

WORKING PAPER

Just transitions in cities and regions: a global agenda

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Summary

This report provides a global synthesis of evidence on justice in transitions to low-carbon energy systems and processes of urbanization. While cities are important sites of energy consumption, analysis of urbanisation offers explanations of how social and spatial injustices are created through the building, fuelling, feeding, and funding of cities. We identify how sustainability transitions can reproduce inequalities – and hence become a potential source of injustice – by highlighting the terms on which transitions are contested, how urban poverty is conceived and measured, how and by whom knowledge about urban change is produced, how cities are planned, how divestment and investment are managed, and how infrastructure is financed. Evidence is presented from Africa, the Asia Pacific, Europe and North America, Latin America and the Caribbean, where the authors have been engaged in projects co-produced with regional research partners. A global agenda on just transitions identifies common and distinctive experiences in different social and spatial contexts. We argue that taking the social and spatial character of transitions seriously means questioning assumptions that underpin the management of transitions, including the strategy of mobilising resources for transitions by maintaining economic power at difference scales from the global to the household.

Recommendations

From this global synthesis of evidence, we draw the following conclusions on how interventions in policy and practice can engage with the politics of just transitions:

Establish how policies can address inequalities by starting with injustice

Too often, transition debates start with technology choice and ask how harm can be mitigated for a given social group. Opportunities to address the causes of existing inequalities can be found by foregrounding the experience of injustice.

Confront the historic injustices of global energy systems

Racialised and gendered exploitation underpins the inequalities of cities and energy systems today. Acknowledging this enables energy policies to address structural inequalities in society.

Engage with labour and class relations

The decline of fossil fuel jobs and communities is an important but partial perspective of just transitions. The formation of class interests around new technologies will shape whether the inequalities of fossil fuel economies are addressed or reproduced in low carbon economies.

Identify energy alternatives in their ownership and control, not in technologies alone

Some policies propose the substitution of dirty fuel for clean fuel; others target systemic changes in the power of citizens, governments, and businesses. The implications of new energy technologies for justice stem from how they are organised socially, not from technologies themselves.

Think outside the city

National and municipal energy policies can engage with the global energy systems that cities rely upon. No policy can address the entire energy systems at once, but they can intervene strategically for more sustainable and just cities.

Evaluate competing ideas of just transition, accounting for the relative power of different voices

Just transition is a flexible term that accommodates different priorities. Whose ideas prevail is instrumental in shaping what is open to change through managed transitions, and what is not.

Politicise participation to harness divergent ideas and actions

Participation can hinder just transitions where the terms of inclusion restrict what can be said and acted upon. But relational approaches can broaden the forums and voices that shape transition pathways

Introduction

‘Just transitions’ have gained a foothold in climate change discourse, invoked to express that economies and societies must change to meet climate targets without reproducing social injustices or creating new ones. The management of transitions is typically imagined as a means to an end: a just transition may strengthen climate action by enrolling people behind it, including those who may otherwise be adversely affected, and a just transition is the right thing to do. Cities also increasingly feature in climate debates, as actors on the international stage and significant sites of energy consumption and inequitable urbanisation. Yet, just transitions raise difficult questions for cities and urbanisation.

First, justice means different things to different people. It is indicative that climate negotiators agree on broad terms like ‘Common but differentiated responsibilities’, but specifying those responsibilities generates competing justice claims. Paying polluters to reduce emissions could be a regressive subsidy or a progressive inducement, depending on how a person perceives justice. Disagreement on justice does not preclude action against injustice. But different ideas of justice matter because they shape assumptions about what aspects of social and economic life need to change, including which institutions – individuals, businesses, governments, financiers – should be empowered or curtailed to realise just transitions.

Second, ‘transitions’ are contested. Emission reductions must be closely scrutinised but counting emissions reveals little about what is transitioning and what is not. Injustices can be reduced or reproduced through interventions designed to address them: Retrofitting homes may reduce heating bills but increase rental prices; electric vehicles may reduce oil demand but extend commodity frontiers for battery components; some regions can capture the benefits of new markets more easily than others. In short, the social organisation of a low carbon urban economy may look very similar to the high carbon economy. This might enable powerful actors to be enrolled in energy transitions but may also reinforce some causes of injustice and constrain action to address them. Whose notions of justice inform policy and practice shapes who is induced and who is coerced into action or inaction, by whom.

Third, cities and regions themselves are understood in multiple ways in climate discourses. Cities may be framed as ecological nightmares that alienate humans from nature, urban agglomerations that make efficient use of space and resources, hubs of innovation that create technological solutions to climate change, or sites of resistance and radical new ideas. They can be local administrative zones, stockpiles of embodied energy, or sites of consumption on a planetary scale that encompass the very forests, mines and fields that support them. Urbanisation is an uneven process that generates inequalities at different geographical scales, while shaping the direction and form of energy transitions. As such, just transitions will require efforts to reshape the social, political, and economic organisation of cities and the flow of resources, energy and ideas that constitute them.

Outline of the report

This report presents a global synthesis of evidence on justice in transitions to low-carbon energy systems and urbanization. It is aimed at readers who are interested in social scientific research that can inform urban and energy policy and practice, such as policy research organisations, think tanks, knowledge brokers, policy advisors, and campaigners. We present evidence from Asia Pacific, Africa, Europe and North America, Latin America and the Caribbean, where the authors have been engaged in projects co-produced with research partners in each region. Rather than providing a systematic review, we pay particular attention to inequalities and injustices produced through interventions that affect the course of energy transitions – directly or indirectly, intentionally or unintentionally. A preliminary analysis of four databases¹ identified sectors and themes in which just transitions with respect to cities have been articulated. We present analysis on policy processes, social practices and political movements that illustrate the possibilities, limits, and blind spots of managed transitions. Interpretative analysis of data from each region examines how urban or environmental interventions have mitigated or exacerbated social and spatial injustices, creating overlapping pinch points, tensions, unintended effects, disruption, and potential opportunities to work toward justice.

We cast cities as dense networks of social and ecological processes that span the local and the global (Heynen et al. 2006, Graham and McFarlane 2014). The boundaries of cities are porous and indeterminate, connected through flows of materials, energy, people, money, and

¹Climate Initiatives Platform (a database of international cooperative climate initiatives driven by non-state actors), CDP Open Data Portal (a database on local action towards a global sustainable economy), the Global Covenant of Mayors for Climate and Energy dataset (aggregating city and local government climate action), the EU Energy Poverty Observatory (a database of EU policies and measures addressing energy poverty)

waste to extractive frontiers and to consumer markets. Urbanisation is not simply the increasing proportion of people living in urban areas, but reflects the continuous processes of building, fuelling, feeding, and otherwise supplying cities through metabolic flows (Swngedouw and Heynen 2003). With respect to justice, we engage with pluralist and empirical perspectives that recognise how competing notions of justice are contested or reconciled by more and less powerful actors (Sikor 2013, Holifield et al. 2009). This literature has coalesced around distribution, procedure, and recognition as distinct but closely related dimensions of justice and has become a primary way to describe inequities associated with energy and sustainability transitions (Bouzarovski and Simcock 2017, Sovacool et al. 2019). We argue that cities and urbanisation are productive for the analysis of uneven energy transitions, how trade-offs and pinch points are produced, and how and by whom they are resolved.

The report is structured in two parts: a review of literature on just transitions, energy, and urbanisation; and a series of regional insights on transitions in practice.

First, we review concepts of justice that have informed analysis of just transitions, cities and urbanisation to date. We draw attention to urbanisation in the production of injustices, arguing that urban injustice can inform how just transitions are conceived and achieved. This implies looking beyond the city limits to the transformation of ecological systems and the people that rely on them. It brings multiple sites and scales of justice together, in which the most prominent controversies of energy transitions – such as employment in fossil fuel industries – are intimately connected with others – such as air quality in cities, land rights at extractive frontiers, or vulnerability to extreme weather events. Many initiatives that engage with transitions do so through sectoral interventions (e.g., reforms to electricity regulation, retrofitting buildings) to protect particular communities or industries through managed decline or change. Yet, the multiple sites and scales of transition imply that a broader project is required (Coenen et al. 2012; Caprotti et al. 2020). The implications are not limited to the need for ‘joined up’ government but require attention to how transitions affect the vulnerability of different social groups to the effects of social and technological change (Bouzarovski and Thomson 2018, Phillips and Petrova 2021).

These processes are inherently spatial. For example, some regions attract investment over others; urban centres rely on resources from elsewhere; gendered divisions of labour underpin energy consumption patterns; global divisions of labour underpin the growth of new energy industries; energy savings free-up capital for further production and consumption; production in one country enables consumption in another. In short, energy

transitions – managed or otherwise – are inherently socio-spatial projects (Bridge and Gailing 2020, Castán Broto 2019, Bouzarovski and Haarstad 2019). This spatial perspective suggests that some assumptions in the management of transitions should be questioned, including the mobilisation of resources for transitions by maintaining the global distribution of political and economic power.

Second, the report presents a series of insights on just transitions in practice, situated in regional research spanning six continents (Africa, Asia, Australia, Europe, North America and South America). The global review helps to address a common but unhelpful division between industrialised economies and developing economies in research on the drivers, character, and consequences of transitions, identifying both commonalities and distinctions in different social and spatial contexts.

We start with evidence from Africa that considers practical implications of the plurality of justice and the uncertainty of transitions. Since justice and fairness are always contested, understanding whose ideas of justice are prioritised when managing uncertainty is critical to understand the distribution of benefits and the sacrifices they demand. There is a long history of energy and wealth extraction from Africa, which is reworked through new technologies such as solar power and biofuels. Addressing these inequalities requires attention to both the continuity and change in how African people and lands are inserted into global markets for low carbon energy and technologies.

Evidence from Latin America emphasises that how vulnerability is understood and measured is critical for policy to address energy poverty while meeting climate goals. Inaccessible, unaffordable, and inadequate electricity and cooking fuels generate calls for justice worldwide and underpin policies as diverse as fossil fuel subsidies, housing policy, social grants, and grid extension. Understanding who is affected by energy poverty not only enables policies to be targeted more effectively, but also provides insights into how energy poverty is produced in the first place, and how well-meaning interventions might make energy inequalities worse.

Evidence from the Asia Pacific region (including Australia) explores the politics of knowledge about cities as climate and energy actors. Urban theories derived from cities in the global north may misread southern cities with the potential to create epistemic injustices. Meanwhile, ‘global cities’ like Singapore and Hong Kong are better represented in regional research and policy forums than smaller cities, which may differ in the networks, material flows, interests, and ideas that shape energy transitions. Injustices of recognition permeate

the region's settler cities and their hinterlands, and the shrinking space for civil society in some cities, where procedural justice is frustrated by the terms of inclusion and the scope of participation.

China's 'high input, high consumption, and high emissions' model of urbanisation (Qi et al. 2020: 24) offers lessons for the implementation of new targets for carbon neutrality and 'human-centred' urbanisation. New national targets encounter established tensions between local and national priorities that have hindered effective implementation of urban policies in the past. In spatial planning, the politics of just transitions are especially evident in how urban economic systems delimit the possibilities of individual behaviour change, which research shows to be differentiated between social groups.

North America and Europe offer lessons from the inequalities of previous fossil energy divestment and industrial decline. There is an apparent consensus in just transitions discourse on managing the impact of fossil fuel divestment on jobs and communities, but therein lie the politics: the redirection of investment is premised on maintaining the power of energy corporations and the stability of financial systems, enabling few opportunities for the kind of affirmative reinvestment that might directly confront the racialised and spatial inequalities of fossil fuel extraction and production at home and abroad.

Lastly, analysis of global infrastructure finance illustrates why just transitions require systemic change in financial systems. Increasing inequality is baked into infrastructure finance, since profitability relies on generating a return on investment by extracting wealth from lower income groups. Hence, 'just' infrastructure finance will not be achieved by increased international finance commitments from COP26 or even redressing the power of creditors over debtors. Rather, alternative finance models place the use value of investments – in air quality, energy efficiency or electricity supply – over and above the profit they may generate. This means rethinking lending, including who is included in decision-making, what types of projects are financed, and the very idea of interest.

Review: Just transitions, cities, and urbanisation

Various concepts of justice have been used to describe and explain the effects of transitions on social groups and economic sectors, and the role of cities and urbanisation in shaping energy transitions. **Two challenges are prominent within the literature: first, the challenge of managing trade-offs between different *material interests*. Second, the challenges that arise from the plurality of justice – that is, the different**

notions of justice that different constituencies hold – and how trade-offs between these competing *ideas* of justice may be reconciled.

Competing Material Interests

Competing interests and ideas of justice are supported by actors with more or less power to realise them. Hence, power is the heart of analysis and practice of just transitions. Nonetheless, some of the literature on just transitions is focused on describing inequalities produced by interventions or by technological change more broadly. Arguably, explanations of how energy injustices are produced are less prevalent. While cities can be understood simply as important sites of consumption where social power dynamics play out, analysis of urbanisation offers potential explanations of how injustices are created through the production and consumption of energy that fuels cities and makes urban life possible. Just transitions can be informed by multiple analytical approaches to understand power; urbanisation provides one such lens on the spatial, social, and ecological politics of just transitions.

Just transitions have been used to describe sustained changes in economies and societies while ensuring a socially equitable distribution of benefits and burdens (Heffron and McCauley, 2018, Newell and Mulvaney 2013, Swilling and Annecke 2012). The ‘transition’ of just transitions has principally been understood through the lens of systems that are both social and technological: shifting to a low carbon economy will entail “major changes in buildings, energy, and transport systems that substantially enhance energy efficiency, reduce demand, or entail a shift from fossil fuels to renewable inputs...but also changes in consumer behaviour, markets, institutions, infrastructure, business models and cultural discourses” (Geels et al., 2016: 577). Challenges arise from the difficulty in shifting relationships between the social and the technical world, which can be resistant to change across physical infrastructure, institutional power, and policy discourse (Unruh 2000, Meadowcroft 2011, Baker et al. 2014). In this respect, energy fuels and systems have been instrumental in the development of industrial capitalism and the formation of states and institutions through which low-carbon transitions may be organised (Huber 2013). For example, fossil fuel-powered steam engines enabled the concentration of factories in urban areas and the organisation of labour, while oil as the world’s primary energy source in the 20th century enabled new opportunities for flexible accumulation (Malmö 2016, Mitchell 2011). The discourse of just transition reflects that “when dealing with transitions one is automatically entangled in moral and ethical questions” (Van Steenbergen and Schipper, 2017: 2).

The justice of just transitions has been informed by concepts of environmental justice that emerged through a combination of political practice and normative political philosophy (Schlosberg 2007, Agyeman et al., 2010, Svarstad and Benjaminsen, 2020). Justice provides a language to politicise transitions and to ground analysis of social and technological change in lives, livelihoods, and politics. It allows people to reason about what they owe to one another and how things ought to be (Sen 2009). Perspectives on justice informed by the social sciences reject the assumption in some strands of liberal political philosophy (e.g., Rawls 1972) of a free and equal public sphere where all parties can expect to reason with each other on equal terms (Young 1990). People will always disagree about justice, and any claims of consensus on what justice means will inevitably silence some voices. However, this pluralism does not imply that all justice claims are equally valid. Instead, there is democratic potential in exploring how different notions of justice are reconciled in policy and practice (Sikor 2013). If the aim of policy is a ‘just’ transition, then who defines what is just? Who can claim to suffer injustice? Who determines how trade-offs are managed? And how do they establish and maintain those powers? Understanding these questions of power has been a principal task for environmental justice and has influenced discourses of just transition.

The language of environmental *in*justice has been used to describe a wide array of social struggles related to environmental goods and harms – including water quality, air pollution, flooding, waste – all over the world (Pellow 2017, Pulido 1996, Mehta et al 2014). Yet the analysis is invariably situated somewhere. Justice claims are informed by the politics of particular struggles in particular places, even if those struggles are over global processes such as climate change (Schlosberg 2004). For example, the language of environmental injustice was first used to describe environmental racism in the US, where toxic waste facilities were found to be disproportionately located in poor neighbourhoods populated by people of colour (Bullard 1990). Early advocacy for just transitions includes labour unions advocating for superfunds to compensate workers and communities affected by environmental regulations and degradation. Early debates on the limits of framing environmental protection as “jobs-versus-environment” (Leopold 2007, White 2020) illustrate how claims of injustice can be situating in their social and historical context to understand the dependency of modern economies on fossil fuels and to find alternatives that address root causes (cf. Harvey 1996). As justice is invoked to politicise transitions, efforts are required to explain how and why injustices are produced, and how they might be addressed.

Pluralities of Justice

Three interrelated dimensions of environmental justice have been distinguished, which have directly informed how just transitions have been understood (Heffron and McCauley, 2018; Williams and Doyon, 2019, Schlosberg 2013): *distribution* of resources, harm and risk; *procedural* justice in decision making; and *recognition* of who is valued and who is not.

With respect to distributive justice, Walker (2012) distinguishes between the *objects* of distribution (e.g., pollution, revenue), by what *principle* they are distributed (e.g., need, vulnerability, responsibilities), and the *subjects* of justice, or to whom these principles of justice apply (e.g., consumers, citizens, residents).

Procedural justice has been closely associated with liberal norms of fair, accountable, and transparent decision making, which present challenges for highly technical decision-making on energy. Deliberation may be formally open to all, but ‘the common good’ is shaped by inequitable resources, organisation and power that shapes whether democratic procedures produce just outcomes (Young 1990, Dryzek 2000).

Recognition asserts that identities and histories are valuable and are vulnerable to forms of cultural domination (Honneth 2004). For example, conservation management is premised on the culturally specific idea that humans and nature are separate, while the concept of ‘energy’ as thermodynamic work itself makes little sense outside of this dichotomy between nature and society (Lohmann et al 2013). The creation of exclusionary protected areas or compensation for displacement from land can hence be experienced as injustices of recognition. With particular reference to Latin America, coloniality has been distinguished as a mechanism of misrecognition that ‘creates structural oppression over marginalised sectors of society whose alternative worldviews become devalued and stigmatised’. (Martin et al. 2016: 258). From this perspective, justice requires equal status for non-Western ways of knowing the world and respect for ideas of progress other than modernity (Álvarez and Coolsaet, 2020).

Frameworks of environmental justice have informed frameworks of energy justice (e.g., Jenkins et al. 2016, Sovacool et al. 2015). In keeping with liberal philosophical traditions, justice typically connotes fairness. Among the most cited sources, energy justice is described in “a global energy system that fairly distributes both the benefits and burdens of energy services, and one that contributes to more representative and inclusive energy decision making” (Sovacool et al., 2017: 677). The particular challenges of achieving justice in technical systems is reflected in ‘centering energy discussions back on people’ (Sovacool, 2014: 11) and an implicit assumption that more inclusive decision-making is more effective

and produces more just outcomes. The scope of energy justice research has expanded significantly to cover energy access, infrastructure, affordability, and poverty as well as energy generation and relations of production (Fuller and McCauley 2016). Debate has developed on trade-offs in ‘who wins, who loses, how and why’ (Newell and Mulvaney 2013), the reproduction of spatial injustices (Bouzarovski and Simcock 2017), and ways to capture energy injustices in both low- and high-income economies (Castán Broto et al., 2018). Energy justice research has covered energy innovations and low carbon technologies as well as established energy systems – where ‘the fabric of our economy, and some would argue our political system (‘carbon democracy’) is dependent upon the plentiful and relatively inexpensive supply of fossil fuels’ (Bradshaw, 2010: 276). These include efforts to formulate policy-making tools that account for multiple dimensions of energy justice (Jenkins et al. 2016, Heffron and McCauley, 2018, Williams and Doyon, 2018).

City Governance

Analysis of urban energy and climate action has coalesced around a similar set of concerns for participatory and collaborative governance (Nguyen et al. 2018, Bulkeley et al. 2010, Chu et al. 2018). Globally, approximately sixty to eighty percent of final energy consumption is attributed to urban areas and over seventy percent of global greenhouse gas emissions are produced in urban areas (IEA, 2012). Climate initiatives designed and implemented at local level – in cities in particular – are increasingly prominent (Johnson and Krause, 2019) and the urban has become an increasingly important arena for international environmental policy, as affirmed in the UN’s New Urban Agenda (UN Habitat, 2017). Local initiatives are established in some cities and networked internationally (Hodson and Marvin, 2009), while a common set of urban strategies and institutional changes have been identified that include vertical and horizontal coordination within government, collaboration with non-governmental actors, long term planning and climate change mainstreaming. Cities may be described as microcosms – smaller administrative units that may address injustices and inform action at national scale (Pulselli et al., 2021, IPCC 2018). Similarly, the heterogeneity of cities has been posited to facilitate transitions (Zhou et al., 2017). For example, Asheim et al. (2011) suggest that regional actors design more successful policies than national actors, supported by specific local and regional knowledge of local needs. Yet, there is evidence that the urgency of climate action and the imperative to demonstrate quantifiable emissions reductions favours certain discrete projects (such as efficiency improvements in energy production) over more socially embedded projects (such as participatory neighbourhood planning) that may be more attuned to the open, exploratory, and indeterminate character of transitions (Castán Broto and Westman 2020).

Cities are also identified as sites of particular inequalities and injustices, such that sustainability transition should engage with specific characteristics of cities and urbanisation (Hughes and Hoffman, 2020). Social injustices in cities present themselves in multiple ways, including displacement, destructive redevelopments or uneven investment that may entrench inequalities. Like discourses of energy justice, perspectives on the ‘Just City’ focus on the role of democracy and civic engagement attuned to racial and socio-economic difference (Perry and Atherton, 2017). For example, Fainstein (2010) associates a just city with open decision-making (procedural justice); tolerance of minority groups (justice as recognition); and access to amenities and services for all (distributional justice), as part of a three-dimensional framework of democracy, diversity, and equity. Urban justice is often closely associated with the right to the city, understood as a collective right to change the city by reshaping the process of urbanisation (see Harvey 2003), including alternative visions for urban planning (Lyles and White, 2019). Hughes and Hoffman (2020) call for further attention to recognise an explicit link between the environment or climate change and urban planning strategies within ‘Just City’ scholarship, while Bouzarovski and Haarstad (2019) situate cities as active agents in transitions.

Tensions

A specific set of tensions arise from the intent to manage and accelerate transitions. In this respect, Cahill and Allen (2020) distinguish reformist intent (e.g., carbon taxes) and transformational intent (e.g., new models of ownership) for socio-technical change. Both are subject to the politics of deciding outcomes and managing the complexity of unanticipated and multiple pathways. Closing-down potential futures through particular visions of transition presents the possibility that new injustices will be produced (Shove and Walker 2007, Swyngedouw 2006). In this respect, efforts to evaluate the effectiveness of urban climate action often overlook possibilities that are less visible to tools of measurement and standardisation (Castán Broto and Westman 2020). Intention in transition will be exclusive to some degree, making the management, design, or steering of transitions inherently political. In this respect, literature on ‘accelerated transitions’ has been concerned with rapid technological development, expanded coalitions, positive visions that appeal to mass publics, and major policy changes that alter technology selection environments (Skjølsvold and Coenen, 2021). While these interventions target rapid decarbonisation, there are tensions between the speed of socio-technical transformations and inclusive change that may exacerbate spatial inequality. Various campaigns and policies for Green New Deals engage directly with the politics of transition design, with different emphases on principles of systemic, rapid, and inclusive energy transitions (White 2020).

Managed transitions will necessarily encounter different views on justice and the politics of intent: people have different ideas of justice, and some ideas of justice will be better represented in policies than others. Yet, when asking what a ‘just’ transition would look like, it can be helpful to consider whether a clearly articulated idea of justice is necessary or useful to address *injustice*. Alternatively, recognising wrongdoing does not require consensus on what is right, but may be better served through communicative tools – elaboration of different claims of injustice and critical reflection on their legitimacy among all those affected (Cooke 2006, Barnett 2017). Consultation is often organised in ways that legitimise prior decisions and exclude divergent views, reflecting deeper procedural inequalities (Lehtonen and Kern, 2009; Stirling, 2009). A meaningful form of deliberation may account for epistemic injustice, whereby the capacity of some people to express how they are harmed is suppressed. Deliberation is always shaped by the exercise of power, but it needn’t be naïve of power and needn’t strive for false consensus (Barnett 2011). It may recognise and work with disagreement to facilitate more honest – but nonetheless more inclusive – debate on injustice.

While similarly attentive to the exercise of power through participation, others are more circumspect about the possibility of procedural parity. For example, Coulthard (2014) describes how recognition of First Nation self-governance by the Canadian government has reproduced historic injustices by enabling fossil fuel infrastructure on indigenous land. Mobilised by the liberal, multicultural state, recognition succeeds in securing state access to land that “contradictorily provide the material and spiritual sustenance of Indigenous societies on the one hand, and the foundation of colonial state-formation, settlement, and capitalist development on the other” (Coulthard 2014: 7). Like procedural norms, recognition can be moulded to suit the political interests of those that mobilise it. These kind of fundamental differences over what should be discussed under the banner of just transitions or urban policy are not restricted to indigenous communities but can also infuse climate assemblies or opposition to new fossil fuel infrastructure in industrialised countries (Veluci and Kaika 2017). Some analysts remain decidedly sceptical about the possibility of genuine democratic equality in official forums, where narrow terms of reference exclude any political position that conflicts with them (Sywngedouw 2010, Marquand 2004).

However, participation may have transformative potential. It is unlikely to be realised in discrete participation events (e.g., a policy consultation) that elicit responses from pre-determined subjects (e.g., consumers) about pre-determined objects (e.g., home insulation, behaviour change), where the terms of inclusion foreclose substantive democratic engagement. Yet, participation can be more systemic and more relational, meaning that no

person or institution acts alone but rather in relation with others and with the environment (Chilvers et al. 2018). In this sense, participation may be ‘co-produced’ by the energy system that it operates within. This means that participation can contest what the system is and should be – how it is framed, what is up for debate, and what needs to change. For example, sanctioned consultations on hydraulic fracturing in the UK typically foreclose discussion of rejecting new fossil fuel extraction, which instead finds space in alternative forms of participation such as protest camps or newly formed alliances between local community groups and large NGOs. Similarly, some energy poverty action groups have organised to strengthen tenure rights for residents of public housing whose homes are retrofitted for energy efficiency, tackling the threat that low carbon renovations will increase rents and displace residents from their homes (Bouzarovski et al. 2018). Various campaigns for ‘energy democracy’ have engaged directly with markets and state institutions but have done so by reframing the priorities, obligations, and accountability of energy companies, beyond their technocratic domain (Angel 2016, Cumbers and Becker 2018). In these and other examples, there is no singular or representative ‘public’ to be incorporated into energy planning, but multiple publics that are produced through the process of participation (Chilvers et al. 2018).

Omissions

Whatever ideas of justice are brought to debates on just transitions, most would agree that advocacy, policy, and practice should engage with the world as it actually exists. A prevailing form of market environmentalism underpins most national and international climate policies, including emissions trading and Net Zero carbon commitments of nations and firms that rely on accounting for carbon sinks elsewhere (IEA 2021). Similarly, while energy efficiency is often hailed as a win-win intervention for climate and economy, the search for energy savings frees up capital for reinvestment that creates further energy production and consumption. Lohmann et al. (2013) suggest that a pragmatic view on energy efficiency cannot afford to ignore the dynamics of capital accumulation and should find ways to reduce energy demand that serve a broader social purpose than economic growth. Yet, as the discourse of just transitions has entered policy arenas, Contorno et al. (2018) argue that its ‘conceptual elasticity’ raises concerns about integrity in implementation and practice, while others have noted that the language of just transitions has evolved to such extent that labour concerns and radical policies are often omitted from UN human rights and climate documents (Stavis 2013, Just Transitions Collective 2018).

These omissions are contested in the various claims of injustice associated with ‘transitions’ that may not be always articulated on such terms. A narrow understanding of transitions as ‘fuel switching’ or the replacement of dirty technologies with clean ones is unlikely to enable

discussion of ownership, control, or the social organisation of energy and cities. In this respect, environmental movements have mobilised multiple dimensions of justice – distribution, procedure, recognition – but they have also foregrounded how relationships between people and their environments produce injustice (Schlosberg 2020, Tschakert 2020, Heynen 2014). In the Canadian example above, the state’s recognition of indigenous people does not extend to recognition of their reciprocal relationships with land, which conflicts with the commercial logics of extraction. In short, social justice has a socio-ecological dimension (Yaka 2019). The socio-ecological processes that fuel urbanisation connect cities to every remote corner of the world through the fuels and minerals, infrastructure and waste that make urban life possible. To account for just urban transitions is to account for how ecological systems are transformed through capitalist urbanisation, without overdetermining the role of capital in producing inequalities associated with energy. Ultimately, identifying how ecological systems are enrolled in the creation of social injustice is to demonstrate that processes of urbanisation and transition can be organised differently.

The global synthesis of evidence that follows illustrates the diverse ways that justice and injustice are contested through institutions, processes and policies associated with transitions and urbanisation. Dimensions of justice can be broadly mapped onto different social domains (Fraser 2009) – distribution is associated with labour struggles, recognition with identity, and procedure with democratic representation – but each is related to the other and combined in distinct ways through specific ecological issues. For example, an unequal distribution of resources can affect who can speak and who will be heard, which may reinforce an inequitable distribution of environmental goods or harm. It is the combination of economic and cultural justice that creates the potential for ‘procedural parity’ that liberal societies champion, but which is so elusive (Fraser 2009). Our contributions provide evidence that procedural parity is difficult to achieve through the forums typically convened to deliberate over energy, climate change and urban change. However, they also point to opportunities for more substantive engagement with the economic and cultural processes that produce inequalities. In this respect, they reaffirm the importance of placing power at the heart of just transitions and illustrate the diverse places, spaces, and scales by which power operates through energy transitions.

Just transitions, cities, and urbanisation: regional evidence

The following sections provide insights on just transitions and urbanisation from regional perspectives. They are organised under sub-headings that identify common challenges and opportunities that arise from each specific region.

Just transitions are contested on unequal terms: insights from Africa

Transitions generate controversies

Individuals and institutions have different interpretations of the right balance between social, economic, and environmental sustainability, different priorities of environmental problems, and different views about the (dis)advantages of solutions or the most appropriate policy packages (Geels, 2010). Just transitions that promise a ‘collective good’ should not crowd out inevitable trade-offs nor obscure complexities and uncertainties in transition processes. Nothing is more certain than uncertainty in systems and conditions, and spatial interconnectedness ensures that no geography or society is independent of others.

Uncertainty refers to the inability or lack of information and knowledge to estimate and adapt to the probabilities of outcomes of events (Stirling and Scoones, 2020). Yet, many sustainability transition initiatives operate on the assumption of a better future with a high level of certainty, despite the widespread vulnerability of people, systems, resources, and institutions to ever-changing/uncertain global-local interactions. SGD7 – universal access to modern, affordable, and sustainable energy *for all* – assumes a universality to energy justice and the pathways to achieve it, downplaying contested and varying entitlement notions in specific geographies (Boamah and Rothfuß, 2020). The nebulous concept of ‘sustainability’ remains contested whenever it is mobilised, interpreted, and appropriated by different actors.

Fairness is contested, on unequal terms

Fair distribution of the benefits and burdens of energy systems *for all groups* is certainly germane to the just energy transition initiatives (Jenkins et al., 2020; Healy and Barry, 2017; Newell and Mulvaney, 2013). Yet ‘fairness’ or fruitful balance between obligations and entitlements are always contested. Thinking about just transitions requires critical reflections on systems, practices and structures that perpetuate injustices/vulnerabilities and stabilise regimes, as well as on governance mechanisms guiding obligation-entitlement interrelations in specific geographies. Transitions require dramatic regime shifts, which

cannot be a seamless process because existing regimes are characterised and stabilised by lock-ins and path-dependencies related to sunk investments in infrastructure, machines and competencies, consumer preferences, vested interests, behavioural patterns, favourable subsidies, and regulations (Unruh, 2000; Geels 2011). Lock-ins may also operate in the form of shared discourses (at multiple levels or scales), institutional and political commitments, strategic political lobbying, etc. intended to perpetuate and defend existing systems and regimes (Unruh, 2000). Vested interests and lock-ins that stabilise regimes do not easily give way to radical shifts, except for incremental transformations.

Identifying which interests should be disrupted in the name of justice is not trivial

The promotion of renewable energy technologies by the global north is often experienced in Africa as bullying behaviour (Boamah, 2020), yet ‘energy bullying’ can also be misleading. Why, where, and how? Industrialised countries certainly bear historic responsibility for climate change but also have the necessary technical knowledge, strong institutions, and financial resources for more effective adaptive capacity to the impacts of climate extremes compared to African economies and agricultural systems (see Rothfuß and Boamah, 2020; Phillips 2019). Furthermore, the ‘small carbon footprint’ label of Africa masks high carbon emissions from individual African countries, notably South Africa, Egypt, Algeria, Morocco, and Nigeria. In this sense, the framing of just transitions should not be reduced to ecological guilt or comparisons between nations, but responsiveness to the differential vulnerability of countries, regions, and social groups to broader systems (Rothfuß and Boamah 2020).

Support for renewable energy generates justice and injustice together

Sustainable energy transitions in Africa are potentially disruptive, but may operate through different relations, particularly where the regulatory frameworks that support niche innovations elsewhere may not play the same role (Baker and Phillips 2019). Many African governments have promoted renewable energy technologies (mini-grids, net metering, decentralised solar PV systems, wind energy infrastructure) primarily to complement intermittent power supply in urban areas or meet energy needs where electrical grids are unavailable or unreliable (Boamah, 2020). National and provincial/local governments are typically reluctant to promote renewable energy technologies that would break the monopoly and reduce revenue inflows of cash-strapped state-owned electricity distributors, until cost-competitive conditions exist, or special funding and technical support are provided from the global north (Boamah et al., 2021). Meanwhile, subsidies for decentralised solar PV systems can reinforce spatial energy injustices due to the lower energy output of small systems, varying energy needs of different social groups and classes, and in some cases exploitative acts of private solar energy service providers (Monyei et al., 2018). Incentives for solar PV in

urban areas of Ghana and South Africa provided 'surplus energy' for wealthy households to meet their high energy demands (Boamah and Rothfuß, 2020; Van der Merwe, 2017). In short, neither universal energy access nor renewable energy necessarily reduce energy inequalities, which many people identify as a requirement of fairness. And yet, subsidies for the wealthy may be judged more favourably if they deliver public goods, for example by protecting emerging low carbon industries, or reducing costs for early adopters of clean technology. Fossil fuel industries have a long record of lobbying against support for renewable energy by hiding behind the poor.

The failures of biofuel investment illustrate how urban and rural communities of justice are connected

These social, spatial, and temporal aspects of transition have been evident during two decades of biofuel investment in Africa. Investors from the global north and within the global south (including Africa) sought to gain a foothold in Africa to access so-called underutilised land or wasteland resources at the peak of global financial, fuel, and food crises. Many African governments promoted biofuel production to reduce expenditure on oil imports. Private investors sought to produce biofuels (bio-ethanol and biodiesel) predominantly for exports and also for domestic markets. Biofuel Sustainability certification initiatives were introduced to govern the production of biofuel feedstock (corn/maize, soybean, jatropha nuts, sugarcane) in ways that would not compromise food security, ecological integrity, and livelihoods, particularly in least-developed countries (Franco et al., 2012; Matondi et al., 2011; Carmody, 2011; German et al., 2013). These were underpinned by just transition considerations, especially following claims that the conversion of food crops for biofuel production serves the interest of the wealthy in the global north to the detriment of the poor in the global south (Shiva, 2008; Ferret, 2007). Empirical studies revealed that unexpected cuts in external funding for biofuel investments, poorly defined demand-supply chains, weak regulatory frameworks, and a sharp decline in oil prices caught biofuel investors unaware, causing biofuel companies to collapse without significant improvement in low-carbon energy provision as envisioned. The effects were primarily felt in rural areas: large-scale land allocations for biofuel investments reinforced social injustices and population displacements, generating public agitations due to lack of transparency, and prior and informed consent. The justice implications of urban energy reach far beyond traditional city limits. The framing of trade-offs and pinch points should be understood in relation to spatial variations of entitlements and uncertainties.

Recommendations:

- While the greatest responsibility for greenhouse gas emissions lies outside Africa, African governments may promote national interests through strategic use of international climate and energy finance and development of domestic technological capabilities.
- Energy planning should address the practical energy needs of different social groups, rather assuming the needs of a homogenous population of energy users.
- Future large-scale agricultural investments should be preceded by thorough scientific studies on land politics and entitlement notions in both rural and urban geographies.

Urban energy poverty must be understood to achieve just transitions: insights from Latin America and the Caribbean

Countries in Latin America and the Caribbean (LAC) have experienced rapid urbanisation in recent decades, but have lacked institutional strength to adequately respond to growing demand for infrastructural systems. There are issues with affordability, adequacy, reliability, and safety across various key urban infrastructures, including drinking water, energy, and transport. LAC countries also face social challenges, particularly with regards to the Sustainable Development Goals for poverty reduction, education, peace, and gender equality, which compound infrastructural issues, and impair population well-being. Focusing on energy poverty, there are some major pinch points to achieving just transitions in LAC.

LAC has significant inequalities in access to clean, affordable, and reliable energy

The LAC region has a high average rate of access to electricity (98.3%), with multiple success stories of countries transitioning to generating 99% or more of primary energy from renewable energy, including Costa Rica and Paraguay. However, these figures disguise an uneven pattern of domestic energy access, with an extremely low connectivity rate of 45.3% in Haiti, followed by 88.1% in Nicaragua, and 91.8% in Guyana (World Bank, 2021a); it also ignores the additional challenges of electrification within so-called ‘Small Island Developing States’ (Surroop et al., 2018). Moreover, it overlooks quality of supply: data from the World Bank’s Enterprise Surveys shows that 64.8% of businesses in LAC have experienced electrical outages, with an average of 2.1 outages in a typical month, each lasting 2.7 hours on average, leading to 26.0% of businesses owning or sharing a generator (World Bank, 2021b). This is despite the fact many parts of LAC are rich in energy resources. Indeed, the history and identity of many LAC communities is deeply intertwined with natural resources and the

conflicts around its extraction and use by colonial and neo-colonial powers (González Salinas 2016, Riofrancos 2017).

Simplistic measures of energy poverty hinder action for just transitions

Reducing energy poverty is typically implicit when just energy transitions are invoked.

Energy poverty is a relatively nascent topic of study within LAC, despite it being one of the most diverse and populous regions of the world. This means most countries in the region are relying solely on simplistic metrics of access to understand energy deprivation, thus overlooking more complex dynamics associated with energy poverty. An in-depth review of academic and grey literature highlights two pertinent observations about the evidence base for LAC (Thomson et al. 2021):

First, quantitative energy service-based approaches, such as adapted Multidimensional Energy Poverty Indexes (MEPIs), have been dominant across LAC. This is an interesting observation since energy services-based approaches generally indicate that higher levels of energy poverty are found within rural areas (Hernandez et al., 2018; Castelao Caruana et al., 2019), attributed to lack of adequate infrastructure and poor housing quality. By comparison, metrics based on energy expenditure, as found in Brazil and Mexico (Piai Paiva et al. 2019), point towards higher probability of energy poverty in urban areas. In Mexico, this observation can be attributed to reduced opportunities for using locally sourced firewood, as well as increased expenditure on electricity. This has distribution justice implications and points to the need for research that integrates both energy expenditure and energy services to detect different dimensions of energy poverty, and to ensure urban energy deprivation issues are adequately captured.

Second, studies in LAC mainly, but not exclusively, answer questions relating to: *How many people are energy poor?* and *Which regions are most impacted?* But fail to provide evidence to questions such as: *What are the characteristics of an energy poor household?* and *Who is most affected?* As such, there is an urgent need for intersectional analyses of social vulnerability to energy poverty, with greater geographical specificity, and focus on urbanisation.

There are institutional and socio-legal challenges to just transitions in LAC

Despite its size (spanning 33 countries and 15 recognized territories of other countries) and shared characteristics - including languages, cultures, climate, and processes of post-colonial recovery - LAC lacks institutional 'unity' akin to the European Union polity. On the one hand, the region enjoyed several waves of institutional integration that resulted in the

creation of political or economically oriented regional institutions, such as UNASUR (Union of South American Nations), CARICOM (Caribbean Community), OAS (Organization of American States), MERCOSUR (Southern Common Market), and many others (Pastrana Buelvas, 2013). On the other hand, the results of these integration blocks have been questionable in political and economic terms. Intra-regional exports in LAC only account for 14.6% of the total exports, as opposed to 68.0% in Europe (United Nations Conference on Trade and Development, 2020). LAC is also far from having a solid supranational body of norms equivalent to European law. Besides, some of the political regional organizations, such as OAS and UNASUR, overlap and compete in diplomatic affairs (Nolte, 2018). These circumstances present significant institutional challenges to collective regional efforts to achieve just transitions.

There are no formal definitions of energy poverty in LAC, although many countries informally use the parameters provided by the UN's Economic Commission for Latin America, CEPAL (Montoya, 2020). Several national written constitutions include clauses that allude to the right to have access to electricity as a fundamental good, and for achieving other constitutional rights. Nevertheless, further socio-legal work is needed to ensure that equitable access to affordable, reliable, and safe energy can be guaranteed for all in LAC. This includes designing formal and explicit constitutional recognition of access to energy as a fundamental, interconnected, and interdependent right, instituting new mechanisms for systematically evaluating the quality and reliability of energy carriers (including renewable forms of energy), and implementing new policies to address energy vulnerabilities.

Cities have conflicting roles and interests as energy actors: insights from Asia Pacific

The Asia Pacific is a diverse geographical region yet one with a distinct identity

The Asia Pacific region is characterised by high rates of economic growth and rapid urbanisation. Cities are firmly situated within the wider dynamics of the region, which plays a pivotal role in global energy systems and accounts for nearly 50% of global energy demand (Lo, 2017). The specific historical, political, economic, and social dynamics of the Asia Pacific region matter in terms of shaping urban energy transitions, particularly in terms of the ongoing legacies of colonialism. For example, while Indigenous land rights debates in Australia have typically been framed in terms of regional or rural concerns, increasing work draws attention to notions of the 'settler city' (Porter et al, 2020). Such approaches challenge

policy agendas to consider issues of reparation and learning/unlearning more sensitively, suggesting from the outset that engagement with the cultural dimensions of energy transitions needs to be a key priority in pursuing justice.

Asia Pacific and other regions prompt a reconsideration of how cities shape just transitions

The politics and practice of energy transitions in the Asia Pacific region has not received systematic academic attention to date. Where work has been conducted, this tends to focus on ‘global’ cities, such as Singapore or Hong Kong, with far less attention paid to smaller urban settlements. This necessarily means that there are significant knowledge gaps about what a just urban energy transition in the region may look like beyond the ‘global city’ model. In this context, geographies of knowledge production about energy transitions need careful consideration. Concepts and theories of urban transition have developed in particular places, drawing on specific experiences and conditions. Work by postcolonial scholars can help expose the challenges of applying ideas developed to explain western, “developed” contexts elsewhere (Shin, 2021). For example, the body of theoretical work related to Asian urbanisms and the ‘Asian city’ (Bunnell et al, 2018; Ren and Luger, 2015) offers an opportunity to generate new conceptual insights into how urbanism is manifest which in turn may shape regionally specific forms of just energy transitions.

Diversity among cities creates challenges and opportunities for just transitions

The urgency of a regional transition to a more sustainable energy future across the Asia Pacific has been heightened by increasing concerns over climate impacts and energy security. To address this there is a tendency, at least on paper, towards integration across parts of the region (Elliott, 2012). For example, the countries of Southeast Asia that comprise ASEAN face a common challenge to meet rising energy demand in a secure, affordable, and sustainable manner. However, the great diversity across the region – particularly in terms of economic development, energy resources and consumption patterns – means that energy transitions will necessarily be different in each individual country and city, challenging a universal notion of justice. As an illustration, Singapore plays a leading role in ASEAN as a “soft power” with some capacity to influence other cities across the region through technology or skills sharing (Fuller, 2020). Nonetheless, Singapore is still heavily reliant on its petrochemical industry, suggesting that the incentives for more radical change across the region may be limited.

Agents of change may have different institutional homes

Different ambitions towards climate change at different levels of government provide a further challenge and opportunity for just urban transitions. For example, Australia lacks a

credible national climate policy with a lack of support for renewable energy transitions at a federal level (MacNeil, 2021, Warren et al., 2016). At the same time, it has some of the highest rates of solar PV penetration in the world. In the absence of federal government policies, cities have stepped up to deliver energy transitions in practice, creating an impetus for change. For example, in Canberra, the Australian Capital Territory government committed to a *Next Generation Renewables Strategy* to support the implementation of distributed solar storage and to rollout battery storage to around 5,000 Canberra homes and businesses (ACT Government, 2012). This strategy has been designed to support Canberra as an innovation hub with industry actors playing a key role (Page and Fuller, 2021). While this enables faster action, questions remain over the extent to which industry actors or public-private partnerships have issues of equity embedded within their delivery models.

A further question is where the policy agenda of just transitions is situated within urban development. A recent unpublished review of policies across 14 cities in the Asia Pacific (Auckland, Sydney, Melbourne, Jakarta, Kuala Lumpur, Singapore, Hong Kong, Bangkok, Hanoi, Ho Chi Minh, Quezon, Seoul, Tokyo and Yokohama) highlights that energy and climate change have a range of policy 'homes'. Many cities have separate mitigation and adaptation plans, which suggests that the achievement of a form of justice that draws together issues of causality and vulnerability may be constrained. Furthermore, ideas of justice or equity were not mentioned specifically in any of the plans. In other parts of urban Asia (for example in China), transitions towards solar energy have explicitly referenced issues of poverty but the outcomes remain unclear (Lo, 2021).

Procedural justice should encompass the terms of inclusion and participation

From a procedural perspective, an important driver for just urban transitions is the engagement of activist and grassroots actors. The Asia Pacific is characterised by shifting and fragmented state-civil society relationships alongside the rise and increasing prevalence of authoritarian regimes. There are important activist and advocacy movements in cities across the Asia Pacific that are seeking to hold city governments accountable for climate change. For example, in Hong Kong, NGOs have put pressure on the city administration who were slow to produce a citywide climate action plan (Fuller, 2020). However, not only are these actors restricted to non-confrontational tactics to influence government policy and progress, but the opportunities for such action are also shrinking across many parts of the region. There is also a risk that while climate and energy policy making may be based on principles of consensus, suggesting a more equitable distribution of power, consensus may not in fact produce progressive climate outcomes. For example, in Hong Kong, collaboration has been a feature of energy governance for many years. However, collaboration is heavily shaped by

regulation and powerful energy monopolies with limited opportunity for genuine participation from other actors (Cheung and Fuller, 2022).

Recommendations

- Energy transitions are not only future facing, but must directly engage with historical legacies of injustice and colonialism.
- Policy makers must embrace difficult challenges of supporting rapid change while governing for justice and equity.
- Policy makers may find innovative and effective climate solutions by looking beyond ‘global’ cities to consider ideas and actions from diverse actors and institutions within the city.

Uneven divestment and investment must be taken seriously: insights from Europe and North America

Just divestment from fossil fuel-dominated energy systems must be incorporated within governance programs for a just transition. However, doing so requires taking the geographies of this project seriously, including potential tensions and pinch points emerging within prominent strategies.

Divestment from fossil energy has gained traction as risk mitigation and accumulation strategy

Divestment has become a growing concern for players and places at the centre of the global economy, particularly in urban and national centres of finance like London and the United Kingdom. For example, major corporations and financial institutions, powerful central banks like the Bank of England and other financial system regulators like the Financial Stability Board (FSB) at the national and international level. Emerging management initiatives targeting and propelled by these actors are exemplified by narratives of large-scale and systemic threat like a ‘carbon bubble’ (popularized by initiatives like Carbon Tracker), the threat of rapid and uncontrolled ‘stranding’ and devaluation of fossil energy assets sufficient to destabilize the global economy (Knuth, 2017; Carbon Tracker, 2021). Related concepts like ‘transition risk’, including fossil fuel producers’ legal liability for climate impacts, bring these mitigation-side risks into the frame for corporations and investors. Strategies include regimes of institutional and central bank ‘stress-testing’ (Langley and Morris, 2020), and particularly risk disclosure initiatives like the Task Force for Climate-Related Financial Disclosures (TCFD). While the effectiveness of voluntary management and privatised self-governance have been questioned (Christophers, 2017; 2019), these initiatives

are an important route to redirect global investment and push internal transformation of fossil energy producers and heavy-industrial consumers. Effectively, the core of this management vision is for markets and financial experts to direct large-scale investment away from climate ‘bads’—now framed in terms of players’ *risks* as well as more altruistic ‘impact investing’ commitments (Cohen and Rosenman, 2020) or profitable opportunities in ‘clean’ or ‘low-carbon’ sectors (e.g., Knuth, 2018; Bridge et al., 2020). Financially, this means new opportunities in green bond markets and other lending to renewables projects (Baker, 2021), as well as new strategies in direct investor ownership of renewable energy infrastructures or other low-carbon technologies (e.g., Bozuwa et al., 2021).

Divestment strategies have prioritised the continuity of economic power

However, even if it succeeds, this set of strategies for managing fossil fuel divestment favours particular scales, kinds of cities, players and populations. They prioritize stability and continuity in the global economic system over the uneven costs of transition to particular places and populations and equate that stability with the economic health of powerful economic players: large corporations; ‘too big to fail’ financial institutions; powerful governments, economies and cities—particularly financial centres. In prioritizing the health and stability of elite actors, this conception of energy transition presents justice dilemmas in a global economic system that has grown even more unequal in terms of wealth disparity since the late 2000s financial crisis. These justice concerns are exacerbated if new state resources are enlisted in support of these divestment strategies, for example in new accelerated depreciation allowances for fossil fuel assets and infrastructures (Stokes, 2020) or limited versions of nationalisation that prioritize continuity in shareholder returns over justice outcomes (still more so if production tax subsidies for fossil fuels – still on the books in the United States and in legacy forms in the United Kingdom – are not eliminated). More concerning still are places and populations exposed to acute costs of transition, and without the power to displace the pain of transition onto others. This governance dilemma in just energy transitions takes on several important facets in cities, in both unjust experience and the ability of that grievance to fuel oppositional politics.

Divestment that prioritises economic continuity may reproduce uneven social costs of deindustrialisation in cities

Discourses on right-wing populism and the ‘Revolt of the Rustbelts’ in the 2010s testify to the enduring pain—and political significance—of urban-regional deindustrialization and disinvestment (Hazeldine, 2017; McQuarrie, 2017; MacLeod and Jones, 2018). These experiences matter in both Northern cities in regions like the Northern United Kingdom, US Snowbelt, and Germany’s Ruhr Valley and in a growing array of ‘premature’ Southern urban

cases of deindustrialisation (Rodrik, 2016; Pike, 2020; Schindler et al., 2020). Many relevant industries are, or will be implicated, in fossil energy legacies—from fossil energy-producing regions to urban regions producing automobiles, petrochemical centres, aviation and military centres, steel and other historically fossil energy-dependent heavy industries. It is all too easy to imagine ‘successful’ divestment movements and even transformations of fossil incumbents that prioritise easier ‘greenfield’ or already-successful urban-regional sites for new green investments, particular ones tied to narratives of innovation (the ‘next Silicon Valley/ies’ of low-carbon economies) (Knuth, 2018). This version of a low-carbon transition would once again sacrifice some cities and regions in the name of the general economic good and favour certain cities and regions at the expense of others.

The racialised regional impacts of fossil energy call for affirmative reinvestment

It is easy to connect regionalised and classed pain with right-wing populist grievance. It is an inescapable feature of fossil fuel wind-down politics in the United States, aligned in overt ways with white supremacy in Trump-era mobilisations. However, narratives centring white-majority cities in ‘flyover’ regions (e.g., in Pennsylvania or West Virginia coal country) as the primary victims of Washington, Wall Street-or California-led transitions miss the broader geographies of US fossil fuel production and consumption. Fossil energy costs have been borne strongly by Black-majority cities, Black and Latino neighbourhoods, and regional urban corridors like Cancer Alley in the US Gulf Coast (Watts, 2012; Bullard, 2018; Bozuwa et al., 2021; Donaghy and Jiang, 2021). Many are also disproportionately exposed and vulnerable to climate change impacts and made less able to afford local mitigation and adaptation infrastructures by the economic and fiscal legacies of past disinvestment. Programs to turn away from fossil fuels must simultaneously consider which places will bear the costs of fossil fuel transition as a new round of disinvestment and another form of environmental justice and racism. These injustices are increasingly emphasised in mobilisations such as the Movement for Black Lives program for a Red, Black, and Green New Deal (Movement for Black Lives (M4BL), 2021; M4BL and Gulf Coast Center for Law & Policy, 2021) and California urban activism around the injustices of urban and racialised inequality-blind policies like state-level cap-and-trade schemes (e.g., Pastor et al, 2013). Across the cases discussed here, there is a strong case to link divestment from fossil energy to affirmative reinvestment that is nationally resourced and geographically accountable in its planning and disbursement: reinvestment as a strategy for economically and racially just energy transition and a response to the increasingly politicised regional legacies of past injustice.

Investment in low-carbon energy can generate its own urban exclusions

A crucial reality of low-carbon energy systems, including new and retrofitted systems in cities, is the ‘mainstreaming’ of key clean energy technologies, particularly solar photovoltaic, onshore wind, and increasingly offshore wind for coastal cities (the latter even in the United States, which has lagged Europe) (Harrison, 2020; Baker, 2021). However, it is necessary to note the ongoing and constitutive exclusions in what kinds of clean energy projects and sites have undergone this mainstreaming process and seen important inflows of investment: smaller-scale projects and ‘riskier’ cities and countries (as well as less mainstream technologies) continue to pay more for energy investment and may not be able to secure investment at all (Baker, 2021; Aronoff, 2021; Bozuwa et al., 2021). These exclusions are evident worldwide. Neither are these exclusions limited to rural areas. Large clean energy projects serving wealthy urban populations will be favoured in the current system, as will increasingly ‘competitive’ transmission investments in deregulated contexts such as US regions and investments in supporting infrastructures like grid-scale energy storage (Bozuwa et al., 2021).

Investment and ownership present interrelated challenges for procedural justice, and are spurring new movement organising

Concentration in energy investment and concentration in ownership of key clean energy assets are interrelated issues for just transitions (e.g., Baker, 2021). Large clean energy projects and developers are more easily able to secure capital. Following decades of deregulation in the Anglo-American context – via Structural Adjustment programs in other countries – and through other frontiers of neoliberalization, owners of clean energy infrastructure are increasingly concentrated among a transnationally set of private investor-owned utilities (Harrison, 2020; Bozuwa et al. 2021). This concentration in private utility energy ownership has already emerged as an important justice issue. In the US context, it has spurred important urban-regional activism such as (but certainly not limited to) mobilizations against Pacific Gas & Electric (PG&E) in California—particularly after the utility’s role in regional wildfires, subsequent bankruptcy and state bailout—and against Consolidated Edison (ConEd) and private Energy Service Companies (ESCOs) in New York City, as environmental and consumer justice groups have organised against racially targeted and exploitive treatment of urban consumers, including extortionate pricing and shut-offs (Bozuwa et al., 2021). Existing charges of private utilities made increasingly large, unaccountable, and exploitive by deregulation stand to become more serious if a clean energy transition is managed in many urban contexts through an increasingly monopolistic energy system. In this context, new organizations for public power offer governance alternatives worth exploring—for example, recent New York City Democratic Socialist (NYC-

DSA) legislation in New York State (Bozuwa et al. 2021; NYC-DSA Ecosocialist Working Group, 2021) and national progressive campaigning as part of broader Green New Deal mobilizations (Aronoff et al. 2019; M4BL, 2021).

Recommendations

- Develop concrete and suitably resourced plans to protect *communities* in processes of divestment for climate risk management.
- Advance multi-sided, geographically sensitive planning on these community-level ‘transition risks’, sensitive to existing regional histories of deindustrialisation as well as particular claims on reparative racial justice being advanced by frontline environmental justice communities.
- Connect regulated processes of governmentally mandated climate-related risk disclosure and divestment to affirmative policies of *reinvestment* in and for frontline communities, including viable public and community ownership options for clean energy technologies.
- Regulate private sector divestment initiatives to require similar planned ‘exit strategies’ and reinvestment commitments for affected communities.

Spatial planning can hinder or enable just energy transitions: insights from urban China

Chinese planning has stated that urbanisation should be more human-centred

China plays a significant role in the global climate regime as the largest carbon dioxide emitter, producing approximately a quarter of global emissions (UNEP, 2019). In the past four decades, China has urbanised rapidly with 60.6% population living in urban areas by 2019.² While this process has been associated with increasing manufacturing power and rapid economic growth, it has brought unprecedented urban expansion and infrastructure development, resulting in significant consumption of materials and natural resources as well as carbon emissions (Feng et al., 2014). The urbanisation pathway in China is characterised by ‘high input, high consumption, and high emissions’ (Qi et al., 2020: 24). In response to global environmental and urban agendas, the Chinese government has proposed various urban policies and initiatives, such as the eco-city, low carbon city, sponge city, and National New-type Urbanisation Plan (2014-2020). The 14th Five-Year Plan (2021-2025) has highlighted the promotion of human-centred new-type urbanisation. All these agendas signify the government’s stated determination to deliver and manage urbanisation and urban development in a more environmentally sustainable and human-centred manner.

² The figure is used in China’s 14th Five-Year Plan (2021-2025).

Sustainable urbanisation has been hindered by institutional challenges in China, particularly at the local level.

Due to multiple and parallel programmes relating to low-carbon city initiatives, duplicated efforts have been made, which caused complexity and confusion (Khanna et al., 2014). In addition, the absence of explicit definitions and consistent guidelines for low carbon plans has given rise to challenges for implementation (Khanna et al., 2014). A set of institutional barriers have constrained the implementation of environmental policies in Chinese cities including the deficiency in the current environmental planning system, inadequate political and economic incentives to local implementers, insufficient public and private participation, as well as limited financial, technical, and political capacity of local implementation agencies (Kostka, 2014).

A Chinese human-centred approach to new-type urbanisation requires further elaboration

Just transitions are not only about the distribution of benefits and pressures for producers and users, but also about the process of policy formulation, decision-making, and governance. Furthermore, the interpretation must be rooted in various dimensions such as spatial equity and urban-rural equity. China's urbanisation rate is predicted to reach 80% by 2050 with Chinese cities expecting to attract additional 255 million residents (UN DESA, 2019). This creates opportunities for the country's transition to carbon neutrality if high-quality urbanisation is delivered. According to a recent report '*Seizing the Urban Opportunity*' by the Coalition for Urban Transitions,³ low-carbon investments in Chinese cities could result in economic returns of \$7.7 trillion by 2050, 15.2 million new jobs by 2030, and a reduction of 90% GHG emission from Chinese cities by 2050. However, more efforts will be required to deliver the transformation, including reforms of land management, resident registration system, urban financing, urban planning and design, environmental management, and local governance (World Bank and Development Research Centre of the State Council, the People's Republic of China, 2014).

Spatial planning could reduce energy demand and address spatial and social inequalities

While technology innovation and renewable energy are important to address climate challenges, spatial planning can play a vital role in ensuring spatial equity and making just transitions happen. At the macro level, it is essential to promote integrated spatial planning and low-carbon development. Traditionally, China's planning system is characterised by fragmented and overlapped planning administration (Wang and Shen, 2017). In 2018, the Chinese government established its new Ministry of Natural Resources to integrate planning

³ <https://urbantransitions.global/en/publication/seizing-the-urban-opportunity/seizing-chinas-urban-opportunity/>

duties of different departments, which provides an opportunity to place policy intervention in a consistent and strategic manner. While the impact from this institutional change remains unclear, a consistent strategic plan associated with clearly defined scope and targets could make a difference in bringing about policy transfer upon implementation at the lower levels, combined with implementation and evaluation frameworks.

Rapid urbanisation in China has created varied socio-spatial landscapes between different cities, which has created enormous challenges for just transitions. A city not only creates emissions within its territory, but also imposed emissions to other areas via interregional supply chains (Feng et al., 2014). Also, this process varies across different localities. For example, from the perspective of embodied energy, over 70% of CO₂ emissions for Beijing, Shanghai, and Tianjin were produced outside these cities, while approximately 48% of CO₂ emissions for Chongqing occurred outside the city (Feng et al., 2014). With differentiated embodied energy patterns, the transition strategies at the local level must be tailored to and embedded within local contexts such as local industrial structure, natural resources, socio-cultural characteristics, local governance, and capacity, as well as keeping in line with the strategic plan and guidelines at the macro level.

Spatial planning can shift individual behaviours and enable public participation

In the urban and transport scholarship, there has been good evidence showing the linkages between urban planning/design, how people live and travel, and carbon footprint (e.g., Hankey and Marshall, 2010; Lee and Lee, 2014; Li et al., 2018). In this context, a just transition is concerned with how planning exerts disproportionate impacts on different groups regarding accessibility to urban facilities, individual behaviours, and associated carbon emissions. For example, the findings from a recent ESRC-NSFC Newton Fund project ‘*Eco-urbanisation*’⁴ have confirmed different degrees of spatial mismatch between jobs and housing within the Beijing Metropolitan Region. Residential estates have expanded into the suburbs while ongoing industrial clustering in central urban districts and northern inner suburban districts has created socio-spatial varied commuting patterns, in which the highest socio-economic status (i.e., income, education, housing) have the longest commute and largest carbon footprint from transport (Zheng et al., 2019). To address carbon inequalities, spatial planning can shape the location of jobs and housing and promote quality neighbourhoods in response to residents’ needs. From a top-down perspective, planning and policy making need to comprehensively evaluate short-term and long-term spatial impacts with particular attention to environmental and social justice. From a bottom-up perspective,

⁴ <https://www.ppgis.manchester.ac.uk/eco-china/>

spatial planning could act as a catalyst to promote community participation to shape sustainable individual behaviours and co-produce solutions.

The current policy discourses in China with the 14th Five-Year Plan and an updated National Determined Contribution in the works have offered an opportunity for just transitions to low-carbon/carbon-neutral cities and urbanisation. Considering China's urbanisation characteristics, current institutional context, and potential challenges and opportunities, achieving just transitions in urban China in the context of the climate crisis calls for concerted efforts from multiple levels and different stakeholders, from macro policy design and regulations to locally adapted initiatives and individual behaviour change. To engage with various actors, especially the most vulnerable groups, the whole process requires an inclusive way to improve collaboration and co-production.

Infrastructure finance works against just transitions, but alternative financing models are possible: insights from the global South and North

Financing models have been central to the production of infrastructural inequalities

A key pinch point for achieving just transitions is the question of how infrastructure will be financed. Rethinking infrastructure financing is fundamental to urban energy transitions and to any hope of justice within and between cities—specifically between those of creditor and debtor nations. Historically, efforts to achieve just transitions through infrastructure development have fallen short. Such transitions have often been geographically uneven, with the most vulnerable segments of the population overlooked while also bearing significant economic burdens. Many cities have also experienced temporary gains that gave way as lending dried up and the costs of debt servicing steered limited resources away from the continued expansion and even maintenance of the infrastructures acquired. This is true within cities of both the North and the South as well as between the two regions more broadly. Financing models have been central to the production and reproduction of infrastructural inequalities and the environmental and economic burdens that result.

Infrastructure finance increases inequalities within and between cities

Infrastructure has long been considered a key instrument for improving social equity. After World War II, getting economies back on track, in Europe and the United States, and improving lives in low-income countries focussed largely on infrastructure development financed by debt. In these efforts, energy infrastructures were a major component.

Infrastructure, however, is rife with paradox and contradiction (Howe et al., 2016). Stemming directly from infrastructure financing models is the contradiction whereby infrastructure acts simultaneously as an instrument of social inclusion and of wealth extraction. Through debt and more recently financialization, inclusion and exclusion are produced simultaneously (Furlong, 2022). Thus, what might begin as a just transition is necessarily already engaged in economic extraction through the finance mechanism, in ways that overburden a city's most vulnerable residents. How do these processes work?

The profitability of debt is built on the extraction of wealth from low-income people

Infrastructure financing through debt or financialization requires that investments be self-financing *and* profit generating; the basic principle of debt being that one returns more than what one borrowed (Payer, 1991). In practice, these criteria have steered infrastructure investments towards particular geographies and types of infrastructure and have further entrenched economic inequality and exclusion through the creation of new extractive measures to ensure the necessary “return on investment”—i.e., debt servicing. Cities investing in infrastructure in the North and the South became overwhelmed by the cost of debt and the conditions placed on acquiring new debt by the 1970s. As Jenkins (2021) shows in the case of San Francisco, the debt model gave extraordinary levels of political power to a small group of bond creditors, and encouraged racial and income segregation as creditors sought projects that seemed to promise profitability. Despite the unequal access to infrastructure and thus livelihood possibilities, citizens—included and excluded alike—were taxed to service the associated debt. For cities in low-income countries on the receiving end of international development assistance—i.e., debt—the issues were even more pronounced. Here, not only rapid increases in interest rates—especially at the end of the 1970s—but also the heavy and uncontrollable burden of devaluation led to skyrocketing costs of debt servicing, particularly in the 1980s. In many cases, this meant that governments and utilities had to borrow to retire past debt. As new loans require new projects, burdensome new infrastructure investments were sometimes created where consumption might have been improved with lower-cost electricity conservation and distribution measures as opposed to new dams (Furlong, 2021; Maldonado, 1991). The burden of such debts has been born chiefly by low-income communities through increased taxes and user fees, cuts to the social safety-net, and increased unemployment (Lazzarato, 2011) as well as increased violence for women living in low-income neighbourhoods on the periphery of cities in Latin America (Cavallero & Gago, 2019).

Finance capital has created new ways of 'making the poor pay for the rich'

In recent years, much attention has been paid to financialization as a method to raise money for much needed infrastructure investments, including green urban infrastructure transitions in the UK. This poses its own challenges. On the one hand, the financial sector is not that interested in such investments forcing governments to woo finance capital with increasingly beneficial and low-risk conditions (Clark, 2000; Langley, 2018). On the other hand, the model favours big infrastructure projects that may have more appeal for investors than for meeting user needs, whereby returns to investors are assured through increasing user fees (Allen and Pryke, 2013; Loftus and March, 2016). In cities in the global South as well as low-income cities in the deindustrializing US, financialization has meant something different. Generally unable to attract finance capital to fund local infrastructure, financialization has generally taken another form: the financialization of public debt. Here, mechanisms like interest-rate swaps to hedge on the cost of debt servicing have had disastrous consequences for infrastructure financing and access to the associated services in cities like Detroit (Ponder & Omstedt, 2019), while dollar-swaps have compelled governments and utilities in Southern cities to park much needed funds for infrastructure and social programs in dollar investments to hedge against the effects of devaluation (Cruz & Walters, 2008). For Cho (2014), the result is to continue “making the poor pay for the rich”. Indeed, between 1980 and 2015, low-income countries transferred \$16.3 trillion of wealth to high-income countries, of which \$4.2 trillion—more than a quarter— was for interest on debt (Kar et al., 2015).

Infrastructure finance will increase inequalities as long as profitability is based on economic return on investment

Whether through debt or financialization, infrastructure financing has engendered increased inequality within and between cities. How can this be remedied? This is not an easy question, particularly politically, as it goes against over 70 years of what Lienau (2015) refers to as the “statist” norm regarding sovereign debt. That is, since the mid-20th century, international lending has significantly favoured creditors over borrowers, especially between North and South. Latin America is a case in point, but it is certainly not alone. Whereas until the post-World War II period, it was not uncommon for borrowing countries to default on debts, by the mid-20th century the relationships between creditors had shifted considerably enabling them to form a unified force to ensure debt servicing irrespective of the social cost (Lienau, 2015; Roos, 2019). For Lienau (2015), the solution is to undo this “statist” norm, by eschewing the repayment of “odious debt” acquired illegitimately by undemocratic regimes or for corrupt purposes. This, however, remains a limited solution. It leaves the key extractive elements of the debt relation intact. Urban infrastructure debt becomes untenable

through the debt relation itself—not through specific instances of illegitimate debt acquisition, but particularly through the effects of devaluation and shifting interest rates (Furlong, 2020). For Rudnycky (2019), similar problems exist with calls for debt forgiveness, i.e., they fail to question the basic ways that debt functions.

Alternative financing models that value socially useful investment already exist

Infrastructure financing for just transitions must undo the very basis of the debt relation. Following Biewener (2001), we must rethink what constitutes a productive investment. Here, use-value would supersede exchange-value in determining productivity or “return on investment”. Rather than monetary profit, distributed benefits like improved housing, public health, air quality, and decarbonization would drive investment decisions. This means rethinking lending, including who is included in decision-making, what types of projects are to be financed, and the very idea of interest (Biewener, 2001). This is not simply utopic; examples already exist. For, Rudnycky (2019) Islamic banking models that focus on equity—as opposed to interest-based lending present such an option. Here, lenders share in either the profits or the losses of a venture but are not guaranteed a return on investment. In practice, Islamic banks struggle to apply these norms given the dominance of traditional financial networks and infrastructures (Rudnycky, 2019). Nonetheless, they present a philosophically distinct alternative to contemporary practices. Other options include collective financing mechanisms such as co-operative insurance, credit unions, and community-based lending. In this regard, low-interest loans to entire communities or neighbourhoods to fund local infrastructure have proven effective in both the US and Colombia (Castree & Christophers, 2015; Furlong, 2013). Another example that has received some attention is the Dutch public bank, NWB Bank (see McDonald et al., 2021). This bank issues ‘sustainability bonds’ as a means of raising international capital to provide low-interest loans to public entities such that they might fund projects focussed on social and environmental investment (and return) such as social housing, flood control and climate change mitigation.

Small infrastructure projects can experiment with financing models that prioritise use values over profit

On a practical level, rethinking infrastructure financing for just transitions means reconsidering the types of projects to be funded. While current financing models favours large, complex projects that often suffer from cost overruns, large debt burdens and high user fees aimed at full cost recovery, favouring smaller-scale projects is a key step towards just transitions as they are more able to meet the immediate needs of vulnerable communities and enable a rethinking of the financing models in turn. As large investors are

typically not interested in such projects, they almost automatically engender new ways of thinking about economic and social relations. Indeed, putting use-value first shrinks the exchange-value that can be extracted in return. This has the potential of releasing cities and their most vulnerable residents from the unpredictable yoke of debt-servicing while improving infrastructure access and outcomes for just energy transitions today and into the future.

Recommendations

- For infrastructure financing, ‘use value’ rather than exchange value should define the “return” on investment.
- Thus, social benefits rather than simple monetary gain would determine a “productive” investment.
- Investors share in the benefits and losses from a project but are not guaranteed a monetary return.
- Targets or beneficiaries of a project share in decisions about its financing.
- Low or no-interest loans are favored.
- Small scale infrastructures solutions are favored over large-scale projects, thus reducing the costs and risks and increasing the potential for alternative financing to work.

Recommendations

Start with injustice

Too often, discussion of just transitions starts with technology choice and asks how the potential harms might be mitigated for particular social groups. Asking which technologies can power a just city makes little sense without asking what energy is for and what kind of low carbon society people want (Lohmann et al. 2013). A shared understanding of justice or the public good is not a prerequisite. By starting with experiences of injustices – in disconnection, displacement and dispossession; in toxic air, water and land; in low pay and long hours; in cold homes and hot homes; in disregard for past and future generations – a more substantive discussion of transitions may be fostered on how society should be organised.

Identify energy alternatives in their ownership and control, not in the technologies themselves.

There is no shortage of alternative visions for low carbon energy and there is no singular process of energy transition. Energy interventions are the outcome of ‘complex and diverse processes of resistance, negotiation and contestation, often with unintended consequences for both nature and society’ (Cline-Cole and Maconachie, 2016: 165). Identifying who has ownership and control can assist in identifying what is proposed to change: from the substitution of one fuel for another to systemic changes in the political and economic power of citizens, governments and businesses.

Think outside the city

Policy frameworks are required to address just urban transition within the context of whole-systems energy justice (Jenkins et al., 2016), whereby social and environmental inequalities in energy production, transport and consumption are on an equal footing. This means not focusing solely on urban energy systems and consumption practices, but rather understanding the role of regions, hinterlands, and global connections in producing inequalities and injustice. Policies and practices needn’t address the entire energy systems at once but can seek strategic interventions in the process of urbanisation to remake cities in more sustainable and just ways.

Engage with labour and class relations

The rhetoric of just transitions is particularly prominent where fossil fuel jobs and communities are threatened. Perhaps understandably, a ‘minimalist’ approach to just

transitions seeks the creation of green jobs, re-training, financial support for affected workers, and union representation in decision-making (Goddard and Farrelly 2018). Yet, how different class interests form around particular ways of organising and controlling energy will affect the extent to which new technologies reproduce the inequalities of old. A more comprehensive project to understand the value of labour and class relations in energy and urban restructuring offers the possibility of changing the balance of power in society.

Acknowledge and confront historical injustices of global energy systems

There are important distinctions in how energy production and consumption are organised in the global north and south, requiring context-specific policies. However, the binary of north and south is unhelpful where it obscures relationships between them. Energy inequalities today reflect how racial capitalism, colonialism and patriarchal gender relations have shaped energy systems that benefit some by exploiting others. These power relations continue to shape who decides which aspects of energy systems should change to address the climate challenge. Social difference is equally important in shaping the adaptive capacity of actors and governance at different scales.

Evaluate competing ideas of just transition, accounting for the power of different voices

Ideas of just transition have directly shaped policy making in many countries, regions and international forums. Like 'sustainable development', the term is flexible enough to encompass divergent ideas, supported by actors with unequal power to pursue their interests. In the name of justice, oil companies may argue that new fossil fuel exploration is required to protect workers and low-income consumers; governments may prioritise urban populations over rural ones, or vice versa. Whose ideas of justice and transition prevail is instrumental in shaping what is open to change through managed transitions, and what is not.

Politicise participation to harness divergent ideas and actions

Calls for more inclusive, bottom-up, participatory, dialogical decision-making are unlikely to produce political alternatives if the terms of inclusion discount perspectives that do not conform to a dominant, often technology-centric understanding of transition. More relational perspectives on low carbon urban interventions can be integrated into policy making to encompass the diversity of actors both inside and outside the policy sphere and the multiple ways that they shape, challenge, and contest transition pathways (Bouzarovski and Haarstad 2019).

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