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Energy colonialism

Franziska Müller[1]

University of Hamburg, Germany

Abstract

Energy colonialism is an essential, yet scarcely theorized concept for understanding how past, present and future energy systems are shaped by colonial or neocolonial power dynamics, imaginaries, discourses, and practices. These perspectives are important for contemporary debates on energy transition processes, namely with regard to green finance flows, new green geopolitics, and energy governance. Energy colonialism becomes manifest as power over energy transition processes, as an epistemic force with regard to knowledge orders and knowledge transfer, but also as an intervention on an individual scale, affecting daily life and human-nature relations. Colonial continuities are pervading contemporary energy debates, for instance in the 'run-up' for green hydrogen produced the Global South to sustain economic growth in the Global North, in colonial imaginaries of *terra nullius* conceptions reproduced in energy partnerships, and not least in financial dependencies that stabilize the political economy of clean energy. Reconstructing how different understandings of energy colonialism entered political and academic debate, this article provides an account of its history of ideas and demonstrates how a lack of theoretical underpinning limits analytical rigor and activist work. To close this gap, I engage with the concept of coloniality in use, and suggest a more nuanced understanding of energy colonialism. A nine-field matrix demonstrates how energy colonialism becomes manifest on different levels of energy transitions and how the concept may serve as a multidimensional research strategy for critical social science research on energy transitions and modes of energy governance, energy infrastructures, and energy subjectivities.

Keywords

Energy transition, renewable energy, energy colonialism, green colonialism, decoloniality

1. Introduction

Energy colonialism is an essential, yet scarcely theorized, concept for understanding how past, present, and future energy systems are shaped by (neo)colonial imaginaries and practices. Energy colonialism becomes manifest as power over energy transition processes, as an epistemic force regarding knowledge orders and knowledge transfer, as well as an intervention on a more individual scale – affecting livelihoods and human–nature relations in the name of universal progress and "development." Colonial continuities are pervading contemporary energy debates, visible in the "run-up" to producing (green) hydrogen in the Global South to sustain economic growth in the Global North, in colonial imaginaries of *terra nullius* conceptions reproduced

[1] Franziska Müller, Assistant Professor for Global Climate Governance, University of Hamburg, Germany. Email: franziska.mueller@uni-hamburg.de. I would like to thank the editorial collective and the anonymous reviewers for their highly valuable comments. For comments, critique and feedback I owe deep-felt gratitude to Tobias Kalt, Aram Ziai, Friz Trzeciak, Johanna Tunn, Imeh Ituen, Lara Narayanaswamy, Ankit Kumar, Keston Perry, Liam Midzain-Gobin, and Joshua Kirshner.

in energy partnerships, and not least in financial dependencies that stabilize the political economy of clean energy.

Facing climate crises and the rise of green capitalism, energy colonialism is a concept that offers new analytical perspectives to understand, criticize, and connect apparently unrelated phenomena, such as green financialization, land conflicts over solar and wind park sites, new hydrogen geopolitics, knowledge transfers related to energy, or, on an ontological level, the conceptualization of energy as commodified nature. However, debates on energy colonialism are still scattered, and a systemic overview is lacking, which has so far prevented the use of energy colonialism as a valuable analytical framework. Reconstructing how different understandings of energy colonialism entered political and academic debate and locating the term within the broader context of debates on environmental extractivism, namely "carbon colonialism" (Bachram, 2004; Paterson & Stripple, 2012), "climate coloniality" (Sultana, 2022), and "green colonialism"/"coloniality of nature" (Agarwal, 1991; Alimonda, 2011; Brookfield, 1992; Nelson, 2003), this article provides an account of its history of ideas and demonstrates how a lack of theoretical grounding has, so far, meant that the concept has not been broadly applied as an analytical lens.

To close this gap, I engage with Anibal Quijano's three-fold concept of coloniality (Quijano, 2000, 2007) and establish a more nuanced understanding of energy colonialism. A nine-field matrix demonstrates how energy colonialism becomes manifest at different levels of energy transitions and how the concept may serve as a multidimensional research strategy for critical social science research on energy transitions and modes of energy governance, energy infrastructures, and energy subjectivities.

Finally, avenues for further research are explored to show how energy colonialism may enrich the agenda of energy research in the social sciences. In doing so, this article ties in with the programmatic perspectives on decolonizing energy (Lennon, 2020; Tornell, 2022) and on pluralizing and decolonizing energy justice (Lennon, 2017; Sovacool *et al*., 2023). In doing so, I align with transnational movements fighting for energy justice and decarbonization with whom I have been associated over the last 20 years as a scholar/activist. Being part of a largely energy-independent collective situated in the Global North, my role is an ambivalent one, as, despite efforts at dismantling it, I am still benefitting from the energy system that I criticize. In this sense, my positionality as a White and queer scholar/activist is motivated by my commitment to practicing ecosocial solidarity and post-development in the Global North, both by securing fundamental aspects of living – housing, food production, and energy use (Bendix *et al*., 2019) – and by contributing to decolonizing activities in academia (Ziai *et al*., 2020).

2. Putting nature to work: Carbon colonialism, climate coloniality, and green colonialism

The concept of energy colonialism evolved in the early 2000s, namely as a critique of large-scale renewable energy (RE) production in Northern Africa under the auspices of the "Desertec Project." Yet, while such connections to activism underpin it, a lack of theoretical rigor has limited the concept's analytical use. Energy colonialism is not an all-too-flat ontology or a mere metaphor, and is historically grounded within the systemic processes of colonization, including entanglements of capitalism and coloniality (Bhambra & Newell, 2022; Tuck & Yang, 2012). To overcome this, unpacking energy colonialism's ideational history requires locating the concept in relation to other neighboring concepts that seek to put nature to work.

"Carbon colonialism" entered debate in the mid-nineties, referring to the fear that forest-abundant countries in the Global South were used as territories ripe for green investment while greenwashing the ecological debt of the Global North. The critique of carbon offsetting and emission trading became prevalent, particularly regarding the Kyoto Protocol's joint implementation mechanism, which, as representatives from the Global South feared, would result in the Global South being considered a carbon sink at the advantage of industrialized countries (Heller, 1995). Later works (Bachram, 2004; Bumpus & Liverman, 2010; Paterson & Stripple, 2012) further elaborated the concept by establishing parallels between historical colonialism and today's carbon offsetting schemes, and thus, defined it as "a new form of colonialism which utilizes climate policies to bring about a variation on the traditional means by which the global South is dominated" (Bachram,

2004, p. 10), resulting in access restrictions and land-grabbing, and displacement and environmental injustice (Bumpus & Liverman, 2010; Lyons & Westoby, 2014). Bachram (2004) concluded that

> …the dynamics of emissions trading, whereby powerful actors benefit at the expense of disempowered communities in both North and South, is a modern incarnation of a dark colonial past. European colonialism extracted natural resources as well as people from the colonized world. (p. 18)

Another perspective, "climate coloniality," is a much broader concept that explores how colonialism and climate crisis are interconnected, centering on the historical responsibility of colonizers in the Global North. Recently, particularly controversies over "loss and damage" have sparked debate on climate colonialism, particularly at the COP27 meeting in Egypt in 2022 (Abimbola *et al*., 2021). Expanding the term to include lived experience and using empirical evidence, Sultana (2022) reminded us that

> …climate coloniality occurs where Eurocentric hegemony, neocolonialism, racial capitalism, uneven consumption, and military domination are co-constitutive of climate impacts experienced by variously racialized populations who are disproportionately made vulnerable and disposable, [occurring] through global land and water grabs, REDD+ programs, neoliberal conservations projects, rare earth mineral mining, deforestation for growth, fossil fuel warfare, and new green revolutions for agriculture. (p. 4)

She linked these forms of colonial and colonizing agency to the lived experience of racialized populations with "slow violence" (Nixon, 2011), based on historical injustices and colonialism's geophysical echoes (Lewis & Maslin, 2017; Todd & Davis, 2018).

Lastly, "green colonialism" or "environmental colonialism" (Agrawal, 1991; Alimonda, 2011; Brookfield, 1992; Dorn, 2022; Nelson, 2003) refers to interventions into Southern ecologies, which resemble colonial discourses and practices, by imposing power over nature and pervading nature–society relations, extracting environmental resources (Galeano, 1971/1997; Svampa, 2019), or engaging in displacements, driven by the Cartesian separation between human and nature (Escobar, 2011; Federici, 2004; Patel & Moore, 2018). Such interventions perpetuate colonial power relations and point to the externalities caused by the Global North exploiting the health, labor, and land of the Global South (Hickel *et al*., 2022). Research refers to timber trade and forest protection programs (Kwashirai, 2009; Müller, 2020), displacements in national parks due to forms of nature conservation stemming from the colonial era (Duffy, 2014), land-grabbing and green extractivism (Normann, 2021; Voskoboynik & Andreucci, 2021), or large-scale hydrogen projects (Dillman *et al*., 2022; Kalt & Tunn, 2021; Müller *et al*., 2022).

These different forms of Western dominance over nature highlight the extent to which interventions into nature–society relations reflect a colonial mindset, assuming that nature does not have a legal status and is ready to be commodified. However, while these concepts share a critique of Western interventions into nature–society relations and root this in the long and haunting global history of Eurocentrist power and domination over nature (Patel & Moore, 2018), they do not specify the particularities that render energy systems and the political economies of energy as a seminal sphere for old and new colonial interventions. They do not refer to specific sociocultural aspects, that is, what environmental humanities consider to be "energy cultures" (Stephenson *et al*., 2010), such as resistance toward new energy technologies against energy extractivism or societal adaptation processes (Boamah, 2018). Another particularity lies in the power-laden and competition-driven understanding of external energy policies, visible in the security dogma and norms of competition, which are still the dominant rationales underpinning external energy relations and resulting in a geopolitical power grip (Kalt & Tunn, 2022; Knodt *et al*., 2015). Furthermore, as energy infrastructures create long-lasting interventions, they require continuous resources for the built environment, often on a trans-regional scale, and intertwined with a nation's economy, which is why energy path dependencies pose such a

hindrance to transitions (Förster & Bauch, 2014; Kallianos *et al*., 2022). In close correspondence to the Eurocentric dichotomies present in development theories, energy is portrayed as the epitome of progress and modernity, boasting significant innovations in industrial history, following the Enlightenment's period's designs to dominate and exploit nature. Indeed, the modernist idea that nature can be "put to work" and can be turned into a commodity is, by and large, reflected in the thermodynamic equations that render wild and untamed nature as burnable carbon (Lohmann, 2021; Tornel, 2023). Finally, on a discursive level, colonial narratives about Blackness and Whiteness are mobilized, visible in light-and-dark narratives associated with renewables, energy poverty, and energy transitions. They form part of development aid narratives while mirroring the enlightenment mindset, technological dominance, and White savior narratives (Girvan, 1978; Jarosz, 1992).

These points underscore that energy transition processes differ from concepts that problematize other forms of green extractivism or green colonialism. Therefore, investigating colonial aspects of energy infrastructures, policies, transition processes, or projects requires a more specific and multidimensional concept.

3. Energy colonialism: History of ideas, conceptual lenses, and epistemological gaps

Proposing "energy colonialism" as a concept allows for analyzing the power-laden, epistemic, and lifewordly interventions associated specifically with energy projects, energy infrastructures, and energy transition processes. In contrast to the works on energy extractivism or post-fossil extractivism (Bertinat & Argento, 2022; Dorn, 2023; Tittor, 2023; Svampa, 2022a), energy colonialism places particular focus on the colonial qualities of the energy sector, especially those that move beyond extractivist relationalities and emphasize prolonged or re-established forms of territorial and resource-related dispossession, as well as the continuation of epistemic, ecological, and cultural erasure. This includes the historical continuities established through prevailing colonial energy infrastructures (Cropper, 2022; Förster & Bauch, 2014). Colonialism is thus understood as a multiscalar process that violently replaces existing nature–society relations, intertwines the subjugation and exploitation of human societies and ecosystems, and results in destructive political, social, ecological, economic, and cultural repercussions that are still felt today and exhibit neocolonial tendencies (Federici, 2004; McEwan, 2021; Nkrumah, 1965; Plumwood 2002).

Energy colonialism traces and depicts implicit and explicit colonial notions that pervade energy infrastructures, energy transition processes, individual energy projects, and, in a more abstract sense, the modes of global or transnational energy governance. Distinguishing between "energy colonialism" and "energy coloniality," here I prioritize the processual component of colonization, that is, a sensitivity for the systemic and processual qualities of any colonization process, as well as an awareness of the material structures and ideological underpinnings that are associated with "isms." In contrast, "energy coloniality" points to the historical qualities and mindsets that perpetuate a colonizing order and have ossified in power structures, such as path dependencies, value chains, or energy doctrines, thus prioritizing the statutory rather than the processual qualities of colonization.[2] While sharing the general assumption that coloniality as a habit, mindset, or politico-economic order persists even after the formal end of colonial world orders, energy colonialism emphasizes that political and economic colonization processes have acquired new material and epistemic qualities and that their processual quality bears an ever-contingent and fragile quality prone to resistance and emancipation. In the article, I want to focus specifically on these processual components and their productive and material qualities, all the more as they forego the creation of habits and mindsets.

[2] Here, I refer to the conceptual differentiations made by the *Grupo modernidad/colonialidad*, namely Walter Mignolo and Aníbal Quijano: "Colonialism denotes a political and economic relation in which the sovereignty of a nation or a people rests on the power of another nation, which makes such nation an empire. Coloniality, instead, refers to long-standing patterns of power that emerged as a result of colonialism, but that define culture, labor, intersubjective relations, and knowledge production well beyond the strict limits of colonial administrations. Thus, coloniality survives colonialism. It is maintained alive in books, in the criteria for academic performance, in cultural patterns, in common sense, in the self-image of peoples, in aspirations of self, and so many other aspects of our modern experience. In a way, as modern subjects we breath coloniality all the time and everyday" (Maldonado-Torres, 2007, p. 43).

To suggest a concept with higher analytical merit, energy colonialism's (or energy coloniality, since the literature is inconsistent) genealogy requires closer observation with respect to the general concepts, epistemic assumptions, and not least its conceptual gaps. Initially, a scholarly article addressing the concept of "*colonialidad energética*" (Saxe-Fernández, 2006, p. 186) examined the extension of the United States' energy security interests into Mexican oil resources. From 2009–2012, the concept appeared in analysis of European attempts to develop large-scale solar projects in the MENA region, later to be known as the Desertec initiative. At that time, researchers based at the liberal Brussels think tank Clingendael feared that such initiatives could be considered "a new form of energy-colonialism, with all sorts of political emotions around it" (de Jong & van Schal, 2009, p. 9), and therefore, recommended diplomatic sugar-coating and increased communication. Despite a widespread critique of Desertec (de Souza, 2018; Rignall, 2016; van de Graaf & Sovacool, 2014), the termination of the initiative after the Arab Spring uprisings meant that a more systemic use of the term only started around 2014, in line with an enhanced (or reawakened) awareness for both fossilist exploitation and forms of "green" post-fossilist extractivism (Tittor, 2023).

Since the 2000s, debates on energy colonialism have covered several themes and topics. Land use is debated, for instance, regarding large land acquisitions in South Mexico (Dunlap, 2018; Dunlap & Arce, 2022), Western Sahara (Allan *et al*., 2022; Hamouchene, 2016, 2017), and the Golan Heights (Alkhalili *et al*., 2023). Closely related, several authors have engaged with the concept of settler colonialism to point out how energy expansion interferes, for instance, with the territorial claims of the Sami, and what socio-psychological impact a lasting presence of settlements and energy infrastructures has on their livelihood in the Arctic (Normann, 2021; Össbo, 2021). Other authors concentrate on Latin America's role in global energy resource chains by analyzing neocolonialism along the lithium commodity chain, and relating this to specific forms of geopolitics in the Anthropocene (Perrault, 2018; Svampa, 2022b). Others point to neocolonialism in the current hydrogen expansion (Dillmann *et al*., 2022; Kalt & Tunn, 2022; Müller *et al*., 2022). Closely connected is a focus on large-scale energy infrastructures and their long-lasting effects on landscapes and nature–society relations (de Onis, 2018 a, b; de Souza *et al*., 2018; Guernsey 2022).

Strongly tied to the Black Radical Tradition and the material and epistemic racisms of US energy infrastructures, a lack of attention for Black and Brown lives within transition scenarios has been identified – especially when driven by a sense of Anthropocene urgency (Kumar *et al*., 2021; Lennon, 2017, 2020). Tying in with the emancipatory powers of the Black Radical Tradition, the liberating potentials of renewables (or "solarities") are highlighted against an energopolitics of white supremacy (de Onís, 2018 b; Kinder, 2021; Luke & Heynen, 2021). Still, in this burgeoning debate, a broader reflection on theoretical perspectives that situate energy colonialism within the context of decolonial theory, facilitating a more cohesive connection between scholarly research and activist endeavors, is missing. Delineating the strands of thought that have evolved so far, we can distinguish between four perspectives that accentuate different facets of energy colonialism/energy coloniality, also revealing certain gaps that require more theoretical grounding.

(1) A *materialist perspective* on energy colonialism offers a close-up of the ways in which energy infrastructures, individual projects, or transnational policy strategies carry colonial notions that manifest in the extraction of resources, in territorial claims, or in energy-induced displacement. In doing so, it draws on broader debates on resource extractivism and neoextractivism stemming from Latin America (Alimonda, 2011; Galeano, 1971/1997; Gudynas, 2015), which, as Maristella Svampa puts it, reflect modes of appropriating nature that perpetuate the patterns of colonial accumulation in modern capitalism (Svampa, 2019). A case in point is the works of Hamza Hamouchene, who has closely observed EU energy relations and geostrategic interests in the Maghreb region. Tracing the activities of gas companies, pipeline projects, and fracking initiatives in European energy diplomacy, Hamouchene and Pérez delineate how the EU's strategic interest to tap Algeria's abundant gas reserves has resulted in side-lining the legitimate social and environmental concerns of those most affected by fossil fuel mega-projects (Hamouchene & Peréz, 2016). Focusing on large-scale solar projects, such as Tunur, Desertec, or Ouarzazate, Hamouchene also concentrates on the roll-out of clean energy in the Maghreb and points out how transitions toward renewables can contribute to land conflicts or overuse of water resources (e.g., for cleaning solar panels), while local energy demands may not be met (Hamouchene, 2016, 2017).

Closely related, yet highlighting a different facet of green capitalism, are conflicts over lithium mining, which have advanced due to lithium being a strategic mineral for fostering e-mobility and the decarbonization of automotive industries in the Global North. In this case, a materialist perspective identifies center-periphery dynamics and unveils the exploitative value creation chains that impose a colonial mode of value creation and territorial appropriation that prolongs an imperial mode of living (Jerez *et al*., 2021; Forget & Bos, 2022; Olarte-Sánchez *et al*., 2022). The merits of materialist perspectives in understanding energy colonialism clearly lie in the ability to reveal the built-in coloniality within the political economy of energy, visible, for instance, in terms of the value creation through extraction or the shape and power geographies of production chains, straddling North and South and centers and peripheries. At the same time, less attention is paid to the discursive, symbolic, or affective qualities that are also part of colonial violence.

(2) In contrast, a *psychosocial perspective* explores how energy infrastructures intervene in the daily lives of people and how they are perceived as socio-technical systems that disrupt or endanger individual habits. In this context, Susana Batel's works have focused on social acceptance and perception of controversial energy infrastructures such as high-voltage power lines (Batel, 2020, 2018). Engaging with social and environmental psychology, she points out how protests against large-scale infrastructures mobilize the local against the transnational. Concentrating on renewables, she understands energy colonialism as "sociohistorical, economic, and political power relations as related to the use of renewable energy and the deployment of related infrastructures and practices" (Batel, 2021, p. 119). Yet, her work is mostly confined to the European hemisphere and does not demonstrate how renewable energy colonialism's analytical lens is rooted in postcolonial or decolonial theory. More pronounced are works that refer to the effects of large-scale wind farms in the isthmus of Tehuantepec in Oaxaca, Mexico and underscore how the expansion of renewable energy is, in essence, an intervention into the everyday lives of Indigenous peoples and small-scale farmers, particularly with regard to nature–society relations, health and bodily affections, land-tenure systems, and displacement (Dunlap, 2018; Dunlap & Arce, 2022). Ramirez and Böhm (2021) understand this as a form of "transactional colonialism" that alters the sociocognitive identities of Indigenous people, arguing that the economic transactions involved in wind energy investment result in a grave ignorance of Indigenous knowledge and livelihoods, when societies are coopted into financial compensation schemes. The potentials of psychosocial perspectives on energy colonialism lie in their ability to capture the everyday dimension, and to identify the ways in which energy subjectivities – i.e., the rural communities awaiting financial compensation, the ones stricken by energy poverty, the Western green "techpreneurs" – are produced.

(3) Perspectives from *political ecology* reflect on the interventionist aspects of fossilist resource extraction and renewable energy expansion, by offering a multiscalar view that links (new) materialist thought to discursive constructions of the energy sector and to socio-ecological struggles (Tornel, 2023). Here, the aim is to explore how the extraction of fossilist energy and also renewables perpetuates, as well as transforms, the extractivist imperative by expanding toward renewable energy and green hydrogen, or toward new territories that are – again – framed as empty zones awaiting development. However, a political ecology perspective also points out how energy is a "fundamentally relational thing" (Perrault, 2018, p. 242) whose infrastructures and individual projects create new socio-spatial fixes and redirect material resource flows, as well as playing out in social protests against energy infrastructures and energy-induced displacement.

Several works engaging with the struggles over wind energy at the Isthmus of Tehuantepec refer to the colonial notions that underpin the large-scale expansion of energy infrastructures. Alexander Dunlap labels this a form of "infrastructural colonization" (Dunlap & Arce, 2021; Kallianos *et al*., 2022) that renders territories as green extractivist zones while promoting the gospel of modernity, progress, and clean energy. His understanding of colonialism ties in with historian Dirk Moses, in pointing to acquiring ultimate control over land, driven by a sense of supremacy over autochthonous populations and their land use systems. This plays out in a subalternization of the local culture and its knowledge systems (Dunlap, 2018). Similarly, Avila-Calero (2017) shows how such public–private partnerships in the Mexican energy sector carry neocolonial qualities, again creating land enclosures.

The concept of the "energy frontier" is a way of zoning and designating land for energy (Backhouse & Lehmann, 2020). The political ecology perspective draws parallels with the long-standing debate on the

coloniality of nature/*colonialidad de la naturaleza* and with the broader concept of green colonialism. However, this also means that certain aspects that render the energy sector so prone to colonial/colonizing notions – technological dominance, epistemological dichotomies, White saviourism pervading the "energy poverty" rationale, and geopolitical tensions – are often sidelined.

(4) Finally, *abolitionist perspectives* on energy colonialism express a fundamental anticolonial narrative. Energy abolitionism draws on the long history of abolitionist struggles against slavery and carcerality, with the Trans-Atlantic slave trade being "the first industrial-scale energy infrastructure" (Lennon, 2017, p. 24). It centers on a radical decolonial vision of energy justice (Dunlap & Tornel, 2024; Tornel, 2023). Energy abolitionism promotes putting an end to fossilist systems and calls out RE infrastructures that perpetuate racialized energy regimes through displacement, unequal access to energy, or financial subordination (Haag, 2022; Perry, 2021). "Abolition solarities" (Stock, 2023) are an emancipatory and autonomous alternative that calls for a redistribution of the means of energy production, technologies, and knowledge (Luke & Heynen, 2020). Energy abolition thus centers on an anticolonial critique of energy colonialism and mobilizes the visionary spirit of the Black Radical Tradition to repoliticize the use of decentralized renewable energies. As an empirical example, the works of de Onís (2018a, 2018b, 2021) reflect on Puerto Rico's vulnerabilized position as an "energy island" in total dependency on the US petrochemical industry. The author promotes renewable energy democracy as a countermovement that may contribute to greater energy sovereignty for the Puerto Rican population (de Onís, 2018 b), and considers this a pluriversal form of decolonization that radically delinks Puerto Rico's energy future from historical dependencies and relationalities. When outlining this powerful argument, however, she upholds a tacit binary that labels energy colonialism as a mostly fossilist strategy, challenged by the emancipatory powers of renewables. This is an analytical limitation that lacks a critique of green capitalism. Other abolitionist works take a clearer stance against green capitalism by centering energy autonomy and Black collective organization against *white* energy supremacy (Luke & Heynen, 2020; Sareen *et al*., 2023).

Combining these four lenses – materialist, socio-psychological, political ecology, and abolitionist – gives an impression of how the concept of energy colonialism serves as a critical research strategy combining scholarly and activist ambitions to denounce controversial energy projects, policies, or infrastructures. Yet, maybe with the exception of the political ecology perspective, it is striking that many works that engage with energy colonialism are not guided by a multiscalar understanding of colonialism/coloniality, which limits their analytical value. In addition, while a political ecology and a psychosocial perspective broadly reflect on resistance and social protest, abolitionist perspectives are centered on this emancipatory view. On a more abstract level, we can discern among them, four significant gaps: historical (1), epistemic and discursive (2), (geo)political and governance (3), and sociocultural (4).

(1) All four lenses concentrate on recent cases, particularly large-scale RE or infrastructural projects. In contrast, we find much less engagement with the longstanding traces of energy colonialism and their repercussions on today's political economy of energy in postcolonial states. Typical cases are dam projects, such as those in Ghana or Zambia; furthermore, the Desertec project builds on older narratives, such as the "Eurafrica" myth (Hansen & Jonsson, 2014). This lack of a historical dimension means that the effects of colonization processes in the energy sector (e.g., energy infrastructures or fossilist dependencies) are mostly invisible, and that the long shadow of power relations and their "slow violence" has not been sufficiently considered for the energy sector (for the few exceptions, see Cropper, 2022; Mavhunga & Trischler, 2014; Stock, 2022). This includes the connection of large-scale energy infrastructures to problematic understandings of "under"development and energy poverty.

(2) So far, existing works have focused on the materialities of energy economies, infrastructures, or projects, yet there is a lack of engagement with the epistemic or discursive dimension of energy and energy transitions. This refers to the role of energy knowledge and how this is framed in the form of "white magic" (Girvan, 1978), bringing Western progress and modernity to "under"developed regions. Furthermore, the

challenges of knowledge transfer, hierarchies of energy knowledge systems, and epistemic violence need to be addressed. Postcolonial science/technology studies (Barthel, 2019; McNeil, 2015) operate in this sphere.

(3) Furthermore, given the dominance of the "energy security" norm in policymaking and the impact of military doctrines on the political economy of energy and on energy transitions, there is a need to reflect on the rise of civil-military complexes and geopolitical desires in the field of energy. Post- and decolonial theory should intensify its engagement with the power geographies of energy and their political dimension, exploring the current hydrogen expansion, lithium extractivism, and new green geopolitics, including deep-sea mining. The modes of global and transnational energy governance that we currently see evolving in parallel with the rise of a multipolar world order also need investigation. Reawakened desires in Southern production zones and the energy partnerships that materialize from these desires redefine energy politics as a transnational project laden with colonial continuities.

(4) Debates on energy transition also cover the socio-cultural dimension of energy technologies, yet a connection with critical perspectives stemming from postcolonial technoscience or energy humanities is seldom made (Barthel, 2019; Boamah & Rothfuß, 2018; McNeil, 2005). This would include a critical discussion of concepts such as "energy poverty" or "energy literacy," which may stabilize epistemic dichotomies of development/"under"development, for example. Current debates on "energycultures" (Stephenson *et al*., 2010) would need to reflect on the ways in which Western technologies are adopted or rejected by societies and which colonial or neocolonial repercussions underpin them, including perspectives on the "energy subjectivities" that are created along the course of transition processes.

4. Energy colonialism: Power relations, energy knowledge, and energy subjectivities

If theoretical engagement is scattered in these domains, then a more holistic understanding of energy colonialism is needed, rooted in decolonial theory, paying attention to material and discursive dimensions, and committed to emancipatory energy justice. Energy colonialism implies power-laden, epistemic, and lifeworthy interventions are needed, addressing energy projects and energy transitions. Energy colonialism should be understood as a multiscalar phenomenon that manifests as power over energy transition processes, as an epistemic force influencing knowledge orders and knowledge transfer, and as an intervention on an individual scale, affecting livelihoods and human–nature relations. In a broader sense, we can understand energy colonialism as a specific expression of the colonization of nature whose historical roots can be traced back to the early days of colonial extractivism and extinction (Alimonda, 2011; Moore & Patel, 2017).

To connect to decolonial theory, I refer to Quijano's (2000, 2007) nuanced understanding of how colonialism continues to shape social structures and power relations, since this offers a multiscalar perspective. It draws on the broader concept of de/coloniality, as brought up by the Grupo Modernidad/Colonialidad, whose goal lies in exposing social science theories of modernity and modernization as Eurocentric projections, in establishing connections between colonization and violent European attempts at modernization in the Americas, and in reconsidering the legacy of critical theory in light of pluriversal revolutions and social struggles in Latin America (Escobar, 2007; Mignolo, 2007; Maldonado-Torres, 2016). First, in referring to the "coloniality of power" (2000, p. 540), Quijano argues that coloniality operates at the level of the economy, whereby colonialism established a global capitalist system that prolongs unequal economic relations between the colonizer and the colonized, resulting in the continuous exploitation of resources, labor, and markets of the (previously) colonized regions. Second, the "coloniality of knowledge" (2007, p. 132) refers to the ways in which knowledge production, dissemination, and validation perpetuate colonial power dynamics. This results in the imposition of Western knowledge as superior and universal while devaluing and marginalizing Indigenous, African, Asian, and other non-Western knowledge systems, resulting in an epistemic hierarchy. Third, the "coloniality of being" (Maldonado-Torres, 2007, p. 257; Quijano, 1992) emphasizes the role of coloniality in the realm of subjectivity, shaping how individuals perceive themselves and their identities, often internalizing the colonizer's values and self-image as superior while devaluing the colonized identities.

Quijano's works have informed decolonial political ecology by adding an analytical layer to denote discourses and practices of coloniality, particularly regarding the modern vs. colonial binary and the repercussions this has for nature–society relations, including gendered layers of nature–society relations and

anticolonial ecologies of care (Ekowati *et al*., 2023; Harcourt & Bauhardt, 2018). Works on the "coloniality of nature" (Alimonda, 2011, p. 22; Bohórquez Caldera, 2013) are informed by this perspective and indicate how the "extractive logic" pervades biosocial entanglements, exploiting life and relationalities itself (Cubillos *et al*., 2023, pp. 89–90). Empirical articles provide an account of the colonialities of conservation programs (Collins *et al*., 2021) and demonstrate how commodification of nature can be explored from a multiscalar decolonial perspective (García & Fold, 2022) and how environmental knowledge is pervaded by modern/colonial binaries (Burman, 2017; Goméz *et al*., 2013). Farhana Sultana's understanding of climate coloniality also ties in with the coloniality of power by revealing how Eurocentric power structures dominate climate agency and use colonial tactics of control, thus adding a "climate layer" to the lived experience of coloniality (Sultana, 2022, p. 4).

Quijano's analysis of the dialectic relationship between modernity and coloniality is highly significant for understanding how energy transitions may be pervaded by colonizing notions. In an ontological sense, it delineates how, according to Western modernist thought, nature can be "put to work" by alienating energy from its socio-ecological context and by creating sacrifice zones, for instance, when designating areas as energy export zones or when energy-induced displacement violates local livelihoods (Lohmann, 2021; Tornel, 2023). This refers to the ways in which energy transitions promote progress and modernity, driven by "white saviourism" while framing lack of energy access not as a historical injustice but rather as an ahistorical outcome of poverty. In line with Tornel, a decolonial perspective may therefore provide an account of "how the values, violence, and structures of coloniality shaped and continue to mold energy systems and energy itself" (Tornel, 2023, p. 46). This sheds light on geopolitical power relations and resource extractivism, on the uneven epistemologies of dominant vs. subjugated energy knowledge, and finally on the ways in which energy systems or energy transitions create certain "energy subjectivities" by distinguishing between traditional and modern uses of energy and by considering certain socio-cultural habits and forms of energy use as "underdeveloped."

To arrive at an analytical framework for empirical research on energy systems and energy transitions, Geels' concept of transition management (2004), known as the multilevel perspective (MLP), which interconnects the levels of niche (1), regime (2), and landscape (3), offers a transition theory, which has been widely used for explaining the dynamics of energy transition processes (Brunet *et al*., 2021; Markard *et al*., 2012). As in Figure 1, *Niches* (1) refer to the space where radical innovations emerge and develop, in this case, small-scale energy innovations. *Regime* (2) represents the dominant set of rules, norms, practices, and institutions that shape a particular socio-technical system, in this case, the energy system. It encompasses the existing mainstream technologies, infrastructures, and established actors, as well as the regulatory frameworks that support their stability and reproduction. Regimes are resistant to change and tend to protect the status quo. Finally, *landscapes* (3) refer to macrolevel factors such as social, political, economic, and environmental trends and developments that influence and shape the dynamics of niches and regimes, in this case, the norms that inform energy policymaking and energy governance, as well as the dynamics of energy transition processes.

The combination of both concepts offers a novel perspective that traces and depicts implicit and explicit colonial notions that pervade energy infrastructures, energy transition processes, individual energy projects, and, in a more abstract sense, the modes of global or transnational energy governance. Tracing colonial and neocolonial notions on these three levels highlights the dependencies and power relations associated with energy, on the forms of knowledge production and knowledge hierarchies and on the "energy cultures" within a society. Furthermore, it reflects on extractivist histories and their continuation through green geopolitics, as well as on racialized energy knowledge and energy subjectivities, and allows a multiscalar analysis of energy transition processes.

	Coloniality of power	Coloniality of knowledge	Coloniality of being
Niche level Energy projects	How is nature "put to work" in energy projects? How do energy projects become integrated into transnational energy relations?	Which knowledge hierarchies exist in the energy sector? Whose energy knowledge counts, whose energy knowledge becomes subjugated?	How do energy projects affect lifestyles and human-nature relations, contributing to modern/ colonial dichotomies? Which 'energy subjectivities' are promoted, which are considered backward?
Regime level Energy Infrastructures	How do power relations and economic dependencies affect energy infrastructures? How do energy policies reflect uneven power relations?	How is knowledge production taking place and which economies of knowledge exist?	How are energy technologies and infrastructures socioculturally promoted, owned and adopted?
Landscape level Energy transitions & energy governance	How do green geopolitics and global resource interests affect transition processes? How do new forms of energy extractivism and spatial claims reflect (neo)colonial geographies? How is energy security underpinned by uneven power relations and deepening dependencies?	Do transfers of energy knowledge take place? Do energy transitions increase or decrease these hierarchies?	How are energy transitions processes affecting societal change, by promoting modern and clean sources of energy?

Figure 1: Analyzing energy colonialism across energy transition processes. Source: Author

A case in point, the expansion of green hydrogen production illustrates the capacities of the suggested concept (Kalt & Tunn, 2022; Kalt *et al*., 2023; Müller *et al*., 2022). At a time where numerous states have agreed on hydrogen partnerships, often delegating responsibility for their decarbonization projects to the Global South and thus producing new socio-spatial fixes on the terrains of Namibia, Mauritania, or Saudi Arabia, an analysis of energy colonialism needs to address the ways in which (neo)colonial power relations, epistemologies of energy knowledge, and interventions into everyday lifeworlds are entangled at the designated production sites. To understand how expansions of hydrogen production work and on which levels colonial echoes can be identified, an MLP adds rigor and addresses how energy colonialism pervades whole energy systems. In the case of green hydrogen production, this means demonstrating the entanglements of power, knowledge, and energy subjectivities exist on the individual project level, across energy infrastructures such as hydrogen terminals or value creation chains. Or, on the most abstract level, they manifest in discourses that legitimize spatial claims within energy partnerships or underscore geopolitical necessities as part of bilateral energy strategies.

5. Conclusion

The expansion of hydrogen production to the Global South, the power grip of fossilist regimes, or the financialization of energy projects within development agendas – all are phenomena that may be pervaded by colonial and/or neocolonial notions. Using energy colonialism as an analytical framework allows for a more nuanced perspective on the dependencies, extractivist hierarchies, or power relations that can be found in small-

scale projects and complex governance structures alike. Still, Bhambra and Newell (2022) call for a careful use of the term "colonialism," especially with regards to the intimate and mutually productive relations between colonialism and capitalism. It is necessary to underpin the broad and sometimes buzzwordy use of the terms "colonialism" and "coloniality" with a theoretical framework that takes account of colonialism's history, epistemologies, and ontologies. Engaging with the works of Quijano and Maldonado-Torres, as well as with transition theory, allows a systematic tracing of colonial notions on the different levels of energy transition processes, regarding the small-scale level of project logics and more abstract levels of abstraction such as modes of energy governance or green capitalism. This paves the way to not only identify energy colonialism at work, but also to reflect on the forms of resistance on each level. Energy transitions need to be decolonized and socially owned, in line with calls for reparative justice and abolition.

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