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Dancing on the head of a needle? ‘Disciplining’ energy justice scholarship

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Abstract

Energy justice (EJ) scholarship grapples with conundrums of application and research due to its transdisciplinary nature, the relational character of EJ, and the cross-fertilisation of ideas from divergent and ever-evolving knowledge production and legitimisation cultures – hereafter its diachronic epistemic cultures. The development trajectory of EJ is shaped by disciplinary and ideological commitments, notably from political science, philosophy, geography, environmental justice studies, development studies, and decolonial studies, each with distinct approaches to legitimising knowledge about EJ. As energy transitions entail spatial processes or geographical dynamics, so should the frameworks that guide EJ research and aspirations. Once the justness of space production (processes), energy systems, and epistemic cultures of EJ scholarship are conceptualised as neither pre-existing nor independent of one another, the dynamic aspect of EJ is foregrounded to expose pitfalls in the field. ‘Disciplining’ the transdisciplinary EJ scholarship – with fundamentally spatial implications – requires repositioning it in the core discipline of human geography and foregrounding the clash of epistemic cultures to foster new dialogues that critically interrogate established methods, theoretical perspectives, and epistemologies. I draw on African case studies to illustrate how such commitments could direct EJ scholars(hip) from producing knowledge with little or no practical value.

Keywords

Africa, energy justice, human geography, pluriversality, space production

Introduction

> Nothing is more damaging to a new truth than an old error. (Johann Wolfgang von Goethe, 1749–1832)

Energy justice (EJ) scholarship grapples with conundrums of application and research due to its transdisciplinary nature, the relational character of EJ, and the cross-fertilisation of ideas from diverse and ever-evolving knowledge production and legitimisation cultures–hereafter referred to as its diachronic epistemic cultures. The development trajectory of EJ is shaped by disciplinary and ideological commitments, notably from political

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science, philosophy, geography, environmental justice studies, development studies, and decolonial studies, with distinct approaches to legitimising knowledge about EJ. As energy transitions entail spatial processes or geographical dynamics (Bridge et al., 2013; Bridge and Gailing, 2020; Broto and Baker, 2018), so should the frameworks that guide EJ research and aspirations. 'Disciplining' the transdisciplinary EJ scholarship with – fundamentally spatial implications – requires repositioning it in the core discipline of human geography and foregrounding the clash of epistemic cultures to foster new dialogues that critically interrogate established methods, theoretical perspectives, and epistemologies. This dialogue also reinvigorates recent calls to foreground energy geography within human geography, urging energy scholars to challenge knowledge orthodoxies and anchor the spatial dimensions of their work within the discipline, rather than in related fields, especially amid growing interest in EJ studies (Ptak et al., 2025).

Justice theorisations in human geography are underpinned by a pre-determined form, expression and target of resistance (Hughes, 2020), regulatory mechanisms that could rectify structural spatial injustice (Barnett, 2011; Dikeç, 2001; Soja, 2010) and strategies to guide political actions aimed at addressing spatial injustice (Barnett, 2017). Others consider spatial injustice rectifiable by addressing the complex social, political, and economic relations that initiated and sustained it (Marcuse, 2009); or identifying particular metrics of justice attuned to exposing spatial inequalities in human capabilities given the elusiveness of justice in its spatial intelligibility (Israel and Frenkel, 2018, 2020). The call to 'spatialise' justice conceptions rests on clarifying the geographical scale – national or global – at which justice should be defined and measured, or how resources *ought to be* allocated across space (Israel and Frenkel, 2018). Energy geographers and environmental justice scholars draw on these geographic thoughts in EJ scholarship, particularly to: uncover and rectify spatial inequalities driving energy poverty (Bouzarovski and Simcock, 2017); ensure self-determination in energy systems (Broto, 2017; Broto et al., 2018); democratise energy transitions to empower weakear voices (Dunlap, 2023; Stephens, 2019); delineate spaces deserving of subsidised energy services (Boamah, 2020b; Boamah and Rothfuß, 2020); reinforce state territorial authority in contested peripheries through energy infrastructure (Power and Kirshner, 2019); conceptualise 'new energy spaces' as sites of entangled knowledge and resistance to the capitalist appropriation of Indigenous territories into energy project hubs (Tornel, 2024); and envision total liberation from energy geographies of domination (Dunlap and Tornel, 2023, 2025). Other works include resistance towards the subtle legitimisation of 'low-carbon spaces' in the Global South as 'ecological safe havens' for the privileged Global North (Boamah, 2022; Monyei et al., 2018) and new geographies of energy colonialism (Tunn et al., 2024, 2025).

The crucial task of legitimising knowledge about EJ is akin to being caught between the Charybdis of resisting entrenched systems – yet serving strategic interests – and the Scylla of 'dancing on the head of a needle' (i.e. struggling only to produce solutions of little or no practical value). My reading of the EJ scholarship shows these conundrums. The cultures of producing and validating knowledge claims about EJ – its epistemic cultures – are based on (i) the right-to-energy and developmentalist, (ii) post-development, and (iii) 'decolonial turn' perspectives. The rights-based and developmentalist perspective considers fairness in energy systems by recognising the concerns of everyone (McCauley et al., 2019) or equipping people with the means to choose dignified lives (see Melin et al., 2021) without creating negative socio-ecological externalities for the underprivileged elsewhere (Holland, 2008). The post-development perspective exposes the continued failure of the 'development project' and advocates pursuing alternatives to development in the Global South (Dunlap and Tornel, 2023, 2025). Decolonial perspectives advocate resistance to neo-colonial institutions perpetuating capitalist modernity against the rights of people in energy system transitions (Dunlap and Tornel, 2023; Hesketh, 2025; Tornel, 2023). In *Pluralising Energy Justice,* Sovacool et al. (2023) incorporate feminist, Indigenous, anti-racist, and postcolonial approaches to address socio-ecological injustice

entrenched by the EJ framework. Dunlap and Tornel (2023) contend that maintaining the mainstream EJ framework reinforces rather than changes the status quo. The 'pluriverse project' – informed by post-development and decolonial thoughts – advocates self-determination, place-based solidarity and collective resistance against the idea of development, state control and other structures that have subsumed multiple worlds of knowledge, ontologies, practices, and lived experiences into a singular blueprint (or uni-verse) of modernist development and Western epistemologies. The insurrectionary energy research agenda aims to empower dissenting knowledge on socio-ecological realities of energy infrastructures (Dunlap, 2023) and resist neocolonial institutions in energy transitions (Dunlap and Tornel, 2023). I label this alternative approach 'critical EJ scholarship' due to its spirited defence for total liberation.

Despite its revelatory tone and emancipatory promises, critical EJ scholarship takes for granted the unique strands of decolonial thoughts and 'good life' aspirations in different geographies in the Global South. Latin American decolonial scholarship, driven by 'decolonial turn', places greater emphasis on pluriversality (instead of the universality of Western knowledge) and belittles postcolonial theory for not being decolonial enough due to its roots in Western-centric epistemological orders (Tembo, 2022). Reservations of critical EJ scholars towards the state, extractivism and capitalism emerge from the institutionalisation of social hierarchies patterned along race, class, and ethnicity in Latin America and state violence that rendered Indigenous populations vulnerable to systemic discrimination and denial of their territorial rights, particularly during the mineral extraction boom in the 1980s (Hale, 2013; Martínez Novo and Shlossberg, 2018). Critical EJ scholarship often gets stuck in a 'victim–oppressor' dichotomy, overlooking the transformative potential of reciprocal state-society interrelations and underestimating the structural constraints to provincialising Western knowledge in the Global South. The exclusive focus of critical EJ scholarship on Latin America overlooks the affordances of total liberation elsewhere. State-making and resource governance in Africa are shaped by relations built through collaborations and legitimacy claims rooted in pre-colonial and post-colonial sources or intermeshing state and non-state institutions (Ray, 1996; Rothfuß et al., 2021). Also, dependencies on state-owned energy infrastructure are an essential indicator of recognition justice (Boamah, 2020b), and Western funding, technologies and institutional norms shape energy planning in Africa (Pedersen and Nygaard, 2018; Tarekegne and Sidortsov, 2021).

Moreover, fluid conceptions of EJ have rendered the concept vulnerable to disciplinary, ideological, and political appropriations. Thus, EJ scholarship has taken a 'diachronic form', proliferating and transmuting from original Western-centric conceptions towards 'pluriverse perspectives'. I surmise that new EJ perspectives or fresh epistemologies would claim supremacy over preceding versions as the foci of EJ scholarship evolve in response to competing disciplinary/ideological commitments and ever-changing socio-ecological concerns. Pluriversality embodies contradictions and utopian aspirations, given its ultimate vision to embrace the co-existence of epistemic diversity in non-hierarchical ways, glossing over 'epistemic injustice lock-ins'. Many EJ studies downplay 'epistemic socialisation' – the process by which researchers, bureaucrats, and grassroots activists are conditioned to adhere to specific privileged ways of studying and validating knowledge about EJ. This socialisation can prove challenging to question, resulting in situations I call 'epistemic injustice lock-ins'. Valuable insights from epistemic cultures and disciplinary and ideological commitments hardly die out, and neither do their pitfalls. Since dialoguing does not require supplanting established viewpoints but rather conversations to improve their respective perspectives (Tembo, 2022), I believe that EJ scholarship needs 'disciplining'.

Given the spatial orientation and implications of EJ scholarship, human geographers must satisfactorily demonstrate why focusing on specific spaces, geographies, or scalar framings of energy systems and transitions is a central matter to justice. *In Where Is Justice in Geography*, Przybylinski (2022) challenges geographers to

seriously engage with why the manifestation of certain spatial phenomena (or socio-spatial relations) can be considered just, and why the subjects and objects of research matter to justice. For Przybylinski (2022), such commitments to justice theorisations can remediate persistent differences in normative approaches to theorising justice in human geography and improve the utility of the justice concept. Justifying the justness of spatial phenomena in energy transitions, however, depends on epistemological, ideological, and disciplinary commitments that shape what justice should look like and what it should afford to people or groups in specific contexts. Broto et al. (2018) argue that future EJ research agenda should focus on the search for methods uncovering the situated understandings and challenges of energy, and privilege synthesising the emancipatory notions of EJ in pursuit of self-determination. Suppose self-determination is the ultimate answer to energy injustice, why do diverse epistemologies and methodologies co-exist and compete as valid ways of identifying, studying, and resolving energy injustice? The different disciplinary commitments to researching and advancing EJ shape distinct ontologies, epistemologies, methodologies, and methods of inquiry. This includes those rooted in insurrectionary research agenda (e.g. decolonial studies), moral and ethical dimensions (philosophy), power redistribution to the marginalised (political science) and analysis of spaces/geographies of control and inequality in energy transitions (human geography), among others. That said, once the justness of space production (processes), energy systems, and epistemic cultures of EJ scholarship are conceptualised as neither pre-existing nor independent of one another, the dynamic aspect of EJ is foregrounded to expose pitfalls in the field. Disciplining EJ scholarship requires answers to these two crucial questions: *How can we navigate 'epistemic injustice lock-ins' in EJ scholarship and institutionalise total liberation in a more pragmatic and enduring way? To what extent does 'disciplining' EJ scholarship open fresh dialogues to challenge the established scientific methods of inquiry into EJ?*

I draw on African case studies to illustrate how such commitments could direct EJ scholars(hip) from producing knowledge with little or no practical value. The first section examines various approaches to EJ research and aspirations. The following section re-examines EJ scholarship, drawing on empirical evidence. Finally, I outline a research agenda for disciplining EJ scholarship.

The clash of epistemic cultures and disciplinary commitments in EJ scholarship

Ontology is 'the study of "being": of whether or in what sense a thing exists' (Galvin and Sunikka-Blank, 2016: 65). What we consider unknown, known, or knowable emerges from our ontology and approach to producing and validating that knowledge (i.e. epistemology). The methodological execution of a study is defined by its epistemology and ontology. A careful assessment of academic disseminations in EJ studies, including mine, shows that disciplinary and ideological commitments and a clash of epistemic cultures between Western-centric development orthodoxies and postcolonial, decolonial and post-development thoughts steer the trajectory of EJ scholarship. Decolonial and post-development works have inspired critical EJ scholarship, drawing predominantly on Latin American experiences. In contrast, rights-based and developmentalist notions continue to inform EJ studies in Africa. For Broto et al. (2018), the conceptual workbook of EJ, required to actualise meaningful contributions to people's lives, instead emerges from Western thoughts and thus perpetuates domination strategies and socio-ecological injustices. Explaining why a particular perspective, commitment, epistemology, object/subject of interest and conception expresses EJ is essential.

The 'energy' concept legitimises extractivist development, Western domination (Daggett, 2019; Lohmann, 2021) and state territorial control tactics (Power and Kirshner, 2019) and expresses citizenship rights (Boamah and Rothfuß, 2020). Every conceived thought (i.e. concept) is preceded by original thoughts (i.e. precepts), prescribing the knowing and interpretation of the object. A

concept, therefore, requires an agreement on the definition of terms (Hilpinen, 2004)[1] to avoid mis/conceptions. Since precepts guide an interpreter (or the inquirer) to determine the applicability of a concept to a given situation and the veracity of a proposition, a concept without precepts is defective (Hilpinen, 2004). Mainstream EJ conceptions are rooted in EJ scholarship and activism in the Global North (Fuller and Bouzarovski, 2023), emphasising fairness in regulations and implementing environmentally polluting activities (Agyeman et al., 2002). Being an offshoot of environmental justice, the 'fairness idea' underpinning the mainstream EJ framework is rooted in comparative notions and Western-centric developmentalist approaches to the 'good life'. This suggests that EJ remains amorphous without comparative perspectives. The earliest EJ framework was based on 'triumvirate' conceptions: advocating the necessity to reduce distributional inequalities (i.e. distributional justice), recognise the perspectives of all groups (i.e. recognition justice) and ensure all-inclusive procedures in energy policymaking and implementation (i.e. procedural justice) (McCauley et al., 2019; Schlosberg, 2007). Cosmopolitan justice advocates treating humans as citizens of a single community (i.e. earth) bound by collective morality and believing that justice principles should have universal applicability (McCauley et al., 2019). Capabilitarian conceptions of EJ draw on Sen's capability deprivation (Sen, 1993), Holland's 'capability-ceilings' (Holland, 2008), and Day et al.'s (2016) 'energy poverty' to emphasise how energy enables individuals to choose a dignified life. Insights from development studies and climate justice scholarship shape these.

EJ scholarship came under scrutiny, particularly regarding the appropriateness of its conceptual tools and methodologies (Broto et al., 2018), the universal validity of EJ theorisations predominantly based on Western experiences (McCauley et al., 2019) and its reliance on Western-centric conceptions (Broto et al., 2018; Tornel, 2023). Energy sovereignty emphasises people's right to self-determination in accessing energy services, reciprocal relationships between society and ecosystems, and participation in decision-making and innovation (Broto, 2017). Informed by postcolonial and political science perspectives, energy sovereignty seeks to correct energy injustices caused by colonial legacies in the Global South (Broto et al., 2018). The call for an economy-wide shift towards low-carbon solutions, aligned with macroeconomic growth and socio-economic goals, necessitates debates on energy transition in a geographically differentiated political economy (Bridge and Gailing, 2020). The geographical political economy approach lends itself well to analysing the relevance of politics in energy transitions and related uneven geographical implications (Bridge and Gailing, 2020). The West's subtle promotion of fossil fuels to sustain their economies and the putative perverse imposition of expensive and (somehow less efficient) renewable energy technologies in the Global South is termed 'energy bullying' (Boamah, 2020b; Monyei et al., 2018). 'Energy bullying' concerns in Africa rest on the unfair construction of the 'needy' developing countries as the 'ecological safe havens' for Global North countries, which have built their economies through past and ongoing dependencies on fossil fuels (Boamah, 2022; Monyei et al., 2018). The post-independence state perpetuates colonial legacies and socio-ecological injustices through discursive practices, territorial control tactics through problematic spatial imaginaries and delimitations of territories as 'empty' to justify controversial renewable energy projects (Avila et al., 2022; Tornel, 2024) or to suppress popular dissent against mineral resource extraction in Indigenous territories (Cardoso and Turhan, 2018).

The critical political economy approach advocates the need to 'decentre' the state (or resist its repressive powers) to decolonise political economy approaches (Tornel, 2024). This emerges from views that state sovereignty is a product of colonial violence and deliberate dispossession of Indigenous territory, agency and existence through extractive development (Hesketh, 2025). Decolonising the political economy of energy transition means privileging energy transition approaches informed by place-based Indigenous struggles rooted in a territorial and relational understanding of energy

(Tornel, 2024) or empowering bottom-up alliances of Indigenous communities rather than dwelling on nation-state centrism in energy transitions (Hesketh, 2025; Tornel, 2023). Building on 'new energy spaces' associated with energy transitions (Bridge and Gailing, 2020), Tornel (2024) considers 'territories' as embodying diverse power relations and political projects, which are emancipatory and dominating. The lived experiences of Indigenous communities in a 'plurinational state' context of Latin America help to understand alternative ontologies and epistemologies of emancipation beyond Western-framed and state-centric conceptions (Tornel, 2023b). This decolonising approach prioritises qualitative research methodology, focused on analysing viewpoints of Indigenous communities and outcomes of territorial struggles of subaltern groups against the state's organising logics (Tornel, 2023, 2024) and how race and class intersect to perpetuate marginalisation (Hesketh, 2025).

While I acknowledge the relevance of 'decolonial turn' slogans informing critical EJ scholarship, the notion of total liberation can be deterministic. A comparative analysis of state-making in Africa and Latin America is essential here. In Latin America, state-refounding involves reversing the constitutional epistemologies that justified predatory extractivism and colonial continuities and instead pursuing a 'plurinationality vision' centred on the coexistence of multiple nations within a territory and self-determination without state dependency (Fahimi et al., 2022; Rodas, 2022). The concept of 'territory' in Latin America has been a key instrument in Indigenous struggles for justice, evolving in meaning and use – from resisting large-scale development projects, and protecting borders and natural resources to mobilising spatialised social movements and reclaiming territorial rights and identity (Dorn and Hafner, 2023; Radcliffe, 2017). Consequently, struggles for territorial rights and spirited insurrection against the state or nation-state centrism, cultural imperialism, and extractivism constitute indices of EJ in Latin America. However, 'territory' carries distinct meanings regarding state-society relations in Africa. In a socialist political landscape like Mozambique, electricity infrastructure serves as a tool for projecting and consolidating the state's territorial authority in contested rural peripheries, while also demonstrating welfare delivery and reinforcing state legitimacy through reciprocal state–citizen relations (Power and Kirshner, 2019). State-making in Africa produced contemporary state-society relations that are typically more *reactive* than reciprocal, privileging elite power consolidation and domination of interest, subjugation of group rights and routine state victories over society (Nagar, 2021). For Nagar (2021), a developmental civil society approach involves building bridges with society, which 'allows African states to ultimately nurture the reciprocal, synergistic and broad-based state-society relations that stand the test of time and uplifts people out of poverty and underdevelopment' (Nagar, 2021: 215). Any enduring liberation requires nurturing reciprocal relations rather than insurrectionary actions. Justice aspirations and conceptions surrounding space production in Africa and Latin America may be similar, but liberation struggles cannot follow similar paths.

Moreover, the lure of Western development ideals, inevitable extractive capitalism in the Global South, and the mediating role of the state in energy transitions warrant a rethinking of the 'pluriverse project'. For example, despite the increasing concentration of fossil fuel consumption in the Global South (Fuhr, 2021), their governments do not feel morally obliged to invest in renewable energy without the support of advanced Global North countries accused of bearing 'ecological guilt' (Boamah, 2020b; Monyei et al., 2018). Many developing countries have adopted a relatively positive stance towards fossil fuels, considering fossil extraction and exports as the state's major 'cash cow' (Cardoso and Turhan, 2018) or drawing inspiration from the prosperity of Western countries and China, India and South Africa, which sustained or built resilient economies by burning substantial amounts of cheaper yet highly polluting fossil fuels (Babatunde, 2016; Monyei et al., 2018). The lasting impacts of Western epistemologies and development orthodoxies raise questions about EJ contributions advocating complete self-determination and insurrectionary approaches.

According to Alison Jagger (2009: 2), justice theorisations demand a clarification of the 'what', 'where', 'how', and 'who' of justice that renders the form and nature of particular processes, situations, phenomena and relations just (or unjust). Human geography has a vital role to play here. Whether human geographers draw on justice to explain the wrongfulness of phenomena in space or guide political actions, Przybylinski (2022) argues that 'rationalising' the justice aspect of their work should be paramount. Again, Ptak et al. (2025) call for situating 'fundamentally spatial phenomena' within energy geography, securing the discipline's rightful place in human geography. What should guide the rationalisation of justice in geographical research remains unresolved in EJ scholarship, especially given its transdisciplinary nature and fundamentally spatial focus. Human geography scholars have drawn on spatial justice theories to engage with these crucial issues, given the discipline's preoccupation with theorising the spatial distribution and expressions of inequality and capability deprivation amid criticism of missing normativity in well-being studies or spatial justice theorisations (Barnett, 2011; Olson and Sayer, 2009). According to Israel and Frenkel (2018: 648), 'choosing a metric of justice in diversified societies could benefit from such a particularistic thinking, as people and communities in them hold different ideas of what constitutes well-being and a good life'. The metric of justice refers to a person's capabilities and substantive freedom to achieve whatever is deemed valuable, and the equality of the distribution of capabilities determines the justness of spatial arrangements (Israel and Frenkel, 2018). For Israel and Frenkel (2020), a person's capital forms (i.e. social space) and habitus determine equality of capabilities and a person's relative position in space in terms of these factors provides the normative dimensions of justice theorisation. This approach confuses relative deprivation or inequality with injustice. Again, Israel and Frenkel (2020: 11) seem at a loss regarding the translation of the metrics of justice into measurable units:

> Empirically testing a theory such as that of Israel and Frenkel (2018) poses a challenge, as capital resources, habitus, capabilities, and functioning are abstract terms without a clear translation into measurable concepts. For example, the tested variables do not relate […] to varying forms of injustices, […] whereas it is not possible to determine the exactly cultural and social capital of a specific population or place.

Nightingale (2018) contends the measurability of justice and poverty, arguing that predefining specific 'desirable' targets as progress requirements downplays processes and enactments that account for the shifting experiences of poverty over space and time.

In *Spatializing energy justice*, Bouzarovski and Simcock (2017: 1) emphasise contextualisation in energy poverty research by showing 'how domestic energy deprivation is fundamentally intertwined with and produced through, geographical inequities and flows that are ingrained in the economic, infrastructural and cultural make-up of society'. An engaging line of inquiry is how space production processes enable or constrain people, and/or reproduce asymmetries in energy service provision. The specified indices of injustice (i.e. vulnerability, maldistribution, stigmatisation and misrecognition) are still predicated on conceptualisations of relative deprivation and express a predetermination of what EJ *ought to be* and *afford* in particular spaces. Since spaces or geographies of justice are produced, spatialising EJ to reveal the underlying forces of socio-spatial inequalities and guide remediation responses must be preceded by analysing the competing meanings invested in their emergence and outcomes. If space matters to EJ conceptions and aspirations, epistemologies, and the disciplinary and ideological commitments mediating its production, the evolving meanings regarding the justness of the space and the approaches to knowing indices of in/justice matter even more. Theories and affordances of EJ remain as contestable as its methods and application without conscious efforts to 'discipline' the field. Disciplining EJ scholarship requires attention to interactions between epistemic cultures and disciplinary and ideological commitments that mediate understandings of the justness of space production (processes)

and appropriateness of the methods of inquiry in EJ studies in specific geographies.

Methodology and case selection rationale

This dialogue is based on an empirical study and a review of EJ studies in Ghana, Namibia, Kenya, and Mozambique. The four countries have unique electrification regimes shaping the spatial organisation of the grid and off-grid energy solutions in pursuing EJ. Ghana and Namibia have a predominantly welfare-driven electrification regime, Kenya has a market-oriented regime, and Mozambique has a typical socialist electrification regime. The findings are predominantly based on my habilitation/postdoctoral research (2017–2023) conducted in Africa (Boamah, 2022) and related energy projects (2019–2022) and conference/workshop proceedings. To examine specific EJ conceptions and applications in different countries, domains (e.g. rural, urban, remote areas) and across diverse social categories (e.g. social class and status), grounded normativity theory (GNT) offers valuable insights. GNT refers to the 'ethical frameworks provided by these Indigenous place-based practices and associated forms of knowledge' (Coulthard and Simpson, 2016: 254). It entails identifying social groups whose situation inspires a researcher's inquiry instead of replacing the perspectives and insights of people with the normative frameworks and claims of researchers and theorists (Miller, 2013) or without being bogged down in moral judgments and normative claims when studying literature and conceptualising issues from specific empirical, epistemic contexts and particular perspectives (Ackerly et al., 2024).

Throughout the research and review of conference/workshop proceedings and published papers, I analysed how the established indices of EJ – such as self-determination and dignified life or energy injustice indices like energy poverty, and capability deprivation – are interpreted and contested by theorists, researchers, bureaucrats, activists and the media. In each of the four cases, I paid particular attention to how and why specific EJ aspirations, normative claims or concerns of individuals, social groups, communities, and activist groups in rural and urban areas emerged, shifted, or even changed based on class relations, practices, expectations of energy infrastructure and service delivery models. Alternatively, I sought to understand what energy distributors (e.g. ECG in Ghana, KPLC in Kenya, and EDM in Mozambique), energy regulatory bodies (e.g. PURC in Ghana or EPRA in Kenya) and rural electrification agencies (e.g. FUNAE in Mozambique or REDs in Namibia) in each country consider a just approach to energy planning and service provision. I sought to understand the initiatives of respective countries to rectify longstanding spatial inequalities in energy provision, as well as the institutional norms and development aspirations that inspire the chosen energy planning and transition pathways. This methodological approach provided insights into how state–society relations mediate people's 'good life' aspirations. The literature reviews entail analysis of assumptions, epistemologies, and disciplinary/ideological commitments underpinning EJ frameworks. Key themes emerging from the studies were analysed to understand the affordances and origins of specific EJ conceptions.

What determines the geographies/spaces of EJ? – illustrations from Africa

In this section, I challenge current conceptions of EJ by examining three factors that matter most to understandings and theorisations of EJ, with illustrative examples from four African countries – Kenya, Ghana, Namibia, and Mozambique.

Why comparative practice and geographical political economy matter. EJ conceptions are being criticised for reinforcing the fetishism of Western-framed 'good life' standards and justice notions, which downplay norms and practices mediating fairness of energy transitions in non-Western contexts (Boamah, 2020a; Broto et al., 2018; Khalid and Sunikka-Blank, 2017). Comparing the materiality of practice and energy is crucial to EJ scholarship here. I examine comparative practices and the geographical political economy of energy transition across Kenya, Ghana, Namibia and Mozambique. The SDG-7 and the World Bank's Multi-Tier Framework (MTF)[2] define energy access criteria and the electrification agenda in Africa. In Kenya,

a geospatial planning tool informs three electrification models: grid expansion, grid densification and grid intensification. Locations ineligible for these options receive mini-grids and Solar Home Systems (SHSs).[3] The longstanding market-oriented energy planning underpins the least-cost electrification regime guiding Kenya's electricity distributor, KPLC (or Kenya Power). Kenya's electricity sector is the state's 'cash cow', with tax components nearing 50% of electricity bills.[4] Kenya Power justifies state-driven management of energy provision:

> Control of power distribution enables the government to implement social programmes in the sector, such as cross-subsidisation among customers in electricity pricing methodology and attaching levies to customer bills to raise revenue for 'unprofitable' rural electrification investments and recurrent expenditure of independent energy regulation. (Interview with KPLC Management Member, September 2018)

Although state support facilitated the solar PV transition in Kenya (Byrne, 2011), the capital cost of energy infrastructure was shifted to users in off-grid areas (Newell et al., 2014). This does not suggest that off-grid electrification always produces geographies of capability deprivation. In the late 1990s, a businessman of Kamba descent in Makueni County financed the electrification cost of an entire Kamba village to boost his electoral fortunes in a keenly contested election. Still, he lost the bid to a poorer fellow tribesman. Paradoxically, the generous gesture had no significance on the outcome of the elections because abject poverty in the village was so widespread that most residents had no immediate pressing need for affordable or efficient grid access. The Kenyan proverb '*In Kenya Solar [SHSs] is not for Big Men*', appearing in daily conversations, expresses that lower-income groups organise their practices (lighting, listening to radio news and watching small-TV sets) around energy services of SHS according to their financial conditions and sometimes consider subsidised grid access superfluous (Boamah, 2020a). Urban residents who had established temporary homes in the periphery equally adapted their practices to the energy services of small-scale solar PV systems during holidays without capability deprivation concerns. Most grid-connected households claimed to have bribed grid contractors to expedite grid access to complement energy services of inefficient solar PV systems or enable home-based businesses to maintain elite cultures and outcompete their counterparts in the periphery (Boamah, 2020a).

The Ghanaian government implemented the National Rooftop Programme (NRP) in 2016 to reduce the peak load of 200 MW by distributing free 500 W photovoltaic panels and inverters to people to minimise the impacts of power generation shortfalls. The media and consumer rights activists invented the satirical terms *Dumsor* and 'Usain-Bolt Meters' to create collective consciousness about persistent energy crises amid unfair electricity billing systems (Boamah and Rothfuß, 2018). NRP benefited mostly urban residents and generated massive interest in solar PV systems as power backups to mitigate injustices associated with dependencies on unreliable centralised grids. Solar energy companies capitalised on public frustrations to expand their customer base by inventing catchy slogans such as 'You have your own Akosombo [power generation station] when you go solar' (Boamah and Rothfuß, 2018). The Akosombo metaphor inspired confidence in self-organised solar PV systems, emphasising their ability to give users some self-determination in energy consumption and expenditure. SHS offered most users 'surplus energy' to continue performing modern practices (e.g. home cooling, food processing/storage and watching TV programmes) and maintain urban elite cultures, which would otherwise be impossible through sole dependencies on state-managed electrical grids.

The new government revised the project to focus on off-grid communities in Ghana's eastern region (Boamah and Rothfuß, 2020). The state implementing agency advised beneficiaries against using energy-intensive appliances (e.g. electric irons, old-fashioned TVs and refrigerators) to ensure the facility's durability. The USD 2500-worth facility was initially received with collective appreciation, especially by lower-income groups requiring energy for basic practices (e.g. watching small TVs,

telephoning, and lighting). Later, misrecognition concerns became widespread in the community, particularly among rural elites who once had exposure to urban lifestyles and could not abandon modern cooking, food storage, and ironing practices. This cohort of users claimed that the lower energy output of the facility neither enables modern practice performances nor supports micro-business enterprises compared to the energy services of centralised electrical grids. Despite their lower and dispersed energy demand patterns, many residents felt entitled to rather centralised electrical grids. Others felt short-changed by politicians who promised the community an electrical grid extension in the 2016 general elections, only to receive a 'sub-standard' energy facility after the party's landslide victory. Lamentations by one NRP beneficiary expressed deep-rooted social constructions of energy: 'Solar (energy) is good, but we deserve the proper power (electrical grid) to live modern lifestyles here (isolated areas) too'. Offering a decentralised solar PV facility instead of centralised grids was perceived as reducing the beneficiaries to 'second-class' Ghanaian citizens. The high social acceptance of centralised grids, particularly in remote areas, stems from the post-independence government's vision to modernise Ghana through a state-led electricity regime. Despite high tariffs and frequent grid power outages in Ghana before and during the research period, most residents still preferred state-managed centralised grids. Conversely, the NRP produced new spaces of self-determination in energy use, class distinctions, and assertive demands for solar PV systems. A prospective NRP application in Accra remarked: 'Solar [SHS] does not befit Atta Kwame[5] at all. (…). The government should bring that back to the city. We [elites in urban areas] deserve that modern technology' (Boamah and Rothfuß, 2020: 9). Observations from urban and rural energy users suggest that just energy provision entails energy technology and service delivery models that fulfil users' needs in practical terms, referred to as 'practical recognition'. Sudden disinterest in solar PV systems and collective agitation for grid extensions in other off-grid locations in Ghana (Bawakyillenuo, 2012) express similar recognition concerns. The practical recognition concept overlaps with the idea that poverty results from capability deprivation (Sen, 1993) or energy poverty (Day et al., 2016). The NRP increased awareness of socio-spatial inequality, primarily from 'relative deprivation' rather than absolute deprivation.

Moreover, mini-grid electrification is gaining traction in Africa due to governments' intention to facilitate least-cost socio-economic transformation in underprivileged geographies (Byrne, 2011; Pedersen and Nygaard, 2018). In Kenya, tariffs charged by private mini-grid operators are more expensive since they are not cross-subsidised, thus exposing off-grid geographies to capitalist exploitation with limited productive energy uses. Unlike in Kenya, mini-grids in Ghana are managed by state institutions to ensure uniform tariff payments and pro-poor interventions in 'island communities' in eastern Ghana, which are considered needier and too remote to warrant centralised grid extensions. A uniform tariff system means non-payment of cost-recovery tariffs and feelings of injustice, especially among higher-income groups that cannot use energy services for productive purposes. Differences in the geographical political economies of off-grid electrification transition and energy practices explain the unique experiences and understandings of EJ in Ghana and Kenya.

Relatedly, a renowned Kenyan activist (Apollo Mboya) initiated a court action against Kenya's energy regulator and distributor on behalf of the Electricity Consumers Association of Kenya (ELCOS) for 'illegal' energy tariff increases for 2018/2019 and demanded refunds. Later on, there were numerous allegations that the activist had become a sell-out by reaching an out-of-court settlement decision with the state agencies without the consent of ELCOS. Aggrieved electricity customers used digital activism (via Twitter hashtags) to mobilise nationwide support for a follow-up legal court action, inventing the satirical tagline '#Kenyapowerless' to expose and rectify injustices in the electricity sector (Boamah et al., 2021). Even after the state agencies reversed the tariff increases, KPLC staffers argued that the tariff review decision was intended to rectify an earlier

undercharge and served cost-offsetting purposes for the public interest. Similarly, consumer rights activism in Ghana reduced unfairness in energy service provision. These experiences suggest that the emancipatory potentials of grassroots activism require deliberative conditions through reciprocal state–society interactions.

In Namibia, the 1998 Energy Policy White Paper introduced regional electricity distributors (REDs) to ensure efficient energy service. Subsequently, two hybrid mini-grids were established in off-grid communities (Tsumkwe and Gam) under the management of regional councils. The Namibian government tasked one of the REDs (CENORED) to manage the facilities to ensure efficient service provision and revenue generation. CENORED hesitated to manage off-grid infrastructure due to high maintenance and operational costs resulting from substantial dependence on backup diesel-powered generators to meet the soaring energy demand amid customers' inability to pay cost-reflective tariffs. CENORED urged its customers to avoid using energy-intensive appliances (e.g. electric stoves, welding machines and geysers) and introduced power load-shedding plans to balance demand and supply. Energy users who had gradually become accustomed to energy-intensive appliances later felt constrained by the load management practices. These reservations revived interest in centralised grids as the 'real electricity', enabling modern appliances in relatively cost-effective and less restrictive ways than mini-grids. Again, an off-grid community, Manghetti Duin, has been granted electrical grid access despite being considered a potential mini-grid community per Namibia's least-cost geospatial planning tool. Grid extension from Grootfontein to Manghetti Duin (about 136 km away) costed approximately NAD 34 million, but the government hesitated to provide even half the amount for mini-grid construction or upgrading. The preference for centralised grids is justified by substantial financial resources invested in rehabilitating mini-grids in Gam and Tsumkwe and high operational and maintenance costs. Some experts argue that the grid extension is a vote-seeking and political control strategy. Centralised grid extension to Mangetti Duin, around 80 km from Tsumkwe, sparked renewed interest in centralised grids. CENSORED and influential residents are lobbying politicians to expand the power grid to off-grid communities to realise the EJ aspirations of both the populace and the electricity distributor.

Relatedly, residents in Namibia's Zambezi region consider themselves marginalised groups and perceive off-grid energy solutions as a sign of non-recognition of their citizenship rights. The state's management approach to off-grid infrastructure in the Zambezi region – at the nascent stages of solar PV technology – neither met the population's practical needs (e.g. using energy to power cooking stoves, air conditioning, TV, and deep freezers) nor inspired their confidence in other off-grid technologies. Consequently, a collective repulsive attitude exists towards off-grid infrastructure: electrical grid electrification or nothing else/less.

The Portuguese colonial administration in Mozambique created an electrification regime characterised by the spatial concentration of electrical grid infrastructure in privileged locations (Broto et al., 2018; Power and Kirshner, 2019). The state-owned electricity distributor (EDM) was set up shortly after Mozambique's independence to ensure collective modernisation of the population, promote national unity, expand state territorial control (Power and Kirshner, 2019), and rectify distributional energy injustice inherited from the colonial regime (Broto et al., 2018). Mozambique added coal-fired plants and diesel-powered generation systems to complement its hydropower plants and established the Rural Electrification Agency (FUNAE) in 1997. These interventions neither solved affordability and reliability issues nor reduced spatial inequalities in energy access, particularly between urban and rural/peripheral locations. In 2018, the government launched the Energy Access for All Programme to achieve SDG-7, backed by substantial Western funding for off-grid energy infrastructure. A social tariff system, rooted in socialist ideals, mandates subsidised and uniform tariffs for customers of donor-funded mini-grids. In 2014, the South Korean government funded a 10-kWp mini-grid facility with a backup battery in southern Mozambique, managed

by FUNAE. Replacing the depleted storage batteries required enormous investments, which the meagre revenues from subsidised tariffs did not justify. The facility was dismantled when EDM extended centralised grids into the community, though energy provision had not started as of May 2022. Dismantling the mini-grid facility suggests the state's reluctance to invest in storage batteries as part of its least-cost electrification plan. Furthermore, the 30-kWp mini-grid facility improved socio-economic conditions in an off-grid community and reduced dependence on diesel-powered generators, but there were ethical concerns about the uniform tariff system, which makes no room for tariff differentiation between the different energy users (Zebra et al., 2023). The uniform tariff system requires that all energy users pay a standard price for every unit consumed, even though lower-income groups consume significantly less energy than higher-income and commercial users. Again, the community lacks technical expertise, resulting in faulty components remaining unfixed for several months until FUNAE technicians are sent to repair them. The state-led off-grid electrification governance denies the local community self-determination in energy planning; meanwhile, a reverse case would undermine the state's capacity to sustain the least-cost electrification regime and maintain its 'presence' in the periphery (Power and Kirshner, 2019). The production of spaces of energy in/justice is, thus, mediated by ideological and political commitments shaping state-society interrelations in energy transitions.

Why 'normativity stencil adventures' matter. The dominant EJ literature conceptualises the causes and effects of EJ and proposes guidelines for energy research and energy planning (Bouzarovski and Simcock, 2017; Day et al., 2016; Jenkins et al., 2021). The methodology that Jenkins et al. (2021) adopted for filtering 85 papers for a systematic review excluded documents that did not use 'EJ'. The authors also excluded publications other than peer-reviewed English papers, neglecting non-Western texts and non-English meanings of EJ. The authors, nonetheless, reached generalisable recommendations: '… these findings remind us that EJ has the potential agency to serve as the unceasing protagonist in energy research and beyond, provoking researchers and practitioners to remain reflexively normative and active in identifying injustices and vulnerabilities' (Jenkins et al., 2021: 22). Jenkins et al.'s (2021) EJ criteria draw on the eight principles underpinning the EJ framework (Sovacool et al., 2016) and the reconsidered version (Sovacool et al., 2017). Without contextualising, Jenken et al.'s (2021) reference to a value-laden index of EJ, such as 'energy poverty', misses situated experiences of EJ. The methodology of mainstream EJ scholarship, critical EJ scholarship (insurrectionary methodology), and those in between would benefit from exploring how spaces or geographies of EJ emerge and evolve in different settings and circumstances.

According to Wood et al. (2024), the 'triumvirate conceptions' of EJ lack the explanatory power to enable normative assessment of energy systems or the multiple interpretations and experiences of justice in energy transitions. Thus, these conceptions limit the contributions of moral and political philosophy to EJ scholarship and the applicability of the mainstream EJ framework outside academia (Wood et al., 2024). Again, the philosophical underpinnings of justice conceptions entail an inclination to particular kinds of normativity, be it ethical (i.e. wrongfulness or rightfulness of action, a state of being, process, or an outcome), or epistemic (i.e. the validity of normative claims and established ways of investigating these) (Darwall, 2001, 2017). Despite determined efforts to 'decolonise' or challenge the mainstream EJ framework, dependencies on Western-centric conceptions of justice, the good life, and neo-colonial institutions persist in energy transitions in developing countries. Instead of getting stuck in such entanglements, I propose an approach to navigating 'epistemic injustice lock-ins'. I argue for the more pragmatic and dynamic normativity stencil adventures. Normativity stencil adventures entail a reflexive search for stencils along which conventional indices of energy injustice (e.g. capability deprivation and inequality) are experienced, produced, contested and measured in relational ways in specific geographies/spaces and situations. I consider

this endeavour an *adventure* because it is an endless pursuit of self-determination that evolves constantly, depending on specific development aspirations, commitments mediating state–society relations, socio–spatial relations, and energy resource entitlements. I draw on illustrative examples to show why similar actions, choices or indices of EJ are experienced, interpreted and contested uniquely, even in similar situations, geographies, and conditions.

A few reflections from the four cases clarify my argument. The Ghanaian government's low-carbon energy initiatives aimed to address consumer rights groups' concerns and win votes in the 2016 general elections (Boamah and Rothfuß, 2018). Improved power generation after 2018 rendered net metering and solar PV subsidy programmes less of a priority to the government (though fossils constituted at least 70% of the power generation mix by then). Ghana's leading electricity distributor (ECG) perceived net metering as a threat to its sunk investments and revenue generation (Boamah, 2020b). The ECG did not credit net-metered customers for power exports due to financial challenges caused partly by customer defaults. Initially touted as climate justice and pro-poor interventions, the Ghanaian government's renewable energy subsidy programmes later proved to be performative altruism aimed at boosting electoral fortunes. The fragmented geographies of solar PV transition and related assertive demands reflect an entanglement of energy politics and Western-centric modernisation narratives. Energy transition in Ghana can be considered 'just' if it complements a welfare-driven electrification regime, aligns with cost-effective visions of the electricity distributor, promotes the energy self-determination visions of urban elites and guarantees practical recognition in off-grid geographies (even if energy tariffs remain unaffordable).

Similarly, in Namibia, mini-grid systems could not balance cost-reflective tariffs, low-carbon power generation and productive energy use in needy off-grid geographies (Hoeck et al., 2022). The Namibian energy ministry planned its electrification along Tier-3 to ensure productive energy use, especially in off-grid locations. Mini-grid operators advocate cost-reflective energy provision in off-grid geographies, while customers, who were once pleased with mini-grid facilities, now consider unfettered access to state-driven, centralised grids as an index of recognition justice. The following considerations determine indices of justice: off-grid systems should be regarded as a 'stepping-stone' to centralised electrical grids, fulfil the 'just business' aspirations of electricity distributors, address the population's demands for 'practical recognition' and accommodate political interests of the government.

It is noteworthy in the four cases that the construction of spaces such as island communities, the periphery, and deprived settlements as the needier locations eligible for decentralised and affordable renewable energy systems has been based on prescribed demands for recognition, reparation, and political/ideological commitments towards inclusive development. Essential indices of EJ in Mozambique and Namibia include participatory governance approaches, uniformity of tariffs, and substantial state control in energy provision. In Mozambique, the state's pursuit of legitimacy and welfare delivery drives energy infrastructure development in peripheral areas. However, following centralised grid expansion into nearby off-grid locations, the lived experiences of EJ in mini-grid-served locations shifted from practical recognition to discontent. In the Zambezi region, the decentralised solar PV transition has continued to reflect a geography of marginalisation, shaped by feelings of relative deprivation and unfulfilled aspirations for 'modernist development' lifestyles. In contrast, practical recognition shaped geographies of inequality, class distinction, and self-determination in Ghana and Namibia, but less so in rural Kenya, where the market-driven electrification regime and energy practices of most rural folks produced spaces of contentment despite the stark spatial inequalities in energy infrastructure development and energy service provision. Practical recognition rather than affordability emerged as a key index of EJ in rural Ghana and Namibia, whereas it held less significance in Kenya and Mozambique. In Mozambique, lived experiences of injustice and the state's commitment to reducing spatial

inequalities in energy access in remote areas were informed by socialist ideologies and the SDGs – based on Western notions of progress. The meanings of EJ depend on specific social classes, individuals, and state intentions and evolve uniquely across the four cases over time. Its affordances depend on how energy transitions fulfil state intentions and social aspirations through reciprocal state-society negotiations – radically different from the total liberation criteria and methodology advocated by critical EJ scholars. The normativity stencils adventures approach is better suited to uncovering the conditions that shape the justness of space production processes in energy transitions and the spatial configuration of energy systems. Consequently, certain aspects of critical EJ scholarship may be inapplicable in Africa, which calls for reflexivity in methodological, theoretical and epistemological approaches.

Why comparative epistemologies of EJ matter. Nothing constrains knowledge production more than dependencies on inherited concepts, knowledge claims, strategic framings, normative frameworks and methodologies that have become 'authoritative' because they serve strategic interests despite their pitfalls. Particularly in Africa, the pursuit of pluriversality visions to accommodate diverse epistemological paradigms from various geopolitical centres within university curricula, while doing self-discovery of Indigenous knowledge or African identity is promising (Gwaravanda and Ndofirepi, 2020: 75). The same emancipatory aspiration for a 'non-hierarchal knowledge' regime constitutes its Achilles heel given existential epistemic injustice lock-ins. I would be curious to read a convincing 'decolonial' definition of seemingly emancipatory terms like 'Indigenous knowledge', 'African Identify' or 'de-Westernised knowledge', in a context where Western epistemological orders continue to set standards for organising logics, identity formations and categories in development studies. Critical EJ scholarship advocates total liberation without interrogating diverse perspectives upon which EJ conceptions are grounded and classification standards (e.g. World Bank's MTF and SGD7) through which hierarchies and asymmetries between Western and Southern epistemologies are maintained. The epistemological dialogue, argued to be the strength of pluriversality, would be pragmatic if framed along a rigorous engagement with the relative strengths, credibility, and weaknesses of co-existing and competing epistemologies of EJ – hereafter referred to as comparative epistemologies of EJ.

The call for integrating justice concerns the planning stages of energy projects to guarantee just outcomes in developing countries (Tarekegne and Sidortsov, 2021). The 'socio-legal research methodology' employed by Tarekegne and Sidortsov (2021) for the content analysis of energy planning instruments governing electrification projects in sub-Saharan Africa still drew on Western-framed 'triumvirate' and capabilitarian conceptions of EJ. The application of right-based and developmentalist conceptions of EJ varies between and within advanced countries (Partridge, 2023), depending on subjects, regions and issues of interest. These notions conceptualise EJ in developed countries based on the right of access to affordable, reliable and high-quality energy infrastructure (Partridge, 2023). In contrast, emphasis is placed on the extent of developmental impacts and access (in) equality (Partridge, 2023) and the freedom to institutionalise cost-effective energy transitions in developing countries (Monyei et al., 2018). Despite their pitfalls, the developmentalist notions of EJ suit the strategic interests of governments, people, and bureaucrats in regions where modernisation narratives drive the electrification regime, and thus mediate understandings of geographies of energy in/justice.

Furthermore, strategic issues and scale framings mediate the utility of EJ epistemologies. Scale frames serve regulatory and discursive functions in low-carbon energy solutions by legitimising inclusions, justifications and exclusions through shifts in the scale at which problems are conceived and solutions are proposed (Weller, 2019). Although strategic scale frames usually entail discussion of issues grounded on particular ontological and epistemological orientations, they can be extended into policy-making, whereby particular scale frames could be strategically drawn upon to delegitimise

alternative viewpoints in the policy space (Mansfield and Haas, 2006; Weller, 2019). According to Day et al. (2016: 262), conceptualising energy poverty in capability terms 'may be particularly useful for thinking about reducing energy poverty in the context of climate change mitigation and carbon reduction…'. Yet the authors do not indicate the spatial scale(s) at which the two ambitious aspirations (i.e. reducing energy poverty and carbon emissions) could be achieved simultaneously without reproducing injustice. Pursuing EJ with a global-scale orientation (see Sovacool et al., 2017: 1) or emphasising equal obligations of citizens of advanced and developing countries towards ecological sustainability (e.g. cosmopolitan justice) (McCauley et al., 2019: 917) entails framing climate change problems as a global problem needing collective de-fossilisation efforts. This strategic scale-framing contradicts rights-based and developmentalist notions of EJ linked to individual, national, communal, and other lower spatial scales in the Global South. Conversely, collective apathy towards expensive energy sector decarbonisation among African governments, driven by energy bullying advocacy, may be justified based on decolonial and post-development thoughts. Nonetheless, the 'energy bullying' advocacy seems unjustified, given the rising spatial concentration of carbon emissions in developing countries (Fuhr, 2021; Rothfuß and Boamah, 2021).

Furthermore, in a typical plurinational landscape such as Latin America – characterised by predatory extractivism and longstanding state violence against marginalised groups – critical EJ scholarship offers valuable insights. As this analysis suggests, it is apparent that conceptions and affordances of EJ and the identification of unjust geographies and scales are shaped by competing epistemologies and specific disciplinary and ideological commitments. Each EJ epistemology serves specific strategic interests, legitimises normative claims, defines frameworks for assessing the site of injustice, and determines appropriate methods of inquiry. Each epistemology has its relative weaknesses and strengths; thus, comparative epistemologies of EJ are conducive to complementarities of diverse epistemes without one being eclipsed by another 'better' one. Knowledge pluriversality, as shown by critical EJ scholarship, rejects Western epistemological orders, so its call for the co-existence of diverse epistemologies sounds contradictory. I contend that the 'pluriverse project' cannot survive 'epistemic injustice lock-ins' and thus requires an approach more attuned to facilitating reciprocal dialogues between diverse epistemologies, perspectives, and methodologies.

Disciplining EJ scholarship and its future research agenda

The transdisciplinary character of EJ scholarship adds vitality to the field, while its diachronic epistemic cultures position it as a field in the making. However, this brand(ing) of EJ scholarship also constitutes its Achilles heel as it hosts diverse disciplines and ideologies with different disciplinary commitments grounded in distinct ontologies, epistemologies and methodologies regarding the actual 'site' of energy injustice, corrective measures and the affordances of EJ. Let me recapitulate significant contributions to EJ scholarship and explain what 'disciplining' the field entails and affords.

To begin with, critical EJ scholarship masterfully exposes the systems that perpetuate neo-colonial undertones of the mainstream EJ framework. The orientation of Latin American decolonial scholarship and its experiences of energy transitions offer a vital inspiration for this turning point in EJ scholarship. While ground-breaking, the approach to achieving 'total liberation' is indeterminate, overly deterministic and too ideologically driven to be pragmatically effective. Inspired by the pluriverse idea, rejecting development is considered a necessity, along with collective struggles against multiple forms of domination, capitalist modernity and 'hostility towards the state,' – all in pursuit of total liberation which is regarded as an unquestionable good (Dunlap and Tornel, 2025). Insurrectionary grammars, including 'confronting', privileging 'insurgent voices', 'recalcitrant', 'anti-statism', and statements like 'rejection of state control and its spread through (neo)colonialism rebranded as development' (Dunlap and Tornel, 2025: 224)

leave no room for bargaining in state–society interactions in pursuing total liberation. If rejecting Western development orthodoxies, neo-colonial institutions, and Western epistemologies constitutes the *sine qua non* for actualising total liberation, I contend that the problems will remain unresolved until Western technologies (e.g. solar and wind energy), infrastructure financing, and Westernised classification standards, perpetuating Western domination and socio-ecological injustices are also jettisoned.

Moreover, since grassroots advocacy may serve specific strategic interests and entrench inequalities (Nanda, 1999; Storey, 2000) or depend on collaboration with actors and institutions to succeed (Bebbington et al., 2008), critical EJ scholarship should clarify the nature of the political settlements that would bring total liberation. Moreover, the confidence in the emancipatory potential of grassroots activism overlooks local uncertainties and specificities, as evidenced in the Ghanaian and Kenyan cases. There is a claim that post-development does not seek to impose a singular methodological approximation, given that the particularities of each place mediate resistance and liberation struggles (Dunlap and Tornel, 2025: 229), yet 'post-development methodology remains a methodology of struggle providing intellectual tools, concepts, and practices that can aid in cultivating an end to development' (Dunlap and Tornel, 2025: 230). It appears contradictory in terms of its insistence on not advocating a singular methodological approximation. Such a methodology is ill-suited to contexts where feelings of injustice stem from relative deprivation resulting from citizens' inability to negotiate with the state for spatially equitable access to modernist development. The inordinate pursuit of alternatives to development echoes a longstanding critique of post-development theory: 'If development is so detrimental to its recipients in the global south, why do its very victims continue to defend and desire it?' (Matthews, 2010; Rahnema and Bawtree, 1997).

Furthermore, informed by insights from political science, Dunlap's (2023) preference for 'direct democracy' to reduce socio-ecological injustices in democratised energy systems does not guarantee just outcomes, as the criteria for selecting those who 'set up justice principles' in energy projects remain questionable (Barragán-Contreras, 2022). Power asymmetries between 'invitees' and 'inviting parties' in energy project consultations override the specific concerns of the former by skewing energy planning deliberations along particular privileged knowledge and perspectives (Barragán-Contreras, 2022). While prioritising contextual conditions and grassroots movements (Barragan-Contreras, 2022; Partridge, 2023) or pluralist views (Barragán-Contreras, 2022) to provide situated experiences of EJ is a promising idea, understanding the epistemologies and methodologies of EJ in specific spaces or geographical contexts is crucial (Broto et al., 2018).

Normativity stencil adventures and comparative epistemologies of EJ build on the idea of Broto et al. (2018) and provide a critical entry point into the diverse epistemologies and disciplinary/ideological commitments shaping EJ studies and aspirations across regions. Energy and human geographers, in particular, contribute significantly to theorising space–energy interrelations. Relational perspectives of space and energy show how these two entities bring out relational aspects of energy justice (Broto and Baker, 2018). Nonetheless, rationalising how particular spatial/geographical configurations of energy systems, transitions, and societal reactions can be deemed just/unjust is more crucial. Otherwise, the expected affordance of such relational perspectives – for example, guiding political actions against geographies of energy injustice – may be diminished or remain out of reach. As illustrated in the four empirical cases, particular geographical areas and scales are 'produced' and filled with diverse meanings, becoming spaces of resistance, entitlements, political expectations and commitments, emancipatory struggles, self-determination, reparation, and human capability enhancements in EJ research and policy-making. The produced spaces – or emergent geographies – of energy in/justice become 'sites' expressing and embodying outcomes of asymmetrical power relations, resistance and liberation struggles, climate-compatible development discourses, issue- and scale-framings, mediated by the clash of epistemic cultures, ideological and disciplinary commitments.

The calls to justify the justness of the object or subject of study in human geography (Przybylinski 2022), employ scientific methods sensitive to ever-evolving and situated life conditions (Nightingale, 2018) and position energy geography to its rightful place within human geography (Ptak et al., 2025) demonstrate the need for turning points in geographical research on energy–space–justice interrelations. These turning points, I argue, require fine-tuning. If there is a commitment to privileging insurrectionary research agenda (Dunlap and Tornel, 2023, 2025), promoting self-determination and methodological rigour in EJ studies (Broto et al., 2018), spatialising EJ (Bouzarovski and Simcock, 2017), re-situating fundamentally spatial aspects of energy research within energy geography (Ptak et al., 2025), or deploying relational conceptions of energy and space to guide political responses towards global energy dilemmas (Broto and Baker, 2018), then disciplining EJ scholarship could not be more essential and timelier. Since dependencies on established framings and discourses, disciplinary commitments regarding indices of EJ, etc., can 'normalise' and perpetuate the taken-for-granted EJ conceptions to constitute epistemic and methodological truths to interrupt alternative approaches, I suggest future EJ research agenda could be guided by the following:

1. Standard scientific methods of inquiry into EJ (e.g. case studies, literature reviews, interviews, ethnographies, and observations) must acknowledge that the justness of spatial or geographical processes in energy transitions is constituted by and constitutive of disciplinary commitments, ideological orientations, and epistemological position(s) and that transparency should guide research designs and processes.
2. Given the diachronic epistemic cultures of EJ, thinking in comparative epistemological terms refines established perspectives and complements epistemologies as the scope and foci of EJ studies evolve. While maintaining reflexivity and flexibility in research design and policymaking, this approach enables situated or context-specific understandings and affordances of EJ conceptions and applications.
3. Finally, EJ dialogues should prioritise knowledge derived from comparative case studies and comparative epistemologies of justice.

This enterprise of 'disciplining' EJ scholarship would tie many loose ends in critical EJ studies, position the burgeoning field to adapt to change and enhance the utility of the EJ concept whilst embracing contributions from all disciplines.

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Notes

1. This idea is also drawn from a lecture by Dr Myles Munroe. The Power of Ideas by Myles Munroe | Optimistic Inspirations (youtube.com).

2. See here: Electricity | Multi Tier Framework (esmap.org)
3. SHS and solar PV systems are used interchangeably in this article.
4. See the tax components in March 2020 electricity bills by percentage of total billing expenditure: fuel cost surcharge (11.2%), forex surcharge (0.5%), EPRA Levy (0.13%), WARMA (water regulator) levy (0.09%), rural electrification levy (3.5%), inflation adjustment (1.25%), and VAT (13%), totalling 34.17%.
5. Mud-and-thatch houses in rural areas.

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