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Just Transition: A whole-systems approach to decarbonisation

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ABSTRACT

Transition to a post-carbon economy implies changes that are both far-reaching and unprecedented. The notion that a decarbonization transition must encompass multiple forms of justice is gaining ground. In response, the concept of Just Transition has become ever more popular – and confusion about its meaning ever greater. We argue in this paper that the term Just Transition needs a rigorous updating to develop its full conceptual power for the analysis and evaluation of the rapid and extensive energy transitions already underway. After reviewing the different uses of Just Transition in practice and scholarship, we propose that the term be used as an analytical concept for an ongoing process of transition. The Just Transition concept can provide an integrated, whole-system perspective on justice (procedural, distributive, recognition, and restorative) that can help in identifying systemic solutions to address environmental and socio-economic concerns. This would differ from reductionist approaches that derive from legacy silo-sectoral or technologically driven approaches; these too often overlook negative side-effects and wider justice implications of reorganizing economic practice. An examination of COVID-19 pandemic responses illustrates our operationalization of the Just Transition concept, highlighting the importance of designing whole-system policies that are equitable, as well as the pitfalls of pursuing a narrow sectoral approach. Taking seriously the implications of complex systems with hard-to-predict effects also has concrete implications for policy interventions at all levels of governance. In particular, we highlight the importance of attending to multiple social inequalities for ensuring the resilience of whole-system decarbonization in the face of instability, unpredictability, and unprecedented change.

Key policy insights:

- The transition to net-zero will be neither sustainable nor credible if it creates or worsens social inequalities; a backlash is likely if the transition is not perceived to be just.
- Pathways forward may only emerge through observation, experimentation, and experience.
- A range of policy tools exist to address Just Transition concerns. These include addressing social and environmental aspects of economic policy; making sure that interventions are adapted to local contexts; building democratic engagement platforms; and open and transparent communication.
- Job creation does not guarantee just outcomes, as justice goes beyond employment conditions.

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Introduction

As commitment to addressing climate change gains momentum around the globe, it has become apparent that a transition to a zero, or a net-negative, carbon world implies changes that are both far-reaching and unprecedented, affecting many aspects of life on earth for humans and all other species (IPCC, 2018). The decarbonization of key sectors – such as transport or energy – will have important and direct consequences for millions of people, and is linked to many other policy spheres, including health, industrial policy, social welfare, housing and so on. These links and consequences mean that decarbonization agendas cannot be limited to a single policy arena or technical area.

That a Just Transition (JT) must encompass multiple forms of justice is not a new assertion. It is evident in a groundswell of political, financial, commercial, and industrial concern for the broader implications of decarbonization and its potentially unequal effects across different geographical scales (Terry, 2009; Green and Gambhir, 2020; Kaur Paul and Gebrial, 2021). The transition to a green economy is frequently framed in reductionist or managerial terms, adopting a language of competition, efficiency, or technological innovation, that is, in the terms of the same economic system that has been complicit in (re-)producing entrenched inequalities (see Fletcher et al., 2019; Low and Boettcher, 2020). Grand narratives of ecological modernization, sustainable development, and green growth have been challenged as lacking the requisite logic and policies to reduce emissions and also address patterns of inequality (see Eckersley, 2020). Literature on global justice also highlights how decarbonization without structural change risks ignoring or, worse, exacerbating existing social inequalities and injustices related to energy and climate vulnerabilities at the local or global scales (e.g. Sareen and Haarstad 2018).

JT scholars argue that the decarbonization policy imperative presents an opportunity to decisively steer societies towards an ecologically and socially more inclusive path, reflecting 'a decision to live in a different type of society, not simply a low-carbon version of the current one' (Healy & Barry, 2017, p. 453). To do so, however, requires a move away from the narrative of a 'green' or 'low-carbon' economy as our sole decarbonization objective. Calls for a JT capture the need to broaden climate ambitions beyond technological adjustment and allocate the costs and benefits of ambitious climate action in a fair and equitable manner (Heffron and McCauley, 2018). This has primarily been framed in terms of addressing employment concerns within decarbonization policies, as reflected in recent discussions under the United Nations Framework Convention on Climate Change (UNFCCC) and the 2015 Paris Agreement. While this is an important issue, a narrow 'jobs versus climate' debate overlooks how many workers and trade unions have adopted pro-environmental positions (Snell and Fairbrother, 2010; Vachon and Brecher, 2016) instead of accepting prescribed positions of 'winners' and' losers'. On the other hand, presenting decarbonization as a 'win-win' project de-historicises the causes of the climate crisis and overlooks the important intersection with patterns of historical responsibility and resource extractivism (see Muttit and Kartha, 2020; Newell et al., 2021). In this context, we focus this paper on decarbonization as a demonstration of the value of a clarified JT whole-systems approach, as we will outline below.

Given the ongoing need to recognize the uneven distribution of costs and benefits of climate and energy policies, and the proliferation of approaches to the notion of a Just Transition, our aim in this paper is twofold. First, we outline the need for some level of agreement over the definition of JT, with a brief review of the development of the term, based on a critical discussion of existing literature that pools the different disciplinary approaches of the authors. We identify different usages of the term and engage with concerns that the concept is becoming 'overstretched' and that its 'hollowing-out' risks turning it into a slogan rather than a realisable goal (Galgóczi, 2019, p. 8). We then present a new conceptualization of JT, drawing upon a whole-systems approach, which recognizes that there is not one transition but rather multiple, interdependent transition processes that rarely follow linear trajectories. We outline four stylised dimensions of transition justice – recognitional, distributive, procedural, and restorative – that offer an alternative to the more reductionist approaches that are typically in play today. Second, having set out our conceptualization of JT, we use the empirical example of the COVID-19 pandemic response to illustrate the potential benefits of a whole-systems JT approach to decarbonization (with our primary focus in this paper on mitigation rather than adaptation). The concluding section of this paper brings the key contributions together, while setting out further possible research.

Defining a 'Just transition'? A critical literature review

International endorsement of Just Transition

The JT concept has a long political history shaped by the efforts of labour unions to reconcile emerging environmental imperatives with achieving justice for workers (Ciplet and Harrison, 2020), initially resulting in the rise of labour environmentalism throughout the 1970s (Silverman, 2004). Labour unions had found themselves supporting polluting industries to defend workers' employment, pushing them into a polarizing narrative that pitted environment against jobs (Newell and Mulvaney, 2013; Healy and Barry, 2017; Jenkins et al. 2020). Efforts to overcome this oppositional framing, spearheaded by the International Trade Union Confederation, the International Labour Organization (ILO), and the UN Environment Programme (UNEP, 2008), reframed the JT discourse around issues of procedural fairness, promoting dialogue and engagement with workers and communities beyond the narrow questions of green jobs or pension schemes (Stevis and Felli, 2015; Burrows, 2001; Goddard and Farrelly, 2018; Pollin and Callaci, 2016; Evans and Phelan, 2016; Galgóczi, 2019).

The JT concept has since been endorsed by diverse national and international trade union bodies, including the European Trade Union Confederation (ETUC, 2018) (Niemec, 2015) and the ILO (ILO, 2015). The Paris Agreement is the first international treaty to refer to the 'imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities' alongside references to human rights, gender equality, intergenerational equity, and procedural justice (UNFCCC, 2016a, p. 2). The JT concept now informs the UN Framework Convention on Climate Change (UNFCCC) process, with decision 11/CP.21 adopted at COP 21 in 2015 adopting 'Just transition of the workforce, and the creation of decent work and quality jobs' as a key area within one of its work programmes (UNFCCC, 2016b).

These advances in international policy are important, but to be effective, JT should not be seen as an 'add-on' to climate policies but needs to be embedded as an operational priority to be implemented effectively in the signatory countries (Galgóczi, 2018). A significant advance can be found in the European Green Deal, which for the first time lays out an integrated, long-term plan for European decarbonization policy, with a EUR100 billion Just Transition Mechanism to support especially vulnerable sectors and regions. This mechanism responds to the concerns of countries such as Poland, whose economy remains heavily fossil-fuel dependent. However, despite its promise, there is a clear risk that the opportunity to enhance justice could be wasted if its operationalization focuses only on labour impacts, and only on fossil fuel industry impacts, rather than broadening energy considerations to include renewables deployment, for instance, and transition considerations to other sectors, such as agriculture.

There is evidence of concrete embedding of JT policy within domestic political systems today. Scotland, for example, established an independent Just Transition Commission in 2018 to advise government on how to achieve a carbon-neutral economy, looking at 'how to maximize opportunities for decarbonization, in terms of fair work and tackling inequalities, while delivering a sustainable and inclusive labour market' (JTC, 2019). However, and in a similar vein to the issues highlighted with the EU's Mechanism above, despite the mention of generic 'community' and 'inequality', the JT concept in practice remains primarily informed by an economic vision of energy systems which privileges labour market transitions. More optimistically, and despite a predominant focus on jobs, the Scottish Just Transition Commission's final report presented responses to energy and industrial change and went a step beyond to highlight opportunities for land use and agriculture change, to make this transition 'just' as well (JTC, 2021). In South Africa, President Cyril Ramaphosa established a Presidential Climate Commission with the stated aim 'to oversee and facilitate a just and equitable transition towards a low-emissions and climate-resilient economy'.[1] This was shortly followed by South African participation in an international JT partnership with France, Germany, USA, UK, and EU, although this is primarily focused on decarbonizing the electricity system and on global justice in relation to improving South Africa's Nationally Determined Contribution under the Paris Agreement.[2] It also relies heavily on private investment in the search for 'green jobs'.[3]

State-of-the-art in Just Transition scholarship

In parallel to the predominantly economic and energy system debates in political and policy domains, the concept of JT has also been widely discussed in the research literature. This includes place-based case

studies (e.g. Evans and Phelan, 2016; Pollin and Callaci, 2016; Abraham, 2017); analyses of specific sectors and industries, such as the coal or automobile sectors (Oei et al., 2020; Galgóczi, 2019); conceptual assessments of its origin (Silverman, 2004); what JT can learn from environmental justice movements (Farrell, 2012); and recommendations for implementing JT through policy action (Jenkins, 2019). JT scholarship both challenges prevailing neoliberal discourses surrounding decarbonization programmes, as well as proposes alternatives. The question remains, though: how can the term's full conceptual power be developed for the analysis, normative evaluation, and enactment of contemporary, rapid, and far-reaching energy transitions?

One of the most explicit efforts to reconceptualise JT beyond its labour-union origins comes from McCauley and Heffron (2018, p. 76-77), who adopt an expansive definition of JT encompassing climate, environmental, and energy justice perspectives with a view to achieve 'a just, holistic societal transition.' These authors are keen to liberate JT from 'its original strategic purpose' (McCauley and Heffron, 2018, p.1). A significant body of research now defines JT along these lines, aiming to transcend a narrow concern for economic inequality and labour market impacts by placing them in historical context and broadening their theorization to elevate societal justice as the core to achieving a sustainable energy transition. There are some authors who continue to defend a functionalist concern for fossil economy transitions, such as García-García et al. (2020, p. 2) who argue that 'a review of just energy transitions must focus on labour and income'. Others call for a re-politicisation of the concept, given the dangers of it being hollowed out (Jenkins et al., 2020).

Such disagreement over what to include within the conceptual boundaries of JT – between a focus on economic inequality and labour markets versus a more expansive focus on social justice – may lie more at the level of strategic practice than with the normative goals underpinning both definitions, offering the potential for synthesis. This may explain why conceptual tensions can be found even within the same publication. For example, in their report 'Pursuing Clean Energy Equitably', Newell et al. (2011) outlined the distributional, recognition and procedural consequences of energy impacts and decision-making, issues that have since become established in energy justice scholarship (e.g. Jenkins et al., 2016). Nonetheless, their JT definition focuses entirely on taking 'appropriate measures to protect jobs in vulnerable industries' and ensuring 'that new jobs created … are 'decent' jobs' (ibid., p. 55).

A framework for a whole-systems approach to the Just Transition

To overcome some of these challenges, we make the case for a broader, 'whole-systems' (Jenkins et al., 2014) JT conceptualization that implicates various justice concerns, including those straddling the broader domain of socially inclusive decarbonization. Energy justice scholarship has previously proposed several 'types' of (in)justice which can be usefully employed in this context to diversify otherwise narrowed conceptualisations – the most frequently recognized are listed below (see Newell et al., 2011; Fuller & McCauley, 2016; Lewis and Hernández, 2019; Jenkins et al., 2021).

- *Procedural justice:* Affected parties are meaningfully and continually consulted;
- *Distributive justice:* Sharing costs and benefits of the transition fairly and equitably;
- *Recognitional justice*: Recognizing that not all members of society are equally valued in current socio-cultural, economic, and political arrangements, and that climate change and transitional policies threaten to exacerbate existing inequalities along gender, class, and ethnic/racial lines; and
- *Restorative justice*: Redressing past harm, e.g. compensation, or reducing the likelihood of future harm through, for example, implementing transition frameworks for workers from polluting industries or compensating low-lying island states.

Integrating all of these dimensions into a whole-systems approach, we aim to take the concept of JT beyond employment and fossil fuel considerations to include the balance of costs and benefits between local and global effects, and between employment and business management; the distribution of risks; the interrelations between sectors and regions; the diversity of energy vulnerabilities; and the process and governance questions that accompany the drive towards whole-system decarbonization. Ours is a holistic approach to the climate crisis, and specifically the energy transition, as we explain below.

In the context of JT, a whole-systems perspective focuses attention on the underlying causes of injustice that arise out of the interactions between and within socio-technical systems. Transitions, seen through a whole-systems lens, are co-evolutionary, dynamic, and non-linear processes that entail distinct but interdependent developments unfolding across different functional and scalar systems (Köhler et al., 2019). A whole-systems approach can therefore help us make sense of the diversity of socio-economic challenges posed by decarbonization and provide coherence to the varied interpretations of the JT concept. In this section, we clarify how a whole-systems approach offers vital lessons for policy, offering a conceptual framework that highlights the power of contextual learning and the need to consider a plurality of perspectives.

Reductionist perspectives on the Just Transition

Why have the wider social consequences of decarbonizing the economy been relegated, in many cases, to an afterthought? Laird (2013) proposes that this tendency results from narrow problem frames that prioritize technological interventions, with the energy transition seen as a temporary state of change following a predefined pathway towards a static endpoint. On a deeper level, the neglect of social variables stems from a reductionism still deeply ingrained in academic and policy analysis, which allows natural, technical, and human (i.e. social, economic, political, and cultural) systems and their constituent parts to be largely understood in isolation from each other. This reductionist approach may allow challenges to be divided into constituent problems and solutions with apparently linear causalities that appear more manageable, but reductionist logics and siloed approaches that overlook complex and uneven socio-economic and socio-ecological impacts eventually hamper the effectiveness of policies associated with energy transitions.

Many paradigms of climate policy – such as sustainable development, ecological modernization, and green growth – have long been accused of incorporating such reductionist logics, in turn sustaining pro-growth narratives (Lélé, 1991; Ferguson, 2015). As Morena et al. (2018) argue, such conventional approaches towards JT – those that are oriented to the 'status quo' or 'managerial reform' – seek to preserve existing power relations. They address a narrow range of adverse impacts, such as job losses, affecting a delimited number of individuals, while eschewing efforts to promote deeper structural or systemic change. Mainstream transition policies also remain steeped in techno-political narratives of innovation and market-based solutions, which are often 'curiously devoid of questions of social power and distribution' (Newell et al., 2021, p.903). The very notion and frame of 'transition' arguably implies a bounded problem-solving process that promises minimal disruption, notwithstanding the role of disruption of entrenched systems in catalysing such change (Eckersley, 2020).

Although references to justice and fairness now abound in mainstream discussions on the low-carbon transition, a lack of adequate attention to the complexity and intersecting nature of social inequalities often results in policies that are have exclusionary effects. Incentive-based programmes for energy retrofits, electric cars, or the installation of photovoltaic panels may disproportionately benefit high-income households (Carrosio and De Vidovich, 2021). Downstream participation – voting, consultation, and carefully constrained stakeholder engagement – may create social buy-in but rarely enable transformative change in understanding or practice, nor meaningful dialogue or contestation, since the terms and agenda of such participation is already decided by those in authority (Schwanen, 2021). Further, the persistence of ecological modernization rationalities threatens to depoliticize the transition through techno-rationalist discourses that depict the green economy as an orchestrated, consensus-based project (Bailey and Caprotti, 2014). Such reductionist approaches reduce complexity and treat justice concerns largely as 'side effects' of techno-economic adjustments. The problems that arise out of these interactions are not static but evolving, with hard-to-predict effects. These illuminate how multiple social inequalities cannot simply be addressed separately but, instead, influence, alter, and partially constitute each other (Walby, 2007, p. 451). It is these interactions and overlapping effects that cannot be addressed by siloed, sectoral approaches.

Whole-systems perspectives on the Just Transition

In contrast to reductionist approaches, a whole-systems perspective treats the JT as a complex challenge that can only be understood in terms of the dynamic relationships and interconnections between different systems and system elements. At the most basic level, systems are constituted by a set of parts (e.g. people, organizations, equipment) in constant interaction with each other and their environment (e.g. energy infrastructures

and political-economic structures). A whole-systems perspective enables us to appreciate both the 'overlapping political, economic, technological and cultural forces' that keep energy systems locked into high carbon technologies (Bernstein and Hoffmann, 2019, p. 919) as well as the non-linear, uneven, and mutually reinforcing ripple effects of interventions aimed at disrupting carbon lock-in. It also recognizes synergies and trade-offs across issues and sectors, focusing attention on potential contradictions and unintended consequences. For example, a rapid shift to renewable energy systems will require increased extraction of minerals and metals, producing new social and ecological injustices (Bainton et al., 2021). These challenges are spatially and temporally differentiated, that is, they manifest very differently across geographies, generations, and governance levels. There is a poor record of international development policies, interventions, and institutions achieving global structural change, due in part to a lack of attention to context and relational contingencies (Mosse, 2005). Even implementation of the Sustainable Development Goals (SDGs), which explicitly address interactions between targets and call for holistic governance, has largely remained sectoral and siloed in practice (Scharlemann et al., 2020).

As the example of the SDGs highlights, whole-systems thinking means working across governance levels. This does not imply that reductionist tools – specialization, compartmentalization of targets, administrative siloes – do not have a place in the JT. However, a whole-systems perspective reminds us that policies must be responsive to lived experience, local context, and shifting realities; that targets must be purposefully aligned; and that different policy specialist areas must speak to each other. In this context, commitment to participation, inclusion, and a diversity of perspectives is not a formality but an important mechanism for situated and collaborative knowledge production and for monitoring system feedback.

Finally, a whole-systems approach to the JT also has an explicitly transformational agenda. In a helpful intervention, Linnér and Wibeck (2019, p. 6) distinguish between transitions, 'rooted in the notion of a passage – 'going across' from one state to another', and transformation referring to 'change in form or shape.' While there may be different perspectives on the destination, transformational systems thinking challenges us as we 'go across' to maintain focus on the fundamental, first order problems that require resolution. These may include disrupting the drivers of entrenched inequalities. Injustice is then understood not simply as a 'side effect' of transitional policies but as symptomatic of underlying structural inequalities that remain unaddressed. A transformative approach further recognizes that the JT is not a passage to a predefined future, but a set of continuously evolving processes that must be responsive to diverse forms of vulnerabilities and the relational practices that condition them.

Implications for the different dimensions of justice

We end this section by discussing the implications of a whole-systems approach for the four justice dimensions of the transition in comparison with reductionist approaches. This comparison is necessarily stylised. In practice, there is a continuum of approaches to the JT that vary in how systemic they are in outlook and how transformational in intent (see Stevis et al., 2019). Many of these approaches are not mutually exclusive (see Wang and Lo, 2021). In the COVID-19 example and analysis that follows, we also highlight how the division between recognitional, distributive, procedural, and restorative dimensions of justice, while analytically useful, is not always so clear-cut in practice.

Recognitional justice: Recognizing the importance of contextual and relational drivers of (in)justice is the starting point of a whole-systems approach. Sensitivity to the lived experiences of different social groups in diverse spaces and places makes apparent the multiple articulations of sustainability transitions and suggests there is no single, linear roadmap towards decarbonization. Whereas reductionist approaches to the JT focus on managing the surface pressures of decarbonization processes, whole-systems perspectives are based on the recognition that inequalities are conditioned by inter-scalar, socio-economic interactions that are often deeply embedded in global structures, such as value chains, and tend to systematically disadvantage particular groups (Martiskainen et al., 2021). Whole-systems approaches emphasize that these groups often face multiple, interrelated vulnerabilities and aim to reveal under-recognized sections of society, including those who are misrecognized, their views often distorted in demeaning ways (Heffron and McCauley, 2017). For example, there is abundant evidence of unequal access to energy services among deprived communities (e.g. Galvin, 2020), entailing vulnerability to additional risks or natural disasters (e.g. Cheek, 2020). Awareness of uneven

vulnerabilities also helps us appreciate how some may find it more difficult than others to decarbonize their own practices. For instance, 'jeepney' drivers in the Philippines – among the poorest Filipinos – tend to oppose a shift to electric vehicle models, as they fear the vehicles will be unaffordable for most drivers, despite financial loan schemes planned by the government (Bouyé et al., 2019). A whole-systems approach recognizes that not all regions, countries, and communities are starting off from the same level (or have access to similar resources).

Distributive justice: Reductionist perspectives on the JT address only a narrow range of implications, such as the need to boost green employment opportunities. A whole-systems perspective considers the full range of distributional consequences of climate change and decarbonization processes, from concerns over quality and equality of employment in sustainable sectors to unequal access to affordable renewable energy services and other benefits of transition. Crucially, distributive justice is not just seen as a matter of 'delivering' benevolent services to deprived communities from remote authorities. Issues of control and ownership must also be reconsidered, assessing how communities might benefit from these projects fairly and equitably, not merely how they can be appeased financially. Indeed, citizens can guide the socially just allocation of resources, for example, by co-creating new patterns of energy production and consumption. Communities in Kenya who have faced decades of neglect from state-led electrification schemes have gained empowerment and autonomy over their energy future by setting up community groups to own, manage, and operate solar microgrid installations (Kiplagat et al., 2011). These schemes have furthered national efforts to reduce carbon emissions whilst alleviating other problems faced by vulnerable community members, for example through the use of solar energy pumps to improve access to clean water.

Procedural justice: Engaging a plurality of perspectives – in particular, those of marginalized communities and those most affected by policy decisions but often most silenced – is not simply a moral choice but is key to realizing decarbonization objectives that are adapted to local context and enjoy broad societal buy-in. The extent of changes required to address climate change means that a transition by government dictate is unlikely to be successful (Lehtonen & Kern, 2011). This is recognized even by reductionist approaches to the JT, although they tend to allow for downstream participation and public engagement as a means to avoid backlash from key stakeholders and promote changes to behaviour, such as what is needed to deliver an uptake of renewable energy technologies. As decades of planning theory have argued, local and national priorities need to be bridged to ensure that all affected parties are meaningfully and continually consulted and engaged in decision-making and their insights integrated into policies and strategies. Far from simplifying matters though, participatory approaches add to the multi-dimensionality of the policy and action challenge, creating a highly complex arena that is difficult to manage (see Boholm, 2013). From a whole-systems perspective, participation and inclusion are not policy tools serving to engineer consensus but a governance principle that must allow room for genuine discourse and contestation. That said, this ambition must contend with a range of challenges, such as the fact that those most affected by climate change and its policy implications – including young people, future generations, and disempowered communities– are frequently excluded or side-lined in global discourses and mainstream policymaking processes. Difficult questions also arise when considering how procedural justice principles can be applied in non-democratic contexts and how they can be squared with the need for extraordinarily rapid structural change (Wang and Lo, 2021).

Restorative justice: This is an often-neglected dimension in transitional frameworks (McCauley and Heffron, 2018). Reductionist approaches address a narrow range of clearly defined losses incurred by transitional policies, mostly centred on jobs, but rarely engage comprehensively with more complex restorative needs. This is partly because these needs challenge the comfortable 'win-win' narrative of reductionist ecological modernization approaches, also putting the spotlight on the historic legacies that underpin existing power relationships and resulting inequalities (including broad contextual injustices that come under the umbrella of 'colonialism'). In short, a whole-systems perspective moves the focus from narrow financial compensation schemes towards broader understandings of redistribution and repair. This means first recognizing the various dimensions of loss (across different viewpoints and epistemologies) incurred by climate change and transitional policies, including, for instance, loss of community, culture, landscape, or sense of place. As with the other dimensions of justice, however, taking restorative action is far from straightforward, especially on the global level, where it presents thorny questions of historical responsibility and unequal capacity. Various

dilemmas present themselves. Some countries see a path to development through the use of abundant fossil fuel resources despite global pressure to mitigate climate change by abandoning fossil fuels (Gellert and Ciccantell, 2020; Ciccantell, 2021). Armstrong (2020) argues that less wealthy countries have a right to develop (as a form of global justice), making it necessary to support and compensate them as fossil fuel extraction is brought into line with decarbonization targets.

In summary, none of these dimensions of justice offers a simple or easy solution, but they do allow us to appreciate the interconnected causes and effects that must be addressed in any transition to decarbonization. Each contributes to a whole-system understanding, and each throws up diverse difficulties to be considered. In the next section, we use a comparison with emerging lessons from the COVID-19 pandemic to reflect on the relevance and practicality of a whole-system JT approach.

Illustrative example and discussion: green recovery in a time of COVID-19

The COVID-19 pandemic, while distinct from the climate crisis, presents policymakers worldwide with a critical emergency that demands simultaneous global, national, and local responses while affecting economic sectors across the board and putting the most vulnerable in society at the worst disadvantage. The COVID-19 pandemic therefore requires a whole-systems approach. Diverse interventions have been applied in relatively short time frames; in 2020, national recommendations and lockdowns were implemented within weeks of the diagnosis of the first case of COVID-19. As a result, measures introduced to date overlook important intersections between the virus and wider patterns of exclusion and inequality (Maestripieri, 2021). The short timeframe over which events and responses have unfolded, enabled a fast and direct evaluation of narrow, siloed responses and the harmful ripple effects these have had on varying sections of society. Such assessments have increased calls for holistic, multi-dimensional policy tools that address economic or environmental problems together, requiring new, diverse and whole-systems solutions.

There is a growing recognition that COVID-19 and climate change are 'converging crises' that should be addressed simultaneously (Lancet Editorial, 2021; Corfee-Morlot et al., 2021) – an appeal that also enjoys a substantial degree of popular support in many countries (Ipsos, 2020). In some ways, the global shutdown from roughly February to April 2020 appeared to represent a clean slate – with communities coming closer together and travel restrictions shortening daily journeys, for example, offering significant short-term reductions in greenhouse gas (GHG) emissions. City leaders around the world pledged renewed investment in cycling and walking infrastructure – creating larger pedestrian-only areas and new urban spaces, for example. Climate change mitigation became a key part of a 'building back better', although the longevity and significance of these interventions have been questioned (and see Beyer and Vandermosten, 2021)

Overall, the pandemic, responses to it, and the positive and negative outcomes that arise from these generate lessons (so far) from the COVID-19 pandemic for discussions of – and research on – JT. In the following, we discuss four such lessons, which we argue also reveal blind spots in existing JT debates:

1. The need for interventions to acknowledge context and global-local links;
2. Interventions aimed at job creation will not necessarily deliver 'just' outcomes;
3. Top-down imposition of predetermined strategies is likely to invite unintended feedback effects; and
4. Complex problems call for a diversity of perspectives, mechanisms, and actors.

1. Interventions must acknowledge context and global-local interlinkages.

COVID-19 starkly demonstrates that unmanaged global systemic disruptions are inscribed by and reinforce socio-economic and health inequalities at the local level. Significant disparities in infection rates, risks, and morbidity outcomes are evident in low- and medium-income countries with notoriously high levels of socio-economic inequality, such as Brazil (Caldwell and de Araújo, 2020) or South Africa (Steinhauser and Dadi Patel, 2020). But they are also evident in high-income countries such as the UK, where ethnic minority groups and those living in economically deprived areas are at significantly higher risk of dying from the virus (PHE, 2020; Palmer, 2020). The crisis is also cross-generational, with increasing concerns over the impacts that the pandemic lockdown and the resulting economic slowdown may have on children's development and mental health, for

example. In the UK, an ex-government advisor warned that the country faces a 'period of destitution', which might leave parents unable to put shoes on their children's feet (BBC, 2020). In addition, some occupations are particularly linked to increased risk of infection. For example, outbreaks linked to coal mines in Poland – where workers are subject to conditions that preclude social distancing and often suffer from underlying work-related health conditions – accounted for almost a fifth of all recorded COVID-19 cases in the country as of mid-summer 2020 (Gera, 2020). Insufficient and delayed recognition of this injustice reflects failures in procedure that did not take all voices into account.

COVID-19 also highlights the interdependencies of vital global infrastructures for food, water, and energy service provision and the asymmetric consequences of their dysfunction. A lack of energy security is likely to increase the death toll from the virus in low-income countries, where health care services often lack reliable access to power (Castán Broto and Kirshner, 2020). The economic disruption caused by COVID-19 could slow progress on access to electricity in these countries even further, reversing progress made on modernizing and decarbonizing local energy sectors and further exacerbating distributional injustices (Gebreslassie, 2020). Moreover, the pandemic has highlighted the interdependencies of infrastructure provision – for energy and electrification in particular – with health maintenance and outcomes, while exacerbating wider social and economic crises.[4]

Hence, policies seeking to address the pandemic have nuanced and unintended consequences because they are inscribed within, and have therefore exacerbated, existing contours of inequality and inequity. This is due to a lack of vision of global-local linkages and contextual interdependencies. A key lesson for JT is that policy tools must take account of existing patterns of inequality across different dimensions of society, acknowledging that these are often far more nuanced and intersectional than they might first seem. Using the four whole-system JT dimensions would imply paying attention to recognition of distributional inequalities; adopting more participatory procedures can be effective in highlighting the risks of unintended consequences and offer an opportunity to avoid them.

2. Without an understanding of how inequalities are systemically produced and reinforced within existing labour markets, interventions aimed at job creation will not necessarily deliver 'just' outcomes.

The COVID-19 pandemic also serves as a reminder that the employment effect of major economic shocks is likely to be extremely asymmetric. Although many governments have created or repurposed worker protection schemes to provide job security, un- and underemployment is rising across the world as lockdowns and social distancing measures take their toll on the economy (ILO, 2020). Among the hardest hit are young people, low-skilled workers, women, and those working in the informal economy – groups that are already disadvantaged in the labour market and less likely to be able to draw on savings, those who would ideally be served by restorative justice, but also the most likely to be excluded from participatory governance. While demand for jobs has risen in some sectors, including those considered essential to the COVID-19 response, the pandemic also illuminates how many deemed 'key workers' (i.e. those working in health and social care, education, or food production and supply) receive inadequate pay and protection from infectious diseases (Harrison and Collins, 2020). Rising demand for these jobs has not, it would seem, resulted in improved legislative recognition of the risks faced or the precarity of working conditions. In Spain, for instance, retired health personnel were re-hired to respond to increased demand (Williams et al., 2020, p. 52); in parallel, health workers have in some contexts felt forced to give up their jobs due to mounting anxiety and health system pressures stemming from extensive overtime and a lack of resources (Linde, 2022).

The aviation sector is among those sectors most affected by the pandemic and population lockdowns, and one already under pressure in the clean energy transition. It is illustrative for this review since it is facing intense pressure to decarbonize, yet business models are predicated on growth in demand. For instance, industry agencies estimated that it would take at least five years for passenger demand to restore to pre-pandemic levels (IATA, 2020), without considering the environmental consequences of such a return. Sudden disruptions in sectors like aviation come at high costs for workers and their communities, with hundreds of thousands of jobs suddenly at risk as a result of government restrictions and related economic disruption (Hiller, 2020), and for those dependent on tourism in destinations as well. This particular example, however, throws the calls for procedural justice into perspective, since it appears to pit the welfare of workers almost directly into conflict with environmental goals. The immediate response included economic stimulus packages enacted by

governments in 2020, with the aviation sector enjoying direct financial support. This included: tax exemptions, discounts on fuel prices, and compensation or financial support (OECD 2020, ITF 2020). In only a few cases has it also faced the prospect of policy support being predicated on emissions reductions. The French government support (in the form of €3 billion directly and €4 billion from banks but guaranteed by the government) was offered to Air France (the national carrier) only once it committed to cutting its emissions by 50% by 2024 (Ministère de l'Économie et des Finances, 2020). Despite these supports, aviation industry responses to this crisis included severe declines in working conditions and lowering of wages.[5] A more forward-thinking, whole-system approach might have enabled engagement of aviation workers in rethinking the structures of the travel industries, to maintain the quality of employment while reducing its environmental impacts, alongside repurposing of sector skills into sustainable industries.

Numerous other sectors have been deeply impacted by the COVID-19 pandemic. Whilst many state policies supporting those unable to – or left without – work have been enacted (see the UK 'furlough' scheme, for example), others adopted a blanket approach with companies able to secure state support for inactive workers. Some workers were encouraged to work from home. Such policies overlooked the nuances of national and regional economies and disparities in housing circumstances. Whilst some white-collar workers have been able to work from their properties, others have not and, as a result, face increased infection risk. Similarly, some sectors have required extensive state support – whilst others have been able to stay afloat or, in some cases, even prospered.

The pandemic experience has shown that blanket job creation policies that are not conscious of the disparate effects these have in conditions that stem from long-rooted social inequalities, will risk exacerbating these disparities, increasing inequality and injustice. A move towards a JT therefore implies finding a way to balance the establishment of environmental regeneration conditions; the need for job protection; and the search for new employment and retraining opportunities for those affected by inevitable industry disruption and closure, within a broader understanding of the ongoing inequality and injustice dimensions in current labour markets.

3. Top-down imposition of predetermined strategies is likely to generate unintended feedback effects

In many ways, the COVID-19 experience highlights the enduring relevance of state capacity to provide public goods, both on the national and subnational level. Delivery of public health measures and worker protection schemes was smoother 'where it could rely on existing strong institutional mechanisms', including 'well-developed and well-resourced social protection systems' (ILO 2020, p. 15). As such, the pandemic provides an opportunity for states to build up core infrastructures and social safety protection systems, and also to stimulate long-term investment in environmentally and socially sustainable economic activities through targeted policy interventions. Centralized responses have, however, also raised concerns about unprecedented government control, often with minimal community input (Marston, Renedo, and Miles, 2020) or parliamentary scrutiny (Griglio, 2020).

While lockdowns have had positive 'side-effects' for GHG emissions, reductions have been temporary, with marginal effects on the concentration of warming gases in the atmosphere (WMO, 2020). Although, on the whole, automobile traffic decreased, for those who could afford it, preferences have shifted from public to private modes of transport (IEA, 2020). It is not yet clear whether or for how long these trends will continue. While the trend towards home-working does appear to contribute to reducing net energy consumption and GHG emissions through a reduction in travel (Hook et al., 2020), and brings benefits for some (Hampton, 2017), it also shifts heating, internet, and other costs to households, including those already suffering financially as a result of the pandemic (Hampton, 2017; Frost, 2020). As well as being difficult to calculate, a corresponding cut in office space energy use appears elusive, since partial office occupation often entails powering and heating the entire space (Bosanquet et al., 2021; Hook et al., 2020). Surging internet usage during the pandemic has also put the spotlight on the carbon footprint of digital infrastructures, with research ongoing into the extent of additional energy demands (Atkins, 2020). Put another way, COVID-19 can provide important lessons on how systems disruptions – and policies designed to mitigate them – can emit waves of consequences, with hard-to-predict medium- to long-term effects.

A participatory, citizenship approach could strengthen rather than replace top-down steering in policymaking. A whole-systems JT will still require state-led interventions to change structures of consumption and

energy usage. However, the COVID-19 experience serves as a reminder that complex systems rarely respond exactly as planned and, sometimes, pathways forward may only emerge through observation, experimentation, and experience. As such, it encourages researchers to explore how wide-ranging measures – deemed as essential for mitigation or adaptation – may create new problems, alter everyday life, and have uneven and unintended effects. It suggests that policymakers must move away from an over-emphasis on prediction, control, and technical problem-solving towards a greater appreciation of foresight, adaptability, and resilience in the attainment of a JT. This shift depends on participatory, collaborative, and locally-grounded processes to ensure a 'flow of experiential knowledge through the system' (Wagenaar, 2007, p. 18) and building mutual trust. Without such trust, even ostensibly robust scientific solutions may encounter resistance, as illustrated by COVID-19 vaccine scepticism (Lazarus et al., 2020).

4. Complex problems call for a diversity of perspectives, mechanisms, and actors

As outlined above, effective participation and deliberation are essential to ensure that policy choices and business decisions reflect a diversity of experiences, perspectives, and knowledge, while not necessarily being sufficient. In the case of COVID-19, uncertainty and fear over both the virus, vaccines, and government restrictions, as well as a lack of consistent public communication, fuelled an 'infodemic' that threatened to undermine broad support for public health interventions (Lancet Editorial, 2020). Similar dynamics are likely to strengthen existing patterns of resistance to decarbonization policies if communication is not transparent, if they remain highly asymmetrical in terms of impact, or are imposed without consultation and involvement of affected communities.

Whilst there are examples of participatory processes of decision-making towards a post-COVID recovery, these appear relatively scant. Prior to the pandemic, the Grand Débat National convention, formed by citizens in France, worked to develop plans to reduce GHG emissions whilst maintaining equity and justice in both approach and outcomes. In April 2020, it proposed 50 priorities to boost economic growth post-COVID, reduce GHGs, and improve health and well-being (particularly of those deemed most vulnerable) (Convention Citoyenne pour le Climat, 2020). The pandemic also illustrated the advantages of institutionalized, permanent platforms of engagement. For example, the German 'co-determination' system, which regulates cooperation between workers and management at firm level, has enabled companies to negotiate tailored crisis responses relatively quickly and with relatively broad support from employees (Lawton, 2020). We would argue that such participatory arrangements should be considered in both developing strategies and designing implementations to achieve the transition to an inclusive post-carbon economy.

Mechanisms for deliberative participation provide an important avenue for JT, allowing communities and stakeholders to voice concerns, challenge policies, and piece together a shared vision of a sustainable future. However, within the case of COVID-19, meaningful dialogue has often been inhibited by the imperative to act quickly and maintain social distancing. As a result, in the early stages of the pandemic, many governments neglected commitments to public consultation and stakeholder involvement (Richards and Scowcroft, 2020). Indeed, some used the public health crisis to roll back civic liberties, limit opportunities for participation, and crackdown on labour unions and political dissenters (Gebrekidan, 2020). In this light, green stimulus packages may be economically advantageous (Allan et al., 2020), but their rapid proliferation raises new tensions over the time needed for participation and democratic engagement in decision-making. It follows that efforts to design and implement JT policies will also have to contend with related challenges, including the need to enable inclusive digital transformations (UNCTAD, 2020) and rebuilding societal trust in an age of 'fake news'.

Summary

At the global level, the COVID-19 crisis has, by most accounts, failed to infuse a heightened sense of collective responsibility, solidarity, and purpose (Pegram, 2020). In some cases, exclusionary nationalist pandemic policies fail to acknowledge that 'integrated and complex systems are only as strong as their weakest link' (Goldin, 2020). Above all, the pandemic serves as a reminder that human wellbeing is closely tied to the health of the planet, with climate change and environmental degradation heightening the risk of future public health emergencies (Brown, 2020). The brunt of these effects will be borne by already disadvantaged and vulnerable

groups with limited ability to influence policymaking processes. While systemic effects are often generated globally, the negative effects of systemic disruptions – and the policy responses they elicit – are experienced locally.

Conclusions

Whilst climate change policy focuses on the need to reduce GHG emissions and curb environmental degradation, a call for a JT represents a more comprehensive vision of policies and strategies that transcend traditional policy domains. The JT term is now commonly used in decarbonization discourse and embedded in international agreements including the Paris Agreement. But given the substantial variation in what JT is taken to mean, we have proposed a route to greater clarity in its conceptualization and operationalization. Specifically, we argue for a whole-systems approach to JT, which encompasses key dimensions of justice as a framework to direct policy design and assessment, while recognizing the different spatial, temporal, and institutional dimensions of multiple, simultaneous transitions.

We are not the first to propose such an approach, but we expand on previous framings by making explicit what to include and what not to include in our definition of JT. The usefulness of this framework is illustrated by consideration of the rapid 'emergency' response to the COVID-19 pandemic, identifying how the four, well-defined dimensions of transition justice – Recognition, Distribution, Procedure and Restoration – can be used to reveal where and how different approaches to policymaking in an emergency context might have led to better outcomes. We argue that the exploration of decarbonization actions through the lens of these four dimensions bring an increasingly transversal lens compatible with a whole-systems approach to the transition that could bring about more sustainable outcomes. Importantly, examples from the COVID-19 pandemic experience highlight the perils of policies that do not take a whole-systems approach and that therefore fail to recognize spatial, temporal, and sectoral policy overlaps, as well as existing intersectional inequalities.

JT agendas, like COVID-19 responses, must grapple with global power realities, explore the scope for multilateral and transnational action, and ensure that policy solutions are not exclusively tailored to the socio-economic context of high-income countries but, instead, take into account local context, un/intended consequences, and the need for learning and experimentation, as well as the importance of deliberation and participatory decision-making. This includes addressing social and environmental aspects of economic policy; making sure that interventions are adapted to local contexts; building democratic engagement platforms; and open and transparent communication. Only through a whole-systems approach that is iterative, flexible, and inclusive, will JT policies be able to approximate and respond to these realities with a greater chance of achieving sustainable, just outcomes than approaches enacted to date.

In closing we have identified lessons from the COVID-19 pandemic for the JT, which, although not fully comprehensive (as there will be many others), provide clear evidence to support further research and to improve the operationalization of a whole-systems JT:

- There is a need for interventions to acknowledge context and global-local links.
- Interventions aimed at job creation will not necessarily deliver 'just' outcomes on their own.
- Top-down imposition of predetermined strategies is likely to invite unintended feedback or backlash effects.
- Complex problems call for a diversity of perspectives, mechanisms, and actors.

Going forward into the next wave of JT scholarship and practice, we suggest that future JT research and policy approaches should be explicit regarding what dimensions of the transition it aims to focus on. The four dimensions above, born out of selective analysis of the COVID-19 pandemic, create opportunities for further research and innovative policy experimentation to build on and expand these dimensions of the JT as we move towards its operationalization. As part of this, we strongly uphold a whole-systems approach as a promising way to attempt the task of responding to the climate crisis with analyses and actions that are integrated, not siloed; and instead of locking us into a low-carbon version of our current society, it should aim to move us towards a sustainable and just society.

Notes

1. www.climatecommission.org.za
2. www.gov.za/speeches/presidency-international-partnership-support-just-transition-2-nov-2021-0000
3. www.gov.uk/government/news/joint-statement-international-just-energy-transition-partnership
4. Readers should note that this article was written prior to the war in Ukraine, which has exacerbated many of the problems highlighted here, particularly in relation to costs of living and costs of, and access to, energy.
5. https://www.unitetheunion.org/news-events/news/2020/december/ba-cargo-workers-to-strike-over-christmas-and-new-year-in-fire-and-hire-dispute/ (accessed 5/5/22)

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