Many roads to justice: A longitudinal analysis of global scholarship on energy transitions

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Abstract

Over the last decade energy justice has rapidly emerged as an important research and policy agenda across disciplines. It seeks to address dilemmas between accelerated decarbonisation and democratisation of energy systems. However, different articulations and interpretations of energy justice have been co-opted into the dominant framework of the three tenets approach which risks (re)producing top-down and western centric knowledge on what counts as just (energy) transitions. Through this systematic literature review we address this gap by examining scholarship at the intersection of energy transitions and energy justice. From a total of 158 articles, we identified sixteen themes categorised into four groups – approaches to development, power and agency, policy and governance, and science, society and technology. Through these, we illustrate how nuanced articulations of justice emerge based on theoretical underpinnings, conceptual framings, geographical landscapes and historical contexts. Our findings suggest a need for mainstreaming feminist and postcolonial perspectives, and place-based community driven governance of energy systems- which reveal alternative traditions of ethics and philosophy for more equitable and just transitions. Our review concludes that plural conceptualizations of energy justice must be respected by scholars, renewable energy developers and policymakers to ensure that transitions are context sensitive and contribute to a larger societal, technological, political, environmental, and economic transformation that is just, equitable, and sustainable for people, communities and the planet.

1. Introduction

Amidst the global pressures for accelerated climate action, decarbonising energy systems have emerged as key to ensuring sustained economic growth and climate resilience. Both the global north and south economies are witnessing an unprecedented transformation in energy systems driven by the urgency for climate change mitigation, energy security needs and technological advancements. However, this has led to emergence of new dilemmas regarding accelerated action versus democratisation, green industrial transformation versus indigenous community rights, and ecosystem conservation etc. Energy justice is hence an important framework that aims to offer insights into designing "a global energy system that fairly distributes both the benefits and burdens of energy services, and one that contributes to more representative and inclusive energy decision making" (Sovacool et al., 2017). It implies equitable access, recognition of diverse stakeholders and contexts, participatory decision making, specifically for those who are historically marginalised and vulnerable to climate change, and those who are directly impacted by new energy infrastructure development (Sovacool & Dworkin, 2015).

Although given its potential as a powerful framework to leverage energy transitions for more just and equitable societies, the three tenet approach (procedural, recognition and distributive) to energy justice is not without its critiques and tensions. One of the prominent limitations of this framework is its normative nature (Wood, 2023), leading to lack of understanding of practices and processes through which justice principles get articulated, legitimised and operationalised in energy and industrial policy (Sovacool & Dworkin, 2015). Moreover, this concept has been critiqued for being western centric and top-down, where imaginaries of a just energy system are often determined by actors who have significant agency, at the cost of local communities and vulnerable actor groups who are often most affected by these projects (Lacey-Barnacle et al., 2020; Sovacool et al., 2017). Thus, presenting a need for a more nuanced and transdisciplinary understanding of justice, that speaks to local and regional contexts rooted in historic socioeconomic and cultural realities. In doing so, it is imperative to explore how justice has been articulated and conceptualised across diverse disciplinary, theoretical and thematic dimensions in global scientific literature.

In this regard, we adopt the PICOST approach (International Liaison Committee on Resuscitation, 2022) to comprehensively and systematically analyse multiple disciplinary perspectives on energy justice, to synthesise a transdisciplinary understanding of justice principles and their operationalisation across various theoretical and spatial contexts. Our approach spans eclectic domains including governance, political economy, feminist theory, and science and technology studies. By analysing trends in publication, theoretical underpinnings, and empirical evidence from both the Global North and South, we identify emerging clusters of inquiry—from economic development and degrowth, to power relations, public policy, and socio-technical studies. These clusters not only allude to the diversity of

scholarly engagement but also expose gaps in the conceptual and normative alignment of energy justice theory and practice.

This is important because it allows for a more nuanced and actionable whole systems understanding of energy justice, given the urgency for climate action while advancing economic growth and social wellbeing (Babiker et al., 2022; Revi et al., 2022) especially in emerging economies and peripheral regions (Lacey-Barnacle et al., 2020; Sovacool et al., 2020). Further, by consolidating an evidence base on how justice has been treated in energy transition literature over a decade (2013-2023), we inform policymakers and practitioners operating in specific geographical and institutional contexts. This study hence is vital to advance energy justice beyond abstract theorization, moving towards pragmatic solutions that respect local contexts, address historical injustices, and foster truly inclusive energy transitions. This is not merely an academic exercise; it is a critical step in ensuring that the promise of sustainable and just energy reaches everyone—through fair, equitable, and responsible production, consumption and policy practices.

The next section offers a description of our methodological approach followed by an analysis of the trends in the last decade where we compare the spatial and theoretical distribution of energy justice concepts. Subsequently we present our findings which include sixteen thematic lenses grouped into four overarching categories. Finally, we summarise the review with a brief discussion and conclusion which highlights key takeaways across scales, temporal dimensions, and governance levels, to enrich and address gaps in the three tenets approach to energy justice.

2. Methodology

The paper adopts a systematic review of literature to trace how justice concerns have been addressed in global scholarship on energy transitions. This literature emerges from various disciplines and theoretical vantage points including political science, economics, and governance.

Systematic literature review is appropriate for this study as it is widely used to identify and assess the state of knowledge in a field through reliable and replicable steps. It helps us collect relevant data on methods, contexts, conceptual frameworks, theoretical underpinnings and gaps in the existing literature in a scientific manner. Guided by the updated PRISMA flow diagram for systematic review of literature, figure 01 illustrates the methodology used in this paper.
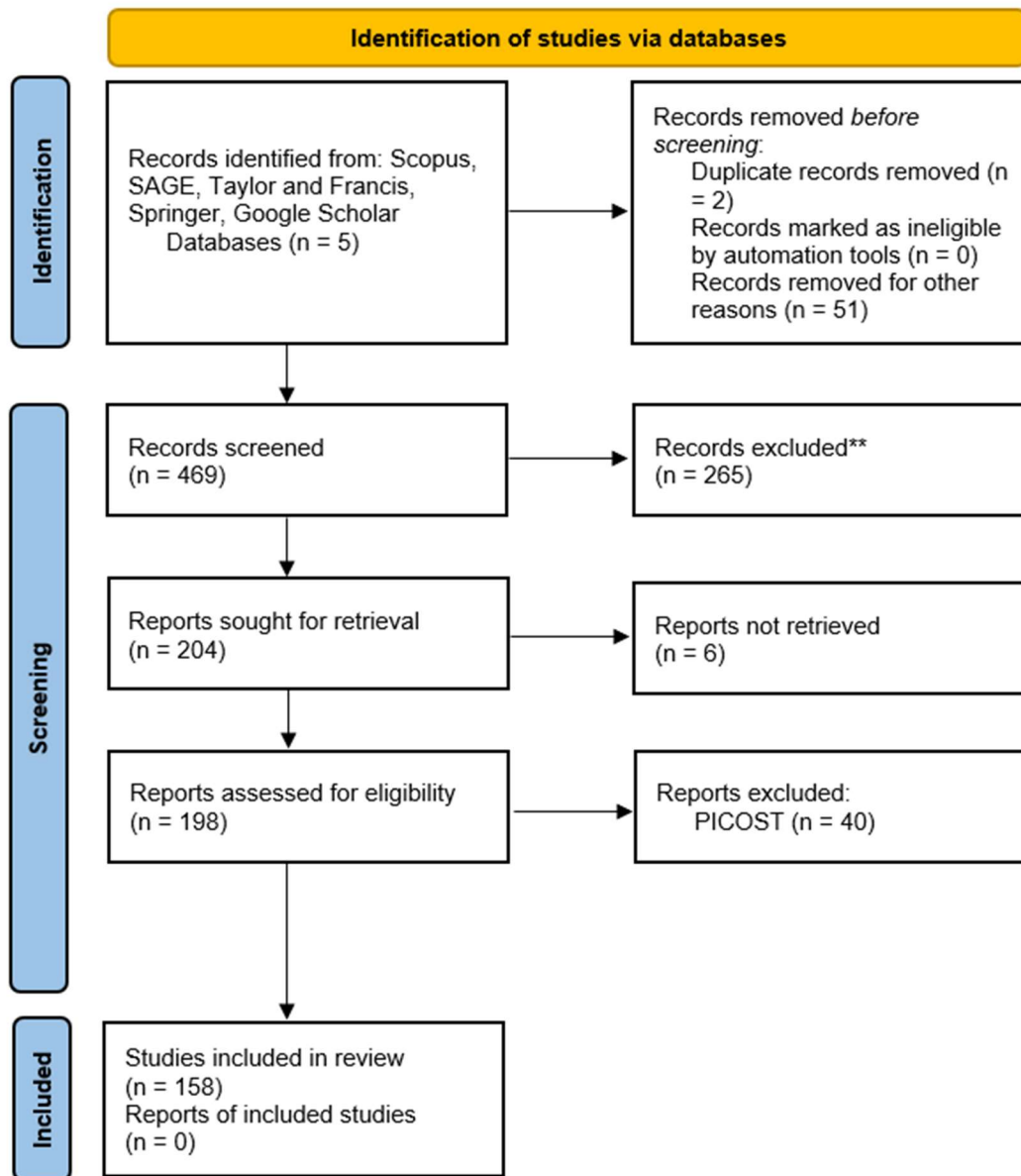
Figure 01: Flow Diagram of the proposed search study

2.1 PICOST approach

Preliminary overview of energy transition and energy justice literature in India was carried out across scholarly platforms such as SAGE, Taylor and Francis, Google Scholar, and Springer to test keyword strategies, and to refine research questions and disciplinary choices (drawing on Haldar et al., 2023). An evolving and iterative approach was developed to rescale the scope of the study from the Indian subcontinent towards a global and interdisciplinary context. A pilot analysis was conducted with five conceptual frameworks for energy transitions and energy justice from a larger body of literature to fine-tune key questions and formulate parameters for data extraction. This process was then consolidated into the framework of Population, Intervention, Context, Outcome, Scope and Time (PICOST) (International Liaison

Committee on Resuscitation, 2022) to ensure transparency, and minimize bias while conducting the following steps.

Subsequently, an article search was conducted based on the final criteria, using one carefully selected database. These articles were then screened and either included or excluded based on their relevance to the study. The final set of papers were then coded to study how energy justice has been embedded in the energy transitions literature.

2.2 Search criteria

The search query was used in Scopus to obtain the maximum numbers of papers relevant to the study in an objective manner. The following syntax was used: (TITLE-ABS-KEY ("energy transition*" OR "renewable transition*") AND TITLE-ABS-KEY ("justice" OR "just energy transition" OR "energy justice" OR "just transition*" OR "energy injustice*" OR "just renewable energy transition*")) AND PUBYEAR > 2011 AND PUBYEAR < 2024 AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SUBJAREA , "ENER") OR LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "ENVI") OR LIMIT-TO (SUBJAREA , "ENGI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "AGRI") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "EART")) AND (LIMIT-TO (LANGUAGE , "English")).

While keywords such as energy poverty, affordability, fairness, social equity intuitively appear to be a part of energy justice, the preliminary keywords testing showed that they hold a certain degree of bias from the authors' assumptions of what is understood as "just." Therefore, to keep the search string objective and unbiased, such keywords were not included.

While the study is geared to being interdisciplinary, papers from technical fields such as mathematics, engineering, medicine and physics were excluded. Since energy justice as a concept first emerged around 2011, the temporal range was set in accordance till the cutoff in May 2023 at the time of commencing the research project. Furthermore, only peer-reviewed journal papers in English were included and all other sources such as book chapters, theses, and reviews were excluded.

2.3 Screening and eligibility test

The initial records acquired from Scopus were screened manually in Sysrev to assess their relevance to the study based on their titles, abstracts and keywords. A set of questions with Boolean values and categorical labels were used for automatic inclusion or exclusion. If adequate information was not available to answer all the required questions, full-text readings were carried out before excluding any papers. Assessing the relevance was based on the PICOST framework with integrated questions to ascertain quality. In summary, only

articles that contained a theoretical or conceptual framework were included, and were categorised according to sub-disciplines in the social sciences. These are not mutually exhaustive parameters, hence articles with different methodologies such as modelling and simulation, empirical, review, experimental and survey were included if they had a theoretical component. This step resulted in 204 articles for the final phase of full-text reading and coding. During this process, articles that did not clearly conceptualise energy justice or were defined synonymously with climate and environmental justice were excluded. This eligibility assessment resulted in 158 articles found to be suitable for the analysis.

2.4 Content analysis and data coding

A systematic summarising of articles was a key element in ensuring verifiability of the entire coding and data extraction process. First, the methodology, research objectives, problematization and key findings were noted. Subsequently, subdisciplines were identified for each paper, which included anthropology, development studies, economics, gender studies, governance, humanities, international affairs, law, policy, political ecology, political economy, political science, socio-technical studies and sociology. Articles which comprised more than one subdiscipline were classified into the most suitable category based on other data fields. The next set of descriptive fields extracted were: scale, energy end-user, social impacts (such as education, employment, health, values, etc.), sectors affected by energy transitions (such as urban, agriculture, transport, etc.), typology of renewable energy (such as wind, solar, biogas, coal, etc.), grid infrastructure (decentralised, centralised, off-grid, hybrid, etc.), and short- and long-term implications of energy justice.

The main analytical data extraction consisted of theoretical underpinnings or conceptual frameworks (further categorised as western or non-western) used to analyse energy transitions and articulate energy justice (either as proper definitions, principles, referenced definitions or through keywords). Although this paper does not focus on empirical evidence, geographical locations were mapped (as global south or global north) and have been used as examples to illustrate how theoretical frameworks and justice articulations were operationalised and applied to a specific country context. Finally, information extracted from the above steps was consolidated into emerging themes, namely, capabilities approach, degrowth, economics, post-colonialism, feminism, geography, health, human rights, governance, policy, community, democracy, local governance, socio-cultural, socio-technical studies and technology. These themes were further clubbed together into four distinct clusters to form the backbone of our thematic analysis. The primary goal of this analysis is to use the most pertinent data indicators to unpack the underlying complexity of embedding normative articulations of energy justice within energy transitions.

2.5 ROSES reporting and protocol

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) was designed to address poor reporting of systematic reviews (Page et al., 2021). The guideline, protocol and statement include reporting guidance for high quality identification, selection, appraisal and synthesis of literature. It is widely adopted in various disciplines, however its focus on healthcare and medicine implies limited applicability to our paper. Hence, we used the RepOrting standards for Systematic Evidence Synthesis (ROSES) (Haddaway et al., 2018) that was developed to overcome this limitation for reviews and systematic maps in the field of conservation and environmental management along with integration of qualitative and mixed methods.

The ROSES protocol was a vital checklist to ensure our review conformed to high quality standards as it requires a record of the summarized information to validate the transparency of reporting the data. Additionally, as stated in the checklist, we explored several tools for critical appraisals, heterogeneity tests and strategies for elimination of bias for qualitative reviews. However, we observed that a separate quality assurance procedure was increasing our bias and we therefore integrated these steps into our PICOST framework to ensure robustness and quality. As a result of which, we adopted the simplified and integrated PRISMA flow-diagram, but chose to follow the ROSES protocol checklist prior to conducting our review.

3. Trend Analysis

3.1 General Trends

The temporal trends of the academic papers, shown in figure 02, indicate a growing interest in the scholarship on justice at the intersection of energy transitions with more than 85% published 2018 onwards. This exponential increase can be further disaggregated into disciplinary trends that reveal that over 40% of the papers fall within the sub-disciplines of political economy and governance. Political science, sociology and economics comprise over 35% of the papers and the remaining are shared by other disciplines with single digit papers. Most importantly the number of sub-disciplines contributing to the scholarship on energy justice have seen a steady expansion from 1 single discipline in 2013 to 11 unique subdisciplines in the year 2021. Out of a total of 14 unique subdisciplines from the entire study period, there has been an annual mix of at least 8 or more from 2019 onwards, prior to which there were 2 or fewer between 2013 and 2016 and exactly 5 in 2017 and 2018. This rate of growth in the scale of literature and in the diversity of disciplines is possibly linked to global trends in recognizing the importance of just transitions in line with the Sustainable Development Goals (SDGs) and international climate targets for renewable energy.
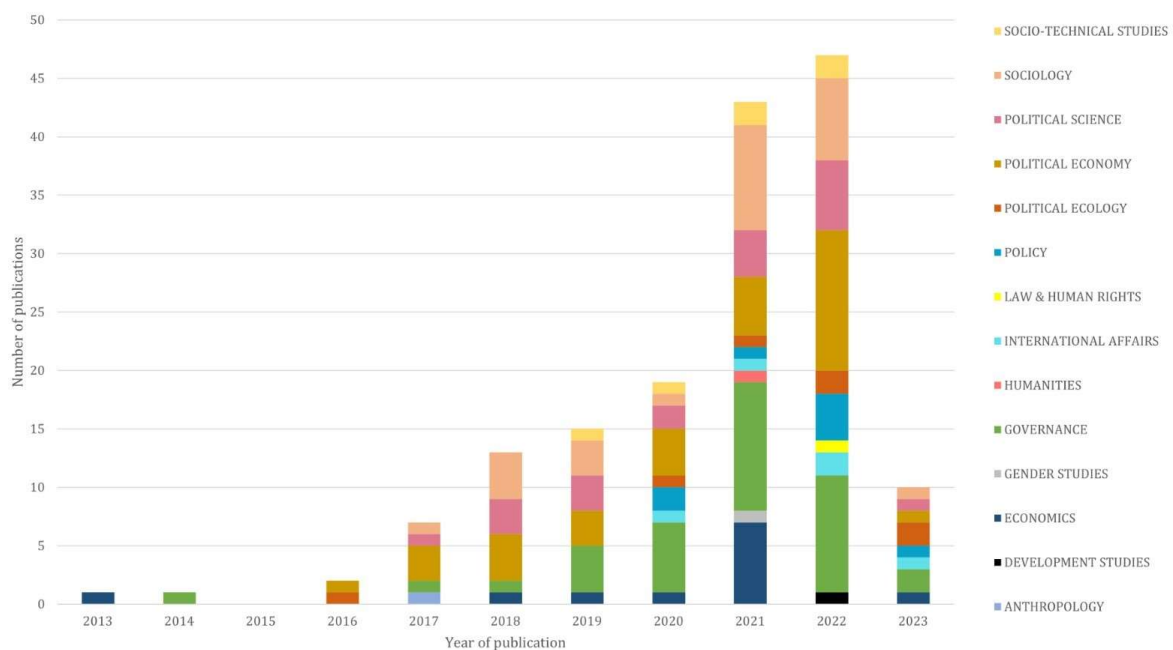
Figure 02: Disciplinary distribution of publications

Source: Authors' own analysis

3.2 Theoretical origins

The theoretical underpinnings and conceptual frameworks discussed in these papers have been organised to reflect their origins in terms of western, non-western and combined. Along with the increased scholarship there is only a marginal increase in papers adopting non-western theories of justice, as highlighted in figure 03. The three papers adopting a purely non-western perspective on justice occur in 2019 (n=1) and 2022 (n=2). The set of papers focusing on a mix (n=27) begin in single digits from 2017 and peaking to 10 in 2021. Papers adopting western notions of justice (n=128) exclusively amount for more than 80% of the papers which indicates an intense and heavy bias in the scholarship. Despite a 126% surge in papers from 2020 (n=19) to 2021 (n=43), over 3/4ths are exclusively dominated by western thought. 80 out of 100 papers in the last three years are based on western theories while only 20% adopt either a non-western or a mixed conceptual approach.
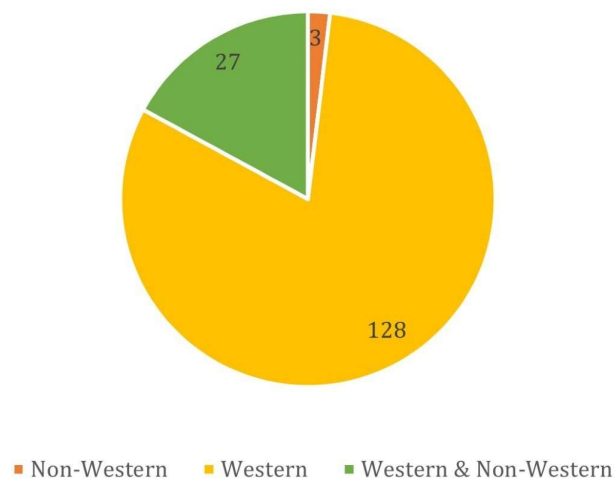
Figure 03: Theoretical distribution of publications

Source: Authors' own analysis

3.3 Regional map

Situating the theoretical underpinnings or conceptual frameworks into distinct geographies highlights a disparity between regions as mapped in figure 04. Using (Rao et al.'s) categorization, 8 regions and 2 exceptions were identified as shown in figure 05. These are – Europe and the United Kingdom, Latin America and the Caribbean, North Africa and the Middle East, North America and Canada, Oceania, South Asia, Southeast and East Asia, Sub Saharan Africa, and multi region and not country specific. 18 articles were not specific to any region and 19 dealt with multiple regions. Europe and UK share a 33% focus, Southeast and East Asia, and North America and Canada share an 11% split each, while Latin America and the Caribbean, Sub Saharan Africa, and South Asia have a share of 7%, 8% and 3% respectively.
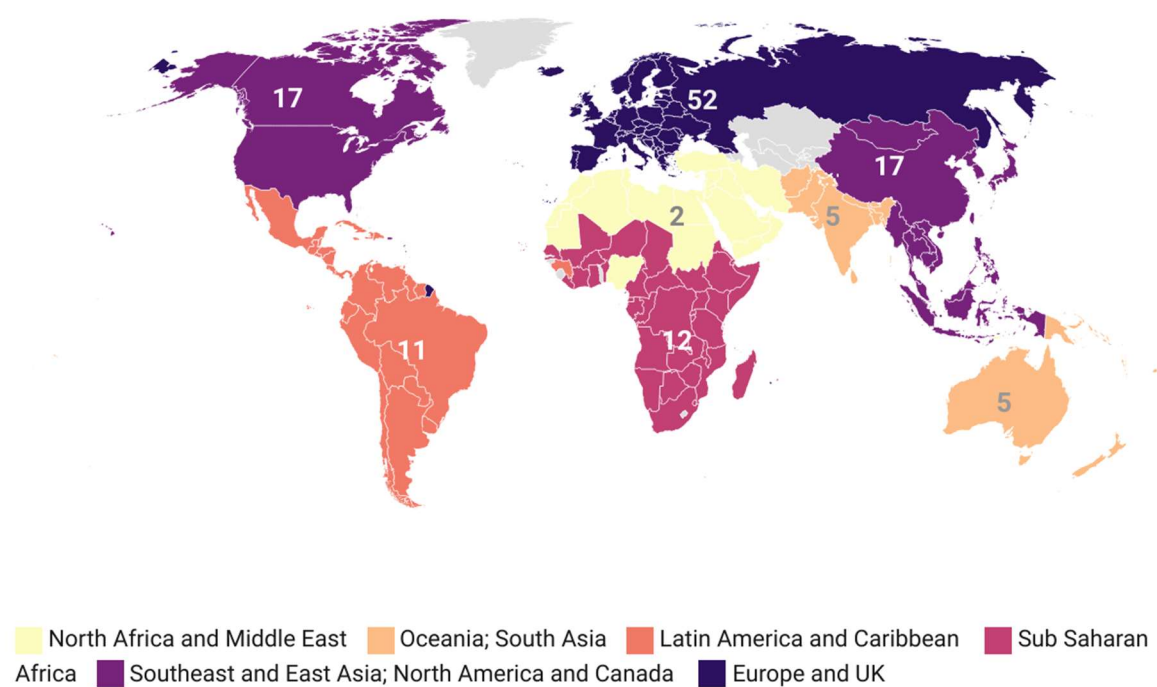
Figure 04: Spatial distribution of empirical examples used in publications

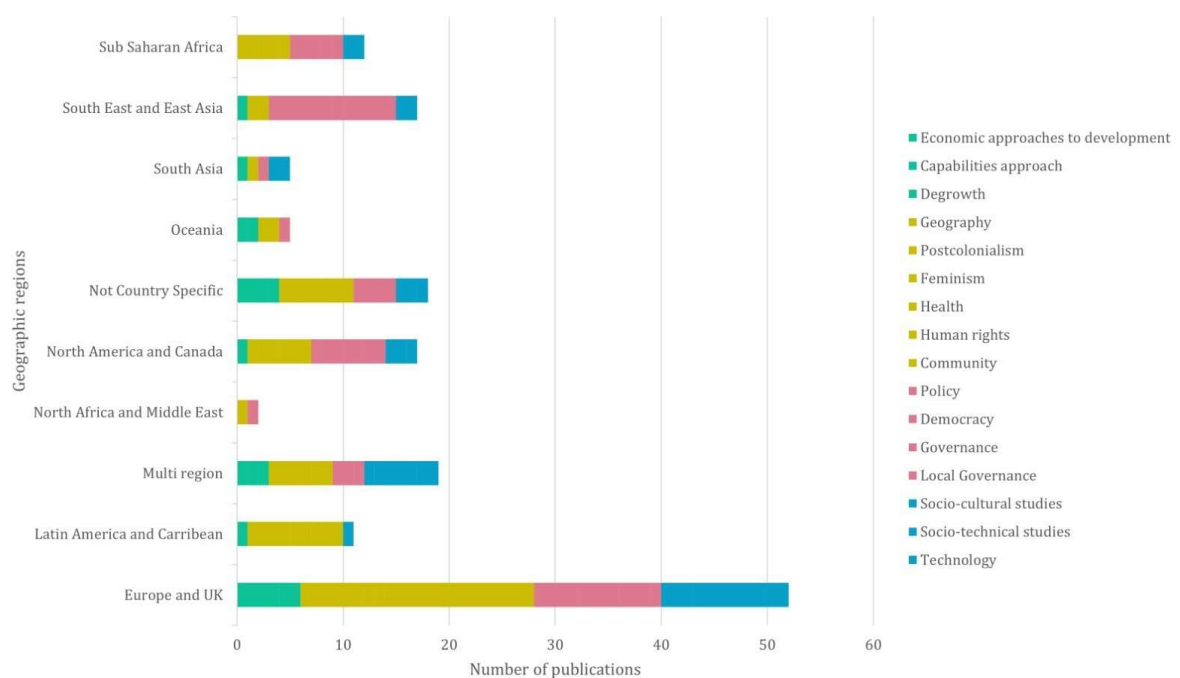Source: Authors' own analysis

Figure 05: Thematic distribution across geographical regions

Source: Authors' own analysis

3.4 Scale

Giving relevance to the theoretical foundations and their supporting methodologies has been mapped across scales of Continental, Global, National, Regional and Local in figure 06. Since we excluded papers that dealt with micro level case studies without adequate focus on theoretical understandings, we find the application restricted to global (n=54) and national (n=75) levels. Transboundary applications of global and national are captured through continental (n=10) and regional (n=14).
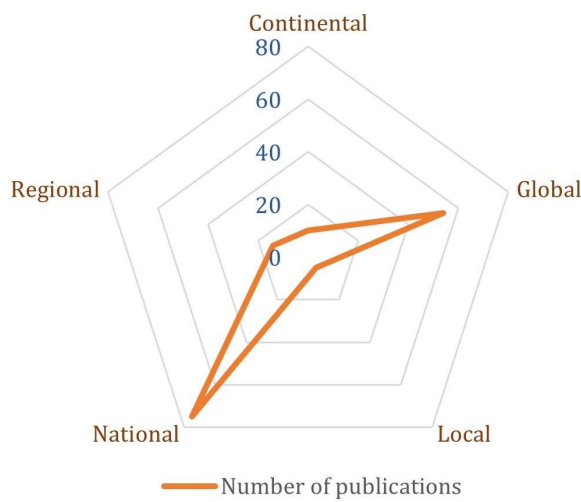
Figure 06: Scale of theoretical applications across publications

Source: Authors' own analysis

3.5 Journal

58 different journals have contributed to this body of literature with Energy Research and Social Science hosting a majority of 42 papers. Applied Energy and Energies has 11 papers each and Energy Policy has 10, the remaining 54 journals have single digit contributions to the sample for this study.

4. Thematic synthesis

4.1 Introduction

In this section, we first introduce the emerging themes and situate them regionally and geographically to substantiate the previous section and link it to our analysis. The themes were formulated based on the content analysis of the papers. Similar ideas, concepts, theoretical arguments and logics were coded and grouped into a single theme. These themes were grouped into a total of 4 clusters, namely — approaches to development, power relations, public policy, and science and technology. The prominent areas of inquiry include

economic development, capabilities approach, postcolonialism, energy geographies, feminism, governance, policy, democracy, community, socio-technical studies, socio-cultural and technology.

4.2 Cluster 1 — Approaches to development

Of 158 papers reviewed in-depth, the "approaches to development" cluster comprises a total of 19 papers distributed in themes of economic approaches to development(n=12), degrowth (n=1) and capabilities approach (n=6). The papers are distributed across multiple geographical regions except Sub Saharan Africa. Over half the papers stem from the global north. Although there is a mix of methods used in these 19 papers, only 5 papers are purely conceptual explorations.

4.2.1 Economic approaches to development

Economic approaches to development recognise the costs and benefits of energy transitions situated within existing economic policies and markets. Commercial risks and capital intensive low-carbon energy infrastructures present challenges to sustainable development on accounts of equity, affordability and access (Heffron et al., 2021). A financial institution perspective on principles of justice proposes additional concepts of compensation, local value, place-based finance, and financial resilience (Pellegrini-Masini et al., 2020). These are often absent while overcoming trade-offs between efficiency and equality through mechanisms rooted in the financialization of energy which reinforces a limitless drive for energy (Arora & Schroeder, 2022; Daggett, 2021).

A market-led approach to energy as a key pillar of running the economy is built into the capitalistic histories of fossil fuel extraction that have profited through environmental racism and colonial forms of domination (Daggett, 2021). These continue to threaten energy transitions by shifting the focus on energy technologies within fundamentally subjective political processes. This does not mean that technology is not important, but innovation of energy sources such as fossil fuels have gained prominence not because they were cheaper or efficient, but because they were congruent with the logic of control, extraction and domination within existing hierarchical political relations (Daggett, 2021). This is supported by the fact that every new source of energy has only led to an expansion and addition of energy in which older fuel systems have flourished alongside and not been replaced.

In this light the Anthropocene is problematised for the unbridled impulse to grow against ecological limits (Arora & Schroeder, 2022; Daggett, 2021). Justice as a response to this economic and political dominance of capitalism takes the form of struggles and resistance through eco-socialism, divestment and energy democracy (which will be reviewed in a later section). Interestingly, the idea of distributional justice based on Rawls' fairness highlights the benefits of abundant energy on the quality, welfare, liberty and intra- and inter- generational justice (Schlör et al., 2013). By extension, distributional, recognition, and procedural justice

rely on institutional structures of a liberal market economy as in the UK or a coordinated market economy as in Germany to achieve outcomes associated with energy finance including affordability, due process, transparency and intra-generational equity (Hall et al., 2018).

On the other hand, an anti-resilience framework articulates energy vulnerability as a product of the commodification of energy systems as opposed to conceptualising energy as a commons which calls for deliberation on energy equality, relative equity and ownership as dimensions of justice (Keady et al., 2021). A deeper investigation of power, differentiation and opposition within social processes that influence the global energy economy adopts a Social Exchange Theory lens and calls for a "redefinition of the relationship between humanity and environment" (Wyleżałek, 2021). To facilitate justice within energy transitions, the market can serve as an enabler for accessible energy markets which reduce energy poverty and increase human wellbeing. Polycentric governance can also facilitate a more transparent, fair and equitable management of energy resources. Nevertheless, the same market also emerges as a barrier in the light of continued resource extraction of critical minerals associated with the energy transition, elite captures of political economic agendas, and worsening disparities in energy consumption by wealthier groups of society (Schlör et al., 2013).

4.2.2. Capabilities approach

The capabilities approach (CA) developed by Sen and Nussbaum is a normative framework for evaluating well-being and the quality of life based on peoples' opportunity and freedom to choose what they value. A capability is essentially the autonomy to achieve valuable human "functionings" which are "doings and beings" that allow people to achieve a good life (von Platten et al., 2021; Willand et al., 2021). For example, good health is a core capability which can require secondary capabilities such as being able to heat or cool homes which may require tertiary capabilities of being able to afford energy (Velasco-Herrejon & Bauwens, 2020).

Within the energy transition scholarship, CA has been widely used to reframe the energy poverty nexus as structural inequalities which reproduce energy vulnerability, energy deprivation and energy insecurity (Biswas et al., 2022; Hearn et al., 2021). Uncovering the interstices of energy poverty is useful for reorienting the triumvirate and other tenets of justice towards a livelihood-based understanding of intra- and inter- generational equity (Hearn et al., 2021). In this sense, CA provides a multidimensional understanding of a just transition as a means to augment people's capabilities and the degree of freedom available to exercise certain choices to improve lives and livelihoods. Empowerment, agency and self-determination emerge as important justice outcomes implying that a lack of access to clean energy is an injustice because it is inherently a capability deprivation which adversely affects the agency of people to live the life they value (Biswas et al., 2022). Thus, CA helps conceptualise justice in a bottom-up and context-sensitive manner to arrive at articulations

which acknowledge that different people need different amounts and types of energy to reach the same levels of well-being (Biswas et al., 2022).

Building a context-sensitive definition of justice is incomplete without a temporal dimension. Malakar et al., 2019 draw from Sen's interpretation of the Hindu Bhagavad Gita which differentiates between "duty-focused" and "consequence-sensitive" justice in a non-western philosophy. This perspective reveals a time-dependent process with trade-offs between short- and long-term outcomes. For example, India's drive to expand thermal power plants to meet present day energy poverty ignores the future consequences of such actions. Other unconventional theories operationalising the CA include rational choice theory, sufficientarianism, egalitarianism, prioritarianism, utilitarianism, and hedonism (von Platten et al., 2021). These analyse the notion of energy justice by focusing on outcomes of energy needs, wellbeing and a good life.

4.2.3 Degrowth

Dunlap & Laratte, 2022 invoke the liberalisation of energy markets and the subsequent deployment of large-scale renewable energy (RE) infrastructure to unpack the debate between social modernism and degrowth. Social modernism approaches to energy have rebranded low-carbon infrastructure and electric vehicles as technological salvation to achieve security, autonomy and freedom from drudgery. Degrowth on the other hand, defined as, "planned downscaling of energy and resource use to bring the economy back into balance with the living world in a safe, just and equitable way" questions what is meant by eco-modernist terms such as "green" "clean" "renewable" and "sustainable". Degrowth also emerges as a response to the interwoven relationships between energy infrastructure, sustainable development and modernism. In this light, promises of health, security, access and employment normally associated with energy justice are rendered illusionary exemplifying "a modernist, even futuristic, brutalism" (Dunlap & Laratte, 2022). Instead, degrowth draws from feminist research and ecological Marxism to envision just transitions as socio-ecological approaches which ensure the "de-thingification of humans and nature" (Dunlap & Laratte, 2022). Some of these approaches to justice include decoupling of economic growth from material extraction, localised low-carbon infrastructures, slowing down of industrialisation, and the disruption of technocratic energy languages.

4.3 Cluster 2 — Power and Agency

The "power and agency" cluster comprises a total of 38 papers distributed in themes of colonialism (n=9), feminism (n=7) and geography (n=19), health (n=2), and human rights (n=1). The papers are distributed across all geographical regions, with the highest being Europe and UK (n=9), followed by Latin America and Caribbean (n=7), and Sub-Saharan Africa (n=5). 11 papers are situated in the global north, whereas 15 papers are situated in the global south.

4.3.1 Geography

Spatial inequality is one of the central pillars of this strand of inquiry which unravels interlinkages with the geopolitics of energy and international political economy of energy transitions. A geographical lens of analysing energy transition questions the role of the state as an enabler of energy access and political strategies that either erases or reconfigures socio-spatial differences (Bosch & Schmidt, 2020; Fathoni & Setyowati, 2022). Henri Lefebvre's conceptualisation of the "production of space" offers a multifaceted framework to analyse the complexities of energy justice (Bosch & Schmidt, 2020; Fathoni & Setyowati, 2022). For example, the German *Energiewende*, exemplifies a technology-driven "conquest of nature", extending to "the everyday spaces" of rural communities (Bosch & Schmidt, 2020; Brock et al., 2021). These altered energy landscapes are not neutral or empty spaces, but are co-produced through interactions between energy technologies and existing social structures (Golubchikov & O'Sullivan, 2020). Another example showcases how state-led electricity infrastructure in the name of universal access, can undermine market-led initiatives while reproducing state control over energy (Fathoni & Setyowati, 2022). Such territories, shaped through processes of state making and are simultaneously homogeneous, fragmented and hierarchical.

Based on this understanding, the tenets of distributional, procedural, restoration and recognition justice serve only as a starting point to realise that existing social inequalities and new energy landscapes might overlap to reproduce uneven energy geographies. Hence exacerbating the natural unevenness of geographical resources and unequal regional capacity of local institutions and communities to engage in energy transitions. Such spatial hierarchies are referred to as "landscapes of material deprivation" and call for forms of local energy consumption and production, decentralisation of energy infrastructure in terms of space, energy citizenship, and area-based decarbonisation (Hornborg et al., 2019; Lacey-Barnacle, 2020).

Examining conceived, lived, and perceived spaces reveals how the socio-materiality of energy landscapes is shaped by a neoliberal logic which reduces landscapes to a production factor, and emphasises that the human-energy relationship goes beyond the hegemony of capitalist capture of space (Bosch & Schmidt, 2020). More practically, these translate into community energy with citizen-oriented energy projects which are not merely about modernising energy systems, but attempt to overcome socio-spatial inequalities and injustices.

The unevenness of energy transitions is explored through allied concepts of core-periphery dichotomies (Golubchikov & O'Sullivan, 2020; O'Sullivan et al., 2020). These concepts interrogate asymmetrical historical, cultural, and spatial relations that are self-replicating through the materiality of energy. For example, a case study of Wales demonstrates how the absence of economic agglomeration, lacking political power, and dependence on off-grid energy sources results in a transition that perpetuates energy deprivation and energy

vulnerability (O'Sullivan et al., 2020). Communities in highly dense areas subsidise other (peripheral) localities in different RE transition phases. The urban-rural binary further illuminates how city centres are dependent on and compete with peripheral areas for energy production (Golubchikov & O'Sullivan, 2020). These "outer" regions are often inhabited by already marginalised communities and fragile socio-energy relations. This compounds systemic patterns of exploitation, exclusion and disenfranchisement (O'Sullivan et al., 2020). This approach introduces energy justice not only as relevant before and after transitions but throughout, emphasising local economic benefits, democratic ownership, and prosumer models. A relational approach to justice demands the end of domination, dispossession, and displacement through energy decentralisation and de-peripheralization (Kelly, 2021; Sovacool, Turnheim, et al., 2021). Dispossession is a core challenge interfacing political ecology, sacrifice zones and energy justice. Here, dispossession either physical, economic, environmental or political indicates a neoliberal restructuring through the "privatisation of profits and the socialisation of losses" (Sovacool, Turnheim, et al., 2021). This literature highlights extractivism, land grabbing, waste dumping, violence, racism and disempowerment as evident in spaces like Ghana's cobalt mines (Sovacool, Turnheim, et al., 2021). A just transition must address both social and environmental dimensions including child labour, criminalization of resistance, challenging binaries like "dirty" and "clean" energy, and practices like greenwashing. It raises critical questions — for whom is a low-carbon transition sustainable and why unjust transitions can be self-defeating.

From a legal geography perspective, dispossession is analysed through indigenous rights, informal practices and more-than-human actors and relationships. Settler colonial geographies often impose state knowledge over plural ways of knowing (Kelly, 2021). Articulations of justice hence revolve around ancestral knowledge, spiritual relationships to the land, and ways of knowing that emphasise the commons and social wealth over privatisation, extraction and division of communities (Kelly, 2021; Sovacool, Turnheim, et al., 2021).

Evidently, energy technology, shaped by capitalist interests, perpetuates colonial legacies by displacing environmental and labour burdens onto marginalised regions. RE technologies, despite their green allure, remain tied to exploitative global supply chains, reliant on low-wage labour and rare earth minerals. The wealthiest countries are "net importers" of resources, benefiting from invisible material transfers (eg. embodied labour, land, energy and materials) that neoclassical economics overlooks (Healy et al., 2019; Wade & Ellis, 2022). A Marxist view on energy justice hence calls for a radical transformation of global political economies and technology to dismantle the domination of land and labour (Wade & Ellis, 2022).

A geographical political economy unpacks the social contestations of fossil fuels and RE through four justice conceptions — utilitarian (maximising emissions reduction), distributive (ending fossil fuel path dependencies by prioritising RE efficiency), restorative (offsetting

historical fossil energy use), and rehabilitative (political willingness and public support for transitioning away from fossil fuels despite higher costs (Le Billon & Kristoffersen, 2020). These concepts can be difficult to reconcile as evident in North Macedonia's dependence on fuelwood which contributes to energy independence despite high prices, pollution, and insufficiency of supply (Moles-Grueso & Stojilovska, 2022).

Energy justice is shaped by economic, political, ideological and military values with in-built tensions over ideas of security, poverty, natural resources and economic wealth amongst and between developed and developing regions (Wójcik & Jeziorska-Biel, 2023). This understanding can reveal vertical, horizontal and transversal dimensions of energy transitions. Transboundary energy supply chains have de-industrialized the global north while shifting environmental and labour burdens to the global south (Brock et al., 2021). RE sacrifice zones, particularly in upstream and downstream phases, contrast sharply with promises of green industrialization, contributing to social erosion and authoritarian populism, as seen in coal nationalism and solar energy narratives (Knuth, 2017).

A broader conception of green capitalism along with theories of rent and ownership deliberates on whether resources like sun and wind should be privately owned or managed as common-pool resources (Wade & Ellis, 2022). Hence highlighting issues of governance and ownership that might exacerbate energy inequities- raising concerns about territorial control and rent seeking.

Political ecology is well-positioned to identify how nationalisation, territorial management, and privatisation result in ecological distribution conflicts including inequitable natural resource access (Martínez & Castillo, 2016). Different actors at different scales exercise power to varying degrees in their pursuit of competition, self-sufficiency, maximisation, and efficiency. A just transition should not merely compensate for harms but transform development models based on land appropriation (Knuth et al., 2022). Recognizing the cultural and ethnic values tied to land, this approach promotes autonomy and self-determination over profit-driven exploitation (Martínez & Castillo, 2016). Ultimately, a just transition towards renewables must centre the lived experiences of marginalised communities, creating pathways for political and social emancipation that challenge current models of development.

4.3.2 Postcolonialism

A postcolonial approach to energy systems relies on historical and subaltern narratives around the politics and legacies of colonialism. This scholarship challenges the idea of the Anthropocene that all humans must unite to accelerate energy transitions (Castán Broto et al., 2018). By focusing on difference and history, a universalised and neutral conception of justice is debated, positioning energy transitions as a phenomenon which impacts different people in non-identical ways, shaped by varied starting positions and experiences with energy

systems (Tornel, 2023). The Anthropocene's environmental crisis has been critiqued for its colonial underpinnings.

For example, the militarisation of the occupied Syrian Golan Heights under the guise of wind energy, normalises the denial of basic human rights such as self-determination, sovereignty, and livelihoods (Alkhalili et al., 2023). Government-led land grabs and corporate investment in energy extraction in (often illegally) occupied territories depoliticizes climate change and legitimises the violation of international law. Settler colonialism by the global north re-emerges in new energy hierarchies, dehistoricising accountability for the climate crisis, and weaponising energy transitions (Alkhalili et al., 2023).

Understanding whose knowledge, justice, and reality is allowed to be real, requires a formulation of justice where many worlds fit together (Alkhalili et al., 2023; Tornel, 2023). The disregard, elimination, and oppression of traditional forms of knowledge are characteristics of coloniality of power, knowledge, and being (Velasco-Herrejón et al., 2022). Challenging the western individualist and materialistic worldviews of sustainability as defined in the Brundtland Report requires recognition of humans as part of a larger web of life depicting harmonious co-living with other forms of life. This approach views natural resources as spaces of ancestral wisdom and spirituality, to be shared through cooperation and solidarity (Velasco-Herrejón et al., 2022). It centres gratitude, reciprocity, humility and non-monetary needs, and non-material aspirations, aligning with notions of frugality and self-sufficiency that underpin degrowth theories (Velasco-Herrejón et al., 2022). Although these ideas diverge from utilitarian perspectives on sustainable development and energy transitions, they are essential to develop a decolonised understanding of energy justice.

Justice dimensions of distribution, recognition, participation, cosmopolitanism and restoration merely affirm these hierarchies instead of challenging the anti-politics that erases and obfuscates race, gender, class, and caste that underpins energy systems (Tornel, 2023). Destabilising the western-centric understanding of justice rooted in democracy, good life, freedom, happiness, and development, needs an articulation based on how people relate to their surroundings and one that addresses difference and otherness (Alkhalili et al., 2023; Mookerjea, 2019). Drawing on ecofeminism, queer epistemologies, ethics of relationality and care, by adopting "intersectional, intergenerational, intercultural, interspecies and interdependent ways of thinking and doing politics" can be powerful in developing a new language for "thinking and being together with our ecosystems" (Mookerjea, 2019; Velasco-Herrejón et al., 2022). A decolonial lens to study energy transitions can help situate degrowth, regenerative commons, and reproduction of common wealth within just transition scholarship (Mookerjea, 2019).

4.3.3 Feminism

A feminist approach entails unearthing the gendered impacts of energy systems and the unsustainable energy cultures attuned to tangled webs of power, profit, and politics of climate change and energy transition. For example, Columbia's energy policies, and Ethiopia's micro-hydropower cooperatives, illustrate how gender-response policies can lead to just transitions by enhancing women's agency (Mohr, 2021).

Mary Robinson's famous declaration that "climate change is a man-made problem and must have a feminist solution" strikes at the heart of challenging a male dominated energy industry which continues to add to global energy consumption and inequality (Mang-Benza, 2021). Interlocked modes of domination and victimisation perpetuated through patriarchy, supremacy, and masculinity require a reclamation, redirection, and restructuring of the energy sector (Allen et al., 2019).

A feminist agenda prioritises relationality, pluralism, and collectivism over individualism. This prioritisation serves to break binaries of rational-emotional, nature-human, white-black, and clean-dirty, associated with energy systems. Different strands of feminist scholarship such as ecofeminism, decolonial feminism, black feminism, Marxist feminism, and Anthropocene feminism contribute to creating an agenda which challenges incumbent "matrices of domination" (Bell et al., 2020; Sejer Damgaard et al., 2022).

This agenda demands recognition of "capitalism's debts to reproduction and nature" and the global north's exploitation of the global south's resources and people (Bell et al., 2020). It counters white masculine conceptions of labour and resources by re-imagining energy limits and low carbon lifestyles that prioritise wellbeing. A feminist construction of energy justice not only centres women and queer people, but uses gender as a lens to question the linkages between energy systems, masculinity, violence, and definitions of humanity and nature.

Energy justice guided by care ethics, emphasises interdependence, empathy, and alternate value systems that prioritise human and non-human wellbeing, care and dignity (Bell et al., 2020; Sejer Damgaard et al., 2022). This perspective challenges rational and individualistic ways by furthering an agenda for necessity, dependence, and gendered relationships of care, both formal and informal, paid and unpaid. Empowering women as active energy citizens reshapes the energy system, shifting from servitude to empowerment, addressing gender blindness, and redistributing power for gender-responsive energy justice (Allen et al., 2019; Sejer Damgaard et al., 2022). A feminist reconfiguration goes beyond increasing female participation in renewable energy; it seeks to transform gender relations, alleviate women's burdens, and achieve genuine equality.

4.3.4 Health

Literature at the intersection of health and energy is scarce in energy transitions scholarship. Yet, it is imperative to take into account the social differences that arise in the context of health and its connection to energy. Access, needs, and choice are fundamentally different

for healthy and unhealthy or disabled people (Ivanova & Middlemiss, 2021). Households with differently abled individuals are often faced with lower energy access and reduced energy consumption. This directly impacts the availability of essential health services and resources, which are energy-dependent and critical for managing health conditions. The situation is exacerbated by the scarcity and inaccessibility of these services, creating significant barriers for those in need of continuous care, highlighting the compounded challenges of energy poverty and health inequities.

Similarly, physical and mental wellbeing are closely tied to energy consumption, while energy systems adversely impact natural ecosystems, leading to negative impacts on human health. Human and environmental health are hence, not isolated, both being equally important. A health-focused approach to energy justice recognises that human and environmental health are critical for one another (Grant et al., 2021). It further ensures that unhealthy people are not rendered invisible by energy transition policies and calls for a distinction between energy choice and energy need because "energy is not purchased for its own sake, but for the energy services that it delivers" (Ivanova & Middlemiss, 2021).

4.3.5 Human Rights

Human rights perspectives overlap with the earlier section on postcolonialism as a rights-based framework has appeared in the context of autonomy and sovereignty. A more comprehensive human rights approach to energy attempts to uphold the rights of billions globally, aiming to achieve universal access through international law and the sustainable development goals (SDGs). Energy for instance, is one the largest emitters and is therefore one of the main drivers of climate change (Wewerinke-Singh, 2022). Achieving universal access to clean energy as stated in SDG 7 alone is insufficient to transform the structural flaws in our current energy systems. Drawing attention to human rights within energy transitions can also serve to address the nexus between inequality and climate change. Wewerinke-Singh, 2022, aims to differentiate between rights to energy access, energy rights, and human rights as a moral instrument embedded in rules of energy transitions either through policy or litigation which helps achieve SDG 7 and all the other SDGs.

4.4 Cluster 3 — Policy and Governance

Of 158 papers reviewed in-depth, 69 papers discuss five themes surrounding policy and governance, namely community (n=23), democracy (n=12), governance (n=14), local governance (n=4) and policy (n=16). This demonstrates substantial research into energy policy and governance for implications on justice. The papers are diverse in terms of geographical distribution, application of scale and methodology. Only one paper uses a combination of western and non-western conceptualization of justice while the remaining adopt entirely western approaches.

4.4.1 Community

The concept of community in energy transition literature is complex, characterised by heterogeneity in power, control, and participation, yet it places people at the core of energy transitions (Braunholtz-Speight et al., 2021; Mang-Benza & Baxter, 2021). Citizen-led participation in energy transitions, embodies elements of locality, democracy, energy autonomy, and poverty reduction. Understanding justice through these dimensions allows for deeper insights into how energy impacts, and is in turn impacted by social contexts. Procedural justice emerges as a central theme here — emphasising bottom-up negotiations, community agency, vulnerability and rights of marginalised communities (Banerjee & Schuitema, 2022; Huang & Glaser, 2021; Mundaca et al., 2018; Vega-Araújo & Heffron, 2022). The procedural perspective surfaces the dynamics of processes related to restoration, reparation, and remediation of historical injustices thus highlighting the need for integrating justice and equity in energy policy and practice.

Identity is a cross-cutting feature across articulations of justice in this theme. Place attachments, territorial rights, and social relationships embedded in the local contexts are key elements that define community identity (Hoicka et al., 2021), specifically for those whose perception of justice is tied to ancestral land or traditional livelihoods like coal mining (Barragan-Contreras, 2022; Della Bosca & Gillespie, 2018). Reconciliation between settlers and indigenous communities, indigenous forms of ownership such as collective or no ownership, self-governance in terms of coexistence, and being recognised as sources of knowledge, and stewardship are other framings of justice (Barragan-Contreras, 2022; Della Bosca & Gillespie, 2018; Hoicka et al., 2021; Mang-Benza & Baxter, 2021; Vega-Araújo & Heffron, 2022; Williams & Doyon, 2019). For example, the RE suitability of La Guajira in Colombia has threatened indigenous authority over resources and rights to ancestral land through unbalanced consultations which overemphasise economic compensation (Vega-Araújo & Heffron, 2022). Similarly, in Canada, or in the Mayan region in Mexico, where colonial legacies persist despite equity ownership in RE projects, depict ongoing challenges to achieving justice for indigenous communities (Barragan-Contreras, 2022; Hoicka et al., 2021; Mang-Benza & Baxter, 2021).

The transformation from energy consumer to prosumer, or energy citizen, represents an interesting shift in conceptualisation of justice, specifically in the global north - aligning digitalisation, democratisation and decentralisation (Bielig et al., 2022; Della Bosca & Gillespie, 2018; DellaValle & Czako, 2022; Forman, 2017; Saintier, 2017). This is reflected in varied ownership models such as cooperatives and citizen energy communities (Bielig et al., 2022; Bode, 2022; Braunholtz-Speight et al., 2021; Forman, 2017; Hanke et al., 2021; Lacey-Barnacle et al., 2023; Lennon et al., 2019; Saintier, 2017; Williams & Doyon, 2019). For example, Community Wealth Building (CWB) experiments across the US in Cleveland, Oakland, Burlington, New York, Denver and Detroit as well as in the UK across Newham, Islington, Sunderland and Stevenage demonstrate these principles at play — contributing to local resilience, socio-economic regeneration, and resource sharing (Lacey-Barnacle et al., 2023). Empirical studies from Denmark, Germany, Ireland and Japan reveal regional

differences in procedural justice along the lines of process-based and outcome-based justice (Banerjee & Schuitema, 2022; Bielig et al., 2022; H. T. Huang & Glaser, 2021; Mundaca et al., 2018; Reitz et al., 2022; Vega-Araújo & Heffron, 2022). Overall, this suggests a need for adaptive, context-specific approaches that are responsive to local histories, social dynamics and cultures.

Resistance and protest also shape justice in energy transitions, informed by Foucauldian governmentality and the Analytics of Protest. These actions resist injustices and challenge ecological modernization narratives that impose "green" solutions without addressing local needs. Enactment theory frames justice as an evolving, context-dependent process shaped by local decisions. This perspective posits that justice in energy transitions is influenced by geography, scale, timelines, and evolving identities. Understanding these embedded politics and mechanisms is crucial to ensuring that 'justice in transition' is genuinely constructed from the ground up.

Critiques of mainstream energy justice scholarship warn against co-opting grassroots conceptions of justice, often resulting in top-down, homogenized policies. These critiques emphasize preserving socio-spatial, cultural, and historical diversity, advocating for approaches that reflect local realities instead of imposing external frameworks.

4.4.2 Policy

Policies are often an assemblage of formal and informal practices, procedural documents, a set of disruptive and constructive ideas, and historical narratives and future aspirations. Policies are also typically categorised into direct policies focused on short term results, integrative policies which expand existing ones, and enabling policies aimed at systemic changes (Ming-Zhi Gao et al., 2022; Vasstrøm & Lysgård, 2021). The tenets of energy justice (Jenkins et al., 2016) are uniquely positioned to inform transition policies as well as analyse the implications of such policies. Examining questions around which actors influence the construction of policy and what considerations are included or excluded is a useful starting point to situate each of the tenets. For example, Norwegian wind power policy addresses energy security, market efficiency, social acceptance, environmental values, and the distribution of burdens and goods. However, Norwegian oil and hydropower policies fare better in terms of public ownership and participation of local governments which indicates that recognition and cosmopolitan justice concerns are not addressed in the wind policies (Vasstrøm & Lysgård, 2021). Similarly, procedural issues in terms of citizen participation are observed in the Dutch heat market (Vitéz & Lavrijssen, 2020) while energy transition policies in the African subcontinent focus on market-based solutions and fail to reflect Southern cosmovisions such as *ubuntu* which pluralise and localise energy justice in the global south (Müller et al., 2020).

The tenets of justice ((Jenkins et al., 2016) are useful for integrating international policies and the Sustainable Development Goals framework into national-level policies by identifying co-benefits and trade-offs. (Hägele et al., 2022; Lin et al., 2020; Müller et al., 2021; Nsafon et al., 2023) Justice driven transition scenarios can enhance systemic policies intersecting sectors including education (SDG 4), health (SDG 3), water (SDG6), etc, or contribute to developing whole system policies aimed at industry-wide decarbonisation (Abram et al., 2022; Lin et al., 2020; Müller et al., 2021; Nsafon et al., 2023). However, the concept of just transition, although included in the European Green Deal, remains limited to social protection for displaced coal workers and does not address the mining of lithium, and damages to rural areas from renewable infrastructure (Del Guayo & Cuesta, 2022).

Understanding just energy transition in authoritarian regimes challenges western notions of democratic foundations. For instance, in China, strict top-down processes for participation which although lack transparent and inclusive deliberation, have lowered energy poverty. Local authorities here also have a certain degree of autonomy in transposing central policies to local levels, embedding informal participatory mechanisms within such centralised planning (Lo, 2021).

The day-watchman concept (Sumarno et al., 2022) is designed to balance public ownership and private competition, safeguarding public interest by adhering to procedural, distributional, recognition and cosmopolitan justice. Actors such as donors, politicians, government ministries, regulatory institutions, grid controllers, consumers, and multinational companies across the energy spectrum further shape policy design and implementation around ownership, alignment, conditionality, and cooperation (Müller et al., 2020; Sumarno et al., 2022). Policy making informed by an energy justice framework should consider varied interests along economic, financial, land, climate, and social and environmental aspects to make the transition more just which results in resilience, new opportunities, enhanced climate preparedness, and reduced social and environmental vulnerability (Ming-Zhi Gao et al., 2022; Nsafon et al., 2023; Tiwari et al., 2021).

4.4.3 Democracy

Energy democracy conceptually emerged in the European context with a normative goal of an ideal bottom-up decarbonisation process (Droubi et al., 2022; Sorman et al., 2020). Democratising the generation, transmission and consumption of energy and redistributing political power in the process is one of the aims of this movement. Participation is one of the core dimensions of energy democracy which speaks to the procedural tenet of justice (Sorman et al., 2020; Szulecki, 2017; H. W. Wang et al., 2022). This is rooted in the concept of political equality, inclusiveness, transparency, equity, and collective decision making. By extension energy is re-imagined as a public good which resists the dominant fossil fuel agenda while reclaiming and restructuring energy regimes (Bloem et al., 2021; Burke & Stephens, 2017; Campos & Marín-González, 2020; Sorman et al., 2020; Thombs, 2019). This also leads

to the emergence of an ideal citizen — the prosumer, who gains political power through ownership, production of energy and participation in decentralised energy systems. (Sorman et al., 2020; Szulecki, 2017; H. W. Wang et al., 2022). Prosumerism as a concept links notions of energy citizenship and cooperatives to (re)politicise energy through bottom-up decision making and civic ownership based on empowerment, trust, transparency and self-determination (Campos & Marín-González, 2020; Krüger, 2022; Sorman et al., 2020). Justice is then articulated as freedom, agency, inclusion and plurality of choices.

Theories such as the Civil Disobedience, Social Movements and Foucault's Governmentality are stitched together with ideas of energy democracy to capture the heterogeneity and social tensions which disrupt and non-violently challenge laws to call for justice (Campos & Marín-González, 2020; Scherhaufer et al., 2021; Szulecki, 2017). A more radical conception of justice entails the resist, reclaim, and restructure idea to transform not just transition structural injustices from domination, alienation, exploitation through activism (LaBelle et al., 2023). This also confronts majoritarian visions for achieving energy justice for minorities.

Energy democracy addresses the nuances between decentralisation and centralisation (Thombs, 2019). Four such possibilities are explored in South Africa libertarian energy decentralism, technocratic energy centralism, democratic energy centralism, and democratic energy decentralism (Bloem et al., 2021; Thombs, 2019). Libertarian energy decentralism and technocratic energy centralism being market focused or investor focused, rely either on private actors or state utility monopolies. In contrast, democratic energy centralism and decentralism prioritise the public good and rights to energy as part of the commons (Krüger, 2022). Each model varies in power dynamics, equity, social relations, participation, deliberation, private-ness or public-ness (Bloem et al., 2021; Burke & Stephens, 2017; Droubi et al., 2022; Thombs, 2019).

Critics of energy democracy challenge two inherent assumptions- first, democracy is necessary and sufficient for justice, and second, non-western systems of governments that are not built around democracy cannot achieve justice (Droubi et al., 2022; Krüger, 2022). Nevertheless, democratisation of the energy systems can serve as a pathway to transcend capitalist growth and expansion, and shift away from accumulation and profit, towards "human benefit and environmental sustainability" (Bloem et al., 2021; Thombs, 2019).

4.4.4 Governance

Papers with a thematic focus on governance investigate the intersections between political economy, policy, management, ownership, and geopolitics. The energy trilemma is a widely used framework in this theme which links three intrinsically conflicting "pillars" (Parović & Kljajić, 2022). First, the politics of energy security and safety which calls for an effective management and reliability in the energy supply. Second, economics and finance which refers to energy equity in the form of accessibility and affordability. Third, environmental or

sustainability pillar that stretches into climate change mitigation. This framework is a central tool for multilateral cooperation in energy governance across local, regional, and global levels. Energy law and policy play a balancing act for governing energy systems (based on procedural, recognition, and distributional dimensions of justice) while addressing issues of energy poverty, security, stability, flexibility, and adequacy (Mayer, 2022; Siciliano et al., 2021; Stojilovska, 2023; Zaman & Brudermann, 2018).

Energy law and policy are key to combining just transition with energy governance and transition management (P. Huang & Liu, 2021). Energy governance serves to mitigate political instability, prevent corruption and supply disruptions, enhance financial performance, and maintain international energy diplomacy. (Mayer, 2022; Zaman & Brudermann, 2018). A core goal of energy governance is framing energy as a basic moral right, often through privatisation, regulatory separation, and retail competition incentives (Stojilovska, 2023; Zaman & Brudermann, 2018). In emerging economies, energy governance also involves informal processes and rules (P. Huang & Liu, 2021).

Transition governance is a "multi-dimensional, multi-level, multi-actor and multi-phase governing process" for achieving low-carbon visions through self-governance, top-down regulation, provisioning of services, and enabling public-private partnerships (P. Huang & Liu, 2021). Transition management promotes green capitalism while reconciling environment vs jobs narratives through a democratic, deliberative, and representative process (Goddard & Farrelly, 2018).

Another important focus of this theme is the implications of failed energy policy and governance on the erosion of justice, fairness, and equity (Qurbani et al., 2021; Sokołowski & Heffron, 2022; Stojilovska, 2023). For example, the failure of Morocco's renewable energy projects to drive socio-economic transformation reveals that government-focused energy transitions overlook the politics of energy transitions which reproduce conflict and violence amongst citizens on ground (Okpanachi et al., 2022). Similarly, a qualitative study of Bangladesh's electricity sector revealed institutional fragmentation around the governance of energy security, energy services, and renewable energy development (Zaman & Brudermann, 2018). Despite Bulgaria's achievements of renewable energy transition targets, mismanagement and corruption undermine the long-term viability of its transition (Andreas et al., 2018). Such transitions not only reflect the interest of the governing elites and their international partners, but override local ownership, self-determination, and sovereignty.

Contrasting Western liberal concepts of justice, rooted in individual rights and fairness, a Confucian perspective emphasises collective interests over individual freedoms. Justice, in this view, is defined by duties, obligations, and a desire to identify with others for collective well-being (X. Wang & Lo, 2022). The classical Chinese character (Yi 義) embodies equity, appropriateness, and rectitude, aligning with the teachings of the Way (Dao 道), which

integrates morality and the relationship between Earth, Heaven, and Humanity to achieve social and universal harmony (Andreas et al., 2018; X. Wang & Lo, 2022).

4.4.5 Local Governance

Local governance examines community-level governance of energy transition to arrive at bottom-up notions of justice (Rasch & Köhne, 2017). Case studies from Nepal, Ethiopia, and Mozambique highlight how top-down managerial perspectives are not well suited to the needs of communities and exacerbate the unequal access to energy including fossil fuels within and amongst communities, especially through gender-based exclusions and income-based hierarchies (Gebreslassie et al., 2022). This approach shifts the focus from a managerial perspective to a type of governance which caters to social and environmental benefits for communities and workers. It also provides a human-centred approach which reflects local values around energy and other natural resources, historical disadvantages faced by certain communities such as the coal workers, and intra-community inequalities. (Cha & Pastor, 2022; Finley-Brook & Holloman, 2016; Gebreslassie et al., 2022; Rasch & Köhne, 2017).

Clearer aims for justice in this context are articulated around the balance of community power, consideration of formal and informal practices of energy, a call for activism and a platform for a dialogue (Gebreslassie et al., 2022; Rasch & Köhne, 2017). This platform not only addresses the spatial and temporal dimensions of energy transition, but also new imaginations of rehabilitation, relocation, reclamation, and repurposing, as well as access to healthy food, housing, and healthcare (Cha & Pastor, 2022). As these concepts are further embedded in governing instruments such as divestment, cap and trade, or carbon pricing, an assessment of the risk and opportunity for equity and justice becomes an important next step (Finley-Brook & Holloman, 2016).

4.5 Cluster 4 — Science, Society, and Technology

Of 158 papers reviewed in-depth, 32 papers discuss three themes surrounding science, society and technology, namely socio-cultural (n=6), socio-technical (n=20), technology (n=6). This demonstrates substantial research into science, technology and society for implications on justice. The papers are diverse in terms of geographical distribution, application of scale and methodology. They feature across all regions except North Africa and Middle East and Oceania.

4.5.1 Socio-technical studies

Multiple theories from socio-technical transitions have been used to conceptually think about energy transitions. This strand of literature is more focused towards bridging the gaps and finding points of convergence between socio-technical transition frameworks and just transitions to derive new ways of thinking about energy justice rather than arriving at novel articulations of justice. Socio-technical transitions emphasise on the interlinkages between

social practices and technological innovation as complementary processes. "A technological innovation does not become widespread simply because of its own characteristics, but because it amplifies certain ongoing trends that are social or economic in nature" (Sareen & Haarstad, 2018). One of the most popular frameworks which illustrates this is the Multi-Level Perspective which visualises transitions as non-linear processes that evolve through the interplay of three distinct levels (Lenhart et al., 2020; Sareen & Haarstad, 2018). The First level captures how technological innovations emerge in protected niches. The second level comprises the regime of existing socio-technical systems that are path dependent and resist change. These include cross-cutting factors in policy, culture, market preferences, science and industry practices. These systems are guarded by a set of incumbent actors, rules, and technologies. The third level is the socio-technical landscape which entails exogenous events such as economic crisis, conflicts, political upheavals, ideology, and demographics. The need for solutions at the socio-technical landscape level puts pressure on the regime and at the niche level, thereby creating windows of opportunities. Promising innovations disrupt incumbent regimes and gradually influence the larger landscape through feedback loops (Kanger & Sovacool, 2022).

Linking this framework, primarily with variations of the three tenets of energy justice reveals new ways of identifying injustices. For example, Kanger & Sovacool, 2022 proposes a multi-scalar and multi-horizon framework which maps international, national, and regional dimensions at the three levels of the MLP and maps potential risks to short, medium- and long-term horizons. This reveals three kinds of injustices, namely, regime optimisation injustices, regime destabilisation injustices, and nice acceleration injustices. By further segregating injustices at an operational level based on environmental, economic, political, or societal factors, this study finds 214 distinct possibilities of injustices in the context of Estonia's energy transition (Kanger & Sovacool, 2022). Another conceptualisation aims to focus on the relationships between niche-regime-landscape and its implications on scale, space, materiality, and relationality. In this, institutions emerge as enabling structures with normative justice implications for human interactions with energy infrastructures (Sareen & Haarstad, 2018).

Institutional theory and institutional work are key components of socio-technical systems that trace how structures provide stability or exhibit tensions. They reveal highly interdependent relationships between technologies and societies with formal and informal rules, principles, interests, beliefs, and norms (Lenhart et al., 2020). This is helpful in examining how agency affects institutions and technology, and how collective organisational forms founded on shared values, existing morals, and collective action exercise local autonomy, self-determination, self-governance or energy sovereignty (Lenhart et al., 2020; van Zyl-Bulitta et al., 2019). Institutional work or the agency that creates, maintains, and disrupts sociotechnical configurations are rooted in local contexts. The three domains of institutional work include reimagining energy futures, recoding energy systems and reconfiguring energy knowledge that re-iteratively feed into the "triple re-cycle" framework to attain social equity, and

sensitivity to differences in the interpretation of (un)fairness across geographic and cultural contexts (Hoffman et al., 2021).

Imaginaries is an important concept that has been applied to energy transitions to understand how collectively held visions about desirable and equitable futures are produced and in turn advance science and technology (Carvalho et al., 2022; Hoffman et al., 2021). For example, sociotechnical imaginaries from the Portugueses Roadmap for Carbon Neutrality 2050 reveal four distinct and conflicting pathways for energy transitions. These include modernisation and techno-economic development, green economy, energy citizenship, and just transition (Carvalho et al., 2022). In the context of the Philippines, pro-coal sociotechnical imaginaries were scripted around affordability, access and mobility while anti-coal visions arose as a response to human rights abuses and pollution (Delina, 2021). This reveals how certain imaginaries based on social, cultural, political, economic and environmental contexts can link vision and innovation through technologies that are co-produced by society and science.

A meta-theoretical framework draws from the MLP to integrate responsible innovation, social practice theory, and energy justice (Sovacool, Hess, et al., 2021). This framework is used to investigate justice outcomes at the stage of technology design, during its integration into social practices, and its global implications on other societal issues. It explores concepts in social practice around inclusion, connections, responsiveness, and reflexivity which are linked to energy justice through theoretical grounding and empirical techniques. This particular framework (Sovacool, Hess, et al., 2021) also showcases tensions between pillars of "energy as commons" and "energy as commodity" to build a "whole systems" energy framework that account for all of the processes discussed above. This meta-theoretical framework can then be applied to explore layers, scales, levels, and timescales of injustices of a technology like nuclear energy, or the supply chains of cobalt and lithium (Dall-Orsoletta et al., 2022; Diaz Valdivia, 2023; Sovacool, Hess, et al., 2021; van Zyl-Bulitta et al., 2019).

Critiques of socio-technical transitions highlight the oversight of power, politics, and agency through the positioning of science and technology as epistemologically superior to other ways of knowing (David, 2018; Pandey & Sharma, 2021). This furthers a technologically driven developmentalist agenda which disregards knowledge politics and contested framings of needs and priorities as shown in three case studies in India involving biogas and solar plants. (Pandey & Sharma, 2021). Politicising energy justice and energy system transitions seeks to emphasise on the political economy of socio-technical transitions which expose pre-existing inequalities with technological patents, resources for innovation, and selection of sacrifice zones for large scale implementation (Healy & Barry, 2017). Studying green growth in the EU energy transition from an institutional theory and varieties of capitalism perspective shifts the focus away from socio-technical transitions towards the regional political economy of just transitions (Loewen, 2022). Similarly, divestment and exnovation oppose the process of innovation by eliminating technologies for decarbonising energy systems based on a normative understanding of justice (David, 2018; Healy & Barry, 2017).

A burgeoning concept within energy justice literature is around flexibility, flexibility capital, and flexibility justice (Calvo et al., 2021; Dall-Orsoletta et al., 2022; Fjellså et al., 2021). Largely examined from an end users' capabilities of being flexible with energy sources and energy choices. However, owning technologically advanced appliances that can be shifted to alternate sources of electricity or everyday lifestyle choices that can be adjusted according to energy supply fluctuations are usually restricted to affluent societies like Norway which are also energy-intensive economies (Fjellså et al., 2021; Heffron et al., 2020). Justice implications in such cases extend to technologies which are designed for zero human intervention, or the potential impacts on households which fail to adopt flexible practices, or the unintended social and health implications of performing tasks at odd hours of the day (Fjellså et al., 2021) . Yet, the potential for inclusive and just flexibility transition can encourage industries, especially those that are powered by renewables to avoid losses (Heffron et al., 2020). In the end, if justice considerations are not embedded in innovations, local and global, big and small, in technology and in flexibility, socio-technical transitions of energy systems can exacerbate injustices (Wyse et al., 2021).

4.5.2 Socio-cultural studies

Socio-cultural perspectives attempt to enhance the simplistic underpinnings of the three tenets of justice. By diving deeper into everyday use of energy and its ethical significance. Groves et al., 2017, uncovers the subtleties around the entangled practices, the emotional investments in energy consuming preferences, habits, necessities, and convenience. For example, the feeling of joy associated with having a fireplace encourages more questions around how existing norms of energy define suffering and flourishing in terms of energy use for a good life. Justice then becomes complex since it involves how people themselves understand the difference between necessary and unnecessary uses of energy as opposed to a universal standard of energy use per capita. In this sense, notions of respect, dignity, needs, and capabilities are closely linked to perceptions of energy (Demski et al., 2019; Groves et al., 2017). For example, energy can be viewed as a commercial commodity, a public good, an ecological resource, a strategic material, or a social necessity. These are not mutually exclusive frames, but emphasise different values and aspects (Demski et al., 2019; Partridge et al., 2018).

Other factors tied to the acceptance of energy transitions are the cost associated with meeting energy justice, the willingness to pay, expectations from governments, and responsibilities assigned to energy companies, each of which have a relative and absolute component (Demski et al., 2019; Evensen et al., 2018; Partridge et al., 2018). Consequently, perceptions of justice are informed by personal financial impact, morally-desirable outcomes assigned to affordability, efficiency, reduction, and reliability. Justice is then built through trust, respect, openness, and honesty (Evensen et al., 2018).

Conceptualising justice around human desires, affect, and emotion reveal expressions of justice in energy transitions as a social good, economic stability, employment, modernity, health, and order. This is a sort of a "net justice" which sits at the intersection of idealism and pragmatism arrived at through assemblage theory and actor-network theory (Barnes, 2022). Similarly, conceptualising justice in an urban informal context reveals that injustice is not only the lack of access to modern energy infrastructure, but also an endless (re)building of energy services and systematic energy vulnerabilities that are chained to dominant perceptions of sustainability and to ways of life (Kovacic et al., 2021).

4.5.3 Technology

Public perceptions also drive the rapid upscaling of certain technologies as well as deliberate slowdown of others. Analysing the speed of transitions through the concept of urgency helps question whose needs and priorities are furthered through innovations and their deployment (Partridge et al., 2018). For example, the use of AI technology to forecast and optimise energy networks are believed on one hand to maintain affordability while on other hand potentially infringe upon personal data (Noorman et al., 2023). In this case, privacy becomes an important element of justice, and the use of AI should be regulated in order to identify injustices and remedy them. Some of the ways in which this can be achieved ties back to ideas of flexibility, inbuilt values, and smart local energy systems (Dillman & Heinonen, 2022; Noorman et al., 2023).

Similarly, theorising hydrogen technology for decarbonisation calls for a concept of hydrogen justice which is positioned at the intersection of energy justice and water justice. This concept emerges from ideas of decoupling of growth from carbon emissions at the nexus of water, energy, and climate. This too attempts to expand the three tenets approach to energy justice by incorporating issues associated with grey, blue and brown hydrogen. These issues revolve around access to technology, human-land-water relations, the nature of hydrogen partnerships across the global north and south, and privatisation of water and energy systems in the public interest (Dillman & Heinonen, 2022; Lindner, 2023; Müller et al., 2022). For example, Namibia's plans of large-scale desalination plants and solar parks for hydrogen production threaten to disrupt habitats of pastoralists and nomads, and change their human-nature relations (Müller et al., 2022). The additional dimensions of justice which emerge are relationality and epistemology which draw from post- and de-colonial literature.

Theorising other technological advances such as electric vehicles, reveals injustices through additional congestion, cost-based exclusions, and the reinforcement of elitism (Sovacool et al., 2019). Similarly, theorising aluminium as part of a material culture of speed and lightness reveals the history of the material as "concentration of time" and acceleration of productivity through assemblages of infrastructures and materials (Sheller, 2014). Such materials built on speed and lightness consume enormous energy, but remain central to energy efficient world-building. Ideologies of acceleration and speed are rooted in rapid innovations made by the

military which are later turned towards social good through industry-centric government planning (Sheller, 2014). Building an understanding of justice based on these underpinnings reveal notions of "slow modernity", the value of stillness, "slow cities" and "off-grid" living that enables unplugging from high-speed connectivity. Justice is then articulated around slowness, and an ecological balance based on the limits of fast life (Sheller, 2014).

5. Discussion and Conclusion

The articulation and operationalisation of justice in global energy transition literature reveal a multifaceted landscape of interdisciplinary approaches that traverse geography, politics, and culture. The overarching findings from the reviewed literature highlight that the concept of energy justice is far from homogeneous, with distinctive interpretations arising from different theoretical frameworks, regional contexts, and scales of analysis. Across clusters like approaches to development, power relations, public policy, and socio-technical studies, our analysis demonstrates that justice in energy transitions is both diverse and dynamic, influenced by historical legacies, socio-economic hierarchies, and the priorities of different communities and actor groups.

One key takeaway is the inherent complexity of balancing justice dimensions—distributional, procedural, recognition, and cosmopolitan—in a context where power, identity, and socio-material relations shape energy transitions differently across regions. Notably, postcolonial and feminist perspectives critique the Western-centric, market-driven transitions that often overlook marginalized communities' needs, thus reproducing historical inequalities. Conversely, socio-technical and socio-cultural frameworks provide alternative pathways to reconfigure energy relationships, emphasising the need for context-sensitive, localized, and participatory solutions. Extant literature makes it evident that justice in energy transitions cannot be understood in a one-size-fits-all manner; it requires nuanced, multi-scalar approaches that acknowledge the diversity of social, economic, and political realities.

In this regard as we synthesised the global empirical evidence and conceptualisations of energy justice across multiple disciplines, we offer some propositions across policy, methodological and future research.

First, our analysis points to the importance of polycentric governance—a system in which decision-making authority is distributed among multiple, overlapping institutions—to foster more inclusive energy transitions. Policies must facilitate regional and local autonomy in energy decision-making, enhancing community agency and enabling locally adapted solutions. This approach promotes procedural and recognition justice, giving voice to communities directly impacted by energy projects. Such governance structures can also address the disparities between the global north and south and core and peripheral regions within these economies, acknowledging the diverse needs, contexts, and capacities of different regions.

Second, further research is needed to deepen our understanding of energy justice through postcolonial and intersectional lenses. Throughout the analysis we observe that traditional frameworks, like Rawlsian distributive justice, often fail to fully account for the systemic, historical injustices that continue to shape energy transitions. Scholars hence need to expand the scope of their analysis to include postcolonial, feminist, and decolonial frameworks that explicitly consider identity, race, and other socio-political dimensions. Doing so will allow for more inclusive articulations of justice that better reflect the lived experiences of marginalised groups in both developed and developing nations.

Third, to fully understand the complexities of energy transitions, methodological approaches should integrate multi-scalar and temporal dimensions. A multi-scalar approach would consider the interactions between local, regional, and global dynamics, while a temporal dimension would examine the short- and long-term impacts of energy policies and technologies. By incorporating such complexity, research can more accurately identify injustices, such as those that may arise during transitions (e.g., the creation of sacrifice zones), and propose equitable solutions.

Additionally, there is a need for methodologies to adopt participatory approaches, ensuring that research is grounded in community voices and local knowledge systems. Overall, our analysis makes it evident that the pursuit of justice must move beyond a narrow focus on distributional outcomes to encompass broader socio-political and cultural dynamics. Achieving a truly just energy transition requires polycentric governance structures, contextually rich frameworks, and inclusive, multi-scalar methodologies that accommodate diverse voices and experiences. By embracing these propositions, policy, research, and practice can advance towards energy transitions that do not simply change energy systems but transform social relations and deliver equitable outcomes for all.

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References

Abram, S., Atkins, E., Dietzel, A., Jenkins, K., Kiamba, L., Kirshner, J., Kreienkamp, J., Parkhill, K., Pegram, T., & Santos Ayllón, L. M. (2022). Just Transition: A whole-systems approach to decarbonisation. *Climate Policy*, *22*(8), 1033–1049. https://doi.org/10.1080/14693062.2022.2108365

Alkhalili, N., Dajani, M., & Mahmoud, Y. (2023). The enduring coloniality of ecological modernization: Wind energy development in occupied Western Sahara and the occupied Syrian Golan Heights. *Political Geography*, *103*. https://doi.org/10.1016/j.polgeo.2023.102871

Allen, E., Lyons, H., & Stephens, J. C. (2019). Women's leadership in renewable transformation, energy justice and energy democracy: Redistributing power. *Energy Research and Social Science*, *57*. https://doi.org/10.1016/j.erss.2019.101233

Andreas, J. J., Burns, C., & Touza, J. (2018). Overcoming energy injustice? Bulgaria's renewable energy transition in times of crisis. *Energy Research and Social Science*, *42*, 44–52. https://doi.org/10.1016/j.erss.2018.02.020

Arora, A., & Schroeder, H. (2022). How to avoid unjust energy transitions: insights from the Ruhr region. *Energy, Sustainability and Society*, *12*(1). https://doi.org/10.1186/s13705-022-00345-5

Babiker, M., Bazaz, A., Bertoldi, P., Creutzig, F., De Coninck, H., De Kleijne, K., Dhakal, S., Haldar, S., Jiang, K., Kılkış, Ş., Klaus, I., Krishnaswamy, J., Lwasa, S., Niamir, L., Pathak, M., Portugal Pereira, J., Revi, A., Roy, J., Seto, K., … Ürge-Vorsatz, D. (2022). *What the Latest Science on Climate Change Mitigation means for Cities and Urban Areas*. https://doi.org/10.24943/SUPSV310.2022

Banerjee, A., & Schuitema, G. (2022). How just are just transition plans? Perceptions of decarbonisation and low-carbon energy transitions among peat workers in Ireland. *Energy Research and Social Science*, *88*. https://doi.org/10.1016/j.erss.2022.102616

Barnes, J. (2022). Divergent desires for the just transition in South Africa: An assemblage analysis. *Political Geography*, *97*. https://doi.org/10.1016/j.polgeo.2022.102655

Barragan-Contreras, S. J. (2022). Procedural injustices in large-scale solar energy: a case study in the Mayan region of Yucatan, Mexico. *Journal of Environmental Policy and Planning*, *24*(4), 375–390. https://doi.org/10.1080/1523908X.2021.2000378

Bell, S. E., Daggett, C., & Labuski, C. (2020). Toward feminist energy systems: Why adding women and solar panels is not enough☆. *Energy Research and Social Science*, *68*. https://doi.org/10.1016/j.erss.2020.101557

Bielig, M., Kacperski, C., Kutzner, F., & Klingert, S. (2022). Evidence behind the narrative: Critically reviewing the social impact of energy communities in Europe. *Energy Research and Social Science*, *94*. https://doi.org/10.1016/j.erss.2022.102859

Biswas, S., Echevarria, A., Irshad, N., Rivera-Matos, Y., Richter, J., Chhetri, N., Parmentier, M. J., & Miller, C. A. (2022). Ending the Energy-Poverty Nexus: An Ethical Imperative for Just Transitions. *Science and Engineering Ethics*, *28*(4). https://doi.org/10.1007/s11948-022-00383-4

Bloem, S., Swilling, M., & Koranteng, K. (2021). Taking energy democracy to the streets: Socio-technical learning, institutional dynamism, and integration in South African community energy projects. *Energy Research and Social Science*, *72*. https://doi.org/10.1016/j.erss.2020.101906

Bode, A. (2022). To what extent can community energy mitigate energy poverty in Germany? *Frontiers in Sustainable Cities*, *4*. https://doi.org/10.3389/frsc.2022.1005065

Bosch, S., & Schmidt, M. (2020). Wonderland of technology? How energy landscapes reveal inequalities and injustices of the German Energiewende. *Energy Research and Social Science*, *70*. https://doi.org/10.1016/j.erss.2020.101733

Braunholtz-Speight, T., McLachlan, C., Mander, S., Hannon, M., Hardy, J., Cairns, I., Sharmina, M., & Manderson, E. (2021). The long term future for community energy in Great Britain: A co-created vision of a thriving sector and steps towards realising it. *Energy Research and Social Science*, *78*. https://doi.org/10.1016/j.erss.2021.102044

Brock, A., Sovacool, B. K., & Hook, A. (2021). Volatile Photovoltaics: Green Industrialization, Sacrifice Zones, and the Political Ecology of Solar Energy in Germany. *Annals of the American Association of Geographers*, *111*(6), 1756–1778. https://doi.org/10.1080/24694452.2020.1856638

Burke, M. J., & Stephens, J. C. (2017). Energy democracy: Goals and policy instruments for sociotechnical transitions. *Energy Research and Social Science*, *33*, 35–48. https://doi.org/10.1016/j.erss.2017.09.024

Calvo, R., Amigo, C., Billi, M., Fleischmann, M., Urquiza, A., Álamos, N., & Navea, J. (2021). Territorial Energy Vulnerability Assessment to Enhance Just Energy Transition of Cities. *Frontiers in Sustainable Cities*, *3*. https://doi.org/10.3389/frsc.2021.635976

Campos, I., & Marín-González, E. (2020). People in transitions: Energy citizenship, prosumerism and social movements in Europe. *Energy Research and Social Science*, *69*. https://doi.org/10.1016/j.erss.2020.101718

Carvalho, A., Riquito, M., & Ferreira, V. (2022). Sociotechnical imaginaries of energy transition: The case of the Portuguese Roadmap for Carbon Neutrality 2050. *Energy Reports*, *8*, 2413–2423. https://doi.org/10.1016/j.egyr.2022.01.138

Castán Broto, V., Baptista, I., Kirshner, J., Smith, S., & Neves Alves, S. (2018). Energy justice and sustainability transitions in Mozambique. *Applied Energy*, *228*, 645–655. https://doi.org/10.1016/j.apenergy.2018.06.057

Cha, J. M., & Pastor, M. (2022). Just transition: Framing, organizing, and power-building for decarbonization. *Energy Research and Social Science*, *90*. https://doi.org/10.1016/j.erss.2022.102588

Daggett, C. (2021). Energy and domination: contesting the fossil myth of fuel expansion. *Environmental Politics*, *30*(4), 644–662. https://doi.org/10.1080/09644016.2020.1807204

Dall-Orsoletta, A., Ferreira, P., & Gilson Dranka, G. (2022). Low-carbon technologies and just energy transition: Prospects for electric vehicles. *Energy Conversion and Management: X*, *16*. https://doi.org/10.1016/j.ecmx.2022.100271

David, M. (2018). The role of organized publics in articulating the exnovation of fossil-fuel technologies for intra- and intergenerational energy justice in energy transitions. *Applied Energy*, *228*, 339–350. https://doi.org/10.1016/j.apenergy.2018.06.080

Del Guayo, Í., & Cuesta, Á. (2022). Towards a just energy transition: a critical analysis of the existing policies and regulations in Europe. *Journal of World Energy Law and Business*, *15*(3), 212–222. https://doi.org/10.1093/jwelb/jwac010

Delina, L. L. (2021). Committing to coal? Scripts, sociotechnical imaginaries, and the resurgence of a coal regime in the Philippines. *Energy Research and Social Science*, *81*. https://doi.org/10.1016/j.erss.2021.102258

Della Bosca, H., & Gillespie, J. (2018). The coal story: Generational coal mining communities and strategies of energy transition in Australia. *Energy Policy*, *120*, 734–740. https://doi.org/10.1016/j.enpol.2018.04.032

DellaValle, N., & Czako, V. (2022). Empowering energy citizenship among the energy poor. *Energy Research and Social Science*, *89*. https://doi.org/10.1016/j.erss.2022.102654

Demski, C., Thomas, G., Becker, S., Evensen, D., & Pidgeon, N. (2019). Acceptance of energy transitions and policies: Public conceptualisations of energy as a need and basic right in the United Kingdom. *Energy Research and Social Science*, *48*, 33–45. https://doi.org/10.1016/j.erss.2018.09.018

Diaz Valdivia, A. (2023). Between decentralization and reintermediation: Blockchain platforms and the governance of 'commons-led' and 'business-led' energy

transitions. *Energy Research and Social Science*, *98*. https://doi.org/10.1016/j.erss.2023.103034

Dillman, K. J., & Heinonen, J. (2022). A 'just' hydrogen economy: A normative energy justice assessment of the hydrogen economy. *Renewable and Sustainable Energy Reviews*, *167*. https://doi.org/10.1016/j.rser.2022.112648

Droubi, S., Heffron, R. J., & McCauley, D. (2022). A critical review of energy democracy: A failure to deliver justice? *Energy Research and Social Science*, *86*. https://doi.org/10.1016/j.erss.2021.102444

Dunlap, A., & Laratte, L. (2022). European Green Deal necropolitics: Exploring 'green' energy transition, degrowth & infrastructural colonization. *Political Geography*, *97*. https://doi.org/10.1016/j.polgeo.2022.102640

Evensen, D., Demski, C., Becker, S., & Pidgeon, N. (2018). The relationship between justice and acceptance of energy transition costs in the UK. *Applied Energy*, *222*, 451–459. https://doi.org/10.1016/j.apenergy.2018.03.165

Fathoni, H. S., & Setyowati, A. B. (2022). Energy justice for whom? Territorial (re)production and everyday state-making in electrifying rural Indonesia. *Geoforum*, *135*, 49–60. https://doi.org/10.1016/j.geoforum.2022.07.012

Finley-Brook, M., & Holloman, E. L. (2016). Empowering energy justice. *International Journal of Environmental Research and Public Health*, *13*(9). https://doi.org/10.3390/ijerph13090926

Fjellså, I. F., Silvast, A., & Skjølsvold, T. M. (2021). Justice aspects of flexible household electricity consumption in future smart energy systems. *Environmental Innovation and Societal Transitions*, *38*, 98–109. https://doi.org/10.1016/j.eist.2020.11.002

Forman, A. (2017). Energy justice at the end of the wire: Enacting community energy and equity in Wales. *Energy Policy*, *107*, 649–657. https://doi.org/10.1016/j.enpol.2017.05.006

Gebreslassie, M. G., Cuvilas, C., Zalengera, C., To, L. S., Baptista, I., Robin, E., Bekele, G., Howe, L., Shenga, C., Macucule, D. A., Kirshner, J., Mulugetta, Y., Power, M., Robinson, S., Jones, D., & Castán Broto, V. (2022). Delivering an off-grid transition to sustainable energy in Ethiopia and Mozambique. *Energy, Sustainability and Society*, *12*(1). https://doi.org/10.1186/s13705-022-00348-2

Goddard, G., & Farrelly, M. A. (2018). Just transition management: Balancing just outcomes with just processes in Australian renewable energy transitions. *Applied Energy*, *225*, 110–123. https://doi.org/10.1016/j.apenergy.2018.05.025

Golubchikov, O., & O'Sullivan, K. (2020). Energy periphery: Uneven development and the precarious geographies of low-carbon transition. *Energy and Buildings*, *211*. https://doi.org/10.1016/j.enbuild.2020.109818

Grant, R., McCauley, D., Von Maltzan, M., Grattage, R., & Mwathunga, E. (2021). An Ecohealth approach to energy justice: Evidence from Malawi's energy transition from biomass to electrification. *Energy Research and Social Science*, *75*. https://doi.org/10.1016/j.erss.2020.101875

Groves, C., Henwood, K., Shirani, F., Thomas, G., & Pidgeon, N. (2017). Why mundane energy use matters: Energy biographies, attachment and identity. *Energy Research and Social Science*, *30*, 71–81. https://doi.org/10.1016/j.erss.2017.06.016

Haddaway, N. R., Macura, B., Whaley, P., & Pullin, A. S. (2018). ROSES RepOrting standards for Systematic Evidence Syntheses: pro forma, flow-diagram and descriptive summary of the plan and conduct of environmental systematic reviews and systematic maps. *Environmental Evidence*, *7*(1), 7. https://doi.org/10.1186/s13750-018-0121-7

Haldar, S., Peddibhotla, A., & Bazaz, A. (2023). Analysing intersections of justice with energy transitions in India-A systematic literature review. *Energy Research & Social Science*, *98*, 103010.https://doi.org/10.1016/j.erss.2023.103010

Hall, S., Roelich, K. E., Davis, M. E., & Holstenkamp, L. (2018). Finance and justice in low-carbon energy transitions. *Applied Energy*, *222*, 772–780. https://doi.org/10.1016/j.apenergy.2018.04.007

Hanke, F., Guyet, R., & Feenstra, M. (2021). Do renewable energy communities deliver energy justice? Exploring insights from 71 European cases. *Energy Research and Social Science*, *80*. https://doi.org/10.1016/j.erss.2021.102244

Healy, N., & Barry, J. (2017). Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition." *Energy Policy*, *108*, 451–459. https://doi.org/10.1016/j.enpol.2017.06.014

Healy, N., Stephens, J. C., & Malin, S. A. (2019). Embodied energy injustices: Unveiling and politicizing the transboundary harms of fossil fuel extractivism and fossil fuel supply chains. *Energy Research and Social Science*, *48*, 219–234. https://doi.org/10.1016/j.erss.2018.09.016

Hearn, A. X., Sohre, A., & Burger, P. (2021). Innovative but unjust? Analysing the opportunities and justice issues within positive energy districts in Europe. *Energy Research and Social Science*, *78*. https://doi.org/10.1016/j.erss.2021.102127

Heffron, R., Connor, R., Crossley, P., Mayor, V. L. I., Talus, K., & Tomain, J. (2021). The identification and impact of justice risks to commercial risks in the energy sector: post COVID-19 and for the energy transition. *Journal of Energy and Natural Resources Law*, *39*(4), 439–468. https://doi.org/10.1080/02646811.2021.1874148

Heffron, R., Körner, M. F., Wagner, J., Weibelzahl, M., & Fridgen, G. (2020). Industrial demand-side flexibility: A key element of a just energy transition and industrial development. *Applied Energy*, *269*. https://doi.org/10.1016/j.apenergy.2020.115026

Hoffman, J., Davies, M., Bauwens, T., Späth, P., Hajer, M. A., Arifi, B., Bazaz, A., & Swilling, M. (2021). Working to align energy transitions and social equity: An integrative framework linking institutional work, imaginaries and energy justice. *Energy Research and Social Science*, *82*. https://doi.org/10.1016/j.erss.2021.102317

Hoicka, C. E., Savic, K., & Campney, A. (2021). Reconciliation through renewable energy? A survey of Indigenous communities, involvement, and peoples in Canada. *Energy Research and Social Science*, *74*. https://doi.org/10.1016/j.erss.2020.101897

Hornborg, A., Cederlöf, G., & Roos, A. (2019). Has Cuba exposed the myth of "free" solar power? Energy, space, and justice. *Environment and Planning E: Nature and Space*, *2*(4), 989–1008. https://doi.org/10.1177/2514848619863607

Huang, H. T., & Glaser, R. (2021). Participatory impetus for and forms of citizens' co-owned power plants: Cases from higashi-ohmi, Japan. *Energies*, *14*(7). https://doi.org/10.3390/en14071843

Huang, P., & Liu, Y. (2021). Toward just energy transitions in authoritarian regimes: indirect participation and adaptive governance. *Journal of Environmental Planning and Management*, *64*(1), 1–21. https://doi.org/10.1080/09640568.2020.1743245

International Liaison Committee on Resuscitation. (2022). *Science Advisory Committee Guidance and Templates*.

Ivanova, D., & Middlemiss, L. (2021). Characterizing the energy use of disabled people in the European Union towards inclusion in the energy transition. *Nature Energy*, *6*(12), 1188–1197. https://doi.org/10.1038/s41560-021-00932-4

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

Kanger, L., & Sovacool, B. K. (2022). Towards a multi-scalar and multi-horizon framework of energy injustice: A whole systems analysis of Estonian energy transition. *Political Geography*, *93*. https://doi.org/10.1016/j.polgeo.2021.102544

Keady, W., Panikkar, B., Nelson, I. L., & Zia, A. (2021). Energy justice gaps in renewable energy transition policy initiatives in Vermont. *Energy Policy*, *159*. https://doi.org/10.1016/j.enpol.2021.112608

Kelly, S. H. (2021). Mapping hydropower conflicts: A legal geography of dispossession in Mapuche-Williche Territory, Chile. *Geoforum*, *127*, 269–282. https://doi.org/10.1016/j.geoforum.2021.11.011

Knuth, S. (2017). Green Devaluation: Disruption, Divestment, and Decommodification for a Green Economy. *Capitalism, Nature, Socialism*, *28*(1), 98–117. https://doi.org/10.1080/10455752.2016.1266001

Knuth, S., Behrsin, I., Levenda, A., & McCarthy, J. (2022). New political ecologies of renewable energy. *Environment and Planning E: Nature and Space*, *5*(3), 997–1013. https://doi.org/10.1177/25148486221108164

Kovacic, Z., Musango, J. K., Buyana, K., Ambole, A., Smit, S., Mwau, B., Ogot, M., Lwasa, S., & Brent, A. (2021). Building capacity towards what? Proposing a framework for the analysis of energy transition governance in the context of urban informality in Sub-Saharan Africa. *Local Environment*, *26*(3), 364–378. https://doi.org/10.1080/13549839.2020.1849075

Krüger, T. (2022). The German energy transition and the eroding consensus on ecological modernization: A radical democratic perspective on conflicts over competing justice claims and energy visions. *Futures*, *136*. https://doi.org/10.1016/j.futures.2021.102899

LaBelle, M. C., Bucată, R., & Stojilovska, A. (2023). Radical energy justice: a Green Deal for Romanian coal miners? *Journal of Environmental Policy and Planning*, *25*(2), 142–154. https://doi.org/10.1080/1523908X.2021.1992266

Lacey-Barnacle, M. (2020). Proximities of energy justice: contesting community energy and austerity in England. *Energy Research and Social Science*, *69*. https://doi.org/10.1016/j.erss.2020.101713

Lacey-Barnacle, M., Robison, R., & Foulds, C. (2020). Energy justice in the developing world: a review of theoretical frameworks, key research themes and policy implications. In *Energy for Sustainable Development* (Vol. 55, pp. 122–138). Elsevier B.V. https://doi.org/10.1016/j.esd.2020.01.010

Lacey-Barnacle, M., Smith, A., & Foxon, T. J. (2023). Community wealth building in an age of just transitions: Exploring civil society approaches to net zero and future research synergies. *Energy Policy*, *172*. https://doi.org/10.1016/j.enpol.2022.113277

Le Billon, P., & Kristoffersen, B. (2020). Just cuts for fossil fuels? Supply-side carbon constraints and energy transition. *Environment and Planning A*, *52*(6), 1072–1092. https://doi.org/10.1177/0308518X18816702

Lenhart, S., Chan, G., Forsberg, L., Grimley, M., & Wilson, E. (2020). Municipal utilities and electric cooperatives in the United States: Interpretive frames, strategic actions, and place-specific transitions. *Environmental Innovation and Societal Transitions*, *36*, 17–33. https://doi.org/10.1016/j.eist.2020.04.006

Lennon, B., Dunphy, N. P., & Sanvicente, E. (2019). Community acceptability and the energy transition: a citizens' perspective. *Energy, Sustainability and Society*, *9*(1). https://doi.org/10.1186/s13705-019-0218-z

Lin, M. X., Liou, H. M., & Chou, K. T. (2020). National energy transition framework toward SDG7 with legal reforms and policy bundles: The case of Taiwan and its comparison with Japan. *Energies*, *16*(3). https://doi.org/10.3390/en13061387

Lindner, R. (2023). Green hydrogen partnerships with the Global South. Advancing an energy justice perspective on "tomorrow's oil." *Sustainable Development*, *31*(2), 1038–1053. https://doi.org/10.1002/sd.2439

Lo, K. (2021). Can authoritarian regimes achieve just energy transition? Evidence from China's solar photovoltaic poverty alleviation initiative. *Energy Research and Social Science*, *82*. https://doi.org/10.1016/j.erss.2021.102315

Loewen, B. (2022). Coal, green growth and crises: Exploring three European Union policy responses to regional energy transitions. *Energy Research and Social Science*, *93*. https://doi.org/10.1016/j.erss.2022.102849

Malakar, Y., Herington, M. J., & Sharma, V. (2019). The temporalities of energy justice: Examining India's energy policy paradox using non-western philosophy. *Energy Research and Social Science*, *49*, 16–25. https://doi.org/10.1016/j.erss.2018.11.002

Mang-Benza, C. (2021). Many shades of pink in the energy transition: Seeing women in energy extraction, production, distribution, and consumption. *Energy Research and Social Science*, *73*. https://doi.org/10.1016/j.erss.2020.101901

Mang-Benza, C., & Baxter, J. (2021). Not paid to dance at the powwow: Power relations, community benefits, and wind energy in M'Chigeeng First Nation, Ontario, Canada.

Energy Research and Social Science, *82*. https://doi.org/10.1016/j.erss.2021.102301

Martínez, V., & Castillo, O. L. (2016). The political ecology of hydropower: Social justice and conflict in Colombian hydroelectricity development. *Energy Research and Social Science*, *22*, 69–78. https://doi.org/10.1016/j.erss.2016.08.023

Mayer, A. (2022). More than just jobs: Understanding what drives support for a declining coal industry. *Extractive Industries and Society*, *9*. https://doi.org/10.1016/j.exis.2021.101038

Ming-Zhi Gao, A., Tsung Kuang, Y., & Jong-Shun, C. (2022). An unjust and failed energy transition strategy? Taiwan's goal of becoming nuclear-free by 2025. *Energy Strategy Reviews*, *44*. https://doi.org/10.1016/j.esr.2022.100991

Mohr, K. (2021). Breaking the dichotomies: Climate, coal, and gender. paving the way to a just transition. The example of Colombia. *Energies*, *14*(17). https://doi.org/10.3390/en14175457

Moles-Grueso, S., & Stojilovska, A. (2022). Towards spatializing consumer energy sustainability. Empirical findings about the policy and practice of energy conservation and poverty in Barcelona and North Macedonia. *Journal of Environmental Policy and Planning*, *24*(4), 407–420. https://doi.org/10.1080/1523908X.2021.2008234

Mookerjea, S. (2019). Renewable energy transition under multiple colonialisms: passive revolution, fascism redux and utopian praxes. *Cultural Studies*, *33*(3), 570–593. https://doi.org/10.1080/09502386.2019.1585464

Müller, F., Claar, S., Neumann, M., & Elsner, C. (2020). Is green a Pan-African colour? Mapping African renewable energy policies and transitions in 34 countries. *Energy Research and Social Science*, *68*. https://doi.org/10.1016/j.erss.2020.101551

Müller, F., Neumann, M., Elsner, C., & Claar, S. (2021). Assessing african energy transitions: Renewable energy policies, energy justice, and SDG 7. *Politics and Governance*, *9*(1), 119–130. https://doi.org/10.17645/pag.v9i1.3615

Müller, F., Tunn, J., & Kalt, T. (2022). Hydrogen justice. *Environmental Research Letters*, *17*(11). https://doi.org/10.1088/1748-9326/ac991a

Mundaca, L., Busch, H., & Schwer, S. (2018). 'Successful' low-carbon energy transitions at the community level? An energy justice perspective. *Applied Energy*, *218*, 292–303. https://doi.org/10.1016/j.apenergy.2018.02.146

Noorman, M., Espinosa Apráez, B., & Lavrijssen, S. (2023). AI and Energy Justice. *Energies*, *16*(5). https://doi.org/10.3390/en16052110

Nsafon, B. E. K., Same, N. N., Yakub, A. O., Chaulagain, D., Kumar, N. M., & Huh, J. S. (2023). The justice and policy implications of clean energy transition in Africa. *Frontiers in Environmental Science*, *11*. https://doi.org/10.3389/fenvs.2023.1089391

Okpanachi, E., Ambe-Uva, T., & Fassih, A. (2022). Energy regime reconfiguration and just transitions in the Global South: Lessons for West Africa from Morocco's comparative experience. *Futures*, *139*. https://doi.org/10.1016/j.futures.2022.102934

O'Sullivan, K., Golubchikov, O., & Mehmood, A. (2020). Uneven energy transitions: Understanding continued energy peripheralization in rural communities. *Energy Policy*, *138*. https://doi.org/10.1016/j.enpol.2020.111288

Page, M. J., Moher, D., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … McKenzie, J. E. (2021). PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ*, *372*. https://doi.org/10.1136/bmj.n160

Pandey, P., & Sharma, A. (2021). Knowledge politics, vulnerability and recognition-based justice: Public participation in renewable energy transitions in India. *Energy Research and Social Science*, *71*. https://doi.org/10.1016/j.erss.2020.101824

Parović, M. M., & Kljajić, M. V. (2022). IMPROVEMENT OF METRIC FOR QUANTIFICATION AND ASSESSMENT OF THE ENERGY JUSTICE. *Thermal Science*, *26*(3), 2225–2237. https://doi.org/10.2298/TSCI210527262P

Partridge, T., Thomas, M., Pidgeon, N., & Harthorn, B. H. (2018). Urgency in energy justice: Contestation and time in prospective shale extraction in the United States and United Kingdom. *Energy Research and Social Science*, *42*, 138–146. https://doi.org/10.1016/j.erss.2018.03.018

Pellegrini-Masini, G., Pirni, A., Maran, S., & Klöckner, C. A. (2020). Delivering a timely and Just Energy Transition: Which policy research priorities? *Environmental Policy and Governance*, *30*(6), 293–305. https://doi.org/10.1002/eet.1892

Qurbani, I. D., Heffron, R. J., & Rifano, A. T. S. (2021). Justice and critical mineral development in Indonesia and across ASEAN. *Extractive Industries and Society*, *8*(1), 355–362. https://doi.org/10.1016/j.exis.2020.11.017

Rasch, E. D. D., & Köhne, M. (2017). Practices and imaginations of energy justice in transition. A case study of the Noordoostpolder, the Netherlands. *Energy Policy*, *107*, 607–614. https://doi.org/10.1016/j.enpol.2017.03.037

Reitz, S., Goshen, L., & Ohlhorst, D. (2022). Trade-offs in German wind energy expansion: building bridges between different interests, values and priorities. *Energy, Sustainability and Society*, *12*(1). https://doi.org/10.1186/s13705-022-00365-1

Revi, A., Roberts, D., Klaus, I., Bazaz, A., Krishnaswamy, J., Singh, C., Eichel, A., Poonacha Kodira, P., Schultz, S., Adelekan, I., Babiker, M., Bertoldi, P., Cartwright, A., Chow, W., Colenbrander, S., Creutzig, F., Dawson, R., De Coninck, H., De Kleijne, K., … Ürge-Vorsatz, D. (2022). *The Summary for Urban Policymakers of the IPCC's Sixth Assessment Report*. https://doi.org/10.24943/SUPSV511.2022

Saintier, S. (2017). Community energy companies in the UK: A potential model for sustainable development in "local" energy? *Sustainability (Switzerland)*, *9*(8). https://doi.org/10.3390/su9081325

Sareen, S., & Haarstad, H. (2018). Bridging socio-technical and justice aspects of sustainable energy transitions. *Applied Energy*, *228*, 624–632. https://doi.org/10.1016/j.apenergy.2018.06.104

Scherhaufer, P., Klittich, P., & Buzogány, A. (2021). Between illegal protests and legitimate resistance. Civil disobedience against energy infrastructures. *Utilities Policy*, *72*. https://doi.org/10.1016/j.jup.2021.101249

Schlör, H., Fischer, W., & Hake, J. F. (2013). Sustainable development, justice and the Atkinson index: Measuring the distributional effects of the German energy transition. *Applied Energy*, *112*, 1493. https://doi.org/10.1016/j.apenergy.2013.04.020

Sejer Damgaard, C., Mccauley, D., & Reid, L. (2022). Towards energy care ethics: Exploring the ethical significance of relationality within energy systems in transition. *Energy Research & Social Science*, *Volume 84*. https://doi.org/https://doi.org/10.1016/j.erss.2021.102356

Sheller, M. (2014). Global Energy Cultures of Speed and Lightness: Materials, Mobilities and Transnational Power. *Theory, Culture & Society*, *31*(5), 127–154. https://doi.org/10.1177/0263276414537909

Siciliano, G., Wallbott, L., Urban, F., Dang, A. N., & Lederer, M. (2021). Low-carbon energy, sustainable development, and justice: Towards a just energy transition for the society and the environment. *Sustainable Development*, *29*(6), 1049–1061. https://doi.org/10.1002/sd.2193

Sokołowski, M. M., & Heffron, R. J. (2022). Defining and conceptualising energy policy failure: The when, where, why, and how. *Energy Policy*, *161*. https://doi.org/10.1016/j.enpol.2021.112745

Sorman, A. H., Turhan, E., & Rosas-Casals, M. (2020). Democratizing Energy, Energizing Democracy: Central Dimensions Surfacing in the Debate. *Frontiers in Energy Research*, *8*. https://doi.org/10.3389/fenrg.2020.499888

Sovacool, B. K., Burke, M., Baker, L., Kotikalapudi, C. K., & Wlokas, H. (2017). New frontiers and conceptual frameworks for energy justice. *Energy Policy*, *105(C)*, 677–691.

Sovacool, B. K., & Dworkin, M. H. (2015). Energy justice: Conceptual insights and practical applications. *Applied Energy*, *142*, 435–444. https://doi.org/10.1016/J.APENERGY.2015.01.002

Sovacool, B. K., Hess, D. J., & Cantoni, R. (2021). Energy transitions from the cradle to the grave: A meta-theoretical framework integrating responsible innovation, social practices, and energy justice. *Energy Research and Social Science*, *75*. https://doi.org/10.1016/j.erss.2021.102027

Sovacool, B. K., Hook, A., Martiskainen, M., Brock, A., & Turnheim, B. (2020). The decarbonisation divide: Contextualizing landscapes of low-carbon exploitation and toxicity in Africa. *Global Environmental Change*, *60*, 102028. https://doi.org/10.1016/J.GLOENVCHA.2019.102028

Sovacool, B. K., Kester, J., Noel, L., & de Rubens, G. Z. (2019). Energy Injustice and Nordic Electric Mobility: Inequality, Elitism, and Externalities in the Electrification of Vehicle-to-Grid (V2G) Transport. *Ecological Economics*, *157*, 205–217. https://doi.org/10.1016/j.ecolecon.2018.11.013

Sovacool, B. K., Turnheim, B., Hook, A., Brock, A., & Martiskainen, M. (2021). Dispossessed by decarbonisation: Reducing vulnerability, injustice, and inequality in the lived experience of low-carbon pathways. *World Development*, *137*. https://doi.org/10.1016/j.worlddev.2020.105116

Stojilovska, A. (2023). Energy poverty and the role of institutions: exploring procedural energy justice–Ombudsman in focus. *Journal of Environmental Policy and Planning*, *25*(2), 169–181. https://doi.org/10.1080/1523908X.2021.1940895

Sumarno, T. B., Sihotang, P., & Prawiraatmadja, W. (2022). Exploring Indonesia's energy policy failures through the JUST framework. *Energy Policy*, *164*. https://doi.org/10.1016/j.enpol.2022.112914

Szulecki, K. (2017). Conceptualising Energy Democracy. *Environmental Politics*, *27(1)*, 21. https://doi.org/10.1080/09644016.2017.1387294

Thombs, R. P. (2019). When democracy meets energy transitions: A typology of social power and energy system scale. *Energy Research and Social Science*, *52*, 159–168. https://doi.org/10.1016/j.erss.2019.02.020

Tiwari, S., Schelly, C., & Sidortsov, R. (2021). Developing a legal framework for energy storage technologies in the U.S: The case of pumped underground storage hydro. *Electricity Journal*, *34*(10). https://doi.org/10.1016/j.tej.2021.107048

Tornel, C. (2023). Decolonizing energy justice from the ground up: Political ecology, ontology, and energy landscapes. *Progress in Human Geography*, *47*(1), 43–65. https://doi.org/10.1177/03091325221132561

van Zyl-Bulitta, V. H., Ritzel, C., Stafford, W., & Wong, J. G. (2019). A compass to guide through the myriad of sustainable energy transition options across the global North-South divide. *Energy*, *181*, 307–320. https://doi.org/10.1016/j.energy.2019.05.111

Vasstrøm, M., & Lysgård, H. K. (2021). What shapes Norwegian wind power policy? Analysing the constructing forces of policymaking and emerging questions of energy justice. *Energy Research and Social Science*, *77*. https://doi.org/10.1016/j.erss.2021.102089

Vega-Araújo, J., & Heffron, R. J. (2022). Assessing elements of energy justice in Colombia: A case study on transmission infrastructure in La Guajira. *Energy Research and Social Science*, *91*. https://doi.org/10.1016/j.erss.2022.102688

Velasco-Herrejon, P., & Bauwens, T. (2020). Energy justice from the bottom up: A capability approach to community acceptance of wind energy in Mexico. *Energy Research and Social Science*, *70*. https://doi.org/10.1016/j.erss.2020.101711

Velasco-Herrejón, P., Bauwens, T., & Calisto Friant, M. (2022). Challenging dominant sustainability worldviews on the energy transition: Lessons from Indigenous communities in Mexico and a plea for pluriversal technologies. *World Development*, *150*. https://doi.org/10.1016/j.worlddev.2021.105725

Vitéz, B., & Lavrijssen, S. (2020). The energy transition: Democracy, justice and good regulation of the heat market. *Energies*, *13*(5). https://doi.org/10.3390/en13051088

von Platten, J., de Fine Licht, K., Mangold, M., & Mjörnell, K. (2021). Renovating on unequal premises: A normative framework for a just renovation wave in swedish multifamily housing. *Energies*, *14*(19). https://doi.org/10.3390/en14196054

Wade, R., & Ellis, G. (2022). Reclaiming the Windy Commons: Landownership, Wind Rights, and the Assetization of Renewable Resources. *Energies*, *15*(10). https://doi.org/10.3390/en15103744

Wang, H. W., Dodd, A., & Ko, Y. (2022). Resolving the conflict of greens: A GIS-based and participatory least-conflict siting framework for solar energy development in southwest Taiwan. *Renewable Energy*, *197*, 879–892. https://doi.org/10.1016/j.renene.2022.07.094

Wang, X., & Lo, K. (2022). Civil society, environmental litigation, and Confucian energy justice: A case study of an environmental NGO in China. *Energy Research and Social Science*, *93*. https://doi.org/10.1016/j.erss.2022.102831

Wewerinke-Singh, M. (2022). A human rights approach to energy: Realizing the rights of billions within ecological limits. *Review of European, Comparative and International Environmental Law*, *31*(1), 16–26. https://doi.org/10.1111/reel.12412

Willand, N., Middha, B., & Walker, G. (2021). Using the capability approach to evaluate energy vulnerability policies and initiatives in Victoria, Australia. *Local Environment*, *26*(9), 1109–1127. https://doi.org/10.1080/13549839.2021.1962830

Williams, S., & Doyon, A. (2019). Justice in energy transitions. *Environmental Innovation and Societal Transitions*, *31*, 144–153. https://doi.org/10.1016/j.eist.2018.12.001

Wójcik, M., & Jeziorska-Biel, P. (2023). Geographies of Energy: Key Issues and Challenges towards Spatial Justice Concepts. *Energies*, *16*(2). https://doi.org/10.3390/en16020742

Wood, N. (2023). Problematising energy justice: Towards conceptual and normative alignment. *Energy Research & Social Science*, *97*, 102993. https://doi.org/10.1016/J.ERSS.2023.102993

Wyleżałek, J. (2021). Dilemmas around the energy transition in the perspective of peter blau's social exchange theory. *Energies*, *14*(24). https://doi.org/10.3390/en14248211

Wyse, S. M., Das, R. R., Hoicka, C. E., Zhao, Y., & McMaster, M. L. (2021). Investigating Energy Justice in Demand-Side Low-Carbon Innovations in Ontario. *Frontiers in Sustainable Cities*, *3*. https://doi.org/10.3389/frsc.2021.633122

Zaman, R., & Brudermann, T. (2018). Energy governance in the context of energy service security: A qualitative assessment of the electricity system in Bangladesh. *Applied Energy*, *223*, 443–456. https://doi.org/10.1016/j.apenergy.2018.04.081