

Building the Concept of Just Transition in Law: Reflections on its Conceptual Framing, Structure and Content

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Abstract. This article focuses on the concept of just transition, which has recently greatly expanded in the climate debate, expressing the demand to adopt and implement climate policies leading to decarbonisation in a way that maintains equity and justice. Building on previous research on the concept of just transition in other disciplines of social sciences, and on the concept's appearance in international climate law instruments and law literature, we analyse the just transition in the field of law. We seek to clarify its conceptual framing, to define its meaning, and to determine its position and limits in law. We then examine it vertically (for each level of law) and horizontally, addressing the main criteria that define its content, i.e., human rights and legal principles.

Keywords: Climate change, just transition, law, human rights, law principles

1. Introduction

The just transition concept, although having originated in the labour movement in the U.S., is increasingly invoked in public discussion about decarbonisation. It forms part of a larger sustainability narrative on how low-carbon transitions can be implemented justly, equitably, and politically smoothly,¹ and requires that during the necessary rapid transformation from a fossil-based to a low-carbon economy, the design and implementation of climate targets, policies and measures should appreciate equity and fairness for those whose livelihoods may be disrupted by these changes.² Such calls come from both the moral imperative of 'leaving no one behind', and the political imperative to reduce resistance to change among potential 'losers'. The just transition thus aims to interlink labour, social and sustainability concerns under one climate change discussion and indicates that such transition can also bring new socio-economic opportunities.

The growing appeal of the just transition concept has brought its rising occurrence across policies and scholarship. However, there is no universally agreed understanding of the term just transition, which continues

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1 Green F., Gambhir A. (2020), "Transitional assistance policies for just, equitable and smooth low-carbon transitions: who, what and how?", 20 *Climate Policy* (8) at 902.

2 Jenkins K., Sovacool B. K., Błachowicz A. et al. (2020), "Politicising the Just Transition: Linking global climate policy, Nationally Determined Contributions and targeted research agendas", 115 *Geoforum* at 138; Eisenberg A. M. (2020), "Just Transitions", 93 *Southern California Law Review* (2) at 273–330; Morena E. (2018), Securing workers' rights in the transition to a low-carbon world. In Duyck S., Jodoin S., Johl A. (eds), *Routledge Handbook of Human Rights and Climate Governance*. Milton, Taylor & Francis, at 292–298; Stevis D., Morena E., Krause D. (2019), Introduction: The genealogy and contemporary politics of just transitions, in Morena E., Krause D., Stevis D. (eds) *Just Transitions: Social Justice in the Shift Towards a Low-Carbon World*. London, Pluto Press, at 11–39.

to be deployed in distinct ways in different settings.³ In the field of law, the concept seems underdeveloped in comparison with other domains like philosophy, ethics, political studies and economy, and it remains undefined. While extensive transformation is already underway, with growing pressure for its speedy completion, the term just transition needs to be clarified to evince its full conceptual power and support the law framework of the whole process.⁴

Our article aims to explore the concept of just transition as a legal concept, especially with focus on international environmental law and human rights law. Building upon various understandings of the concept in related disciplines, we attempt to position it in relation to a principal environmental law concept of sustainable development, and to define it for the field of law. We will then structure it vertically, to outline its meaning for individual levels from international to local. This will then be followed by a horizontal structure, to explore its main content elements, divided into substantive and procedural, and including the most relevant law criteria – those of human rights and law principles.

2. Building the Concept of Just Transition

2.1. Roots of the Concept and its Understanding in Non-Legal Scholarship

The concept of just transition arises from a broader entanglement of interlinked concepts of environmental justice, climate justice, and energy justice. While the elder concept of environmental justice interrelates various issues, including: public health, safety, indigenous land rights, race or poverty, with environmental concerns,⁵ the more recent climate justice concept has made the core argument for historical responsibility and the Common But Differentiated Responsibilities and Respective Capabilities (CBDRRC) principle agreed upon by the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. On the other hand, energy justice refers to the application of human rights across the energy life-cycle, focusing mainly on vulnerabilities in terms of access and affordability.⁶

The just transition concept originated in the U.S. labour and environmental movement several decades ago in calls for public policy support for workers and communities whose livelihoods were to be lost due to the planned closure of hazardous industries.⁷ Around 2010, the concept of just transition re-emerged in a new context when the International Trade Union Confederation (ITUC) placed environmental concerns at the heart of the Trade Union Statement to the 15th Conference of the Parties (COP) in Copenhagen.⁸ At the international level, ITUC together with the ‘Sustainlabour’ Foundation played a pivotal role in getting workers’ voices heard in national and international policy spaces such as International Labour Organization (ILO) and UNFCCC.⁹ The term just transition was broadly understood as promoting green jobs in the transition away from fossil fuels.¹⁰

Since then, the concept of just transition has developed in literature of various disciplines, and appeared in policies and law documents, which led to divergent interpretations, while a universally agreed-upon definition of the term is missing.¹¹

In the scholarship, two basic positions on the meaning of the concept exist. The first group of scholars defend a traditional narrow approach to the term, asserting that the labour-oriented just transition concept is essential in

3 Carlarne C. P., Colavecchio J. D. (2019), “Balancing Equity and Effectiveness: The Paris Agreement & the Future of International Climate Change Law”, 27 *New York University Environmental Law Journal* at 115.

4 Abram S., Atkins E., Dietzel A., et al. (2022), “Just Transition: A whole-systems approach to decarbonisation”, 22 *Climate policy* (8) at 1033.

5 See e.g. Schlosberg D., Collins L. B. (2014), “From environmental to climate justice: climate change and the discourse of environmental justice”, 5 *Wiley interdisciplinary reviews, Climate change* (3) at 359–374.

6 For differing views of the justice concepts, compare Schlosberg D.; McCauley D., Heffron R. (2018), “Just transition: Integrating climate, energy and environmental justice”, 119 *Energy Policy* at 1 and Heffron R., McCauley D. (2018), “What is the ‘Just Transition’?”, 88 *Geoforum* at 74–75.

7 Eisenberg A. M. at 285–286.

8 Trade Union Statement to COP15, United Nations Framework Convention on Climate Change – UNFCCC, Copenhagen, Denmark (7–18 December, 2009), at: https://www.ituc-csi.org/IMG/pdf/No.65.-_App.3.-_COP15_TUstatement_Final.EN.pdf.

9 Morena E. at 292–298.

10 McCauley D., Heffron R. at 1.

11 Wang X., Lo K. (2021), “Just transition: A conceptual review”, 82 *Energy Research & Social Science* at 2.

light of the deep political polarisation and ‘job-versus-environment’ tensions. For instance, Doorey defines the narrow approach as a set of policies to aid affected fossil fuel workers and their communities, as their jobs are phased out.¹² Morena argues that despite the growing popularity among non-labour organisations, just transition remains firmly rooted in the union movement at the international level.¹³ Eisenberg claims that it is not clear what a broad call for a just transition adds to the powerful and better-known concepts of environmental justice, climate justice and energy justice.¹⁴ Nevertheless, the labour-oriented concept was challenged by many, objecting for instance the excessive focus on male-dominant fossil fuel workers.¹⁵

On the other hand, other researchers promote a broader, holistic or integrated understanding of the concept.¹⁶ For example, Abram et al. assert that:¹⁷

“a narrow ‘jobs versus climate’ debate overlooks how many workers and trade unions have adopted pro-environmental positions instead of accepting prescribed positions of ‘winners and losers’ as decarbonisation without structural change risks ignoring, or exacerbating existing social inequalities and injustices related to energy and climate vulnerabilities at the local and global scales.”

McCauley and Heffron propose that the concept of just transition should exceed its original strategic purpose and define it as a *“fair and equitable process of moving towards a post-carbon society”*.¹⁸ In such understanding, the concept should merge the theories of climate, energy and environmental justice and attempt to reduce inequality in modern society concerning ethnicity, income, and gender.¹⁹

The diversity of recent approaches to the concept of just transition shows even more differing attitudes.²⁰ Moreover, the tension between these different understandings can lead to contradictory meanings of the concept, for example the term just transition *“has become extended, multifaceted, and to some degree problematically polysemic, which leaves room for confusion in interpretation.”*²¹ This all means that there is a significant disagreement over what to include within the conceptual boundaries of just transition – between a focus on economic inequality and labour markets versus a more expansive focus on social justice and environmental interests.²² In our view, the just transition concept is today considerably broader than in its original focus on workers, and encompasses also several other aspects of potential harm or inequality associated with structural change, including the environmental and climate concerns. When modelling the just transition as a law concept, we follow this broad perception.

2.2. The Coverage of the Concept in Law and Law Literature

The UN has established global architecture for just transition, starting with the ILO Just Transition Guidelines adopted in 2015.²³ While neither the UNFCCC nor the Kyoto Protocol contains any explicit reference to the just transition concept, the Paris Agreement from 2015 includes the concept in its preamble, urging the Parties to take into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs following nationally defined development priorities. Yet, the just transition receives no substantial mandate in

12 Doorey D. J. (2021), “The Contested Boundaries of Just Transitions Law.” *LPE Project*, at <https://lpeproject.org/blog/the-contested-boundaries-of-just-transitions-law/> 2023.

13 Stevis D., Morena E., Krause D. at 25.

14 Eisenberg A. M. at 287.

15 Coles K., Thim A., Harris S. et al. (2021), “Gender Equity in the Just Transition and the Shift to Green Jobs.” *BSR*, at <https://www.bsr.org/en/blog/gender-equity-in-the-just-transition-and-the-shift-to-green-jobs>.

16 Morena E. et al. (2018). Mapping Just Transition(s) to a Low-Carbon World, Just Transition Research Collaborative. Wang X., Lo K. at 8.

17 Abram S., Atkins E., Dietzel A. et al. (2022), “Just Transition: A whole-systems approach to decarbonisation”, 22 *Climate policy* (8) at 1034.

18 McCauley D., Heffron R. at 2.

19 Heffron R., McCauley D. at 75.

20 Compare Wang X., Lo K. at 2–8.

21 *Ibid.* at 8.

22 Abram S., Atkins E., Dietzel A. et al. at 1036.

23 Guidelines for a just transition towards environmentally sustainable economies and societies for all, International Labour Organization, 2015, at: https://www.ilo.org/wcmsp5/groups/public/@ed.emp/@emp_ent/documents/publication/wcms_432859.pdf.

the text of the Agreement as such. Instead, the matter is being progressively developed at annual meetings of the COP in its decisions. COP21, where the Paris Agreement was concluded, launched work on the just transition of the workforce, and the creation of decent work and quality jobs,²⁴ and consequently, a technical paper on this issue was published at COP22.²⁵ Under the Polish Presidency at COP24, the Silesia Declaration on Solidarity and Just Transition was signed by more than fifty countries.²⁶ It was the COP26 under the UK Presidency that called upon Parties to recognise “*the need for support towards a just transition*”.²⁷ By the Sharm el-Sheikh Implementation Plan from COP27, a work programme on a just transition was established and a preparation for a draft decision on this matter was launched,²⁸ and an annual high-level ministerial round table on just transition shall take place.²⁹ The growing importance of the just transition narrative in the international climate regime also reflects the growing emphasis on it in the Intergovernmental Panel on Climate Change (IPCC) assessment reports.³⁰

At the EU level, the 8th General Union Environmental Action Programme to 2030 notes that a just transition that leaves no one behind must be ensured when reducing Greenhouse Gas (GHG) emissions and enhancing removals by natural sinks. Moreover, following the European Green Deal, the Just Transition Mechanism (JTM) was presented as a “*key tool to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind*.”³¹ The JTM addresses the social and economic effects of the transition in three pillars: A new Just Transition Fund (JTF), the InvestEU Just Transition scheme, and a new Public Sector Loan Facility.³²

Despite the described appearance of the just transition concept in the climate law documents, legal scholarship has very rarely addressed it. One exception is the relation of just transition to climate litigation. ‘Just transition litigation’ has been defined as lawsuits raising questions over the justice and fairness of measures adopted to deliver climate action.³³ Another exception is Doorey’s suggestion to create a new field of ‘just transition law’ that would draw together experiences and knowledge from existing law fields related to just transition, i.e., labour law, environmental law, climate law, pension law, corporate law, migration law, and budget law.³⁴

2.3. Conceptual Framing: ‘Just Transition’ and ‘Sustainable Development’

Before defining just transition in law, we can take definitions offered by authors in other disciplines as a starting point to wider considerations on its position within the whole sustainability debate. According to Abram et al, just transition means an ongoing process of transition that can provide an integrated, whole-system perspective on justice (procedural, distributive, recognition, and restorative) and that can help in identifying systemic solutions

24 Decision 11/CP.21, 2015

25 Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs, Technical paper, UN Framework Convention on Climate Change, at: <https://unfccc.int/sites/default/files/resource/Just%20transition.pdf>, Report of the forum on the impact of the implementation of response measures, at <https://unfccc.int/documents/623789>.

26 Silesia Declaration on Solidarity and Just Transition – Authorisation to support the adoption on behalf of the European Union, Council of the European Union, Brussels, 26 November 2018, at <https://data.consilium.europa.eu/doc/document/ST-14545-2018-REV-1/en/pdf>. For more details, see Jenkins K. (2019), Implementing Just Transition after COP24, Policy Brief. Climate Strategies.

27 Decision 1/CMA.3 Glasgow Climate Pact, para 36.

28 To be adopted in 2023.

29 Starting at COP28 in 2023.

30 See IPCC, 2022: Summary for Policymakers. In: Climate Change 2022: Mitigation of Climate Change. Contribution of WGIII to the 6th Assessment Report of the IPCC, at <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>.

31 The Just Transition Mechanism: making sure no one is left behind, European Commission, at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en.

32 Regulation (EU) 2021/1056 of The European Parliament and of the Council of 24 June 2021 establishing the Just Transition Fund, also reflected in EU NDC and in EU long-term low GHG emissions development strategy.

33 Comp. Savaresi A., Setzer J. (2022), “Rights-based litigation in the climate emergency: mapping the landscape and new knowledge frontiers”, 13 *Journal of Human Rights and the Environment* (1) at 9–10, and especially the article under review Savaresi, A., Setzer, J., Armeni, Ch. et al. Just Transition Litigation: A New Knowledge Frontier (April 5, 2023). Available at SSRN: <https://ssrn.com/abstract=4561679> or <http://dx.doi.org/10.2139/ssrn.4561679>.

34 Doorey D. J. (2017), “Just Transitions Law: Putting Labour Law to Work on Climate Change”, 30 *Journal of Environmental Law and Practice* at 237.

to address environmental and socio-economic concerns.³⁵ García-García et al., suggest that just transition is a long-term technological and socio-economic process of structural shift that affects the generation, distribution, storage and use of energy and causes rearrangements at all levels, while also ensuring that the desired socio-economic functions can be accomplished through decarbonised and renewable means of energy production and consumption, safeguarding social justice, equity and welfare.³⁶ According to McCauley and Heffron, just transition is a fair and equitable process of moving towards a post-carbon society while seeking fairness and equity with regards to the major global justice concerns such as (but not limited to) ethnicity, income, gender within both developed and developing contexts.³⁷ Harrahill claims that the just transition is to ensure that policies which are environmentally beneficial do not cause undue harm to the social or economic well-being of those who are, or have traditionally been, dependent on the fossil fuel sector.³⁸

After studying the origins of the concept of just transition and the definitions offered, it can be seen that the concept's principal points of focus are: economic concerns, as it calls for structural changes in how development is fuelled; environmental and climate concerns, as it is attached to decarbonisation; and social concerns, as this process is required to be just. This raises the question of how this new concept relates to existing leading terms that focus on the same values. Primarily, 'sustainable development' comes first and foremost into consideration, with its emphasis on economic, environmental and social pillars. Under its widely recognised definition, "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".³⁹ Is perhaps just transition meant as a 'transition to sustainability'⁴⁰? Or is the just transition about to take the lead instead of the original notion of sustainable development, which has been sometimes described as having lost its contours? In fact, the sustainable development has been increasingly exposed to the new and not previously discussed challenges of decarbonisation,⁴¹ and its popularization led to its use for all sorts of objectives "desirable", many of which have no bearing to the original meaning of sustainability.⁴² In the following passages, we will try to distinguish the two concepts by reviewing existing analyses of the concept of sustainable development and modelling the new concept of just transition.

The example definitions of just transition above in general all describe the concept as a 'process' that is characterized by certain qualities.

First, the word 'transition' implies a process of a controlled change from one state to another. 'Transition' has mainly been used to analyse changes in societal sub-systems (e.g. energy, mobility, cities), focusing on social, technological and institutional interactions, while 'transformation' would be more commonly applied to refer to large-scale changes in whole societies, which can be global, national or local, and involve interacting human and biophysical system components.⁴³ Nowadays, 'transition' is commonly used in connection with switching the most emission-intensive sectors (or rather a whole economy) from fossil-based to low-carbon. This meaning is mirrored within the just transition concept, referring at the same time to the roots of the concept in economic development, which existing interpretations of the term neither hide nor problematize.

While development is an integral part of sustainable development concept by its very designation, the lasting misunderstanding of its proper position within the concept may be behind its many criticisms. Economic growth, closely connected to discussions about environmental limits, planetary boundaries and the Anthropocene, is

35 Abram S., Atkins E., Dietzel A. et al. at 1033.

36 García-García P., Carpintero O., Buendía L. (2020), "Just energy transitions to low carbon economies: A review of the concept and its effects on labour and income", 70 *Energy Research & Social Science* at 101664, Cited in Wang X., Lo K. at 6.

37 McCauley D., Heffron R. at 2.

38 Harrahill K., Douglas O. (2019), "Framework development for 'just transition' in coal producing jurisdictions", 134 *Energy Policy*, at 1.

39 Gro Harlem Brundtland et al. (1987), *Our Common Future: Report of the World Commission on Environment and Development*, Oxford, Oxford University Press.

40 Comp. e.g. the language used in Meadowcroft, J., Banister, D., Holden, E., Langhelle, O., Linnerud, K., & Gilpin, G. (eds.) (2019), *What Next for Sustainable Development? Our Common Future at Thirty*, Cheltenham, Edward Elgar Publishing.

41 See e.g. Banister, D., et al. (2019), What next for sustainable development? In Meadowcroft, J., Banister, D., Holden, E., Langhelle, O., Linnerud, K., & Gilpin, G. (eds.) (2019), *What Next for Sustainable Development? Our Common Future at Thirty*, Cheltenham, Edward Elgar Publishing, at 308.

42 Bosselmann, K. (2008), *Principle of Sustainability: Transforming Law and Governance*, Abingdon, Oxon, GBR, Ashgate Publishing Group, at 40.

43 Banister, D., et al. at 303, and publications cited there.

seen by some as a necessity for a sustainable development trajectory but by others as the ultimate driver of unsustainability, and the opponents of economic growth still represent a minority in mainstream politics.⁴⁴ The sustainability debate since the Brundtland Report of 1987 has, to a large extent, overlooked the importance of the relationship between “sustainability” and “development”: in its right meaning, the notion of sustainable development calls for development based on ‘ecological sustainability’ in order to meet the needs of people living today and in the future: “*No economic prosperity without social justice and no social justice without economic prosperity, and both within the limits of ecological sustainability*”.⁴⁵ In this sense, the concept of sustainable development seems to offer a comprehensive guide to a long-term⁴⁶ life of society in accordance with planetary boundaries, i.e. which would not be self-destructive.

On the contrary, the concept of just transition seems to be narrower in this respect. It focuses only on that part of development that represents the change in economic patterns needed to move from carbon to non-carbon sources. Moreover, it also seems to be a concept limited in time – once the transition to a low-carbon economy is complete, the concept will lose its relevance.

Second, the word ‘just’ expresses the desired characteristics of the process, meaning fairness to actors of the process. ‘Just’ thus works as a value criterion here: the transition is demanded to fulfil the criteria of ‘justice’. In this regard, the concept of just transition can be described rather as a goal, an imperative, a normative commitment, or a precept, expressing certain values that are to be met. However, the content of that goal is not very precise and it fully depends on the interpretation of ‘justice’ as its main indicator, which then also depends on which theory of justice is applied.

‘Justice’ or ‘equity’ is also a pillar of the concept of sustainable development, and was central already in Our Common Future in 1987, meaning social equity in time and space. The principle of equity represents the social dimension of sustainable development.⁴⁷ It implies a concern for social equity between generations and within each generation, and in this sense, it also presents an instrument to achieve sustainability.⁴⁸ When widely understood, as suggested by Bosselmann, ‘justice’ covers not only the justice of the distribution of the environment among people today and among people today and in the future – so-called ‘environmental justice’, but also the justice of the relationship between humans and the rest of the natural world, so-called ‘ecological justice’. Ecological justice aims to integrate the non-human world in environmental decision-making, and best reflects the ethics of sustainable development.⁴⁹

In contrast, the concept of just transition seems to be built in a much more anthropocentric perspective, relying more on ‘environmental justice’ rather than ‘ecological justice’, and leaving non-human world mostly outside the discussion. In addition, temporarily it seems to more focus on intra-generational justice, as the transition to low-carbon economy takes places now but at times of more distant future generations it should have been already finished. The concept of just transition is therefore limited in the aspect of justice as well.

To sum up, the concept of just transition seems to be narrower in all respects than the concept of sustainable development. This is particularly true if we take the recent advanced interpretations of sustainable development reflecting the long way the concept has already undergone through the soft law documents, hard law provisions, judgments, and law scholarship, and that allowed the concept to form clearer outlines, as well as a normative core.⁵⁰ The just transition concept may be at the starting point of a similar process but now, it can hardly be considered a concept that could replace sustainable development. Nevertheless, it is making its way into legal documents. Perhaps it is precisely because of its narrower scope and, unfortunately, its anthropocentric and predominantly present and near-future generations focus, that it has a chance to make its way more effectively into policy as a practical and implementable concept, as opposed to sustainable development, which tends to be

44 Ibid. at 297.

45 Bosselmann, K. at 11 and 53.

46 Whether it can be truly sustainable, i.e. unlimited in time, is doubtful. See Bonevac, D. (2010), “Is Sustainability Sustainable?” 23 *Academic Questions* (1) at 86, and there cited A. A. Barlett (1998), “Reflections on Sustainability, Population Growth, and the Environment,” revised version, 16 *Population & Environment* (1) at 5–35.

47 Bosselmann, K. at 59.

48 Banister, D., et al. at 300.

49 Bosselmann, K. at 79–81.

50 Verschuuren J. (2022), The principle of sustainable development as a legal norm. In Fisher D., Verschuuren J. (eds), *Research Handbook on Fundamental Concepts of Environmental Law*, Edward Elgar Publishing, at 228–251. Bosselmann, K. at 52.

(rather unfairly) accused of being vague, open-ended and impractical for real-world.

2.4. Defining the Concept of Just Transition in Law

To delineate the concept of just transition in law in more detail, we may ask first what social objectives it pursues. The main benefit of the just transition is described as reducing inequality in society. A decarbonisation without justice risks ignoring, or exacerbating existing social inequalities and injustices related to energy and climate vulnerabilities at the local and global scales.⁵¹ Moreover, just transition processes are expected to create multiple economic opportunities and deliver a range of co-benefits, such as better air quality and energy security.⁵² As such, just transition can significantly contribute to a smooth transition, especially with regard to society's acceptance of the necessary social and economic changes.

The second question is where the just transition imperative is positioned. It can be located in the area where climate and development policies meet (or rather clash). These policies need to be reconciled to complement each other. Just transition should not be seen as a mere 'add-on' to climate policies,⁵³ but rather to be embedded as a priority at the heart of these policies, respecting an integrated approach to developing responses that simultaneously address climate change and inequality.⁵⁴

Third, concerning the elements of just transition, the imperative is not (as yet) strongly embedded in hard law documents to directly encompass rights or duties. It rather implies guidelines on how to lead the transition in a just way, with an as yet unresolved and inconsistent interpretation of 'justice'. Within climate law documents, 'justice' thereto appears besides 'fairness' and 'equity' as target values, which may overlap.⁵⁵ Still, we do have the most important criteria of 'justice' of the transition; they are determined by human rights and law principles. Further elements of just transition should be identified through a social dialogue and participation of affected stakeholders by linking government with businesses, trade unions and civil society to plan and agree on policies that are necessary for a just transition, which seems to be key.⁵⁶

Fourth, the imperative of just transition is addressed primarily to state governments, when they design transformation policies. It may also be addressed to regional and local level authorities wherever they influence processes leading to low-carbon society within their communities. We can even consider individuals as addressees of just transition, seeing as they are also invited to participate in planning the transformation processes within their communities, sectors and affected localities.

To conclude, in law, just transition can be defined as an imperative guiding primarily governments and regional and local authorities during preparation and implementation of policies, laws and measures, with the value of 'justice' at its core. It requires to lead the transition processes in a way that takes into account the benefits and losses of all relevant actors and prevents exacerbation of inequalities that could result from these processes.

3. Vertical Perspective on Just Transition

The concept of the just transition captures a full range of fundamental issues concerning justice. From the global level, where the call for an overall shift originates, to the local level where the specific context of transition processes are embedded, particularly for people and regions that now depend on carbon-intensive industries and

51 Heffron R., McCauley D. at 75, Abram S., Atkins E., Dietzel A. et al. at 1035.

52 Atteridge A., Strambo C. (2020), *Seven principles to realize a just transition to a low-carbon economy*, SEI Policy Report, Stockholm Environment Institute, at 5.

53 Abram S., Atkins E., Dietzel A. et al. at 1035.

54 Gösele A., Wallacher J. (2012), Criteria for Compatibility of Climate and Development Policies. In Edenhofer O., Wallacher J., Lotze-Campen H. et al. (eds), *Climate Change, Justice and Sustainability: Linking Climate and Development Policy*. Dordrecht, Springer Netherlands, at 97–98.

55 For more details on how the terms justice, fairness and equity are used and interpreted in the international climate law, see especially Carlarne C. P., Colavecchio J. D. (2019), "Balancing Equity and Effectiveness: The Paris Agreement & the Future of International Climate Change Law", *27 New York University Environmental Law Journal* at 119–129; Will U., Manger-Nestler C. (2021), "Fairness, equity, and justice in the Paris Agreement: Terms and operationalization of differentiation", *34 Leiden journal of international law* (2) at 399–410.

56 Sundström A. (2021), "Looking Through Palme's Vision for the Global Environment JUST TRANSITION", *51 Environmental Policy and Law* (1/2) at 87.

sectors.⁵⁷ Various actors and stakeholder groups exist at each intersection, and collaboration among the states, and between the state, local communities and trade unions is required.⁵⁸

“*The rhetoric of the ‘just transition’ lies at the heart of energy and development policies internationally.*”⁵⁹ The transition from the fossil-based to a low-carbon society must be initiated at a global scale, as this transformation forms the cornerstone of the solutions to the global and complex problem of climate change. The international level involves the development of principles, tools and agreements that call upon states to ensure the just transition, and provides a forum for the dissemination of information and exchange of knowledge.⁶⁰ The contribution of the international law regime, as such, to a real implementation of just transition within states seems arguable. For instance, Doelle claims that the UN climate regime is unlikely to be the place to ensure equity, including a just transition.⁶¹ The question thus arises: What exactly is supposed to be governed by the just transition imperative at the international level? Here, two approaches appear.

The narrower understanding of the just transition at the international level works as a pure instruction from the international community to each state on how to tackle their national transition processes internally. In simple terms, it concerns how Nationally Determined Contributions (NDCs) are nationally implemented. The broader coverage includes also how the NDCs are determined, i.e. how the burdens (and costs) of the global transition are allocated among states that are, to varying degrees, affected by climate change, and have varying capacities to carry out the transition.⁶² This takes us to such questions regarding how NDCs should be calculated, considering also historical responsibility for emissions,⁶³ and what specific role should the concept of just transition play here. In our view, just transition could also guide in determining NDCs, if it worked as an umbrella or framing concept of climate action. Since this is not the case currently, we think that the processes of transition are so closely connected and understood nationally and regionally with labour, industry and decarbonisation that, the term is not suitable to be interpreted so broadly. For equity among states in mitigation efforts, the term ‘fair shares’ seems to be established and appropriate instead.

In line with the Paris Agreement, the centre of the just transition discussions should be positioned at the national level.⁶⁴ State climate and other related policies, laws and measures lead the main directions of the transformation. At the core of the national dimension of just transition we may find the labour-related problems of vulnerable regions, for instance coal regions, in the context of decarbonisation. The framing rules for the just transition are usually set at the national level, and then zoomed in at lower levels, taking into account regional or local specificities, and involving affected stakeholders and communities.

4. Horizontal Perspective on Just Transition

The core elements that make the content of the just transition and should guide the transformation processes include: human rights and law principles, both substantive and procedural, at all relevant levels, plus other lower-level legal principles, as well as non-legal criteria, such as climatological, economic, or ethical criterion. The lower the level, the more specific region- or locality- related criteria and methods will apply, even those outside law. Just transition interventions need certain common principles and rules applicable anywhere but they must be informed, guided and applied context-specifically.⁶⁵

57 Atteridge A., Strambo C. at 4.

58 Jenkins K. at 9.

59 Harrahill K., Douglas O. at 1.

60 McCauley D., Heffron R. at 2; Jenkins K. at 9.

61 Doelle M. (2022), “The UNFCCC Regime at a Crossroads: Can You Trust Anyone Over 30?+”, 52 *Environmental Policy and Law* (5–6) at 358.

62 Gösele A., Wallacher J. at 97–104, Atteridge A., Strambo C. at 103.

63 On the problem of the responsibility for historical emission, see e.g. Kowarsch M., Gösele A. (2012), Triangle of Justice, In Edenhofer O., Wallacher J., Lotze-Campen H. et al. (eds), *Climate Change, Justice and Sustainability: Linking Climate and Development Policy*. Dordrecht, Springer Netherlands, at 14ff; Will U., Manger-Nestler C. at 402–403; Brown D. A. (2018), Using the Paris Agreement’s ambition ratcheting mechanisms to expose insufficient protection of human rights in formulating national climate policies. In Duyck S., Jodoin S., Johl A. (eds), *Routledge Handbook of Human Rights and Climate Governance*, Milton, Taylor & Francis, at 231.

64 Jenkins K. at 9.

65 Ibid.

4.1. Human Rights

Human rights and human rights principles make an essence of just transition by both legal and other scholars.⁶⁶ First, climate change, as such, has a strong potential to impact human rights, so the failure to take steps to address it presents human rights concerns. Second, the steps taken by states in the form of mitigation and adaptation strategies may also affect fundamental rights.⁶⁷ It means that mitigation or adaptation mechanisms may produce both positive and negative human rights consequences.⁶⁸ Therefore, any climate policies designed upon the just transition precept must consider all possible human rights impacts. In this way, human rights work as guidelines and thresholds for making climate policies, and apply at all relevant levels where just transition is taken into account. Human rights thresholds provide levels of protection for individual rights that can be regarded as the minimum acceptable outcome under a given climate change impact or policy scenario. They must be embedded into policy objectives and policy drafts must be assessed considering human rights commitments including all their elements (duty to respect, protect and fulfil),⁶⁹ to identify likely transgressions of these thresholds,⁷⁰ which may also mean to restrict states from taking particular forms of mitigation and adaptation action altogether.

4.1.1. Substantive human rights

There are numerous substantive human rights that must be taken into account when evaluating draft climate and development policies within the frames of the just transition. The most important human rights embodied in several international human rights instruments are briefly summarised here.⁷¹

The right to life, liberty and security of person are the most important and key human rights that must be taken into account while creating any climate policy. Especially, the right to life is a ‘supreme right’ which, when not guaranteed, make other human rights meaningless. States are committed to respect, protect, promote and fulfil the right to life.⁷²

Freedom of movement includes the right of all persons to choose their place of residence and protects against forced displacement. This right is clearly implicated where people are forced to relocate in order to make way for mitigation or adaptation measures. While rising sea levels may well substantiate relocation, changing land use practices; production of biofuels; or other adaptation measures, requiring new locations, must be very well justified to comply with this right.⁷³

The right to an adequate standard of living, closely connected with the right to subsistence, incorporates the rights to adequate food and water. It is especially important as a threshold wherever mitigation or adaptation policies involve changes to land use, which may have significant implications for people who rely on such lands for their subsistence. Examples may cover reforestation or changes to agricultural practices or crop varieties on lands which have previously provided a source of income or food for local people. Such changes also have the potential to interfere with food security.⁷⁴

The right to health may also be endangered by certain forms of mitigation and adaptation. For example, mitigation based on construction of alternative energy sources, such as nuclear power plants or wind turbines, may present a risk to the health of people living nearby; changes to agricultural practices may have impacts on food security and nutrition, increasing the risk of diseases or infant mortality.⁷⁵

66 E.g. Reder M. (2012), *Climate Change and Human Rights*. In Edenhofer O., Wallacher J., Lotze-Campen H. et al. (eds), *Climate Change, Justice and Sustainability: Linking Climate and Development Policy*. Dordrecht, Springer Netherlands, at 61–71. Humphreys S. (ed) (2010), *Human Rights and Climate Change*. New York, Cambridge University Press. Brown D. A. at 314. Kowarsch M., Gösele A. at 73–89.

67 Atapattu S. (2015), *Human Rights Approaches to Climate Change: Challenges and Opportunities*. London, Taylor & Francis, at 68 and 71.

68 Lewis B. (2016), *Balancing Human Rights in Climate Policies*. In Quirico O., Boumghar M. (eds), *Climate Change and Human Rights: An International and Comparative Law Perspective*, Routledge, at 50–52.

69 Ibid. at 41–42.

70 Humphreys S. at 314–315.

71 In this article, we do not refer to a specific way in which the rights in question are enshrined in any particular international instrument.

72 In more detail see e.g. Atapattu S. at 76ff; Albers J. H. (2017), “Human Rights and Climate Change: Protecting the Right to Life of Individuals of Present and Future Generations”, 28 *Security & Human Rights* (1–4) at 113–144.

73 Lewis B. at 43–45.

74 See also Atapattu S. at 81–82.

75 Reder M. at 65.

The right to respect private and family life relates to just transitions when the loss of employment can force displacement. The sphere of private life covers environmental issues, too,⁷⁶ and professional or business activities, both relevant to just transitions, although employment aspects of this right will probably rise in relevance in the future.⁷⁷

The rights to social protection and decent work, representing social and working rights, are especially relevant in the context of just transition, and participation of workers in planning any transformation measures is important here. The governments are responsible for meeting their obligations on climate policy and environmental protection but in meeting these goals they must also protect social rights.⁷⁸

When applying human rights thresholds to assess climate and development policies, an important question emerges: how to balance and reconcile competing human rights objectives within these processes. Positive outcomes they contribute to, in terms of addressing climate change, must be balanced not only to negative human rights impacts of these mitigation and adaptation measures but also considering how they interact with other human rights, including those associated with development.⁷⁹ Human rights law provides certain mechanisms for balancing potentially competing fundamental rights. First, many human rights provisions are completed with limitation clauses that determine under what conditions restrictions are lawful. Here, a legitimate purpose (under which climate change mitigation and adaptation may be subsumed) is usually required. On the other hand, certain human rights, including the right to life, cannot be derogated from even in times of emergency. Second, there are general law principles guiding balancing rights against other rights or colliding public interests, with the principle of proportionality as the leading one. This principle, applied at numerous national jurisdictions, is based on assigning ‘weight’ to important societal values, and ‘balancing’ of the colliding interests.⁸⁰ In climate policies, it may be the case that the negative consequences of mitigation and adaptation activities will be justified on the grounds that they are necessary to achieve the broader benefits that come from taking action on climate change.⁸¹

4.1.2. Procedural human rights

In order to successfully execute just transitions there must be procedures and processes in place to facilitate the move from a carbon intensive to a low-carbon society.⁸² In order for these processes and procedures to support a just, fair, equitable and inclusive transition there must be considerations for the procedural human rights elements. These could function as both a tool and a guideline for designing climate change legislation, broadly speaking, and implementing just transition and decarbonisation policies, in particular. Procedural human rights serve two distinct functions:⁸³ firstly, as a means to ensure effective and adequate precautions to prevent the abuse of other human rights, and secondly, as an outline of the necessary steps in procedure to ensure that individuals can exercise substantive human rights.

Within the context of climate change, procedural human rights have been outlined as those rights contained explicitly within the *Convention on Access to Information, Public Participation in Decision Making and Access to*

76 E.g. European Court of Human Rights ‘Guide on Article 8 of the European Convention on Human Rights: Right to respect for private and family life, home and correspondence’ (ECtHR, 31 August 2019), at https://www.echr.coe.int/Documents/Guide_Art_8_ENG.pdf.

77 Profous C. (2020), *The Relevance of Human Rights Law to Just Transition*, Submission to the Special Rapporteur on Extreme Poverty and Human Rights, at 11.

78 Krause D. (2019), “Why Human Rights-Based Social Protection is Needed in Climate Change Responses: A Just Transition.” *Social Protection Human Rights*, at <https://socialprotection-humanrights.org/expertcom/why-human-rights-based-social-protection-is-needed-in-climate-change-responses-a-just-transition/>.

79 Lewis B. at 50–52.

80 See e.g. Barak A. (2012), *Proportionality: constitutional rights and their limitations*, Cambridge: Cambridge University Press.

81 Lewis B. at 51.

82 Houston L.J.H., Ruppel O.C., (2022), “Just Energy Transitions in Progress? The Partnership between South Africa and the EU,” 19 *Journal for European Environmental & Planning Law*, 1–2.

83 Ruppel O.C., Houston L.J.H. (2023), “The Human Right to Public Participation in Environmental Decision-making: Some Legal Reflections,” 53 *Journal of Environmental Policy and Law*, 2–3, at 133–134.

Justice in Environmental Matters (Aarhus Convention).⁸⁴ The Aarhus Convention specifies three key procedural rights: the right to access environmental information;⁸⁵ the right of the public to participate in decision making related to specific environmental matters;⁸⁶ and the right to access justice.⁸⁷ In order for a just transition to be considered so, each of these procedural human rights should be achieved. Additionally, the order in which these rights are provided also indicates the processes of climate change legislative design and implementation through which the public are included. Ultimately, by ensuring that the public is able to fully exercise their procedural rights, there is an introduction of procedural due process that can be achieved, thus promoting procedural justice.⁸⁸

Now to take a closer look at how these procedural rights would impact the design, implementation and oversight of just transition policies. The first procedural step would be to ensure access to environmental information. Environmental information is broadly defined as any form of information relating to the state of elements of the environment, factors likely to affect the environment and the state of human health and safety.⁸⁹ In the process of transitioning to a low-carbon society, governments are required to make decisions on various factors which affect the environment.⁹⁰ As an example one can use the transition of the energy sector.⁹¹ In such an instance, it would be in the interest of the government to make the public aware of its intentions to transition the energy sector, the possible plans to carry out this intention and, more importantly, how this transition would impact those members of the public and civil society whose livelihoods and economic certainty are directly and indirectly impacted.⁹²

The second procedural step would be to ensure that the public is able to participate in decision-making in relation to policy which will be implemented in support of the just transition. Public participation in decision making bolsters greater support from the public in the implementation and oversight of new policies.⁹³ Varadi indicates that this increased support is based on the implementation of principles of transparency and accountability which increases public confidence in the legislative system and the actions of the government.⁹⁴ There are various forms of public participation that can be facilitated by governments, for example: public consultations, citizen advisory panels, NGO workshops or citizen assemblies.⁹⁵

Third, and finally, the public should have the right to access justice when procedures have not been followed or adequately and effectively executed or when violations of human rights have occurred within the process of executing a just transition. In order to access justice, the public and various stakeholders must meet criteria and procedural requirements that have been stipulated within the legal system, which may mean that these parties are placed at a disadvantage to those government entities who have written the laws themselves.⁹⁶ Therefore, the judiciary plays a crucial role in providing unbiased and impartial insight for the certainty of justice and legal outcomes. However, in certain instances, the establishment of a transition ombudsman or tribunal could equally

84 Peeters M., Nóbrega S. (2014), "Climate Change-related Aarhus Conflicts: How Successful are Procedural Rights in EU Climate Law?" 355 *Review of European, Comparative and International Environmental Law*, 23(2), at 254–366; See United Nations Economic Commission for Europe (1998) *Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (Aarhus Convention)*; 2161 UNTS 447, 38 ILM 517 (1999), 25 June 1998.

85 Art. 4–5.

86 Art. 6–8.

87 Art. 9.

88 McCauley D., Ramasar V., Heffron R.J., Sovacool B.K. et al. (2019), "Energy justice in the transition to low carbon energy systems: Exploring key themes in interdisciplinary research," 233 *Applied Energy*, at 916–921.

89 Aarhus Convention Article 2(3).

90 Hale T., Smith S.M., Black R. et al. (2022), "Assessing the rapidly-emerging landscape of net zero targets" *Climate Policy*, 22(1), at 18–29.

91 Harrahill K., Douglas O. at 1–11.

92 Mayer A. (2018), "A just transition for coal miners? Community identity and support from local policy actors" 28 *Environmental Innovation and Societal Transitions*, at 1–13.

93 Ruppel O.C., Houston L.J.H., at 132.

94 Varadi A. (2019) "Defining the Role of the Aarhus Convention as Part of National, International and EU Law: Conclusions of a Case-Law Analysis" 121 *Hungarian Yearbook of International Law and European Law*, at 125.

95 Quick K.S., Bryson J.M. (2022), "Public Participation". In Ansell C., Torfing J. (eds), *Handbook on Theories of Governance*. Edward Elgar Publishing, at 158–168.

96 Heffron R.J. (2022), "Applying energy justice into the energy transition" 156 *Renewable and Sustainable Energy Reviews*, 111936.

ensure access to justice as the public would have the opportunity to bring forward complaints before approaching the judiciary.⁹⁷

4.2. Principles

In preparing climate policies, law principles work as guidance and interpretation tools. Legal principles are general guidelines having a source in laws or the jurisprudence of courts, which express certain value positions and thus allow choice among several possible solutions. Recognised international and environmental law principles provide a basic orientation and direction. Moreover, at the national and primarily at the regional level, numerous other principles, criteria and methods of just transition have been described, often in relation to case studies and descriptions of regional just transition plans.⁹⁸

There are numerous substantive and procedural principles that may provide good guidance in the just transition processes. The brief summary of the most distinctive principles follows.

The principle of non-discrimination, based on the right to equal protection before the law, underpins all human rights. Besides its international relevance, for instance in setting the NDCs along with the CBDRRC principle, non-discrimination shall apply in domestic climate policies to ensure that the burdens and benefits of mitigation and adaptation measures are distributed equitably and without any discrimination, and without distinction as to race, religion, age, sex, property or any other status. Especially where certain individuals or communities are disproportionately impacted by negative effects of climate change (e.g., people with fewest resources, those relying most directly on natural resources for subsistence, or whose subsistence was dependent on fossil fuels industry) states must address these vulnerabilities and tailor climate measures to meet the needs of these most affected.⁹⁹

The principle of sustainable development, formulated in many environmental law documents, has developed into an umbrella concept providing a framework for various principles in the field, and interconnecting the pillars of economic development, environmental protection and social development. As shown above, considering all its substantive elements (equity, integration and the sustainable use of natural resources) is highly relevant when designing any climate policies, and in this respect the concept of just transition cannot replace it. For example, the element of inter-generational equity reflects the fact that while previous and present generations have contributed substantially to the problem of climate change, the main negative consequences will be borne by future generations, which requires us to implement the just transition measures expeditiously and fairly so that future generations do not unfairly bear a disproportionate burden of the consequences and financial costs.¹⁰⁰

Besides its role within the principle of sustainability, the principle of equity also figures as an autonomous principle, serving as the “backbone of the UNFCCC” and concerning fairness for present and future generations. At the national level, which is decisive for just transition processes, it may be called the ‘compensation principle’, which states: If certain persons or communities suffer a loss that exceeds the loss that everyone else in society has to bear, then that loss must be compensated.¹⁰¹ This leads us back to the necessity to predict and take into account any kind of vulnerability or higher sensitivity experienced by those affected by decarbonisation processes, while planning the national and regional climate policies.

The polluter pays principle, one of the well-established principles of environmental law, requires that those who carry out polluting or harmful activities, whether individuals, corporations or states, should be held responsible for the consequences of pollution or environmental damage. In the context of just transition, the application of this principle, albeit not explicitly enshrined in the climate regime, should facilitate a fair distribution of the costs and benefits of decarbonisation between actors that were directly involved in the causes of climate change and profited from it (e.g. the fossil fuel industry) and actors who lose out in the decarbonisation process. However, the

97 Stojilovska A. (2021), “Energy poverty and the role of institutions: exploring procedural energy justice – Ombudsman in focus” *Journal of Environmental Policy and Planning*, at 1–13.

98 See for instance seven principles of just transition described in Atteridge A., Strambo C. at 6; a structure of strategies and measures focused especially on workers and specially-affected communities suggested by Green F., Gambhir A.; or a set of four most important factors that Harrahill and Douglas developed to categorise the approach to transition at the regional level in Harrahill K., Douglas O.

99 Lewis B. at 47.

100 More on the intra- and inter-generational equity in climate action see also Atapattu S. at 107–118.

101 Driessen P., Van Rijswijk H. (2011), “Normative aspects of climate adaptation policies”, 2 *Climate Law* (4) at 565–566.

application of the principle at a domestic level may be questionable, especially if we understand it as analogous to the responsibility for historical emissions in relations between states.¹⁰²

The precautionary principle, also widely recognized in several environmental law instruments, which links law with science, forbids invoking lack of full scientific certainty as a reason for postponing cost-effective measures to prevent environmental degradation if serious or irreversible damage threatens. In the same regard, it shall expedite introducing mitigation and adaptation measures before it is too late to protect human health and the environment, presupposing that risk assessments and evaluation of pros and cons are realised.¹⁰³

The principle of subsidiarity calls for allocation of responsibility to the lowest, least central unit of decision and action, possessing the needed competence. Applied to climate policies it means that the necessary measures should be designed and implemented at lower levels where they will have the most immediate effect, although climate change is a global problem necessitating, at the same time, international cooperation and national form.¹⁰⁴

One of the principles in relation to procedural elements of policy design and implementation is the “Principle of free prior informed consent” (FPIC). While introduced within the context of chemicals, waste and biodiversity and later in relation to indigenous communities and biodiversity, the FPIC is the backbone of a number of human rights relating to public engagement in environmental decision-making.¹⁰⁵ The FPIC, in short, stipulates that when activities are to be executed that affect the biodiversity or rights of the public (which was usually considered to be indigenous communities), the public are to be provided information, free of charge, with sufficient time to contend or accept the execution of said activity.¹⁰⁶ When executing any processes or actions in favour of pursuing a just transition it is necessary to consult with the public, and the best way is to implement a system that applies the FPIC.

5. Conclusions

The transformation from a fossil-based to a low-carbon society appears to be the cornerstone of the global solution to climate change. To accelerate and facilitate the transition processes, building a robust concept of just transition in law, its composition, application criteria, functions and relevance in climate action seems crucial. Our article attempted to make the first step in a hitherto absent law scholarship debate on the concept of just transition in law.

We first positioned the concept within the whole sustainability debate, particularly in relation to the concept of sustainable development, with which it shares some common features. We found just transition to be a narrower concept, but one with a potentially higher chances to practical application in the process of switching to a low-carbon economy. Building on approaches to just transition in other disciplines we proposed possible formulation of the concept in the field of law. For the interpretation of the term, it seems fundamental how the general and abstract notion of ‘justice’ is understood. Yet, the trigger for any interpretation of the just transition concept are the human rights criteria that act as thresholds, together with legal principles from the field of international and environmental law. As a part of the societal change leading to decarbonisation, governments need to plan and prepare climate policies, laws and measures. Just transition objectives must be incorporated into this planning at all stages. While human rights lie at the heart of the just transition concept, assessing compliance with them must be a mandatory part of any climate policy preparation.

The challenge for follow-up research could be whether the concept of the just transition may have more potential within climate action than as one of its leading guidelines. The responses to climate change are to involve a far-reaching transformation of society, ranging from changes within countries’ energy mix to the behaviour of lay-citizens. Continual conceptualising of solutions in terms of ‘climate protection’ may be too

102 Maguire R. (2012), “Incorporating International Environmental Legal Principles into Future Climate Change Instruments”, 6 *Carbon & Climate Law Review* (2) at 111.

103 Driessen P., Van Rijswijk H. at 567.

104 Gösele A., Wallacher J. at 102.

105 Roller G. (2018) “Prior informed consent”. In Krämer L., Orlando E. (eds) *Principles of Environmental Law*. Edward Elgar Publishing, at 338–352.

106 Terry M., Arseneau C., Thomas D., Smith P. (2019), “Towards an Indigenous-Informed Relational Approach to Free, Prior, and Informed Consent (FPIC)”, *International Indigenous Policy Journal* 10(4), at 1–28.

narrow to capture the complex nature of the necessary transformation of future society. We may ask if ‘just transition’ can become a new conceptual frame to this unprecedented challenge, highlighting the opportunities and participation in modelling the future shape of the low-carbon society, instead of the less attractive self-limiting demands of the ‘climate protection’ narrative. In that regard, further studies would be needed.

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