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Editorial

Energy justice: A policy approach

1. Introduction

The world is set to invest over $300 trillion in renewable, fossil fuels and nuclear energy in the next ten to twenty years (Stern et al., 2016). Over three quarters of this total is estimated to be renewable and, to a lesser extent, nuclear investment (BNEF, 2016). This will involve fuelling current energy systems, but above all the creation of new supply chains, technologies and multiple impacts. Old injustices could be reinforced, whilst new incarnations emerge if we continue to ignore the ethical implications of our policy and investment decisions. This includes failures to appreciate the burdens of having too much energy, including waste, over-consumption and pollution, or from not having enough, where some individuals lack access, are challenged by under-consumption and poverty, and may face health burdens and shortened lives as a consequence of restricted energy choices (Sovacool et al., 2016); and emergent moral quandaries that question the criteria on which we base our energy choices. With an aim to fill this gap (at least partially), this special issue critically evaluates the social justice implications of energy supply and use from a policy perspective. This is the first special issue in any leading journal to do so.

Although not explicitly termed as such, key aspects of energy justice theory and debates have been discussed, and in some cases, remedied, since around the 1980s (Halff et al., 2014). A development trajectory building towards contemporary interest in energy justice can thus be identified through activities such as the 1980s group Resources for the Future, who were actively involved in this field, the work of the Brundtland Commission whose 1987 report was embedded with notions of social justice, as well as the scenarios study of the World Energy Council (1993), 'Energy for Tomorrow's World', which similarly addressed issues foregrounded in contemporary conceptions of energy justice. Such activities sit alongside mounting United Nations material and aspirations (such as Goldemberg et al.'s (2000) UNDP Report: "Energy and the challenge of sustainability"), and in the case of fuel poverty, the emergent concerns for increasing housing standards to achieve affordable warmth dating back to the early 1970s (Boardman, 1991) which find parallels back to the 19th Century at least.

As a contemporary, academic manifestation of such concerns, the energy justice concept evaluates (a) where injustices emerge, (b) which affected sections of society are ignored, and (c) which processes exist for their remediation in order to (i) reveal, and (ii) reduce such injustices (Jenkins et al., 2016a). Despite being a relatively new term in terms of its academic recognition and use, the concept of energy justice gained early prominence as one of eight core themes of the new (2016) Nature Energy journal, and was recently named as an explicit theme of the UK Energy Research Council (UKERC). The first academic contribution to be published that explicitly reflects on energy justice from a policy perspective was co-authored by two of the three special issue editors (McCauley et al., 2013). In the years following, we have seen peer-reviewed articles and edited books published on energy justice with regards to whole systems (Heffron and McCauley, 2014; Jenkins et al., 2014, 2016a), ethical behaviour (Hall, 2013), climate change (Bickerstaff et al., 2013; McCauley et al., 2016), household energy consumption (Walker et al., 2016), energy policy-making (Heffron et al., 2015; Sovacool et al., 2016), energy consumption and mobility (Simcock and Mullen, 2016), and theorization and methods (Sovacool and Dworkin, 2014; Sovacool, 2015; Jenkins et al., 2016b). This special issue contributes not only to a more nuanced understanding of the formation and implications of the energy justice concept, but it is hoped, the increased justice literacy of academics and practitioners. Across its contributions it emphasises that we must not only mitigate the impacts of energy via socio-technical change, but also seek to do so in an ethically defensible, socially just, way.

2. New frontiers in energy policy and energy justice research

So far the rapid development of the energy justice concept has been dominated by geographical and sociological approaches, and the concept is only starting to emerge in legal and policy literature. As an introduction to the papers in the special issue, we suggest five challenges that both academics and practitioners must reflect upon as we: (1) use concepts from ethics, morality and justice to think about energy dilemmas, and (2) continue to develop, and increasingly implement energy justice concepts in the policy sector.

2.1. Learning from national policy contexts

McCauley et al. (2013: 1) identify that energy justice 'aims to provide all individuals, across all areas, with safe, affordable and sustainable energy'; a cosmopolitan approach, which identifies that all ethnic groups belong to a single community based on a collective morality. Yet the globalised 'energy for all' concept is at odds with our policy structures. There is a tendency to split our energy systems into small, understandable pieces, leading to ad-hoc, detrimental, policy, as some of our 'solutions' both cause and fail to recognise widespread externalities (Gagnon et al., 2002; Meadows, 2009; Sovacool et al., 2014), including issues of social justice. This includes a continued focus on national strategies for energy

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provision and use, detached from the often international, systems-wide upstream and downstream implications of these policies. UK nuclear energy policy and UK assessments of nuclear energy's viability do not account for the impacts of imported uranium, for example, despite the policy's obvious knock-on effects (Jenkins et al., 2016a, 2016b). The same is true when considering widespread failures to acknowledge the impacts of extracting or producing the rare metals required for wind and solar technology, which are associated with adverse environmental and health impacts and are geo-politically divided, as well as broader environmental issues such as natural habitat loss due to palm oil production for electricity generation or biofuel, and the surreptitious clearing of hardwood forests to supplement wood wastes and chips for electricity generation (Stegen, 2015; Baldi et al., 2014; Saikkonen et al., 2014). We seek to not only expand the national context, considering structures for energy justice at the international systems level, but to increase dialogue between these national contexts as we consider how one country might learn from another, or in contrast, how contextually-specific our strategies for energy justice must be.

2.2. Legal and regulatory context

Each energy decision and process occurs within a regulatory and legal context, whether it is at a local, national or international level. As an illustration, the United Nations' Economic Commission for Europe's 'Aarhus Convention' ensures opportunities for access to environmental information and transparent procedures for all citizens of party countries, controlling the means by which energy decisions are made and mandating consultation (Yenneti and Day, 2016; UNECE, 2006). These regulations occur throughout the lifecycle of an energy form as we control resource extraction, the design and construction of new facilities, the transport of materials, and their safety and security, as well as issues of common, international concern – associated research or the risks of proliferation, for example. Whilst these regulations may indirectly represent issues of distributional justice, justice as recognition and procedural justice, we identify that on the whole, not enough attention has been paid to the legal and regulatory context in which issues of energy justice emerge. Thus, we call upon authors and readers to reflect on, firstly, which areas of legislation and regulation are hindering ethically-just decision-making, and secondly, how new concepts or ideas from energy justice might help us to inform this hard policy context.

2.3. Methodologies for energy justice

A number of different approaches have emerged to exploring the social dimensions of energy supply and use, including actor network theory, assemblages, and capabilities approaches, amongst others (see Wong, 2016; Day and Walker, 2013; Day et al., 2016). Heffron et al. (2015) sought to quantify energy justice, for example. Yet despite this growth, two content analyses of the top energy technology and policy journals highlight the apparent unimportance of energy justice both methodologically and topically (Sovacool, 2014a, 2014b), and there is a growing predominance of theoretical contributions. Not precluding but building upon these methodologies, we develop energy justice scholarship as normative, change-driven and policy focused. Specifically, we question which methods we need for assessing the prevalence of injustices in our energy systems, and for remediating them.

We advocate for the exploration and proliferation of policy-oriented methodological approaches to energy justice scholarship that utilises methods from *across* the academic disciplines. These include methods incorporating modelling, statistics, metrics, cost-benefit analysis and policy assessments alongside qualitative approaches. Moreover, we highlight the importance of considering not only *which* methodological approaches to use, but *when* in the policy cycle we seek to implement them. Using the framework of Miller et al. (2015), we identify three decision-making areas where it is possible to enact socio-economic approaches that are conscious of ethical dilemmas: (1) the practices and techniques through which potential energy futures are envisioned, analysed, modelled where required, and evaluated, (2) the forums and methods for deliberating, debating, and making energy choices, and (3) the institutions for fashioning, operating, and regulating new energy systems. The energy justice framework has extensive potential to contribute to each of these fields.

2.4. Thinking across energy types

Each energy source is inevitably imbued with its own justice challenges – nuclear power's creation of radioactive waste, wind energy's needs for stronger reliability in offsetting intermittency and distribution expansion, or coal's high worker death toll and CO_2 production, for example. Indeed, where renewable energy sources are concerned, there is an increasingly desperate need for large-scale storage capacity beyond pump storage as a means of securely providing energy services for all. Moreover, the costs of subsidising renewable energy are increasingly linked to rising fuel poverty in some industrialised countries. In this regard, differing forms of energy use also raise the concerns of who has access, who does not, and the distributional burden of our different consumption forms. These challenges are increasingly well documented in a series of source-by-source accounts of an energy source's social impacts, including assessments of energy production (Simpson and Clifton, 2016; Yenneti and Day, 2016; Goedkoop and Devine-Wright, 2016) and energy consumption with a focus on mobility and domestic life (Simcock and Mullen, 2016; Liddell et al., 2016; Walker et al., 2016; Chatterton et al., 2016; Mullen and Marsden, 2016). Whilst clearly valuable, we identify that few studies explore the comparability and contrast of different production and consumption patterns, and what the justice implications of one source can mean for another. Does oil and gas extraction raise similar energy justice concerns, and therefore necessitate similar injustice remediation procedures? Do the justice implications of household energy use translate to behaviour in business? And through these contrasts and comparisons, should we choose one source of production or use over another because it presents the 'lesser justice evil'? Here we ask for authors and practitioners to contemplate the source-specific implications of an energy form or use *as well* as their role as part of a diverse energy mix, considering their findings and policies in a wider context.

2.5. Temporal approaches

Finally, we identify the challenge of time. The drivers of energy systems transformation inevitably change, with different energy sources and usages being selected based on their ability to fulfil evolving political priorities. This includes a shift in concern for the cheap, plentiful supply of energy, to the provision of safe and secure electricity generation, resource efficiency, or the desire to transition to low-carbon production. As an outcome of these selection processes, what energy justice has been, is, or might be also evolves. Germany's transition away from nuclear power in the wake of the Fukushima disaster can be seen to represent a change from the 'morality of risk' to the 'morality of carbon reduction', for example,