Energy Justice

Roman Sidortsov and Darren McCauley

Introduction

The concept of energy justice transpired out of recognition by practitioners and scholars of the inequalities, inequities, insecurities, and other moral wrongs and ethical wrongs created in the course of production, transportation and use of energy (Sovacool et al, 2014; Sidortsov et al, 2019). This is a young but rapidly emerging field with its first attempts to develop comprehensive frameworks, conceptions and principles dating back to the early 2010s. At the centre of energy justice is energy as a particular type of good that is instrumental and a prerequisite to human flourishing in the contemporary world.[1] There is not a single country that can claim to be capable of maintaining let alone developing its economy and society without sufficient supply of modern energy and there are not many communities whose members can thrive without access to energy services.

Energy is supposed to be a means to human flourishing through the provision of energy services. However, in reality, it tends to dominate and determine the ends while creating vast and numerous inequities in the process. Oil wars, community displacement, pollution and the looming climate catastrophe are just a few examples of mounting sources of insecurity, inequities and injustice. Correspondingly, the primary goal of energy justice is addressing both the causes and effects of such insecurities, inequities and injustices across multilevel energy systems through exposing and analysing them, as well as developing pathways and solutions for more just production, transportation and use of energy. This does not mean that energy justice scholars are not interested in developing an energy justice theory and contributing to the development of fundamental schools and applied theories of justice. In fact, even a brief survey of scholarly literature, some of which are noted in this chapter, shows several proposed theoretical frameworks

and significant contributions to understanding distributive, cosmopolitan, procedural and recognition aspects of justice.

Historical development

The term 'energy justice' first appeared in academic literature in the 2000s in Guruswamy's (2010) article 'Energy justice and sustainable development'. Guruswamy largely equates energy justice with the concept of energy poverty but does not further develop and ultimately define it. Hall (2013) focuses on the possibility of what he calls an ethical consumption, including consumption of energy, while remarking on the lack of an accepted definition of energy justice. The particularly multifaceted nature of energy studies leads to definitional contestation. The next wave of energy justice scholarship explored the foundations of the concept. Heffron and McCauley (2014), Sovacool and Dworkin (2014), Guruswamy (2016), Jenkins et al (2016), and many others, ground the concept in the application of the different aspects and forms of justice that they deem instrumental to an energy system's operations. Jones et al (2015) take a less direct approach. They go through four assumptions to build their conceptual foundation via reconciliation of insights from applicable justice schools with the aforementioned unique characteristics of energy as a good. They develop two principles, affirmative and prohibitive (discussed in more detail in what follows), which they use as the foundation and starting point of analysis for any energy justice problem. Sidortsov et al (2019) term these two approaches respectively 'system' and 'foundational'. This designation is not indicative of analytical superiority of one over another or better suitability for providing solutions to energy centric problems. The chief purpose of the designation is to underscore two divergent pathways that scholars take to deciphering energy justice. To date, the system approach received much wider recognition than the foundational approach.

Energy justice has been shaping out to be a truly energy-first and discipline-second area of scholarship. It did not emerge from a single discipline, university or department. The knowledge of and focus on the energy sector and systems have united energy justice scholars.[2] Often, energy justice is built upon existing research agendas across social sciences in the form of environmental and climate justice (Walker and Bulkeley, 2006; Bickerstaff and Agyeman, 2009; Walker, 2009; Barrett, 2012; Bulkeley et al, 2013), as well as more recent developments in energy poverty (Bouzarovski and Herrero, 2016; García-Ochoa and Graizbord, 2016) and energy vulnerability research (Middlemiss and Gillard, 2015; Bouzarovski et al, 2017a; 2017b). Energy justice engages strongly with geography, legal studies (Guruswamy, 2015), business (Hiteva and Sovacool, 2017), political science (Jenkins et al, 2016), engineering (Heffron and McCauley, 2014) and other disciplines. Because

172

the first attempts to conceptualise energy justice occurred less than a decade ago, analysing its historic development at length is premature. However, with the ever-increasing volume and breadth of energy justice scholarship, the empirical foundation for such analysis is not far away.

The need for historic analysis, reflection and, perhaps, rethinking of the role of energy justice in decision-making is sharpened by several ongoing and emergent crises: climate, energy and supply chain. This differs to just transitions research where it has already played a key role in shaping international policy making as outlined in Chapter 15. Energy justice scholars have established that there is an ethical and moral deficiency of the status quo and outlined many instances, processes and places where injustice occurs. For instance, Sovacool et al (2014) centre their work on instances of injustice that they group into temporal, economic, sociopolitical, geographic and technological dimensions. In general, there is little disagreement among energy justice scholars about the prevalence, impact and significance of injustice in the energy sector. However, attempts to conceptualise different approaches to analysing, pre-empting, mitigating and remedying energy injustices have only begun. For this reason, we focus on the aforementioned system and foundational approaches to deciphering energy justice.

Approaches to defining energy justice

The *system* approach to energy justice builds directly on mainstream theories of justice that the proponents of the approach deemed to be integral to energy sector operations. This is a major point of departure from just transition (Chapter 15), which does not base itself on systems thinking. Unlike energy justice, it places its core focus on transitioning away from carbon-intensive fuels. Thus, the approach aims to address an energy justice problem largely with an already existing arsenal of conceptual and theoretical tools. McCauley et al (2013) premise energy justice on three central tenets: distribution, procedural and recognition justice. Sovacool and Dworkin (2014) and Sovacool et al (2016) tap into a larger pool of justice forms and concepts and develop eight core principles through which they define energy justice. These include availability, affordability, due process, transparency and accountability, sustainability, intragenerational equity, intergenerational equity, and responsibility (Sovacool et al, 2016).

These two conceptual springboards have led to further advancement of the system approach. Heffron and McCauley (2014) explore how the concept applies across the energy life cycle and system (see Figure 1). Heffron and McCauley (2017) also add cosmopolitan justice to their framework as depicted in Figure 1 because of the global nature of the production, conversion, delivery and use of energy. To remedy past injustices, they bring restorative justice into their framework as well. Heffron and McCauley place

Figure 1: Energy justice conceptual framework developed by Heffron and McCauley (2017)
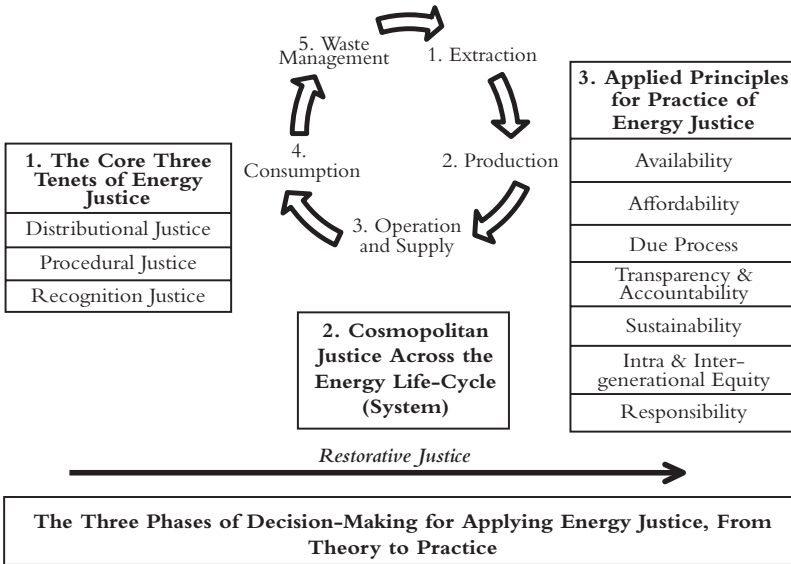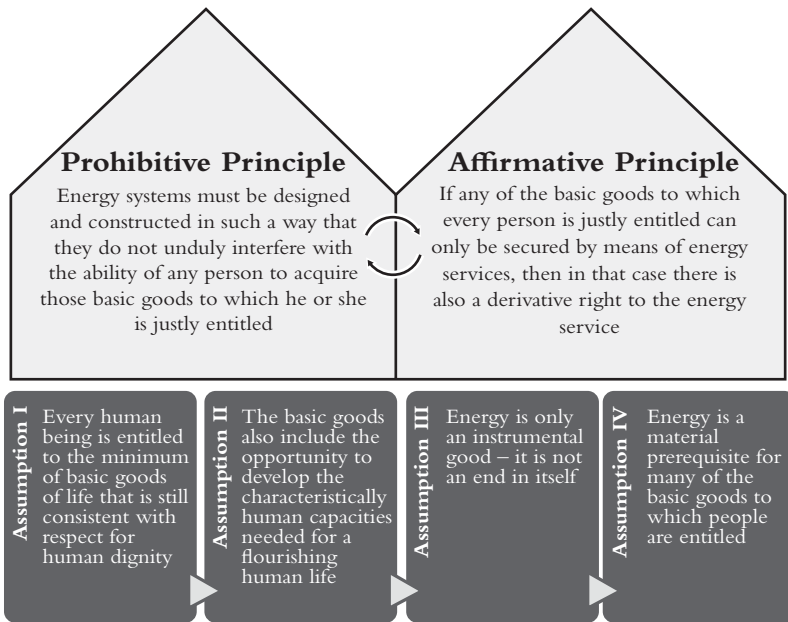

Source: Heffron and McCauley (2017) © 2017 Elsevier Ltd. Reproduced with permission of the Licensor through PLSclear.

the energy life cycle at the core of their framework to ensure that there is an increased understanding of shared obligations by all actors in the energy sector regardless of where individual decisions are made.

Analysis under this framework begins with examining an energy inequity problem (for example, community displacement due to the construction of a hydroelectric dam) vis-à-vis the core tenets (distribution, procedural and recognition justice) to determine its ontology or ontologies. The next step is to broaden the scope to place the problem within the energy life cycle and/or energy system and its global interdependencies and issues. The final step is employing the applied principles for guidance on practical action and restorative justice as a condition for such action.

The *foundational* approach to energy justice is based on two cornerstones, the unique characteristics of energy as a good and insights from the applicable justice schools. These are used to create a philosophical foundation of energy justice and effectively define it through two principles, prohibitive and affirmative. Sovacool et al (2014) begin by identifying three key forms of justice – distributive, procedural and cosmopolitan – and proceed with four sequential assumptions (as depicted in Figure 2) (Jones et al, 2015), eventually arriving at the aforementioned two principles. In doing so they also enrich the analytical arsenal for applying the principles. This includes, for example, identifying the nature and contextualising of

174

Figure 2: Assumptions and principles of energy justice

Prohibitive Principle
Energy systems must be designed and constructed in such a way that they do not unduly interfere with the ability of any person to acquire those basic goods to which he or she is justly entitled

Affirmative Principle
If any of the basic goods to which every person is justly entitled can only be secured by means of energy services, then in that case there is also a derivative right to the energy service

Assumption I
Every human being is entitled to the minimum of basic goods of life that is still consistent with respect for human dignity

Assumption II
The basic goods also include the opportunity to develop the characteristically human capacities needed for a flourishing human life

Assumption III
Energy is only an instrumental good – it is not an end in itself

Assumption IV
Energy is a material prerequisite for many of the basic goods to which people are entitled

Source: Sovacool et al (2014, 2019) © Kathleen E. Halvorsen, Chelsea Schelly, Robert M. Handler, Erin C. Pischke and Jessie L. Knowlton 2019. Reproduced with permission of the Licensor through PLSclear.

one's response to energy injustice, as well as determining the ontology of basic goods (Jones et al, 2015). The interplay between the prohibitive and affirmative principles is a balancing act between an obligation to deliver energy services and the conditions under which the services need to be delivered. Unlike the system approach, the foundational approach also articulates why people have the right to modern energy services, as well as the extent of this right.

The centrepiece of the analysis to which Sovacool et al return repeatedly is the unique role that energy plays in the global economy and modern society. Energy is a prerequisite to many if not most goods, including basic ones. Thus, energy, instead of simply being means to other goods, instead dominates them. This domination transcends countries, communities and individual minds. It is used as a geopolitical weapon and a reason to risk the future of humankind. Policy discourse around energy is almost exclusively centred on energy commodities – barrels of oil, gallons of gasoline, megawatts of electricity and tonnes of coal – and not what all these sources of primary and secondary energy need to achieve. However, energy is not an end in itself. As Jones et al (2015, p 160) put it, 'the use of energy must be determined by the human ends it serves (rather than these ends being

175

distorted to fit the technical imperatives of the energy system), and these ends must be consistent with respect for the equal dignity of human beings'.

Debates and key developments

Procedural energy justice and capabilities

Procedural justice is a key concern for individuals and communities who are affected by changes in energy systems. This is a shared point of concern for just transitions research (Chapter 15). Affected communities have been found to be routinely excluded from decision-making processes with regard to the siting of energy infrastructure in and around their vicinity (McCauley et al, 2013). Spaces of undue process are already well established in environmental and climate justice research. The unjust distribution of power plants or waste facilities is directly correlated with an ineffective or even absent process for including community organisations. Higginbotham et al (2010) revealed that residents in the Upper Hunter, Australia, were routinely blocked from inputting crucial scientific data on air pollution as part of their protest against the state's promotion of coal production in the area. More recently, similar research has emphasised the lack of procedural mechanisms for including opposition and supportive voices for shale gas in the UK (Cotton et al, 2014). This space of injustice is therefore characterised by non-inclusion in crucial decisions.

Research in procedural energy justice has been dominated by multiple case studies of wind energy. This reflects the broader changes in global energy systems (as well as a more Anglo-American dominance of literature as elaborated later in this chapter) towards investing in renewable energy sources. This has moved the debate on fair process from simply inclusion itself, towards reflections upon who is seeking to include and when this takes place. Warren and McFadyen (2010) demonstrated that local ownership of community wind farms has a greater chance to be accepted and incurs fewer instances of injustice. Ottinger et al (2014) find, in contrast, that greater state involvement can lead to less opposition in the US. Outside the EU and US examples, feelings of injustice on renewable energy are driven by the lack of informal recognition or appreciation of local livelihoods that are destroyed by some energy efficient projects (Yenneti and Day, 2015). Spaces of unfair process in emerging energy systems are therefore more complex, contextual and time-sensitive.

The decentralised nature of renewable energy systems requires a new approach to including affected communities in infrastructural decision-making. In the examples raised here, the community is viewed as detached from its energy system, at least in terms of production and associated processes. Originating from Sen (1999), the Capabilities Approach sheds light on not only the basic desire to access energy but also the wide range

of capabilities that energy provides. Unconventional energy systems which do not require major infrastructure offer the potential for a much freer engagement for the traditionally understood consumer. Parag and Sovacool (2016) support this observation by suggesting that electricity markets are currently undergoing a process of redesign to deal with unconventional energy systems and smaller scale renewable systems.

Adjacent concepts: fuel poverty, energy poverty and energy vulnerability

Historically, fuel poverty is defined as the need to spend above 10 per cent of a household's income on energy. It is a practical action-oriented concept that exposes the structural unfairness of income poverty related to basic energy services. Fuel poverty preceded energy justice and motivated some energy scholars to think about structural unfairness in the distribution of energy services more broadly. Thus, it falls firmly under the umbrella of energy justice. In a study between 2010 and 2013, Sovacool (2015) found that the warm fronts programme in England significantly reduced the number of fuel poor British homes by providing energy efficiency upgrades. It led to a reduction in greenhouse gas emissions as well as an average annual income addition of £1,894 per household. Similar research has emphasised the need to investigate such spaces of fuel poverty due to higher levels of health issues (Lacroix and Chaton, 2015), resulting from damp or cold housing (Shortt and Rugkasa, 2007; Dear and McMichael, 2011) as well as inadequate air conditioning (Teller–Elsberg et al, 2016).

The concept of fuel poverty has been broadened by the development of energy poverty (Bouzarovski and Herrero, 2016). It relates to the injustices felt not only by those spending under the 10 per cent of annual income. Similarly to the concept of fuel poverty, energy poverty exposes structural unfairness related to income and wealth disparities in the context of the provision of energy services. It also belongs under the wide umbrella of energy justice as it connects particularly well with the aforementioned affirmative principle. It was instigated by the observation that fuel poverty is not as applicable outside developed nations. Energy poverty brings our attention to a much more absolute understanding of energy access. García–Ochoa and Graizbord (2010, p 40) define energy poverty, in relation to Mexico, as an agenda which seeks to reveal the 'deprivation of energy services linked to satisfying basic human needs'. The focus of responsibility is placed upon the providers of electricity, heating and transportation fuels.

Fuel poverty is also defined by misrecognition or exposing the understudied consequences of distribution which is often referred to as post–distributional conceptualisations (Walker and Day, 2012). A UK-based study found that poverty and lack of access to energy directly correlated with ill health among older people (de Vries and Blane, 2013). Research in energy poverty has

attempted to move beyond post-distributional justice issues by considering procedural concerns also, for example in post-communist states of eastern and central Europe (Bouzarovski and Herrero, 2016).

From these origins, research in energy vulnerability (Fernández-González and Moreno, 2015; Middlemiss and Gillard, 2015; Cauvain and Bouzarovski, 2016; Bouzarovski et al, 2017a) emerged directly from the inclusion of post-distribution research (Bulkeley et al, 2014). Spaces of vulnerability are identified as the direct consequences of distributional injustices.

Responsibility in energy justice

Energy justice scholars have consistently argued that 'we all' (from government and business to citizens and academics) have a responsibility to ensure that energy justice is achieved (Heffron and McCauley, 2014; 2017; Reames, 2016; Sovacool et al, 2016; Munro et al, 2017). This understanding of responsibility builds directly upon the works of Iris Marion Young (2004; 2006; 2011). Young recognises that a shift in models of responsibility is required in order to respond to the major questions that society faces, such as climate change or making the global energy system more sustainable. She referred to this as the model of social connectedness, whereby individuals adopt senses of responsibility that go beyond their immediate context of family or even local community.

The trajectory of energy systems reinforces the argument that scholars need to adopt a broad understanding of responsibility. As the global energy system moves away from fossil fuels, alternative fuel systems are inherently more decentralised. The decentralisation of energy systems means that individuals and householders may decide to assume responsibilities for their own energy provision, as well as for others (Capaccioli et al, 2017). Their position within the energy system is not restricted to that of the end user. Recent studies (Ritzer et al, 2012; Parag and Sovacool, 2016) have focused on the notion of a prosumer, meaning a consumer that also produces for its own energy needs. Damgaard et al (2017) revealed in their study of biofuels in Nepal that individuals adopted a greater sense of responsibility in producing and consuming energy when they understood how their biofuel energy system worked, and that they had to maintain it.

No 'good' energy?

The global energy system must decarbonise to ensure sustainable long-term clean sources of electricity, heating and transport. The electricity sector has experienced the most improvement in this regard with the development of a wide range of sources (IEA, 2016). Renewable and low-carbon electricity technologies can, first, exude similar injustices as dirty fuels. The

establishment of large-scale onshore and offshore wind and solar farms has placed communities in opposition to developers (Urpelainen, 2016; Yenneti and Day, 2016). Pepermans and Loots (2013) find that current siting processes in Flanders reinforced disagreements between communities and companies in a similar fashion to coal power stations. Bailey (2016) argues in a similar vein that national governments have exploited rural communities through the renewable agenda leading to the expansion of related infrastructures. From this perspective, clean fuels can exacerbate feelings of injustice, instigated by large-scale fossil fuel developments in the 1970s, through multiplying infrastructures in close proximity to communities.

The absence of health implications from air pollution commonly found in relation to fossil fuels does not necessarily translate into higher senses of justice. The comparatively large size of individual fossil fuel production infrastructure such as a power plant or waste facility contrast with micro- and medium-sized renewable sources (albeit large-scale wind farms often cover more space). This means that energy infrastructures are multiplied throughout a given region or nation (Liljenfeldt and Pettersson, 2017). In the case of wind turbines, this has marked a shift from urban-based concerns around justice towards rural communities (Malin, 2015). The high load needed for older and more established fossil fuel power plants require urban or semi-urban localisations (this is less true for newer power plants often located outside urban areas). This is not the case with wind or solar. The ability of a consumer to purchase and use micro infrastructure has moved energy towards the household level where energy can be both produced and consumed (Reid et al, 2009). Yet the size, location and scale matter, often more than the type of energy facility.

Connections with other applied theories

Spatial and intergenerational justice

Energy justice as a concept includes like-minded spatial conceptualisations such as proximity, due process and misrecognition. In terms of spatial approaches, energy justice has recently added a fourth dimension of restoration justice (Heffron and McCauley, 2017). The global energy system is a highly complex network of production, distribution, transmission and waste infrastructure designed to provide energy to end users. Traditionally, environmental justice would focus on the negative implications of energy and non-energy generating or waste-related activities for local populations (Tayarani et al, 2016). US-based research found that there was a high propensity of local, national and supranational organisations to locate these infrastructures within ethnic minority or socially deprived communities (Macias, 2016). Geographical literature in this area concentrates on revealing the place-specific nature of injustices, or explores the spatial tactics used by

opposing activists (Houston, 2013). Proximity has therefore represented a key concern for such researchers. They did not, however, reflect explicitly on the role of energy. Energy justice provides an opportunity to fill this gap. The rise of new 'clean' energy technologies offers new spaces of proximity.

Energy production is the stereotypical focus when considering distributive justice implications. The standard examples often come from what is termed 'dirty fuels' such as oil (Orta-Martinez and Finer, 2010), especially coal (Higginbotham et al, 2010) or even gas (Nevins, 2004). These energy systems inevitably involve the construction of large centralised industrial plants to convert these sources of primary energy into secondary energy sources such as electricity and gasoline. During the 1970s, infrastructural developments took place throughout the US and Europe as the oil boom took place. This gave rise to justice-based research in these areas (Taylor, 2000). Today, the industrial fossil fuel system is either being updated or maintained in developed nations, while many emerging economies are currently, or recently, adopting large-scale fossil fuel systems. China, and especially India, are classic examples (Liu et al, 2014). From this perspective, new proximities to energy infrastructure emerge in developing world contexts where populations can be more vulnerable.

Nigeria is an example where oil has been the driver of the national political economy (Glazebrook and Kola-Olusanya, 2011). It has also fuelled conflict, as well as embedded logics of 'capital and care' (Maiangwa and Agbiboa, 2013). Proximity to oil fields leads to 'logics of capital' that is largely driven by militant male youths, whereas 'logics of care' are more closely associated with notions of justice driven by women. This demonstrates that injustice in energy does not always originate from the location of infrastructure in a given community as it can often be contextual, leading to variable outcomes for certain groups of society. The development of gas reserves in the Russian Arctic presents an example whereby energy is a more direct driver of injustice (MacDougall, 2001; McCauley et al, 2016). The decision of multinational energy companies to drill in the Yamal Peninsula has directly resulted in health implications for both the local community and foreign workers (Silin, 2015). The emergence of fracking has equally inspired opposition movements against shale gas in both the UK and US (Cotton et al, 2014; Eisenberg, 2015). Similar research has pointed to potential health implications of being located within the vicinity of the producing infrastructure (Crowe et al, 2015). In both cases, proximity has indeed resulted in social opposition and new feelings of injustice.

Intergenerational justice has also been at the heart of the climate mitigation policy discourse since the 2000s. It was spurred by the release of the 2006 *Stern Review on the Economics of Climate Change* (Stern, 2007) and, more specifically, the discount rate its authors adopted to value future damages from climate change. In essence, the discount rate is centred on the weight

given to the welfare of future generations compared to the welfare of present generations. While the early discourse focused on the discount rate itself, energy and climate justice scholars added a dimension to the discourse by questioning the right of present generations to saddle future generations with a catastrophic debt. Sovacool et al (2014) argue that from the perspective of intergenerational justice, discounting the future impacts of climate change is nothing more than a ruse that serves to hide a terrifying indifference to the assured suffering and demise of millions of people yet to be born. Factoring in current, likely and possible impacts of climate change on agricultural land, freshwater resources and fisheries, the belief that future generations will have the collective wealth to deal with these impacts is problematic if not delusional. Moreover, it is not just the debt of climate change impacts that is at issue, if the configuration of current energy systems is not scrutinised temporally, future generations will be saddled with an obsolete energy infrastructure incapable of providing even basic energy services.

Environmental and climate justice

Although environmental and climate justice target the energy sector in some ways, neither can sufficiently encapsulate emerging questions around equity and fairness with regard to current and future energy systems. Environmental and climate justice are well-established literature bases in multiple disciplines, for example, geography, sociology and environmental studies. Neither can sufficiently encapsulate emerging questions around equity and fairness with regard to current and future energy systems. Environmental justice has been a successful tool for activists (Schlosberg, 2004; Houston, 2013). Its origins are closely related to social opposition against the siting of hazardous waste in the US. Studies emerged in academia as opportunities to reflect upon the ways in which these injustices were resisted (Taylor, 2000). Similar research has also emerged outside the US, often focusing on resistance movements including in Africa (Ako, 2009), Europe (Slater and Pedersen, 2009), South America (Urkidi and Walter, 2011) and Southeast Asia. Early research in this area reveals the distributional injustices with regards to where environmental burdens are sited (Taylor, 2000). It sheds light on how companies and governments sited harmful infrastructure through planning processes in areas of social deprivation or near ethnic minority communities (Shrader-Frechette, 1996). More recent literature has offered insight into decision-making processes which have been referred to as investigations of procedural justice (Hricko et al, 2014). Scholars realised in this way that the process of locating infrastructure was equally important as the final outcome.

The focus in environmental justice research is therefore positioned at the intersection between social concern and environmental impacts. It is equally valid for other forms of research where the emphasis is placed outside the

environment. Climate justice emerged directly from this literature and associated conceptual frameworks (Bulkeley et al, 2013; Harris et al, 2013; Olawuyi, 2016). The focus of resistance is placed directly upon a much larger concern than individual environmental impacts (Russell, 2015). Climate change is presented as an overriding meta concern where social justice is juxtaposed with international climate negotiations (Lyster, 2017), their implementation (Mathur et al, 2014) and the local consequences of rapid changes in climate (Bulkeley et al, 2014). Conceptually, this agenda brought a new spatial dimension to academic research in the form of misrecognition, albeit absent from some climate justice literature in geography (Fisher, 2015). It encouraged us to consider who is missing from our policies or decisions in response to climate change (see Chapter 10).

Applying energy justice in the social sciences

As noted in this chapter, the concept of energy justice emerged in the social sciences and has been developed largely by empirical scholars. Its rapid ascent and adoption have already benefited energy research and there is no dire need to tighten theoretical conventions just yet. Theoretical accounts of justice might restrict energy justice researchers in activism (and more generally) pigeonhole them into predetermined western conceptions of justice (Barnett, 2010). Attention should be drawn to where and when injustice is felt and experienced, in support of Hobson (2006), justice-based activism research must diversify its understanding of where injustice can be found in multiple contexts. Justice, in this regard, is pluralist.

Reed and George (2011, p 839) comment that 'researchers are cautioned that the long observed disconnect between theory and practice in the field of environmental justice may be exacerbated should academics become more concerned with theoretical refinement over progressive, practical, and possible change'. The theorisation of justice seeks to expose ideal endpoints (and more recently processes) from various (usually western) philosophical traditions. In a similar vein, Schlosberg (2013) argues that justice theorists need to be pluralist in accepting a range of understandings of 'good'. The first step in this direction is therefore the acknowledgement that the study of justice is pluralist. It is argued here that we need to explore the plurality of injustice too.

Martin et al (2014, p 2) acknowledge 'that justice poses considerable conceptual challenges, not least because of the practical (if not intellectual) impossibility of reaching consensus'. Their conclusion bears a self-reflective unease; as they question the limitations of their own framing and methods, including the underlying logics of justice. This calls for acknowledgement, then, that justice is contextual. Walker (2009, p 622) comments, for example, that 'as we move from concern to concern and from context to

context, we can expect shifts in both the spatial relations that are seen to be significant and in the nature of justice claims being made'. The expansion in the theorisation of justice as a concept must be answered with a similar response in our empirical understanding of energy justice and the injustices it entails. As Barnett comments in support of Sen (2011):

> Rather than thinking of philosophy as a place to visit in order to find idealised models of justice or radically new ontologies, we would do well to notice that there is an identifiable shift among moral and political philosophers towards starting from more worldly, intuitive understandings of injustice, indignation, and harm, and building up from there. (Barnett, 2010, p 252)

Energy justice is a foundational concept for social scientists to investigate the ethics, morality and values behind energy decision-making, the negative and positive outcomes thereof, and the causal links and gaps between the decisions and impacts. Energy justice is often best identified and analysed by examining energy injustice. However, energy inequities usually span many dimensions making it difficult to identify and classify their exact origins. Yet it is challenging to solve an energy injustice problem without knowing *how* it impacts people and the environment and *where* the impacts are felt the most. Having a typology helps account for the complexity of energy justice problems while designing solutions that target the causes and not symptoms.

Sovacool et al (2014) offer such a typology and Sidortsov and Sovacool (2015) apply it in the context of energy development in the Arctic. The typology is centred on five dimensions – temporal, economic, sociopolitical, geographic and technological – and was developed based on the prevalent energy injustices that the scholars identified as part of their work. The temporal dimension groups injustices arising from harmful legacies that are passed to future generations. The economic dimension puts a spotlight on economic inequalities, inequitable distribution of energy services, energy and fuel poverty and drudgery, energy price volatility, and the economic impacts of resource depletion. The sociopolitical dimension highlights conflicts over energy resources, resource curse, social marginalisation, corruption, often leading to the erosion of democratic institutions, and human rights abuses. The geographic dimension helps to identify injustices related to the unequal distribution of risks, impacts and benefits of energy development such as the creation of sacrifice zones, community displacement and climate refugees. The technological dimension refers to injustices that are embedded in the design of certain energy technologies: reliability, safety, path dependence, vulnerability and inefficiency.

The Five Dimensions of Energy Justice framework is just one example of the array of impressive analytical tools that energy justice scholars have

amassed. These tools cover most, if not all, social science disciplines and can be used for descriptive, evaluative and prescriptive purposes. Energy justice remains a social science concept throughout that will continue to serve researchers, practitioners and activists well.

Conclusion

Barely a decade old, energy justice has already emerged as a foundational concept in energy studies. Inherently transdisciplinary, energy justice transcends academia and is emerging as an analytical tool employed by activists and practitioners alike. Its strong empirical foundation safeguards it against the domination of a single normative justice theory. Rather, energy justice scholars draw upon different traditions of justice, often employing distributive, procedural, recognition and restorative forms of justice to develop the concept. There is no unity among scholars in defining energy justice, which is a good thing. Energy justice discourse remains fresh and stimulating with various frameworks borrowing from each other and not trying to prove each other wrong. Even the two seemingly divergent approaches to energy justice, system and foundational, can and do work together as each provides a different perspective on an energy justice problem at hand. Energy justice works well with several adjacent concepts such as energy and fuel poverty and energy vulnerability. Whereas these concepts enable a researcher to zoom in on a specific issue, affordability of heating for example, energy justice provides an overarching framework for placing and assessing this issue within the ethics of the energy cycle or energy system.

What makes energy justice a distinct applied theory of justice is the special nature of energy as a good. In theory, a means of achieving the end, moving people from point A to point B, for example, it tends to dominate the end, in this instance, chaining it to the global oil market. Thus, other relevant applied theories, environmental, climate, spatial and intergenerational justice, only address some injustices created by energy systems. These injustices often fall into the category of burdens created by the production, transportation and use of energy, leaving the services that energy systems must deliver unaddressed. However, this makes these applied justice concepts perfect complementary tools in the hands of energy researchers and practitioners to transition the world towards a sustainable and equitable future.

Notes

[1] For the purposes of this chapter, we refer to energy as primary energy and secondary energy. The International Energy Agency defines primary energy that the energy stored in natural resources that has not undergone any anthropogenic conversion. Primary energy that has been modified for a particular use, refined into petroleum and converted into electricity but not delivered to final users, is referred to as secondary energy (Intergovernmental Panel on Climate Change and Edenhofer, 2014).

² According to the Intergovernmental Panel on Climate Change, 'the energy system comprises all components related to the production, conversion, delivery, and use of energy' (Intergovernmental Panel on Climate Change and Edenhofer, 2014, p 1261).

References

Ako, R.T. (2009) Nigeria's and use act: An anti-thesis to environmental justice. *Journal of African Law*, 53(2), 289–304.

Bailey, I. (2016) Renewable energy, neoliberal governance and the tragedy of the Cornish commons. *Area*, 48(1), 119–121.

Barnett, C. (2010) Geography and ethics: Justice unbound. *Progress in Human Geography*, 35(2), 246–255.

Barrett, S. (2012) The necessity of a multiscalar analysis of climate justice. *Progress in Human Geography*, 37(2), 215–233.

Bickerstaff, K. and Agyeman, J. (2009) Assembling justice spaces: The scalar politics of environmental justice in north-east England. *Antipode*, 41(4), 781–806.

Bouzarovski, S. and Herrero, S.T. (2016) Geographies of injustice: The socio-spatial determinants of energy poverty in Poland, the Czech Republic and Hungary. *Post Communist Economies*, 29(1), 27–50.

Bouzarovski, S., Herrero, S.T. and Petrova, S. (2017a) Energy vulnerability trends and factors in Hungary. *Energie und Soziale Ungleichheit*, 455–474.

Bouzarovski, S., Herrero, S. and Petrova, S. (2017b) Multiple transformations: Theorizing energy vulnerability as a socio-spatial phenomenon. *Geografiska Annaler Series B: Human Geography*, 99(1), 20–41.

Bulkeley, H., Carmin, J. and Castán Broto, V. (2013) Climate justice and global cities: Mapping the emerging discourses. *Global Environmental Change*, 23(5), 914–925.

Bulkeley, H., Edwards, G.A.S. and Fuller, S. (2014) Contesting climate justice in the city: Examining politics and practice in urban climate change experiments. *Global Environmental Change*, 25, 31–40.

Capaccioli, A., Poderi, G. and Bettega, M. (2017) Exploring participatory energy budgeting as a policy instrument to foster energy justice. *Energy Policy*, 107, 621–630.

Cauvain, J. and Bouzarovski, S. (2016) Energy vulnerability in multiple occupancy housing: A problem that policy forgot. *People, Place & Policy Online*, 10(1), 88–106.

Cotton, M., Rattle, I. and Van Alstine, J. (2014) Shale gas policy in the United Kingdom: An argumentative discourse analysis. *Energy Policy*, 73, 427–438.

Crowe, J., Silva, T. and Ceresola, R.G. (2015) Differences in public perceptions and leaders' perceptions on hydraulic fracturing and shale development. *Sociological Perspectives*, 58(3), 441–463.

Damgaard, C., McCauley, D. and Long, J. (2017) Assessing the energy justice implications of bioenergy development in Nepal. *Energy, Sustainability and Society*, 7, 8. https://doi.org/10.1186/s13705-017-0111-6

Dear, K.B. and McMichael, A.J. (2011) The health impacts of cold homes and fuel poverty. Report. https://www.instituteofhealthequity.org/resources-reports/the-health-impacts-of-cold-homes-and-fuel-poverty

de Vries, R. and Blane, D. (2013) Fuel poverty and the health of older people: The role of local climate. *Journal of Public Health*, 35(3), 361–366.

Eisenberg, A.M. (2015) Beyond science and hysteria: Reality and perceptions of environmental justice concerns surrounding Marcellus and Utica shale gas development. *University of Pittsburgh Law Review*, 77(2), 183–234.

Fernández-González, P. and Moreno, B. (2015) Analyzing driving forces behind changes in energy vulnerability of Spanish electricity generation through a Divisia index-based method. *Energy Conversion and Management*, 92, 459–468.

Fisher, S. (2015) The emerging geographies of climate justice. *Geographical Journal*, 181(1), 73–82.

García-Ochoa, R. and Graizbord, B. (2016) Privation of energy services in Mexican households: An alternative measure of energy poverty. *Energy Research & Social Science*, 18, 36–49.

Glazebrook, T. and Kola-Olusanya, A. (2011) Justice, conflict, capital, and care: Oil in the Niger Delta. *Environmental Ethics*, 33(2), 163–184.

Guruswamy, L. (2010) Energy justice and sustainable development. *Colorado Journal of International Environmental Law and Policy*, 21, 231.

Guruswamy, L. (2015) Global energy justice. In L. Guruswamy (ed), *International Energy and Poverty: The Emerging Contours*. London: Routledge, pp 55–67.

Guruswamy, L. (2016) *Global Energy Justice: Law and Policy*. St. Paul, MN: West Academic Publishing.

Hall, S. (2013) Energy justice and ethical consumption: Comparison, synthesis and lesson drawing. *Local Environment*, 18, 422–437. 10.1080/13549839.2012.748730.

Harris, P., Chow, A. and Karlsson, R. (2013) China and climate justice: Moving beyond statism. *International Environmental Agreements-Politics Law and Economics*, 13(3), 291–305.

Heffron, R.J. and McCauley, D. (2014) Achieving sustainable supply chains through energy justice. *Applied Energy*, 123, 435–437.

Heffron, R.J. and McCauley, D. (2017) The concept of energy justice across the disciplines. *Energy Policy*, 105, 658–667.

Higginbotham, N., Freeman, S. and Connor, L. (2010) Environmental injustice and air pollution in coal affected communities, Hunter Valley, Australia. *Health & Place*, 16(2), 259–266.

Hiteva, R. and Sovacool, B. (2017) Harnessing social innovation for energy justice: A business model perspective. *Energy Policy*, 107, 631–639.

Hobson, K. (2006) Enacting environmental justice in Singapore: Performative justice and the Green Volunteer Network. *Geoforum*, 37(5), 671–681.

Houston, D. (2013) Environmental justice storytelling: Angels and isotopes at Yucca Mountain, Nevada. *Antipode*, 45(2), 417–435.

Hricko, A., Rowland, G. and Eckel, S. (2014) Global trade, local impacts: Lessons from California on health impacts and environmental justice concerns for residents living near freight rail yards. *International Journal of Environmental Research and Public Health*, 11(2), 1914–1941.

International Energy Agency (IEA) (2016) *World Energy Statistics 2016*. Paris: IEA. https://www.iea.org/reports/world-energy-outlook-2016

Intergovernmental Panel on Climate Change and Edenhofer, O. (eds) (2014) *Climate Change 2014: Mitigation of Climate Change: Working Group III contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press.

Jenkins, K., Heffron, R.J. and McCauley, D. (2016) The political economy of energy justice: A nuclear energy perspective. In T. Van de Graaf, B. Sovacool and A. Ghosh (eds), *Palgrave Handbook of the International Political Economy of Energy*. Basingstoke, UK: Palgrave, p 661–682.

Jones, B.R., Sovacool, B.K., Sidortsov, R.V. and Center for Environmental Philosophy, The University of North Texas (2015) Making the ethical and philosophical case for 'energy justice'. *Environmental Ethics*, 37(2), 145–168.

Lacroix, E. and Chaton, C. (2015) Fuel poverty as a major determinant of perceived health: The case of France. *Public Health*, 129(5), 517–524.

Liljenfeldt, J. and Pettersson, Ö. (2017) Distributional justice in Swedish wind power development: An odds ratio analysis of windmill localization and local residents' socio-economic characteristics. *Energy Policy*, 105, 648–657.

Liu, L., Liu, J. and Zhang, Z. (2014) Environmental justice and sustainability impact assessment: In search of solutions to ethnic conflicts caused by coal mining in inner Mongolia, China. *Sustainability*, 6(12), 8756–8774.

Lyster, R. (2017) Climate justice, adaptation and the Paris Agreement: A recipe for disasters? *Environmental Politics*, 26(3), 1–21.

MacDougall, J.C. (2001) Access to justice for deaf Inuit in Nunavut: The role of 'Inuit Sign Language'. *Canadian Psychology-Psychologie Canadienne*, 42(1), 61–73.

Macias, T. (2016) Environmental risk perception among race and ethnic groups in the United States. *Ethnicities*, 16(1), 111–129.

Maiangwa, B. and Agbiboa, D.E. (2013) Oil multinational corporations, environmental irresponsibility and turbulent peace in the Niger Delta. *Africa Spectrum*, 48(2), 71–83.

Malin, S. (2015) Conclusions and solutions: Social sustainability and localized energy justice. In S. Malin (ed), *The Price of Nuclear Power: Uranium Communities and Environmental Justice*. New Brunswick, NJ: Rutgers University Press, pp. 148–160.

Martin, A., Gross-Camp, N. and Kebede, B. (2014) Whose environmental justice? Exploring local and global perspectives in a payments for ecosystem services scheme in Rwanda. *Geoforum*, 54, 167–177.

Mathur, V.N., Afionis, S. and Paavola, J. (2014) Experiences of host communities with carbon market projects: Towards multi-level climate justice. *Climate Policy*, 14(1), 42–62.

McCauley, D., Heffron, R. and Stephan, H. (2013) Advancing energy justice: The triumvirate of tenets. *International Energy Law Review*, 32(3), 107–111.

McCauley, D., Heffron, R. and Pavlenko, M. (2016) Energy justice in the Arctic: Implications for energy infrastructural development in the Arctic. *Energy Research & Social Science*, 16, 141–146.

Middlemiss, L. and Gillard, R. (2015) Fuel poverty from the bottom-up: Characterising household energy vulnerability through the lived experience of the fuel poor. *Energy Research and Social Science*, 6, 146–154.

Munro, P., van der Horst, G. and Healy, S. (2017) Energy justice for all? Rethinking sustainable development goal 7 through struggles over traditional energy practices in Sierra Leone. *Energy Policy*, 105, 635–641.

Nevins, J. (2004) Contesting the boundaries of international justice: State countermapping and offshore resource struggles between east Timor and Australia. *Economic Geography*, 80(1), 1–22.

Olawuyi, D.S. (2016) Climate justice and corporate responsibility: Taking human rights seriously in climate actions and projects. *Journal of Energy & Natural Resources Law*, 34(1), 27–44.

Orta-Martinez, M. and Finer, M. (2010) Oil frontiers and indigenous resistance in the Peruvian Amazon. *Ecological Economics*, 70(2), 207–218.

Ottinger, G., Hargrave, T.J. and Hopson, E. (2014) Procedural justice in wind facility siting: Recommendations for state-led siting processes. *Energy Policy*, 65, 662–669.

Parag, Y. and Sovacool, B. (2016) Electricity market design for the prosumer era. *Nature Energy*, 1, 1–12.

Pepermans, Y. and Loots, I. (2013) Wind farm struggles in Flanders fields: A sociological perspective. *Energy Policy*, 59, 321–328.

Reames, T. (2016) Targeting energy justice: Exploring spatial, racial/ethnic and socioeconomic disparities in urban residential heating energy efficiency. *Energy Policy*, 97, 549–558.

Reed, M.G. and George, C. (2011) Where in the world is environmental justice? *Progress in Human Geography*, 35(6), 835–842.

Reid, L., Sutton, P. and Hunter, C. (2009) Theorizing the meso level: The household as a crucible of pro-environmental behaviour. *Progress in Human Geography*, 34(3), 309–327.

Ritzer, G., Dean, P. and Jurgenson, N. (2012) The coming of age of the Prosumer. *American Behavioral Scientist*, 56(4), 379–398.

Russell, B. (2015) Beyond activism/academia: Militant research and the radical climate and climate justice movement(s). *Area*, 47(3), 222–229.

Schlosberg, D. (2004) Reconceiving environmental justice: Global movements and political theories. *Environmental Politics*, 13(3), 517–540.

Schlosberg, D. (2013) Theorising environmental justice: The expanding sphere of a discourse. *Environmental Politics*, 22(1), 37–55.

Sen, A. (1999) *Development as Freedom*. New York: Oxford University Press.

Sen, A. (2011) *The Idea of Justice*. Cambridge, MA: Harvard University Press.

Shortt, N. and Rugkasa, J. (2007) 'The walls were so damp and cold' fuel poverty and ill health in Northern Ireland: Results from a housing intervention. *Health & Place*, 13(1), 99–110.

Shrader-Frechette, K. (1996) Environmental justice and Native Americans: The Mescalero Apache and monitored retrievable storage. *Natural Resources Journal*, 36(4), 943–954.

Sidortsov, R.V., Heffron, R.J., Mose, T.M., Schelly, C. and Tarekegne, B. (2019) In search of common ground: energy justice perspectives in global fossil fuel extraction. In K.E. Halvorsen, C. Schelly, R.M. Handler, E.C. Pischke and J.L. Knowlton (eds) *A Research Agenda for Environmental Management*. Cheltenham UK: Edward Elgar.

Sidortsov, R.V. and Sovacool, B.K. (2015) Left out in the cold: Energy justice and Arctic energy research. *Journal of Environmental Studies and Sciences*, 5(3), 302–307.

Sidortsov, R.V., Heffron, R.J., Mose Moya, T., Schelly, C. and Tarekegne, B. (2019) In search of common ground: Energy justice perspectives in global fossil fuel extraction. In K. Halvorsen, C. Schelly, R. Handler, E. Pischke and J. Knowlton (eds), *A Research Agenda for Environmental Management*. Cheltenham, UK: Edward Elgar, pp 134–144.

Silin, A.N. (2015) Sociological aspects of rotational employment in the northern territories of Western Siberia. *Economic and Social Changes: Facts, Trends, Forecast*, 4(40), 109–123.

Slater, A.-M. and Pedersen, O.W. (2009) Environmental justice: Lessons on definition and delivery from Scotland. *Journal of Environmental Planning and Management*, 52(6), 797–812.

Sovacool, B.K. (2015) Fuel poverty, affordability, and energy justice in England: Policy insights from the Warm Front Program. *Energy*, 93, 361–371.

Sovacool, B.K. and Dworkin, M.H. (2014) *Global Energy Justice: Problems, Principles, and Practices*. Cambridge, UK: Cambridge University Press.

Sovacool, B.K., Heffron, R.J. and McCauley, D. (2016) Energy decisions reframed as justice and ethical concerns. *Nature Energy*, 1, 16–24.

Sovacool, B.K., Sidortsov, R. and Jones, B. (2014) *Energy Security, Equality, and Justice*. London: Routledge.

Stern, N. (2007) *The Economics of Climate Change: The Stern Review*. Cambridge, UK: Cambridge University Press.

Tayarani, M., Poorfakhraei, A. and Nadafianshahamabadi, R. (2016) Evaluating unintended outcomes of regional smart-growth strategies: Environmental justice and public health concerns. *Transportation Research Part D-Transport and Environment*, 49, 280–290.

Taylor, D.E. (2000) The rise of the environmental justice paradigm: Injustice framing and the social construction of environmental discourses. *American Behavioral Scientist*, 43(4), 508–580.

Teller-Elsberg, J., Sovacool, B. and Smith, T. (2016) Fuel poverty, excess winter deaths, and energy costs in Vermont: Burdensome for whom? *Energy Policy*, 90, 81–91.

Urkidi, L. and Walter, M. (2011) Dimensions of environmental justice in anti-gold mining movements in Latin America. *Geoforum*, 42(6), 683–695.

Urpelainen, J. (2016) Energy poverty and perceptions of solar power in marginalized communities: Survey evidence from Uttar Pradesh, India. *Renewable Energy*, 85, 534–539.

Walker, G. (2009) Beyond distribution and proximity: Exploring the multiple spatialities of environmental justice. *Antipode*, 41(4), 614–636.

Walker, G. and Bulkeley, H. (2006) Geographies of environmental justice. *Geoforum*, 37(5), 655–659.

Walker, G. and Day, R. (2012) Fuel poverty as injustice: Integrating distribution, recognition and procedure in the struggle for affordable warmth. *Energy Policy*, 49, 69–75.

Warren, C.R. and McFadyen, M. (2010) Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland. *Land Use Policy*, 27(2), 204–213.

Yenneti, K. and Day, R. (2015) Procedural (in)justice in the implementation of solar energy: The case of Charanaka solar park, Gujarat, India. *Energy Policy*, 86, 664–673.

Yenneti, K. and Day, R. (2016) Distributional justice in solar energy implementation in India: The case of Charanka solar park. *Journal of Rural Studies*, 46(1), 35–46.

Young, I.M. (2004) Responsibility and global labor justice. *Journal of Political Philosophy*, 12(4), 365–388.

Young, I.M. (2006) Responsibility and global justice: A social connection model. *Social Philosophy & Policy*, 23(1), 102–130.

Young, I.M. (2011) *Responsibility for Justice*. Oxford, UK: Oxford University Press.