16

Issues of Justice in Sustainability Transitions

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16.1 Introduction

This chapter focuses on issues of justice in sustainability transitions, highlighting why there is an increased focus, and need, to develop sustainability transitions that are fair for all. Imagine a housing retrofit scheme being designed for your local area. Would you like to know who is planning that scheme and expect to hear from them? Would you want them to outline the process that is planned for the scheme? Would you expect that they would ask your opinion on it, listen to you and take your views on board? Would you want to know how decisions about the scheme are made, and by whom? Finally, would you care who benefits, or may even become worse off, because of that new retrofit scheme? Questions such as these are increasingly being asked about developments and initiatives that are the building blocks of sustainability transitions as we move towards net-zero societies. The concept of energy justice, in particular, has gained attention as a growing topic (e.g. Qian et al. 2023) that has been used as an approach to unpack the justice implications that are related to whole energy systems, all the way from the materials that are needed, for example, for energy technologies, to end-use practices and waste (Sovacool et al. 2023). However, justice concerns spanning social and environmental justice (e.g. Fitzgerald 2022) are also increasingly addressed in the context of other socio-technical systems of relevance for sustainability transitions, such as mobility justice (e.g. Sheller 2019), food system justice (including issues such as biodiversity loss) (e.g. Tribaldos and Kortetmäki 2022), labour justice (e.g. Kaizuka 2024) and social justice related to fast fashion (e.g. Buchel et al. 2022).

The issue of justice is an important concern for sustainability transitions as without due consideration for it, sustainability transitions may disproportionally benefit some people whilst causing harm to others. This risks sustainability transitions affecting people unevenly and casting a shadow on the end goal of sustainability transitions being core to addressing climate change. For example, in the United

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Kingdom (UK), Low Traffic Neighbourhoods (LTN) (RAC 2022) is a concept that has become hotly debated. Similar schemes have been introduced in other countries too, including, for example, car-free city centres in Norway (Haugland 2023; Remme et al. 2022). LTNs and car-free city centres aim to reduce travel-related emissions and air pollution in local streets by limiting car use and increasing active travel like walking and cycling. While LTNs' objectives are to improve health, reduce emissions and make streets safer, they have become hotly contested in public, political and media debates as potentially impending on people's right to choose how and when they use cars, for instance (The Guardian 2023). Another example of sustainability transitions being contested is the Fosen Vind project in Mid-Norway, one of Europe's largest onshore wind farms, which has been developed despite being in conflict with the rights of the indigenous Southern Sami people to maintain reindeer herding practices as a basis of their culture and lifestyle (Fjellheim 2023). This has led to massive protests against wind power, involving prominent figures such as Greta Thunberg (Milne 2023). Fosen Vind is only one of several wind developments in Norway that have been termed 'green colonialism', emphasising that sustainability transitions can have negative consequences and exacerbate existing injustices for marginalised groups (Fjellheim 2023). Such debates are a good example of the reasons why sustainability transitions need to not only consider but also integrate principles of justice, so that transitions can be truly inclusive and equitable. Addressing climate change requires a considerable effort in sustainability transitions, meaning that the issues of justice need careful consideration and debate, to avoid downplaying the core need for transitions.

This chapter first elaborates on the roots of the current research on justice in sustainability transitions and introduces relevant frameworks and their relevance to sustainability transitions research. It then illustrates via case studies of the digitalisation of transport and mobility and of double energy vulnerability how justice issues come to surface in sustainability transitions. Following the case studies, the chapter further outlines some of the ongoing debates and further research needs in justice research related to sustainability transitions, concluding with a summary of the chapter.

16.2 Historical and Thematic Development

The research addressing justice issues in sustainability transitions is a growing and increasingly multifaceted interdisciplinary field which focuses on different sustainability transition-related areas, such as energy, transport, agriculture and fashion and encompasses various conceptual approaches (for recent reviews, see, e.g. Jenkins et al. 2021; Qian et al. 2023; Stark et al. 2023; Wang and Lo 2021).

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In this section, we outline the historical development of the field along two key lines[1]: (1) the 'just transition' concept and its roots in labour rights struggles and (2) the environmental justice movement, before elaborating on energy justice frameworks and briefly introducing relevant strands of justice literature related to other socio-technical systems, such as mobility and food systems.

The 'just transition' concept became prominent in the US labour movement in the 1970s when labour unions advocated for justice for workers in existing fossil fuel industries whose jobs were threatened by new environmental regulations (Wilgosh et al. 2022, Newell and Mulvaney 2013). The term has later been adopted by international organisations, such as the International Labour Organisation (ILO) and the International Trade Union Confederation (ITUC), who shifted its focus from polluting industries to climate change and green industries while maintaining workers' rights as key priority (Wilgosh et al. 2022, Stark et al. 2023). Today, the concept also figures prominently in EU Green Deal policy and the vision of 'leaving no one behind' (European Commission 2019). The increasing popularity of the 'just transition' concept has led to the development of various interpretations of the concept (Healy and Barry 2017). McCauley and Heffron, for example, have introduced 'just transition' as an umbrella term encompassing perspectives from energy, environmental and climate justice, defining just transition as 'a fair and equitable process of moving towards a post-carbon society' (McCauley and Heffron 2018: 2).

The research on justice issues in transitions also builds on the environmental justice movement and literature, which emerged in the US in the 1970s – parallel to the just transition concept – to investigate environmental injustices in relation to the siting of polluting infrastructure, such as hazardous landfills, in areas mostly inhabited by socio-economically disadvantaged groups (Knoble and Yu 2023). A range of studies show that impacts from environmental pollution are unequally distributed and that 'ethnic minorities, indigenous persons, people of colour and low-income communities confront a higher burden of environmental exposure from air, water and soil pollution from industrialisation, militarisation and consumer practices' (Mohai et al. 2009: 406). The 'jobs versus environment dilemma' (Räthzel and Uzzell 2011) becomes evident when environmentalists point out the injustices caused by polluting industries (environmental justice), while labour unions protest the loss of fossil fuel industry jobs due to new environmental regulation (just transition).

In the beginning, the concept of environmental justice focused mostly on questions of equity and the distribution of environmental risk and environmental 'goods'

[1] Within the context of this chapter, we focus on these two key roots of the research on justice in sustainability transitions, while acknowledging the importance of concepts, such as social justice (e.g. Fraser 2008) and climate justice (e.g. Parsons et al. 2024) as well as of considering the philosophical background of justice (see e.g. Wood et al. 2024).

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and 'bads', thus linking environmental questions to social differences along dimensions such as race/ethnic identity, gender and social class (Fuller and McCauley 2016; Schlosberg 2013). Later, the environmental justice literature became increasingly pluralistic; however, the most common framework – which the energy justice literature also adopted – is to distinguish between three dimensions of justice: distributional, recognition and procedural justice (Schlosberg 2013).

The energy justice literature, which features prominently in current research on justice in sustainability transitions, applies the same way of conceptual, analytical and normative thinking to a slightly narrower range of topics than environmental justice, that is, energy policy and energy systems encompassing both supply and demand and the entire lifecycle of energy systems (Jenkins 2018). Socio-technical energy systems and changes of both energy supply and demand are at the center of sustainability transitions. McCauley et al. (2019: 920) argue that 'addressing the transition towards sustainable low carbon energy systems means recognising and addressing energy justice'. As transitions entail radical changes of how we organise society and live our everyday lives, justice-related questions regarding energy transition processes and outcomes should be at the centre of attention. A popular definition of the energy justice concept has been introduced by Sovacool and Dworkin (2015: 436) who define it 'as a global energy system that fairly disseminates both the benefits and costs of energy services, and one that has representative and impartial energy decision-making'.

There are two main energy justice frameworks. The first framework (see Table 16.1) represents the first systematic conceptualisation of the energy justice concept and is still among the most utilised frameworks today. It was introduced by McCauley et al. (2013) as the *three tenets of energy justice* which mirror the three abovementioned environmental justice dimensions. The first tenet, *distributional justice*, focuses on how benefits and burdens are distributed. It investigates the outcomes of energy projects and policies, where injustices happen, what the positive and negative effects are, and who is affected how. The second tenet, *recognition justice*, addresses social inequities, diversity and representation with a specific focus on vulnerable and marginalised groups. It emphasises the recognition of the diverse voices, perspectives, needs, experiences and knowledges and pays attention to which societal groups are represented and who is ignored. Finally, the third tenet, *procedural justice*, focuses on participation and decision-making processes. It explores how different actors are invited and included in these processes and how to design and implement fair processes that enable just outcomes (Jenkins et al. 2016).

Later, other dimensions have been added to these three tenets. *Restorative justice* emphasises the importance of compensating injustices that already happened and of repairing damages caused by energy-related activities and restoration to the

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Table 16.1 *Energy justice dimensions (based on Eames and Hunt 2013; Gürtler 2023; Heffron and McCauley 2017; Jenkins et al. 2016; McCauley et al. 2013; 2019; Sovacool et al. 2023; Winter, 2022)*

Justice dimension	Definition
Distributional	Focuses on how benefits and burdens are distributed.
Recognition	Addresses social inequities, diversity and representation.
Procedural	Focuses on fairness of participation and decision-making processes.
Restorative	Emphasises the importance of compensating existing injustices and repairing damages.
Cosmopolitan	Highlights that justice principles apply equally to every individual on this earth.
Spatial	Focuses on how justice plays out in different spaces and scales.
Postcolonial	Acknowledges power inequities due to colonisation and addresses injustices related to the exclusion of non-western knowledges and perspectives.
Intergenerational	Emphasises equity for future generations.
Multispecies	Emphasises equity for non-human species, biodiversity and nature.

original state (Heffron and McCauley 2017). *Cosmopolitan justice* highlights that justice principles apply equally to every individual on this earth. It emphasises the importance of having a global perspective when investigating energy justice and considering the impacts of people's actions in one country on people's lives in other countries (McCauley et al. 2019). Linked to that, the concept of *spatial justice* pays attention to how justice plays out in different spaces and scales (regional, national, supranational) (Gürtler 2023), whereas *postcolonial justice* acknowledges the continued power inequities due to colonisation and challenges white western hegemony. It addresses injustices related to the exclusion of non-western knowledges and perspectives and focuses on land justice and the need for rectifying injustices through 'reparation, restoration, compensation and apology' (Sovacool et al. 2023: 4).

Other justice dimensions go beyond the dominant focus on currently living human beings and emphasise equity for future generations, *intergenerational justice* (Eames and Hunt 2013) and for non-human species, *multispecies justice*, focusing on the inherent value of biodiversity and nature (Winter, 2022). The latter two dimensions reflect the breadth of sustainability as not only addressing relations between people who currently populate the earth but also relations with future generations and with the environment (Stumpf et al. 2015).

The second widely used energy justice framework was introduced by Sovacool and colleagues (2017) and incorporates the different justice dimensions into ten

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principles for decision-making. These are (1) availability, (2) affordability, (3) due process, (4) transparency and accountability, (5) sustainability, (6) intragenerational equity, (7) intergenerational equity, (8) responsibility, (9) resistance and (10) intersectionality (Sovacool et al. 2017).

While research on energy justice still dominates the field of justice in sustainability transitions, justice considerations related to other socio-technical systems are increasingly addressed as well. One example is the integration of justice considerations in transitions of food systems. Tribaldos and Kortetmäki (2022), for example, introduce a framework that identifies principles for just transitions in food systems based on the following justice dimensions: distributive justice, cosmopolitan justice, ecology and non-human beings, procedural justice, recognition justice and capacities. They also note the importance of biodiversity and preventing biodiversity loss.

Another example is research on justice issues in transport and mobility systems which has grown significantly over the last years (Verlinghieri and Schwanen 2020). Sheller (2019:23) describes mobility justice as 'overarching concept for thinking about how power and inequality inform the governance and control of movement, shaping the patterns of unequal mobility and immobility in the circulation of people, resources and information'. Research in this field has focused on a large diversity of issues, ranging from personal mobility and the accessibility and affordability of transport systems, the interlinkages of gender, race, class and age and how they affect (im)mobility to spatial injustices at different scales from urban inequities to issues of migration (Cook and Butz 2019; Verlinghieri and Schwanen 2020). Section 16.3 will illustrate some of the justice aspects to consider in transitions to sustainable mobility and energy systems.

16.3 Empirical Application

In this section, we illustrate the importance of considering justice issues in sustainability transitions through introducing two empirical examples: (1) Digitalisation of transport and (2) double energy vulnerability (DEV).

16.3.1 Digitalisation of Transport and Mobility

Our first justice example is digitalisation in transport and mobility, which is claimed to have both positive and negative impacts on just transitions. On the one hand, it can enable the development of new mobility services, such as ride-sharing and micro mobility, which can provide affordable and accessible transportation options for low-income communities and marginalised groups, improving the distributional aspects of who benefits from such systems. On the other hand,

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digitalisation in transport and mobility may exacerbate existing inequalities and create new ones (Ryghaug et al. 2023; Verlinghieri and Schwanen 2020). The shift towards automation and digital technologies may, for example, lead to job losses in some sectors, particularly in low-skilled jobs, which could result in increased inequality and social exclusion, particularly for those who are already marginalised or living in poverty. Again, this would have both distributional and recognition justice impacts, if certain groups are affected more than others, and they have little say on the outcomes. Furthermore, there is a risk that the benefits of digitalisation will not be equally distributed, with some groups having better access to new technologies and services than others.

One example of this we find when it comes to electric vehicles and concepts such as Mobility as a Service (MaaS), which refers to 'integrative approaches for accessing transport services […] via mobile applications (apps)' (Pangbourne et al. 2020: 35–36) and is envisioned to support the transition away from the private car. Many variants of MaaS are currently being developed; most of which tend to offer door-to-door multi-modal mobility services, brokered via digital platforms connecting users and service operators (Pangbourne et al. 2020). From the perspective of sustainability transitions, MaaS offers potential for significantly altering mobility systems, if it replaces private car ownership and travel with more sustainable solutions (Kivimaa and Rogge 2022). So far, there is, however, limited evidence that MaaS will have such effects, and it may be just as likely that consequences will be more cars and a deepening of car-based mobility systems (Butler et al. 2021; Milakis and Seibert 2024). For instance, this may be the case if these systems are predominantly tailored to and utilised by younger middle-class residents living in cities. They typically have several mobility options available to them, and if they were to benefit from MaaS disproportionally, it could mean that other demographic groups are left out to some degree (Lange et al. 2022). Also, research has shown that MaaS may adversely affect equity of access as it relies upon registration and digitalisation for service access and that its reliance on smartphone access also prevents MaaS from offering 'access for all' (Pangbourne et al. 2018). Other studies have shown that regulatory measures are required to ensure equal access to transportation for all in a MaaS environment, because, 'multi-worker households in outlying areas bear most of the cost burden because they lack the variety of mobility alternatives of areas around the CBD [central business district] and must purchase additional cars to make commuting trips to, potentially, dispersed work locations' (Hawkins and Habib 2019: 3106). Thus, there is the chance that MaaS and similar digital transport innovations may be co-opted by entrenched interests and elites (Verlinghieri and Schwanen 2020). Moreover, digitalisation may require significant investments in new infrastructure and equipment, which could further exacerbate inequalities, especially if the costs are borne by people from vulnerable

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communities or those with limited resources. Different geographies have different economic capabilities to invest in infrastructures and communication technologies needed for digitalisation of transport systems and new innovations such as autonomous vehicles (Ryghaug et al. 2022). Different places may also have other qualities making them unfit, or unlikely, sites for the development, implementation and/or maintenance of infrastructures, for example, for the reasons of a lack of access to public transport infrastructure, or due to lack of skills, knowledge and resources.

There is also a risk that digital technologies could be controlled by a small number of powerful actors, (for instance, within big tech industries) further concentrating economic power and exacerbating inequality. Well-configured and governed mobility platforms, utilising open-source data and algorithms, can advance environmental and social sustainability. Success, however, depends on customer support for transport workers and fair pricing, and that governments protect commoning mobility platforms from hyper-capitalist rivals focused on profit and monopolies (Lange et al. 2022).

16.3.2 Double Energy Vulnerability

A second example presented in this chapter on justice concerns focuses on energy and transport services and vulnerabilities related to those. Energy poverty is one area of research that is closely related to issues of justice. This form of injustice can be defined as the lack of access to sufficient domestic energy services such as space heating and cooling, lighting and the use of appliances (Bouzarovski and Petrova 2015). Increasingly, research is recognising the concept of 'DEV', which also factors in transport (Robinson and Mattioli 2020; Martiskainen et al. 2021). Simcock et al. define energy and transport poverty as the 'inability to attain a socially and materially necessitated level of domestic energy and/or transport services' (2021: 2). This means that a person or household struggles with both energy *and* transport poverty. Living in DEV means that people must choose between different services of energy or transport, often juggling day-to-day activities such as balancing a high cost of using energy at home for heating with high transport costs (Martiskainen et al. 2023; Solbu et al. 2024). While DEV can easily be seen to be associated with costs and affordability of energy and transport services, it also links to infrastructural inequalities such as poor housing conditions and access to adequate transport services (Martiskainen et al. 2023), having clear links to distributional justice implications. For example, someone could have a bus network nearby but struggles to use it due to costs, mobility requirements or the fact that the buses do not go to where needed. Another may live in a rural location with limited public transport links, thus having to rely on a 'forced ownership'

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of personal cars which can be costly (Martiskainen et al. 2023). If those people then also live in poor housing conditions with high energy bills, DEV becomes an issue. This reduces quality of life, and the impact of DEV have been shown to affect certain people more, for example those with children, disabilities and health conditions are particularly at risk, as are women and people from ethnic minorities (Simcock et al. 2021). This not only has distributional and recognition justice implications, but also links to intergenerational justice as growing up in poverty can influence children's later life, for example (e.g. Tilahun et al. 2021). Facing DEV means missing out on what people themselves deem to make a good quality of life, for example having to forgo leisure trips, buying favourite food, or keeping the home at a comfortable temperature (Martiskainen et al. 2023; Woods et al. 2024). Given the prevalence of energy poverty globally and its dire implications on health, wellbeing, education and life chances (Simcock et al. 2018) it is important to recognise its connections to, and how it can be further worsened by, transport poverty.

Household DEV is closely linked to digitalisation which are increasingly seen as entangled in energy social science (Sareen et al. 2022). For example, the concept of flexibility within household energy consumption, whereby people have the ability to adjust the timing of their energy use in response to changes in energy prices or the availability of renewable energy sources, requires further examination from a justice angle (Fjellså et al. 2021a). For instance, providing information and activating people through technology such as apps or automated demand side management (DSM) solutions may have serious implications for justice, especially on distributional impacts (who benefits), recognition (who has a say on how those systems are designed) and procedural aspects (how are such systems designed and governed). Flexibility capital has been introduced as a concept to capture the way flexibility depends on specific resources and capabilities within the households (Powells and Fell 2019: 57). Households that lack the resources to invest in smart grid technology or who have inflexible schedules may be unable to take advantage of flexible pricing schemes or real-time energy consumption data or avoid expensive peak hours for their commute to work. This could create distributional justice implications where more affluent households benefit from reduced energy bills or transport costs, while less affluent households continue to pay higher prices and experience 'flexibility poverty' (Fjellså et al. 2021b; Solbu et al. 2024). Thus, the intersection of energy poverty and transport poverty due to the twin transition of decarbonisation and digitalisation seems to exacerbate existing inequalities and create new ones (Sareen et al. 2022), with the risk of further cementing distributional and recognition justice implications. As we move towards more digitalised and interconnected energy and transport systems, it is important to apply the principles of recognition justice, that many people are excluded and vulnerable

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within these systems, and how those issues could be addressed. For example, when schemes such as housing retrofits and developments, LTNs, car free city centres and MaaS are designed, these need to take into consideration justice issues such as DEV and flexibility poverty, so that sustainability transitions provide an opportunity to address rather than worsen them (Dossett 2022).

16.4 Ongoing Debates and Future Research Needs

As the field of research on justice issues related to sustainability transitions is growing and getting increasingly pluralistic as well as getting increasingly recognised as relevant by other academic fields and by policymakers and practitioners within sustainability transitions, many important debates have recently emerged in the field pointing towards new directions and research needs. In this section, we will briefly introduce four topics representing important debates and directions for the field (knowingly excluding many other important topics[2]): (1) acceleration and justice, (2) geographies and justice, (3) epistemic justice and (4) linking justice and sustainability transitions theories and education.

16.4.1 Acceleration and Justice

The first topic for future research is how the issues of justice will be addressed in the debates surrounding the need to accelerate sustainability transitions (see Chapter 8). As governments, cities and companies are adopting net-zero emissions goals by mid-century to combat global warming, the world requires an unprecedented but purposeful speeding up of change in all significant systems. As a result, research on sustainability transitions should prioritise studying how we can accelerate these transitions and quickly spread new technological and social advancements needed to reach these goals (Andersen et al. 2023). However, the speed at which for example the energy transition occurs can impact social and environmental justice in a number of ways. For instance: (1) Employment: A rapid transition could result in the displacement of workers in industries that are being phased out, such as coal mining or oil and gas extraction, while a slower transition could delay the creation of new jobs in the clean energy sector. (2) Energy affordability: A rapid transition may lead to higher energy costs in the short-term, due to initial capital investment for example, which could disproportionately impact low-income households, while a slower transition could result in prolonged

[2] Examples of other research topics deserving attention are politics, power dynamics and structural causes of inequity; the role of labour and unions; intersectionality and inequities related to race, gender, sex, class; and environmental injustices and a focus on non-human species (Healy and Barry 2017; Kanger and Sovacool 2022; Wang and Lo 2021; Wilgosh et al. 2022). Also, the need for philosophical discussions of justice is increasingly recognised (Wood et al. 2024).

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exposure to the harms of fossil fuels, such as air pollution. (3) Community participation: A rapid transition could limit opportunities for community input and participation in decision-making, especially for marginalised groups, while a slower transition could provide more time for community engagement and collaboration. (4) Timing of benefits and harms: A rapid transition could bring about positive impacts quickly, such as reduced emissions and improved air quality, but may also lead to short-term negative impacts, such as job losses or higher energy costs. A slower transition may delay these positive impacts but could also avoid some of the negative impacts associated with a rapid transition. (5) Environmental impacts: A rapid transition without due process for environmental impacts of development, for example, in sensitive locations and regions, could lead to land use concerns and impacts on biodiversity, while a slower transition would increase the negative impacts on biodiversity caused by climate change.

Thus, lately the temporal aspects of transitions have spurred debate within the transitions community, especially relating to the way the need for accelerating the speed of the transition impact the ability to enact such change in just and inclusive ways (Skjølsvold and Coenen 2021).

16.4.2 Geographies and Justice

The second topic for further investigation centres on geographies and justice. While the temporal dimension of transition has received more traction lately in relation to justice, also spatial or geographical perspectives (see also Chapter 21) have been highlighted more (Skjølsvold and Coenen 2021). As both the urgency and scale of the energy transition may be perceived differently in different regions, sustainability transitions must take into account the unique needs and vulnerabilities of different places and communities. The abovementioned 'spatial justice' dimension also emphasises the importance of recognising the interrelations between regional, national and international scales (Gürtler 2023). This also relates to the speed of transitions. For example, regions in the Global South may be more severely affected if transitions are accelerated due to, for example, poor working condition in extractive industries that produce materials needed for new green technologies. On the other hand, many regions in the Global South are among the most vulnerable to the effects of climate change and will thus be more severely hit if the transition does not happen fast enough (Kumar et al. 2021). Transitions can lead to social unrest, such as when dominant areas become even more powerful than less dominant ones, or when they reinforce the authority and progress of existing centres, leaving other areas at a disadvantage (Skjølsvold and Coenen 2021). Spatial justice considerations are also highly relevant in the context of biodiversity loss and environmental degradation.

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16.4.3 Epistemic Justice

The third area for further research focuses on epistemic justice *or* 'knowledge justice' highlighting the need to include a broad set of societal actors and their different knowledges into decision-making in sustainability transitions (Schwanen 2021). Rather than only relying on and valuing expert knowledge, important decisions should also be based on the participation and knowledge of citizens (Foulds et al. 2023). This is important as, for example, transportation and energy researchers working on making transportation more sustainable should not automatically assume that they fully understand how people and groups affected by these changes think and feel (Schwanen 2021) as such understanding can be limited and influenced by their own backgrounds and the idea that expert knowledge is more important than knowledge specific to a certain place or social group. When developing renewable energy projects, for example, the participation of local communities, who may represent different values of nature than the developers, and their context-specific knowledge of nature and their environment is essential for understanding the local impacts of the proposed development. Thus, there is a need to make sure that not only the same expertise, and the same type of knowledge get the possibility to set the agenda and contribute to important decisions concerning sustainability transitions.

On a more fundamental level, epistemic justice also relates to what perspectives are used when studying sustainability transitions and justice. For instance, non-Western and feminist perspectives on justice have been underprivileged compared to justice literature dominated by Western, male ideas. Hence, there is a need to broaden the scope of the justice field itself and give attention and space to ideas, philosophies and perspectives from the Global South, indigenous groups, women and other under-represented groups (Sovacool et al. 2023).

16.4.4 Linking Justice and Sustainability Transitions Theories and Education

Finally, it has been pointed out that sustainability transitions and justice often are treated separately by two different strands of literature without many points of contact and calls for more comprehensive approaches encompassing both the socio-technical transition dimension and the justice dimension have been voiced (Sareen and Haarstad 2018). In line with that, we argue that the sustainability transitions field must focus more on social organisation and social innovation in addition to its current dominant focus on technology and technological innovation. This includes incorporating the issue of justice in the dominant sustainability transition theories. One example of this is Williams and Doyon's (2019) analytical framework for justice and system transition which identifies (1) key questions, (2) risks

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of not incorporating justice and (3) mitigation strategies to overcome risks, for each of the three justice tenets (distributive, procedural and recognition). Another example is the integration of energy justice and the Multi-level perspective (MLP) (see also Chapter 2) to a framework addressing the connections between injustices and transition dynamics (Kanger and Sovacool 2022). Thus, while it is important to study how transitions unfold and how to support transitions as is commonly done in the field of sustainability transition, it is as important to study the implications of transition processes and how they impact social and environmental justice.

Moreover, justice perspectives should also be included into the education of sustainability transitions in a range of fields and professions. Tomorrow's teachers, planners, engineers, politicians, craftsmen, nurses, social workers and chefs will be part of forming the sustainability transitions in our societies and should therefore be made aware of the inherently socio-technical nature and the social and environmental justice implications of transition processes.

16.5 Conclusion

This chapter focused on the issue of justice in sustainability transitions. Although there is an increasing focus in academia, policymaking and practice on the importance of making transitions not only environmentally and economically sustainable, but also just and fair – so that costs and benefits are shared equally (European Commmission 2019) – this chapter has illustrated that social inequities can often be exacerbated rather than alleviated in the context of transitions. Indeed, people who are vulnerable and marginalised do not often benefit from sustainability transitions: they may have, for example, limited opportunities to actively participate as citizens, and suffer from negative consequences of climate and energy policies and projects. Such injustices are often the reason for contestations of developments, projects, policies and initiatives that are part of sustainability transitions. This underlines the importance of considering questions of distributional, recognition, procedural, restorative, cosmopolitan, spatial, postcolonial, intergenerational and multispecies justice when designing, developing and implementing sustainability transition policies and projects across all socio-technical systems, while keeping the injustices of existing fossil fuel systems in mind (Newell and Mulvaney 2013).

References

Andersen, A. D., Geels, F. W., Coenen, L., Hanson, J., Korsnes, M., Linnerud, K., … & Wiebe, K. (2023). Faster, broader, and deeper! Suggested directions for research on net-zero transitions. *Oxford Open Energy* 2, oiad007.

Bouzarovski, S., & Petrova, S. (2015). A global perspective on domestic energy deprivation: Overcoming the energy poverty–fuel poverty binary. *Energy Research & Social Science* 10, 31–40.

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Buchel, S., Hebinck, A., Lavanga, M., & Loorbach, D. (2022). Disrupting the status quo: A sustainability transitions analysis of the fashion system. *Sustainability: Science, Practice and Policy* 18(1), 231–246.

Butler, L., Yigitcanlar, T., & Paz, A. (2021). Barriers and risks of Mobility-as-a-Service (MaaS) adoption in cities: A systematic review of the literature. *Cities* 109, 103036.

Cook, N., & Butz, D. (2019). *Mobilities, Mobility Justice and Social Justice*. London: Routledge.

Dossett, S. (2022). Green uplift: How a net zero economy can reduce fuel and transport poverty. Green Alliance and Centre for Research into Energy Demand Solutions. ISBN 978-1-912393-86-2. https://green-alliance.org.uk/publication/green-uplift-how-a-net-zero-economy-can-reduce-fuel-and-transport-poverty/

Eames, M., & Hunt, M. (2013). Energy justice in sustainability transitions. In K. Bickerstaff, G. Walker, & H. Bulkeley (eds), *Energy Justice in a Changing Climate: Social Equity and Low-carbon Energy*. London: Zed Books, pp. 46–60.

European Commission (2019). The European Green Deal. COM (2019) 640 final. Brussels, 11 December 2010. https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

Fitzgerald, L. M. (2022). Winning coalitions for just transitions: Insights from the environmental justice movement. *Energy Research & Social Science* 92, 102780.

Fjellheim, E. M. (2023). Wind energy on trial in Saepmie: Epistemic controversies and strategic ignorance in Norway's green energy transition. *Arctic Review on Law and Politics* 14, 140–168.

Fjellså, I. F., Ryghaug, M., & Skjølsvold, T. M. (2021b). Flexibility poverty: 'locked-in' flexibility practices and electricity use among students. *Energy Sources, Part B: Economics, Planning, and Policy* 16(11–12), 1076–1093.

Fjellså, I. F., Silvast, A., & Skjølsvold, T. M. (2021a). Justice aspects of flexible household electricity consumption in future smart energy systems. *Environmental Innovation and Societal Transitions* 38, 98–109.

Foulds, C., Valkenburg, G., Ryghaug, M., Suboticki, I., Skjølsvold, T. M., Korsnes, M., & Heidenreich, S. (2023). Implementing mission-oriented experiments: Recommendations on epistemic inclusion for city stakeholders working in climate change initiatives. *Journal of City Climate Policy and Economy* 2(55–76): https://doi.org/10.3138/jccpe-2022-0014

Fraser, N. (2008). *Scales of Justice: Reimagining Political Space in a Globalizing World*. Cambridge, UK: Polity Press.

Fuller, S., & McCauley, D. (2016). Framing energy justice: Perspectives from activism and advocacy. *Energy Research & Social Science* 11, 1–8.

Gürtler, K. (2023). Justice in energy transformations as a spatial phenomenon: A framework for analyzing multidimensional justice claims. *Energy Research & Social Science* 105, 103277.

Haugland, B. T. (2023). The future is present: Prefiguration in policy and technology experimentation. *Environmental Innovation and Societal Transitions* 48, 100750.

Hawkins, J., & Habib, K. N. (2019). Heterogeneity in marginal value of urban mobility. *Transportation* (2019). DOI: 10.1007/s11116-019-10041-7

Healy & Barry (2017). "Politicizing energy justice and energy system transitions: Fossil fuel divestment and a 'just transition'".

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

Jenkins, K. (2018). Setting energy justice apart from the crowd: Lessons from environmental and climate justice. *Energy Research & Social Science* 39, 117–121.

Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016). Energy justice: A conceptual review. *Energy Research & Social Science* 11, 174–182. DOI: 10.1016/j.erss.2015.10.004

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 19 Nov 2026 at 05:34:08, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009437318.021

Jenkins, K. E. H., Sovacool, B. K., Mouter, N., Hacking, N., Burns, M-K., & McCauley, D. (2021). The methodologies, geographies, and technologies of energy justice: A systematic and comprehensive review. *Environmental Research Letters* 16, 043009.

Kaizuka, S. (2024). Politics of a just transition: Lessons from the UK coal mines. *Contemporary Social Science* 19, 154–177.

Kanger, L., & Sovacool, B. K. (2022). Towards a multi-scalar and multi-horizon framework of energy injustice: A whole systems analysis of Estonian energy transition. *Political Geography* 93, 102544.

Kivimaa, P., & Rogge, K. S. (2022). Interplay of policy experimentation and institutional change in sustainability transitions: The case of mobility as a service in Finland. *Research Policy* 51(1), 104412.

Knoble, C., & Yu, D. (2023). Environmental justice: An evolving concept in a dynamic era. *Sustainable Development*. DOI: 10.1002/sd.2519

Kumar, A., Höffken, J., & Pols, A. (2021). *Dilemmas of Energy Transitions in the Global South: Balancing Urgency and Justice*. London and New York: Routledge.

Lange et al. (2022). Digital Reset. *Redirecting Technologies for the Deep Sustainability Transformation*. Technische University in Berlin. https://doi.org/10.14279/DEPOSITONCE-16187

Martiskainen, M., Hopkins, D, Torres Contreras, G.A., Jenkins, K., Mattioli, G., Simcock, N., & Lacey-Barnacle, M. (2023). Eating, heating or taking the bus? Lived experiences at the intersection of energy and transport poverty. *Global Environmental Change* 82, 102728. https://doi.org/10.1016/j.gloenvcha.2023.102728

Martiskainen, M., Sovacool, B. K., Lacey-Barnacle, M., Hopkins, D., Jenkins, K. E. H., Simcock, N., Mattioli, G., & Bouzarovski, S. (2021). New dimensions of vulnerability to energy and transport poverty. *Joule* 5, 3–7. https://doi.org/10.1016/j.joule.2020.11.016

McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy* 119, 1–7.

McCauley, D., Heffron, R. J., Stephan, H., & Jenkins, K. (2013). Advancing energy justice: The triumvirate of tenets. *International Energy Law Review* 32(3), 107–110.

McCauley, D, Ramasar, V., Heffron, R. J., Sovacool, B. K., Mebratu, D., & Mundaca, L. (2019). Energy justice in the transition to low carbon energy systems: Exploring key themes in interdisciplinary research. *Applied Energy* 233–234, 916–921.

Milakis, D., & Seibert, D. (2024). The illusion of the shared electric automated mobility transition. *Transportation Research Interdisciplinary Perspectives* 26, 101171.

Milne, R. (2023). Greta Thunberg accuses Norway of 'green colonialism' over wind farm. Financial Times. 27 February 2023. www.ft.com/content/3e3813c9-e568-49f9-a64c-7d7da03f4d36

Mohai, P., Pellow, D., & Timmons Robert, J. (2009). Environmental justice. *Annual Review of Environment and Resources* 34, 405–430.

Newell, P., & Mulvaney, D. (2013). The political economy of the 'just transition'. *The Geographical Journal* 179(2), 132–140.

Pangbourne, K., Mladenović, M. N., Stead, D., & Milakis, D. (2020). Questioning mobility as a service: Unanticipated implications for society and governance. *Transportation Research Part A: Policy and Practice* 131, 35–49. https://doi.org/10.1016/j.tra.2019.09.033.

Pangbourne, K., Stead, D., Mladenović, M., & Milakis, D. (2018). The case of mobility as a service: A critical reflection on challenges for urban transport and mobility governance. In Marsden, G., & Reardon, L. (eds.) *Governance of the Smart Mobility Transition*. Leeds, UK: Emerald Publishing.

Parsons, M., Asena, Q., Johnson, D., & Nalau, J. (2024). A bibliometric and topic analysis of climate justice: Mapping trends, voices, and the way forward. *Climate Risk Management* 33, 100593.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 19 Nov 2026 at 05:34:08, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009437318.021

Powells, G., & Fell, M. J. (2019). Flexibility capital and flexibility justice in smart energy systems. *Energy Research & Social Science* 54, 56–59.

Qian, Y., Xu, Z., Gou, X., & Škare, M. (2023). A survey on energy justice: A critical review of the literature, *Economic Research-EkonomskaIstraživanja* 36, 3. DOI: 10.1080/1331677X.2022.2155860.

Remme, D., Sareen, S., & Haarstad, H. (2022). Who benefits from sustainable mobility transitions? Social inclusion, populist resistance and elite capture in Bergen, Norway. *Journal of transport geography* 105, 103475.

RAC (2022). Low traffic neighbourhoods – what are they? And will they appear nationwide? Online: www.rac.co.uk/drive/advice/driving-advice/low-traffic-neighbourhoods-what-are-they-and-will-they-appear-nationwide/ [Accessed 23 August 2023].

Räthzel, N., & Uzzell, D. (2011). Trade unions and climate change: The jobs versus environment dilemma. *Global Environmental Change* 21(4): 1215–1223.

Robinson, C., & Mattioli, G. (2020). Double energy vulnerability: Spatial intersections of domestic and transport energy poverty in England. *Energy Research & Social Science* 70, 101699.

Ryghaug, M., Haugland, B. T., Søraa, R. A., & Skjølsvold, T. M. (2022). Testing emergent technologies in the Arctic: How attention to place contributes to visions of autonomous vehicles. *Science & Technology Studies* 35(4): 4–21.

Ryghaug, M., Subotički, I., Smeds, E., von Wirth, T., Scherrer, A., Foulds, C., … & Wentland, A. (2023). A social sciences and humanities research agenda for transport and mobility in Europe: Key themes and 100 research questions. *Transport Reviews* 43(4), 755–779.

Sareen, S., & Haarstad, H. (2018). Bridging socio-technical and justice aspects of sustainable energy transitions. *Applied Energy* 228, 624–632.

Sareen, S., Waage, M., Smirnova, P., Boakye Botah, J., & Loe, M. R. (2022). Double energy vulnerability in the Norwegian low-carbon urban transport transition. *People, Place and Policy* 16(1), 33–52. DOI: 10.3351/ppp.2022.3953567323

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

Schwanen, T. (2021). Achieving just transitions to low-carbon urban mobility. *Nature Energy* 6(7): 685–687.

Sheller, M. (2019). Theorizing mobility justice. In N. Cook, & D. Butz (eds). *Mobilities, Mobility Justice and Social Justice*. London: Routledge.

Simcock, N., Thomson, H., Petrova, S., & Bouzarovski, S. (eds). (2018). *Energy Poverty and Vulnerability: A Global Perspective*. Oxford: Routledge.

Simcock, N., Jenkins, K., Lacey-Barnacle, M., Martiskainen, M., Mattioli, G., & Hopkins, D. (2021). Identifying double energy vulnerability: A systematic and narrative review of groups at-risk of energy and transport poverty in the global north. *Energy Research & Social Science* 82, 102351.

Skjølsvold, T. M., & Coenen, L. (2021). Are rapid and inclusive energy and climate transitions oxymorons? Towards principles of responsible acceleration. *Energy Research & Social Science* 79, 102164.

Solbu, G., Ryghaug, M., Skjølsvold, TM., Heidenreich, S., & Næss, R. (2024). Deep experiments for deep transitions – low-income households as sites of participation and socio-technical change in new energy systems. *Environmental Innovation and Societal Transitions* 52, 100865.

Sovacool, B. K., Bell, S. E., Daggett, C., Labuski, C., Lennon, M., Naylor, L., Klinger, J., Leonard, K., & Firestone, J. (2023). Pluralizing energy justice: Incorporating feminist, anti-racist, Indigenous, and postcolonial perspectives. *Energy Research & Social Science* 97, 102996. https://doi.org/10.1016/j.erss.2023.102996.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 19 Nov 2026 at 05:34:08, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009437318.021

Sovacool, B., & Dworkin, M. H. (2015). Energy justice: Conceptual insights and practical applications. *Applied Energy* 142, 435–444.
Sovacool, B., Burke, M., Baker, L., Kotikalapudi, C. K., & Wlokas, H. (2017). New frontiers and conceptual frameworks for energy justice. *Energy Policy* 105, 677–691.
Stark, A., Gale, F., & Murphy-Gregory, H. (2023). Just transitions' meanings: A systematic review. *Society & Natural Resources: An International Journal* 36(10): 1277–1297.
Stumpf, K. H., Baumgärtner, S., Becker, C. U., & Sievers-Glotzbach, S. (2015). The justice dimension of sustainability: A systematic and general conceptual framework. *Sustainability* 7, 7438–7472.
The Guardian. (2023). Rishi Sunak orders review of low-traffic neighbourhood schemes. 30 July 2023. Online: www.theguardian.com/uk-news/2023/jul/30/rishi-sunak-orders-review-of-low-traffic-neighbourhood-schemes [Accessed 23 August 2023].
Tilahun, N., Persky, J., Shin, J., & Zellner, M. (2021). Childhood poverty, extended family and adult poverty. *Journal of Poverty* 27(1): 1–14.
Tribaldos, T., & Kortetmäki, T. (2022). Just transition principles and criteria for food systems and beyond. *Environmental Innovation and Societal Transitions* 43, 244–256.
Verlinghieri, E., & Schwanen, T. (2020). Transport and mobility justice: Evolving discussions. *Journal of Transport Geography* 87, 102798.
Wang, X., & Lo, K. (2021). Just transition: A conceptual review. *Energy Research & Social Science* 82, 102291.
Wilgosh, B., Sorman, A. H., & Barcena, I. (2022). When two movements collide: Learning from labour and environmental struggles for future just transitions. *Futures* 137, 102903.
Williams, S., & Doyon, A. (2019). Justice in energy transitions. *Environmental Innovation and Societal Transitions* 31, 144–153.
Winter, C. (2022). Introduction: What's the value of multispecies justice? *Environmental Politics* 31(2): 251–257.
Wood, N., Uffelen, N. V., Frigo, G., Melin, A., Milchram, C., Lee, J., & Bessa, S. (2024). Strengthening the foundations of energy justice scholarship: What can philosophy contribute? *Energy Research & Social Science* 117, 103699.
Woods, R., Heidenreich, S., Korsnes, M., & Solbu, G. (2024). Energy efficiency policies reinforce energy injustices: The caring energy practices of low-income households in Norway. *Energy Research & Social Science* 116, 103663.

Downloaded from https://www.cambridge.org/core. UNIVERSIDAD AUTONOMA METROPOLITANA, on 19 Nov 2026 at 05:34:08, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/9781009437318.021

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