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Energy sovereignty storytelling: Art practices, community-led transitions, and territorial futures in Latin America

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ABSTRACT

In this article, we study forms of storytelling about energy sovereignty retrieved from community-based art and their implications for energy justice formulations in Latin America. Based on the visual and discursive analysis of five contemporary Latin American artistic practices, the article shows that their poetic and political engagements with energy production, consumption, and distribution build what we call "energy sovereignty storytelling." That is, understandings of energy justice that territorialize energy technologies, thus defying Western-centered views on energy and energy infrastructure in a context of marked transitions. Combining insights from art analysis in STS with concepts from energy humanities and technological sovereignty studies, this research discusses four aspects that characterize these emergent energy storytelling practices. By bringing these four aspects together, this study shows that territory-attuned, community-based art research highlights understandings of energy beyond corporate extractivism and market interests. In this way, activating new modes of storytelling in relation to energy affords novel understandings of energy and energy infrastructure that can contribute to attaining a just and equitable energy transition in Latin America, where ancestral and local more-than-human communities can participate actively in shaping energy presents and futures.

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PALABRAS CLAVE
Transición energética; arte comunitario; soberanía energética; futuros sostenibles; pensamiento energo-territorial

Narrativas de Soberania Energética: Práticas Artísticas, Transições Comunitárias e Futuros Territoriais na América Latina

RESUMO

Neste artigo, estudamos formas de contar histórias sobre soberania energética recuperadas por meio da arte baseada na comunidade e

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suas implicações para a formulação de justiça energética na América Latina. Com base na análise visual e discursiva de cinco práticas artísticas latino-americanas contemporâneas, o artigo mostra que seus engajamentos poéticos e políticos com a produção, consumo e distribuição de energia constroem o que chamamos de "narrativas de soberania energética." Ou seja, entendimentos de justiça energética que territorializam as tecnologias, desafiando assim visões centradas no Ocidente sobre energia e infraestrutura em um contexto de transições marcantes. Combinando insights da análise de arte advindos dos estudos CTS com conceitos das humanidades energéticas e estudos de soberania tecnológica, esta investigação discute quatro aspectos que caracterizam essas práticas emergentes de narrativa sobre a energia. Ao reunir esses quatro aspectos, este estudo mostra que a pesquisa sobre arte baseada na comunidade e sintonizada com o território destaca entendimentos de energia além do extrativismo corporativo e dos interesses de mercado. Dessa forma, ativar novos modos de contar histórias em relação à energia permite novos entendimentos sobre energia e infraestrutura que podem contribuir para alcançar uma transição energética justa e equitativa na América Latina, onde comunidades ancestrais e locais mais-que-humanos podem participar ativamente moldando presentes e futuros energéticos.

Narraciones de la soberanía energética: Prácticas artísticas, transiciones comunitarias y futuros territoriales en América Latina

RESUMEN

En este artículo estudiamos formas de narración sobre la soberanía energética recuperadas del arte comunitario y sus implicaciones para las formulaciones de justicia energética en América Latina. Partiendo del análisis visual y discursivo de cinco prácticas artísticas latinoamericanas contemporáneas, el artículo muestra que sus compromisos poéticos y políticos con la producción, el consumo y la distribución de energía construyen lo que llamamos "narraciones de la soberanía energética." Es decir, comprensiones de justicia energética que territorializan las tecnologías energéticas, desafiando así las visiones centradas en Occidente sobre la energía y la infraestructura energética en un contexto de marcadas transiciones. Combinando conocimientos del análisis del arte en STS con conceptos de humanidades energéticas y estudios de soberanía tecnológica, esta investigación analiza cuatro aspectos que caracterizan estas prácticas emergentes de creación artística sobre la energía. Al reunir estos cuatro aspectos, este estudio muestra que la investigación artística basada en la comunidad y en sintonía con el territorio destaca la comprensión de la energía más allá del extractivismo corporativo y los intereses del mercado. De esta manera, activar nuevos modos de narración en relación con la energía permite comprensiones novedosas sobre la energía y la infraestructura energética que pueden contribuir a lograr una transición energética más justa y equitativa en América Latina, donde las comunidades más-que-humanas ancestrales y locales puedan participar activamente dando forma a los presentes y futuros energéticos.

Introduction

According to the International Energy Agency's World Energy Outlook (WEO) 2023 report, Latin America is at a crossroads, grappling with an energy crisis and an urgent need for a transition (CEPAL 2023). Although achieving 97% electricity coverage, the region's energy matrix reveals an alarming dependence on fossil fuel imports, showing scant diversification and use of renewables. Latin America's energy systems have proven fragile in the last decade. As current cascading social and economic crises have exacerbated poverty and inequality, they also have imperiled energy security and sustainability. With human and material capabilities aplenty, WEO experts argue, Latin America is uniquely positioned to participate in the global energy transition aimed at harnessing wind, water, and solar energy. This motto resonates with the current energetic policies of countries such as Brazil, Colombia, Mexico, and Chile. However, while postextractive energy transitions could be a catalyst for environmental and economic change, recent studies are beginning to show that such reconfigurations may not necessarily escape the grips of capitalist dominance, legacies of settler colonialism, power inequalities, and commodity contingencies (Boyer 2019). Even more, renewable energy development, based on market mechanisms and anthropocentric legal frameworks, may be intensifying the destructive trajectory of the industrial economy (Dunlap 2017; Hernández Cortez and Joaquín Castillo 2018; Walston et al. 2016). Thus, scholars contend that the transition towards energetic resilience and justice first requires a fundamental change in understanding and interacting with energy and, by doing so, reinventing contemporary energy paradigms (Dawson and Gómez-Barris 2022).

In this article, we examine how contemporary Latin American artistic practices weave stories around energy transitions, stimulating reflections on energetic and technological sovereignty and forging diverging understandings of technology in relation to questions about territoriality and community. Specifically, we argue that Latin American art practices produce diffracting perspectives on "energyscapes" (Howard et al. 2013), addressing affective and embodied perceptions of energy that transcend utilitarian dimensions that typically confine energy to a commodity – primarily electricity – within market-driven frameworks. Energy epistemologies exceed modern economic, financial, and engineering frameworks, and there is a wealth of theorization about its broader socio-ecological dimensions in anthropology, cultural studies, STS, and philosophy of science. Ancient Greek philosophy, for instance, regards energy as an embodiment (Marder 2022). In contrast, the Wayúu community in La Guajira, Colombia, sees energy as a life-giving force that circulates and can be transferred to other entities (Reina-Rozo 2022), while certain lineages of ecofeminism portray energy as an affective current producing emergent modes of togetherness (Relatorio colectivo 2017). Taken together, these diverse understandings may act as a potent force in challenging, redefining, and exceeding modern conceptions of energy transitions, which are predominantly shaped by corporate and market formations – postextractivist or otherwise.

What are the alternatives to the market-dominated interpretations of energy? What can energy mean beyond market servitude? How can artistic practices serve as catalysts in multiplying our understanding of energy transitions? And how can they contribute to more equitable and just energetic futures? Questions about the relationship between energy and socio-ecological justice and sovereignty in the context of an accelerated

transition to "greener" energy matrixes have become prevalent in contemporary Latin American artistic practices. Three central themes characterize this emerging "energetic turn." First, art practices critically assess the prevailing capitalist paradigm that animates the transition, where value creation often comes from the exploitation of human and other-than-human bodies. Therefore, the notion of "transition" becomes problematic from an energy justice perspective as it conceals the persistence of old systems and attaches the future to economic managerial rationality (Bonneuil and Fressoz 2016, 74–75). Through territory and community-centered approaches and in-depth conceptual interventions in energy justice discourses, artistic practices strive to unmake and remake modern understandings of energy and the environment by engaging closely with the territories, critters, and their dwellers. Second, artists emphasize practices that foster energy sovereignty, here understood as the right of particular communities to decide on energy matters without the demand to increase profits and satisfy shareholders' or private enterprises' attempts to commodify energy (Del Bene, Soler, and Roa 2019). Third, they challenge the prevalent notion of the energy crisis as mainly a technological or financial concern. By viewing energy through a broader and diffracted lens that urgently considers its interplay with the environment and communities, these artistic practices shed light on the localized energetic knowledge formations that emerge as constitutive of the territories themselves. Consequently, this calls for a reassessment of the notion of "technology" in the Latin American context as a way to expand it beyond that of the expertly created artifact.[1]

To study the "energetic turn" in Latin American arts, this article engages with contemporary discussions in the field of Energy Humanities from an STS perspective (Szeman and Boyer 2017). Broadly, Energy Humanities is an emerging field that critically and creatively investigates the intersections of energy, infrastructure, and culture. Much of the ongoing debate in this field has centered on fossil fuels and petrocultures (LeMenager 2014; Wilson et al. 2017), with a particular focus on how energy has been thought about, practiced, and produced – and what worlds it makes – in relation to modernity and capitalism (Daggett 2019). More recently, however, scholars thinking with and in the Global South have been emphasizing the need to engage more fully with the views, hopes, and aspirations of those directly impacted by global energy schemes (Stripple, Nikoleris, and Hildingsson 2021). Questions such as, "What is energy?", "Energy for whom?" and "Whose visions shape energy futures?" are becoming central to this conversation as they raise crucial issues around energy (in)justice and sovereignty at times of transitions (Barandiarán et al. 2022; Castro and Prádanos 2022). This push also resonates with a growing interest in STS scholarship regarding citizen and community involvement in science and knowledge formation, as well as on strategies that broaden engagement in mainstream science while also forming alternative narratives and dissenting actions – an excellent example of this is *Tapuya*'s Thematic Cluster on Citizen Science, featured in Volumes 5 and 6.

[1]Western notions of technology – prevalent in discussions around global energetic transitions – tend to overlook the perspectives and values of communities, particularly rural ones, which possess unique knowledge systems (epistemologies) and ways of relating to the world (ontologies). In this context, activists and scholars have argued that technological autonomy is crucial for these communities to survive, remain in their territories, and take action to strengthen decision-making and energy sovereignty at the community level. This approach also challenges the "technological versus primitive" dichotomy, thus proposing an enriched understanding of how communities interact with their technical instruments, particularly in the context of energy.

In response, novel scholarship has begun exploring energy imaginaries beyond the Global North, addressing how Indigenous communities challenge resource extraction that sustains national and global energy systems (Isabel Altamirano-Jiménez 2021), the interplay between ethics and the development of infrastructures (Hannah Appel 2019), and the mediating role played by alternative energy cultures and the built environments (Plaza Azuaje 2018). In their attention to the experiences of the Global South, these studies inspire our analytical framework. We follow Lea Schick's (2021) question in her study on art – energy projects, where she asks: How may the arts help us in the struggle of making new energy systems and new energy engagements? In this vein, this article expands these research agendas by examining how Latin American art practices respond to the challenges that emerge with the transition towards green energies and how they engage and amplify the perspectives of local communities and their alternative notions of energy.

What practices are evoked while thinking about energy transitions, and to what ends? Drawing from the analytical repertoire of STS studies on the intersection of art and technology (Gabrys 2014; Marres 2016; Rogers and Halpern 2021; Schick and Winthereik 2016), this article also offers novel approaches to the interplay between energy, territory, and communities by shedding light at a contemporary artistic corpus we call "energy sovereignty storytelling." As such, the practices in this corpus weave stories that address alternative energy (re)sources, territorial energy, and marginalized viewpoints on energy in, from, and for Latin American territories. In doing so, we argue, they are charting new investigative paths for the Energy Humanities and socio-technological approaches to localized energy. The corpus examined here comprises a diverse collection of Latin American art forms, including visual and media art and installations, underscoring innovative, art-based collaborative design practices and communal infrastructures that offer alternative understandings around energy justice, sovereignty, and transition. We are especially attentive to how ideas around energy sovereignty manifest in the selected artistic projects, how these can elaborate alternative forms of energy storytelling, and their political implications in energy justice debates. The projects under study also coalesce around a theme of broadening what we mean by "energy" beyond capitalist extractivism to emphasize ancestral, embodied, and community-driven approaches. This article contends that the art practices in the "energy sovereignty storytelling" corpus make two crucial interventions in discourses on justice and sovereignty in the context of energy transitions: (1) a territorialization of energy technologies and (2) a more-than-human dimension to conceptualizations of energy. Specifically, these interventions are achieved by weaving together community-based efforts in specific territories with the poetic affordances of artistic practices that foster and extend modes of kinship beyond the human.

The article is structured as follows. In the first section, we critically explore the intertwining narratives of energy justice and sovereignty in Latin America and how artistic expressions and territorial formations can contribute to shaping sustainable and inclusive energy futures. The second section discusses the art-based project *Tecnologías para abrazar el sol* (2020–2021) conducted in La Guajira, Colombia, shedding light on community understandings of sovereignty and ancestral conceptions of energy beyond electricity. The third section deals with the *Aerocene* and *Aero Solar Museum* (2015–) projects, highlighting a do-it-yourself ethos that allows artists to involve broader audiences in cultivating awareness around energy generation and consumption. The fourth section

studies the community-based practice *Nidos de equilibrio* (2014) and the citizen-science prototype *Plantas Autofotosintéticas* (2013–2014), which raise critical questions around energy generation by attending to the symbiotic connections between local communities and microbial worlds. In the fifth section, we discuss *Algas verdes* (2016), an art project that entails crafting a photobioreactor prototype to harness energy from algae, sharing the processes with diverse communities through open-source technology. In the concluding section, we discuss how this emergent and understudied corpus of artistic practices paves the way to imagine new approaches to Latin America's energy transition, advocating emancipatory politics that remain attuned to enduring struggles for communal resilience, the protection of the territories, and the right to ancestral modes of knowing and worldmaking.

Energo-territorial thinking and art practices

Energy sovereignty, a concept gaining traction in public debate and academia, has recently emerged in national and international politics as a desirable objective in energy policies. Much like food sovereignty, energy sovereignty advocates for the empowerment of local communities, populations, and nations to exert authority and agency over the energy produced and consumed within their territories (Juntunen and Martiskainen 2021; Timmermann and Noboa 2022). In an era of interdependence and sociotechnical reliance on global petrochemical circulation, the idea of energy sovereignty challenges the dominance of large corporations, geopolitical positions, and political elites, generating an all-encompassing understanding of the energy sector (Dell'Anna and Menconi 2016, as cited in Timmermann and Noboa 2022). In this capacity, energy sovereignty is generally understood as a desire to pursue autonomy and independence from fossil fuels, develop self-sustaining energy systems at varying scales, and respond to emission reduction goals.

Empowerment, self-determination, and democratic participation in decision-making are all central to attaining energy sovereignty at local and community levels (Juntunen and Martiskainen 2021; Timmermann and Noboa 2022). In contrast to notions such as energy security, which directs action towards ensuring an ample supply of energy at a macro level that calls for affordability and reliability, energy sovereignty emphasizes the role of individuals and communities in decision-making concerning energy generation, distribution, and consumption, taking into account social, ecological, and cultural dimensions including stewardship and justice (Ariza-Montobbio and Herrero Olarte 2020; Timmermann and Noboa 2022). However, research on cultural forms, aesthetics, and communal values of energy justice and transitions remains scarce, especially in the Global South (Avila 2018). Moreover, artistic engagements exploring energy justice beyond critiques of petromodernity and reliance on fossil fuels are limited.

Drawing from STS scholarship on *Sci-art* (Latour and Weibel 2020; Schick 2021; Schick and Winthereik 2016), this article studies Latin American art practices engaged in the struggle to imagine and create new energy systems to unearth emerging cultural and communal formations around energy justice and sovereignty in an era marked by transitions. Artistic engagements can challenge and impact energy policies and contribute to shaping diverse energy futures (Schick 2021). Such aesthetic explorations into alternative energy futures cultivate rich social, political, and ethical imaginaries, engaging

complex questions regarding the contours of energy production, circulation, and consumption. By attending to emergent art practices across the hemisphere, this article examines how the call for energy justice and sovereignty affords critical assessments of the consequences of present transitions and future energy developments in the region. "For whom is the energy being produced?", "For what purpose?" and "At what cost and to whom?" are all vital questions that resonate deeply with Latin American communities and their territories (McCauley et al. 2019, 916). These are also questions being addressed through the political-ecological and decolonial lens of a series of art practices, such as the ones studied here.

The call for energy sovereignty in Latin American art practices, however, extends beyond the desire for inclusive energetic and political infrastructures; it is also an urgent plea for resilience against territorial devastation and planetary extinction. Scholars have noted that the ongoing global shift toward renewable energy has an extractive character, where prime economic centers, such as capital cities and urban hubs, reap the benefits at the expense of exploited landscapes crucial for renewable energy infrastructure (Boyer 2019; Dawson and Gómez-Barris 2022). In the Global South, this energy transition is significantly accelerating ongoing patterns of human exploitation and environmental degradation (Milanez and Santos 2015). Latin America currently leads in renewable energy production worldwide (Washburn and Pablo-Romero 2019). The region expects rapid wind and solar energy growth, driven by favorable wind conditions and abundant mineral resources in the Lithium Triangle spanning Bolivia, Argentina, and Chile, which are crucial for battery production (Petavratzi et al. 2022). However, a disturbing trend is now palpable. In many Latin American territories, the installation and development of large-scale energy and mining projects are being carried out without consulting local communities. This leads to social unrest, environmental devastation, and the dispossession and uprooting of local communities from their territories (Timmermann and Noboa 2022; Traldi 2021).

A pressing challenge in fostering socio-ecological resilience within the current transition paradigm – including common calls and understandings of energy sovereignty – is the narrow conception of energy as a transferrable commodity fueling and circulating within global-local production systems. This view neglects the less conspicuous – but maybe more capacious – energies that sustain and interact synergistically with the territories, their dwellers, and their myriad life forms. Subtle energies that are often overlooked because they do not directly connect or contribute to capitalist production systems but do support localized compositions that form planetary weavings of life and death. In an invitation to speculations on energy – perhaps even with a hint of provocation – the art practices here studied raise a set of questions: Can a world teeming with life thrive without the vibrant energies that nourish its territories? Can it thrive without rich territorial energyscapes? How can Latin America's living and lived experiences weave new understandings of energy that echo the symbiotic transformations that Donna Haraway (2016) deems vital amidst planetary extinction? And how can these understandings inform the production of new infrastructures that amplify the energies circulating in the territories without depleting or consuming them?

Energo-territorial thinking – as a way of engaging with the territory as an energetic composition and a matter of concern – is a notion we pose to capture both an inheritance and a productive exploration that Latin American art practices are introducing to the

contemporary discussion around energy transitions. Unlike "region" or "community," the notion of "territory" suggests a multi-dimensional weaving that binds the intimate interplay between humans and their environment, knitting identity and ways of living with a universe of relations that exceed and support the contours of the human (Escobar 2008). Our approach to "territory" is informed by practice and thinking in Latin American ecofeminist and Indigenous movements, which advocate for the defense of the "body-territory" (Halvorsen and Zaragocin 2021), as a means to re-scale and localize struggles endured by human and nonhuman bodies alike.

Addressing the question of how to build resilient and sovereign futures, Brazilian Indigenous thinker Ailton Krenak (2022) underscores the urgency of imagining plural narratives – or layers of worlds – aligned with the lived experiences of diverse peoples in their territories (17). In this vein, the Latin American art practices studied here, through their attentive engagement with territorial matters, are producing diffracting devices that open energy to its localized otherwise. These practices activate narratives around desirable territorial futures built on "biocultural diversity of place (…), incorporating indigenous social thinking," fostering the emergence of cultural practices and aesthetic re-existences that can lead to sustainable, sovereign, and plural modes of being together (Juri et al. 2021). By articulating new stories about energy transitions – by forging narratives, imaginings, and idioms – with an acute awareness of territories, these practices underscore the vital weavings that are integral to the identity, welfare, and flourishing of localized more-than-human communities, and advocate for care practices towards the territorial diversity that underpins planetary life.

The works included in the "energy sovereignty storytelling" corpus trace energy as a dynamic and affective force, circulating and intertwining forms and beings into ecological networks in ways that resonate with contemporary debates in new materialism within the humanities and the arts (see Bennett 2010). Doing so, these practices propose an expansive circuit of energy production, circulation, and consumption by acknowledging the role of other-than-human beings – not only as mediating or transmitting electricity but also as agents and contributors to the life force that suffuses a place (Navaro-Yashin 2012). This includes infrastructure and technological devices that participate in energy production or circulation and plants, critters, and minerals that weave a tapestry of energy intensities into felt bodily-experienced territories. In this capacity, the practices in question foster the emergence of new commons wherein "technologies" take on active roles as decision-makers in energy matters, free from the shackles of profit-driven narratives and corporate commodification. This also challenges the conventional view of the energy crisis as predominantly a human *matter* and prompts a reassessment of sovereignty that transcends the figure of the Nation-state and the human-political community. When sovereignty is viewed as dominion over a territory, what transpires if we invert this equation, placing the territory itself in a position of authority? What forms of energy politics surface, and what are their potentials and constraints? And who reaps the benefits, and at what expense?

Approaching energy as an inter-active field demands addressing the role of technology as a mediating formation. Given the demand for centralization in national and regional power grids, what technologies may empower territorial sovereignty? Several practices studied here grapple with this question by engaging directly with low-cost, DIY technologies that decentralize and afford new circuits attuned to territorial circulation patterns –

and w*ho* participates in these patterns. This gesture is not exclusive to the corpus in question. Within Latin American Art, a field historically intertwined with social and political commitments, the trend towards new media and bio-art has enabled artists and collectives to engage with the territories through technological devices as tools for dialogue and interaction with non-human expressions, integrating alternative storytelling practices that intertwine and interject science and technology (Page 2021; Yeregui 2020). These artistic practices, often relying on low-cost, open-source technologies, don't separate nature and place from science or culture. Instead, they fuse them to refract common understandings about what we mean by these concepts. In this context, technology becomes a mode of interacting with the territory and reweaving its socio-ecological fabric. By doing so, as we will discuss throughout this article, these artistic practices do not deny the need for an energy transition but take the terms of such engagement seriously, negotiating them by considering the plurality of territorial voices and expressions – even from beings who do not communicate in human language. In this context, the poetic gesture of this corpus articulates diverse energies and intensities, facilitating dialogues across species, bodies, and presences. Its techno-poetic language transcends the utilitarian paradigms of modern transitions and paves the way for alternative forms of expressing diverse energy circuits.

As suggested in the remainder of this article, artistic expressions may be a cornerstone for discussing energetic transitions and futures for Latin America. By attending to territorial, lived, and embodied energetic experiences, these artists can weave alternative stories and imaginings that diffract the prevailing paradigms centered on technological innovation, human techno-salvationism, and the interconnectedness of *every-thing* of the global power grid. Through storytelling, these art practices articulate notions of justice and sovereignty that transcend mere circulation and redistribution, focusing instead on nurturing and mobilizing a diversity of energies. Their experimental engagement with technological tools and scientific methodologies activates an attentiveness to the territory as an always-fleeting totality rather than confining the focus to human actors. This fosters dialogues that embrace more-than-human perspectives as valid and necessary to consider the holistic well-being of the territory and its relation to energy. The art practices here studied render meanings of "other energies" that afford inclusive, resilient, and sovereign futures for Latin American energyscapes.

Ancestral conceptions of energy beyond electricity: embracing the sun

La Guajira, located in northern Colombia, has been historically represented as an isolated desert disconnected from Colombia's political and economic hubs (Torres Barragán 2020). Presently, however, the region is emerging within political discourse as an energy frontier. Reports from Guajira360, a local think tank, underscore La Guajira's robust winds, making the region ideal for energy generation. Enel Colombia, the leading Colombian energy-sector company, plans to build one of 16 wind projects in La Guajira over existing ones. Moreover, the Colombian government will roll out the country's largest rural electrification project using solar panels in La Guajira over the coming decade. In this context, the art-based project *Tecnologías para abrazar el sol*, led by Juan David Reina-Rozo and funded by a 2020 research grant from the Instituto Distrital de las Artes (Idartes), aimed at collaboratively exploring the interplay

between energy production, technology, and the Sun in rural communities in La Guajira. The project and its processes were registered in the book with a homonymous name published in 2020 by Idartes.

To understand notions, values, and practices around solar energy transitions, Reina-Rozo and collaborators conducted workshops in settlements known as Rancherías, engaging the community in building solar chargers and solar lamps. This hands-on experience paved the way for dialogues and further workshops, where researchers and community members discussed understandings and engagements with energy as well as the challenges and threats that their territories face due to the ongoing energy transition, which is gradually transforming biological and cultural ecosystems. The Sun holds a special place in the cosmology and cosmogony of Indigenous and peasant communities worldwide. Tightly woven with their ancestries, these communities recognize the Sun as a wellspring of energy, vital for everyday activities, agricultural engagements, and spiritual practices (Powell 2006). Contrary to a narrow understanding of energy as electricity – that can also be extracted as a commodity for international markets – the concept of energy is multifaceted for communities in La Guajira (Reina-Rozo 2022). In Gonawindua, a territory also known as the Sierra Nevada de Santa Marta, native communities, including the Kogui and Arhuaco people, express their connection with the Sun through various means, such as the iconic backpacks that symbolize the Sun. While the Arhuaco people refer to the Sun as Yui and the Wayuu refer to it as Ka'I, both communities consider it foundational to the genesis of human and other-than-human worlds. These communities have nurtured a spiritual relationship with the Sun, recognizing its significance in agriculture and livestock rearing and, more recently, harnessing its energy through solar panels to power information and communication technologies.

In Latin America, a stark disparity exists between urban and rural areas regarding access to electricity. Rural communities, often excluded from national electricity networks, face heightened energy poverty (Carpenter and Jampolsky 2015). To address these issues, governments all over the continent use devices and infrastructure to harness solar energy by converting photons into renewable electricity, which can be stored for later use (Mulvaney 2013). This approach is particularly viable in places that lack connections to centralized grids – such as Gonawindua and Alta Guajira – which in Latin America often correspond to territories inhabited by Indigenous peoples, mestizo peasants, and African diaspora communities. However, it is critical to recognize that even though solar energy has fewer detrimental effects than fossil fuels, large-scale solar projects still have severe socio-environmental costs and implications (Hernández Cortez and Joaquín Castillo 2018; Walston et al. 2016). Following and fostering connections among people, technologies, and infrastructure, *Tecnologías para abrazar el sol* invited its interlocutors to consider that all innovations, whether technical or social, have consequences for both people and the environment as well as to reconsider the material costs of the generation, distribution, and consumption of electricity for rural communities – which often bear the brunt of environmental sacrifices through mining, dams, and wind and solar farms.

As discussed in the former section, energy sovereignty in Latin America hinges on communities having autonomous control over their energy practices and relationships with their territories (Del Bene, Soler, and Roa 2019). In this regard, the artists and researchers involved in *Tecnologías para abrazar el sol* initiated rich dialogues and activated co-

Figure 1. Co-creative process in rural communities. *Tecnologías para abrazar el sol* project 2020. Courtesy of Juan David Reina-Rozo.

creation processes with the communities. This approach nurtured an environment for technological, conceptual, and affective exploration, experimentation, and prototyping deeply rooted in territorial matters of concern. In recognizing the territory as both an entanglement to care for and an inherited responsibility imbued with ancestral knowledge, the project re-energized the vital link between community autonomy and design autonomy as a cornerstone for fostering energy sovereignty (Figure 1).

The co-design approach advocated by the project organizers also invited local communities to foster dialogues between ancestral and Western scientific modes of knowing around energy. As other studies have shown, combining Western scientific understandings with experiential and traditional modes of knowing is crucial for nurturing collaborative and holistic learning processes in rural contexts (Aguilar and Rátiva-Gaona 2022; Hess 2018). The interweaving of these knowledge forms ignited participants' imaginations, prompting them to imagine *other* energy presents for their communities, which were anchored to their specific realities, worldmaking practices, and ways of knowing their territories. This amalgamation of practical skill-building also laid the groundwork for the cooperative development of contextually relevant skills, enhancing processes of territorial/technological making. By doing so, the project underscored the relationship between communities, territories, and transition technologies as a vital connection in adopting new technologies as capacious tools to re-make their energy futures (Figure 2).

In the co-design process of *Tecnologías para abrazar el sol*, it became clear that it is necessary to think, imagine, dream, and re-create collective futures from the territories to redefine the contours of localized energy sovereignty. Drawing inspiration from the

Figure 2. Co-creative process in rural communities. *Tecnologías para abrazar el sol* project 2020. Courtesy of Juan David Reina-Rozo.

Solarpunk movement,[2] the project's organizers encouraged the creation of fictional, fantastic, and imaginative narratives among workshop participants (Reina-Rozo 2021). The book compiles essays, narratives, illustrations, and photographs produced by workshop participants, presenting people and communities who harness the sun's energy daily to foster well-being in their territories. These narratives offer insights, aspirations, desires, and reflections on ancestry, solar technology, territory, and community. Thus, rooted in the traditional practices and wisdom of La Guajira communities, *Tecnologías para abrazar el sol* sheds light on localized perspectives on the relationship with the Sun – as an ancestral technology – and explores how inhabitants – particularly the youth – from these territories envision their futures amidst new energy technologies.

Bodies of wind: flying without fossil fuels in *Museo Aero Solar* and *Aerocene*

In his visionary 1950s poem, "Oda al Aire," Pablo Neruda (1991) implores the air not to sell itself for profit. Neruda's poem seems prophetic in anticipating major investments in Chilean wind farms at the beginning of the 1970s and the subsequent energy disputes

[2]We understand *Solarpunk* as an aesthetics of hope, which resists the daily despair generated by ecological destruction. As a movement, it may be considered a counter-cultural rebellion to supplement culturally pessimistic visions of how the future may unfold in view of the increasing catastrophism in public cultural discourses.

sparked by the encroachment on Mapuche lands for energy and forestry developments. Despite the typical portrayal of wind energy as being clean and sustainable, Eolic farms have inadvertently led to a geography of dispossession, as Indigenous and local communities find themselves dislocated from their territories and their established ways of life disrupted. In this section, we discuss artworks by Argentine artist Tomás Saraceno, which find inspiration in wind and air as active agents to open up questions of its flux as a force of deterritorialization and reterritorialization, displacing aerial and solar semantics into communal geographies. As wind-oriented designs, these works incorporate both material and symbolic elements that draw upon motifs of currents, flight, flux, and buoyancy, envisioning technology as a collaborative process while fostering new understandings of aerial affordances that contribute to imagining alternative energy futures.

First, consider *Museo Aero Solar*. Initiated in 2007 by Saraceno and collaborators, the project continually curates a diverse collection of community-built floating museums. These museums employ plastic bags, which participants cut, paste, and sew into canvases that elevate personal narratives into airspace. These museums are site-specific and built with the local communities in mind. For the 2021 Biennale di Venezia, for example, *Museo Aero Solar* showcased pieces with messages from the Bella Flor recycling service and incarcerated students at the educational space within Criminal Unit No. 48 of the Buenos Aires Penitentiary Service. Poetically, this practice fosters a sense of togetherness among participants, aspiring to transcend spatial-gravitational power structures such as borders and punitive controls – barriers that disproportionately discriminate yet impact us all.

In *Museo Aero Solar*, collaborators are also invited to participate in the making of the artwork by repurposing plastic, a ubiquitous material in our current geological epoch, into an imaginative medium of the *Aerocene* – a notion proposed by Saraceno to address a future-to-come, embedded in the complex meshwork of associations, communities, and relations. The materiality of plastic – bags and tape produced from fossil fuels – acquires new meanings in this project when associated with reusability and aerial flotation. This challenges the notion of a utopian future devoid of fossil fuels, acknowledging that even in shaping alternatives and transitions, Earth's critical zone and atmosphere are already imbued with fossil matter that will last for a very long time. In doing so, *Museo Aero Solar* activates an ecological ethos that involves recollecting entanglements, reactivating affordances, and introducing ambiguity to mobilize possible future alliances between opposites. It is, paraphrasing the celebrated title of Donna Haraway's book, a strategy for "staying with the trouble" (Figure 3).

Aerocene is also the name for an artwork, platform, and intervention led by Tomás Saraceno and his art collective, which deploys aerosolar sculptures to provoke modes of imagining this transient emancipation from above. These pieces evoke a sense of a looming cloudscape, instilling an uncanny sensation that aims at attuning participants to a new era of planetary cohabitation that aspires to restore Earth's thermodynamic balance, liberating it of borders and fossil fuels. In doing so, the sculptures question the meaning and character of air as an alternative to fossil fuels and a sentient agent that animates our collective selves in and through which we are in relation. While Saraceno's art practice proposes a reevaluation of air within the logic of infrastructures and energy technologies, it also raises some questions. Can its mode of conceptualizing aerial energetics with utopian infrastructure while attempting to foster global togetherness fully incorporate grassroots

Figure 3. *Museo Aero Solar Reconquista*. Aerocene Foundation. Created by the UNSAM, IAMK, and Inflatable Laboratory. *Museo Aero Solar* communities coordinated by Carlos Almeida. Screen capture (Saraceno 2015).

and territorial perspectives? If wind, through its motion and shifts, lays the groundwork for planetary energetic emergence, can it also stimulate local and territorial reshaping of the architecture of institutions and the relationships between bodies?

In the context of energy economies, air is often portrayed in relation to energy-generating transitions. What Saraceno's work proposes, on the contrary, is to attend to how aerial movements, flux, and scales draw participants into a territory of unsuspecting socio-affective entanglements and unforeseen encounters with nonhuman presences. Air becomes a weaving that brings together meteorological and geophysical conditions with the fluid relations between air, earth, humans, and other-than-human dwellers. From this angle, these artistic practices invite their audiences to engage – as a community of active participants – with air's affordances through various configurations, phases, motions, and states. The sculptures afford choreographic relations across atmospheric phases. Through them, the air shapes and transcends relations between people, places, architectures, and institutions – an energo-territory.

This gesture traces back to Saraceno's commitment to collaborative art practices that emphasize a Do-It-Together (DIT) ethos. Such practices strive to establish relationships that surpass actual and virtual borders, fostering growth towards other collective formations. Central to *Museo Aero Solar* and *Aerocene*, for instance, is an educational initiative that involves communities in conversations about energy use, consumption, and infrastructure. It is worth noting, however, that while Reina Rozo's previously analyzed work includes the communal component at the process's outset – building a generator was the community's initial desire – Saraceno's proposal invites a community into the realization of an idea previously conceived in Saraceno's studio. Anyone, anywhere, can

construct a Museo Aero Solar by following the instructions already available on the project's website, exemplifying the DIT spirit – or, dare we say, affective atmosphere – promoted by the Aerocene community. Attendees and spectators are encouraged to bring their own plastic bags to the construction sites for repurposing, thus nurturing an affective community dedicated to crafting a more inclusive, regenerative world and imagining a future beyond the reliance on fossil fuels. Hundreds of thousands of plastic bags have been reused from over 50 communities across more than 30 countries, reflecting a sense of care and accountability.

Overall, the communities of practice brought together through Saraceno's artistic initiatives foster new forms of energy storytelling that exceed traditional narratives around societal reliance on fossil fuels while engaging the community in envisioning sustainable, energetic futures – an approach that resonates with contemporary claims to energy justice and sovereignty, emphasizing communal decision-making about energy production, distribution, and consumption (Ariza-Montobbio 2015). Furthermore, the emphasis on reusing materials derived from petroleum hydrocarbons, such as repurposing plastic bags into aerial creations, prompts a reassessment of the need for novel technology as the sole avenue for transitioning energy infrastructure. In doing so, these pieces raise critical questions about technological sovereignty and grassroots participation in shaping territorialized energy futures.

Microbacterial energies: *Nidos de equilibrio and Plantas Autofotosintéticas*

At a time when infrastructural sustainability and resource management are at the forefront of global energy concerns, artistic practices can act as catalysts for innovative system design. The works of Argentinian artist Ana Laura Cantera and Mexican artist Gilberto Esparza exemplify such endeavors, as they poetically weave together ecology, community, and energy production into self-sustaining circuits. Imagine a habitat that sustains you by providing essential energy from your own waste, sparking a community-based power generation system to run appliances. Using unconventional artistic materials such as organic waste and sewage, these artists construct systems that both generate energy and question conventional ideas of energy production, circulation, and consumption. Specifically, this section studies Cantera's *Nidos de Equilibrio* and Esparza's *Plantas Autofotosintéticas*, highlighting how they experiment with energy systems that co-exist with their environment and sustain themselves through recycling waste. By doing so, the artworks shed a poetic light on alternative futures by orchestrating precarious energies: practices that evoke diverse energy visions and utopian habitations, where energy subsistence is attuned with the territorial affordances as a more-than-human weaving of life and death.

In the site-specific work *Nidos de equilibrio*, Argentinian artist Ana Laura Cantera, in collaboration with the community of São José de Barreiro, Brazil, focused on the vitality and relevance of minute bacterial energies to invite reflection on ancestral and self-sustaining energetic futures that can be compatible with the planet's multiple life forms (Krenak 2022). As such, the piece is composed of a bioconstruction that adopts a shape similar to that of termite nests and consists of mud bricks containing plastic cells filled with organic waste from the locale. These cells incorporate rudimentary electrodes that

enable the conversion of biochemical energy into electrical energy through the action of anaerobic bacteria in Microbial Fuel Cells. In these cells, microorganisms consume biodegradable organic waste and release electrons that the electrodes capture to produce electricity. Though modest and erratic, the electrical output of each cell holds value in crafting localized energy narratives of cooperative generation and more-than-human energy sustainability. By connecting these bricks, the accumulated voltage – harnessed through Do It Yourself (DIY), low-cost, and open-source technologies – illuminates a small bulb that visualizes the interdependent relationships between bacteria and organic matter, and among these elements, the environmental affordances, human mediators, technological devices, and the living forces of the territory (Figure 4).

In Cantera's work, organic waste takes center stage as a means to generate biochemical energy capable of powering a living space (*habitáculo*). Mexican artist Gilberto Esparza, in a similar gesture, turns to sewage as a source of energy. As such, his piece *Plantas Autofotosintéticas* (2013–2014) consists of a symbiotic system that re-imagines sewage management to harness its energetic potential. The system features modular microbial cells designed to foster bacterial colonies. The metabolism of these bacteria produces electricity and improves water quality. These modules form a hydraulic network that delivers bio-filtered water to a central container. By doing so, an ideal environment takes shape in which producer and consumer species from different trophic levels – including protozoans, crustaceans, microalgae, and aquatic plants – can achieve an energetic communal balance in the form of homeostatic equilibrium. The bacteria produce electricity,

Figure 4. *Nidos de equilibrio* (Cantera 2014). Courtesy of Ana Laura Cantera.

Figure 5. *Plantas Autofotosintéticas* (Esparza 2013–2014). Courtesy of Gilberto Esparza.

intermittently released as bursts of luminous energy. This light supports the photosynthesis of plants dwelling in the central container, allowing them to complete their metabolic processes. Once the microbial cells have fully consumed the organic material, an electronic monitoring network pumps out the byproducts generated by the species in the primary nuclear ecosystem into the modular cells, thus reinitiating the cycle (Figure 5).

Cantera's and Esparza's works urge us to rethink energy production through a poetic and political use of biomaterials, citizen science, and co-designed energetic grids beyond conventional materialities, forms, processes, infrastructures, and methods. By harnessing waste (Cantera) and sewage (Esparza), these practices lay the groundwork for alternative understandings of energetic and technological sovereignty that unfold through systems that are deeply rooted in territorial affordances and also invite alternative ways of imagining energy infrastructure in communion with the other-than-human dwellers in the territory. As in the case of Saraceno, the diffracting use of everyday materials in these practices also acts as catalyst and vector for communal engagement and societal transformation, welcoming a shift towards more cyclical energy generation and distribution methods, extending beyond the boundaries of profit-driven paradigms for energy generation.

Glowing algae: biofuel stories through *Algas verdes*

Emerging "green hydrogen" projects are thriving in the energetic agendas of Latin American countries. However, these national projects consistently stress energy efficiency aimed at energy export, while the issue of "energy sufficiency" (Millward-Hopkins et al. 2020) that could pave the way for reduced consumption and multiply the energy sources is largely ignored. Contemporary artistic practices framed under what we have called the "energetic

turn" enlarge the panorama of energy consumption in the region by exploring the use of local resources through self-sustained and self-managed infrastructures that highlight personal and communal consumption aiming at a decreased use of energy.

In the bioart project *Algas Verdes* (2016), Colombian artist Hamilton Mestizo turns to algae to probe the prospects and constraints of locally-produced biofuels, focusing on green hydrogen. Liquid biofuels, specifically ethanol and biodiesel, have long served as an alternative to fossil fuels in Latin America, aiding in controlling fuel prices and reducing greenhouse gas emissions. Governments and industry experts promote biofuel factories and large-scale plantations as a hopeful means of reducing oil dependence, even envisioning the full substitution of fossil fuels in the near future. As the global demand for biofuels increases, the region has witnessed a surge in sugar cane and oil palm production. New biodiesel plants are sprouting while existing ones are operating at total capacity. But this cultivation scale is not without consequences; it guzzles water, triggers erosion, and erodes biodiversity, as it favors monoculture. In Colombia, palm tree plantations have been especially troubling, contributing to forced displacements in the context of an armed conflict (Aparicio 2017). Amid this backdrop, Mestizo's *Algas verdes* weaves energy sovereignty stories by employing algae as a medium to envisage localized, alternative energy production practices that allow communities to tap into biofuels' potential responsibly.

Algas verdes started as a project to simulate and visualize the influence of cyanobacteria in the earth's atmosphere through a photobioreactor and atmospheric gas sensors (O_2, H, CO_2). The first version was developed at the Medialab-Prado in Madrid, Spain, as part of the Interactivos program, where the project expanded to integrate biotechnology to tackle questions of energy problems and pollution in urban settings. As the green algae clean the air, the resulting biomass can produce electricity, methane, biodiesel, and food supplements. The second version was developed in Bogotá with the Tecnoparque Sena, where questions of symbiosis and daily life gained prominence in a series of open, in-situ, and interactive workshops conducted as part of the project. In the project's introduction, Mestizo highlights the importance of microalgae:

> Microalgae are found in all bodies of water, rivers, lakes, seas, etc., also in the soil and various ecosystems on the planet, adapted to even extreme conditions. In addition to their importance for the biosphere, they are attractive to science and industry as their biomass is a rich source of energy. By carrying out biochemical processes, they can serve as biotechnology and obtain substances and products of pharmaceutical interest, animal and human food, wastewater treatment, fertilizers, electricity production, and biofuels, among others. (Mestizo 2016)

As Cantera with waste and Esparza with sewage waters, Mestizo employs algae as an artistic material and as an active participant in energy production. This approach invites us to explore alternative forms of nourishment and energy from an embodied, nutritional perspective, moving beyond global industrial chains. Similarly, in parallel with Saraceno and Reina-Rozo's practices, *Algas Verdes* adopts DIY methodologies, welcoming reuse, and community involvement. Mestizo's photobioreactor prototype employs open-source hardware, allowing for the visualization and control of green algae cultivation conditions. Specifically, it uses the species Spirulina and Chlorella. This model enables control over airflow (CO_2-O_2), artificial light, and biomass collection while monitoring real-time

environmental conditions such as pH, humidity, and temperature. As this art practice employs an open platform, others can replicate and modify this model, making it both a springboard and a reference for enthusiasts eager to experiment with homegrown algae culture and alternative forms of energy. Citizen science underpins Mestizo's experiments with algae and biofuels, thus fostering self-sufficiency and sovereignty. In this way, this art-science project engages a broader public in politics and poetics of doing that connect energy, environment, and community to foster a symbiotic connection with nonhumans (algae) and raise consciousness about daily energy needs and consumption (Figure 6).

Furthermore, Mestizo has coined the terms "ciencia de barrio" (neighborhood science) and "cultura casera" (homemade culture) to describe the territorial foundations of this art-energy project and the specific form of citizen science it engages. These art-science practices can be considered forms of community science – which offers more inclusive alternatives to the term "citizen science" – as they seek to empower communities, primarily in urban areas, to conduct experiments that are relevant and contribute to their communal wellbeing, connects them to energy through local understandings, and engages them in discussions about the energy futures they desire. In this sense, we propose *Algas verdes* enables situated energy sovereignty imagination by facilitating access to technologies that empower communities to generate energy tailored to their daily life needs, in contrast to the restrictive patent system and the reliance on large-scale energy infrastructures and industries.

Figure 6. *Algas Verdes* (Mestizo 2023), showing the artist pouring the algae liquid. Courtesy of Hamilton Mestizo.

Along with Cantera's and Reina Rozo's, this art project resonates with Aguilar and Rátiva-Gaona's (2022) proposition that cooperative energy work activates the conditions for a dignified life. The emphasis on open-source technology, diffracted uses of algae, and cooperative experimentation enabled in the interactive workshops connects art, science, and the community, thus fostering an energo-territorial thinking for more sustainable energyscapes in Latin American cities.

Conclusions: energy sovereignty storytelling

In this article, we shed light on a less-explored body of Latin American art that explores practices and understandings of energy for post-fossil energyscapes in a manner that fosters conversations around energy justice and technological sovereignty in the context of the energy transition. Unlike top-down techno-salvationist approaches deployed by government and corporate initiatives, these artistic practices experiment with community-centered energy engagements and territorial understandings of energy, focusing on territorial epistemologies and communal circuits that include more-than-human forces. In this way, these practices construct a new energy storytelling that reconsiders the conceptual contours of energy transition, justice, and sovereignty in the Latin American context.

The works analyzed here interweave a critique of the extractive paradigm with propositions for alternative relations to energy through local, embodied, and affective dimensions. These artistic "energyscapes" bring new ways of building energy imaginaries rooted in grassroots efforts and in tune with territories and communities (rural, Indigenous) striving for situated energy justice. While *Tecnologías para abrazar el sol* highlights the importance of including ancestral meanings and cultural perspectives in the knowledge production and material infrastructures of energy, *Aerosolar Museum* and *Aerocene* stress a DIY dimension as a democratic form of participation in energy generation forms and discussions. *Nidos de equilibrio* and *Plantas Autofotosintéticas* propose biochemical waste and sewage as possible materials in a circular generation of energy to rethink our ways of inhabiting the planet, and *Algas verdes* stresses the importance of circulating the processes for energy generation with algae in diverse communities for shared knowledge production. The studied artistic practices experiment with biomaterialities, citizen-science, and art-science explorations, where sun, wind, algae, and waste are not considered objects from which to extract value for a global market but co-producers for more equitable and sustainable futures for humans and more-than-humans alike.

The dialogues between entities territorialize practices at both geographic and community levels, enabling and encouraging concrete actions for alternative energy futures. They help develop tools and methodologies applicable beyond the artistic fields, transferable to various scales and localities. Citizen/community science and co-design with both human and non-human agents, as well as artist-participant collaborations in specific localities, are vital. These collaborations help map and reclaim collective and heterogeneous energies that shape territories and activate them as units of reciprocal affectation. While addressing the scale of a global or hemispheric energy crisis is urgent, our work demonstrates that questions on the "right" scale should not detract from the pursuit of better conceptualizations of energy, its territories, and ecologies. Altogether,

the various modes of energo-territorial thinking channeled in the art practices studied here are at the forefront of emerging narratives in Latin America. These narratives advocate for alternative, post-extractive, community-led energy futures, extending beyond the global visibility of hegemonic discourses on energy transitions in the region.

If energy sovereignty entails both reclaiming the right to decide upon energy matters and challenging dominant energy paradigms (Del Bene, Soler, and Roa 2019), the artistic practices here studied build new emergent forms of storytelling that put into practice energy sovereignty by co-designing with local territories, empowering citizens to become responsible users and makers by DIY and citizen-science, and by actively encouraging to reflect and work with the waste as a circular energy pattern. In this way, new embodied, affective, ancestral, communal, and multispecies meanings of energy emerge through energo-territorial entanglements as alternatives to the linear trajectory of energy as electricity – global, transferable, and non-local – in contemporary Western paradigms shaping the energetic transitions.

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