question, criticise and develop their own evaluative criteria for assessing proposed innovations [70-72].

Deliberative process can range from large-scale societal processes involving large numbers of citizens over a prolonged period or smaller scale focus groups, workshops or citizen juries that convene for shorter periods on a single topic, but all involve convening groups of citizens in facilitated discussion round a specific issue [73]. The model of deliberative workshops reported on here tends towards the shorter, small-group end of this spectrum, in which the primary emphasis is on participants learning about and discussing an issue via a series of informational inputs, structured activities and open-ended discussions, without necessarily seeking to crystallise those views into an individual or collective decision [72, 74]. In this way they bear close similarities to in-depth forms of

focus group enquiry [75, 76], in which the careful design of stimulus materials and discussion framings aims to offer a variety of positions and repertoires on which participants may draw in response to a particular issue.

The analysis on which this paper is based is derived from four deliberative workshops held between July and October 2017 in Aberdeen, Scotland; Abergavenny, Wales; and Birmingham (x2), England. Workshops lasted approximately 7 hours, and each was attended by 11-12 participants who were paid a £100 honorarium for taking part. Participants were recruited topic-blind by a professional market research company in each location in order to capture a diverse range of backgrounds and political perspectives. Given the role of shared experience and context in shaping views of socio-technical change [75, 77], we recruited the two Birmingham groups either to include suburban homeowners or urban tenants living in rented accommodation. Recruitment in Abergavenny focused upon rural residents, typically living in larger properties in an area lacking connection to the national gas grid, and thus already reliant on domestic scale energy storage in the form of oil tanks or electrically powered heat storage (storage heaters and hot water tanks). Aberdeen was selected to reflect an area with significant past experience of energy infrastructure in the form of an established oil and gas industry as well as more recent low carbon energy projects. Aberdeen and Abergavenny participants were mixed in terms of housing tenure and recruited from the urban centre as well as surrounding suburbs and countryside. A complete breakdown of participants can be found in table 1.

Workshops began with a discussion of participants' current ideas and feelings about the UK energy system, before introducing details of a range of technologies for enhancing the flexibility of the UK energy system. A full protocol and all stimulus materials used in each workshop can be found elsewhere [*citation removed for peer review*]. The analysis below was derived predominantly from afternoon sessions, which focused on discussion of six posters detailing archetypal models for governing energy systems flexibility, each entailing a different relationship between citizens and wider socio-technical systems, however we also present data from wider discussions to illustrate how views evolved throughout the day.

Table 1: Breakdown of participants by workshop location

Workshop	Total	Age brackets	Male/ Female	Social grade	Tenure type	Political Orientation:
Birmingham-suburbs homeowners (B1)	11	30-39=2	5/6	A/B=2	Mortgage=6	Con= 5
		40-49=4		C1=4	Own outright=5	Lib= 1
		50-59=3		C2=3	Private rented=0	UKIP= 1
		60-69=2		D/E=1	Social rented=0	N/A= 1
Birmingham-city centre tenants (B2)	12	18-29=3	6/6	A/B=3	Mortgage=0	Con= 3
		30-39=3		C1=3	Own outright=0	Lib= 2
		40-49=3		C2=3	Private rented=6	Lab= 6
		50-59=2		D/E=3	Social rented=6	UKIP= 1
Abergavenny (Abv)	12	60-69=1	5/7	A/B=2	Mortgage=3	Con= 5
		18-29=6		C1=7	Own outright=7	Lib= 1
		30-39=1		C2=4	Private rented=1	Lab=5
		40-49=1		D/E=0	Social rented=1	UKIP=1
Aberdeen (Abd)	11	50-59=2	5/6	A/B=2	Mortgage=3	Con= 2
		60-69=2		C1=4	Own outright=4	Lib= 1
		70+=1		C2=3	Private rented=2	Lab= 4
		18-29=2		D/E=2	Social rented=2	SNP= 4
Total	46	18-29=11	21/25	A/B=9	Mortgage=12	Con=15
		30-39=9		C1=18	Own outright=16	Lib= 5
		40-49=11		C2=13	Private rented=9	Lab= 18
		50-59=8		D/E=6	Social rented=9	SNP=4
		60-69=6				UKIP= 3
		70+=1			Social rented=9	N/A= 1

Design of governance models was informed by a review of the literature and discussions with energy systems experts and aimed to reflect how implementing flexibility at different scales of centralisation may entail different relationships between users and the energy system. Three levels of centralisation were considered: centralised systems managed by large energy suppliers and the transmission network operator; community scale systems largely managed by municipal authorities or civil society organisations, and; domestic, focused on household level generation and storage operating independently from the network or as part of smaller micro-grids. Within each of these participants were presented with two options reflecting a high degree of user participation in flexibility provision, and a lower level reflecting differing degrees of automation and control. Posters were written and piloted with colleagues and members of the public in advance to ensure that each provided a clear and distinct vision for managing flexibility, while at the same time leaving room for creative interpretation of their implications for society and everyday life. The six models are illustrated in figure 1 and described briefly below, copies of each poster are can be found in the supplementary material accompanying this article.

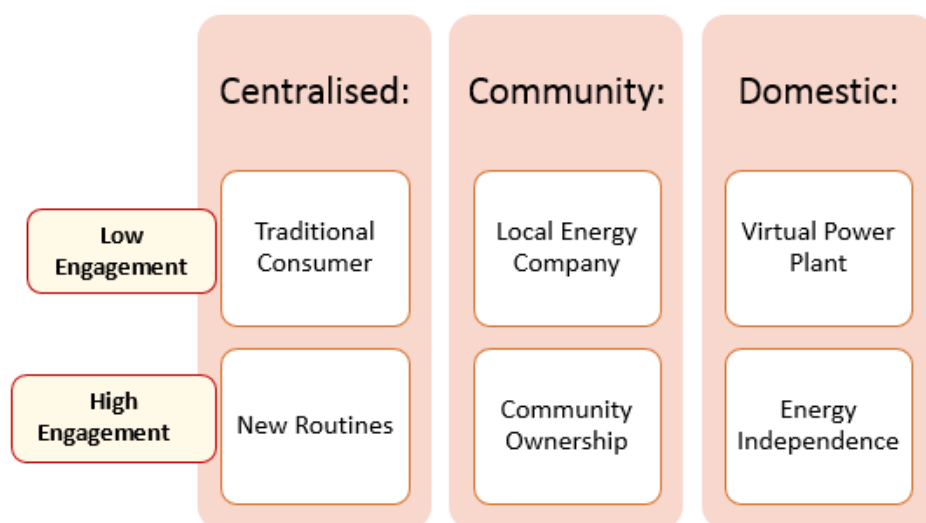


Figure 1: Models for governing energy system flexibility by degree of centralisation and engagement

- 1) **Traditional consumer:** A highly centralised model in which responsibility for flexibility provision remains with energy company operated generation and storage on the national transmission network. Citizen engagement with storage limited to seeing new storage infrastructure on the landscape and additional network costs mentioned on bills.

- 2) **New routines:** Transmission network remains highly centralised, but flexibility is provided via domestic demand response, incentivised via ToU tariffs set by large energy companies. Citizens have the option of paying more, engaging in demand response practices or investing in smart appliances to help automate the process.
- 3) **Local energy company:** Local and municipal authorities take on greater responsibility for local energy distribution networks. Councils own and operate energy generation and storage to balance supply and demand in their area.
- 4) **Community ownership:** Local communities take on greater responsibility for energy distribution networks. Civil society organisations form to invest in energy generation and storage, sometimes with investment from private businesses.
- 5) **Virtual power plant:** Micro-generation and storage is increasingly deployed in homes which split off into smaller sub-distribution scale micro-grids. Energy service companies match homes with available generation and or storage to those requiring energy services and engage in trading with other virtual grids to manage excesses and shortfalls in capacity.
- 6) **Energy Independence:** Micro-generation and storage is increasing deployed in homes in order to maximise consumption of self-produced energy. Households increasingly begin to split off from the local and national energy networks.

Participants were split into two groups of 5-6 and were asked to examine, comment upon and discuss three posters at a time. After 35 minutes groups swapped rooms so all participants had an opportunity to discuss every governance model, and this fed into whole group discussion later in the day. Discussions were moderated by authors 1 & 2 and transcribed prior to analysis.

Analysis was thematic in nature [78] and undertaken by the lead author in extensive discussion with both co-authors. Themes were developed in an iterative process, initially from listening to workshop recordings and subsequently through transcript coding using Nvivo 11. In the first instance emergent themes within discussion were identified and refined through repeated readings of, and comparisons between transcripts. However, as analysis proceeded the authors increasingly referred to the energy justice literature in order to make sense of and further refine themes emerging around issues of fairness, equity and independence. The references to energy justice in this paper thus represent a complimentary scaffold around which analysis developed, rather than a top-down analytical frame imposed upon the data from the outset. As a compliment to thematic analysis, following Halkier [79] we also examined elements of participants discourse and interactions in order to better understand how participants situated themselves in relation to key normative principles. In

particular, we drew on tools from interpretive and discourse analytic traditions to examine how participants invoked popular narratives, metaphors [80, 81], and legitimising strategies [82] to make sense of and situate themselves in relation to different governance models. This approach did not aim to identify new themes or discourses, but rather to add depth to our account of how participants were using justice discourses to make sense of the desires and concerns discussion of energy systems change evoked for them.

While we are confident the approach taken yielded a broad spectrum of discourses in relation to energy systems flexibility and justice, we do not claim our findings to be statistically representative at the population level, or to represent the totality of perspectives available within society. While we did reach a point of saturation during analysis in which further analysis ceased to yield new insights [78], it is possible that conduct of further workshops, for example with groups exhibiting pre-existing interests or vulnerabilities in relation to energy issues may yield new findings. Despite the geographically diverse recruitment of different groups, the single-event format of the workshops have made it difficult to attribute particular perspectives to particular areas and as such the findings discussed below are restricted to discourses appearing across groups. Despite this, in our judgement there were some differences in emphasis across groups, which may be attributable to differences between geographic and housing contexts. Further, more focused research, particularly in relation to rural communities and tenants of rented accommodation would be needed to confirm these suspicions, and for this reason we have not included them here. Finally, we would note that the participant discourse reported below emerged under particular framing conditions around flexibility technologies and the socio-technical relations under which they may function. While we attempted to keep these options as broad as possible, an alternative framing centred on the needs and desires of society or local communities [83], may well have elicited different discourses.

V.i Centralised systems- distributive justice and the ‘money-making machine’

One of the most salient discourses emerging during workshops was around energy as an essential public good, which ought not to be subject to the functioning of unmitigated market forces [**Reference removed for peer review**]. This distributive concern manifest early in the day, in talk relating to current energy retail practices where a clear discourse emerged constructing large energy companies as dishonest, profiteering and lacking in transparency. This manifest in constructions of energy companies as: “*rip-off merchants*” (Steven, B2), who “*just want to make profit*” (Imran, Abd), and are out to “*bamboozle you*” (Ken, B1) with complex tariffs designed to confuse and disorientate consumers. The sum of this view was a feeling that distributions of benefits within the UK energy

system disproportionately favour large companies at the expense of consumers, and that complex pricing arrangements make it difficult for citizens to adequately exercise the procedural remedy of switching suppliers. Rather, as the below extract from a discussion between Jessica and Author 1 illustrates, centralised energy systems tended to be constructed as exploitative of both citizens and the natural environment:

“Jessica (Abd): It’s the reliance on them, like we depend on them but I don’t want to have to depend on them because there’s plenty of natural resources that we could channel without having to pay for them as standard ...

Moderator: That’s interesting. So what would you like to do instead, instead of relying on these—?

Jessica (Abd): Make my own Energy... Or at least [for it to] be easier, that part of the energy that you can have could be created naturally as opposed to through a money-making machine.”

Taken from discussions early in the day and prior to the presentation of distinct governance options for flexibility, Jessica here is trying to outline what it is she perceives as unjust about centralised models for governing flexibility, while trying to imagine a more positive alternative. By characterising the existing system as a relationship of dependence on a “*money making machine*” she draws attention to what she perceives as a double injustice in distribution with large energy companies exploiting both consumers and the natural environment for their own benefit. The machine metaphor operates to underscore both the unresponsive and uncaring nature of the system itself, and to underscore its capacity for environmental damage.

Table 2: Summary of Energy justice discourses relating to dissatisfaction with large energy suppliers

Key discourses	Distributive	Procedural	Recognition
Dissatisfaction with centralized providers	Citizens feel exploited by relationship with large energy suppliers.	Market relationships limit citizens ability to remedy unfair treatment.	Citizen desires for greater autonomy and sustainability within the energy system not recognised in centralized systems dominated by large suppliers and mass consumption.

V.ii Decentralised systems- just distributions and empowerment

Jessica's construction of centralised models of energy provision as dependence on a money-making machine, points to a wider sense of alienation which was voiced in manifold ways across the workshops. In some cases, reliance on low-engagement solutions to systems flexibility was constructed as fostering inattentive or careless attitudes towards energy that could better be addressed through more localised and tangible forms of energy generation and storage. In others, alienation from the centralised energy system manifest in discourses which constructed domestic energy independence or communal generation as part of a wider vision of self-sufficiency in which reliance on exploitative consumer relationships are a thing of the past:

'I like the idea of being able to just not rely on other things. So if I could grow my own—if I had room to grow my own veg and that kind of thing, I'd do it. I don't, but I would if I had the choice. So I think if I could make my own stuff and generate my own stuff, then I'd just be, a lot less pressure on paying for this and that, that I can't do that somebody else can, cut down on the bills in the long run, whereas it costs a lot to do it all in the first place, then once it's there, it's there for you and then your kids can pass it on and their kids and it just keeps going.' (Lesley, Abd)

Referring to combination of micro-solar and battery storage, the above extract from Lesley is emblematic of self-sufficiency discourses appearing across all workshops, constructing self-generation and consumption as inevitably being less costly than buying energy from a large company. Her references to reducing bills for herself and future generations by generating energy without mediation by external companies, points first and foremost to the same distributive claim outlined by Jessica above, that without corporate interests the benefits of energy generation can be more fairly shared by consumers. However, her association of energy self-sufficiency with food and intergenerational transfers also points to a desire for autonomy and sustainability in which closer relationships between human beings and the natural environment appear as valued functionings that decentralised energy generation and storage technologies may enable.

Similar sentiments were expressed by other participants in favour of community and municipal forms of flexibility provision. Rather than novel technologies empowering householders to achieve previously unrecognised lifestyle aims, community and municipal flexibility were seen as means of building local capacities and empowering communities. At times this was spoken of as an ethically desirable end in and of itself such as in talk of "*bring[ing] communities closer together*" (Imran, Abd), or building "*community spirit*" (Jessica, B2). In other instances it was seen as a means of addressing distributional inequalities whereby distant centralised energy suppliers extracted money from

communities by bringing generation and storage assets into communities themselves: “*You’d think almost that it belonged to you*” (Miles, Abv). In this sense, decentralised, high engagement forms of flexibility governance came to be seen as not only correcting perceived distributional inequalities but also as recognising and building capacities for new forms of participation in the energy system which several participants found intuitively attractive.

In contrast, discussion of more traditional, centralised forms of flexibility management based on interconnection or (low-carbon) thermal generation were often characterised by a sense of powerlessness and dissatisfaction: “*It smacks to me of ‘Because you couldn’t be bothered, we [centralised providers] gave you what we wanted to give you’...*” (Marco, B2). In this view traditional supplier-consumer models were constructed as failing to recognise legitimate desires for more empowering domestic, community or municipal systems for energy generation and management and thus shutting down opportunities for citizens to become involved in such activities. Not only was this seen as a form of procedural injustice denying greater civic participation in the energy system, it was also seen as failing to recognise desires for alternative lifestyles and forms of social organisation that may underpin more just distributions of energy system benefits.

Table 3: Summary of energy justice discourses relating to community and domestic flexibility provision

Key discourses	Distributive	Procedural	Recognition
Desire for household and community participation	Community scale flexibility may redistribute benefits from large suppliers to communities and households but may also disproportionately benefit wealthier households and communities.	May empower citizens and communities to take on greater roles and responsibilities in managing energy system.	May help meet desires for more autonomous and sustainable lifestyles which are denied by more centralized systems.

V.iii Recognising differences: capacities, vulnerability and distributive injustice

While high engagement forms of flexibility provision were presented by some participants as a means of addressing distributional and recognition injustices, counter discourses also emerged

which problematised high engagement forms of flexibility provision based on ToU pricing as posing significant potential for injustice. Generally, such discourse centred around the claim that proposals for community and domestic storage failed to recognise the inability of specific groups to access these options. For some this manifest in concerns that that low-income groups would struggle to gain access to cost saving domestic storage technologies or community storage schemes due to high costs. The following extract from Danielle raises concerns about the ability of some households to contribute financially and thus benefit from community scale energy storage:

“Because, there’s a lot of people in communities that are poor, you know, and struggling along every day to go to them and say, ‘Look. We’re going to do this community ownership, you know, we need £300 from you.’ Some people are lucky if they’ve got £3 in the bank, so it would be difficult.”

(Danielle, Abd)

Sentiments such as the above were expressed not only in relation to community energy storage, but also flexibility models requiring the purchase of domestic storage or smart technologies, and point to a concern that at the needs of economically disadvantaged groups should not go unrecognised.

Stronger claims of distributive injustice centred on the possibility that poorer households on ToU tariffs may end up subsidising wealthier households and communities to invest in generation and storage technologies, allowing them to benefit from dynamic pricing at the expense of others: “*And the rich people will also sell the electric to the poor people, so they’ll benefit from it and profit from it and the poor people are maybe worse off*” (Tristan, B2). Others, such as Marian expressed worries that uptake of energy independence and community storage among the rich could shrink the customer base of the national grid, increasing costs for those still reliant upon the residual centralised infrastructure: “*...if a lot of people started doing that and like you said, started sourcing out the electric and it did push company prices up for, let’s say, poor people, it probably would be a problem then*” (Marian, B2). Mirroring concerns raised in the energy justice literature critiquing the distributive impacts of energy efficiency and micro-generation subsidies and emerging literatures on grid defection and ‘utility death spirals’ [84, 85], participants across groups displayed both a nuanced understanding of how failure to recognise pre-existing inequalities may lead to flexibility transitions further disadvantaging poorer households.

In addition to lack of economic capacities, participants also pointed to differences in needs which may render some social groups particularly vulnerable to transitions towards system flexibility. Particular concern was expressed for groups such as the elderly, disabled, shift workers and parents

who may struggle to afford or utilise smart appliances and storage systems, adjust their patterns of energy use or attend meetings about community energy projects. Across groups this tended to result in a discourse in which high engagement modes of flexibility provision may be justifiable, but only for those social groups with the ability to engage with them: *“I think it’s more for the younger person who’s more into this technology. The likes of me, I’m terrible with phones, computers and all the rest of it, so it wouldn’t—I couldn’t do it”* (Jack, Abv). Other participants were more open minded about extending high engagement technologies into the homes of more vulnerable groups but highlighted the need for additional support to ensure elderly and disabled citizens could access them without suffering detriment: *“I’m a support worker and the people I support wouldn’t manage to do that, so they’d need the extra help”* (Danielle, Abd).

Concerns such as those voiced above by Danielle and Jack, tended to centre on a belief that while economically and technologically capable citizens will be able to mitigate higher peak-time energy pricing other groups may be disadvantaged or rendered vulnerable. Such perceptions of injustice often manifest in a discourse of ‘penalties’ falling on households and communities who, for no fault of their own may experience disbenefits due to their inability to engage in flexibility investment or practices. The below exchange between Amy and Ken is illustrative of this discourse:

“Amy (B1): Disabled people on dialysis machines, and...things that they have, you know, and these oxygen things that they need to use during the day time.

Ken (B1): I think its balance, and obviously... [it should be] tailored to individual needs, but you shouldn’t be penalised.”

Deploying the example of disabled citizens who rely on electrically powered medical equipment, Amy is drawing attention to groups within society whose energy needs may be unsusceptible to adjustment in the face of changing information or price structures. Concern for the elderly and disabled was a prominent theme in such discussions, possibly reflecting established tropes in neoliberal energy and welfare discourses which do recognise (albeit unevenly) vulnerabilities imposed by age and infirmity [81]. The first part of Ken’s response that balance is needed, caveats his own concerns about ToU pricing by accepting, at least in principle, some potential benefits of high engagement modes of flexibility provision. However, in following this to suggest price structures should reflect individual needs and avoid imposing penalties, Ken shifts from a focus on vulnerable groups to the universal: *‘you shouldn’t be penalised’*.

The belief that novel market forms may disadvantage energy consumers carries two implications. First it led some participants to reconsider some of their scepticism over low-engagement modes of flexibility governance. Reasoning that current market models at least provide a degree of price stability and predictability, socialising costs and allowing vulnerable groups to budget, some participants expressed a desire for this to be replicated or extended in future governance arrangements. Others, such as Danielle outlined the possibility for hybrid schemes in which municipal or national agencies work in tandem with domestic and community initiatives so that: *“the council... steps in a lot [for] people with not a lot of money”* (Danielle, Abd). Secondly, and more importantly discourses around penalties point analytically towards a view that energy is not simply a commodity to be bought and sold on the basis of supply and demand, for many citizens it is an essential public good on which they depend. In such instances leveraging energy prices as a form of incentive or punishment, seemed wrong and as unjustly disadvantaging social groups least able to respond. In this view, energy is just the kind of basic good or enabling condition referred to in the energy and social justice literature and as such, should be subject to the kinds of distributive and recognition based concerns described therein. This argument went well beyond protecting groups traditionally identified as vulnerable in UK energy policy discourse such as the elderly and low-income households.

Table 4: Summary of Energy Justice discourses relating to capacities and vulnerability

Key discourses	Distributive	Procedural	Recognition
Concern for vulnerable groups	Differences in financial and social capacities may lead to some groups being further disadvantaged under community and domestic forms of flexibility provision.	Some sections of community may lack time or social resources required to become involved in community or municipal energy governance.	The needs of those lacking the ability to engage in flexibility technologies and practices not recognised by many proposals for domestic and community scale flexibility.

V.iv Neoliberal fairness-compensation for services rendered

While the bulk of justice claims emerging in workshops closely resembled concerns common in the energy justice literature, other discourses were also in play. Emerging alongside and in partial contradiction to recognition and distributive concerns, an alternative discourse framed flexibility as a

service citizens may render to the energy system through the adjustment of daily routines, investments in domestic or community scale storage or participation in virtual power-plant type arrangements. Such actions were, at times, discussed as a form of responsible or pro-social behaviour which deserved to be rewarded:

“I expect lower prices...Because you’re storing that for them. They don’t have to have this massive storage facility that you’re sending all this electricity back to, if you are storing some of it within your own home.” (Harriet, B1)

Above, Harriet outlines an explicitly reciprocal arrangement through which households render flexibility services to the energy system in exchange for lower bills. Her perspective closely mirroring policy discourses emphasising the need for market reforms to ensure contributions to system stability are fairly compensated in the allocation of costs and benefits. In some cases such claims may reflect appeals to distributive justice whereby loss of convenience, space in the home or enforced expenditure on storage is viewed as an unjust imposition on energy users, particularly if not also imposed on suppliers, who participants felt had disproportionately benefited from energy retail arrangements in recent years. However for most participants, including Harriet, commitments to compensation sat uneasily alongside concerns that such compensation may come at the expense of vulnerable groups unable to make such adjustments.

Generally, contradictions between these two conceptualisations of fairness went unacknowledged. However, on occasion the tension between the two manifested in direct disagreements between participants or stronger articulations of compensation discourses. While the following extract from Andy is highly atypical of our participants at large, it is representative of a small minority for whom compensation rather than distributive or recognition justice formed the main basis for evaluating flexibility governance:

“That’s the other side of the coin is there’d be a load of do-gooders saying, no, you can’t do that because poor people can’t afford to buy a battery, they’ve got to pay more for their electric... But that’s kind of tough luck really, isn’t it? If you don’t work you don’t have money, do you? [pause] That’s a bit cruel, really.” (Andy, Abv)

Responding to ongoing conversations regarding the potential benefits of battery ownership Andy anticipates and aims to counter potential critiques on the basis distributive impacts. This anticipation may have arisen partly in response to issues raised earlier in the day regarding rooftop solar panels

as well as the presence of wind, solar and anaerobic digestion units in the area, a process some participants described negatively as removing land from agricultural production and imposing an eyesore on residents while enriching wealthy landowners. At the same time Andy's reference to 'do-gooders' and assumption that inability to invest in costly battery equipment arises from unwillingness to work, reflects common neoliberal discourses on poverty and social exclusion in which inequitable outcomes are attributed to laziness, fecklessness and other moral failings on the part of the disadvantaged [31, 81]. However, even in this atypically strong rejection of distributive and recognition based arguments was followed, after a pause with a partial disavowal: "*that's a bit cruel really*". While this hedging statement might in part be directed as softening his perception among other participants, the fact he felt obliged to do this is indicative of the wider strength of feeling across groups, that pre-existing vulnerabilities ought not to be ignored in governing energy systems flexibility.

VI. Discussion

In the course of this paper we have illustrated how diverse conceptualisations of justice emerged across participant discussions of six models for governing flexibility in future energy systems. In many cases these conceptualisations mapped directly onto established categories in the energy justice literature (see table 6), for example the strong initial discourse we encountered around the perceived distributive injustice of centralised energy systems, and the sense that the procedures of market competition offered little recourse to consumers. Initial dissatisfaction with this system did much to drive enthusiasm for high engagement modes of flexibility provision. In particular, energy independence and community provision came to be seen as enabling new functionings such as securing energy free from exploitation by large companies or achieving a degree of sustainability, autonomy or collective empowerment that may be unattainable within a more centralised system. Such discourses go beyond links thus far established in the literature between procedural justice and energy citizenship [40, 54], and point towards emergent conceptualisations of sustainability and wellbeing which may be recognised or denied by ongoing transitions towards flexibility.

While higher engagement and decentralised procedures for managing flexibility were received by some participants as enabling greater citizen participation, and hence, fairer distributions of benefits within future energy systems, this discourse informed subsequent discussions relating to recognition justice. Recognition based discourses tended to centre on the perceived failures of high engagement modes of flexibility provision to account for those citizens who, through no fault of their own, may lack the economic or social resources to invest in flexibility technologies or adapt their practices in

order to mitigate ToU pricing. From families and citizens engaged in unpredictable shift work to the elderly and chronically ill, participants described a plethora of conditions they felt could be disadvantaged through the imposition of penalties by a one-size fits all approaches to flexibility.

Table 5: Summary of energy justice discourses relating to systems flexibility

Key discourses	Distributive	Procedural	Recognition
Dissatisfaction with centralised providers	Citizens feel exploited by relationship with large energy suppliers.	Market relationships limit citizens ability to remedy unfair treatment.	Citizen desires for greater autonomy and sustainability within the energy system not recognised in centralised systems dominated by large suppliers and mass consumption.
Desire for household and community participation	Community scale flexibility may redistribute benefits from large suppliers to communities and households but may also disproportionately benefit wealthier households and communities.	May empower citizens and communities to take on greater roles and responsibilities in managing energy system.	May help meet desires for more autonomous and sustainable lifestyles which are denied by more centralised systems.
Concern for vulnerable groups	Differences in financial and social capacity may lead to some groups being further disadvantaged under community and domestic forms of flexibility provision.	Some sections of community may lack time or social resources required to become involved in community or municipal energy governance.	The needs of those lacking the capacity to engage in flexibility technologies and practices not recognised by many proposals for domestic and community scale flexibility.

Concern for such ‘vulnerable’ groups and recognition of their needs was by far the most salient discourse within and across groups. Failure to recognise differences in citizen’s capacities to engage in flexibility was seen as underpinning a range of potential injustices, from the imposition of less accessible procedures for engagement with the energy system, to the exacerbation of existing patterns of inequality and marginalisation. Such concerns mirror clearly recent work by in the energy justice literature, in particular the notion of social and economic ‘flexibility capital’ capital proposed by Powells and Fell [9] as two axis along which energy injustices may be emerge. Our findings in this area thus suggest that not only is there a congruence between scholarly conceptualisations of energy justice and the moral frameworks through which citizens make sense of energy system governance, but that among our participants at least, ensuring equality of access to and status in more flexible energy systems and providing mitigation for those who may struggle was of particular importance in assessing the desirability of potential pathways for transitions towards energy

systems flexibility. Such concerns point to a belief on the part of participants that differences in needs and abilities ought not operate to the detriment of achieving basic goods such as warmth and power, or to effect the status of vulnerable groups as equal participants in more flexible energy systems.

To date much of the policy discourse around systems flexibility has centred around more fairly reflecting the costs and benefits energy suppliers and users place on the system [2, 7]. To the extent that participants felt citizens and communities providing generation and flexibility services to the network ought to be fairly rewarded, our findings indicate some citizen support for the prevailing policy discourse. This was particularly true following initial discussions in framing 'the public' as a singular entity being exploited by larger energy companies. However, as discussions progressed and developed in nuance it became clear that a narrow focus on re-allocating costs and benefits based on contribution and impact upon the system is unlikely to be seen as fair or just in and of itself, particularly if it comes to be seen as perpetuating narrow forms of energy system participation, or more significantly, as creating new vulnerabilities for groups without the ability to manage them.

While we are confident our findings reflect much of the diversity that would likely be present in a UK national discourse on systems flexibility, the qualitative nature of this study means we cannot be wholly certain of the wider salience of each fairness discourse we have identified across contexts. Further cross-national research would be helpful in order to assess the extent to which the energy justice considerations raised by citizens in this study are transferable to other national contexts. Similarly, more localised research in the UK, framed around the needs of a particular population or place, may be of value in elucidating more specific local justice concerns that could have been overlooked in the more abstract system and governance scale discussions which characterised this study. Finally, it ought to be noted that in following a relatively traditional deliberative methodology, this study did not go out of its way to recognise and recruit participants from marginalised populations. As a result, while our data tells us much about concern for these groups in wider society, it does little to tell us how they understand their own needs. If recognition justice is to be fully realised in flexibility transitions, further engagement work will be needed with groups such as the elderly, disabled and financially disadvantaged designed specifically around their needs, a process which may require alternate modes of recruitment, facilitation and a focus on the needs of citizens over those of the energy system [59]. Given the somewhat ambivalent discourses we identified around the desirability of more participatory forms of energy citizenship and the difficulties some groups may experience in realising this, future work would also be of value in assessing the extent such

desires are salient in wider UK society, and identifying the measures that may be required to enable participation among groups who otherwise may be excluded from flexibility transitions.

The diverse justice considerations we have found in relation to energy systems flexibility raise some questions for energy justice scholars. Desires for greater participation and engagement in energy system processes point to claims rooted in both procedural and recognition justice. However, such claims sat uneasily alongside recognition and distributive concerns for vulnerable populations which may emerge if the needs of less capable groups go unrecognised. Discourses relating to compensation for services rendered to the system represented an alternative framing of fairness less amenable to incorporation within an energy justice framework. On one level claims for compensation may be read as a response to alienation and distributive injustices which participants perceived as being perpetrated by large energy companies on consumers. However, matters become more complicated when discussion turned to the new inequalities such a system of compensation may give rise to, particularly if markets for flexibility provision do not recognise and account for the diverse needs and abilities which may hinder participation in flexibility provision for some. Under these circumstances a neoliberal commitment to marketized exchange as a basis for liberty, and hence justice would appear incompatible with both the lay conceptualisations of fairness and the broad thrust of social justice concerns which underpin the bulk of the energy justice literature.

These tensions are by no means insurmountable. Cappers et al. [87] have found that, under carefully designed ToU systems, vulnerable groups need not suffer adverse impacts and may in fact benefit financially from flexible energy systems which compensate users for services rendered to the system. Incentives for storage could be designed in such a way as to specifically target the needs of the energy poor and vulnerable, or to socialise the costs of flexibility rather than imposing regressive impacts on less well-off households [14, 31]. Enhanced levels of engagement by some need not preclude socialised provision for others; although in some cases such as district heating, trade-offs may need to be made in order for socialised systems of provision to become viable [88]. In such instances the overriding principle among our participants bore striking resemblance to those found in the energy justice literature, namely that the needs and abilities of the vulnerable first need to be recognised, and if necessary mitigating steps should be taken to ensure broad and equal access to energy services and decision processes [32, 53, 61]. How such a recommendation might be operationalised in practice should be a priority for future energy justice research into systems flexibility. No one governance mechanism examined in this study emerged free of ambivalence

among our participants. At this stage we would thus recommend regulatory structures remain open to experimentation and participation by a range of new actors in order to find a balance of governance mechanisms that can meet system requirements while satisfying as broad a range of justice concerns as possible, but with an overarching commitment to protecting the vulnerable.

Data Availability

Audio and visual files from the workshop cannot be made publically available due to participant confidentiality. However, we will consider requests to share anonymised transcripts for research purposes on a case-by-case basis after an embargo of two years. The protocol and stimulus materials used can be found at: <http://www.restless.org.uk/project-results> or requested via the following DOI address: <http://doi.org/10.17035/d.2018.0052852533>

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