Energy Justice: A Conceptual Review

Energy justice has emerged as a new crosscutting social science research agenda which seeks to apply justice principles to energy policy, energy production and systems, energy consumption, energy activism, energy security and climate change. A conceptual review is now required for the consolidation and logical extension of this field. Within this exploration, we give an account of its core tenets: distributional, recognition and procedural. Later we promote the application of this three-pronged approach across the energy system, within the global context of energy production *and* consumption. Thus, we offer both a conceptual review and a research agenda, providing suggestions of how the field of energy justice could be advanced. Throughout, we explore the key dimensions of this new agenda - its evaluative and normative reach – demonstrating that energy justice offers, firstly, an opportunity to explore where injustices occur, developing new processes of avoidance and remediation and recognizing new sections of society. Secondly, we illustrate that energy justice provides a new stimulating framework for bridging existing and future research on energy production and consumption when whole energy systems approaches are integrated into research designs. In conclusion, we suggest three areas for future research: investigating the non-activist origins of energy justice, engaging with economics, and uniting systems of production and consumption.

Key Words: Energy justice; energy policy; whole energy systems; energy economics

1. Introduction

Energy justice has recently emerged as a new cross-cutting social science research agenda, which seeks to apply justice principles to energy policy (McCauley *et al.* 2013), energy production and systems (Heffron and McCauley 2014), energy consumption (Hall 2013, Jenkins *et al.* 2014), energy activism (Fuller and McCauley 2015), energy security (Sovacool *et al.* 2013) and climate change (Bickerstaff *et al.* 2013, Sovacool 2013, Sovacool and Dworkin 2014). A conceptual review is now required for the consolidation and extension of this research agenda. With this in

mind, this paper has two aims: firstly, sections 1-4 give a review of the literature to date and provide empirical examples of its applications, and secondly, section 5 promotes new directions for its development. Thus, we offer a conceptual review *and* a research agenda, both consolidating the existing literature and providing suggestions for how the field of energy justice might be advanced. Throughout, we approach energy justice from an inter-disciplinary perspective, involving insights from business, geography, political science, legal studies, philosophy, and environmental studies to reflect the backgrounds of the authors.

Energy is a new centre of gravity for justice scholars. The 'energy challenge' is, of course, well documented. It can be summarized globally as resource scarcity and population growth in an increasingly unpredictable social and environmental climate. In a bid to explore and understand such phenomena, a range of conceptual frameworks have emerged. Each framework (which is inevitably contested) attracts a different emphasis on the content and purpose of energy research.

Energy security assesses (a) the security of supply and production, and (b) emergent insecurities (such as availability and pricing) with a view to promoting the safeguarding of energy supply and 'indigenous' production capabilities (Ang *et al.* 2015, Mansson *et al.* 2014).

Fuel poverty scrutinizes (a) energy vulnerabilities in communities in order to (i) shed light on distributional unfairness, and (ii) reduce such inequity with regards to a person's ability to access and consume energy (Middlemiss and Gillard 2015).

Energy justice, our focus throughout, evaluates (a) where injustices emerge, b) which affected sections of society are ignored, (c) which processes exist for their remediation in order to (i) reveal, and (ii) reduce such injustices.

Sovacool (2014), in his review of current energy scholarship in the social sciences, identifies a need to move towards human-centred, social science explorations of energy developments. Sovacool identifies fourteen avenues of research and highlights the role of human-centred research methods and philosophy and ethics in energy studies. He promotes energy justice as a promising avenue for research, stating in particular because "energy justice … recognizes that energy needs to be included within the list of things we prize; how we distribute the benefits and burdens of energy systems is pre-eminently a concern for any society that aspires to be fair" (Sovacool 2014: 15). This raises questions about how the costs and benefits of energy production and consumption should be distributed; and about whether we

are being "fair to future generations in leaving a legacy of nuclear waste, the depletion of fossil fuels and the pollution of the atmosphere and climate?" (ibid.). Whilst we do not seek to answer these questions directly, we situate this paper within such key debates in the fields of energy studies and social science and the growing application of human-centred approaches to energy challenges.

Sovacool and Dworkin (2014) provide the most comprehensive account of philosophical approaches to energy justice to date. Within our exploration, however, we limit the philosophical groundings of energy justice to distributional, procedural and recognition-based tenets. We utilise the framework of Fuller and Bulkeley (2013) who focus on the application of distributional and procedural justice considerations in energy justice, based on the works of Rawls (1991), and, in line with McCauley et al. (2013), add to this a 'recognition-based' approach from the works of Fraser (1999, 2014). Within, we choose to present each tenet of justice in the following order: distribution, recognition, and procedure. We do so on the understanding that if injustice is to be tackled you must (a) identify the concern – distribution, (b) identify who it affects – recognition, and only then (c) identify strategies for remediation - procedure.

Specifically, we explore the key dimensions of the new energy justice agenda - its evaluative and normative reach - where energy justice researchers both assess injustices and make recommendations on how they should be approached. Jordan and Lenschow (2010) similarly use this combined approach in their conceptual review of 'environmental policy integration' (EPI) as a new agenda in policy studies. As shown in Table 1 below, this approach allows the researcher to explore a number of agendas in relation to energy justice.

INSERT TABLE 1

Distributional justice encourages researchers to investigate where energy injustices emerge in the world. The location of production facilities such as gas power stations has raised justice concerns among nearby communities (Endres 2009, Sicotte 2010). Simultaneously, studies of energy poverty have questioned the distributional burden of rising energy prices (Boardman 1991, 2013). In light of this, we use several

empirical examples throughout this paper to demonstrate that energy justice seeks to explore both production and consumption.

Recognition-based justice moves researchers to consider which sections of society are ignored or misrepresented. Production-oriented research has sought to expose the unfair location of power plants in the vicinity of ethnic minorities or indigenous peoples, often cut adrift from decision-making (Pastor *et al.* 2001). Consumption-based research has equally revealed the struggles of ageing or disabled populations (Boardman 2013, Liddell and Morris 2010). Here we explore the emergence of recognition-based justice through non-recognition and disrespect.

Procedural justice inspires researchers to explore the ways in which decision-makers have sought to engage with communities. Warren and McFadyen (2010) demonstrate how fostering a sense of community ownership in wind farm development can create new processes of acceptance, for example. Thus, rather than classifying procedural injustices or unveiling mechanisms of exclusion as is classically the case (Gibson-Wood and Wakefield 2013), we consolidate and contribute to this literature by making explicit three mechanisms of *inclusion*: achieving just outcomes through local knowledge mobilization, greater information disclosure, and better institutional representation.

Later we promote the application of this three-pronged approach throughout the energy system. This approach extends our exploration of distributional, procedural and recognition-based justice issues within the global context of energy production *and* consumption. We do so in a bid to not only describe the current literature and demonstrate its applicability, but also to advance the field of energy justice. Here, we further develop our understanding of "where" to our "what, who, and how" tenet framework. Exploring injustices throughout an energy system helps us to appreciate the multiple sites of injustice that can occur throughout global energy systems.

Energy justice offers, firstly, an opportunity to develop new crosscutting social science agendas on exploring where injustices occur, developing new processes of avoidance and remediation, and recognizing new sections of society. It is therefore an agenda that inspires both evaluative accounts and normative solutions. Secondly, energy justice provides a new framework for bridging existing and future research on energy production and consumption. We begin our assessment of energy justice by exploring each of the tenets and their real-world applicability.

2. Distributional Justice

Distributional justice recognises both the physically unequal allocation of environmental benefits and ills, and the uneven distribution of their associated responsibilities (Walker 2009). It assesses where "questions about the desirability of technologies in principle become entangled with issues that relate to specific localities" (Owens and Driffill 2008: 4414), and represents a call for the even distribution of benefits and ills on all members of society regardless of income, race, etc. As recognition that some resources are inescapably unevenly distributed (the location of wind resources, for example) such claims for justice require that evidence of inequality are combined with an argument for fair treatment (Eames and Hunt 2013). One avenue for empirical research, therefore, is to consider to what extent the siting of energy infrastructure is leading to distributional injustices.

Distributional justice concerns not only the siting of infrastructure, but access to energy services too. From a consumption perspective, the fuel poverty agenda has revealed the uneven spread of burdens with regards to affordable access to energy services. In this regard, energy justice concerns both physical access to heating and electricity, and questions the extent of an individual's freedoms, i.e. the extent of choice a person has over his/her life. We develop this notion below, giving the example of the *Energiewende* in Germany from both a production and consumption perspective as an illustrator of the tenet's real-world applicability. In closing, we explore the notion that the re-distribution of benefits can enforce a sense of justice.

2.1 Distribution of ills for electricity consumers

The current energy strategy transformation occurring in Germany, termed as the *Energiewende*, comes with a number of distributional justice implications. The *Energiewende* entails the decarbonisation of the German energy sector, as well as the removal of nuclear power from the energy mix. This strategy change comes with a shift towards increasingly decentralised production, and the gradual replacement of large-scale nuclear power plants and fossil electricity sources (though as a caveat, the success of this strategy remains to be seen as fossil fuel consumption has also not decreased in Germany as a result of the new German energy strategy, and new fossil fuel plants and mining operations continue to be built (Hanks and Richards 2015).

Nevertheless, the German government has initiated this attempted transition through feed-in tariffs (FiTs). FiTs guarantee priority access and profitable electricity prices for producers of renewable electricity. The cost of the scheme (the so called EEG-Umlage) is transmitted to the electricity consumer who is then required to make an additional financial payment within their electricity bill. The resultant financial burden on lower income communities, who have to pay a relatively higher share of their total income for their energy costs and the additional *EEG-Umlage*, raises concerns of distributional justice.

Additionally, an adapted electricity grid will be necessary to support the transport of decentralized and naturally volatile electricity supplies. Much of the electricity produced from renewable sources comes from wind turbines in the northern regions. Yet typically, the energy intensive industries are located in the south. Such an imbalance in supply and demand across the grid requires a complex and expensive process of rebalancing (Bundesnetzagentur 2014), including extensive networks of new transmission lines. In this regard, distributional justice also manifests as the physical siting of energy infrastructure.

Bavaria, however, blocked the development of new grids as a result of public resistance to new power lines, resulting in proposals for electricity tariff zones within Germany, where southern regions may have to pay a premium for their electricity (Schultz 2015). Should the proposal of different tariff zones be realised, this will further aggravate the disproportional financial burden of the Energiewende on lower income clusters, introducing a regional dimension of distributional injustices in the southern states of the country. Here then, we demonstrate the complexity of balancing the allocation of environmental benefits and ills – whether they're physical or financial - in real-world terms.

2.2 Re-distribution of benefits

The philosopher David Hume reminds us that "justice is a conventional device for preserving social order by settling disputes between individuals who are making incompatible claims on…scarce resources" (in Campbell 2010). People receiving less than others, for example, portrays the unequal distribution and access to energy through both financial and physical means. Hume further suggests, however, that justice has to do with the distribution of *benefits* as well as burdens. One research

agenda in this area thus involves an investigation of the unfair spread of benefits, and their role in creating injustices. Here, we briefly explore the notion that the re-distribution of benefits can enforce senses of justice, thereby evidencing energy justice's normative contribution.

Developing the example above, the *Energiewende* can be seen to address distributional injustices in terms of benefits. Firstly, as about half of the nuclear capacity in Germany is already offline, with the remainder is to follow in 2022, the risk of a nuclear incident to the surrounding area is decreased. Given nuclear's replacement with renewable sources, this arguably contributes to a more just distribution of risks from electricity generation. Secondly, the *Energiewende,* with its decentralised production capacity and increased infrastructure, will affect larger proportions of the population when compared to a centralised solution. While an increase in infrastructure might be perceived negatively, the burdens of the *Energiewende* are also distributed more evenly across the population. Thirdly, FiTs are designed to attract a broad range of contributors to the Energiewende, from the public as well as from businesses outside the 'big four' in Germany. As of 2010 only 6.5% of renewable capacity in Germany was owned by the 'big four', while 40% is owned by private individuals, 14% by project managers, 11% by banks and funds, 10% by farmers and 9% by businesses (Strunz 2014). This reveals the potential positive distributional justice effects with regards to the benefits of the Energiewende and highlights potential framings through which distributional justice issues can be approached.

3. Recognition Justice

Recognition justice is more than mere tolerance and states that individuals must be fairly represented, that they must be free from physical threats and that they must be offered complete and equal political rights (Schlosberg 2003). A lack of recognition can occur as various forms of cultural and political domination, insults, degradation and devaluation. It may manifest itself not only as a failure to recognise, but also as misrecognising—a distortion of people's views that may appear demeaning or contemptible (Schlosberg 2003). Thus, it includes calls to acknowledge the divergent perspectives rooted in social, cultural, ethnic, racial and gender differences (Fraser 1999, Schlosberg 2003). In including a recognition perspective, we acknowledge the

work of McCauley et al. (2013) who explicitly mention recognition justice as a third tenet of energy justice. We place it in second place, however, on the grounds of our "what, who and how" approach outlined above.

Fraser (1999) identifies three main categories of misrecognition: cultural domination, non-recognition, and disrespect. Here, we focus on the latter two aspects as indicative examples of its real-world manifestation, using illustrative UK examples.

3.1 *Injustice as Non-recognition*

Non-recognition has been evident in the UK's policy on 'fuel poverty'. Policy-makers in England, Wales, and Scotland have only recently begun to recognise the specific needs of particular social groups—such as the elderly, the infirm, and the chronically ill—and their reliance on higher-than-average room temperatures (Walker and Day 2012). This shift counteracts a long-standing tendency to stereotype the "energy poor" and their "inefficient" use of scarce energy and monetary resources. Government-sponsored programmes have typically treated the "energy poor" as suffering from a "knowledge deficit", with initiatives focussed on the provision of objective information, economic subsidies and other incentives for increasing the energy efficiency of the housing stock and electrical appliances. Yet hardly any attempts were made to discover the motivations behind consumption patterns or to engage with their interpretation of energy-related issues, and what kind of improvements and strategies they would envision (Catney *et al*. 2013). This failure to recognise specific groups not only creates injustice, but may also lead to the loss of potentially beneficial knowledge, values and stories, as we lose the insights of marginalized social groups (see section 4.1 below).

3.2. *Injustice as Misrecognition and Disrespect*

The emergence of organised misrecognition and disrespect can be illustrated in connection to siting decisions for renewable energy generation in the UK. Developers and investors often deride local campaigns against wind farms as 'not-in-my-backyard' (NIMBY) protests by self-interested and misinformed individuals. This is accompanied by an implicit reliance on the 'deficit model', which regards citizens

as 'empty vessels' in need of factually accurate information (Catney *et al.* 2013; Burningham *et al*. 2015). However, there is little systematic evidence that the top-down provision of information – for instance about economic benefits, climate mitigation, moderate noise levels – changes opinions in the short term (Gardner and Stern, 2002).

Further, limited effectiveness of information campaigns and promises of economic benefits for local communities (jobs, annual monetary dividends) often leads wind farm developers to believe that local people's knowledge is not merely 'insufficient' but also 'incorrect' (Burningham *et al.* 2015: 251). This perception is especially acute when it comes to supposedly irrational objections that cannot easily be countered with scientific and technical arguments – such as wind turbines' aesthetic impact on the landscape, or distrust of a project's corporate financiers and beneficiaries.

Equipped with public opinion surveys showing support for wind energy (in general), developers typically assume that the "social gap" (Bell *et al.* 2013) between global/national and local perceptions is ultimately rooted in the NIMBY phenomenon. This unreflective use of this label tars all critics with the same broad brush of "selfishness, conservatism and ignorance" (Graham and Rudolph 2014: 144), contrasting unfavourably with the depiction of wind power developments as a 'civic good'. This strategy of delegitimising local protest risks undermining attempts at open-minded discussion and compromise. It also fails to recognise the sincerity of many concerns voiced by local opponents. When framed in distributive or procedural terms, these interests are often altruistic (for the good of the broader local community) and based on demands for fair and respectful treatment (Gormally *et al.* 2014). They are also frequently based on context-specific emotions and values related to place attachment, aesthetic criteria and cultural identity (Devine-Wright 2009; Murphy 2013).

3.3. *The Isle of Lewis Example*

The flaws of an approach based on non-recognition, misrecognition and disrespect have been evident on the Isle of Lewis in northwest Scotland. In April 2008, the Scottish government declined permission for a 181 turbine, 1,000 MW project on the island; a scheme which would have delivered up to £6m annually in

financial benefits (over 20 years), of which £2m would have accrued directly to local residents (Carrell 2008). An overwhelming majority of islanders spoke out against the proposal, but given the island's fragile economy and reliance on government subsidies, there were equally influential backers from local government and the business sector.

Local opposition groups raised various economic, political, and environmental objections within which cultural identity was a distinctive undercurrent. Some of the cultural arguments reflected historical grievances about the Highland Clearances, unjust patterns of land ownership, and the continuing need to "stake a claim and to fight for the land" (Murphy and Smith 2013: 700). These narratives highlighted a potentially skewed distribution of benefits and expressed a distrust of large energy corporations and other outside interests.

Of even greater significance were expressions of place identity and attachment. The peat moorland of Lewis is not merely a delicate ecological habitat which would be disturbed by road-building and concrete foundations for wind turbines. In the minds of many islanders, the moorland is also an integral part of their cultural identity – in stark contrast to the "barren wasteland" imagined by the developers (Murphy and Smith 2013: 699). A "lack of awareness and sensitivity" (ibid. 703) among wind farm developers to this 'cultural rationality' (Barry *et al.* 2008) meant that non-recognition was rife.

Subsequent developments on Lewis vindicated the significance of cultural arguments, alongside distributive and procedural concerns. Instead of relying on external developers, a group of local community member bought a large privately owned estate and established the Urras Energy Society. Relying on existing roads and carefully selected turbine sites, the new community-owned wind farm's capacity is a small fraction of the original proposal, but will nonetheless generate considerable financial benefits (Bunting 2015). This demonstrates that fostering a sense of community ownership in wind farm development can offer an effective tool for creating new processes of acceptance (Warren and McFadyen 2010). Furthermore, it suggests that neither knowledge deficits nor NIMBY tendencies represented insurmountable obstacles. Recognition and respect allowed for compromises and solutions that were perceived as just and legitimate.

Yet there is room to further explore the spatialities of recognition as acknowledgment that such issues do not just play out at a local scale. Barry *et al.*

(2008: 93) highlight that anti-wind campaigns are often undermined by their failure to concretely outline their favoured alternatives for the transition to a post-carbon economy: how, in effect, they would "do their bit" to shoulder the costs of tackling this global issue. Indeed, recent psychological studies "of empathy and its relation to altruism indicate that we also tend to empathise more with those whose problems are immediate for us" (Slote 2010). Globally, individuals seem to respond more to issues in their immediacy, distancing themselves from an invisible plight that they only know of only through description. Similarly, individuals also respond more to the '*clear and present*' danger faced by miners that we hear are trapped underground, for example, than to dangers that will arise in the indefinite future (Slote 2010). To do so, however, highlights the possible contradiction of justice in the short-term and moral obligations over potentially longer timescales and the challenge of recognising international groups. A whole systems approach to energy justice may prove fruitful in this regard: a concept we discuss in section 5, below.

4. Procedural Justice

Procedural justice concerns access to decision-making processes that govern the distributions outlined above. It manifests as a call for equitable procedures that engage all stakeholders in a non-discriminatory way (Walker 2009; Bullard 2005) and has become synonymous with politically excluded civil rights movements across North America (Gibson-Wood and Wakefield 2013). It has been thereafter applied to class (Taylor 2000), gender (Buckingham and Kulcur 2009) and religion (Schlosberg and Carruthers 2010). Procedural justice is underpinned by access to and pressure from multi-level legal systems (Walker and Day 2012). It is also driven by softer non-regulatory influences such as practices, norms, values and behaviours (Hall 2013). Rather than classifying procedural injustices or unveiling mechanisms of exclusion (Gibson-Wood and Wakefield 2013), we contribute to this literature by making explicit three mechanisms of *inclusion* designed to achieve just outcomes through local knowledge mobilization, greater information disclosure, and better institutional representation. In so doing, we demonstrate both the evaluative and normative reach of energy justice, providing, in this case, suggestions of mechanisms for remediation. We do so using the example of the Sami people in Norway, household energy consumption disclosure and gender representation in energy companies.

4.1 Mobilizing local knowledge

Local knowledge has been a critical motivating factor raised in the literature for seeking the inclusion and engagement of affected publics. The notion is most closely linked to indigenous peoples. This pattern of overlooking indigenous knowledge on the environment emerges within several energy contexts to the detriment of communities and the sustainability of decision-making. Local communities, such as the indigenous Sami people, are scattered across mostly the northern parts of Norway, Sweden, Finland and Russia (all Arctic states) and are living off fishing and reindeer herding. Thus such communities are heavily dependent on the local ecosystems. Early intervention is paramount to an effective consultation process, and thus the engagement of local communities is an imperative with regards to procedural justice aspects.

The most recent examples of where knowledge was mobilized have involved wind farms. A proposed development by Finnmark Kraft AS in the predominantly Sami county of Finnmark threatened to disrupt reindeer populations. The developer sought guidance on location and speed of construction from the Sami people through the Sami Council (McCauley *et al.* 2015). Procedural justice is therefore more than simply inclusion. It involves also the mobilization of local knowledge.

Local knowledge mobilization is equally critical outside indigenous contexts. Critical knowledge, from this perspective, is less considered as resulting from livelihoods or from an inherent sensitivity to ecosystems built up across several decades. It is rather cultivated by scientists in a plethora of non- or quasi-state organisations. Davies (2006) reveals, for example, how the Galway Safe Waste Alliance in Ireland amassed local health and geophysical data in an attempt to resist the expansion of energy-from-waste. For energy justice scholars, such literature reminds us that effective participation does not necessarily mean physical involvement in decision-making. The inclusion of knowledge, discourse and stories in our decisions can make a significant impact on policies.

4.2 Disclosing information

Procedural justice requires meaningful participation *as well as* impartiality and full information disclosure by government and industry (Davies 2006) and appropriate and sympathetic engagement mechanisms (Todd and Zografos 2005). In this context, for example, it is notable that many governments put public consultation at the centre of energy strategy and environmental decision-making. There is, however, the issue of full information disclosure. This can take the form of both state induced or voluntary disclosure, with varying levels of effectiveness in both cases (see Matisoff 2013). At a global level, information disclosure can be a driver for encouraging more ethical (Hall 2013) and sustainable (Hobson 2006) consumption practices as well as for a society's choice of energy production (Schwanitz *et al.* 2014). It can also act as a means of recourse when a community is faced with a given injustice (Walker and Day 2012).

Information disclosure on household energy consumption patterns (i.e. a form of local knowledge mobilization) is emerging as a procedural mechanism for tackling distributive injustices. Delmas *et al.* (2013) identify three types of information disclosure strategies instigated by a range of governmental and non-state actors in the household through a meta-analysis of energy conservation behaviour between 1975 and 2012. Each strategy is increasingly targeted at low-income areas. Low-level information dissemination aims, firstly, to provide hints and tips on reducing energy consumption. Individual householders can, secondly, provide their own usage feedback to authorities, upon reflection of past usage or in some instances usage patterns of their peers. The more effective strategy involved high level information interventions where, for example, lengthy home audits were implemented. Coupled with real-time information feedback loops and interactive smart grid development (Naus *et al.* 2014), these strategies can assist in encouraging more sustainable practices, and inclusion of householders in resolving distributive injustices.

4.3 Representation in Institutions

Unequal representation in a wide range of institutions including business, local, national and international governmental bodies, as well as non-state actors has an impact on the decisions made (EHRC 2014, 2011, 2010). Gender and ethnic minority inequalities have long been observed in governing bodies. A survey conducted in 2010 across politics, business, voluntary and media sectors of UK society found that

women were "seriously under-represented in all forms of leadership positions" (EHRC 2011: 8). A different survey in 2013 revealed a similar conclusion with regards to minority representation (EHRC 2010). Pulido (2000: 15) refers to this situation as "white privilege", whereby "hegemonic structures, practices and ideologies reproduce whites' privileged status". Pellow and Brulle (2005: 298) have argued environmental justice scholars need to appreciate the larger "social dynamics of the social production of inequality". Energy justice scholarship must also explore, and challenge, institutional misrepresentation as a motor for unjust energy decisions.

A focus on energy companies reinforces this gender imbalance. Carlsson-Kanyama *et al.* (2010) found that 64% of 464 energy companies surveyed in Germany, Spain and Sweden had no woman at all in boards or management groups. A consultancy firm undertook a similarly wide-ranging survey of energy companies' boards and executive teams on the Fortune 250 (RRA 2013). Its headline figure revealed 84% white male in contrast to black, Hispanic, Asian and female representations. Moreover, it reinforced such proportions widened further for smaller companies. Figures are starker still in the oil and gas industry despite efforts to implement diversity policies. BP revealed in a survey with 3,000 oil and gas professionals that 72% believed the industry remained 'male' and 'white' dominated, with notable geographical variation and some case studies of improving gender and minority representations in the results (BP 2013). Ensuring better representation in such institutions offers a more proactive approach to achieving justice, rather than depending upon the response of affected communities to injustice (Buckingham and Kulcur 2009).

5. Energy Systems and Justice

The challenge of energy justice is to apply this three-pronged approach to energy policy across the whole energy system. Energy policy often deals with only one section of the energy system to the detriment of its overall effectiveness. Thus, more pronounced "systems" thinking is needed. In this regard, we advocate for a combination of the social science account of energy (policy) with its natural science counterpart (systems). This approach provides a more nuanced understanding of justice concerns through the exploration of distributional, procedural and recognition based justice issues within the context of both energy production *and* consumption,

questioning where, across a global scale, our injustices lie (Heffron and McCauley 2014: 435).

The need for this stems from perceived and realized failures in energy systems governance (Gagnon *et al.,* 2002). Florini and Sovacool (2009) draw attention, for example, to gaps in the international system's ability to manage energy's externalities and secure a transition to low-carbon sources. Our current approach, where we focus on production and consumption as distinct outcomes of energy provision, means that typically, our supply is governed through piecemeal, ad-hoc responses (Florini and Sovacool 2009). This neglects attention to justice concerns *throughout* the system, including at the stages of resource mining, transmission and waste.

5.1 Production and consumption dichotomy

To date, literature in the field of energy justice has focused on the production and consumption of energy as distinct fields of concern. Walker and Day (2012: 69), for example, use the three-tenet framework in an evaluation of fuel poverty, exploring "how justice is made sense of in real world contexts" with regards to energy consumption. Hall (2013) promotes a synthesis of the energy justice and ethical consumption literatures in a bid to explore new avenues for theoretical development and empirical investigations of in both fields. Yet Hall (2013: 424) also acknowledges that "production, consumption and population are not independent variables, and that issues of production are inextricably connected to consumption when considering energy justice in the distribution of energy services". In support of this notion, we advocate energy justice as a framework for bridging research on energy production and consumption.

We promote therefore more pronounced systems thinking as a means of capturing the true social nature of an energy form. In this regard energy policy needs to address "the unequal distribution of ills" *throughout* the energy system from decisions on infrastructure siting, (e.g. mines, wind farms, nuclear waste facilities, etc.), subsidies (e.g. renewables, nuclear energy), pricing (e.g. fuel poverty) and consumption indicators (e.g. smart meters) within the context of local *and* global pressures (McCauley *et al.* 2013).

5.2 Whole energy systems

New perspectives and research are needed to understand the complex relationship between the global transformation of social and natural systems (Biermann and Gupta, 2011; Biermann, 2012; Dryzek and Stevenson 2011). Here we propose whole-systems as a tool. A whole-systems approach involves identifying the characteristics of the system question - its elements, interconnections and overall function - and examining the interactions between them (Meadows 2009). The energy system is defined as the entire energy chain, from mining, conversion, production, transmission, and distribution, right through to energy consumption and waste, and exists to fulfil the goal of energy production from a variety of sources (Bevier 2009; Alanne and Saari 2006; Gagnon *et al.* 2002). Such systems are taken as both material in terms of their physical infrastructures *and* social in nature, as recognition that technologies are intertwined with user practice, life styles, value changes and organisations (Markard *et al.* 2012; Whitmarsh 2012; Kern and Smith 2008). In line with Goldthau and Sovacool (2012: 233) then, we refer to "energy" as a socio-technical system that includes traditionally overlooked elements of the fuel cycle such as coalmines and oil wells in addition to the institutions and agencies that manage the system.

Meadows (2009) highlights the tendency to break our systems into small and understandable pieces, yet such an ad-hoc, often national-scale policy approach can be detrimental. Some of our "solutions" both cause and fail to recognise widespread externalities or negate the impacts of uranium mining on the environment and human health, for example (Florini and Sovacool 2009; Sovacool *et al.* 2013). In taking a systems approach, we seek to acknowledge such externalities in the decision-making process, as recognition of energy's far-reaching social, economic and environmental impacts (Stagl 2006: 53). Furthermore, such an approach aims to identify, and where possible prevent, problems that can arise from otherwise unseen or unintended consequences by shifting the scale of focus to a global "bigger picture" (Adams *et al.* 2013: 94). This concept builds to the idea that by bringing greater awareness of human needs and actions it is possible to improve the system overall (Bevier 2009: 202).

5.3 The nuclear example

The UK government is embarking upon the largest nuclear energy program in Europe, with plans for 10 new reactors at 5 different sites (Bickerstaff, 2008; Heffron 2013a); a move that reflects the national desire for energy independence and a low-carbon transition (Florini and Sovacool 2009; DECC 2011). However, the UK has experienced widespread opposition to nuclear development and local objection to the siting of new reactors (Bikerstaff 2008). Thus, as part of this drive UK policy has been drafted to draw attention to issues of social inclusion. Stagl (2006) notes, for example, that with increasing emphasis on public participation governments tend to take more consideration of the opinions of the public on electricity generation techniques.

The UK Government, prior to the publication of their Energy White Papers, undertakes public consultation, including survey-based consultation, focus groups and deliberative workshops (Stagl 2006). Despite some criticism, such consultation attempts show some attention to justice concepts at a national level (indirectly representing issues of distribution, recognition and procedure). Yet they fail to acknowledge justice manifestations in their systems context, including the upstream impacts of uranium mining and the downstream externality of nuclear waste (Sovacool and Dworkin 2014); albeit nearly all energy sources fail to account for down-and upstream externalities, so nuclear energy is no exception. To do so, however, regards the decision-making community as homogenous, and neglects the idea that injustices at one scale do not necessarily translate across others (Bickerstaff and Agyeman 2009; Heynen, 2003).

Inescapably, issues of nuclear justice do not always exist within the bounds of these geographical areas and therefore cannot be dealt with by national governments or local stakeholders alone (Hofmeester *et al.* 2012). Take, for example, uranium mining. Most prevalent in Australia and Canada, though with increasing input from Kazakhstan, uranium mining commonly occurs on lands owned by indigenous and tribal people (Karlsson 2009; Conway 2013). In such communities, the need to work with minority communities to overcome environmental injustices is widely acknowledged (Martinez-Alier 2001). This includes, for example, damage to human health and the local environment, poor economic compensation, and concerns over sovereignty and indigenous rights (Karlsson 2009; Sovacool *et al,* 2013). Yet this is neglected from UK policy and UK assessments of nuclear energy's viability despite the policy's obvious knock-on effects. This does, in effect, fail to represent nuclear's

true justice nature. Many authors argue, therefore, for a multi-scalar focus; an acknowledgement, according to Holifield, Porter and Walker (2009: 4), that "place-specific policies and practices can have consequences that cross national boundaries, affect multiple scales, and extend across global networks". This includes recognition too, of nuclear's intergenerational justice implications, as acknowledgement of its waste legacy and dependence on finite uranium (Taebi, Roeser and Poel 2012).

We seek to demonstrate that current parochial policy approaches often fail to acknowledge system-wide implications and as such, do not acknowledge all relevant systems actors. Yet by taking a whole-systems approach to energy justice, numerous other considerations, and arguably potential solutions to our energy challenges become apparent. This approach may lead to a radical appraisal of energy sources, with appropriate emphasis being given to the justice benefits or dis-benefits of differing sources.

Previous work in this area (Heffron and McCauley 2014: 435) suggested that such a system-wide focus had two implications: 1) it allowed the energy technology to be valued at full cost, and 2) that this valuation would affect whether it is chosen as an energy source, influencing energy security. In addition, we have demonstrated that the whole-systems framework draws attention to different actors of concern and most pertinently, different scales of justice, providing a global account of energy's impact. In so doing, it provides a focus, which is not restricted to a particular technology, application, location and point in time (Stagl 2006; Adams *et al.* 2013: 93).

6. Conclusion: Achieving Energy Justice

As Hall (2013: 434) has noted, we should "widen the scope of energy justice…to dislodge debates from where they currently stand…towards a more nuanced understanding of energy". Energy justice provides numerous insights in this regard.

Throughout, this paper had two aims: Firstly, sections 1-4 gave a review of the literature to date and provided empirical examples of its applications. Secondly, section 5 promoted a new direction for its development: energy systems justice. Thus, we have sought to offer both a conceptual review and a research agenda, providing suggestions of how the field of energy justice could be advanced.

Within, we chose to present each tenet of justice in the following order: distribution, recognition, and procedure. We did so on the understanding that if injustice is to be tackled, one must (a) identify the concern – distribution, (b) identify who it affects – recognition, and only then (c) identify strategies for remediation - procedure. In essence, addressing "what, who and how".

Our review has demonstrated two core contributions. Firstly, energy justice provides the opportunity to explore where injustices occur, to recognize new sections of society and to develop new processes of avoidance and remediation. It is therefore an agenda that inspires both evaluative accounts and normative solutions. Throughout this review we have characterised injustices - including, for example, those around the *Energiewende* in Germany (section 2.1), wind power developments on Lewis (section 3.3), gender and ethnic minority imbalances in governing bodies (section 4.3) - and proposed methods of remediation. These include, but are by no means limited to, redistributing benefits (section 2.2), acknowledgement of non-recognised and disrespected social groups (section 3.3) and local knowledge mobilization, greater information disclosure, better institutional representation (section 4.1-4.3). We illustrate within that energy justice has both a role in academic discourse *and* policy. Secondly, energy justice provides a new framework for bridging existing and future research on energy production and consumption, both of which can subscribe to the common goal of achieving *just* energy-based processes and outcomes. Indeed, our promotion of a whole systems approach to energy justice demonstrates that energy justice can provide a global account of energy's social, economic, and environmental impacts, as we assess the multiple sites of injustice that can occur throughout global energy systems.

However, energy justice currently remains at an embryonic stage. In brief, we would therefore like to propose several avenues for further research. In light of the activist origins of environmental and climate justice, we invite scholars to investigate why the energy justice movement is seemingly mute in comparison. Secondly, this lack of an anti-establishment past opens the door for significant contributions to mainstream policy-making: thus we would encourage engagement with the field of economics. Finally, the necessary reflection on 'energy' demanded by the concept provides an opportunity to unite systems of production and consumption. We add, in closing, the need to integrate both the consideration of past injustices, which may highlight both compensatory claims and important lessons, and future injustices, such

as intergenerational concerns. We do so to acknowledge that energy justice is pluralist; that is not restricted to a particular technology, application, location or point in time (Stagl 2006; Adams *et al.* 2013: 93). We look forward to the continued development of the field.

Word count: 8,877

Acknowledgements

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