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Carlos Tornel. Decolonizing energy transitions. The political economy of low-carbon infrastructure, justice, extraction and post-development in the Southeast of Mexico.

Abstract: This thesis examines socioecological and onto-epistemic conflicts over low-carbon infrastructure in Yucatan, Mexico. Focusing on how energy systems and policies reconfigure landscapes and vice versa, it offers an expanded view of the broader social, political, historical, economic and environmental implications of such a transformation at different scales. It argues that the reconfiguration of landscapes is mediated by a capitalist drive towards the exploitation of so-called superabundance of 'renewable energy potential' where *othered* territorial relationships are made invisible or seen as ‘waste’ as they are tied-in to a particular epistemology of development. This thesis draws on the analysis of Critical Political Ecology on energy transitions, on the decolonial turn and the rise of extractivism in Latin America and on the work of political ecology and ontology, which has open broader questions about how certain notions such as ‘energy’, ‘transitions’ and ‘justice’ are understood. Drawing on these contributions, this thesis argues that geographers and critical scholars must pay closer attention to low-carbon infrastructure and the transition process, not only transcending the limited and simplified fossil fuel vs. renewable energy dichotomy that shapes the hegemonic energy transition, but in their analysis of how energy systems operate around Eurocentric and universal formulations of knowledge, power and being. The thesis seeks to make a contribution to how researchers, activists and policy-makers engage with the notion of energy justice arguing for a pluriversal and relational understanding of energy and of the process of transforming energy systems.

Decolonizing energy transitions:

The political economy of low-carbon infrastructure, justice, extraction and post-development in the Southeast of Mexico

Carlos Armando Tornel Curzio

Thesis in pursuit of the qualification of

Doctor of Philosophy (PhD)

Department of Geography

Durham University

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List of Abbreviations

AEU: Actually Existing Unsustainability

AEI: Actually Existing Injustice

AMLO: Andres Manuel López Obrador

AZEL: *Atlas de Zonas de Energía Limpia* [Clean Energy Zone Atlas]

CDA: Critical Discourse Analysis

CDM: Clean Development Mechanism

CFE: *Commission Federal de Electricidad* [Federal Commission of Electricity - Mexico]

CLACSO: *Consejo Latinoamericano de Ciencia Sociales* [Latin American Social Science Council]

CMP: Colonial Matrix of Power.

COP: Coloniality of Power

CPE: Critical Political Economy

CSO: Civil Society Organization

DA: Document Analysis

EDC: Ecological Distribution Conflicts

EIA: Environmental Impact Assessment

EJ: Environmental Justice

EJN: Energy Justice Network

EROI: Energy Return on Investment

FONATUR: Fondo Nacional de Fomento al Turismo

FPIC: Free, Prior and Informed Consent

IEA: International Energy Agency

IFC: International Finance Corporation

ILO: International Labour Organization

IRENA: International Renewable Energy Agency

LAERFTE: *Ley para el Aprovechamiento de Energías Renovables y el Financiamiento para la Transición Energética* [Law for the Use of Renewable Energies and Financing the Energy Transition]

LASE: *Ley para el Aprovechamiento Sustentable de la Energía* [Law for the Sustainable Use of Energy]

LGCC: *Ley General de Cambio Climático* [General Climate Change Law]

LIE: *Ley de la Industria Eléctrica* [Electricity Industry Law]

LTA: Long Term Energy Auction

LTE: *Ley de Transición Energética* [Energy Transition Law]

MLP: Multi-Level Perspective

NGO: Non-Governmental Organization

NREL: National Renewable Energy Laboratory

NYT: New York Times

PE: Political Ecology

PECC: Programa Especial de Cambio Climático [Special Climate Change Program]

PEMEX: Petróleos Mexicanos [Mexican Petroleums]

PO: Political Ontology

POETCY: *Programa de Ordenamiento Ecológico del Territorio Costero de Yucatán* [Ecological Management Program for the Yucatan Coastal Territory]

GHG: Greenhouse gasses

RAN: *Registro Agrario Nacional* [National Agrarian Registry]

SDG: Sustainable Development Goals

SEMARNAT: *Secretaría de Medio Ambiente y Recursos Naturales* [Ministry of Environment and Natural Resources]

SEN: *Sistema Eléctrico Nacional* [National Electricity System]

SENER: *Secretaría de Energía* [Ministry of Energy]

SIA: Social Impact Assessment

SSI: Semi-Structured Interviews

UN: United Nations

USAID: United States Agency for International Development

Declaration Statement:

This thesis is entirely the work of the author except the research article titled "Article 4. Resistance to 'renewable energy' as a form of extractivism: The case and lessons learned from San José Tipceh." This article is the result of a collaborative work of the author with Romel González and Aurelio Mugarte Xool. Their authorship is recognized accordingly throughout this document.

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For Ximena

List of Papers

Paper 1: Decolonizing energy justice from the ground up: Political Ecology, Ontology and Energy landscapes. *Progress in Human Geography*, 47(1): 43–65.

Paper 2: *The political economy of energy transitions: new energy spaces and decolonial politics in Mexico.* Manuscript accepted by Review of International Political Economy (RIPE). Additionally, an early version of this chapter constitutes as a book chapter that will form part of the book: *Economía política de las energías renovables en América Latina [The political economy of renewable energies in Latin America]* edited by Edgar Talledos and Lorudes Alonso) Forthcoming by the Consejo Latinoamericano de Ciencias Sociales (CLACSO) in Spanish.

Paper 3: *Energy justice in a context of green extractivism: Perpetuating ontological and epistemological violence in the Yucatan Peninsula.* Manuscript. The article was published in the *Journal of Political Ecology* as part of the special issue on: The political ecology of green extractivism edited by Alexander Dunlap and Judith Verweijen.

Paper 4: *Resistance to renewable energy as a form of extractivism: The case and lessons learned from San José Tipcéh*. This paper is co-authored with two Indigenous community members that are part of one of the case studies of this thesis. Two versions of this article, that were not peer-reviewed, were published in Spanish by the *Due Process Law Foundation* and the *Heinrich Böll Foundation* in Mexico City. The version reproduced here is a translation by the author.

1. Introduction

No one here is against renewable energy, Please! We are against the economic system that sees renewable energy as a way of exploiting our land.

Indigenous land defender in a conversation with the author.

"To civilize" is a key expression. In Mexico, civilizing has always meant de-Indigenizing, imposing the way of the West.

Guillermo Bonfil Batalla, 2009.

On August 17, 2022 the New York Times (NYT) ran an article titled *Mexico Sees Its Energy Future in Fossil Fuels, Not Renewables*, the argument presented in the article is that the Mexican government has radically shifted its position from supporting the deployment of low-carbon infrastructure and meeting its climate goals, back to a focus on fossil fuels, mostly citing how the president, Andres Manuel Lopez Obrador (AMLO), an "oil man", has pushed ideas of national sovereignty, intertwined with the availability and the state's capacity to extract its hydrocarbon reserves. The article explains how AMLO's focus on fossil fuels is rooted in a dual fight against what the president sees as a reversal of neoliberalism and a "corrupt privatization of the industry", referring to the involvement of private and foreign companies in the energy sector. Re-empowering the state-owned electricity and fossil fossil fuel-producing companies is thus an instrumental piece to "guarantee Mexican energy sovereignty [to] return the country to the glory days when oil created thousands of jobs and helped bolster the economy." (López, 2022).

The NYT piece reflects several layers of how the energy transition has been debated at the public and federal level in the country. While it presents the issue of the transition as a problem that is now dealt with at the highest levels of politics: every branch of government in Mexico, from the president, passing through Congress and the supreme court, as well as daily news outlets, seems to understand the energy system is embroiled with broader considerations of politics such as political power and national identity. AMLO's crusade against neoliberalism, which has consisted in tackling the hollowing out of the state by the market led by previous governments, placed the energy sector as one of the most contentious issues in reformulating how the state can

take back its role. However, the matter seems to be discussed in terms of ownership (i.e. state vs. market), technology (renewables vs. fossil fuels) and hardware (state-owned vs. private infrastructure), reducing the energy transition to a simplified dichotomy between these dualisms.

The article shows that there is a general sense that the energy systems represent much more than energy, infrastructures and technological choices. For example, it argues that the question of the transition is wedded to the previous government's reforms seeking to simultaneously expand private sector and free-market involvement in the energy system, and the adoption of national and international commitments to reduce greenhouse gas (GHG) emissions. While the current government's actions act as a direct response seeking to expand hydrocarbon production and abandoning such commitments as part of a broader strategy to counter neoliberalism. In other words, the NYT article, albeit unintentionally, has captured the shifting socio-technical imaginaries that shape each of the government's goals or the "collectively imagined forms of social life and social order reflected in the design and fulfillment of nation specific scientific and/or technological projects" (Jasanoff & Kim 2009, 20). A process that is nonetheless usually reduced to a matter of depoliticized choices that seem to question nature of the transition process, but that fail to challenge and even reveal how energy systems and their transformations interact with historical power relations, spatial reconfigurations, thermodynamic interactions and the spatiotemporal reconfiguration of landscapes through the manifestations of capitalist crisis.

A few months before I came across the NYT article, I was in the state of Yucatan visiting two sites where low-carbon infrastructure energy projects were already operating or planned for construction. Starting in 2012, the state of Yucatan has seen an impressive number of low-carbon infrastructure projects announced. Most of them came after 2016 when the federal government passed a series of reforms to the energy system's regulatory framework, which had remained mostly untouched for over 70 years. These changes had already manifested into a spatial, political and socio-ecological reconfiguration of landscapes, spaces and territorialities across the country as the expansion of public and private interests to 'new' energy sources, that is shifting to conventional hydrocarbon resources –which were now experiencing a rapid decline– to 'unconventional' energy resources, including solar and wind, where now being experienced on the ground.

The transformation of spaces into zones with 'renewable energy potential' was quickly being experienced by local communities and activists as the emergence of new frontiers of extraction and as another manifestation of capitalism unwavering demand for energy and space to sustain its extractive practices (McCarthy, 2015; Dunlap & Jakobsen, 2020). This was a familiar process to many people as the Yucatan Peninsula was already embroiled in a series of socioecological conflicts emerging from strategies of land and 'green' grabbing, that is, the control and capture of lands and natural resources through hard (coercive) and soft methods such as social engineering and pacification on the name of furthering economic growth and sustainable development (Dunlap, 2020). Since 2012 the peninsula has seen a rapid rise of economic development in the region through the expansion of transgenic monocrop plantations, pig farming, urban sprawling and tourism, mostly driven by land speculative practices that had shifted a mostly commonly owned land system (called *ejidos*[1] in Spanish) to privately owned land used to expand economic and private development in the region (Torres Mazuera, et al. 2020).

The deployment of low-carbon infrastructure was adopting the same practices of green grabbing as the aforementioned industries. But this time the 'greenness' of these projects was being hailed as substantially different from previous land-enclosing policies by the federal government, the state of Yucatan and the private sector developers', as these projects entailed the basis for a low-carbon energy transition and a commitment towards a sustainable future (Gobierno de Yucatán, 2018). As I spoke to a number of people during my visit to Yucatan, the cumulative effects of land privatization by these series of industries was perceivable in the spaces used for such an expansion. Communities were organizing and resisting the advancement of low-carbon infrastructure, drawing on their previous experience with the land grabbing tactics used by the federal government for mono-crop plantations (see Muúch Xíimbal, 2019). A cornerstone of their resistance –which included the use of legal injunctions, communication strategies and organizations ot exercise their right to self-determination aided by local and national networks of academics and civil society organizations (CSO)– was the defense of the territory and a

[1] Ejidos are a form of communal property created in the aftermath of the Mexican Revolution through an agrarian reform programme inscribed in the 1917 Constitution. The Mexican State enacted a land redistribution program guaranteeing protection for communally owned land for more than 70 years until the sector was liberalized in 1992 (Torres Mazuera, 2022: 347).

reaffirmation of their own way of living, being and relating to nature in this particular place. However, the matter of the energy transition seemed to be much more convoluted than their previous experiences. "The problem is that most people think we are against renewable energy, which is a problem in the context of climate change, or that we don't want it here because we didn't get a good enough cut of the pie (in monetary terms), but what they don't see is a long history of strategies of occupation, extraction and exploitation that these technologies represent"[2] one of the Indigenous leaders told me.

The reality was that Indigenous and peasant ejidatarios communities in the Yucatan Peninsula where experiencing the continuation of a long history of capitalist expansion in the region justified through attempts to 'bring development' to an area that has long been thought of as 'outside', 'backward' or 'left behind' by previous governments (FONATUR, 2019). The expansion of low-carbon infrastructure was seen as just a piece of the puzzle that, if and when completed, would entail a rapid increase of jobs, the reduction of poverty and sustainable development for the region (Ansotegui, 2021). The socio-technical imaginary that had shaped previous governments' project for progress and later sustainability, was manifesting through the deployment of low-carbon infrastructure as a continuation of centuries old plans to civilize, Christianize, develop and democratize the region (Grosfoguel, 2016).

As I visited the sites where these projects were operational or planned, the questions of 'for whom' or 'for what' is this energy was one of the main concerns raised by most of the people interviewed. Several academic and CSO's networks had already identified that most of the low-carbon infrastructure projects in the peninsula (and in the rest of the country) where built by private companies under a self-supplying scheme called '*autoabasto*' which allows private entities to generate their own electricity and connect through the national grid. Hence, most of the projects being developed in the state of Yucatan were occupying mostly privatized formerly community-owned land to generate electricity that created little-to-no benefits for local populations –aside from the negotiated deals made between a few land-owners and the companies which usually excluded other members of Indigenous communities, and lacked a proper assessment of the origins and consequences of long histories of poverty and exclusion– (Articulación Yucatán & GeoComunes 2019; Torres Mazuera, et al., 2021).

[2] Interview No. 24 with an Indigenous community member. 20-May-2021.

In 2018, after the election of AMLO, the renewed focus on fossil fuel and state-led development offered a moment of uncertainty over the role of low-carbon infrastructure and the socio-technical imaginary that would guide the energy transition. While the government canceled the development of new low-carbon infrastructure projects by the private sector, it simultaneously announced the construction of a 1,525 km train that would interconnect the states of Tabasco, Chiapas, Campeche, Yucatan and Quintana Roo to "improving the quality of life of people, care for the environment and trigger sustainable development". This Train or the '*Tren Maya Regional Project*' which seeks to "strengthen the region's territorial organization and boost its tourism industry, generating economic revenue and increasing connectivity in the Yucatan Peninsula, allowing the efficient movement of cargo and passengers" (FONATUR, 2019), became a new articulating mega-project that could capture the output and production of many of the land grabbing practices that have reshaped landscapes and territorial relations in the Peninsula for almost a decade.

"It's all connected," said one of the Indigenous *ejidatarios* (or communal land owners as they are called in Mexico) as we walked along the path of what was still under threat of becoming one of the largest solar photovoltaic parks in the world. "They will tear down this jungle, where we live, hunt, gather wood, keep bees and harvest, to install millions of solar panels and use the energy generated and take it to the cities, to those new 'development poles' created by the so-called 'Maya Train' and to move the train itself." As we walked through a narrow road in the middle of this dense jungle he pointed out some of the first areas where the prospective removal of trees was already happening. "And what will become of you (the ejidatarios) and this land?" I asked, "well the choice is simple" he said, "we can either accept *their* terms and move on, that is, we can take the company's money and accept that they lied to us, that they deceived us and made us fight against our friends and neighbors in our community and that they are using *our* land for *their* economic benefit, or we can say 'no', stay and defend our territory."[3]

As I read the NYT article and this conversation flash-backed into my head, it became evident that the way that the energy transition was being discussed at the national level was radically simplifying and reducing the matter of the energy transition into a question of different socio-technical imaginaries, but a discussion that was leaving how energy systems interact with

[3] Interview No. 40. with an Indigenous community member. 24-Feb-2022.

particular histories and legacies of extraction and occupation in particular places, as well as the forms of governance –or the governmentalities– that shape energy transitions and the deployment of energy infrastructure to meet particular socio-technical imaginaries of the future (Boyer, 2019). In this sense, and drawing on the argument that the legacies of extractive expansion and colonial occupation in the Yucatan Peninsula are 'all connected', I could think of at least four levels in which the energy transition had to be discussed to counter the simplified view presented in the NYT article.

First, any analysis of the transition has to tackle the 'us and vs. them' dichotomy –or what could also be called the fossil fuel vs. renewable energy dichotomy–. In Mexico, the convoluted nature of the energy system and its interaction with neoliberalism policies, market expansion and the hollowing out of the state (Tetreault, 2023) has meant that the transition has been reduced to the actors and power relations driving changes in the regulatory framework (Baker et al., 2014). In Mexico, this has pitted environmentalists and private sector companies (at times positioned in unlikely alliances) against the federal government. This level has mostly focused on honoring the government commitment to voluntarily reduce GHG emissions –recognizing Mexico's role as the 14th largest emitter in the world and as a highly vulnerable country (SEMARNAT, 2015)–, coming from the excessive reliance on fossil fuels (85% of Mexico's primary energy comes from these sources), substituting technologies and fossil-fuel-based aging infrastructures, while taking advantage of the enormous potential of 'renewable' energy sources in the country (USDC, 2022).

A second level presents the question of the transition as a matter of justice, a narrative that is usually built around the political economic consequences of the transition, that is, who will win and who will lose from this material, institutional and political changes; what mechanisms, policies, regulatory or social, political or economic arrangements will determine these outcomes, and how, if at all, can the state, market and any other actors address the injustices emerging from this new configuration of the energy systems (Baker, *et al.*, 2014; Newell & Mulvaney, 2013; Healy and Barry, 2017). In the NYT article, this level was already downplayed in favor of highlighting the simplified fossil fuel vs. renewable energy dichotomy that has captured the national spotlight, however, political economists usually deal with these set of concerns by first, seeking to identify how policy and regulatory mechanisms can have unintended consequences –by piling on already existing or creating new injustices– (Healy & Barry, 2017; Sovacool,

2021). Secondly by locating the historical, discursive and material conformations of energy systems which prevent or hinder these changes from taking place (i.e., powerful elite groups invested interest in maintaining a particular configuration of the existing energy system) (Baptista, 2018; Newell, 2019). And third, by engaging with the socio-technical imaginaries and symbolic and political power configuration embedded in to the promises and visions of the future attached to particular projects, infrastructure and energy systems in themselves (Jasanoff & Kim, 2009; Kuchler & Bridge, 2019; Lyall & Valdivia 2019).

While all of this was perceived in one way or another in the NYT article, my conversation with the Indigenous community member and his collective struggle to defend his communal territory struck me as capturing another two levels of the transition, which often appears *elusive* to policy-makers and even to some working and analyzing energy transitions. The third level refers to the uneven power relations, the uneven distribution of harms/privilege associated with the deployment of energy infrastructure (Temper, et al, 2015; McCarthy, 2015) and the struggles, resistance and production of alternatives to these particular configurations (Ávila-Calero, 2017; Dunlap, 2018). The work of political ecologists has been essential in identifying how these harms are experienced by communities that experience low-carbon infrastructure 'on the ground' and how such interactions are spatially, metabolically and thermodynamically interconnecting and separating places between consumption, production, waste and value (Cederlöf, 20021; Franquesa, 2018). Finally, the conversation with Indigenous communities and ejidatarios was revealing another layer to this perspective, one simultaneously rooted on a material level –where colonial legacy of power, land occupation and extraction became embedded in the design, operation and infrastructure of energy systems– and at the epistemological level, by revealing these conflicts to be, in essence, disagreements about the nature of land, energy and the *world* itself, that is, about their meaning, the ways of interacting with them and the knowledges that inform these relationships (Blaser, 2014).

This anecdote reveals how this thesis seeks to examine the apparent dichotomous and layered understandings of energy transitions by questioning how energy transitions are governed in Mexico, that is: what are the key actors and interests that shape the energy transition? What are the material, institutional and political implications of how these processes are governed? and what other forms of governance, spaces, relations and understandings of energy, energy

infrastructure and energy systems are revealed through these disagreements? Drawing on two low-carbon infrastructure projects in the state of Yucatan, which are themselves part of a much broader geopolitical and spatial reorganization of the territory in the Yucatan Peninsula –through the deployment of projects like the 'Maya Train'–, this thesis seeks to engage with: the political economy that shapes the energy transition at multiple scales including the national and international level; the possibilities of reconstituting energy justice under a context of 'total' or 'hyper' extraction' (Dunlap & Jakobsen, 2020; McNeish & Shapiro, 2021); and the tensions and struggles that have emerged around the deployment of low-carbon infrastructure, placing particular emphasis on the epistemological and ontological injustices that originate in the resistance to such infrastructural harms by movements struggling for their own (re)existence (Porto-Goncalvez, 2001; Leff, 2017).

Following these approximations, this thesis answers specific calls to engage with the colonial legacies and the coloniality of energy systems (Boyer, 2019; Allen et al, 2021), of *energy* itself (Lohmann, 2021; Lennon, 2017; Daggett, 2019) and the politics and governmentalities shaping energy transition processes in the Global South (Castán Broto, et al, 2018). To do so, this thesis starts by introducing the context in which the energy transition is taking place in Mexico by engaging with what Lisa Breglia (2013) refers to as the 'post-peak condition', that is, the moment after 2006 when oil and gas production reached peak production in the country. The aftermath of this event, –that is, the steady decline in hydrocarbon production– has substantially altered the material and political landscape of the country: from the changing landscapes and territorial relations resulting from the expansion of extractive and spatial occupation entailed by low-carbon infrastructure, to changes in the regulatory framework, electoral politics, geopolitical relations and biopolitical forms of governance. Starting the analysis from the post-peak condition means that this thesis will trace how energy systems have operated in Mexico historically and how their transformations have had particular impacts on power relations –manifesting in material, institutional and discursive changes–, spatial organizations –transforming landscapes and changing the meanings or territorial relations–, and symbolic changes –which are tied to a particular colonial histories of oppression, extraction and exploitation– all of which are necessary to understand how the deployment of low-carbon infrastructure entails much more than a simple choices between technologies and the 'correct' deployment and /or design of policy mechanisms.

This research project is organized using the structure of a *thesis by publications*[4]*,* which consists of a *Capa* that provides an overall assessment of the research project highlighting its theoretical background, research design and case study selection. While the *Capa* introduces the research project, this thesis consists of 4 academic articles which reflect its main theoretical and empirical contributions to the literature. The *Capa* provides a brief summary and introduction to each of these articles and offers a general conclusion and the main contributions of the entirety of the research project at the end. In this sense, this chapter serves as an introduction to the overall research project and as an overview to the *Capa* itself. The rest of this chapter introduces the main arguments of the thesis by first presenting a brief, albeit detailed, historical overview of the energy sector in Mexico focusing on the federal regulatory framework as the main point of entry of the analysis. The next section introduces the different theoretical approximations that constitute the basis of this analysis. While these are explained in more detail in Chapter Two, this section briefly highlights their relevance and the importance of approaching the study of energy transitions, energy justice and energy itself from a position of *actually existing unsustainability* (AEU)*,* Critical Political Economy (CPE) and the decolonial turn. The third section introduces the research questions and the overall aims of this thesis, drawing on the aforementioned contributions that this research project seeks to make. The last section introduces the structure of the *Capa* which is organized by presenting the theoretical contributions in Chapter Two, the research design in Chapter Three, and an overarching view of the context and case studies selected in the state of Yucatan in Chapter Four. Chapter Five introduces the four research articles that provide evidence for this research project while Chapter Six offers some concluding remarks highlighting the contributions made by this research project and emphasizing a series of questions and considerations for future research.

Finally, it is important to mention that the *Capa* offers a glimpse, albeit a detailed one, of the main points and contributions that this thesis is trying to make. It is therefore important for any prospective readers to see the *Capa* as a general introduction to the theory, the empirical evidence and the methodology. However, the results, apart from the concluding remarks, are centered on the academic articles. This is why some of the concepts and ideas expressed in the *Capa* might at times seem less developed than others. My invitation would be for the readers to

[4] Guidance for this format was based on Colls, McFarlane & Talling (2019). *PhD by Publication: Information Document*. Department of Geography, Durham University.

draw on the concepts presented in the *Capa* as a general introduction to what is then stated in the articles. This is of course not to say that the *Capa* could not be read on its own, but merely that a joint reading is suggested.

1.1. Historical overview of the Mexican energy system

This section briefly deals with the historical development of the energy system in Mexico. It does so in three particular ways. First, it deals with the way in which the energy system has become entangled with a particular national identity, one that emerged out of the Mexican Revolution and that is rooted into an energy security and developmental teleological understanding of history (Breglia, 2013; Baker, 2016). Second, it covers how the federal regulatory framework has changed during the last 3 decades, starting in 1992 with the first reforms to the energy sector in over 50 years. This section shows how, in an attempt to maintain the capture of resource revenues, the federal government enabled the configuration of a new frontier for energy generation through low-carbon infrastructure as a direct result of a steep decline in hydrocarbon production. Third, it engages with the present political, material and institutional configuration of the energy system and some of its main challenges. Overall, this section seeks to explain the context in which this thesis is set and highlight some of its main characteristics that will be addressed throughout and that inform this research project.

During the 80's and 90's, as Mexico was turning towards the neoliberal reforms that had already begun to shape the rest of the Latin American region, the energy sector (the electricity and hydrocarbon industries) was exempt from other structural reforms and policies that characterized the country's turn towards extractivism. As Breglia (2013) explains, oil and gas production remained closely linked to the national idea of independence and sovereignty, a notion that remained contested throughout the 20th and early 21st century but that came into fruition only after the Mexican Revolution of 1910. In 1938 President Lazaro Cardenas del Rio nationalized the oil industry, effectively rebuking foreign interests in the country and creating a first period of national stability based on economic development and industrialization fostered by oil production (Breglia, 2013). Like most countries from the Global South, oil became a blessing and a curse, by capturing the imaginaries of independence, development and progress on the one

hand, and by keeping foreign interests and attempts to enroll these resources into further capitalist integration and expansion ever-present on the other.

The neoliberalization project of the 80's and 90's placed the country on a path towards what in Latin America is commonly referred to as 'extractivism', that is, a modality of capitalism based on "the extraction of natural resources in great quantities and speed, to be exported as primary goods without or with very little processing" (Gudynas, 2013:4). The process is usually linked to a framework known as the 'Washington Consensus', a system of economic policies designed to place financial valorization at the center, including policies for structural adjustments and privatization, which redefined the state "as a meta regulating agent" (Svampa, 2015). This policy framework is closely knitted to the expansion of neoliberalism in the region, which itself was based on a 500 year old strategy of conquest and colonization, where some regions became specialized in the extraction of prime goods, while others in their manufacturing (Acosta, 2013). While the Mexican government began quickly adopting such structural reforms by *flexibilizing* the role of the state and enabling access to private sector investment, it strategically excluded the energy sector from such interactions (Baker, 2016; 2018).

The state-owned companies –the Federal commission of Electricity (CFE) and Mexican Petroleums (PEMEX)– played a key role in shaping Mexican politics, identity and notions of state sovereignty, independence and pride (Montaño, 2021; Baker, 2016). PEMEX and CFE were seen as the quintessential result of state-led progress and development and as the direct embodiment of national sovereignty and the fulfillment of the promises of revolution. Both of these companies represented the more than a century promise of national independence without foreign intervention (Breglia, 2013) and embodied the *promises* and imaginaries of the Mexican revolution which included land distribution, economic development and resource sovereignty (Baker, 2016). Both institutions were seen as responsible for providing the material basis for the country's most cherished institutions (such as hospitals and schools), employment and for providing important amounts of revenue as the direct payoff from natural resource extraction (Martínez & Herrera, 2021).[5]

[5] In 2003, the year with most oil production registered in the country, PEMEX provided at least 32% of the national budget, by 2008, oil revenues supplied almost 44% of the budget, employing nearly 140,000 workers. After 2009 however, the fluctuating international prices in oil and a steady decline in production rapidly shifted the scenario,

The significance of both CFE and PEMEX is anchored on Article 27 of Mexico's 1917 post-revolutionary constitution, which declares national resource sovereignty and explicitly rejects foreign intervention in the exploitation of the nation's "strategic" resources. Article 27 also includes the mandate for *reparto agrario* (land reform and distribution) which provided a procedural mechanism to transfer land to a communal form of management and converted the subsurface mineral rights back to the state. The article also holds together the two spheres that have historically been linked to the nationalist and revolutionary ideals and that are now closely linked as low-carbon infrastructure: the reconfiguration of landscapes and territorial relations across the country based on the 'new' spatial implications of low-carbon infrastructure and its deployment (Smil, 2010). In other words, resource sovereignty is the cornerstone of Mexican nationalism (Breglia, 2013), where the nationalization of the oil industry in 1938 and the subsequent nationalization of the electricity industry in 1960 are seen as key steps towards the fulfillment of revolutionary ideals, explicitly stated in Article 27.

After 1938, PEMEX became the metaphorical goose that lays the golden eggs (Tetreault, 2023) for the federal government, as it provided the material basis at very low extraction costs for the industrialization of the country. The role of PEMEX became even more emblematic after the discovery of the oil basin Cantarell in 1977 –the fourth largest oil basin in the world at the time– which would become the lifeblood of the national economy.[6] The use of resource rents captured through the rapid expansion of crude oil production quickly became the basis of the Mexican economy: at its best, Cantarell produced more than 2.5 million barrels of oil per day (MBD) –which is more than the total production combining all oil basins in the country in 2021 (1.7 MBD)–. In 1975, the country began crude oil exports to the United States, a progress that has maintained a steady flow of about half of the national production (between 1.2 and 1.5 MBD) to the country since 1982. During this period, oil revenues accounted for between 30 to 40% of the yearly national budget (Marínez & Herrera, 2021).

with crude oil production supplying less than 10% of the national budget in 2018 (Martínez & Herrea, 2021; Ferrari & Hernandez, in press).

[6] In a famous broadcasted speech made after the discovery of the oil basin, president Lopez Portillo (1976-1982) would infamously mark the discovery by inviting Mexicans to prepare themselves to "administer abundance". The resulting legacy of oil rents is usually associated with a long history of government embezzlement and corruption (see, Colmenares, 2008; Huizar, 2015).

The neoliberal reforms of the 80's and 90's were conducted under the continual expansion and exploitation of hydrocarbons, which allowed the governments to successfully negotiate further regional integration measures with minimum changes to the energy sector (Tetreault, 2020). However, after 2004 the context started to shift dramatically. In said year, Cantarell reached its point of maximum extraction, or 'peak', quickly dropping production at an alarming rate (Breglia, 2013). Since then, oil production has declined by half and gas production by a third, so much that Mexico went from being the 5th most important oil producer in the world to 14th place, with a production of about 1.7 (MBD) of crude oil corresponding to 2.2% of world production in 2021 (BP, 2021)[7]. The subsequent peak of gas production in 2009 led the Mexican government to scramble to find other ways of meeting an ever increasing national demand for processed fuels, electricity and economic growth (Boyer, 2014). The rapid decline of oil production since 2004 and the configuration of a 'post-peak condition' after 2009, meant two things. First, the government would have to reverse the decades-old ban of structural neoliberal reforms in the energy sector allowing private companies to participate in almost all aspects of the energy production process by creating new resource-rent capturing mechanisms. And secondly, this would entail the creation of new policies to increase private sector participation in the electricity industry, as a way of guaranteeing access to low-cost energy resources.

In 2013, after 75 years under public management, a new government-led coalition passed a Constitutional Energy Reform (from now on, 'Energy Reform'), amending articles 25, 27 and 28 of the Mexican Constitution, opening the energy sector –including the generation and commercialization of electricity, as well as the exploration, extraction and retail of hydrocarbons throughout the country– to private investment and management. The Energy Reform resulted in a series of new laws and policies seeking to capture resource rents from extraction as the liberalization of the electricity sector pushed for private investment over an aging infrastructure and harder access to such resources (Baker, 2018; 2019). Out of these policies emerged two particular mechanisms that are worth mentioning, first the creation of 'petroleum rounds' a series of contracts emerging from bidding rounds for exploration and extraction and new measures to increase taxes paid by PEMEX and private companies (Tetreault, 2023), and the deployment of

[7] As of 2022 the oil industry accounted for less than 10% of the national budget (compared to more than 40% in 2004), with remittances from migrant workers surpassing it, and with more than 70% of natural gas imported from the United States (Ferrari & Hernandez, in press).

Long Term Auctions (LTA) which allowed private companies –national and foreign– to bid for the lowest electricity generation costs in whatever technology available.

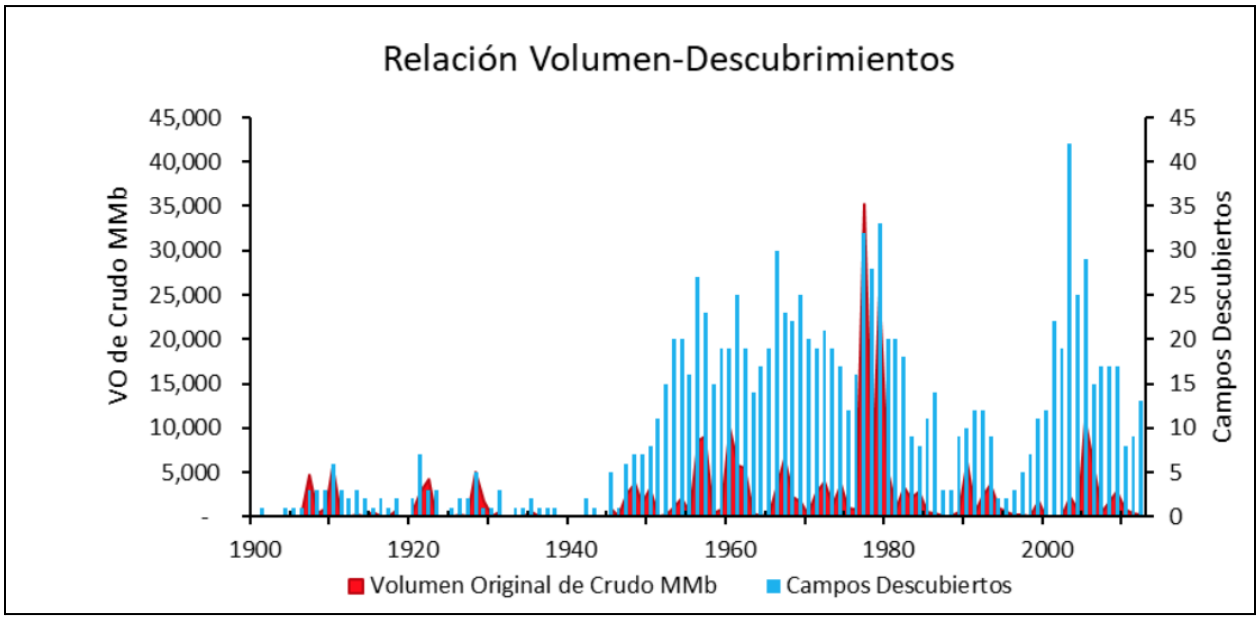


Figure 1: Number of crude oil basins discovered (blue) and crude oil production (red). Source. Ferrari & Hernandez, forthcoming.

Resource rent capture through classical forms of extractivism –that is, linked to the neoliberal structural policies aimed at increasing private involvement in the extractive process (Tetreault, 2023)– became a new way for the government to increase foreign and private investment, whilst maintaining expectations for rapid economic growth and development. Supporters of the reform argued that the new regulatory framework would be essential to inject new investments and technologies, while also allowing the continued expansion of extraction of oil and gas; and it would also allow private companies to start taking advantage of the large 'renewable potential of the country' (SENER, 2013; Melgar, 2013). Under this new regulatory framework the role of private and public partnerships would increase substantially, a process that promised reducing national debt –in 2012 PEMEX was one of the most indebted companies of the world– while also promising investment in aging infrastructure and capturing resource rents for local development through the creation of new resource allocating funds (Tetreault, 2023).[8] For the electricity industry, this also included the formulation of new regulatory framework that would

[8] Such funds included the Petroleum Fund and the Fund for Hydrocarbon Producing States and Municipalities. For an análysis in this context see: Tetreault (2023).

encourage 'clean energy'[9] generation, investment in the national electricity infrastructure and the reduction of GHG emissions (SENER, 2013; Cámara de Diputados, 2015).

The post-peak condition resonates with what Ferrari and Masera (2020) refers to as "the end of the era of cheap energy". As Figure 1 shows, the rapid expansion of discovery in oil fields in the post-peak condition coincided with the rapid decline in production. In other words, the post-peak condition captures Mexico's confrontation with the complex issues of sovereignty, security, and stability *after* fossil-fuel abundance and its associated development (Breglia, 2013). As a *condition*, the post-peak allows us to capture the interaction of how material and political aspects are embroiled in the reconfiguration of the energy sector, as multinational companies find circumstances ripe profiting from the exploitation of natural resources, while the state, under the neoliberal structural reforms, sees little choice but to expand the privatization process. Despite its usefulness, the post-peak condition still does not say much about how energy regimes are reformulated *after oil*, and how power relations are incorporated into the emerging energy systems.

The work of anthropologist Dominc Boyer (2014) on the concept of *Energopower* offers an analysis of the forms of governance that are enabled through energy and energy systems. Energopower refers to the material foundations that enable the possibility of biopower –the mechanisms through which basic biological features of the human species became the object of political strategy (Foucault, 2007)– to take place by providing the edifices and forces that enable such governance strategies to exist in the first place (i.e. the electricity and fuels used to *power* hospitals and schools). This particular *energopolitical* analysis goes beyond the study of energy politics to explore how energy, fuel and electricity (are used to) govern populations and produce subjectivities (Allan, et al, 2021: 47). A combined analysis of both the post-peak condition with the particular energopolitical regime reveals how such processes lead towards the political reconfiguration of the energy sector bridging discourse, materiality, and history (Boyer, 2014). Applied to the case of Mexico, energopolitics reveals that the declining revenue and the actual

[9] In Mexico the definition of clean energy –included in both the Electricity Industry Law (2014) and the Energy Transition Law (2015)– includes 'renewable' energy sources such as those coming from the sun, wind, hydropower, geothermal and biomass, but it expands to include high efficient combined cycle technologies (which include combustion and steam generated electricity), nuclear power and fossil fuel-based generation paired with carbon capture and storage (see Cámara de Diputados, 2014; 2015).

exhaustion of resources meant that the grip on political power from the Mexican state was also waning. Boyer (2014, 2019), argues that the rampant war on drugs that has raged since 2006 in the country –not coincidentally surging during the first years of the post-peak condition– was a direct result of the Mexican government scrambling to maintain political power. As the government lost its grip on the material and infrastructural basis of its biopower (i.e. the abundance and technologically extractible fuel and cheap electricity), the rapid push for low carbon technologies ultimately translated in an attempt by the government to inaugurate new *resource frontiers* and capture revenues from them, inevitably reshaping the political and spatial character of the energy systems. In a similar attempt to retain legitimacy and control over the population, the war on drugs can also be seen as an attempt to restore biopower, as the signs of terminal illness in the goose that laid the golden eggs became more difficult to ignore.

The energopower analysis stands as the crossroads between discourse, materiality and history (Boyer, 2014) as it enables an understanding of the organization and dynamics of political forces, across different scales, of the interactions between biopower and energy flows. In Mexico, as Boyer points out, there was clear environmentality expressed by the federal government to protect the population from climate change. The dual projects of wind and solar power are expressed –at least at policy level– as means of guaranteeing or improving the health and welfare of environments, economies, communities and individuals. The use of energopolitics is then crucial to animate some of the points this thesis is making. First, it enables an understanding on the role of the government and power relations through shifting landscapes of fossil and low-carbon technologies. Secondly, it also points towards the role of energy infrastructure and its interactions with political power, and the social experience emerging from the material, institutional and discursive reconfiguration of power through the deployment of new technologies. Finally, similar to Foucault's discussion of power, energopower is fluent and moves both ways. In this thesis, albeit not as its central point, it works as a companion that enables a reading of the new forms of extraction and dispossession tied to the advancement of low carbon infrastructure into previously 'wasted' or 'underdeveloped' landscapes. However, it also centers the possibility of creating 'revolutionary infrastructure' (Boyer, 2019:16), or what I would term, the material means for energy autonomy and insurrection: the possibilities of territorially reconfiguring energy systems in terms of scale, ownership and purpose, whilst

centering different epistemic and ontological understandings 'grounded' on a particular place, its history and the possibilities of emancipatory politics.

Thus, the adoption of low-carbon infrastructure in Mexico can only be understood as a direct result of the crisis of the particular energopolitical regime based on the progressive exhaustion of conventional energy resources, and the convoluted process that reshaped the regulatory framework and governance structures while retaining sovereignty, security, and stability. However, as Tania Li (2014: 589) reminds us, transforming something into a resource, that is rendering something extractible, investible, productive or unproductive requires "regimes of exclusion that distinguish legitimate from illegitimate uses and users, and the inscribing of boundaries through devices such as fences, title deeds, laws, zones, regulations, landmarks and story-lines." In the case of Mexico, the energopolitical analysis points to the Energy Reform as the assemblage of materialities, relations, technologies and discourses that have to be pulled together and made to align, to create the basis of a possibility of extracting and taking advantage of a potential.

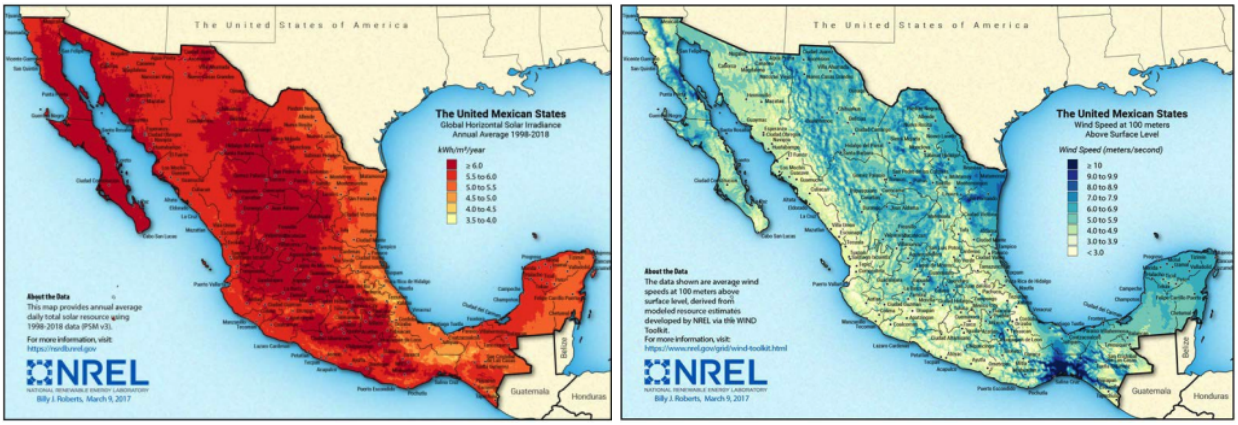


Figure 2: NREL's assessment of renewable energy potential for Mexico.

Source: Bracho, *et al*., 2022.

Drawing on Li's framework, McCarthy and Thatcher (2019: 245) argue that efforts to map *renewable energy potentials* by international institutions such as the World Bank and governments are seen as potential ways that can make particular territories more *legible* by "increasing what states and capitals can 'see' in certain respects (...) while making other things *less* legible, such as existing land uses and claims omitted from many of the maps." They argue

that the graphic and quantitative details of these representations (i.e., maps, graphs, statistics and measurements) create a legibility of places, rendering particular characteristics as valuable and others wasteful in terms of the political economic framework of capitalism (Gidwani, 2013), that is, places are seen as "simultaneously essentially empty (of people with valid claims and significant land uses) and full of potential (in terms of resources and productivity) that can be unlocked with sufficient investment." (McCarthy & Thatcher, 2019: 245) (see Figure 2).

In Mexico these systems were put in place through the regulatory framework of the Energy Reform, which includes the Atlas for Clean Energy Zones (AZEL), and the LTA as a means of securing access to the *cheapest* form or technology available (SENER, 2017a). Understanding the way in which low-carbon infrastructure was deployed also requires a particular assessment of the notion of 'cheapness' for two reasons. On the one hand, it goes to show that capitalism has exhausted the most easily accessible reserves of fossil fuels, increasingly having to rely on new more socio-ecologically harmful methods of extraction, which also entail the investment of more energy and money (Kallis, et al, 2019; Smil, 2019). This is particularly true considering reliance of so-called renewable energy technologies (such as wind and solar) on fossil fuels to extract, assemble, install, maintain and dismantle energy infrastructure, as well as on mining to obtain metals and minerals (Dunlap, 2021). And secondly, it reveals a strategy through which capitalism, through different historical socio-ecological regimes of accumulation, has expanded its reliance on labor-power, energy, food and raw materials that appear as non-commodified 'gifts' which can be exploited at apparently little-to-no cost (Moore, 2015).

While, on the surface, the move towards the incorporation of low-carbon infrastructure gives the impression that the Mexican government had 'no choice' but to move towards low-carbon energy infrastructure as a way of substituting declining hydrocarbon reserves. A process that 'coincidentally' also aligned with a substantial 'drop' in low-carbon technologies costs and an increased international attention to the rising temperatures and impacts associated with climate change.[10] However, the post-peak condition and the energopolitics shaping the governmentality meant almost the exact opposite: The Mexican government did not substitute the dwindling

[10] The drop in prices of renewable energy levelized costs at the time is usually associated with a significant increase in production of solar panels and wind turbines paired with an expected growing demand (Lazard, 2016; IRENA, 2016). However, these costs are usually disregarded and for an analysis of the socioecological supply chain costs and impacts associated with their production (see LeBillon & Spiegel, 2022).

hydrocarbon reserves with low-carbon infrastructure; instead, it added new primary energy sources to the energy mix, inaugurating a new resource frontiers by creating the regulatory, discursive, and legal means to effectively 'cheapen' the generation of electricity by making new spaces and landscapes *legible* for capital investment (Li, 2014; Moore, 2015; McCarthy & Thatcher, 2019). This process was built on the perceived 'wastefulness' of landscapes with *superabundant* high renewable energy potentials (Povinelli, 2021: 5), and the progressive erasure or invisibilization of other other *things* and relations existing in the landscapes (Tsing, 2015).

1.1.1. Low-carbon infrastructure deployment in Mexico

Once the setting in which the Mexican government created 'legibility' for the deployment of low-carbon infrastructure becomes clear, it is important to briefly recall how the process has unfolded over the last two decades. The arrival of low-carbon infrastructure in Mexico can be traced back to a 2003 report by USAID: 'The Wind Energy Resource Atlas of Oaxaca', which established the Isthmus of Tehuantepec, Oaxaca as an "excellent resource (power Class 7)" site for wind energy generation' (Elliott et al., 2003: iv). Since then, the International Finance Corporation (IFC, 2014: 1) has called the Istmo 'home to some of the best wind resources on Earth' (quoted in Dunlap, 2017). Starting from this description the Mexican government, along with a series of private actors, accelerated investment in Oaxaca, particularly a place called "La Ventosa", which literally means (the windy place). Today the region –the wind corridor in the Isthmus– holds at least 29 mega-wind farms –consisting of 1,564 turbines in 32,000 hectares–, mostly developed through international private capital, which generate roughly 90% of wind power in Mexico, of which 74% is produced through the *autoabasto* (self-supplying) scheme (Danieau & Ávila, 2021).

By 2008, the Federal Government pushed for a liberalization of the energy system. Although the effort for a comprehensive constitutional reform failed in the house of representatives, two laws, with a set of limited measures were passed: The Law for the Use of Renewable Energy and Financing for the Energy Transition (LAERFTE in Spanish) and Law Sustainable Use of Energy (LASE in Spanish). Both laws lacked actual commitments and mechanisms that would enable the public or private development of low-carbon technologies. In 2009 the Government passed the first Climate Change Special Program (PECC in Spanish) which set out to develop a modest

amount of renewable energy. Indeed from 2008 to 2012 renewable energy integration grew only marginally (Guzman, 2018). The legislative process regained attention in 2012 when congress enacted the General Climate Change Law (GCCL) producing a new regulatory framework and establishing the national goal of reducing emissions in 30% by 2020 and 50% by 2050 based on the year 2000 (Cámara de Diputados, 2012).

After hosting the 2010 COP-16 Summit in Cancun, the Mexican government moved climate policy to a prominent position, making it one of its flagships and promoting a rapid transition towards low-carbon infrastructure and pushing for a federal mitigation and adaptation program (SEMARNAT, 2009). Through it, the government openly embraced a green economy discourse as a means to solve the climate problem, placing green growth (i.e. through the adoption of efficiency measures and low-carbon technologies to sustain economic growth) as one of its most relevant strategies (Ávila-Calero, 2017; Tornel, 2019). This approach highlighted the need to invest in low-carbon infrastructure and develop market mechanisms to curb emissions for the electricity sector (the second biggest source of GHG emissions in the country - with 24% of the total) (SEMARANT, 2018). The 2013 Energy Reform drew from these previous efforts, but enacted a broader liberalization of the energy sector, effectively allowing private companies in the extraction and exploration of hydrocarbons and the development of electricity infrastructure through a series of bidding mechanisms (such as the oil rounds and the LTA already described). Figure 3 presents a timeline for the adoption of the main regulatory changes since 1992.

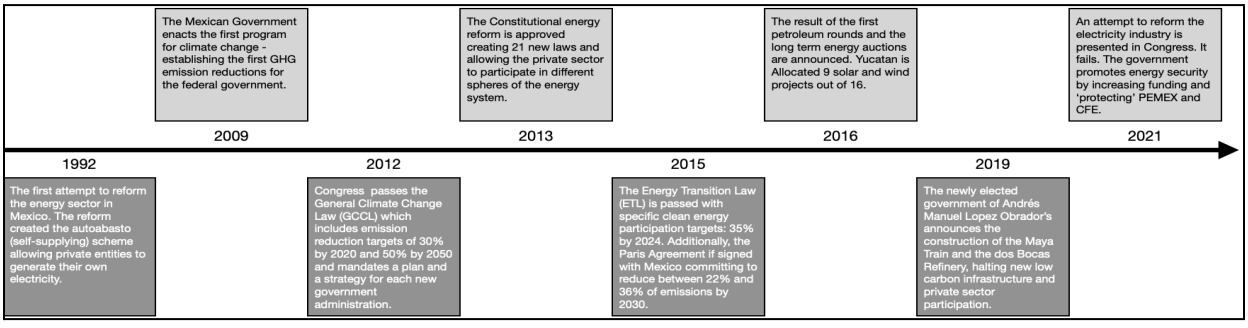


Figure 3: Timeline for the energy sector reforms in Mexico.

Source: The author.

1992 also saw the first changes to the ejido systems in Mexico. Since its origin in 1910, in the context of the Mexican revolution, the ejido system was meant to provide land subsistence to peasant families, creating a communal land ownership that was inalienable and indivisible (Torres-Mazuera, 2022: 347). However, the 1992 reform officially ended the land redistribution process inscribed in the 1917 Mexican Constitution, effectively ending a protection granted by the State over peasant and Indigenous livelihoods (Avila, et al., 2022). The progressive parcellation and fragmentation of ejidos enabled the creation of a legal and illegal market, effectively commodifying and privatizing communal land, and enabling a rapid advancement of corporate interests' access to otherwise inaccessible lands (Torres-Mazuera, et al, 2020). In other words, both the liberalization of communal land and the energy sector in 1992, gave way to a progressive but systematic land grabbing process necessary for the eventual deployment of low-carbon infrastructure in Mexico.

Thus, the liberalization process that started in 1992, culminated in the deployment of 'Petroleum Rounds', which allocated 111 contracts after three rounds. Similarly, the LTA allocated 122 'clean energy' projects in 15 states 70 of which for solar infrastructure and 50 for wind (CNH, 2018; SENER, 2018a) (see Figure 4). Out of the first of these auction rounds carried out by the LTA, 9 low-carbon infrastructure projects landed in the state of Yucatan, a state that offered important solar and wind energy potentials to adapt these technologies into the energy grid (AZEL, 2018) (See figure 2). Justification for the adoption not only came through the legal and regulatory scaffolding that the energy reform created, but was further supported by the adoption of the Energy Transition Law (ETL) in 2015 which included specific *clean energy* targets –25% by 2018, 30% by 2021 and 35%– by 2024 (Cámara de Diputados, 2015).

The regulatory framework, paired with Mexico's recent commitments to reduce GHG emission before the signing of the Paris Agreement in 2015 –to reduce 22% to 36% of emissions by 2030 (SEMARANT, 2015)– can arguably be considered as the discursive, regulatory, political assemblage of elements required for the possibility of making land, through its renewable potential *legible* for capital investment. Lastly, the development and use of AZEL provided the necessary tools to *measure* and *see* the possibilities of extraction embedded within these places, while the LTA provided the material, and financial tools that enabled investment and exploitation of the 'renewable' potential (Li, 2014). In Yucatan, the initial reaction by a few (mostly

government and private sector) actors was that these projects could "benefit" the region, as the peninsula holds one of the highest costs for electricity generation in the entire country, with important indexes of energy poverty in the state (Bracho, et al, 2021: Graizbord and García Ochoa, et al. 2016) in part due to a weak interconnection system with the national grid (Gobierno de Yucatán, 2016) (see Chapter 4). However, drawing on the experience of Oaxaca, several social movements, communities, activist groups and academics began noticing similarities with previous deployment of these projects: local communities argued that the projects had violated their rights to free, prior and informed consent (FPIC), while most of the projects already in place (allocated before the auction process) were designed to benefit private companies (through the self-supplying scheme), and most of them lacked adequate and cumulative social and environmental impact assessments (Articulación Yucatán, 2018; Zarate Toledo, et al. 2019; 2021).

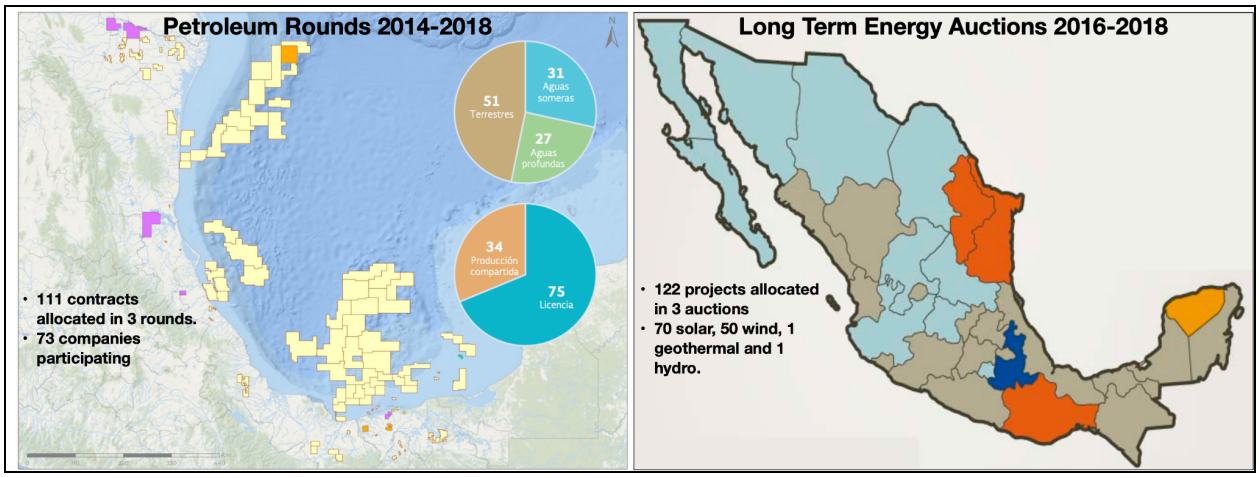


Figure 4: Petroleum rounds allocated in the Gulf of Mexico and states depicting the allocation of low-carbon infrastructure through the LTA scheme. Source: CNH, 2018; Energy Management, 2018; Villarreal, 2019.

The overall assessment was that the legibility provided by the LTA had in fact reduced the costs of electricity generation substantially, but it did so by focusing only on the low-prices offered through the bidding mechanisms and the generation potentials that could be exploited. In other words, while the government did not explicitly mandate the projects allocated through the LTA to be 'clean' or 'renewable', the cost reduction was provided by the possibility of *seeing* landscapes for their potential, while making other things –relations, histories, practices, forms of

living– *less* visible. Moreover, in Yucatan and Oaxaca, the analysis revealed that most of these projects, allocated through the LTA or under the self-supply mechanism, were being deployed in the name of sustainability and climate mitigation, but were generating electricity that would not benefit local populations, but would instead be used to support local businesses or fed into the grid (where the main consumer of electricity is the industrial sector with 58% (PLANEAS, 2021)). By 2019, about half of the energy produced in Mexico originated from the private sector (Planeas, 2021)[11], a process that did not reduce the cost of electricity, tackle energy poverty or increased well-being for local populations. Additionally and according to Zárate-Toledo and colleagues (2021: 10), the deployment of such projects in Yucatan has been accompanied by inadequate access to information for locally affected populations, a lack of measuring of individual and cumulative socio-ecological impacts as well as a lack of spatial planning, specially for fragile landscape and endemic biodiversity.

This trend came to an abrupt halt in 2018 with AMLO's election. As several new low-carbon infrastructure projects were being deployed in the Peninsula, the newly elected government quickly canceled the bidding rounds for new oil contracts and suspended the fourth LTA round, referring to them as "flawed mechanisms that had granted spurious and abusive contracts benefiting only private companies" (AMLO, 2020a). Despite growing opposition, mostly coming from the private sector and a few CSO, the government canceled any new permits for low-carbon infrastructure projects, with the president himself publicly denouncing them as 'the result of corrupt politicians and their disregard for the natural environments and landscapes'. In a video posted on his twitter account, the president called out wind turbines labeling them as 'scams approved by corrupt neoliberal politicians, which generate very little electricity'. In the same video, he goes on to argue that 'no new permits to pollute landscapes like this will be given during my tenure, we will respect nature and avoid this kind of shenanigans' (AMLO, 2020b).'[12]

[11] In 2018 roughly 48% of the generation of electricity in the country was developed by private companies - mainly through the figure of *autoabasto* (self-supplying). In 2020 the federal government mandated that at least 54% of the total generation of electricity must come from CFE, while also instituting a 'dispatching order' giving priority to the state-owned companies to inject their generated electricity into the grid. By 2020, CFE accounted for 46.47% of the generation, with independent producers generating 29.22%, and private producers accounting for 23.83%, the remaining 0.47% corespons to PEMEX (PLANEAS, 2021).

[12] The video posted on AMLO (2020b)'s twitter feed is available at: https://www.xataka.com.mx/energia/amlo-energia-eolica-generadores-afectan-paisaje-no-se-permitiran-nunca-Mexico (Accessed 19 June 2023).

The declarations and the cancellations were met with a series of injunctions and legal contests. However, AMLO's government justified their actions claiming that 'rescuing' PEMEX and CFE was a matter of national security and thus, any cancellations, as well as the deployment of high-profile regional regional infrastructure projects like the two regional trains in the South and Southeast of the country ('Interoceanic' and 'Maya Train', respectively), a new mega-refinery in Dos Bocas, in the state of Tabasco and a new airport in Mexico City, were shielded from any environmental regulations and civil suits (AUSM, 2022). Criticizing the policies belonging to the previous government and arguing that they had put CFE and PEMEX at a disadvantage, in 2021 the government proposed a decree supporting previous declarations to 'strengthen' CFE, mandating that the later must generate at least 54% of electricity in the country (PV Magazine, 2021), while at the same time announcing a national austerity program (that would go on to defund the state's environmental institutions) rapidly increasing funding for PEMEX and CFE, as well as the agencies in changed of building the 4 aforementioned regional infrastructure projects such as the national Tourism Fund (FONATUR) and the National Guard (Tetreault, 2020).

AMLO's plan to 'rescue' PEMEX and CFE is underpinned by a populist agenda against corruption and neoliberalism that shaped Mexico during the last 4 decades. However, as Tetreault (2023) argues, the fourth transformation (as AMLO's government is commonly referred to) has made no significant changes to the neoliberal extractive framework that was set before by previous governments, pushing instead towards a rapid militarization of most aspects of social life (Centro Pro, 2022), and increasing the rate of hydrocarbon exploitation and the developmentalist and regional economic integration agenda that has shaped Mexico's government's for decades. In other words, despite a populist rhetoric focused on 'reversing neoliberalism', corruption and social inequality, the government has left the legal and regulatory frameworks in place, without passing any substantial redistributive policies, opting instead for increasing the size of some government agencies, and defunding others as a response. This process has simultaneously increased the violence and infrastructural harms associated with this development agenda: Since AMLO took office, attacks against environmentalist and land defenders have skyrocketed, with 18 people being murdered in his first year in office, to 30, 54 and 45 in the following years respectively (Global Witness, 2022; Frontline Defenders, 2023).

Just in 2021, CSOs in Mexico registered 582 attacks against environmentalists and land defenders, most of them associated with the deployment and construction of infrastructure projects (including low-carbon technologies) and mining (CEMDA, 2022a).

The overall significance of this section is to present the ways that the energy system has been imbricated with Mexican national life and identity since the early 20th Century. It argued that the regulatory changes are in fact much more than mere decisions based on a simplified dichotomy over energy resources and availability, in fact, changes in the physical, discursive, material and institutional character of the energy system are closely related to the struggles over political power, which has produced a particular energopolitical configuration and power organization around these systems, especially after the post-peak condition. Additionally, it argued that the Mexican government has remained –even with AMLO's rejection of market based mechanisms and discourse on energy security– under a neoliberal framework, providing the basis for hydrocarbon extraction within a framework of classical forms of extractivism (AUSM, 2022). AMLO's government has systematically ignored the post-peak condition and instead doubled down on a short-term national project, seeking to continue the expansion of fossil fuel production, using low carbon technology as a palliative to postpone a biopolitical and energopolitical crisis.[13] Finally, this section has argued that the current configuration of the energy system is creating new socio-ecological distribution conflicts (EDC) as the deployment of low-carbon infrastructure has become more 'visible'. The following section introduced some of the theoretical frameworks that the rest of this thesis and research projects draws on, arguing that, to understand how energy transitions have been deployed in places like Yucatán, it is necessary to first look at the context from which transitions are *starting from*.

1.2. 'Just' energy transitions: starting from actually existing unsustainability

This section briefly introduces the theoretical contributions that shape this research project. First, it draws from the concept of 'actually existing unsustainability' (AEU) (Barry, 2012) as a

[13]Although outside the scope of this thesis, the announcement of the construction of one of Latin America's largest solar farms in the Sonoran Desert in 2022 –as part of U.S. near-shiring efforts in northern Mexico– can be seen as a push towards this palliative use of low-carbon technologies (Arellano, 2023).

starting point to begin to reflect about energy transitions and their uneven socio-ecological, political, cultural and economic impacts. This section highlights how different notions of social justice are ingrained in a particular promise or imaginary of what an energy transition might bring about. AEU enables a specific starting point to assess how different conceptions of justice are perceived and developed. In a nutshell, it reveals that our starting point is not the pursuit of justice in abstract, universal terms, but that place-based and historically-specific *energy injustice* is what characterizes the present situation. The second subsection builds on this narrative but turns to Critical Political Economy (CPE) to highlight *who, how and for whom* energy production is organized and re-organized in a given historical period. This section introduces the notion of 'new energy spaces', that is, the places where social relations under capitalism are being reworked (Bridge & Gailing, 2020) to highlight a need to 'ground' particular understandings of energy relationalities and spatialities. This particular approach enables a critique to the over-infatuation of political economists with the State and instead turns to the *eco-territorial turn* in Latin America (Svampa, 2018) as a way to highlight the relevance of territories and landscapes in their interaction with demands for social justice coming from social and other grassroots movements. The third subsection builds on this framework to introduce the concept of Coloniality of Power (COP) to the analysis of CPE. This section argues that the engagement of CPE with the COP is an essential tool to understand the historical, material, spatial, institutional and political configuration of energy systems particularly in the Global South. The overall goal of this section is to introduce the reader to the main theoretical contexts used as the guiding principles that constitute this thesis. However, this section only introduces the concepts and their role in this research project. Chapter 2 and articles 1, 2 and 3 explicitly engage with them in more conceptual depth.

Following Barry (2012), our understanding of the energy transition must then begin from the recognition that unsustainability is what characterized existing energy systems and not sustainability. In other words, any attempt to study the socio-ecological and political impact of energy systems and their transformations must begin from the recognition that *unsustainability* or *injustice* is the condition that characterizes energy systems. Beginning a study of energy transitions from the perspective of AEU, produces questions of how 'sustainability', 'justice' or in this case 'transitions', in late-liberalism and capitalist societies "become a form of 'simulative

politics', a 'rhetorical politics' which is unable or unwilling to actually confront the economic, cultural, and political causes of unsustainability" (Barry, 2012: 6). In other words, AEU gives way to a particular point of departure, one that offers a 'much more radical, systemic and politically oppositional project' (Healy and Barry, 2017: 452), as opposed to a position such as energy justice which departs from a position in which 'just' outcomes can be created from within the existing regulatory, political and socio-ecological context (see Jenkins, *et al*., 2016).

Looking at the emerging politics of decarbonization and the deployment of low carbon technology, Healy and Barry (2019) argue that an emerging range of injustices stemming from the push to mitigate the pressures of climate change are creating uneven distributional impacts associated with this push (see also Sovacool, 2021). The politics of low-carbon infrastructure are risking ''locking-in' patterns of exploitation and dispossession that characterize the current global political economy built through uneven forms of development articulated around fossil fuel extraction' (2019: 451). Additionally, they center this discussion of the changing power relations on the concept of energy justice, politicizing and bringing attention to the *actually existing injustices* (AEI) that characterize the energy systems. Similar to the use of energopolitics, the concept of AEI is deployed here as a means to center the theoretical and empirical contributions of this thesis. It enables the possibility of historicizing, politicizing and contextualizing energy systems by focusing on how uneven relations of power and politics have played a significant role in their deployment. Without discounting the material character of the energy sources and infrastructure, AEI brings attention to the historical-colonial power relations, the struggles for and against domination and the social, spatial, and political experiences that shape energy systems.

As several authors have shown, low-carbon energy systems are not free of the geopolitical tensions associated with fossil fuels (Blondeel *et al.*, 2021: 12; Vakulchuk, *et al.*, 2020). Solar and wind projects are paraded as ecologically sustainable, environmentally friendly answers to climate change and energy transition (Dunlap & Jackobsen, 2020). However, they also create and exacerbate pre-existing social tensions (Newell & Mulvaney, 2013; Temper et al., 2020), including new forms of land grabbing (Yenetti *et al.,* 2016, Dunlap, 2018), extraction of minerals and mining (Zografos & Robbins, 2020) and the reproduction of violences related to extraction (Le Billon & Middeldorp, 2021). An energy transition heeding justice principles should raise

concerns about social injustices embedded in the multiple frontier-making capacities of energy transition processes (Hornborg *et al*., 2019).

Following Krüger, Eichenauer and Gailing (2022: 2), energy transition and justice differ among many multiplicity of actors and can range from "a status quo-oriented approaches that can call for greening capitalism while leaving global configurations of power and injustice intact, to transformative approaches that aim at overcoming the capitalist system and develop alternative forms of societal progress and social well being". Velicu and Barca (2020: 3) for example, argue in a similar vein when they analyze how, despite a broad adoption of the environmental justice framework and its core tenets –distribution, recognition and participation– critical scholarship has pointed to the limits of this ethical and rights-based politics of justice in which "vulnerable people seem to be invited to buy an equal share of whatever justice is distributed, usually as compensation [where] redistribution, recognition, or participation poorly address the already racialized, patriarchal and militarized political-economic patterns of controlled access to resources". For these authors, matters of justice are defined beyond the traditional liberal framework of energy justice (i.e., the idea that justice can be delivered through the existing institutions via some form of policy reform or government change), instead, they draw on Jaques Rancierè (1999) to argue that justice within the transition process is constituted by a political, antagonistic interruption of the pre-established order. The politics of AEI operates in a similar way, as it calls attention to politicizing energy justice starting from the injustice of the incumbent fossil fuel-based energy systems.

Despite a solid foundation built on the normative principles of environmental, climate, and social justice movements, academic formulations of energy justice often rely on Western, liberal and universalistic notions of justice (McCauley, et al., 2013). While some of the contributors to these specific definition of energy justice have had important contributions to our understanding of energy injustices throughout the entirety of the energy system by separating (or bounding-out) energy related injustice from broader injustices such as climate or environmental concerns (Bickerstaff, et al., 2013), the terms in which justice is discussed are often limited by the very structures that created them (See: Sovacool et al., 2017; Castán Broto et al., 2018). In other words, the inclusion of recognition, participation and distributive measures, rely on a *Western and modern* conception of justice, which assumes a teleological framework or progress (i.e. a

future realization of justice), appears as universal and reproduces the ontological and epistemological assumptions that are reproduced through policies and the nation state (for example, an ontological separation between nature and culture (and other dualisms) and private property) (see: *Article 1*).

Starting from AEI means questioning the historical agency, the structural process and power relations in which these energy systems were developed, their spatial manifestations and the uneven nature of the process of 'transition' itself (Pearce, 2020). Acknowledging that energy systems have a particular legacy of power struggles, differentiated and uneven forms of development (Smith, 2008) shapes the way that these systems manifest physically, symbolically and politically (Kuchler & Bridge, 2018). The result is a much more nuanced political assessment of how energy systems reproduce uneven power relations, and how this will unfold as they change their relationships with landscapes and the different knowledges and perceptions of being and reality that shape them. For example, identifying how infrastructure is attached to imaginaries of Western and modern projects of progress and development (Castán Broto et al, 2018), to energy security and economic neoliberalization (Power & Kushner, 2019); and to other structures of political and (anti)democratic governance (Mitchell, 2011), reveals how energy transitions are usually embedded in broader uneven relations of power shaped by colonial legacies and histories of exploitation and extraction. The next section draws on the aforementioned as a starting point to analyze the way in which energy transitions are analyzed through the lens of Critical Political Economy (CPE).

1.2.1. Critical polítical economy and the 'just' energy transition

A critical political economy of the energy transitions provides useful insights into the drivers of change and the actors that shape how energy systems are produced and how they change over time. These analysis enables a better understanding of the role of the state, international institutions, local and grassroot communities and social movements shape the way that low-carbon energy infrastructure is being deployed and the multiple social, ecological, political, economic and historical meanings are embroiled into their rollout (Baptista, 2018). The political economy of the energy transition is shaped around the questions of "*who*, *how* and *for whom* production is organized and re-organized in a given historical period: the relations of power

which underpin this and what this might imply for current efforts to transition to a different production base with its attendant political implications" (Newell, 2021:29). The approach foregrounds the relations of global power which shape particular institutional configurations and socio-technical possibilities. In other words, the analysis of political economy reveals that the incumbent regime –made up from a coalition of powerful actors and their interests– that benefit from the on-going reliance on a fossil fuel economy will not give up their position easily (Newell, 2019).

This analysis, not only allows a better understanding of how incumbent actors are capable of influencing politics and policy, by blocking change in order to maintain a particular formulation of the transition taking place (Baker, et al, 2014). This process is simultaneously aided by a hegemonic understanding of the transition that usually imposes the will and interest of the incumbent powers, subduing and disciplining radical calls for transformation by absorbing them into complacent, superficial and incremental changes, in other words, a *passive revolution* (Wanner, 2015; Spash, 2021). Starting from AEI means engaging with what appears as the backdrop in which energy transitions are taking place (in this case, a tendency towards extractivism), and how different actors hold a diverse set of interests in radically reshaping energy systems to either hindering any possibility of transformation by ensuring that shifts which do occur do not disrupt prevailing social relations and distributions of political power, or by contesting and bringing disrupting the predominant status quo (Newell, 2019).

At the international level the International Energy Agency (IEA, 2020), the United Nations Framework on Climate Change (UNFCCC, 2021), transnational corporations and national governments are calling to reduce the amount of greenhouse gas (GHG) emissions coming from the energy sector, as it is a major driver and central to mitigating such emissions and reducing climate change (IPCC, 2023). This has brought an important amount of attention to the role of energy, one that has not been seen since the 1973 oil crash (Huber, 2015). This perception is revelatory, not only because it sheds light on what appeared to be invisible: The reliance of fossil fuels that has shaped our spatial, social, economic and political realities became evident as the climate crisis revealed the actual physical limits that shapes it (Malm, 2016) (i.e. *AEI*), but because, after years of climate change meetings and a myriad of market-based mechanisms,

emissions have risen over 65% in the last 30 years (Stoddard, et al. 2021; Swyngedouw, 2022). As Abramsky (2010: 7) argues, only *unwanted degrowth* (or capitalist crises) has had the effect that these meetings have sought to achieve. And yet, the hegemonic discourse of the energy transition maintains the illusion that it will be possible to sustain current levels of energy consumption, and to continue to grow without a particular limit in mind (Smil, 2019).

In a form of *cruel optimism* (Berlant, 2013) the transition is framed as the possibility of maintaining societies that rely on the relative abundance of energetic content of fossil fuels, *without* fossil fuels (After Oil, 2016). The tensions that emerge from the study of political economists on this matter has been dominated by first, analyzing the forms of material, institutional and discourse power deployed by the incumbent actors to sustain their hegemonic position (Newell & Simms, 2021) and by considering how energy transitions posit a set of trade-offs between the speed and inclusions –as the pressures that arise from the urgency to decarbonize increase because of the deepening climate crisis–, in contrast to a rapid call to for adding 'justice dimensions' –such as who is included, how and through what mechanisms) to the transition process– (Sareen & Haarstad, 2018; Newell, et al. 2022). Such questions are usually translated into who are the 'winners' and who are the 'losers' of the transition process (Newell & Mulvaney, 2013), or to approximations seeking to identify *who* are the 'victims' of such a process (Sovacool, 2021). This however, tends to focus on *how* energy systems are organized, and tends to leave questions of how they *should be* organized unanswered (Lohmann, 2019).

As Peter Newell (2019: 27) explains, the dominant strain of the debate over how the energy transition process should be designed and actually take place, has been captured by a form of *trasformismo* by the incumbent hegemonic powers, that is by a discursive framing that enables them to narrow down radical calls for transformation into incremental and at times glib propositions such as 'green growth'. This particular understanding of the transition process is in part due to a socio-technical approach that for years prioritized technological and financial matters over politics and power (For a critique see: Shove & Walker, 2007; Meadowcroft, 2009; Newell & Mulvaney, 2013; Sareen & Haarstad, 2018; Bridge & Gailing, 2020) and that understood the energy transition as a series of stand alone variables. While this will be explained in more detail in Chapter Two, suffice it to say that, as James McCarthy (2012: 616) argues, the main contribution of political economy was to understand socioecological problems dialectically,

that is, in relational, processual and political terms instead of absolute, quantifiable, and discrete variables and limits.

This dialectical understanding is precisely what infomes both the CPE, as it highlights the spatial configuration of energy transitions as some places expand their demand for energy, while others are usually sacrificed in an attempt to cover and meet the rising metabolic (materials and energy) demands (Zografos & Robbins, 2020). Bridge and Gailing (2020) build on the spatial character of the energy transition process from a CPE by arguing that it is in these places –where low-carbon infrastructure is being deployed– where social and political relations under capitalism are being worked out. In other words, their analysis suggests, not only that energy transitions are ultimately a matter of space, but that these interactions, which are usually understood as Ecological Distribution Conflicts (EDC) (Martinez-Alier, 2021) in fact provides the basis of what can inform our understanding of the transition itself: a conception of what can be consider 'just' and the relational or grounded basis that constitutes such interactions with energy (Lohmann, 2019; Cariou, 2017).

Thus, CPE offers the possibility of looking at the energy transition from a historical, dialectical and political approach. As opposed to a simplified way of engaging with energy transitions as mere substitutional dichotomies (as will be explain further in Chapter Two), this approximation allows to 'see' *who* is in power, *what* are the ways in which the particular coalitions of actors seek to circumvent and prevent changes that could threaten their incumbency and, likewise, it also enables a possibility of looking at *how* different actors seek to contest and shake the incumbent regime of its hegemonic power (i.e. becoming counter hegemonic movements). Although useful, this approach, very much like the case of energy justice in the previous section, remains wedded to a teleological vision of progress and justice (Velicu & Barca, 2020), one that often downplays the existence of AEU and that often relies on the nation-state –the quintessential modern institution– to deliver the changes required for this transition to take place. The following section, engages with the notion of the Coloniality of Power (COP) and the decolonial/territorial turn in Latin America to argue that such omissions can effectively sustain and in fact affirm the politics of AEU particularly in the Global South.

1.2.2. The coloniality of power and its interaction with energy systems

In the previous sub-section, I dealt with the concept of Critical Political Economy (CPE) and its relevance for understanding how energy systems are shaped by different actors and the uneven relationships that emerge from these interactions. While the previous section argues that the focus of CPE on power relations, and more specifically in the spatial dimensions and interactions that emerge from the transition process, can enable new ways to inform how transitions, justice and energy itself are understood, this section argues that such possibilities become much more clearer when they are approached through what Latin American sociologist Anibal Quijano (2000) called, the Coloniality of Power (COP). This section introduces the concept and proceeds to argue that including this dimension enables an additional *layer* to our understanding of how AEI defines the current condition of energy systems, especially coming from the Global South where energy systems are inherently linked to previous colonial and capitalist regimes and forms of extraction and accumulation (Fraser, 2022). Additionally, this section argues that adding a layer of analysis based on the COP can reveal how CPE can contribute to pluriversal struggles based on the political nature of emancipatory politics and post-development alternatives attached to the *societies in movement* resisting the advancement of extractive practices in their territories (Zibechi, 2012).

Most work on socio-technical energy transitions has typically focused on the Global North making assumptions "about the nature of state capacity, markets, institutions and infrastructural systems which do not hold in other non-western and northern contexts" (Power et al., 2016: 12). Concerns over energy systems, their transition towards low-carbon infrastructure and the principles of justice that shape the process have thus surfaced from the experiences of the Global North, which are mostly centered on and around a lack of effective participatory mechanisms, the failure of deliberative democracy or distributional injustices, and a dichotomy between speed and inclusion (Mulvaney 2019; Milbourne & Mason, 2017; Newell, et al. 2022) on the one hand, and lack of access, equity and sustainability on the other (WEC, 2015; UN, 2015; IEA, 2020). In other words, concepts of energy justice, transitions and energy itself are broadly built on epistemic foundations of a Eurocentric and modern conception of environmental justice, relying on resource management strategies that are wedded with a liberal framework that rests upon an unwavering commitment to capitalist modernity, development and progress (Hesketh, 2021).

The term *Coloniality of Power* (Quijano, 2000) refers to a historic repertoire of cultural, spatial, and signifying systems that stigmatize and depreciate worldviews for the purposes of another's health, development, safety, profit, and pleasure. The COP operates through the codification of racial difference between Europeans and non-europeans and the universalization of Western/modern institutional forms of power to organize the international division of labor and production (Álvares & Coolseat, 2020). Not coincidentally, Quijano and Wallerstein (1992) argued that the origin of capitalism can only be explained through the inclusion of the Americas into the world system, a process that would later come to shape the COP. Despite acknowledging a colonial past, conventional frameworks on environmental and energy justice do not account for how injustices in the energy system interact with persistent colonial power and violence in the Global South. Similarly, discussions about energy transitions rarely consider the colonial and post-colonial path-dependencies and historical contingencies of energy systems in need of transformation (Baptista, 2018: 31). A decolonial approach to energy transition and energy justice would require reckoning with how the values, violence, and structures of coloniality shaped and continue to mold energy systems and the definition of *energy* itself.

The COP is part of a broader system of hierarchical codification of difference, what Walter Mignolo (2018) calls the Colonial Matrix of Power (CMP). The CMP operates through power itself, that is, via the imposition of particular normative frameworks like justice, development and progress, or through institutions and conformations like the nation-state to appear universally valid and superior. But it also appears in the form of a *coloniality of knowledge*, a system that imposes a particular hierarchy and superiority distinguishing between European and non-european forms of knowledge aimed at making the latter appear naturally inferior; through the *coloniality of being*, through mechanisms of subjectivation on the life, body and mind of the "colonized" or marginalized people (Rodríguez, 2021: 85); and through a *coloniality of gender*, the imposition of a modern gender system that enables the colonial exploitation of bodies and gender hierarchies (Lugones, 2008).

Despite acknowledging the existence of a colonial past in other settings, discussions over energy transitions rarely consider colonial and post-colonial path-dependencies and historical contingencies of the energy systems that they seek to transform (Baptista, 2018: 31; Castán Broto, et al, 2018; Allen, et al, 2021). From this perspective, a decolonial approach to energy

transition requires reckoning with the ways that values, violence and structures of coloniality shaped and continue to mold energy systems, their 'transition' and integration of low-carbon infrastructure and the notion of *energy* itself, all of which have become entangled with a colonial past and the persistence of a CMP –through power knowledge and being– persists in the present. In the case of Mexico, this project requires revisiting the historical agency that has shaped the physical, material, political and socio-ecological characteristics of energy systems over time, accounting for how the energy system has been instrumental in reproducing multiple forms of violence (cognitive, ontological, physical, cultural, gender, etc.) and how this has informed and enabled forms of governmentality, internal colonialism and oppressive political powers to operate within the country (Turner, 2018).

One of such processes is the cost-shifting and value-determining strategies embedded in the CPE analysis of the energy transition process. Because the transition is wedded to a conception of capitalist development and an unwavering commitment to economic growth. The dialectical character of capitalist modernity is constantly shaping what has value and what has not. As Marco Armiero (2021) argues this is a 'wasting relationships' between people and places, sustained by how, for example, 'renewable energy potentials' are mapped and new energy spaces are created around them. Mapping such places or presenting them as exceptional or special zones of development, has to make determinations about the relative value of land use and what is deemed to be 'marginal' or 'backward' under official categories (McEwen, 2017; McCarthy & Thatcher, 2019). Such a process necessarily entails a form of violence as it inscribes boundaries through devices that are both material and immaterial, institutional or symbolic such as fences, title deeds, laws, zones, regulations, landmarks and story-lines (Li, 2014: 589). In other words, rendering something 'extractible' or 'legible' can only be done through a matrix of symbolic, physical and representational violence. It is through the colonial gaze that landscapes, territories, populations, and plant and animal life can be reorganized into extractible data and natural resources for material and immaterial accumulation (Gómez-Barris, 2017: 5).

Bringing this discussion to the AEU of energy systems, allows one to look at the transformation of energy systems from a historical/colonial perspective, but simultaneously bring multiple questions that can inform and challenge the hegemonic, incumbent or dominant frame that shaped the energy transition process: What are the possibilities of other forms of spatial,

political, material and ecological forms of organization that have been systematically obscured by a hegemonic view of the transition, by the liberal configuration of justice and by the notion of energy itself? Are there other forms of *relating* to energy that have been excluded from this process?, when thinking of the energy transition as a metabolic relation, are spaces with high energy potential not '(in)visible' and/or 'wasted' for certain groups for the benefits of others? And if so, who gets to decide these outcomes? Bringing concerns about energy, transitions and justice to the discussion of coloniality which, as Mignolo (2018) argues, constitutes the often unaccounted 'dark side' of modernity, then poses the question of how can energy systems and their transitions be understood from a decolonial perspective? This question is further discussed in Chapter Two, while the following section draws on this brief theoretical discussion and the contextual framework presented at the beginning of this chapter and turns to the overall aims and objectives of this research project.

1.3. Research aims, objectives and questions

The overall aim of this thesis is to explore how the reconfiguration of space resulting from so-called 'energy transitions' processes drives unequal forms of development and creates new forms of violence and injustice. By analyzing the multiple ways in which energy systems are shaped by the CMP and a long history of colonial extraction in Mexico, this thesis explores how concepts like energy, transition and justice are usually presented uncritically normalizing capitalist relations, presenting them as universally valid. It asks the question:

How can struggles against low-carbon infrastructure inform multiple understandings of justice, energy and transition from a decolonial perspective?

This thesis seeks to understand the limitations and structural contradictions of the incumbent energy regime and the hegemonic discourse that constitutes the *actually existing* energy systems. Informed by the conceptual framework of decoloniality, and drawing on literatures from political ecology, energy geography and the political economy of energy transition, the aim of this PhD thesis is to identify how different forms of representing, experiencing and inhabiting territories and energy landscapes are (not) considered in the deployment of low-carbon infrastructure in the southeast of Mexico. Indigenous, peasant and community owned lands (ejidos) are front and center in this process: capital investment and resource extraction for the process of energy

transition are enclosing and transforming these landscapes. Accordingly, the aim will be pursued through the following three research questions:

1. How are various modes of conceptualizing, imagining, representing and inhabiting energy landscapes by peasant and Indigenous communities incorporated and/or contested by the state through institutionalized, material and discursive practices?

2. Through what instruments, techniques, actions, and policies are concerns of energy justice distribution, recognition and participation- addressed by the Mexican government? and do these instruments offer a space for dialogue between different epistemologies and ontologies or are they used to sustain different forms of exploitation, accumulation and domination?

3. How can the concept of energy landscape, seen from a decolonial perspective, challenge existing notions of energy justice and open up new terrains for inquiry, design and relational meanings of what constitutes the right to the landscape around the deployment of large-scale low-carbon technology projects in the Global South?

These three research questions were developed with Mexico and Yucatan in mind. As several authors who have studied the political ecology of the energy transition have shown (Howe & Boyer, 2016; Ávila-Calero, 2017; Dunlap, 2018; Hesketh, 2021), the deployment of low-carbon technologies in the south of Mexico follows a distinctive transformation: it is simultaneously informed by the regulatory framework within the country, a particular set of practices in the ground and a shift in international discourse towards an urgency over the rapid substitution of energy sources and a pursuit of sustainability.

This thesis specifically responds to a call for more empirically-grounded research on a decolonial praxis on the one hand, and applied analysis of energy justice on the other (See: Mignolo and Walsh, 2018; Grosfoguel, 2018; and Castán Broto et al, 2018, respectively). As such, the purpose of this thesis is to understand how low-carbon infrastructure can effectively contribute to build a notion of energy justice that it detached from its Westernized, universalized and colonial origins, to instead constitute the basis for emancipatory struggles that are more broadly focused into the

struggle for autonomy, radical democracy and emancipation (Escobar, 2020; Gutierrez Aguilar, 2020; Esteva, 2022).

Table 1: Research Aim, Research Questions and Analytical Domains

<table>
<tr><th colspan="3">How can the struggles against low-carbon infrastructure inform multiple understandings of justice from a decolonial perspective?</th></tr>
<tr><td colspan="3">The core argument is that the notions of energy and justice continue to be defined through a Western-liberal framework, one that remains committed to a universal and uniliner vision or a singular world. A critical-decolonial approach seeks to question how this particular understanding of energy justice normalizes capitalist modernity and, drawing on a series of case studies, reveals what is being done to unsettle or decolonize these ideas.</td></tr>
<tr><th colspan="3">Research questions</th></tr>
<tr><td colspan="3">1. How are various modes of conceptualizing, imagining, representing and inhabiting energy landscapes by peasant and Indigenous communities incorporated and/or contested by the state through institutionalized, material and discursive practices?

2. Through what instruments, techniques, actions, and policies are concerns of energy justice distribution, recognition and participation- addressed by the Mexican government? and do these instruments offer a space for dialogue between different epistemologies and ontologies or are they used to sustain different forms of exploitation, accumulation and domination?

3. How can the concept of energy landscape, seen from a decolonial perspective, challenge existing notions of energy justice and open up new terrains for inquiry, design and relational meanings of what constitutes the right to the landscape around the deployment of large-scale low-carbon technology projects in the Global South?</td></tr>
<tr><th colspan="3">The analytical domains of decolonial politics and their objectives</th></tr>
<tr><th>Political economy of the energy transition</th><th>Extractivism and decolonizing energy justice</th><th>Political ecology/ontology, energy landscapes and new energy spaces</th></tr>
<tr><td>How are energy systems organized? Who determines how these systems are organized? And what are the struggles to define how</td><td>How is a universalized notion of energy justice at odds with the historical and political reality in places like Mexico and Latin America? What do</td><td>How do energy systems reproduce geographical differentiated experiences? Do they enable the possibilities for radical</td></tr>
</table>

energy systems *should* be organized?	struggles against energy infrastructure reveal about pursuing a 'just' energy transition under a context of actually existing unsustainability (i.e. extractivism)?	emancipation and transformation? /or do they further (or create new forms of) cultural oppression and physical, ontological or epistemological violence?

Source: The author.

1.4. Thesis outline

This chapter has introduced the contextual background starting from anecdotal observations and offered some of the key issues and windows into what shapes the theoretical discussion of this thesis. Chapter Two outlines the theoretical framework and the contextual setting of this thesis. Additionally, Chapter Two presents a decolonial approach to the study of energy transitions in the Global South, dealing with the role of politics shaping the energy transition and the colonial legacies of power embedded in energy systems and their interactions with the transformation of landscapes. The chapter offers an engagement with the multiple ways in which energy policy, infrastructure and the enterity of the energy production-chains are bound-up in the transformation of landscapes.

Chapter Three covers the research design, by highlighting the selection of methodological tools, outlining the empirical data and identifying some of the main limitations of doing research at a distance. This chapter outlines the research setting, the main methodologies and the empirical sources as well as my research process (including materials and methods) while also highlighting my own positionality as a researcher and some other ethical considerations while undertaking this endeavor. Chapter Four presents the articles that constitute this thesis by offering a small introduction to each, and showing how the articles come together to offer a theoretical and practical analysis of the study of energy transitions in the Global South. This then is taken up again in Chapter Five, which presents the main findings of this research highlighting the key results, identifying some of the gaps in the literature addressed through this thesis and presenting some of the main points that would constitute a further research agenda for the study of energy transitions in the Global South.

It should be noted that the articles reproduced after the *Capa*, provide further details on the methodologies chosen to research these topics, on the empirical material (i.e., direct quotes from the interviews), theoretical arguments and other findings that are presented in a simplified version in this Capa. The first article is a theoretical contribution, which is essential for the rest of the articles, and thus it is recommended that the articles be read in order. Articles two and three provide a balanced format that includes theoretical contributions and detailed case study

analysis. Article four was co-written with members of the community of San José Tipché in an effort to convey their struggle for their territory in their own words. The four articles are presented in order as part of this thesis following the '*References*' section of this Capa. The articles appear here as the manuscripts that were submitted to the article's corresponding journals and each article contains its own references, style and format as per the rules of each of these journals.

2. Theoretical perspectives and analytical domains

This chapter provides an insight to the main theoretical perspectives that inform this research project. The first section examines the role of CPE in the study of energy transitions highlighting some of the main virtues of this approach –which consist on a progressive, albeit slow, shift in attention from the technological and financial possibilities that shape energy systems, to centering politics and uneven power relations as the main point of entry for the analysis–. This section also introduces some of its limitations focusing on the over-infatuation with the State and market as the main actors that shape, transform and destabilize the energy transition process. It introduces the concept of green extractivism (Verweijen & Dunlap, 2021) and, drawing from the previous chapter, it expands on the notion of new energy spaces (Bridge & Gailing, 2020) as a way to engage with other places that might exert influence on how energy transitions are designed based on a relational and structural approach. The second section, draws on the decolonial turn in Latin America to address the main limitations identified in the CPE literature. It reveals how energy transitions are bound to a teleological, universal and eurocentric conception of modernity, thus erasing and obscuring other forms of being, doing and knowing that do not fit within this particular framework. The third section, draws on the CMP critique to the energy transition process to argue that political ontology –understood as the multiple worlding practices often excluded by political ecology and political economy, that constitute the basis of antagonism in politics between humans and non-human beings– can contribute to how energy transitions are understood and designed.

Section four explicitly engages with the concept of energy justice. After introducing the concept, it highlights how the frameworks introduced before interact to shape a particular definition of energy justice that: a) draws on CPE's analysis of power and engagement with new energy spaces; b) includes a CMP critique of energy transitions, which reveals that energy systems are the result of histories and power relations tied to previous attempts to occupy and grant access to particular places, and c) engages with how socioecological conflicts are in fact epistemological, material and ontological in nature, expressing how differences transcend the simplified dichotomies that shape energy transitions and definitions of justice. The final section shows how this framework is reproduced in the articles that constitute the body of theoretical research for

this thesis and shows how a definition of energy justice would have to take these three contributions into account. This last section also gives a broad overview of how this is addressed in the rest of the *Capa*.

2.1. Critical political economy of energy transitions

Previous attempts to understand energy transitions mainly focused on its socio-technical character, dispersing attention from the political and power relations that shape energy transitions. Despite integrating the interactions between society, energy, power and politics, these frameworks remained overwhelming focused and tied to changes associated with the market, finance or the availability of new technologies and resources as the main drivers (e.g. solar or wind power, scarcity or availability of land or minerals (Wrigley 2010; Brenner, 2007)). The most widespread approach for analyzing these interactions is the Multi-Level Perspective (MLP) which studies the governance and interaction of technological innovation 'niches', national-level management 'regimes' and some external pressures, which are usually referred to as 'landscape' (Geels, 2010; Geels, et al., 2016). The overall consensus of this approximation is that, for energy transition to occur, "reconfigurations must happen at every level of socio-technical systems concurrently. Considerable focus is placed on the local 'niche' level of technological innovation as the initial source of socio-technical change" (Pearce, 2021: 953). However, approximations like the ones proposed by the MLP have systematically failed to engage with politics and power relations, falling back on a 'socio-technical' understanding of the transition process, ignoring or at best acknowledging, but not necessarily incorporating, the political dynamics and power relations that define them (For a critique see: Shove & Walker, 2007; Meadowcroft, 2009; Barca, 2011; Sareen & Haarstad, 2018).

The use of CPE to study energy transitions has emerged in part as a direct response to these oversights, focusing instead on addressing questions related to who controls the decision-making processes and through which means it is possible to govern (and which are not) energy systems and transformations (Newell, 2020). As James McCarthy (2012: 616) argues, the main contribution of political economy was to understand socioecological problems dialectically, that is, in relational, processual and political terms instead of absolute, quantifiable, and discrete

variables and limits. In other words, CPE views transitions as historical-materialist and power-laden processes shaped by economic, political and socio-cultural dimensions, paying close attention to its contradictions and limits (Gill, 1993: 16). Given the centrality of energy and its relationship to the state, geopolitics and international relations, a CPE approach to energy transitions offers an understanding of transition processes from a historical, institutional and material point of view (Newell, 2021).

This approach highlights how changes in sources and technologies, along with the physical (infrastructures) and spatial manifestations of energy systems, are associated with the power relations that shape contemporary capitalism (Bridge & Gailing, 2020). As Newell and Simms (2021) argue, the relations, tensions and power imbalances between multiple actors and groups such as governments, transnational corporations and social movements at different scales, offers a broader analysis of how historical, political, social and economic, as well as technological conditions, inform our understanding of how energy transitions take place. The theoretical tools enabled by CPE are the possibility of recognizing, interpreting and acting on the problems that emerge from the overwhelming consensus of transitioning away from fossil fuels and the role that the multiplicity of actors play in either progressing or hindering these transformations.

Drawing on these contributions, there are four main ways in which CPE informs this study of energy transformations. First, by focusing on the differentiated character and uneven distribution of benefits and harms, as well as the agency and of particular coalitions of power that either enable or hinder the transition process (Newell & Mulvaney, 2013; Roberts, *et al.*, 2018). CPE questions how power relations are maintained. Using this approach to study energy transitions explores how, for example, certain framings of the energy transitions themselves maintain the status quo. As Peter Newell (2019: 28) explains, energy transitions are usually mediated by power relations that either enable or frustrate progress towards system transformations and the adoption of new technologies (i.e. low-carbon technologies). Incumbent actors mobilize and exercise their influence as a way to narrow the debate into a form of *trasformismo* or "the ability to accommodate pressures for more radical and disruptive change and to employ combinations of material, institutional and discursive power to ensure that shifts which do occur in socio-technical configurations do not disrupt prevailing social relations and distributions of

political power." Such an approach highlights how particular configurations of power are deployed by incumbent actors to narrow transformative challenges and proposals and convert them into piecemeal, top-down approaches that operate as affirmative or redistributive reforms –that is, by affirming the preexisting order and seeking to change it from within– (Fraser, 2003).

Secondly, by understanding transitions as historical, metabolic and interconnected in character, which operate as a cost-shifting strategy creating uneven but interconnected impacts between places (Cederlöf, 2021; Zografos & Robbins, 2020). As several authors have shown, low-carbon energy systems based on low-carbon electrification are not free of the geopolitical tensions associated with fossil fuels (Blondeel et al., 2021: 12; Vakulchuk et al., 2020). Solar and wind projects are paraded as ecologically sustainable, environmentally friendly answers to climate change and energy transition (Dunlap & Jackobsen, 2021). However, they also create and exacerbate pre-existing social tensions (Newell & Mulvaney, 2013; Temper et al., 2020), including new forms of land grabbing (Dunlap, 2018; Yenetti et al., 2016), extraction of minerals and mining (Zografos & Robins, 2020) and the reproduction of violences related to extraction (Le Billon & Middeldorp, 2021). This conceptualization of energy relies on the colonial notion of *terra nullius* (Blaser & De la Cadena, 2018) and the "sacrifice" of extractive zones required for capitalist expansion (Gómez-Barris, 2017). It obscures and obfuscates how race, gender, class, and space underpin the physical and material manifestation of energy systems and how marginalized communities are disproportionately impacted by the universalistic temptation to abstract, alienate, and commodify energy.

Third, by analyzing the inherent interconnection of energy with the state as an 'environment making institution' (Parenti, 2015) by how policy-making decisions transform landscapes and vice versa (Nadaï & van der Horst, 2010), and how capitalist relations are reworked in these particular places. The energy transition process is understood as a geographically differentiated phenomenon, one that manifests through different sites and scales that constitutes space through its interactions with one another (Bridge & Gailing, 2020: 1038). The spatial character of the energy transition –that is, the physical manifestation over time of one dominant socio technical energy regime to another– is constituted by what Bridge and Gailing call: new energy spaces: "novel combinations of energy systems and social relations creating social challenges to

high-carbon incumbents and marked by the creative-destructive effects of low-carbon technologies." (Bridge & Gailing, 2020: 1038). This socio-spatial approach reveals much more than the physical and material transformation of space through and around energy systems, but enables a broader understanding of the energy transitions as spatially, historically and political specific processes, which harbors possibilities for emancipation, democratization, autonomy and total liberation by the reorganization, contestation and reformulation of new and old energy regimes, or the reconfiguration of extraction, oppression and injustice.

Finally, by analyzing the crisis tendencies of capitalism, which manifest around spatio-temporal fixes and the reconfiguration of space as new energy/extraction frontiers (McCarthy, 2015; McCarthy & Thatcher, 2019). The value of CPE is in how it can access power relations, and how it offers a vantage point for critiquing key terms around energy transitions, including notions such as ‘energy’ and ‘transition’ themselves. As Kuzemko and colleagues (2019: 4) argue, energy has largely been understood as ‘an exogenous factor that requires no special conceptualization (...)’ a process that requires ‘recognizing how combinations of ideational, institutional and material sources of power are changing at different levels of governance in ways that defy the imposition of a universal template when answering the apparently straightforward question of what energy is.’ As Larry Lohmann (2019:4) explains, energy as a thermodynamic concept, has always been about "a particular pattern of exploitation of human as well as nonhuman beings" (Lohmann, 2019: 4) a process that is historically shaped by capitalism's socioecological regimes of accumulation. Nancy Fraser (2022: 92) shows how the integration of non-human labor (i.e. animal muscle), colonial and imperialist politics, fossil fuels and the rise of financial capitalism has reshaped the ways that capitalism organizes the economy/nature, value/waste relations over the last 500 years. This becomes evident in the way that capitalism transformed capital-labor relations with the introduction of coal (Malm, 2016), the democratization of politics through coal- extraction-production chain, and the imperial ambitions with oil (Mitchell, 2011), shaping everything, from spatial manifestation of capitalist modernity, to neoliberal subjectivities (Huber, 2013), to forms of biopower related to the availability and material infrastructure that enables modern political forms of governing and control (Boyer, 2014).

These four characteristics can be applied as a countermeasure to engage with the idea of 'high-energy modernity', a situation in which, as Jaume Franquesa (2018) reminds us, energy has long remained invisible in modern capitalist societies. This ''invisibility' alienates energy from its socio-ecological context, making it appear as an abstract standalone entity. This is a key feature of any plantation economy (Tsing 2015: 5-6)—a process that simplifies landscapes into standalone assets where "everything else becomes weeds or waste." Whereas previous attempts to understand transitions as technical in nature tended to reproduce this narrative, CPE opens a much more nuanced understanding of energy transition, showing how particular places are made *legible* for capital investment and the many "regimes of exclusion that distinguish legitimate from illegitimate uses and users, and the inscribing of boundaries through devices such as fences, title deeds, laws, zones, regulations, landmarks and story-lines" (Li, 2014: 589).

These places or 'zones' –which often appear to be extemporaneous or exceptions from the prevailing laws and regulatory systems (McEwen, 2017)– often require the incumbent's power coalitions to create new spatial-fixes that ease capitalist crisis tendencies of accumulation by temporally displacing them (McCarthy, 2015). However, these processes are increasingly anchored on violent militarization, coercion, and dispossession to secure access to (grabbed) land (i.e., 'green sacrifice zones' (Zografos & Robbins 2020) a role that is usually produced via legitimate or illegitimate means. This is key to understanding how energy transitions are both conducive and result of capitalist modes of operation that usually manifest in terms of extractivism (Mezzadra & Nielsen, 2019) or through spatial-fixes and the expansion of sacrifice zones.

2.1.1. Limitations of the critical political economy perspective

Despite the aforementioned contributions, the work of CPE has maintained three key limitations: First, the energy transition literature makes assumptions about the nature of the transition which come mostly from the Global North, and thus relies on a westernized and universalized tool box that might not be applicable elsewhere (Castran Broto, et al., 2018). Secondly, the use of CPE often exposes the power coalitions that constitute incumbency and either hinder or advance energy transitions, but it often fails to examine the nature of the state and its relationship with

capitalism, presuming that energy transitions can be mediated by taking state power or through policy changes from the top-down (see Sovacool & Brisbois (2019) as an example). Finally, CPE has also opened up the possibility of critically engaging with historical, spatial and political ways in which energy systems are built, but it has often maintained an uncritical approximation to the notion of energy itself. Starting the analysis from actually existing unsustainability (AEU) (as described in Chapter One) would then entail engaging with these three limitations as a way to enrich how CPE expands our understanding of energy transitions in different places.

The teleological argument that sits at the core of capitalist modernity (that is, the stageist process of progress/development) means that most work and analyses on socio-technical energy transitions has typically focused on the Global North, making assumptions "about the nature of state capacity, markets, institutions and infrastructural systems which do not hold in other non-western and northern contexts" (Power et al., 2016: 12). Concepts such as energy transitions and energy justice are broadly built on the epistemic foundations of a Eurocentric and modern conception of environmental justice and the transition process often relies on resource management strategies that are wedded with a liberal framework that rests upon an unwavering commitment to capitalist modernity, development and progress (Hesketh, 2021). The next section will deal with this issue in more detail, for now suffice it to say that main problem of CPE can be rooted on an unwavering commitment to modernity and the continued adoption of some of its core characteristics (i.e. the stagist belief in progress, the separation between nature and culture and the adoption of a narrow universal view of the world).

Secondly, as Dunlap (2021b) argues, terms such as 'energy transitions' and 'renewable energy' largely invisibilize the structural networks of harm and violence that are attached to the process of decarbonization. Such impacts can be located throughout the supply-web harms (from mining and mineral extraction, to the use of fossil fuel for their ensemble, installation and maintenance) to the ones produced by the energy infrastructure itself intersecting with ecological impacts spatial occupations, dividing rural populations and police repression (see also Dunlap, 2021; 2019). In reality it is hard to argue that there is such a thing as an energy transition in the first place. First, there has been no actual substitution but 'addition' of primary energy resources (Bonneuil & Fressoz, 2016:1) a process that has in turn not yielded any emission reductions over

the last 30 years (Stoddard, et al, 2021), nor has reduced the total amount of energy produced. The lack of substitution is then predicated upon by the origin of the transition itself, as a gentler euphemism for crisis, 'designed to reduce popular anxiety after the 1973 oil crisis (...) paving the way for other developmental myths such as *sustainable development* and *green growth* (Dunlap, 2021a: 4).

As Marín-Beltran, and colleagues (2021) argue, the existing metabolism of industrialized societies has led to a rapid increase in energy and material flows as well as waste and overconsumption. Even if some countries have become more efficient in some aspects of energy use, approximately 31% of all energy generated yearly is wasted (equivalent of 177 EJ) and thus, could be significantly reduced.[14] This sits in line with Millward-Hopkins and colleagues (2020: 6-7) findings that providing a decent living standard[15] for the total amount of earth's population by 2050 (taking into account its expected increase) could be met with roughly the equivalent of one third of the total amount of energy generated in 2018, and; that amount all of that energy could be generated mostly on the expected increase of non-fossil fuel energy resources by 2050. While these models have a few caveats and limitations, energy 'additions', or indeed *accumulation* as Dunlap (2021b) argues, presented as transitions, 'may not only be misleading, but also potentially counterproductive by creating a 'false impression of imminent reductions in carbon emissions and thereby suppress efforts to bring about a genuine transition' (York & Bell, 2019: 41).

In a similar vein, the notion of *renewable energy*, which is usually presented as a fossil fuel vs. renewable dichotomy, distracts from the actual techno-industrial impacts and harms that are built into production supply-webs and attempts at greening extractive industries (Dunlap, 2021; Verweijen & Dunlap, 2021; Le Billon & Spiegel, 2022). As Schmelzer et al. (2022) argue, non-fossil energy such as wind and solar have a low intensity, which requires massive infrastructure to capture and store this energy. This process also has a material and physical limit,

[14] Marin Beltran et al. (2021:7) argue that these losses are primarily due: "i) inefficient energy conversion of the technology that humankind is currently using and to ii) useless usage and direct waste of energy.
[15] The authors define decent living through 6 dimensions and services: which include nutrition, shelter and living conditions, hygiene, clothing, communication and information and mobility, for a detailed explanation see: Millward-Hopkins, et al. (2021: 5).

as the extraction of resources and the energy cost in itself increases over time (Kallis, et al., 2018). In other words, 'technological progress and non-fossil energy sources cannot beat the entropy law in the long term, especially since resources and land are inherently limited.' (Schmelzer, et al., 2022: 82). These material limits of the energy transition must then be linked to its structural roots which are based on the drive for capital accumulation: the increasing uneven distributional and ecological unequal exchanges that result from different metabolic relations of energy systems (Cederlöf, 2021). This is why Dunlap (2021a, 2021b) argues that there is in fact no 'renewable energy', but only 'fossil fuel+' infrastructures or technologies. This term re-situates so-called *renewability* by acknowledging the multilayered and interconnected destruction that is invisibilized by supply-webs, marketing and peoples' willingness to believe in these technologies.

The notion of energy itself also deserves closer examination. As Cara Dagget (2019: 4) reminds us, energy as a concept has a date of birth. In the 19th Century, before the insertion of fuel and global imperialism energy had a divergence of meanings. However, after 1840's energy became equatable with work 'which justifies the indexing of human well-being according to the idealization of work and an unquestioned drive to put the Earth's material to use for profit.' Larry Lohmann (2019: 4) argues in a similar vein when he states that the role of machine used to discipline labor 'also needed extended colonial extraction of vegetable and mineral products from land, as well as the means to transport and convert them in bulk' a process that systematically transformed landscapes around the world according to the laws of thermodynamics and a reconfiguration of value and waste around them (i.e. imports of low entropy and exports of high entropy, where certain areas become designated as heat/waste). This in turn is what enabled certain types of physical control and political power as new forms of discipline and colonization became possible (Mitchell, 2011; Boyer, 2014, Malm, 2016; Turner, 2018).

The work of CPE has made important contributions to our understanding of transitions, however remaining 'neutral' in terms of concepts such as *transitions* and *energy* can be problematic. Some have shifted their attention towards the notion of 'energy transformation' in order to deal with some of the original limitations embedded into the energy transitions literature –remaining

largely silent on power relations, invoking neoclassical economic interpretations and independent variable approximation to address the transition variables (see Newell, 2019; 2021; Pearse, 2020)–. The term aims to capture the deeper structures and contested socio-ecological processes involved in the history and trajectories of energy (Newell, 2019). The approach has been effective in leading CPE away from the a simplified renewable energy vs. fossil fuel dichotomy and a lack of attention to the underlying power relations of capitalist modernity that underpin and shape energy-society relations. However, political economists have, until recently, just begun to engage critically with certain modernizing myths that are embedded within notions such as transitions and energy itself. Contributions by CPE have highlighted how energy becomes embroiled in combinations of ideational, institutional and material sources of power at different scales and levels of governance, but have largely remained uncritical of the 'meaning' attached to these concepts.

Finally, the analysis of energy transitions has consistently maintained a focus on the state and its institutions, financial innovation and technological development to articulate how the energy transitions are governed (see Newell & Simms, 2021). As Kuzemko and colleagues (2019: 18) argue, political economy has only just begun to engage with the "new pressures being placed on energy politics through the emergence of new actors attempting to open up new points of contestation over acceptable energy futures." Most authors insist that the state remains a central actor in the study of transitions (Johnstone & Newell, 2018; Newell & Simms, 2021), however, recent contributions towards the spatial character of the energy transition led by geographer Gavin Bridge (Bridge, et al, 2013; Bridge, 2018; Kuchler & Bridge, 2018; Bridge et al., 2018; Bridge & Gailing, 2020) reveal how energy transitions –understood as space-making processes– are simultaneously shaped by spatial contexts and the powerful imaginaries, that emerge from the territorial struggles and forms of occupation through the interactions with old and new technological configurations.

Critical geographers have shown that the energy transition process is a geographically differentiated phenomenon that manifests through different sites and scales and constitutes space through its interactions (Bridge & Gailing, 2020: 1038). Bridge and Gailing use of the term *new energy spaces* denotes the spatial character of the energy transition, where categories like

landscape, scale, place and territory enable a broader are relational and structural understanding of energy systems as place-making phenomena and their physical (infrastructural) transformation. For example, Becker et al. (2020) utilize the concepts of scale and place to highlight the possibilities for autonomous urban energy communities in London and Berlin. Kirshser et al. (2020) use the concept of energy landscapes to link the energy transition process to historical legacies and collective memories of colonialism in Mozambique. Categories such as territory and landscape offer additional openings to theorize alternative futures and possible horizons and are essential tools for reworking and resisting state power (see also Castán Broto & Sanzana Calvet, 2020). As Halvorsen (2019: 794) contends, the Latin American conception of territory reveals how knowledge is situated and rooted in multiple genealogies that overlap with broader historical-political and emancipatory struggles. Such a process creates 'contact zones' where multiple onto-epistemic proposals—including the modern Eurocentric conception of a singular oppressive worldview—can come into dialogue with other formulations of emancipation and liberation.

In other words, ‘the territory’ encompasses a plurality of power relations and political projects, both emancipatory and dominating, with multiple protagonists, or with ‘overlapping territorialities’ at the same time (Öslender, 2019). Uruguayan journalist Raul Zibechi (2012:67) explains how a long history of political disenfranchisement and the failure of traditional movements (e.g., unions, political parties, and governments) to create social change through the State in Latin America led towards a re-territorialization of social struggle. This process was further exacerbated in the first two decades of the 21st century, as so-called progressive governments in South America increased the rate of state-captured rents and resource extraction to finance progressive social programs and incorporated other onto-epistemic horizons such as Buen Vivir (as a territorialized alternative to development) during a period referred to as neo-extractivism or the *Pink Tide* (Tetreaut, 2023).

The Pink Tide refers to the rise of left-wing governments during the first decade of the XXI Century. Among the main characteristics of this ‘tide’, were an increased drive towards extractive policies and rent captured by the states to create social benefit programs; a reliance on crude non-processed primary commodities; a dependence or the growing Chinese market for

continued and rapidly increasing demand, and a ‘strong hand’ to repress and any social and political opposition (Gudynas, 2021; Acosta, 2013). The Pink Tide became synonymous with what Maristella Svampa (2015:65) called the *commodity consensus*: “a complex, fast-paced, recursive process (...) that involved a ‘reprimarization’ of Latin American economies, emphasizing their reorientation toward mainly extractive or rent-based activities, with little added value.” The experience of the Pink Tide –a process that eroded the legitimacy on the possibilities of enacting decolonizing or progressive measures through the state– was followed by what Svampa (2018) calls an 'eco-territorial turn', a broad movement consisting of a coalition of Indigenous people, peasants, civil society organizations, and academics working through support networks creating alternative languages of valuation that manifested as a diverse set of onto-epistemic practices that embodied the Zapatista slogan, *a world where many worlds fit* seeking alternative forms of emancipation *beyond* the capture of state-power (Dinerstein, 2015).

The Latin American experience reveals the limitations of actually depatriarchalizing, decolonizing and contesting capitalism through the State (Walsh, 2018). Yet, the CPE of energy transitions literature continues to place an overwhelming focus on the State as the main actor of the 'transition'. Meeting the challenges of scale and urgency posed by climate change is said to require destabilizing the incumbency of fossil fuels and mobilizing financial investment (Newell & Simms, 2021). However, this risks reproducing the colonial violence deployed through so-called low-carbon infrastructure, as will be discussed in the following section. Additionally, it risks exacerbating and reproducing injustice as communities are integrated into the liberal framework of justice (which will be tackled in section 2.4. See, Velicu, 2020; Partridge, 2022; Dunlap, 2023). While the state may not be a monolith, a continued emphasis on top-down policymaking, driving financial investments, and rapid technological changes to decarbonize (see Johnstone & Newell, 2018; Newell, *et al.*, 2023) risks reproducing forms of hierarchical domination, and further encroaching colonial and capitalist strategies of accumulation as the Latin America experience reveals. The deployment of low-carbon infrastructure entails a process in which “(d)evelopment is rendered synonymous with the furtherance of capitalist social relations of production (...) [which] ‘continues the colonial lineage in Latin America of devaluing Indigenous knowledge and ways of life in the name of modernisation” (Hesketh, 2021:549).

In other words, CPE can benefit from understanding energy transformations beyond simply moving away from fossil fuels and their capture of state power or incumbency. As Bridge and Gailing (2020: 1040) argue, new energy spaces are 'key contemporary sites of struggle, through which broader questions of political economic governance are being worked out.' They constitute what geographer Edward Soja (1996: 2,5) labeled a Thirdspace - “a flexible term that attempts to capture what is actually and constantly shifting and changing milieu of ideas, eventes, appearances and meanings (...) to encompass a multiplicity of perspectives.” These spaces offer the possibility of capturing multiple projects of sovereignty through a historical, material, political examination of how energy systems and their 'transitions' are imagined and enables the creation of potentially emancipatory practices that contests them. While the political economists have done an exemplary job of politicizing the transition narratives by focusing on power and politics in the transition process and the adoption of one technology to another; highlighting how the incumbent ruling elites are capable of shaping and controlling the narrative, where any challenge to the status quo, is adopted as a form of trasformismo; and by placing considerable emphasis on the variegated strategies and struggles that appear as capitalist social relations are expanded, resisted and ultimately worked out through the physical deployment of energy system, infrastructures and value chains. The approximations of CPE at the energy transition continue to treat ‘energy’, ‘renewability’ and ‘transition’ unproblematic, closely linking them to a top-down decision-making process which relies on the state institutions, and at times the market (Scoones, et al., 2015).

While critical of how incumbent elites hold and maintain power, some pundits of the CPE approach argue for the same institutions and forms of governance, albeit with different representatives, to *correct* the problem. To put it simply, in the words of Audre Lorde (1984): ‘The master’s tools will never dismantle the master’s house. They might allow us to beat them in his own game temporarily, but they will never bring about actual freedom’. The quote encapsulates some of the main limitations hold by CPE, and some of the main contributions that this thesis is trying to make: Holding an uncritical position towards this forms of transition or even transformation risks reproducing new forms of injustices, or the ‘master’s narratives’ (Barca, 2020) that expand on new forms of unequal exchanges and new patterns of spatial and political difference under the banner of the ‘just’ or ‘green’ energy transitions.

The following section argues from the point of view of the decolonial turn in Latin America drawing on the work of decolonial scholarship and the literature on extractivism, which has also focused most of its analysis in Latin America. This section contends that applying a framework based on the COP enables an understanding of how energy transitions operate under different contexts, questioning the centrality of Western-logics of development, progress and power. Section four, further develops the critique of state-led energy transitions, arguing that the focus of *ontology* in political ecology has enabled a much more nuanced understanding of what energy is, as well as the spatial and relational character of the energy transition. The fifth section draws on the two aforementioned contributions, to argue that the framework laid out in this Chapter offers the possibility of radically reconceptualizing our understanding of what defines 'energy justice', arguing instead for a non-universal, anti-stagist and non-dualism definition of justice that is *rooted* or *grounded* in different territorialities. The final section specifies how this thesis draws on this particular theoretical framework and explains how it is deployed in each of the articles that constitute it.

2.2. The decolonial turn and critical political economy

Despite acknowledging the existence of a colonial past in other settings, CPE's analyses of energy transitions rarely consider colonial and post-colonial path-dependencies and historical contingencies of the energy systems that they seek to transform (for exceptions see: Howe & Boyer, 2016; Baptista, 2018: 31; Castán Broto, et al, 2018; Allen, et al, 2021; Hesketh, 2022). From this perspective, a decolonial approach to energy transition requires reckoning with the ways that values, violence and structures of coloniality shaped and continue to mold energy systems, their 'transition' and integration of low-carbon infrastructure and the notion of *energy* itself, all of which have become entangled with a colonial past and the persistence of the CMP in the present. In the case of Latin America, this project requires revisiting the historical agency that has shaped the physical, material, political and socio-ecological characteristics of energy systems over time, accounting for how the energy system has been instrumental in reproducing multiple forms of violence (cognitive, ontological, physical, cultural, gendered, etc.) and how

this has informed and enabled forms of internal colonialism and oppressive political powers to operate within each country.

The decolonial turn in Latin America has taken shape over the last three decades as a direct critique of the theory of modernity and some of its core values. These values are rooted in what Bruno Latour (1993) referred to as 'the Modern Constitution' or a system of thought in which there is a fundamental division between the human and the nonhuman world, as well as other assumptions like the hegelian notion of teleological development and staginst progress (Castro-Gómez, 2014), and a narrow conception of eurocentric universality where Europe appears as the center of world history, values, imaginaries and organizing principles are imposed everywhere (Mignolo, 2018). The decolonial turn's critique of modernity is rooted on what decolonial scholars refer to as 'colonial difference', which argues that modernity originates after the 1492 conquest of the Americas (instead of the Enlightenment), constituting capitalism as a world-system. Modernity is then the moment in history in which Europe begins to see itself through recreation of a constitutive other, instituting racial hierarchies where Europe sits at the top and a system of knowledge-power (Eurocentrism) that presents itself as universal (Öslender, 2019: 1692).

Placing capitalism and colonialism as a dual process that informed the multiple regimes of accumulation through history, not only reveals the centrality of energy to each of these regimes, but also reveals how the experiences of subaltern populations in both the Global North and South are linked by the same process of capitalist exploitation/expropriation. As Nancy Fraser (2022: 92) argues, these regimes were constituted around "the ways of organizing economy/nature relations, each featuring a characteristic methods of generating energy, extracting resources and disposing waste." In other words, the manifestation of the structures of colonialism through each of these socioecological regimes of accumulation manifested differently, informed by the different ways each of these regimes' relationship with its primary energy sources. From endosomatic (internal to bodies and biomass sources) production, which required brutal subordination and exploitation of bodies, to exosomatic (external to the body) production, which exacerbated the metabolic rift by expanding the extraction of 'cheap nature', that is, minerals, energy, food and nature itself (Moore, 2015). The drive for accumulation intensified exploitation of workers in the centers, while destroying the means of production and relying on pillage and

raw-extraction in the peripheries. A system that is now expressed simultaneously in different places (i.e. in the North and South alike).

The decolonial turn emerged as a direct result of praxis and political action during the last decade of the 20th century in Latin America. In 1992, the commemoration of 500 years of the European invasion, created a resurgence in the interest over how colonialism was maintained internally over the last 200 years of independent states (Grosfoguel, 2022). At the same time, the Zapatista uprising of 1994 challenged and interrupted the dominant model of liberalism that invisibilized and obscured their collective identities and forms of knowledge, by integrating them into a condescending form of multiculturalism, reshaped and repurposed to further entrench the genocide and epistemicide of these communites (Walsh, 2018). These struggles, radically interrupted the assumption that capitalism was much more than an economic system of domination –a common assumption in the post cold-war period–, but that it also constituted a system of cultural, sexist, racial, political and socio-ecological forms of expropriation, linked to the exploitation of the workers (Grosfoguel, 2022).

The notion of coloniality is different from colonization. While the latter refers to a period of history in which capitalist, cultural and political relations were organized by an empire of conquest and occupation, the former refers to a period after the fact, one in which the system of power and organization inaugurated during colonialism is maintained but via the adoption of colonial forms of organizations, hierarchies and differentiating principles. As introduced in Chapter 1, the work of Peruvian sociologist Aníbal Quijano's on decoloniality is particularly useful as it shows how a Eurocentric system of values and forms of power—what he refers to as the Coloniality of Power (COP)—persists despite the end of colonial occupation. These values are organized along two axes: first, the idea and naturalization of race as a mental category of modernity; and second the articulation of economic relations around a control of labor, resources and products into a single capitalist market (Quijano, 2000). This implies that the COP involves and affects us all by creating differences between modern-Eurocentric and non-modern subjects.

The COP represents a historic repertoire of cultural, spatial, and signifying systems that stigmatize and depreciate worldviews for the purposes of another's health, development, safety, profit, and pleasure. The COP is in fact constitutive of a much broader experience that

reproduces coloniality through hierarchies into systems of power, knowledge and being. Walter Mingnolo refers to this system as the CMP, where coloniality is experienced through four different forms of structural oppression and violence: coloniality of power (economic, political, and cultural forms of domination), coloniality of knowledge (through epistemic and cognitive violence and the imposition of a singular way of knowing the world), coloniality of being (subjective, individual, and collective identities), and gender (enabling a modern gender system and hierarchy) (Rodríguez, 2021; Lugones, 2008).

The reproduction of the CMP reveals how coloniality is in fact the darker-side of modernity. As Mignolo argues, there can be no constitutive process of modernity without accounting for how coloniality created the material, ideological structural character of modernity itself. In other words, these concepts are interconnected and the work of decoloniality must then engage them together (Mignolo, 2018). For Mignolo (2018) knowledge acts as the primary domain through which epistemologies are 'materialized', a process that reproduces particular ways of understanding the world, while simultaneously erasing or rendering (through descriptions, explanations, representations, and interpretations) otherness invisible. Similarly, Santos (2014: 119) argues that this one way of knowing (eurocentrism), characterized by Western modernity, "creates a subsystem of visible and invisible distinctions in such a way that the invisible ones become the foundation of the visible ones."

Thus, to understand how the CMP operates through energy systems and their transformations requires two particular approximations. First, there is a need to link how the physical manifestation of energy systems is embroiled in the structures of power-knowledge that shape the CMP, and consequently, how this interaction also enables the production of subjectivities, or the coloniality of being. Physically and materially, the CMP is experienced through what Dunlap and Correa Acre (2021) call *Infrastructural Colonialism* (see also Batel, 2022). Here, infrastructure is utilized as a weapon of conquest, serving as a dispositif to enroll people into a particular form of citizenship and modernity (Power & Kirshner, 2019) while also enabling spatial, economic and psychological management (Dunlap & Correa Acre, 2021: 7). Techniques like inclusion, recognition and participation ultimately distract, disperse and discipline communitarian struggles fighting for autonomy (Gutierrez Aguilar, 2020) while energy infrastructure is mobilized through the use of certain instruments that Dunlap (2020a) articulates

as the material manifestation of the colonial/statist project. This project entails the use of hard and soft techniques of pacification to sustain access to land –that is, land grabbing via hard tactics such as police harassment and brutality, surveillance, extra-judicial intimidation and violence, or soft such as those aiming to gain 'social license' or win 'hearts' and 'minds' of the population through promises of development, inclusion, participation and other forms of social engineering (Dunlap, 2020b)–. In the case of low-carbon technologies, this process constitutes what is commonly referred to as green grabbing- the process of maintaining access to land in the name of sustainable development or 'greening' the prevailing economic, political and social system (Isla, 2022).

Low-carbon infrastructure or so-called 'renewable energy' relies on a series of unsustainable infrastructure that materially sustains the discursive 'renewability' of these technologies, which includes the deployment of power lines, substations, control centers, smart technologies, that necessitates hydrocarbons and large quantities of extracted minerals to produce, and the manufacturing of components to transport, install and maintain (Dunlap, 2021a, 2021b). Infrastructure captures the promises of modernization and development, usually positioned as a national good, over a particular definition of the future, and linked to the state's conception of progress (Anand, et al. 2018). In sum, infrastructure colonialism entails the material and physical manifestation of the structures of power and governmentality. Informed by the CMP, the discourse of sustainability offers the promise of an imagined future of development without the negative socio-ecological consequences (Swyngedouw, 2022).

Secondly, there is a need to specify how the CMP is enabled with broader projects of colonization, in this case through the expanding frontiers of capitalism and strategies that either sustain structures of internal colonialism, settler-colonialism and/or forms of governmentality. On the one hand, decoloniality introduces new concepts that are not rooted in the Eurocentric knowledge, but that reclaims and/or regenerates those knowledges that were oppressed by the hegemonic discourse (Foucualt, 2004). This does not reduce the struggle against Eurocentrism to a particular place (i.e. Latin America, Africa or South Asia), but rather creates a pluriversal system that seeks to recognize that which has been 'obscured' by the structures of power, knowledge and being of capitalist modernity.

Escobar (2016) articulates the notion of the pluriverse by arguing that the framework of the *Epistemologies of the South*, developed by Boaventura de Sousa Santos (2014), that is, the ecology of knowledges emerging from the production of a decolonial framework takes an ontological dimension, that is, 'to speak about knowledges means to speak about worlds.' Taking the Zapatista dictum of '*a world where many worlds fit*', the notion of the pluriverse is based on the idea that those knowledges oppressed by Western-monderity also entail world-making practices that have been oppressed by the '*one-world world'* (Law, 2011), or the capitalist modernity that has been discussed up to this point and that will be developed further in the following section. The notion of pluriverse draws both from the decolonial as well as post development thinkers.

On the one hand, the pluriverse emerges from the notion of a *transmodernity* (Dussel, 2014) which seeks to go beyond european modernity seeking to reaffirming that which appears or has been 'made absent' by Western-modenrity, and enables the possibility of encompassing a universal project constituted on the rejection of capitalism, patriarchy and colonialism, but informed by particulars, that is, of a reaffirmation of life rooted on the particularities of each alternative (Grosfoguel, 2022: 242). On the other hand, from the point of view of post-development, the pluriverse draws on a similar idea, but is rooted not identity but rather on the political affinity of the many alternatives emerging from the alternative of thinking 'after' development (Esteva, 2019; Kothari et al, 2019). In these cases, post-development argues that, while the work of decolonial scholars emerged and flourished principally in Latin America or based on the Latin American experience, the contested hegemonic knowledge also recognizes those other forms of knowledge/worlds that were repressed within Europe as the models for colonization were deployed and practices with 'internal populations' (Gonzáles Casanova, 2006; Grosfoguel, 2016; Prado, 2018).

Joe Turner (2018) identifies the way in which the histories of colonialism play a central role in the configuration of modern societies and how these practices informed what is now the basis of liberalism. As Abdullah Öcalan (2019: 9) argues, liberalism presents itself as the eclectic amalgam of all social theories that seek to absorb the teleological progress of multiple theories of social well-being (i.e. democracy, progress, market development, etc.), when in reality it incorporates only a few truths combining the most flawed aspects of each social model. Such

practices are rooted in the form of internal colonization that gave birth and informed the governmentality and 'management' of racialized populations within the global North and that expanded through the colonies (Turner, 2018). Decolonial scholars argue in a similar vein when they show how the colonial experience after 1492 (the year Columbus arrived in the Americas) was informed by the Spanish conquest of ál-Ándalus and in turn, the Eurocentric philosophy of the XVIII and XVIII centuries, was based on the colonial experience itself, starting with Descartes dualism philosophy of being (Maldondo Torres, 2013; Dussel, 2014; Grosfoguel, 2016).

The 'modern constitution' referred to by Latour is then a direct result of the experience and practice of colonialism and the reproduction of an apparent universal, 'objective', 'neutral' and 'impartial' form of knowledge. From which everything that does not qualify or is presented within this framework, falls on *the other side*, of the 'abyssal line' (Santos, 2007), this is, what separates, disqualifies and invalidates non-European knowledges as partial, invalid, irrelevant, unscientific, practical, magical or inferior (Grosfoguel, 2022: 222). The experience of the populations that sit on the other side of this 'line' is then an experience of *subalternity* that manifests within and outside the colonial center, a system that infomes modern racism and that has been reconstituted through the different socio-ecological regimes of accumulation of historical capitalism (Moore, 2015; Wilson Gilmour, 2021). Still, a tendency to overlook the place of colonialism in the development of contemporary rule and the production of modern capitalism remains within European and Northern scholars.

The experience of the colonized or the subaltern populations in/outside of the colony was one of denying the humanity of those that were colonized (Maldonado Torres, 2017), a process that simultaneously justified the expansion of colonial interventions (i.e. through notions of *terra nullius* in terms of access to land), and a process of uprooting and disembedding those *subalterned* populations from nature, culture and knowledge, dominating the dreams, desires and imaginaries (Prado, 2018). By denying their humanity, colonialism perpetuates the dualist distinction between colonized/colonizer, modern/savage, developed/underdeveloped status of those that require colonial interventions, a process that, as Weber (2015) argues, justifies the intervention of disciplinary power where underdeveloped can never become developed but only 'developing', perpetuating colonial interventions. Turner (2018) further expands this notion by

arguing that such a process informed the modern/liberal framework where "knowledges and practices of colonial governmentality were constantly fed back through internal colonialism, just as the government of subjects within the metropole provided knowledge of and ways of ruling distant others" (Turner, 2018: 771).

The deployment of low-carbon infrastructure not only expands the existing socio-ecological regime of accumulation –one that requires immense amounts of metals, minerals, fossilized energy and complex supply-chains with uneven spatial consequences– but it it also perpetuates and expand the colonial histories embedded in the existing energy systems, reproducing and inaugurating new spatial reconfigurations between value and waste and nature and society. Considering that energy is the prime mediator between these relationships (Calvert, 2016), the spatial and material manifestations of the CMP are experienced through the deployment of low-carbon infrastructure and the reconfiguration of landscapes and places as new sacrifice zones, or places to where the socio-ecological costs of decarbonization and 'greening' are transferred to (Zografos and Robbins, 2020).

Bringing together how the CMP operates, on the one hand through the manifestation of coloniality of power-knowledge and being, and on the other through the material expression of low-carbon infrastructure enables the possibility of thinking how power relations and mediated by those subjugated knowledges. Boyer (2019) argues that energopower can either sustain the basis of oppressive forms of governmentality or it can enable the possibilities of emancipatory power and resistance. Drawing on Timothy Mitchell's (2011) argument that the materiality of energy systems –that is, through the knots and bolts of the coal value chain, and the flows, cables and pylons of electricity workers were able to politicize and mediate power–, there is a possibility of a multiplicity alternatives for energy technologies to enable a pluriversal alternatives, that is, the emergence of particular places that hold the potential to create alternatives to the epistemological and ontological commitment of westernized development. The decolonial turn is thus a system that inaugurated the possibilities of *'otherness'* to emerge, or that which has been excluded and made invisible by the hegemonic view of modernity/coloniality to emerge, and that can be either sustained or contested via the deployment of low-carbon infrastructure.

To sum up, the work of decolonial scholars has focused on the emergence of subjugated knowledges by Western-modernity and on the praxis (i.e. the ontological) aspects attached to the transformation of that reality (Esteva, 2019). The decolonial turn highlights how the CMP is expressed through the reproduction of colonial hierarchies in terms of power, knowledge and being. This process informed the CPE of energy transitions by engaging with how low-carbon infrastructure and the transition process itself is built under a commitment to the modern constitution: a teleological form of progress (usually expressed as development), a dualist separation of nature from culture, and a narrow definition of the universal based on Eurocentric knowledge. This in turn manifests physically and materially through infrastructural colonization, as low-carbon infrastructure embodies the promises of such development projects and their commitment to *greening* and creating the illusion of 'sustainability' of 'renewability'. By recognizing the elimination or oppression of other forms of knowledge as the main source of violence, the decolonial turn argues that modernity has systematically sought to erode the vital conditions for well-being of Indigenous and other subaltern populations (including non-humans), through displacement, exploitation of land, disregard for traditional knowledge and authority, and the imposition of a particular way of knowing and being in the world. As a response, thinking form the position of colonial difference, decolonial scholars argue for a pluriversal approach that breaks with the dominance of modernity and calls for a world where many cosmologies can coexist and reconstitute modernity (a *trans*modernity) from below (Öslender, 2019: 1693).

2.2.1. The political ontology of energy

Drawing on the notion of the pluriverse and the introduction of the CMP to the study of energy transitions, this section seeks to contribute to the overall understanding of CPE by showing how the work of political ecology (PE) and political ontology (PO) –which for some scholars represents the 'third generation' of political ecology itself (Balser & Escobar, 2023)– can contribute to the study of energy transitions. Moreover, this section argues that the contributions of PE/PO can enrich and complement the contributions made by adding the COP to the study of the CPE of energy transitions. It does so by first, highlighting how PE has engaged with energy in different moments; Second, by explaining how PO compliments the approximations taken by

most political ecologists to the study of Ecological Distribution Conflicts (EDC) and finally, by arguing that these contributions are essential for articulating and reformulating a decolonial theory of energy justice, which is presented in the next and final section of this Chapter.

The work of political ecology has had a convoluted relationship with energy and energy systems. By first treating energy like any other resource, the work of political ecology tended to see energy as part of "conflicts and struggles engendered by the forms of access to, and control over resources" (Peluso & Watts, 2001: 24-5). Very much like CPE, the origins of political ecology emerged from a concern of explaining complex phenomena through single independent variables, usually decentering the role of power and the political economy's undeveloped notion of nature (McCarthy, 2012). Blaser and Escobar (2023) argue that, aware of some of these concerns, the *second generation* of PE focused on the epistemological debates fostered by constructivism and its break with an essentialist approach –arguing that environments are *always* 'already cultural' and hence that nature is not external or distinct from culture–. Second generation political ecology applied to the matter of energy, examined the concept as a thermodynamic relation (Cederlöf, 2021), as a structural and relation entity in the reconfiguration of space (Bridge & Gailing, 2020) and as a social relation mediated by historically specific political struggles (Huber, 2015).

As Knuth and colleagues (2022: 998) argue, this approximation of PE to energy systems and the transition processes shows that transitions is at once "material, ecological, power-laden, culturally meaningful and deeply geographical phenomena, localized into particular contexts and meaningfully differentiated across them." The common principles of this approach has been to explain human-environment interactions and the historical-geographical contexts (McCarthy, 2018), paying close attention to the imperial, colonial, and postcolonial relationships that informs struggles over power and nature (McCarthy, 2012). However, focus on the epistemological aspects of the transition process also took an additional turn as political ecologists focused on the distributional effects of environmental change. The notion of ecological distribution conflicts (EDC) emerges from the interaction between ecological economics and political ecologists. First, it argues that uneven distribution of costs and benefits of resource and energy extraction manifest unequally among different groups. Secondly, it focuses on the aforementioned thermodynamic

relation created by different social metabolisms, anchored on how entropy informs the spatial and dialectical interaction between different places (Cederlöf, 2021). That is, it shows how societies are dependent on a flux of energy and matter that increase entropy and thus, expands and displaces 'waste' generated from one place to another.

This work has been informed by ecological economists and political ecologists like Joan Martínez-Alier (2021), who argued that the way in which EDC emerged from ecologically unequal exchange of energy and materials not only infomed the asymmetrical distribution of resources and risks across geographies, but that different local communities resisting and shaping this conflicts embody a form of 'situated knowledges' (Haraway, 1988). Such knowledges transform the role of social movements (e.g., environmental organizations, Indigenous peoples, peasants, neighbors, and citizens) from *objects* of study to *knowledge producing subjects* who demand recognition of alternative valuation systems (Martínez-Alier 2021). Temper et al. (2015) refer to such knowledge production as 'activist knowledge,' a process that calls for new forms of scientific production by destabilizing the boundaries between movements and academic (or other expert) domains. The EDC emerging from the metabolic expansion of commodity frontiers (i.e., from the continuous demand for materials and energy) constitutes a geographical and metabolic staple of capitalism's tendency towards *accumulation by dispossession* (Harvey, 2004), that is, the expansion of spatio-temporal fixes in the form of new technologies, infrastructures and projects that can spatially *expand* while displacing capitalist crisis of overaccumulation temporarily (Surprise, 2021). However, as Martinez-Alier points out, the main contribution of the EDC is based on the challenge of the power dynamics of hegemonic systems of valuation through the production of situated knowledges. *Third generation* PE is rooted in the particularity and place-based specificity of these knowledges. It focuses its attention not on trying to formulate the taken-for-granted ontological character of the nature-culture divide, but it "challenge(s) the assumption that the divide is universally applicable as if it represented the ultimate reality" (Blaser & Escobar, 2023: 166).

This approximation has been essential to inform what third wave political ecologists refer to as *political ontology* (PO). Drawing on these situated knowledges, PO argues that knowledges and disagreements also entail divergent worldings practices which are constantly coming about

through negotiations, enmeshment, crossings, and interruptions (Blaser & de la Cadena, 2018). The ontological dimension emerges from the gap between political economy and political ecology: early positions in both fields were incapable of thinking through antagonisms involving non-human nature (e.g., rivers, mountains, and forests). The former reduced them to "resources" (Shiva, 2010), while the latter could only "see" disparities rooted in unequal distribution. Neither identified them as "subjects" (Blaser & de la Cadena, 2018: 5). Proponents of PO argue that struggles over land and territories are not simply about the distribution of environmental harms and benefits, but entail the right of so-called 'subalterns' to live in accordance with their own identities, cultural imaginings, and ways of knowing the world (Leff, 2017).

Mostly informed from the experiences in Latin America, environmental and cultural forms of degradation have propelled alternative proposals seeking to reconceptualize the relationships between humans, nature, and space. The rapid rise of the phenomena known as extractivism and neo-extractivism in the region have been key in shaping and constituting PO. To quickly recap, extractivism refers to a particular phenomenon consisting of the extraction of natural resources, at a high pace and volume, to be exported as unprocessed primary commodities (Gudynas, 2013:4). It constitutes a modality of capitalist accumulation constituted over 500 years ago, a process that is now defined by the specialization of certain regions as exporters of nature, while others as importers (Acosta, 2013). Despite the end of colonialism, most extraction sustains colonial-style oppression over the Global South through notions like 'development' and 'underdevelopment' –euphemisms used to justify colonial-style interventions that operate in former colony states and within areas linked to racialized ethnic minorities and women within industrialized (Kothari, etal., 2019: xxii)– through the provision of raw materials and the international division of labor (Svampa, 2015). However, the link between extractivism and global capitalism has become more spatially and temporally complex via expansion of technology, commodity frontiers, financialization and logistics. Martin Arboleda (2020) argues that such expansion is underpinned by a technological and organizational modernization that has made the geographies of extraction ubiquitous at a global scale, where raw materials, resources, data, knowledge flows in 'new' directions, not only along traditional geographically determined North/South paths; extractive operations move from everywhere and in every direction.

The rise of an enormous demand of raw materials for China in the first decade of the 21st Century, coincided with the rise of left-wing progressive governments in Latin America, rapidly expanding the totality of unprocessed materials, and with it the emergence of new socio-ecological conflicts as governments in South America started leaning to the left, but progressively expanded the extractive rate of the economies, capturing rent and repurposing it to fund social programs (Svampa, 2015). The phenomenon is usually referred to as the *Pink Tide*, and constitutes what can be called neo-extractivism, a continuation of the transitional form of extractivism described above, but one that breaks with the Washington Consensus –the extraction of raw materials linked to the neoliberal reforms of the post-cold war era–, towards a left-leaning politics in the region, or what is also called the 'commodity consensus', where the unprocessed raw-materials are paired with progressive left-leaning governments (Tetreault, 2023).

The experience of countries like Bolivia and Ecuador[16], who in an effort to redirect the role of the State to manage a more benevolent form of capitalism also seeked to challenge the colonial nature of the nation-state by creating a "plurinational state". Through the recognition and incorporation of Indigenous cosmologies –through notions like *Buen Vivir* as alternative to Western-centered notion of development and by recognizing nature as a subject of *rights*– into new plurinational Constitutions. However, as Dinerstein (2015) argues, the anti-neoliberal discourse and the coalition of Indigenous, peasant and other subaltern communities that enabled the capture of State power, where quickly confronted by the intensification of the commodification and appropriation of natural resources, an expansion of extractive industries by transnational conglomerates, and a rapid rise in state-sponsored violence and criminalization (Tetreault, 2023). As the *Pink Tide* exacerbated the rate of extraction, it proportionally articulated social movements and the politics of self-determination and autonomy beyond the horizon of capturing state-power. As Raquel Guitierrz Aguilar (2017) argues, the *communitarian entanglements*, that articulated their emancipatory struggles around the definition of autonomous politics, quickly saw the impossibility of maintaining the autonomous popular-horizon by capturing the state-power.

[16] This also includes the governments of Brazil, Uruguay and Venezuela, who 'rode' the pink tide in terms of adopting a commodity consensus and capturing state rents through the p´rimarization of the economy, but unlike Bolivia and Ecuador, these countries did not take the step of 'refounding' the nation state into a plurinational one. For a more concrete argument see: Dinerstein, 2015; Giraldo, 2021.

In a similar vein, Giraldo (2020) draws on the Zapatista metaphor of looking at the state like a plantation (*finca* in Spanish) where the presidents are only the overseers, the governors the stewards, and mayors are foremen. The one who rules is the capitalist boss, and the whole structure is at the service of the system. Even if the government changes, we are only changing the overseer, who, whether he wants to or not, has to abide by the logic of capital (EZLN, 2021). This metaphor shows how thinking in this way only allows the state to act within very narrow limits. As the *Pink Tide* brought about a crisis of the legitimacy of the state and its possibility to question the limits of capitalism, coloniality and patriarchy (see Anthias, 2018; Girlado, 2020; Gutierrez-Aguilar, 2020), it also inaugurated the possibility of challenging capitalist modernity and the role of the state as its primary enforcer.

The rise of neo-extractivism in Latin America and the proportional increase of the number of EDC, quickly laid the foundation between the incommensurabilities that persist even in the incorporation of other epistemological or ontological aspects of the these struggles into the dimension of the state (Behn & Bakker, 2019). The adoption of the rights of Mother Earth (*Pachamama*) and even *Buen Vivir* itself, became an *ontological tools* used to legitimate and expand the extraction in the name of the people (even Mother Earth itself) (Tola, 2018; Altmann, 2020). This meant that the proposals emerging from local actors' constituted a reaffirmation of their culture and identity, but also an emancipatory project of resistance against a universalized and homogenized vision of the future, and a reconfiguration of the horizon of politics (Ulloa, 2015: 323; Esteva, 2022). These strategies are constituted through epistemological foundations and practices that move beyond proposing alternative *forms* of development, but instead speak of alternatives *to* development (Santos, 2014). Rather, they emerge from particular interactions with the territory and are focused on how knowledge production and practice emerge as a response to, or in contestation of, the imposition of one way of 'knowing nature' (Temper et al., 2015). From this perspective, the socio-ecological conflicts emerging from Indigenous, peasant, and other social movements' resistance to large-scale development projects, resource extraction, and mono-crop farming are not only about the destruction of territories. They are also ontological struggles—struggles for a right to exist differently—and for *a world* itself (Escobar, 2020).

The ontological character of EDC enabled the possibility of clearly defining the role of colonial difference and a critique to the constitution of modernity that is continually deployed by the state and the promises of development. PO incorporates the notion of relational ontologies, as a way of challenging the nature/culture divide, by paying closer attention to the territories and encounters where seeing landscapes and places becomes entangled with other wording practices. These places constitute a "third space" were a multiplicity of perspectives and visions of the future are captured (Soja, 1995), where the possibilities of the pluriverse can emerge from the direct challenge of Western-modenity and its interaction with state-power and capitalism (Oslander, 2019). In other words, these places constitute the basis of what the geographers drawing on CPE refer to as 'new energy spaces' that is the spaces where alternative *energopowers* can emerge and from where ontological openings can enable the possibility of other worlds to emerge, resist and persist.

As for the possibilities of understanding energy transitions differently, PE/PO draw on a particular form of AEI in Latin American, which in this case is constituted by extractivism/neo-extractivism, which, when entangled with the deployment of low-carbon technologies, can also be understood as 'green extractivism'. Green extractivism expands the notion of extraction beyond minerals and hydrocarbons; it pushes the frontiers into forestry, fishing, and farming (Acosta, 2013) and incorporates so-called 'renewable resources' (by calling their *renewability* into question). Isla (2022) argues that greening is the "highest stage" of extractivism as it uses discourses of sustainable development to introduce new forms of global capital accumulation, enrolls previously non-commodified nature and (women's) bodies to extract 'cheap' resources and labor. Green extractivism entails the use of new technologies to inaugurate extractive frontiers and justifies its expansion through narratives of 'cleaning' supply chains, mitigating GHG emissions, and providing the tools for green growth (Riofrancos, 2019; Dunlap, 2021a).

In other words, the contribution of PE/PO to the understanding of energy transitions is that, by drawing on the focus already embedded within PE on power, it shifts the attention to the ontological and epistemological character of what is erased by the imposition of development, of capitalist, imperial, or colonial relations and how these inform the incumbent or hegemonic form

of power. The ontological assumptions of green extractivism, as Sullivan (2017: 223) argues, "denote(s) what entities can exist, into what categories they can be sorted, and by what practices and methods they can be known (i.e. epistemology), for participants in a social grouping sharing and negotiating these assumptions".

Focusing on PO also enables the possibility of understanding why the question of the transition in Latin America calls for a shift away from the state as the central character of the energy transformation. While Indigenous, peasant and other autonomous movements in Latin America are not *de-facto* anti-state, they do reconfigure politics in a radical way, one that begins what Ana Cecilia Dinersten (2015) and John Holloway (2022) refer to as '*negative praxis*', that is, a form a rejection of the forms of power and oppression that are rooted into the hierarchy of state, capitalism and colonial forces. This process shifts the attention of politics from *what we do not wan*t, to a pluriversal opening of political horizons of *what becomes possible* –what Gustavo Esteva (2022) calls the politics of a common 'No' with many 'Yeses'–. Figure 5 shows how the contributions of PE and PO complement the critique of CPE enabled by the COP. The next section argues how these three critiques can inform and determine how energy transitions are conceptualized and most importantly, how different conceptions of justice can articulate and address the challenging nature of the transition process itself.

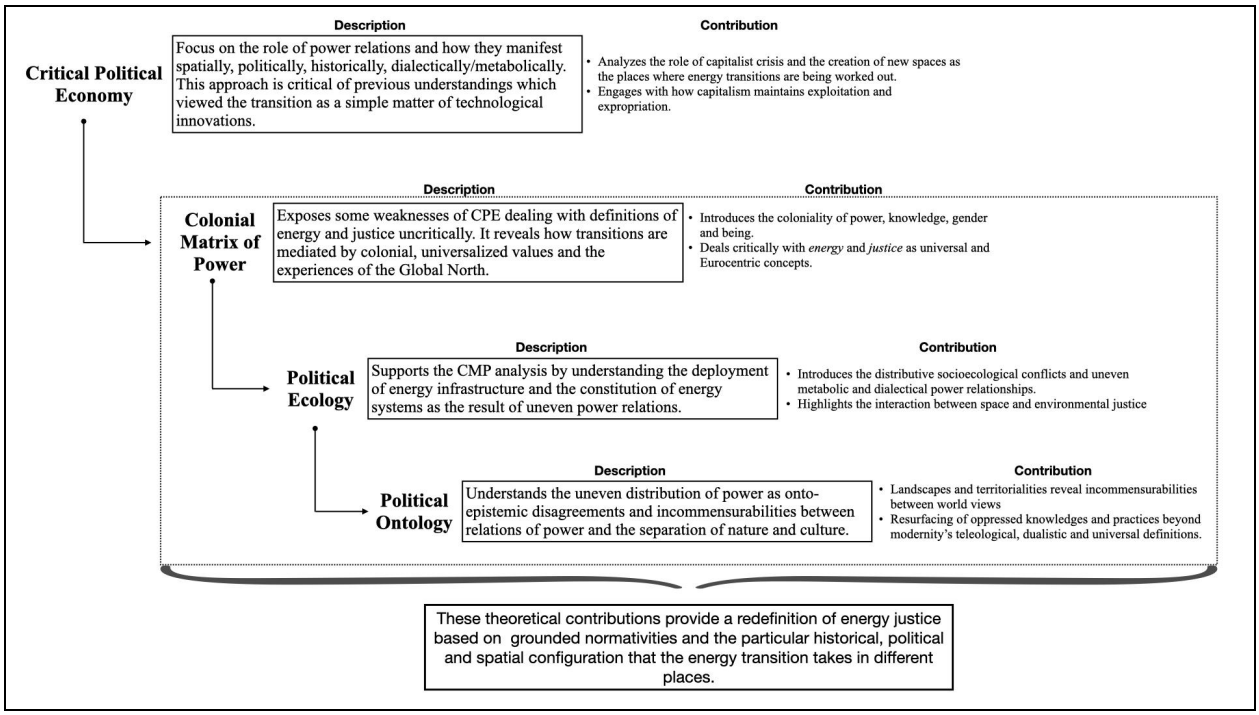


Figure 5: *Justice from the ground up. How the decolonial turn, political ecology and political ontology can inform CPE engagement with the energy transition and the definition of what constitutes energy justice.*

2.3. Decolonizing energy justice

This section draws on the four previous sections to question how energy justice has been conceptualized, some of its main shortcomings and offers a reformulation of the concept. It draws particularly on the way that the modern conception of justice, based on its liberal expressions and manifestations, has been informed by a long history of colonial oppression and extraction, a process that is itself manifested through the different regimes of accumulation of capitalism over the last 500 years. The engagement with liberalism in this section not only reveals some of the most flawed characteristics that infomes the notion of justice and its application through an unwavering commitment with modernity, but how the liberal forms of justice tend to disavow the antagonism of social struggles, favoring instead a form of depoliticized policy-making adopting universalized notions of justice. First, this section engages with the root of the liberal notion of energy justice and how it has been applied. Secondly, it deals with some of the main shortcomings of this notion to then argue for a reformulation of

justice based on a contestation of the Modern Constitution and a direct engagement with what Álvares and Coolseat (2020: 55) refer to as the *coloniality of justice* –a notion of justice geographically and conceptually bound to a hegemonic-Western idea of modernity that manifest as the extant opposite of what it tries to address: recognition, distribution and participation–.

This section closes with a *reformulation* of the idea of energy justice from a decolonial perspective making five main contributions. First, that no theory of justice can or should be universalized. This is not to say that there are not direct energy/material needs that need to be accounted for, however, as noted in the sections above, energy is not treated as just another resource, but as a relational notion, hence the prospect of limits and sufficiency are incorporated into this definition. Secondly, the notion of epistemic disobedience sits at the core of the global call for cognitive justice (Santos, 2014), a system that enables the recognition, beyond the nation-state, of otherness that was previously excluded and made invisible by western modernity. The third point is based on rooting or localizing struggles and the defense of the territory - a system that grounds and informs the particular definition of justice. Which in turn leads to the fourth point, the need to account for decolonial thought and praxis as a political project, a process that radically interrupts the pre-established social order to provide a new conception of politics. Finally, this chapter argues for the production of an 'undisciplined' approach to inform what could be called a universalization of the particulars, or a 'pluriverse' to shape our understanding of energy justice.

2.3.1. The origins of energy justice and the problem with late-liberalism

The term energy justice originates from the particular concerns emerging from the energy system and its uneven distribution of impacts linked to the production and distribution of energy. The first example of the use of the term can be traced back to the *Energy Justice Network* in the US, which adopted the principles developed by other environmental justice networks and activists to the matter of energy in 1999 (Patridge, 2022). Drawing on the work of environmental justice activists in the 1980s, who focused on the uneven distribution of environmental bads to racialized and subaltern communities in the US (Schlosberg, 2013), energy justice adopted the

three main tenets —distribution, recognition, and participation— as the principles through which it could be measured. Drawing directly on the philosophy of John Rawls, the conception of *justice* in energy justice is defined, first as the distribution of goods in a society, and the best principles by which to distribute those goods (Schlosberg, 2007). Distributional concerns consider how costs and benefits are allocated in the context of uneven power relations (Kaswan, 2021), and how this is experienced at different scales (i.e., local, national, and/or global) and in different timescales. Geographers have shown how these distributional injustices can be experienced via proximity to environmental harms, through historical legacies of changes in the landscape, and through the territorialization of power relations across space (Bridge et al., 2013). They have also noted how distributional concerns apply to energy systems and the production of infrastructures, landscapes, and residues at multiple scales (Day, 2021).

Other philosophers like Nancy Fraser, Alex Honneth and Iris Yung have also expanded the distributional focus originally adopted from the Rawlsian conception to the matters of recognition as the processes through which maldistribution can be generated in the first place (Scholsberg, 2007). (Mis)Recognition acknowledges differences in identity. In the framework of environmental justice, it emerged from efforts to accommodate different people, practices, and knowledge systems. However, recognition has played two seemingly opposing roles in dealing with environmental injustices: First, misrecognition can be experienced when people are treated differently because of who they are, and second when "the differences of some people are rendered invisible when supposedly universal solutions are applied in the name of the environment" (Coolsaet & Neron, 2021: 59).

Finally, the focus on capabilities, that is, into how goods are transformed into the flourishing of individuals and communities –and how limiting participation into their definition and functioning can entail new forms of injustices– also expanded the notion of justice to include procedural justice (Sclosberg, 2007). Fraser (2008) refers to the matter of parity of participation, focusing on power asymmetries and different peoples' opportunities to engage with and influence decision-making about the environment (Suiseeya, 2021: 48). However, the "participatory turn" in environmental justice has brought about a series of technocratic and apolitical mechanisms that erase historical and political legacies and strip communities of their

power (Ferguson, 1990). Hence, while there are in fact more issues being discussed, these can only happen within a predetermined set of dialogical forms prioritizing consensus formation, technocratic management, and problem-focused governance (Swyngedouw, 2010).

Energy justice scholars draw on this tridimensional framework to argue that measuring injustices in the energy system retains the tenets of environmental justice, but can also reveal the metabolic relations of environmental resources, and the uneven distributional character of these relations, reshaping landscapes throughout energy value chains (Day, 2021). In other words, while the philosophical foundation of energy justice is built on a liberal framework that infomed most of the environmental justice activism and scholarship, the question of energy is addressed differently by identifying and examining energy systems in their entirety, that is, from resource extraction, production, transmission, distribution, consumption and waste disposal (Jenkins, et al., 2016). This 'whole systems approach' seeks to identify where distributional, participatory or misrecognition injustices occur as it understands energy systems as a spectrum of globally interconnected socio-technical processes that co-produce social and political power—a view mostly absent from traditional political economy's socio-technical perspectives (Newell, 2019; Sareen and Haarstad, 2018).

Additionally, the notion of 'bounding-out' or separating energy from broader concerns such as environmental or climate justice campaigns –despite them being closely related– has placed considerable emphasis on the cultural, political, spatial and social aspects of energy systems (Bickerstaff, et al., 2013; Sovacool, et al., 2017). This lens has allowed political ecologists and critical geographers to construct innovative methodological foci considering how energy infrastructures are envisioned, the institutions that fashion, operate, and regulate energy systems, and the processes of deliberating and debating that create energy choices (Jenkins, 2018; Miller et al., 2013). In other words, energy justice assesses how the different facets and scales of energy systems operate and interact, and how multiple types of experiences point to difficult-to-address injustices in the production, distribution, and consumption of energy-related services (Mulvaney, 2019).

While these contributions have driven an impressive surge in the scholarship of energy justice, most of the main proponents of the concept pay little attention to the activists' histories and instead offer a notion of the concept that reproduces a liberal framework that is not informed by movement or social demands, focusing instead on academic literature itself (Partridge, 2022). The omission of these struggles has lead some of this scholars to argue that, since the concept has not been adopted by social movements –mostly in the Global North– (Fuller & McCauley, 2013), and because environmental and climate justice as concepts have been "naïve in assuming that society would support their 'ideal' instead of focusing on the data-driven world of policy formulation and the dominant role that economists and economic-modeling have" (Heffron & McCauley, 2017: 664), energy justice can benefit from its "non-activist past", focusing instead on a top-down, technocratically-informed approach and speaking directly to policy-makers (Jenkins, 2018).

This formulation of energy justice not only ignores and disavows political movements' demands, but it further entrenches a committed to a liberal-modern view of justice that is oriented around policymaking and statist interventions (Sovacool & Brisbois 2019). This is despite some scholars' interventions seeking to 'extend' the core tenets to include *cosmopolitanism* and *restorative* justice (Heffron, 2021). While commendable, they share an underlying problem as –very much like the frameworks that inform CPE– they continue to treat 'energy' and 'justice' uncritically as they are largely defined through Western ways of thinking (Lohmann, 2013; Agyeman, et al., 2010). These scholars often assume that energy justice can be delivered through state energy policy, downplaying the underlying conditions in which energy policy operates. Such an approach fails to recognize the embedded patterns of injustice in energy systems at the local, historical, and spatial levels and lacks a coherent assessment of global capitalism and structural oppression (Baptista, 2018). As a result, energy justice becomes overly positivistic and affirmative, excessively relying on policymakers, experts, managers, and consumers *doing the right thing* or making more informed energy choices (Sovacool, 2021). This is particularly true in the Global South when energy justice is coupled with, or based on, universalized or one-size-fits-all policies promoted by international organizations like the World Bank or the International Energy Agency (IEA) (Labban, 2012).

An example of this would be projects such as SDG 7 which seeks to "modernize" or "develop" energy systems in the Global South and which could effectively transform energy systems and infrastructure into an "apparatus" for neoliberal governmentality. In other words, energy infrastructure and electrification represent key means through which state formation, accumulation, and political capture by economic elites is enacted and contested (Power and Kirshner, 2019). The material and symbolic work of large-scale infrastructure allows the state to discipline, enroll, and enlist citizens in modernization and development projects (Power and Kirshner, 2019. For a critique, see: Castán Broto, et al., 2018; Munro et al., 2017; Urpelainen, 2018). Critical scholarship has pointed to the limits to these normative approximations of justice which uncritically bring together distributive and procedural theories of social justice. For example, even Nancy Fraser's (2003, 2008) bivalent conception of justice which conceived distribution and recognition as two mutually exclusive spheres –where class struggles appear separate from status or identity politics, as imbricated paradigms of injustice and argues that strategies that seek to "remedy" maldistribution or misrecognition are either *affirmative* or *transformative*– does not provide the tools to problematize the state's role in the (re)production of injustices (i.e., via domestication through the creation of participatory spaces) and downplays the subjective dimension of coloniality in overcoming injustices (Álvarez & Coolseat, 2020: 59).

While, affirmative solutions aim to correct inequitable outcomes of social arrangements "without disturbing the underlying social structures that generate them." Transformative strategies, in contrast, aim to correct injustices by restructuring the underlying generative framework— the root causes of the injustice (Fraser, 2003: 74). The bivalent approach incorporates economic, cultural, and political dimensions to identify misframings and evaluate possible remedies (Fraser, 2008: 21). However, concerns over distribution, participation, and recognition—while useful in exposing the unequal exchanges resulting from, for example, the dispossession of land— often fail to account for the experiences of Indigenous communities and subaltern groups as they continue to face a much broader patterns of violence, extraction and exploitation based on the persistence of the CMP. This includes the material impacts of the maldistribution of harms and benefits and "the right to live in relation to one another and the natural world" (Coulthard, 2014: 13). Additionally, Álvares and Coolsaet (2020: 56) argue that prioritizing a fair distribution of environmental costs and benefits encounters two problems from a decolonial perspective: first,

“it may entail a misrecognition of other modes of life that are incompatible with a capitalist mode of production and/or with anthropocentric ways of understanding justice”; and second, “it sets aside the fact that even the requests of recognition from minority groups may be the expression of a desire that has been captured by coloniality.” Only measuring the equality of exposure to environmental hazards can obscure misrecognition. Although this may temporarily and locally address environmental injustices, in a global context, it simultaneously may legitimize and expand the capitalist economy.

This has mostly become clear in a context defined by AEU where redistribution, recognition, or participation are applied in already racialized, patriarchal and militarized political-economic patterns of controlled access to resources (Velicu & Barca, 2020). Furthermore, the onto-epistemic commitment of these principles to Western modernity often reduces distributive concerns to matters of monetary exchange, compensations or reparations, disregarding other knowledge and forms of living/being. While issues of participation and procedural terms often reduce people to a singular identity, their participation can only be limited to a particular issue, project or policy, after which people can be further exposed to other forms of violence (Velicu, 2020). Due to these limitations, concepts like recognition, distribution, participation, cosmopolitanism, and restorative justice often affirm, rather than transform, the underlying conditions of social and environmental injustice embedded in the energy system (Fraser, 2003; Fraser & Jaeggi, 2018). The resulting policies are a form of “anti-politics”—a process that neutralizes, erases, and/or disavows contentious politics (Ferguson, 1990; Swyngedouw, 2010) by assimilating and domesticating pressures for radical and disruptive change into the dominant hegemonic order (Newell, 2019).

In terms of recognition, the problem goes further. Addressing recognition as a form of injustice goes beyond simply identifying how, why or where *misrecognition* happens, instead we must understand recognition as part of a broader strategy or a form of governing social difference in the wake of what Elizabeth Povinelli (2011) refers to as *late-liberalism*. While liberalism can be understood as a form of governance that draws on democracy and capitalist markets –a governmentality that devolved into *neo*liberalism, which seeks to place economic rationalities beyond the state and market itself, making it the general measure of all social activities and

values– *late-liberalism* is constituted by a form of governance or a direct countermeasure to the crisis to liberalism posed by the anti-colonial politics that emerged after the 1960s. Povinelli argues that the crisis brought about by these movements pushed the governmentality of liberalism to manage and incorporate minorities and *difference*, without disturbing the fundamental experience and already existing truths of liberalism.

In other words, *cultural recognition* acts as a form of governmentality that transforms a crisis of legitimacy of the nation-state (itself a modern/colonial institution) into a crisis of *how to govern* the cultural differences within the state. The rise of notions such as 'multi' or 'pluriculturalism' reflect this trend by showing how cultural recognition incorporated and disciplined the challenges posed by anti-colonial movements by creating a limit over how much difference is allowed to be included, that is 'culture had to become pliant to legal and social science analysis and political and social incorporation.' (Povinelli, 2011: 27) Turner (2018: 772) expands on this analysis by showing how late-liberalism is simultaneously and paradoxically challenging and sustaining coloniality. The central premise of late-liberalism is rooted in understanding it as a temporal category that mediates the value/waste categorization and marks the way in which different bodies are caught up in and subject to disciplinary, sovereign and governmental power. For example, the division of those that appear to be *underdeveloped* and the imposition of interventions required to place them on the *developing* path, places *others* in a condition where *the future* can only be determined through the framework developed by the colonizer, turning *othered futures* into an identity linked to the past. This form of liberalism draws on how governmentalities were historically informed by the colonial logics of empires and justified the deployment of violent forms of *developmental technologies* within the 'developed' modern-liberal states as well as in the former colonies or 'developing' countries (Dunlap & Jakobsen, 2020).

Postcolonial scholars have argued in a similar vein, reflecting on how the politics of recognition is not "posited as a source of freedom and dignity for the colonized, *but rather as the field of power through which colonial relations are produced and maintained*" (Coultard, 2014: 17). In a similar vein, decolonial scholars in Latin America argue that the push for 'multiculturalism' paired with the expansion of neoliberal policies in the region was mobilized as a project to pacify

resistance, fragment movements and bring the excluded into global capitalism's all-consuming framework and structure (Walsh, 2018). The notion of interculturality of pluriculturalism quickly became embedded into the developmental policies that shaped the neoliberal policies and constitutions of the countries in the region. In terms of culture, recognition still operates under a colonial system of hierarchies and superiorities, where 'otherness' is recognized condescendingly through 'individual inclusion and the facade of dialogue (...) interculturality entails a more complex mode of domination that captures, co-opts pacifies, demobilizes and divides movements, collectives, and leader; impels individualism, complacency, and indifference, and shrouds the structural and increasingly compound convolution of capitalism and coloniality' (Walsh, 2018: 58).

In terms of energy justice, the deployment of such tactics (see Articles 2, 3 and 4) usually manifests through the use of specific tools that seek to guarantee a form of recognition, in the deployment of infrastructure projects or broader policies in general. Such tools include public consultations and the Free, Prior Informed Consent (FPIC) procedure regulated by the International Labour Organization (ILO) for Indigenous peoples, as well as other project-based tools such as Social and Environmental Impact Assessments (SIA/EIA). As described in Section 2.2 these tools are often deployed through various forms of *hard* coercive strategies and *soft* technologies of social pacification or engineering around the emergence of EDC. The adoption of such strategies follows the same conditions of cultural recognition under late-liberalism, where the matter of recognition is used to legitimize and structurally determine the interest of the colonizers the persistence of a CMP. While, some scholars have highlighted some of the limitations of trying to deploy a energy justice framework in a context of *total extractivism* or AEI –for example, around the conflictive nature of mining and extraction needed to sustain low-carbon energy systems (Sovacool 2021; Sovacool, et al., 2021)–, addressing questions of distribution, participation and recognition in a context of late-liberalism seems not only to limit the actual possibilities of 'justice' to become possible, but risks further encroaching injustices as the concept of energy justice remains committed to a liberal-modern conception of justice.

2.3.2. Reformulating energy justice for the ground-up

Critically engaging with the notion of energy justice opens two particular challenges at this point. First, it opens a dialogue over how energy justice can be formulated (if at all) and under what characteristics can it be theorized / understood. And secondly, it brings to the fore the challenge of analyzing a normative framework –such as the one defined above by energy justice, with its benefits and limitations–, to the actual processes of transforming energy systems (i.e., energy transitions). This section engages with these two points and offers the basis of how energy justice can be addressed as the study and praxis of energy transitions moves forward. The first challenge is that of how to critically reformulate the notion of energy justice. To be clear, the intention of this chapter –and of the entire research project– is not to claim that the tenets of energy justice are 'useless', but that they have to be seriously questioned when deployed from a top-down perspective. This line of questioning would entail reflecting on how energy justice is informed and by whom (i.e., on what practices, histories, politics, etc.)? And if these tenets are effective in acknowledging how injustice emerged and continues to operate (i.e. do they question and destabilize the persistence of AEU?). Drawing on the theoretical framework presented in this Chapter, it can be reasonably argued that the normative framework of justice guiding energy transitions in different places and scales, is limited and overly relies on a Westernized-universalized conception of justice and the *world* itself. Incorporating a decolonial critique would first and foremost entail tackling how the formulation of energy justice remains committed to principles of the modern constitution. The work of Lina Álvares and Brendan Coolseat (2020), Leah Temper (2019), Glean Sean Coulthard (2014), Catalina de Onis (2021) and Jacques Rancière (1999) offer important contributions that could help determine how energy justice could be reformulated from the ground-up.

Álvares and Coolseat (2020: 55) argue that the notion of Environmental Justice (EJ) remains "too geographically and conceptually bound to a hegemonic-Western idea of modernity and Western-inspired political ideals". This, they argue, manifests in the three tenets of EJ framework in the following way. First, in terms of distribution it risks *distributing harm* by misrecognition of other forms of life that are incompatible with capitalism mode of production –by legitimizing exploitation as long as its most harmful effects are being distributed equitably within society (p.

55) – while discounting the possibility that requests from minority groups already operate under desires captures by the CMP. Secondly, in terms of recognition, they argue that EJ frameworks tend to reproduce state-based solutions as the dimension in which EJ can be attained, a process that maintains a Western-informed value/waste relationship and ignores or downplays the psychological dimension of subjects (i.e. the coloniality of being), dissolving it into broader social concerns (p. 61). Finally, they challenge the notion of participation by drawing on postcolonial scholars' discussion about 'speaking for others'. Here, Álvares and Coolseat draw on the notion of situated knowledges (Harraway, 2009), which has also influenced the work of PE in dealing with EJ frameworks. The problem comes when EJ frameworks draw on universalized notions of justice that sees discounts other forms of knowledge and being –reducing difference to what is 'tolerable' without disrupting the Western conception (Povinelli, 2002)–, sees local groups as objects of study and not knowledge producers and presents its discourse as *'neutral'*, *'objective'* or *'scientific'* (Castro-Gómez, 2007).

Álvares and Coolseat's critique to the coloniality of EJ is echoed by Leah Temper's (2019) analysis of the Unist'ot'en Resistance and Action Camp blocking pipelines in northwestern British Columbia (BC), Canada. Drawing on a similar background, Temper argues that going beyond distribution, recognition and participation entails reformulating the notion of justice by first recognizing the way that dominant conceptions and forms of knowledge operate through the normative framework of EJ. She instead advocates for Epistemic justice –"which entails making visible and politically relevant ways of knowing that have been marginalized as a result of the imposition of a dominant knowledge system over others" (Widenhorn 2013: 380)– as a way to move from procedural, distributive and recognition concerns to autonomous self-governing bodies, non-monden and place-based destabilization of the modern constitution and cognitive justice respectively.

In terms of procedural justice, Temper shows how the terms dictated for participation by states usually are unable to comply with the ontological and cosmological experiences of Indigenous communities. This matter, which is also informed by how PE and PO understand the persistence and expansion of EDC, shows how the experience of First Nations in Canada turn towards forms of self-governing authorities and the reformulation of procedures such as FPIC within the terms

of their own self-determination, can unsettle the participatory structures set by the state and the legal frameworks that often invisibilize and downplay the terms under which inclusion and participation can occur. This perspective argues for a radical reconfiguration of procedural energy justice by drawing on the possibility of 'grounding' how Indigenous and peasant communities traditionally make decisions and the different temporalities and procedures associated with the forms of knowledges that are often invisibilized by the State (Coulthard, 2014). This approach highlights the role that *new energy spaces* –such as territorialities and energy landscapes– take in reshaping our conception of energy, justice and the transition process (Bridge & Galing, 2020).

For example, Becker and colleagues (2020) utilize the concept of scale and place to highlight the possibilities for autonomous urban energy communities in London and Berlin, while Kirhser and colleagues (2020) use the concept of energy landscapes to link the energy transition process to the historical legacies and collective memories of colonialism in Mozambique, an essential tool for reworking and resisting state power (see also Castán Broto & Sanzana Calvet, 2020). Categories such as territory offer additional openings and interrogations towards theorizations of alternative futures and horizons of the possible. As Halvorsen (2019: 794) contends, the Latin American conception of the territory reveals not only that knowledge is situated, but that the notion is rooted in multiple genealogies that overlap with broader historical-political and emancipatory struggles. The process enables the creation of 'contact zones' where multiple onto-epistemic proposals –including the Modern eurocentric conception of a singular worldview oppresses others– can come into dialogue with other onto-epistemic formulations that hold broader political struggles towards emancipation, self-determination and liberation. The 'eco-territorial turn' in Latin America (Svampa, 2018) has provided a wealth of alternative languages of valuation that manifest is a diverse set of onto-epistemic practices and a plurality of knowledges that arise from ontological conflicts in these spaces. These knowledges and practices constitute the basis of what informs the pluriverse, understood as the emergence of a confluence onto-epistemic practices that resist the imposed form of knowledge, being and power articulated under Western modernity and embodied by the zapatista slogan *a world where many worlds fit*.

Secondly, Temper argues for a destabilization of human/nature dualism. This point sits at the core of the decolonial critique formulated in this thesis around the challenge of delinking social theory from Latour's (1993) 'modern constitution'. However, Temper's point highlights the challenge of effectively addressing distributive claims within the Western epistemological framework which sees nature as "a passive object that can be more justly and equitatively distributed among human populations through different property rights" (2019: 106). The problem is that legal frameworks informed by this perspective are often not capable of grasping other conceptions of nature where it is not transformed into a 'resource' a process that usually reduces ontological incommensurabilities into monetary and negotiable terms. Behn and Bakker (2019) for example, show how different conceptions of nature and relations to nature are reduced to compensation or mitigation strategies when governments plan to exploit or extract resources in Indigenous territories –in this particular case, referring to a hydroelectric dam in Canada–.

Even in countries like Bolivia and Ecuador in Latin America which sought to transcend and break this dualism by using the state to challenge the Western/modern framework that informed it, reveals that the notion of *plurinationality* was mobilized as a tool legitimize the expansion of extractive practices with a limited record on actually decolonizing, depatriarchalizing and/or contesting the very basic building blocks of their integration of these states into the international division of labor and material dependencies that constitutes capitalism (see Dinerstein, 2015; Anthias, 2018; Walsh, 2018; Girlado, 2020). Finally, Temper shows how the notion of recognition, itself being the cornerstone of late-liberalism societies, has to be challenged through forms of self-affirmation and cognitive justice. This is the main argument of Section 2.2 and it argues that the CMP "rests on questioning the knowledge structures through which decisions are made themselves; and creating and asserting their own processes and practices relying on their own knowledge, language and ways of seeing and being the world" (Temper, 2019: 107). In the case of Latin America, Indigenous and peasant movements *unsettle* the core tenets of energy justice through "negative praxis" (Dinerstein, 2015: 18): the process of negating or refusing recognition by and through the state, thereby enabling the creation of practical alternatives. Such a refusal blurs the modern separation of nature and society, unsettles private property relations through communitarian and collectivizing practices, privileges use over exchange-value, distinguishes between democracy and emancipation from the State, and seeks to create unique

structures of governance, participation, and collective commitments (Barkin & Sánchez, 2019: 1423).

Despite appearing geographically separate and conceptually different from the Latin American experience, the example of First Nations in Canada provided by Temper, shares several commonalities which are key to the decolonization of formulations of environmental and energy justice. As argued in section 2.2 and 2.3 the experiences of racialized and oppressed minorities in the Global North are directly informed and connected to the structures, tactics and politics of coloniality deployed in the former colonies and 'developing countries' (Turner, 2018). The Global South is then understood not in geographical terms, but in terms of historicity and positionality (Kothari, et al. 2019). However, the main relation is the local communities attachment to land. As Coulthard (2014: 60) argues, Indigenous and peasant struggles focus on space (place) rather than on time (which is centrally important for Western modernity via 'progress' and 'development'). There is an inherent incommensurability between these two ontological perspectives, where land (like energy) builds an ontological and relational framework between nature and society. Simpson (2016: 155) adds that land plays a pedagogical role, forming the basis for indigenous identities, thoughts, relationships, and beliefs.

A sense of place and particular knowledges emerge from relationships with the land: "it is the place where our ancestors reside, where spiritual beings exist, and where the spirits of living plants, animals, and humans interact." (Simpson, 2016:155) The land is a way of knowing, experiencing, and relating to the world and others; situated knowledges emerge through relational practices within a territory to "guide forms of resistance against other rationalizations of the world that threaten to erase or destroy that collectively held sense of place" (Coulthard, 2014: 61). As argued by Coulthard (2014), land cannot be reduced to its material properties, but rather should be understood as a field of relationships between different beings. A sense of place enables a sense of being, experiencing, and relating to the world. The land 'grounds' a system of thought and produces a different sense of ethics, which necessarily reconstitutes how people relate to their surroundings (Cariou, 2017). Coulthard and Simpson (2016: 254) call this 'grounded normativity'—that is, a system of place-based ethics at the core of struggles for dignity and self-preservation and against the abstraction embedded in capitalist modes of

oppression and dispossession. Through grounded normativity, we can problematize what is just, for whom, and how universal ideals of justice operate through the core tenets of energy justice.

The work of Catalina de Onis (2021) offers an additional layer to the reformulation of energy justice. De Onis focuses on the case of Puerto Rico and the everyday power struggles that shape the island's relationship to the rest of the United States by analyzing energy as a relational concept connecting privilege and coloniality, which in Puerto Rico manifests through a long history of colonial occupation. De Onis understands decoloniality as the action of 'delinking' modernity/coloniality in theory and practice, a process that seeks to challenge literally and metaphorically *delinks* the island from the grip of colonial power and simultaneously offer a political-practical framework based '*4Ds'*: *decarbonizing, decentralizing, democratization* and *decolonizing* energy systems in everyday relations in Puerto Rico (p. 156).

De Onis argues that *decarbonization* results from seeing polluting energy systems as the material legacy of colonial occupation. While the possibilities of adopting solar technologies enables the possibility of destabilizing the centrality (i.e., *decentralizing*) of this regime, *democratizing* energy systems can only come about through grassroots coalitions and communities that contest the politics of cultural recognition pushed by the United States government in the island. Her analysis argues that *decolonization* in energy justice manifests a way of delinking inherited assumptions to envision new social, political, and environmental possibilities that continue to normalize, ignore and sideline histories and presences of dispossession and domination by those who benefit from energy coloniality and energy privilege (p. 166). In other words, the act of delinking entails a form of *epistemic disobedience* that "challenges dominant ways of knowing by focusing on difference rooted in various geopolitical bodies that struggle for pluriversality to resist one-size-fits-all approaches; in doing so, this action encourages hybrid and heterogeneous onto-epistemologies and practices" (p. 155).

The notion of epistemological disobedience sits comfortably with the argument presented in sections 2.3 and 2.4. Disobedience —that is, how knowledges and realities that are actively made non-existent by the singular world are "resurfacing" (Ingold, 2000)–, offer three main interventions for energy justice. First, it presents the repressed knowledges, disqualified as

non-conceptual, subjugated by modernity and coloniality, or hierarchically inferior (Foucault, 2004: 7) as a source of emancipation and autonomy (Esteva, 2019). Second, it implies a radical reworking of the "imaginary of politics" that enables political thought and practice beyond modernity's ontological and epistemic limits (Blaser and De la Cadena, 2018). Finally, it reveals the territorial dimension of political ontology through the notion of radical relationality—where the defense of territory, life, and the commons is one and the same (Escobar, 2020). Knowledges produced from territorial struggles suggest that kinship with(in) the territory and a sense of place are built into the relational character of the pluriverse. The notion of epistemological disobedience highlights how, as Escobar (2016) reminds us, the framework of epistemologies of the south has an ontological dimension. In other words, alternative definitions of energy justice become perceptible through the everyday forms of practice and resistance embodied by grassroots movements resisting occupation and designing alternatives to the energy systems embodying privilege and colonial legacies of occupation and exploitation.

Finally, the work of French philosopher Jaques Rancière on the notion of *the political* can also support an additional redefinition of energy justice. Raciere defines the political as 'the interruptive staging of equality by the "part that has no-part" (Rancière 1999: 9). Geographers Erik Swyngedouw and Henrik Ernstson (2019: 12) draw on this definition define the political as "the name that stands for the recognition of the antagonisms that cut through the social. (It) manifests itself in moments or events of interruption of or rebellion against the instituted order of actually existing politics." This definition manifests as the underlying condition of how energy justice is formulated under a context of AEI, that is, it refers to the "disavowal, repression, or foreclosure of the recognition of such constitutive antagonism". Or in other words, it reveals how the appearance of disagreement becomes possible only within neatly defined categories such as class and identity and separating the antagonistic contradictions within these groups by creating a *post-political situation*, that is, a situation in which everything seems to be up for debate and yet radical disagreement is "is either banned completely, met with cynical rejection, or regarded with great suspicion" (Ernstson & Swyngedouw, 2019: 11).

Drawing on this framework, Irina Velicu and Stefania Barca (2020) have applied Rancière's discussion of the political and the politics of recognition to the notion of a just energy transition.

They argue that the notion of justice as usually discussed within the liberal framework, tends to assume that recognition only appears through a question of identity (i.e. in the groups and individuals that appear misrecognized). However, the work of Rancière argues that recognition does not mean being recognized by the preexisting order (i.e. the state under late-liberalism), but that recognition manifests through the adoption of another identity, one that appears to be 'invisible' and that becomes visible only when certain groups *'interrupt'* the pre-established order. Rancière (1999) refers to this as a 'scandalous' that is as the "the scandalous intervention of 'the no-name/the invisible equal' in the 'police' (or pre-established) order of any governmental regime" (Vicalu & Barca, 2020: 7). The *interruption* of the pre-established political order is then what constitutes the basis of recognition, as it forces the redefinition of what is under discussion under the terms of those that had no say or no part in their definition.

The political can then be understood as an *interruption* of the status-quo, or as a way in which that which appears invisible or silent suddenly becomes perceptible and must be reckoned with (Swyngedouw, 2010). From this perspective, Ranciere's formulation of the political is then closely related to the framework of energy justice proposed here and the work of decolonial scholars: by acknowledging that the political as that which can only manifest through a radical interruption of the pre-established order, it simultaneously calls for epistemological justice, by recognizing as valid alternative forms of being and seeing the world, of those knowledges that had been oppressed or erased by the dominant framework of Western modernity (Foucault, 2004; Santos, 2014) while it pushes for a redefinition of what constitutes energy justice informed from the place-based practices and ethics. In other words, it argues that the lived experiences of Indigenous, peasant, oppressed and subaltern communities in the Global South are not only determined by questions of distribution and participation nor their recognition in the design, operation, development, and transformation of energy systems but by a right to live in accordance with their own identities, cultural imaginings, and ways of knowing the world (Leff, 2017).

Table 2: Reformulating energy justice from the ground up.

Tenets of energy justice	Decolonial critique (drawing on section 2.2 and the work of Álvares and	Reformulation (drawing on section 2.3 and the work of Temper, 2019)	Contribution to CPE (Drawing on section 2.4 and the work of De Onis (2021),

(drawing on the work of Jenkins, et al., 2016)	Coolseat, 2020)		Coulthard (2014) and Rancière, 1999)
Distribution: Questions the desirability of technologies in principle become entangled with issues that relate to specific localities, and calls for the even distribution of benefits and ills on all members of society regardless of income, race, etc. (p. 176).	Distributing Harm: Misrecognition by presenting exposure to environmental harm as a fair solution; fails to account for the coloniality of being expressed through desires.	Destabilization of human/nature dualism: Seeks to reformulate the basic definition of nature and private property.	'Interrupting' the established political order: Seeks to transcend the identitarian configuration of the subject, focusing instead of political affinity and the redefinition of the possible.
Recognition: Failure to recognise cultural and political domination, insults, degradation and devaluation or misrecognizing other perspectives rooted in social, cultural, ethnic, racial and gender differences (p. 177).	Speaking for Others: Maintains a coloniality of knowledge that erasers others and reproduces universalized pre-determined definitions.	Cognitive justice: Calls for the recognition of other forms of knowledge that also inform ontological practices.	Epistemic disobedience: Entails a negative praxis of rejection and subsequent self-affirmation.
Procedure: Access to decision-making processes as a call for equitable procedures that engage all stakeholders in a non-discriminatory way (p.178).	Misrecognition of subjectivities: Fails to account how states reproduce and entrench injustices reproducing a Western-informed value/waste relationship.	Self-governing authorities and self-determination: Institutes self-determined processes and practices informed by place-based onto-epistemic codes of ethics and justice.	Grounded normativity: Practices and procedures, based on deep reciprocity, inherently informed by an intimate relationship to place.

Source: The author.

Table 2 captures this research project's attempt to reformulate the notion of energy justice. This perspective traces energy systems' spatial and historical role in reproducing injustices through ontological and epistemological forms of violence and asks how energy justice might destabilize the power relations that shape them. A decolonial perspective on energy justice would then focus on the everyday actions and the territorial relations that constitute energy systems operating alongside dominant power relations (Kirshner et al., 2020). This distinction reveals the entanglements of humans and non-humans that constitute energy systems and challenges

understandings of energy as an abstracted force or "dead input," which obscure energy's connections to political power and domination (Franquesa, 2018). Energy justice can potentially deliver energy as an emancipatory project, destabilize the Western-centric conception of justice embedded in existing regulatory frameworks, and contest/resist epistemological forms of violence and ontological incommensurabilities in existing energy systems and their future transformations (Behn & Bakker, 2019; Castán Broto et al., 2018).

2.4. Theoretical contributions and their relation to the research articles

This chapter has argued that the work of CPE on energy transitions has become a fruitful space to engage with how energy transitions manifest physically and materially, and how these expressions are rooted to structures of power and politics. Foucault's (1986: 7) conception of the emergence of 'subjugated knowledges' encapsulates what can address some of the core limitations of CPE –uncritical approximations to the role of the state, energy, transitions and renewability, as well as an unwavering commitment to the Modern Constitution– to understand the nature and the implications of energy transitions in different places. That is, from 'the historical contents that have been buried or masked in functional coherences or formal systematizations' and the knowledges that have been disqualified as non conceptual, insufficiently elaborated or naive and which remain hierarchically inferior, below erudition of scientificity, there is a possibility of informing different patterns, spatial manifestations and socio-ecological relations that constitute energy systems. The emergence or *insurrection* of these knowledges (Dunlap, 2021) now shapes how the CMP can contribute to engaging with some of the core limitations of the CPE understanding of transitions. Article 1 –which deals explicitly with how energy justice can escape from a Western, modern and universalized definition of energy justice– draws on a systematic emergence of such subjugated knowledges, specifically focusing on the Latin American context and proposes a theoretical examination of how energy transformations can manifest in more grounded or place-specific ways.

In a similar vein, the work of political ecology and political ontology has made important contributions to the study of energy and energy systems by engaging and revealing the uneven

metabolic relations that shape energy systems, and how energy is understood as much more than just a resource but as a relational entity or the result of the interaction between the human and non-human relations. This chapter drew upon the political economy of energy transitions to determine the role of 'new' or 'emerging' spaces/actors and technologies in shaping the structural, relational and the processes of transitions. In doing so, it argued that much like the sources of energy that transform the material and ideological landscapes that shape energy systems, they also reconfigure existing power retaliations by questioning who and how and for whom production is organized and re-organized in a given historical period (Newell, 2019). In other words, the transition process creates new spaces that reconfigure social power relations and expand the conditions towards emancipatory configurations based on a different relation with landscapes, territories and energy itself (Bridge & Gailing, 2020; Kirhsner, *et al.*, 2020; Becker, *et al*., 2020). Article 2 –which deals specifically with CPE and the emergence of new actors beyond the nation-state and their relevance to inform CPE discussions– explicitly engages with these new energy spaces, and contributes to the work of CPE by expanding its interaction with the CMP.

Additionally, this chapter has also argued that understanding energy justice, by first exposing the liberal and modern attachment of the term, and secondly, by understanding how the reproduction of energy justice, can end up reproducing and creating new forms of injustices. Starting from a context of AEU enables a much more nuanced and broader critique to the coloniality of justice as argued by Álvares and Coolseat, (2020). In other words, the core and extended tenets of energy justice –participation, distribution, recognition, restorative and cosmopolitan justice– are built on modern conceptions such as an unilinear form of development and a Western-centric conception of human rights which has reached an impasse as a language for emancipatory change (Santos & Sena Martins, 2021; Maldonado-Torres, 2018). These notions are embedded within an epistemology of development that not only maintains the COP, but that also normalized capitalist social relations. As Turner (2018) argues, the connection between forms of internal colonialism and colonial exploitation connect the strategies of capital accumulation and control of populations in the center and periphery model. Articles 3 and 4 of this thesis present draw on the contributions highlighted in this chapter to:

a) Argue that energy justice, which is usually measured by instruments that seek to embody each of these tenets (i.e. FPIC for recognition, EIA for Participation, etc.) are usually deployed as measures of ontological weapons that seek to repress other forms of knowing, being and doing, operate as forms of social engineering consent and shaping hearts and minds (Verweijen & Dunlap, 2021) and forms of social control, that legitimizes and imposes a particular form of development over others.

b) That these forms of control and legitimation are built into much more broader processes of capitalist reorganization and creation of legible zones from extraction (i.e. the deployment of regional infrastructure projects like the so-called 'Maya Train').

c) That the struggles and strategies of those defending their territory leads towards forms of epistemic disobedience and reaffirmation of traditional or grounded forms of justice, blocking access and defining the territory, interrupting the status quo and politicizing the framework of the transition and creating 'undisciplined actions' –drawing form knowledges emerging outside academia (Armiero, Barca & Velicu, 2019)– or 'third spaces' that can inform our conception of what counts as energy justice.

Section 2.3 (and more specifically, section 2.3.2) has offered a reformulated vision of what constitutes energy justice. This proposal draws on different literatures and approximations to the question of justice, as well as its application in different places. While this notion is further developed in Article 1 and applied in case studies in Articles 2, 3 and 4, the formulation presented in this chapter remains theoretical, that is, the case studies used in the latter articles inform this (re)definition of justice, but have not necessarily provided an alternatives that can be seen in other places (for example in the case of Indigenous communities in the North of Puebla in Mexico (see Cooperativa Tosepan, 2022)). More research is required to understand some of the challenges, limitations and possibilities emerging from this (re)definition and its application (something that will be discussed further in the final chapter of this Capa). The following chapter explains how this research was designed, by presenting the methodologies chosen to engage with the research questions, the empirical sources that informed such methodologies and how these interact with the theoretical framework presented in this chapter.

3. Research design and methodological approximations

This chapter describes the research design. The first section explains how the research process was designed and how it unfolded. The second section highlights the methods used to answer the research questions. This section draws on multiple sources of information and different types of scholarship dealing with the transition process in Mexico, Latin America and the Global South. The third section introduces the empirical evidence recovered to support the methodology, which includes two rounds of interviews conducted with a set of different actors over the course of 2021 and 2022 and a selection of documents and online materials. Section four introduces the research limitations dividing them into two main categories: The circumstantial limitations for data collection, which highlights the emergence of the COVID-19 pandemic in early 2020, and the theoretical, power and positionality challenges that emerged from this and other complications. Finally, section five introduces a discussion on the issue of my positionality and research ethics in doing decolonial research and shows how this thesis draws on multiple knowledges and practices to engage with energy transitions.

Because the case studies are grounded in the theoretical perspectives outlined in the previous chapter, this chapter adopts a methodology that closely resembles that of other studies in these same scholarly traditions (See: Dunlap, 2018; Ávila-Calero, 2017; Castán Broto, et al, 2018; Behn & Bakker, 2019; Kirsher, *et al.,* 2020; Franquesa, 2018; Milbourne & Mason, 2017). These studies have based their analysis on a mixed set of empirics including interviews, ethnographic work particularly in the context of the Global South, and the analysis of power relations built upon a historical dependence on 'cheap' energy and exploited land/labor. They also draw on documentary sources (newspaper articles, archival and public documents), historical studies, expert analyses, and autoethnographic methods such as researcher's observations. This sort of approach enables one to both capture the substance of public debate (in the form of newspaper editorials, documents published by institutional actors, and interviews) as well as understand the context surrounding a particular conflict (based, for example, on archival documents, participant observation, and historical studies), and to get first hand information about the lived experience of participants and the researcher (Dowling, *et al.*, 2016).

A final but important note is that, because this research project was presented as a *thesis by publications*, given the nature and word limit of academic research articles, I was not able to explain in full detail the case studies selected and do deep dives into the methodological approximations in each of the articles. Therefore, this and the following chapter seek to provide the necessary context that informs the 4 articles presented as the result of the research project. The following section goes further into this by detailing the research design for this thesis.

3.1. Research design

Before engaging with this PhD Project I worked for several civil society organizations in Mexico dealing with climate politics, human rights and the prospect of an energy transition. This work had brought me closer to an engagement with low-carbon infrastructure and the multiple ways in which different grassroots, Indigenous communities and peasant groups were affected differently from their deployment. My work in civil society and social movements had brought me closer to a political economy of the energy transition, highlighting some of the unwanted consequences of the deployment of large-scale low-carbon infrastructure projects, and the multiple actors involved in this process. As described in Chapter 1, since 2013, the energy transition process in Mexico has been marked by a progressive liberalization of the energy system. However, the deployment of low-carbon infrastructure has responded to the needs and interests of the incumbent hegemonic forces and has not addressed the increasing energy inequality in the country –where roughly 40% of households experience a kind of energy poverty (Graizbord & García Ochoa, 2016), where rapidly aging infrastructure and a systematic lack of public investment has created unreliable electricity services and a reliance on fossil fuel generation–.

My first contact with the state of Yucatan came as a coalition of organizations I was working with in 2017 started a project seeking to address the socio-ecological consequences of the deployment of low-carbon infrastructure in the state. The project emerged after documentation and analyzing the events in Oaxaca, where the massive deployment of wind turbines had generated important socio-ecological conflicts in the region and inaugurated a new form of extractivism in the country (Howe and Boyer, 2016; Avila-Calero, 2017; Dunlap, 2018). The approval of 9 low-carbon infrastructure projects in the State, as part of the newly inaugurated

Long-Term energy Auctions (LTA), brought increased attention to Yucatan Peninsula, and to how the new regulatory framework emerging from the 2013 Energy Reform would be implemented –with policy makers seeking to avoid the same fate of Oaxaca–. The project quickly determined that the new regulatory framework was increasing instead of reducing socioecological conflicts, in part because of a lack of adequate forms of recognizing difference of local, Indigenous and campesino communities into the policy framework (CER, 2020).

Stemming from some of the results of this project, I presented a research proposal for a PhD project arguing that the approach of the project itself was limited, mostly because it was still trying to speak to policy-makers and trying to address injustices within the liberal-modernist framework that constitutes capitalism's unwavering commitment to economic growth and 'sustainable' development. The original proposal sought to engage with the EDC emerging in the Peninsula of Yucatan, drawing specifically from PE. In other words, I was interested in trying to understand how uneven metabolic relations were shaping the energy transition in Mexico and how the uneven consequences of such a transformation was quickly changing landscapes and territorial relations across the country, as 'renewable' potentials inaugurated new extractive frontiers. The original proposal focused on 4 large-scale low-carbon infrastructure projects in Yucatan: 2 solar parks (*Ticul A and B*, and *Yucatan Solar*) and 2 wind farms (*Dzilam de Bravo* and *Chcxulub*). The proposal also included a six month visit to the Yucatan Peninsula to conduct ethnographic research of Indigenous and peasant communities in the region resisting the deployment of these projects and/or experiencing the uneven socioecological consequences of their deployment. Finally, the proposal included visits to each of the project sites, interviews and dialogues with the communities living in close proximity (and not necessarily or explicitly opposed) to these projects and interviews with government officials, private companies as well as academic, activists and civil society networks in the region.

However, two things drastically changed the research design: First, during a climate justice conference held in Durham University at the end of 2019, I was surprised to see that the concept of energy justice –which at the time was becoming an important research interest for academics in the social sciences, was presented as a technocratic and policy-making tool that could benefit from a lack of an 'activist past' (see Section 2.4). The results of this conference pushed me to

question: Wasn't energy justice, like environmental or climate justice, all about listening to people's demand for a fairer system? And aren't the goals of energy/environmental justice researchers to draw attention to and support struggles against exploitation and extractivism arising from capitalist systems? Consequently, the question for me became: if the purpose is to dissociate energy justice from what is happening on the ground then, how exactly does energy justice (or any other form of justice for that matter) account for these historically different realities? This questions quickly reformulated the theoretical basis of my work, enabling me to focus on the particularities of the energy transitions in the Global South, where societies-in-movement and a few scholars had begun to challenge and question how energy systems continue to sustain material and ideological colonial regimes of power (see Allan *et al*., 2021; Dunlap, 2019).

The second reason was not theoretical but circumstantial. As the research proposal was being developed, the COVID-19 pandemic struck, halting international travel and effectively elevating a sense of actual and perceived risk hindering any possibilities for site visits. Because of this, the field-work to support the theoretical arguments that was also in development at the time had to be reformulated. This condition prevailed for over a year (beginning in March 2020), which meant that the research would have to continue but the methodology had to be changed to meet this unprecedented circumstance. To address this, the research design was modified in three ways: First, and because at the early stage of the COVID-19 pandemic fieldwork was impossible, the theoretical basis of this research project was reworked as a research article (now Article 1), which would lay the foundations of the rest of work. However, this triggered the possibility of pursuing another format for the thesis (i.e., thesis by publications), which allowed me to divide the research perspective into 4 specific research articles.

Secondly, instead of pursuing ethnographic research focused specifically on the knowledges that are situated around low-carbon infrastructure, the actual methodological approach of the thesis takes a broader approximation to the energy transition through three layers of understanding: First, it looks at the energy transition process from a political economy perspective, trying to understand how the energy systems are organized and how they *should* be (*re)organized* through the transition process (Article 2), secondly, it looks at the ontological and epistemological

disagreements that constitutes the energy transition process in a context of total extractivism (Article 3) and, third it looks at the particular lived experiences of communities resisting low-carbon infrastructure deployment, and the broader implications this has when applying a colonial lens to the existing energy system and its transition processes (Article 4).

Third, a change in the theoretical perspective also meant that the methods and empirical evidence would have to change. To address this, I reduced the number of case studies to two (a solar project and a wind project) and added an additional layer of the regional reconfiguration of the territory focusing on the Maya Train –a regional infrastructure project seeking to interconnect 5 states in the south-east of Mexico (further described in Chapter 4)– to march the three layers and scales of approximation to the energy transition described above. Methodologically, I conducted on-line, in-depth semi-structured interviews (SSI) with a broad range of actors, but mostly focusing on civil society and activist groups working on the energy transition process in Mexico from different perspectives. The reason for such a disparity with other actors emerged because during the interview process, few government officials, Indigenous community members and private sector actors answered my requests for interviews and, because of my previous work in México, I had pre-existing connections and contacts with some of these activists, networks and organizations. In order to address this gap of representation, I also conducted a selection of 78 documents (which included private company reports, government documents, audio and video recordings of conferences and speeches, as well as academic papers and civil society organizations press releases and newspaper articles) to create an even balance between these different actors and their perception of the energy transition in Mexico.

Once the pandemic restrictions began to ease in late 2021, I was able to travel to Yucatan and conduct fieldwork, but this visit was reduced to only two months instead of six. I nonetheless conducted an additional 14 in-depth SSI interviews, this time focusing on local government officials, Indigenous and peasant community members and local activists. The two rounds of interviews were transcribed and, after conducting Document Analysis (DA) and Critical Discourse Analysis (CDA), to the selection of 78 public documents, the results were analyzed using thematic analysis by creating a code that would allow to identify and differentiate the different perspectives of each actor and their relation to the energy transition process in Mexico (more details of how this process was done are presented in the following sections).

The fourth and final change in the research design came while the fieldwork was being conducted. Living in Yucatan for 2 months allowed me to conduct site visits as I was scheduling and seeking interviews. This included visits to archeological sites, museums, sites with traditional forms of housing, and harvesting (*milpa*) sites, walking the streets of Merida and other adjacent smaller towns in the state of Yucatan and the sites of the low-carbon infrastructure projects themselves. All the while, I carried a notebook, a voice and video recording devices taking notes about these experiences. These notes, pictures, videos and recordings would become the basis of an autoethnographic reflection, which constitutes the fourth method chosen to support the findings. The following section explicitly engages with the methodos chosen for this research project. It goes into further detail of why these particular methods were chosen and on how these methods interact with one another to support this research project.

3.2. Methodology

This thesis relies on four methods: First, it draws on qualitative semi-structured interviews (SSI) as the first and main source of empirical information. Secondly, it uses Critical Discourse Analysis (CDA) to analyze a series of public and online documents (including written, audio and video material) –which will be described in more detail in the following section– engaging with the way multiple actors frame and understand energy transitions in Mexico. Third, it draws on thematic analysis as a way to analyze the results obtained from the SSI and the CDA of the revised documents together. This approach also included and was put into dialogue with the final methodological approximation which was auto-ethnographic observations and site visits conducted during two months of fieldwork in the State of Yucatan to support the empirical evidence gathered by the other selected methods. This section will explain the relevance of each of these methods to this research project and lay out the basis for the rest of the sections in this chapter.

First, qualitative SSI is one of the most commonly used data collection methods because it allows the researcher to explore subjective viewpoints and to gather in-depth accounts of people's experiences (Flick, 2009). SSI are usually conducted through a set of general and specific questions designed for each type of participant. While some of these questions are the same for all interviewed subjects, a few are modified and selected based on the particular person,

their context and background, as well as their expertise or particular knowledge on the subject (Kallio, et al., 2016)[17]. This approach guides the interview, but it also allows other relevant themes to emerge and develop throughout the conversation. As Rubin & Rubin (2005) argue, the interview should resemble a 'flowing conversation'. For this particular research project, the use of SSI was a deliberate choice as it allowed participants to formulate in-depth reflections over their particular epistemological position on the matter (in this case, the way that energy transitions are being designed and low-carbon infrastructure deployed in Mexico). Qualitative SSI can be used "to consider experience, meanings and the 'reality' of participants' experiences and to explore how these experiences, 'realities' and meanings might be informed by discourses, assumptions or ideas which exist in wider society" (Evans, 2017).

SSI was selected as the main method precisely because it enables the possibility of engaging with multiple epistemological positions from a set of multiple actors engaging with the same issue (energy transitions and energy systems) from multiple perspectives. The interviewees were strategically selected to cover a broad representation of the multiple actors involved (as described in the following section) and supplemented by using snowballing sampling (Mendez, 2020) to gain access to other actors who fit in more-or-less the same broad categories (i.e., civil society representatives, Indigenous communities, academics, etc.). All interviews were recorded and then transcribed in order to analyze the conversations using thematic analysis (Evans, 2017) which consists of analyzing interview transcripts by creating codes and identifying patterns (such as key words, phrases, concepts and narratives) throughout a broad data set (Braun & Clarke, 2006). For example, I used thematic analysis to identify patterns and themes within the data, including the meanings people attach to "energy" and "justice" (at times "energy justice"), "renewable energy,", "climate change" and "territorial rights", "extractivism", "coloniality", "energy alternatives" and "self-determination". All interviews were anonymized and are reported as '*actor*, *date*'. This was a precondition established under the ethical considerations of my

[17] Since the set of actors that were interviewed were different in scope and structure, a set of general questions was prepared describing the overall and general process of the transition process in Mexico, and a second questionnaire with specific questions for each set of actors was prepared (see Appendix 2). This was adjusted to the respondents' field of experience/expertise and in relation to how the conversations unfolded during the interviews. Additionally, these questionnaires and the ethical considerations handouts that were given to participants are incorporated into the annex section of this thesis.

thesis, in order to protect the participants from any political, physical or psychological retaliation.

The second methodological approach comes from a selection of documents that were analyzed using Document Analysis (DA) (Bowen, 2009) and Critical Discourse Analysis (CDA) (Hajer & Versteeg, 2005) to bring them into dialogue with the other empirical data obtained from the interviews and the case studies outlined in the following chapter. For this particular approach, DA was paired with CDA, in order to first select the documents to be read and analyzed, and secondly as a way of understanding how language can perpetuate, or in certain cases, undermine, unequal relations of power (Fairclough and Wodak, 1997), respectively. The combination was particularly useful as it created the possibility of discussing different ontological and epistemological assumptions, as well as the 'hidden motivations' behind how issues are framed by different actors (Sikka, 2012). In Mexico, the use of terms like "renewable energy", 'environmental justice', 'climate change', 'sustainable development' in relation to the deployment of low-carbon infrastructure is used as a way to justify particular imaginaries and legitimize the deployment of infrastructures and as 'inherently necessary', 'a common sense' or as 'natural' in the fight against climate change and the government's efforts to reduce GHG emissions. Using CDA offered the possibility of understanding how particular actors have expressed opinions, plans and other public statements (Bowen, 2009), in this case regarding the energy transition process in Mexico and more specifically in Yucatan.

The third methodological approach was based on a combination of the result of the first two methods (i.e. the interview transcripts and the DA of the selected documents). The results obtained from the document analysis, and the transcripts obtained from the interviews, were merged into a single word processing document (using *Nvivo software* to separate and identify certain relevant parts of the DA and the interview transcripts). Thematic analysis enabled the possibility of creating certain 'codes' and identifying themes from the data gathered from the interview transcripts and the DA. The resulting analysis provided a way to compare the documents revised with the interview transcripts, which already contained a series of themes and issues that could be juxtaposed to the DA. In this sense, the role of language operating as an ideological tool, that is, as doing ideological work in a historical context (Sikka, 2012) enables the possibility of capturing different understandings over what the energy transition process

entails, how different groups experience energy (in)justice and what are the reasons behind this transition process. This approach understands texts as expressions of 'social practice' identifying the relationship between a discourse of a particular actor with the situation, institutions and social structures that frame it (see Table 3). As Wodak (2015: 76) argues, this process is dialectical, in that the discourse of the particular event is shaped by it, and shapes the way it is framed as well, or in other words, a "discourse is socially constitutive as well as socially conditioned".

Table 3 introduces how the lens of CDA was applied to the key stakeholders that produced and authored these documents. This approach reveals how each actor holds particular interests and a variety of discursive frames are able to limit, shape and mold the current debate surrounding the energy transition in Mexico. The frames revolve around three core concepts: 'energy transition', 'energy justice' and 'territorial rights'. These concepts shape how different actors understand their relationship to the energy system, a perception of justice, or just outcomes around the deployment of low-carbon infrastructure, and the relationship to place that is reproduced through their use of these concepts. Martínez and Komendantova (2020) in their assessment of the effectiveness of Social Impact Assessments (SIA) used in the deployment of low-carbon infrastructure in Mexico, identify a series of stakeholders involved in the 'social opposition to renewable energy'. Drawing on this work, Table 2 assesses how these actors perceive and hold different or opposing ontological and epistemological assumptions, as well as their hidden motivations behind how these particular issues are framed.

Table 3: Key stakeholders in the deployment of renewable energy in Mexico (Result form the CDA obtained from interviews and DA):

Actor	Main concerns and conceptualization
Private Sector	**Energy Transition**: Reproducing the fossil fuel vs. renewable energy dichotomy - the only things needed are finance, technology and the correct regulatory framework. **Energy Justice**: Is a responsibility of the State and the regulatory framework. A process that has been destabilized by changes in federal policies. **Territorial Rights:** Can be negotiated with the local populations. There

	is no incommensurability between the interests of the companies and the local communities. These are reconcilable differences.
Federal Government	**Energy Transition**: Perspective based on potential that can be exploited. Mapping and prospective thinking for exploitation. The main conceptualization is based on 'adding' new primary energy resources. **Energy Justice**: achieved through the 'correct' application of the regulatory framework. **Territorial Rights**: These are recognized but are placed in a hierarchical position to other interests (development, economic growth, poverty reduction etc.). The argument is that there can be compensation and participation in case of damages, negating ontological differences.
Local Government (Yucatán)	**Energy Transition**: Possibility for sustainable development, increased investment, jobs and energy generation in the state. Influx of economic revenue. **Energy Justice**: A process that depends on federal regulation and the adequate implementation of the framework. Can be achieved by working with all actors involved. **Territorial Rights**: Like the federal government, these are recognized but are usually placed in a hierarchical relation to other economic and political interests.The argument is that there can be compensation and participation in case of damages, negating ontological differences.
Civil Society	**Energy Transition**: This is not a single consolidated group but there is a more nuanced perception of what the transition is looking beyond the dichotomy of renewables vs. fossil fuels and the socio-technical approach. Emphasis on the historical and uneven outcomes of the process. **Energy Justice**: Position is also varied. Most actors subscribe to the correct implementation of the regulatory framework, with some questioning the coloniality of the justice framework calling for self-recognition as a tool for emancipation. **Territorial Rights**: The recognition of self-determination by peasant, Indigenous and other groups through their cultural, historic and political relationship with the territory is recognized as a key point to define territorial rights.
Peasant, Indigenous and	**Energy Transition**: Seen as an imposition of colonial practices of extraction with differences between members and groups who see them

rural communities	as economic opportunities, but still 'imposed' by other interests. **Energy Justice**: While some see it as a possibility for negotiation (through FPIC procedures, for example) others see it as a form of recognition and participation that reproduced colonial occupation through inclusion, socially engineering pacification and quelling social dissent. **Territorial Rights**: These are presented as key for autonomous alternatives to the imposition of the state and private companies. For some these can be negotiation terms, but for others there is a relationality with the territory that can lead to autonomous alternatives.

Source: The author, drawing from Martinez and Komendantova (2020).

Finally, this thesis also includes a fourth data set which contains autoethnographic descriptions that were recorded in journals, a camera and a voice recordings during my visit to the field sites in Yucatan. This method was used as a way of supporting the empirical data obtained, as the empirical evidence that supports it was originally intended to be used only as notes and reminders about the research process. However, at some point during the research process, I was made aware by a few colleagues of auto-ethnography as a method to provide the context and support to my empirical findings. This was particularly useful as the purpose of autoethnography enabled me to reflect on my own experience doing research as an outsider on a different cultural setting (Campell, 2016).

During the systematization of the transcriptions and the empirical analysis, I found myself repeatedly going back to these recordings/notes as reference to my thinking and positionality at the time. Particularly to specific notes made during site visits, and musings before and after several of the interviews (most of them required me to move from Mérida to smaller towns by car, which usually took one or more hours driving). Additionally, because I was living by myself at the time, I found myself constantly keeping notes and recording my own thoughts and ideas as I went along the research process, something that, when listened afterwards, provided a sense of clarity of what each interview and each site visit meant in the process of my thinking. In other words, the autoethnographic approach allowed me to describe moments of everyday experience that cannot be captured through more traditional research methods and articulate this knowledge with a particular cultural experience (Adams, *et al.*, 2017: 3-4). These notes and recordings had no specific length in mind, but were instead focused on being produced daily. After careful

consideration, and because these notes provided references in themselves to my own understanding of the implications of the case studies into a broader context (i.e. the manifestations of the coloniality of power, green extractivism, different conceptions of justice, etc.) I have included them both as a method and as an empirical source *only* as a complementary source to the other empirical sources of information gathered for this research project and mostly as a way of dealing with my own positionality, uncertainty and anxiety on doing decolonial research (see Section 3.5 for this discussion) (Halvorsen, 2018).

3.3. Empirical sources

This section enlists and explains the empirical sources that document and support the methodological approximations described in the previous section. Corresponding to each of the aforementioned methods, the section first introduces the interviews which were conducted on two different sets. It then introduces the selection of documents and the criteria for their selection and, and finally, it presents empirical evidence to support the ethnographic methodology, which includes some of my own writings and photos taken during the site visits and everyday-life in the city of Merida and the Yucatan Peninsula during February and March 2022.

The first empirical resource for this thesis comes from 50 SSI interviews conducted in two different rounds. The first round of these interviews was conducted remotely between February and September 2021. A total of 36 interviews were conducted with different actors, mainly those working or dealing with aspects of the energy transition process in Mexico (see Table 3). These interviews included representatives from NGOs, ex-government officials, business consultants and representatives from the private sector, academics and activists. Interviews usually lasted for approximately 60 minutes and a few of them were carried out with 2 or 3 people at the same time. For this latter type of interview, I relied on group dialogues which meant that interviews tended to be longer, but with more varied content. During the first round I reached out to several people in different sectors including the Federal (5) and local government (3), academics (5), civil society representatives (15), private sector companies and business associations (4), Indigenous leaders and representatives (5) of social movements (5), with the majority of interviews during this round of research were with members from civil society and academics. The main reason for this disparity, as described above, had to do with the COVID-19 pandemic

and simply because more people from these particular sectors were available and willing to have an online conversation about the issue.

A second round of 14 in-depth semi-structured interviews, site visits, and field observations at the sites of deployment of low-carbon infrastructure projects in the Yucatan, took place between February and March 2022. These interviews were conducted with representatives from NGOs, ex-government officials, academics, activists and Indigenous community leaders. Unlike the first round of interviews, which focused on a broader examination on the political economy of the energy transition in Mexico , the role of the regulatory changes and their overall implications in different sectors and groups (mostly to inform Article 2), this second round was focused specifically on the uneven socioecological relations and struggles that resulted from the deployment of low-carbon infrastructure in particular communities (which informed, along with the previous set of interviews Articles 3 and 4). A particular emphasis was given to the ontological and epistemic incommensurability that originated during dialogues between actors and their particular relation to energy systems, to the transition process and their relationship to a particular place. The interviews were based around two particular cases: the proposed development of a solar mega-project in the Municipality of Muna and a wind-farm in the municipality of Dzilam de Bravo in the state of Yucatan. Additionally, the interviews also engaged with the regional context in the Peninsula, or more specifically, with the deployment of a regional project also known as the "Maya Train" which will interconnect the 5 states in the southeast of Mexico, reconfiguring local landscapes and energy policies in the Yucatan Peninsula. Finally, the site visits included a visit and dialogue with communities on the site of the proposed solar project and with several actors involved in the public debate about the wind farm in Dzilam de Bravo.

Table 4: List of interviewees, their respective affiliations and dates.

Interview Number	Sector	Date
1	Academic	23-Feb-2021
2	Civil society rep. (x2)	24-Feb-2021
3	Civil society rep.	25-Feb-2021
4	Civil society rep.	02-Mar-2021
5	Civil society rep.	04-Mar-2021
6	Academic	17-Mar-2021
7	Civil society rep.	17-Mar-2021
8	Government official (x2)	25-Mar-2021
9	Government officials (x2)	29-Mar-2021
10	Civil society rep.	30-Mar-2021
11	Academic	01-Apr-2021
12	Private sector consultant	07-Apr-2021
13	Civil society rep.	13-Apr-2021
14	Academic	14-Apr-2021
15	Civil society rep.	20-Apr-2021
16	Civil society rep.	20-Apr-2021
17	Civil society rep.	22-Apr-2021
18	Ex-government official	23-Apr-2021
19	Government official	03-May-2021
20	Ex-government official	05-May-2021
21	Civil society rep.	06-May-2021
22	Academic	19-May-2021
23	Civil society rep.	19-May-2021
24	Community spokesperson	20-May-2021
25	Civil society rep. (x2)	21-May-2021
26	Academic	31-May-2021
27	Academic	31-May-2021
28	Civil society rep.	01-Jun-2021
29	Academics (x4)	04-Jun-2021
30	Community spokesperson	20-Jul-2021
31	Community spokesperson	20-Jul-2021
32	Government official	28-Jul-2021
33	Civil society representative	5-Ago-2021
34	Academic	14-Sept-2021
35	Academic	17-Sept-2021
36	Private sector consultant	19-Sept-2021
37	Government official (x2)	22-Feb-2022
38	Private sector consultant	23-Feb-2022
39	Academic	23-Feb-2022
40	Community spokesperson	24-Feb-2022
41	Community spokespersons (x4)	25-Feb-2022
42	Community spokespersons (x2)	25-Feb-2022
43	Community spokespersons (x2)	26-Feb-2022
44	Community spokespersons (x2)	27-Feb-2022
45	Academic	02-Mar-2022
46	Civil society rep.	03-Mar-2022
47	Academic	04-Mar-2022
48	Academic	10-Mar-2022
49	Private sector consultants (x2)	11-Mar-2022
50	Community spokespersons (x2)	14-Mar-2022

Source: The author.

The second empirical source comes from a direct response to address the uneven access to different actors during the first round of interviews. As mentioned in section 3.1, the COVID-19 pandemic complicated the possibility of visiting Mexico and carrying out the original research plan, which included at least 6 months of ethnographic research in the state of Yucatan. The selection of additional empirical resources and methodological approximations to this particular research project emerged out of this particular circumstance (and through the methods explained

in the previous section). In other words, this meant that I was unable to have access to a series of actors that, at least in principle, I would have had a better chance of interviewing in person such as representatives from the federal and local governments, private sector employees and representatives and Indigenous communities. To address the gap that emerged from the information obtained during the interviews (which was overwhelmingly coming from civil society, academics), I selected a series of online talks, government documents, private sector reports and other available information online to make up for this imbalance (see Appendix 1). A total of 78 documents were selected for this particular analysis. This is not to say that there are the only documents cited in the coming chapters, nor that these are the only relevant documents for this investigation, rather; the documents reviewed were selected because:

a) They represent the actors that play an important role in shaping or contesting the existing energy systems and reproduce either a continuation or a different vision of its future transformation.
b) They seek to compensate for a lack of access to some actors during the research process, highlighting some of their discursive practices through these documents and,
c) They provide a historical, political and heterogeneous account of the multiple imaginaries seeking to influence the energy transition process in Mexico. The selection of these documents is presented in *Appendix 1*.

A third source of empirical evidence comes from several site visits to the two low-carbon infrastructure sites. In a series of visits to the community of San José Tipehé in Muna, the group of Indigenous and ejidatarios I spoke with opposed the development of a 738 hectare mega solar farm from the beginning. A process that has since divided the community and created tensions that are still present as new government programs, such as Sembrando Vida [Planting Life] continue to roll into the region.[18] These dialogues extended to networks of activists and academics supporting and/or researching the impacts of low-carbon technologies in the peninsula. During fieldwork I was able to visit the site of the proposed project, speak with a few of the ejidatarios opposing the construction of the project and be present in a few of their meetings.

[18] Sembrando vida or Planting life is a program developed by the Federal Government which seeks to continue the reduction of poverty by planting fruit and timber trees for communities and ejidos in southern Mexico (see AUSM 2022).

Similarly, during my visit to Dzilam de Bravo, I was able to visit the site and speak with the park operators. I was able to record (audio) and take pictures of the site as well as speak with the operating team and took a tour of the site. I was later able to speak with people living nearby the project, but overall engagement with this particular project was more limited on the ground. After conversations with a few local people, some of them contacted me and asked me to remove the information from the record.[19] I was then unable to speak with them again or with others involved directly with the project. To compensate for the lack of time and the impossibility to conduct proper ethnographic work, and in-depth SSI, I utilized documentary evidence and empirical research documented by other academics and local activists of local opposition to the project to complement the analysis. Therefore my account of the project comes from dialogues with a few local people regarding the project, my own experience of visiting the site and dialogues with activists and academics surrounding the project. The information obtained from the site visits was included as part of the interviews (in both cases I interviewed people involved in one form or another with the projects) and as part of the documents selected for the DA (as indicated in Appendix 1).

Figure 6: Proposed site for the Solar project in San José Tipché and a wind park in Dzilam de Bravo. Sources: pictures by the Author.

The fourth set of empirical evidence comes from autoethnographic notes taken during the two month field-work in the city of Merida and the state of Yucatan. During this time I was able to

[19] The reasons for such a withdrawal, as per the ethics statement presented to each of the participants, must remain confidential.

record a series of thoughts and write in a diary mostly reflecting on what the research findings at the time and of my own understanding of what it meant to be 'white/mestizo' from a city and researching in a foreign ('developed') country (something on which I reflect more closely in the following sections). These notes were also complemented with a series visits to the sites where low-carbon infrastructure projects where planned or to specific sites where the projects were already operational, as well as other important landmarks and places in the State (as depicted in Figure 7). This source was included as part of the empirical data as a way of compensating for some of the shortcomings already described above (the lack of ethnographical and in-depth SSI). Figure 7 also contains a series of photographs that provided several points of departure to engage more specifically with the local history and how the colonial legacies of power, knowledge and being are still present in the everyday material and ideological manifestations in the Yucatan Peninsula. The following are edited notes (adding the appropriate references) from some of the notes taken at the time, these are then related to the pictures presented in Figure 7.

Entry note 1, recorded on February 15th, 2022: One of the first things people told me upon arrival was that the city was colloquially referred to as the '*white city*', mostly because of the white facades of buildings. As I spoke with local people, visited local museums and read about the mayan history in the Peninsula (Most notably the work of Alicia M. Barabas, 2000, Miguel León Portilla, 1973; Eduardo Galeano, 2018; Guillermo Bonfil Batalla, 2009, all of which I read whilst in Yucatan) it quickly became clear that the 'whiteness' of the city was entangled with a long history of coloniality and expulsion in the Peninsula. One that revealed a long history of plantation-life slavery in the region and a period of open rebellion by Mayan communities referred to as the 'war of the castes' which began in 1847 and lasted until the early 20th century, making it the largest open rebellion in the history of the American continent (Barbas, 2000).

Entry note 2, recorded on March 1st, 2022: The history was also entangled with a progressive epistemic and ontological erasure by the Mexican state, a process that again relies on a long history of colonial extraction and occupation of the peninsula. In the main avenue of the City of Merida (Paseo Montejo) a statue of the Montejo brothers, the first spanish invaders that arrived in the peninsula in 1526 when the conquest of Yucatan was

authorized by the Spanish crown. The statue presents them in a classic explorer position in which they look to the horizon seeing only land to claim and discover. The statue serves as a constant reminder of the colonization impetus of the *Terra Nullius* - *Tierra de nadie* (no-man's land) - that ultimately erases or 'deprives' the landscape of its content, facilitating the reorganization of territories, populations, and plant and animal life into extractible data (Gómez-Barris, 2017). The henequen hacienda a few meters from the proposed Ticul A and B site serves as a form of internal colonialism (Gonzáles Casanova, 2004) and as an ever-present remembrance and as a layer of the waves of colonial occupation. Energy systems and infrastructure are now spatially, historically, and politically embedded within the same structures of extraction and, sometimes, literally the same sites as the colonial occupation. These realities shape power imbalances (Allen et al., 2021) and contemporary politics of land access. Figure 8 depicts, what Patrick Wolfe (2006) argued, colonialism was and continues to be about access to land. Although colonialism might have ended, the colonial project did not end with independence in Mexico, but was perfected through it (Aguilar, 2019). The strategies to gain access to land for the settlers have changed over time, with some being more explicitly (physically or psychologically) violent than others, but the objective and the main tactic remain the same, Terra Nullius ultimately erases or 'deprives' the landscape of its content.

Entry note 3, recorded on March 3rd, 2022: This history, which is often misinterpreted or misquoted in the official record (see Uc, 2019) provides fresh evidence of the progressive epistemic and ontological erasure perpetuated to the Mayan people in the name of progress, civilization, development and now 'sustainable development'. One of the pictures –of a traditional mayan house– was taken close to the archeological site of Chichen Itza. This, along with visits to sites like Uxmal and the Grand Museum of the Mayan World in the city of Merida, revealed how, despite a perceived reverence of the Mayan culture, this exaltation is seen as a thing of the past, one that is converted in touristic attractions and historical sites, but one that denies the Mayan identity and difference in the present (Bonfil Batalla 2009). In other words, Mayan identity is seen as something in the past (Ansotegui, 2021), and something that must remain a thing of the past as development and progress are not compatible with other knowledges and

relationships to nature and place. The same can be said about projects like the Maya Train that contribute to the perpetuation of the colonial order. As mentioned in the beginning of this research project, the creation of an independent Mexico did not signify a rupture with the colonial order, but rather its *perfection* (Aguilar, 2019). Development of megaprojects like this one are a deepening of that colonial order, where the Mayan identity is reduced to a tourist service, transforming it into an experience or merchandise that can be exploited and extracted. Under the vision of "development" and "progress", the traditional ways of harvesting, of subsistence, of relating to the territory and, therefore, of the Mayan cosmovision itself, are usually discounted or even seen as obstacles to the development of the region.

Figure 7: Photos taken during fieldwork in the Yucatan Peninsula. Including the city of Mérida, the archeological site of Uxmal, the Grand Museum of the Mayan World and the cenote Chihuán. Source: Photographs taken by the author.

Table 4 presents the three empirical sources together detailing their relation to each of the methods presented in the section above. The table also includes the time frame during which each of these methods was carried out and empirical evidence was gathered. The following section engages with the main research limitations and some of the most significant complications experienced during the research process.

Table 5: Methods, empirical sources and timeframes.

Method	Empirical sources	Description of the empirical data	Timeframe
Qualitative Semi Structured Interviews (SSI)	Two rounds of semi-structured interviews.	SSI with one or more people. First round included 36 interviews with a set of different actors: Civil Society, federal and local Government officials, representatives from the private sector, academics and activists. Second round (14) focused on local academics, Indigenous community members and activists.	First round of online interviews was conducted from February to September 2021. Second round was conducted during February and March 2022.
Critical Discourse Analysis (CDA) and Document Analysis (DA).	Review of 78 selected documents from different actors and sectors.	Selection of newspaper, journal, online articles, archival and public government documents, academic papers, company or NGO reports, expert and non-expert analyses trough other multimedia platforms (i.e. Youtube), as well as academic conferences and published thesis.	The main collection of documents spanned between March and November 2021. However, the process continued until April 2023.
Thematic Analysis	Review of interview transcripts and the result of DA together.	Interview transcripts and the result of DA were systematically analyzed and coded together using thematic analysis.	This process took place between April and December 2022.
Autoethnographic annotations and recordings.	Site visits and a selection of notes, audio and video recordings during fieldwork in Yucatan.	The process included a review of writings, annotations in journals, video and audio recordings during the two months of field work in the State of Yucatan. These notes were informed through site visits and follow up sessions with particular actors, as well as additional off the record conversations.	Site visits and auto-ethnographic research was conducted between February and May 2022.

Source: The author.

3.4. Research limitations: doing research at a distance

This section introduces the main challenges and limitations that emerged from this research project and explains how these challenges were addressed. Overall, the limitations experienced during the research process emerged from the COVID-19 pandemic and the impossibility to carry out the proposed methodological approach and collect the empirical evidence necessary to sustain it. While the reorganization of the thesis (as described in section 3.1) created new challenges and limitations, this is not to say that the original framework did not have limitations of its own. There are three main limitations identified: a) the absence of particular actors and participant imbalances from the data collected, b) issues of access and trust and c) positionality and power relations. This section engages with each of these limitations, while the final subsection reflects on some of the challenges that emerged in doing research at a distance.

3.4.1. Accessing different actors and creating trust

The first limitation emerged out of the complications created by the COVID-19 pandemic and the research design process. It mostly created two particular challenges. The first had to do with a lack of access to specific actors such as federal government officials and private sector companies. While I already had a network of civil society and other activists in Mexico, I have close to no connections to representatives from the private and federal government officials, which meant that establishing a connection with people over email became difficult. While I reached a significant number of these actors (at least 10) I was only able to get interviews with a few people, with some of the requests being denied or more generally not receiving a response.

Second, the lack of trust also became an issue when working from a distance. This issue became clear especially when interviewing local activists in the Yucatan Peninsula. Several civil society organizations refused to speak to me, doubting my intentions and interest in the situation in Yucatan. Others were open to an interview but had doubts about my positionality (i.e. a mestizo male researcher from Mexico City working in a university from the Global North) and of my interest in Yucatan. A few of these activists and scholars questioned my intentions and labeled them “academic extractivism” (see Grosfoguel, 2016), a process where Universities in the Global North reproduce ideas and concepts emerging from the South and then feed them back as theoretical concepts to them (Cusicanqui, 2010) (Section 3.5 explicitly engages with this point).

Establishing trust in this conditions was especially hard since activists in the Peninsula have also faced both fiscal and a general antagonistic and often dismissive rhetoric by the federal government, disqualifying their work as 'pseudo environmentalism' (SEMARNAT, 2021) as well as backlash by AMLO supporters to groups and communities resisting the expansion of extractive projects in the region. This created a general sense of mistrust and doubt that is still shaping the political context in the Yucatan Peninsula. I was unable, for example, to interview local people directly and indirectly affected by the projects as it was previously intended (Dzilam de Bravo). Because of a brief visit to the site, I was unable to create a trusting relationship with people. However, after an open dialogue with some of the participants, I managed to engage with community members, academics, activists and government officials, both on and off the record conversations that allowed to gain the trust of some of the networks and present a coherent narrative that now constitutes the case-studies (as described in the following chapter). To address the imbalance created by only having a few interviews with federal government officials and private sector representatives, the selection of public documents was carried out in an effort to create a more or less equal representative sample of each participant input in the research project. However, this does not necessarily mean that the methodological approach was without its own issues –some of the most important being an overwhelming number of participants are male (36) (despite efforts to include more women (14)) and difficulty accessing opinions that are not 'official' which are usually conveyed in more personal conversations (i.e. through SSI) and not necessarily through document analysis–.

3.4.2. Decolonial positionality and uneven power relations

The second limitation had to do with a matter of my own positionality and the uneven power relations between actors interviewed, which itself plays out in two particular ways. As Almlund (2013: 52) argues "interpretation and conscious attention to the unequal power relation in the final interpretation of research results requires decentring the subject and dissociating from the ideal of intersubjectivity as well as being descriptive instead of normative and accepting the unconquerable infinite distance between the researcher and the researched as a condition." The quote suggests that as a researcher there is always a tendency to engage subjectively with some of the unequal power relationships between participants. To avoid this, I tried to acknowledge from the beginning that this research project was not designed to place all positions from all

actors in an equal standing to evaluate them, but that the starting point is AEI. Or in other words, uneven power relationships already exist, and hence it would be problematic to present all actors under the same context (i.e., there are some actors that have 'benefited' while others have 'lost' from the previous and existing configuration of energy systems).

This formulation for approximating research was supported by what several decolonial and activists such as Raul Zibechi (2022) refer to as *militant research*. That is, a process that seeks to recognize the way that societies in movement and collective subjects *move*, tracing new paths and creating new concepts and ways or resistance that are embodied in their everyday lives. In other words, resistance against capitalism is experienced by frontline communities through their everyday lives, where their simple existence can be considered a defiance. These movements' paths also entail the recognition of different knowledges and the construction of solidarity networks that seek to support their struggle. As a researcher engaging with some of these frontline communities, my position towards their struggle was one of support, but without trying to impose my own agenda. This later point meant that from the start, a few actors would express a rejection of some of the premises that constitute this research project (for example that the energy transition is inherently unequal and shaped by capitalist uneven relations of power), reducing my possibility of interviewing them (i.e., the federal government and the private sector, as described in Table 3).

Finally, this also brought about the matter of my own positionality. Doing decolonial research entails recognizing that there is an 'abyssal line' that constitutes how the colonial division of knowledge and law operates (see Section 2.2). As Boaventura de Sousa Santos (2007) explains, there is one side of the line, where Eurocentric knowledge is seens as universally valid, and there is the other, where everything else is considered non-valid, or reduced to lower hierarchical categories that which cannot be considered per-se as knowledge (i.e., folklore, magic, traditions or myths). While engaging with other knowledges, always runs the risk of reproducing this colonial distinction between what is valid and what is not (based on my own positionality and as a researcher from the North), the way in which I tried to engage with this risk was to recognize from the beginning that there are incommensurabilities between different forms of understanding the world and our interactions with it, and place this research project as a way of establishing a dialogue between these different forms of understandings without assuming how and what would

result of each perception (Esteva, 2019). The following section engages in more detail what this means in terms of my own positionality and the ethical considerations that shaped this research project.

3.5. Ethics and research positionality

Drawing on decolonial theorists from Latin America, this thesis supports the idea that doing decolonial research cannot be separated from the actual worldly implications of social movements doing decolonial work/actions. In other words, decolonial scholarship cannot be produced without social movements, otherwise "the scholar becomes an anthropologist and ceases to produce decolonial work" (Grosfoguel, 2018: 33). This distinction is crucial and simultaneously critical for this thesis and for the arguments presented in it. It states that not only must decolonial work be done with and informed by actual social movements and groups on the ground, but that this work should also contribute to the perspective of critical, anti-imperialist and anti-colonial thinking (Cusicanqui, 2010). If decoloniality is not an option, that is, if it is not something that we can choose to actively support or ignore, if, rather, it is a political project for actual democratization, emancipatory struggles and autonomy, then decoloniality and decolonization must be understood under two particular characteristics.

First, decoloniality cannot be understood purely under geographical pretenses. As decolonial scholars have time and again stated, the Global North and South are not geographically determined spaces, but they constitute social, political, economic and epistemological distinctions between the universalizing totality of Eurocentric modernity and the many alternatives that appear *absent* under its universal gaze (Santos, 2014). And secondly, who is capable of doing decolonial work cannot be reduced to the 'geopolitics of knowledge' (Mignolo, 2003), that is, the assumption that anyone coming from Europe is not capable of doing decolonial scholarship, or that someone from the Global South is automatically doing decolonial scholarship because of who they are (Grosfoguel, 2018: 34). This epistemological framing tends to reproduce a sort of ally-enemy distinction by definition, based purely on geographical origin and assumed or tokenized identities.

Secondly, decolonial work is structured around the possibility of reinforcing these struggles and always in line with the idea that decolonization cannot be reduced to an academic trend but that

it constitutes urgent political action. Some decolonial scholars have been criticized for creating an overly identitarian narrative over decolonial scholarship, for extracting ideas that emerge from the Global South and reformulating them as theoretical concepts from the North, only to flow back to the South and be consumed as 'formal' academic knowledge. This is addition of supporting the creation of state-sponsored forms of recognition, which can ends up dispersing autonomous and self-determination struggles from peasant and Indigenous communities and subsuming their demand for a world where many worlds fit into the hierarchical and modernist structures of the Nation-State (for a critique see respectively, Dunlap, (2022); Rivera Cusicanqui's (2010) response to Walter Mignolo, and Gutierrez Aguilar, 2020).

The structure of coloniality is built under the supposition that there is always a hierarchy in knowledge production, one that is produced under a monological approach where Eurocentric thinking always sits at the top. This is what colombian decolonial philosopher Santiago Castro-Gómez (2005) refers to as the 'hybris of zero point' (see section 2.3) a point of hierarchical superiority where the subject - 'who has not sexuality, gender, ethnicity, race, class, spirituality, language or epistemic location 'creates a truth from an interior monologue with itself, with no relation to the outside' (Grosfoguel, 2022: 161) –produces knowledges as if it was detached from his/her actual lived experience–. This is a condition embedded into the framework of modernity, and one that sees politics as either 'left' or 'right' as choices but fails to understand them as structures of the same CMP (or 'the dark side') of modernity. From this perspective, the COP is informed by a legacy of eurocentric thinking that emerged from the Spanish conquest and that would later inform the basis of Eurocentric philosophy from Descartes, to Hegel and Marx (See Dussel, 2014: Castro-Gómez, 2008), and reproduced through a perspective where there is only one absolute truth, one way of being human and one way of thinking that is superior to others (Maldonado Torres, 2017).

Silvia Rivera Cusicanqui (2010) argues for a "political economy of knowledge" instead of a "geopolitics of knowledge". This notion is helpful in delinking the geographical reductionism that tends to be associated with the *geopolitical* aspect of thinking, providing the necessary tools that enable us to question our persistent attachment to the COP and the structures of Eurocentric Modernity. For example, there is a tendency by some academic thinkers to delink class from other hegemonic narratives (see Moore, 2021 for a critique) –by simply tokenizing identity and

reducing conflicts to the position each identity holds–, this position fails to link identity to structural problems entangled and reproduced through capitalist modernity. Rivera Cusicanqui's political economy of knowledge places politics instead of identity in the center of the debate. Similar to what Dunlap (2021) calls the '*Spirit of Revolt'*, or the *'Insurgent Universality'* advocated by Japhy Wilson (2022), Cusicaquí argues for a rightful recognition of difference but for actual politics to build and create solidarity networks and action that can effectively counter capitalism and its interactions with the COP.

Mignolo has since expanded his conception of decolonial thought advocating for what some Latin American scholars refer to as a *dialogue of knowledges* (Leff, 2017), key in the production of *Transmodernity* or pluriversal thinking (Dussel, 2014; Escobar, 2018). The dialogue of knowledges emerges as a direct response to persistence of coloniality as *the darker side of modernity* (Mignolo, 2003), a process that reveals how colonialism has remind active in defining social, political, cultural, economic and ecological relations through the erasure of the other both in epistemic and ontological terms. This harkens back to Santos' abyssal line (2007) and is akin to WEB Du Bois (2007) 'color line' or Sylvia Wynter (2015) discussion of the human, where abyssal thinking sees only one side of this line, erasing and discounting everything that appears on the other (including the *racialized* populations or the *less-than-human*). For Santos (2014), tackling this way of thinking produces an 'ecology of knowledges' revealing as *existing* what was actively produced as *invisible*.

Political ecologist like Enrique Leff (2017) and political ontologists like Mario Blaser, Arturo Escobar and Marisol de la Cadena advocate for a dialogue between these emerging knowledges, a process that entails a radical relationality: recognizing other knowledges and realities are co-existent and hence, a dialogue between worlds, or a world where many world fit, as the Zaptaistas would say (EZLN, 2015), offers the possibility of engaging in a dialogue between these *othered* worlds, of recognizing other forms of relations beyond the dualisms institutionalized by Western modernity and the hierarchical form of relating to others which are deemed inferior under the COP. The point of the dialogue of knowledges is to attest that no culture is hierarchically positioned over others, hence the idea is not to substitute a master's narrative for another, but to subvert its position as the only way of thinking (Barca, 2020).

From the beginning of this research project, I was interested in understanding how injustices were reproduced through the deployment of the energy transition on the ground, and how these injustices are articulated with a broader history of coloniality in the region (if at all). This meant that while I had already identified injustices to have taken place, my research questions were meant to try to understand why injustices over the energy system could not be resolved quickly or through simple regulatory changes –a strategy that was actively pursued by some policy makers and scholars–. This meant that right from the beginning I found myself in an awkward position with some interviewees who, from the start, disagreed on the nature of our discussion - some saw no issues with 'coloniality' in the deployment of low-carbon infrastructure (See, Martinez (2020) for a review of different 'epistemic positions' of different actors in Mexico). As the review of the empirical research found, a few of these actors, mostly coming from the private sector and the federal government, objected to some of the questions that were posed during the interviews, with one of the interviewees walking back their interview after it was finished. Although this seems to be a research limitation at the time, after the review of the empirical data, it became clear that the colonial/decolonial dimensions of the energy transition are mostly if not completely absent from discussion in these sectors (for reference see also Table 3).

While this discussion over positionality was prevalent over the design of my research questions, my visit to Mérida and the two field sites in Yucatan, created a second layer of issues to consider. Speaking with Indigenous, local, academic and peasant activists and thinkers, it quickly became apparent that some of this injustices had to be articulated with a much broader history of oppression and colonizing 'missions' that had shape social, economic and political histories of the region, which meant that, not only that I had to take into account this complex and at times 'obscure' forms of injustices, but that the challenge was to bring this issues into a complex political context that was taking place in Yuatán. As decolonial scholars have shown, the CMP still looms large in the production of infrastructure and development-seeking projects. Drawing on the legacy of Franz Fanon (2004), for example, scholars have shown how in a post-colonial setting, coloniality is not reproduced through force alone, but through the production of a 'colonized subject': namely, the production of the specific modes of colonial thought, desire, and behavior that implicitly or explicitly commit the colonized to the types of practices and subject positions that are required for their continued domination (Coulthard, 2014: 16). Fanon's

contribution is concomitant with what geographers and anthropologists of the energy transition have also mapped in the production of particular citizenships (Power & Kirshner, 2019), landscapes or places (Castán Broto et al. 2018; Swyngedouw, 2015) and forms of governmentality that operate through the deployment of energy systems.

As I mentioned before, considering my position as a white/mestizo man, from Mexico City and studying in a foreign university, working with Indigenous people meant several things in relation to ethics and my own positionality, something that was exacerbated by the fact that most of the research was done with me not physically being 'on the ground'. This was perceived as a lack of confidence from some of the people I interviewed who questioned my positionality as an 'outsider' trying to do research with Indigenous people or even by coming into their state or region to do academic work. Because of this, CSOs and academics legitimately questioned my intentions. Throughout my research project this remained important considerations that were progressively addressed mostly through my own research of what decolonial research meant (basically from reading and speaking with other academics) and what would be the correct approach under the limited circumstances created by the COVID-19 pandemic and what this meant for my research.

First, it meant that a commitment had to be made on my part to support Indigenous struggles on the ground. Latin American thinkers like Raúl Zibechi (2023), for example, argue that the way in which academics can and should engage with societies in movement –speaking to the diversity and multiplicity of actors, forms of organization and methods of fighting– is by immersing themselves into the struggle itself to actively pursuit of emancipation, autonomy or justice (however this is defined). However, doing research at a distance meant that I could not fully commit myself to a research of this nature. Nevertheless, Zibechi's point stands: Avoiding academic extractivism required enabling a commitment to movements on the ground and expressing solidarity with their cause.

To respond to this, my research was made clear from the beginning, and the purpose and outcome of my work had to produce and contribute to their particular political cause. While I was unable to physically remain committed to their struggles, I could identify how my research could maintain a certain degree of militancy. Following Halvorsen (2018) I sought to remain in

dialogue with activists and communities, supporting their cause, albeit at a distance, and continued to publish research results in Spanish, meanwhile giving public talks in academic and non-academic spaces to bring attention to their struggles.[20] Additionally, I was also confronted with the need to avoid reproducing the colonial trope of speaking for others (Spivak, 2010), effectively eliminating the agency of oppressed groups and translating their struggle into my own epistemic framing. Avoiding this required recognizing that decolonial research needs to take seriously the possibility of creating a *dialogue of knowledges*, striking a balance between speaking with and learning from multiple others and developing long-term commitments and 'speaking to' particular sites of subaltern knowledge production (Jazeel, 2016). This has meant staying in touch with the subjects interviewed for this research project (which I did) and contributing to their cause by supporting activist, academic and civil society networks that build and support this and other similar struggles in Mexico and Latin America.

With regards to the ethical considerations, it is important to mention that I first came into contact with some of the civil society organizations supporting Indigenous legal cases in Yucatan in 2018. Using a snowballing sampling method, I was able to interview and establish a degree of trust by contacting existing activist and community networks via video calls in 2020-2021. This process was later reaffirmed by a site visit in 2022. During interviews and dialogues with participants I always offered a brief description of the project before engaging in conversation and in interview cases, this also meant requesting permission to record the interviews, asking participants to read and sign a consent form[21] and informing them of the purpose the data will be used, stored and deleted in case they wished to retract their participation. To ensure the confidentiality of the participants, I anonymised all the interviews and no information about any individual was or will be disclosed in order to avoid being identified. All recordings of the interviews will eventually be destroyed (unless requested) and until then are kept on a hard drive that is not connected to the Internet. Since then, I have kept in contact with several actors

[20] Part of the research was translated into an *Amicus Curiae* that supported the community in their legal struggle, while Article 4 was co-authored with members of the community to present, in their own words, their process of organization and resistance against green extractivism (See: González *et al*. 2022). Additionally, annex 2 of this research project contains a number of public talks and documents published in Spanish with direct or indirect relevance to the case studies detailed here.

[21] I always requested the participants to read information and sign a consent form, while very few people actually returned a signed consent form to me. I always asked the participants if they had read and agreed with the content of the consent form before starting to record.

interviewed for this dissertation and have since joined and contributed to networks and groups supporting these types of struggles in the Yucatan Peninsula.

The first three sections of this chapter, have laid out the research design, methodological approximations and the empirical data gathered for this thesis. While the research design introduced some of the main challenges experienced during the research process, the methodological section explained how these challenges were addressed throughout the research process and how the theoretical framework chosen for this project was also adapted in a close relationship between the selection of methods. The section engaging with the empirical data described how the methodology was applied and how the resulting data was analyzed and processed. Additionally, this chapter also presented the main limitations experienced during this research project and a discussion on the positionality and ethics that inform the research process and its results. The following section describes the selection of the case studies, introduces the context of how and why these case studies were selected and explains how they fit into the overall research project.

4. Overview of the Case Studies

This chapter introduces the case study selection, providing more background on their relevance to this research project and highlighting why and how these particular projects and places were selected. The first section provides a justification for the selection of two particular case studies in the Yucatan Peninsula starting from the research limitations and the ethical and positionality matters dealt with in the previous chapter. The second section provides a general overview of the energy system in the Yucatan Peninsula, providing a context in which these projects are either planned for construction or already in operation. This section also introduces the 'Maya Train' –a large-scale infrastructure project interconnecting the five southeastern states of Mexico– as a separate subsection and as the backdrop in which the socioecological, political and spatial relations of energy systems and the energy transitions are being worked out in Southeast of Mexico. The third section describes solar and wind low-carbon infrastructure projects in the municipality of Muna (the town of San José Tipché) and Dzilam de Bravo, Yucatan respectively. Overall, this chapter lays out the case studies that are analyzed specifically in Articles 2, 3 and 4 of this research project and engages in more detail with their particular importance to the study of energy systems and its interactions with CPE, the CMP in the Global South.

4.1. Case study selection and approach

Originally, the goal of this research project was to visit at least 6 sites of the proposed solar and wind projects in Yucatan allocated through the Long Term Auctions (LTA) mechanism and spend as much time as possible conducting ethnographic research in dialogue with the communities and involved actors in the development of the projects. However, the COVID-19 pandemic and the impossibility of leaving Durham at the time[22] meant that a series of changes had to be made. The main one being that the number of cases analyzed had to be reduced to two sites: a wind farm located in Dzilam de Bravo and a solar farm approved but not yet constructed in the town of San José Tipché in Muna, Yucatan. I selected these projects for four reasons. First, the material and technological differences of each project reflected different conditions and issues

[22] This impossibility happened due to an increased risk factor associated with the COVID-19 virus and the unavailability of vaccines at the time the research was intended to happen. This is addressed in more detail in the following section.

emerging from the spatial configuration of each project's technology, which allowed me to explore some of the challenges each technology (i.e. wind turbines and photovoltaic solar panels) faced as they were being deployed or in operation (De Laurentis & Pearson, 2018).

Secondly, the case studies represented different project stages: While the wind park in Dzilam de Bravo was already operational, the solar farm in San José Tipche was still being contested in the court system, which meant that the work on the project was still minimal and construction was delayed. At the same time, each project was approved under different regulatory frameworks: the Dzilam de Bravo wind farm was approved before the Electricity Industry Law (EIL) (Cámara de Diputados, 2014) was enacted, while the solar farm of San José Tipche was allocated through the LTA mechanism in 2016. This offered the possibility of assessing how the regulatory framework hindered or enabled the deployment of low-carbon infrastructure and what were the consequences in each of these cases. This meant that the policies and mechanisms used to approve, assess and develop the projects were different which offered an interesting possibility of studying two particular moments in the deployment of low-carbon infrastructure and how these particular conditions interacted with the spatial, political, historical realities already-existing in these particular places.

Third, each case also revealed the existence of different participatory processes and inclusionary measures associated with who was consulted, how, and under what particular framework (i.e. separating landowners from land users). In the case of Dzilam de Bravo, as I explain below, land tenure was reduced to a few communal *ejidatarios*, while San José Tipché included 98 *ejidatarios* (communal land owners). Measuring the level of local opposition and comparing why one of the projects was built and the other was not, and how a different set of actors got involved, revealed interesting differences and similarities for each case that could enable a better understanding of the multiple factors that shape how these infrastructures are deployed.

Fourth, both cases offer different forms of conflicts and social opposition. For Dzilam de Bravo, opposition was mostly registered by activists and academics citing improper Environmental Impact Assessments (EIA) and lack of attention to the biodiversity and land planning in the region (Articulación, 2018). Public opposition by local communities was relatively less 'visible', mostly because consultations and access to information was reduced to a few local land owners,

with whom the specifics of the contracts were negotiated, which meant that the rest of the community was not properly consulted. Additionally, the company engaged in a preemptive phase of social engineering, utilizing soft tools for coercion and pacification such as social participation and inclusion under a particular set of terms that demobilized any community opposition (Encalada Gómez, 2019, see also Dunlap, 2020 for a theoretical discussion). In the case of San José Tipché's, activist networks and academics were more actively involved in supporting the local community involved, but the main source of opposition came from an organized minority of *ejidatarios* and members of the Maya community, who opposed the project and sought help from academics, civil society organizations and local activists (see Article 4).

In 2021, the company operating the Dzilam de Bravo wind farm and the State government put together a series of documents analyzing 'co-benefits' emerging from the project (Gobierno de Yucatán, 2021a, 2021b, 2021c), where they argued that the creation of jobs, protection of biodiversity as well as a reduction of GHG emissions produced by these project constitute a series of 'lessons learned' for other projects, generating local benefits aside from the reduction of GHG emissions, such as building infrastructure for local communities. However, local residents and activists have repeatedly denounced that the co-benefits consist mostly on non-essential infrastructure (like playgrounds), along with other issues that remain a responsibility of the local government like protecting biodiversity and granting access to jobs (Reyes Maturano, 2021). Some of the interviewees did mention that the park at Dzilam de Bravo had mitigated most of the environmental damages. For example, in speaking with the park operators they repeatedly assured me that the parks were not damaging local biodiversity, and that the problems such as the weight of the turbines in fragile land was being mitigated.[23]

Both cases are then useful not only in showcasing the differences embedded in the materiality and the technological aspects of the projects, but are also revealing of different ways in which government actors operate under different regulatory settings; how companies and corporations deal with people differently and how they frame the development of low-carbon infrastructure. Additionally, the two case studies reveal different routes and tactics used by activists and

[23] Interview No.26, Academic. 31 May, 2021.

community leaders to oppose, contest and question the nature of these infrastructural projects. Finally, both case studies are embedded into a larger context of the energy system in Mexico and a rapid regional reconfiguration of the territory. The following section introduces the context in which the energy transition is taking place, from the perspective of the energy system and its configuration in the Yucatan Peninsula, pairing the analysis with the federal regulatory changes and mechanisms that enabled the process to take place. A subsection introduces the "Maya Train" regional project as part of a general context in which a regional spatial reconfiguration is taking place in the Peninsula. The final section explains each of the two aforementioned cases in more detail. This last section also explains why the Maya Trian was included into the research analysis and its relevance to complement the two case studies.

4.2. The power sector in the Yucatan Peninsula

Since 1976, when the Mexican government became aware of one of the biggest oil fields in the world, the population in the eastern coast of Mexico has had a complicated relationship with energy infrastructure and energy services. As described in Chapter 1, oil production was concentrated in offshore extraction with most of the facilities being concentrated in the neighboring states of Tabasco and Veracruz. The rise of awareness or the 'visibility' of the Yucatan Peninsula as a possible energy generating region only became 'evident' during the first decade of the 21st Century as measurements of wind and solar power were taking place in the region (AZEL, 2018; Zárate Toledo, *et al.*, 2021). However, and despite of a few projects developed in 2012, it was not until 2016 with the first Long Term Energy Auction (LTA) and the allocation of 9 out of 16 projects (all consisting of low-carbon infrastructure) to the State of Yucatan, that the peninsula became a new frontier for solar and wind extraction (Howe & Boyer, 2016; Dunlap, 2021).

In 2014 the Mexican Ministry of energy published a National Atlas for Clean Energy Zones (AZEL in Spanish) which was meant to identify potentialities for renewable energy development and investment (SENER, 2017). The project, supported by the United States National Renewable Energy Laboratory (NREL), followed a long history of renewable energy potential mapping in Mexico supported by the United States Association for International Development (USAID) in 2003, with the objective of directing more capital investment in renewable energy and taking

advantage of the ‘unused potential’ that was seen as dormant or ‘wasted’ (Dunlap, 2017). AZEL had the particularity of deploying cartographic data and layering maps of potential, topography and the points of interconnections of the electricity system, however the drive towards low-carbon integration and mapping also meant that the government had to enable some sort of regulatory framework that could enable investment in these areas.

The deployment of such projects was heavily exacerbated with the national and international commitments adopted by the federal government of GHG emissions reductions (22 to 36% by 2030), and additional commitments to increase 'clean energy' generation in the country (with the target of reaching at least 35% by 2024, see SEMARNAT, 2015; LTE, 2015). The adoption of the auction model provided a relatively low cost to low-carbon infrastructure developers. As I discussed in Chapters 1 and 2, these apparent reduction emerged form a process of ‘cheapening’ or a process of making land ‘legible’ for capital investment and resource capturing via new technologies, legal and regulatory frameworks, discourses and practices (Li, 2014; Moore, 2015; McCarthy, 2015). Yucatan quickly became a site with high potential for renewable energy generation and with the right conditions to capture the spread of low-carbon energy infrastructure and investment.

As McCarthy and Thatcher (2019: 250) argue "(t)he use of maps reinscribes colonial and capitalist forms of state power and classification systems, including the authority to classify people, places, and land uses as 'marginal,' forcibly relocate people, and determine levels of compensation." In Mexico, and Yuctan, this was done by a forceful simplification of landscapes done through the use of AZEL as a tool to conduct and select the places where projects won in the auction would be installed, however there were little-to-non considerations of what was in the territory aside from the potential and the proximity to interconnecting points.[24] In other words, AZEL became a mapping tool that enabled the possibility of creating renewable energy scenarios and driving up investment towards places deemed with ‘high potential’ effectively rendering other epistemological and ontological characteristics of the landscapes as non-existent or ‘empty’.

[24] AZEL did include a series of ‘social, demographic and cultural layers’ that could be applied to the map, however, the main issues that mattered to the companies bidding for a generation contract had to do with technical issues such as potential and proximity to interconnection lines.

Mexico's energy system consists of 2,500 nodes of energy generation. In spatial terms the energy system is twice the size of continental Europe but with only a third of its installed capacity (396.6 GW vs. 88GW). The grid is constituted mostly of combined cycle generation, responsible for 58.9%, hydroelectric (8.6%), heavy oil (7.5%), wind (6.3%), coal-fired plants (4%), gas-powered turbines (4.5%), photovoltaic (4.3%), nuclear (3.5%), geothermal (1.5%), internal combustion plants (0.9%), and biomass (0.03%) (González-López & Ortiz-Guerrero, 2022) (see Figure 8). According to the PRODESEN 2019-2033 –Mexico's Electricity Sector Development Program– (SENER, 2019), the growth rate of the electricity generation and demand is 3.3% on average, which means that new demand will rapidly increase the sources that are required to maintain and meet this prospective demand/growth.

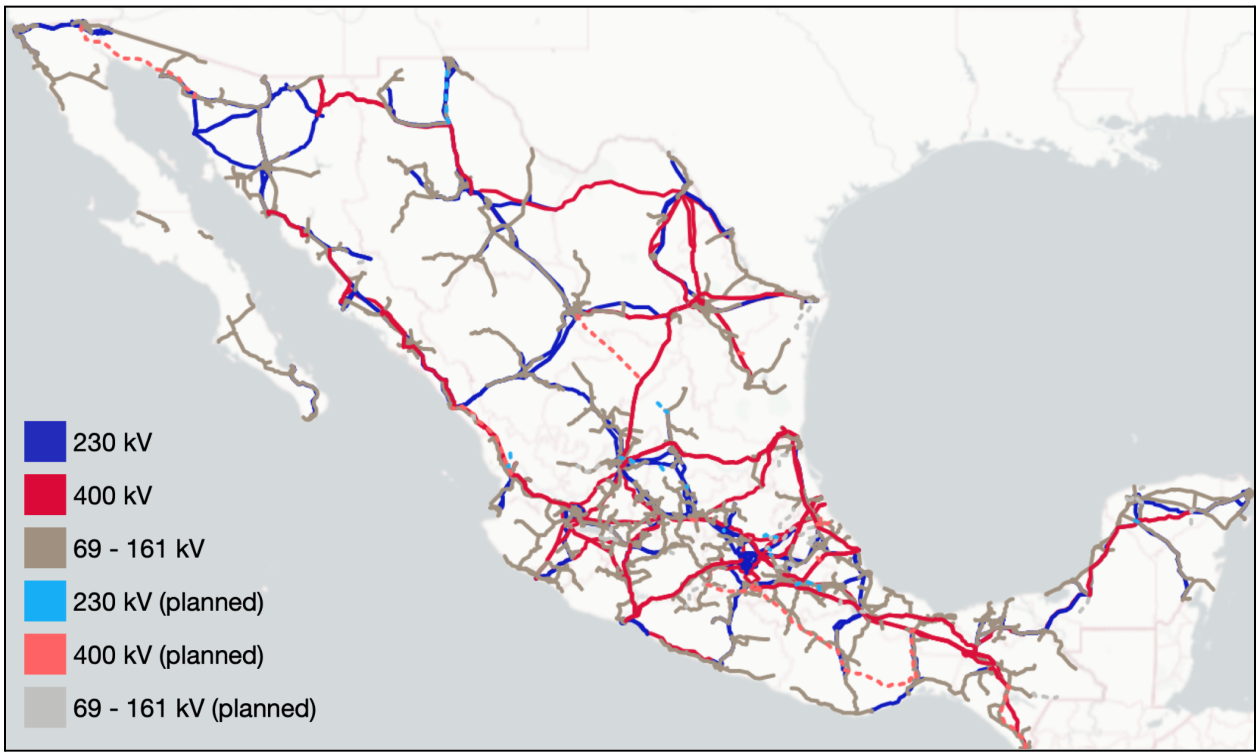


Figure 8: Map of Mexico presenting the national transmission grid and its interconnecting points (The peninsula of Yucatán, which constitutes the states of Yucatan, Campeche and Quintana Roo, appears on the bottom right corner of the picture).

Source: https://energia.conacyt.mx/planeas/electricidad/sistema-electrico-nacional

Overall, the Yucatan Peninsula has a similar pattern of installed capacity –with a high dependency on fossil fuels– and rapidly increasing demand. Power generation for the Peninsula

consists primarily of natural gas-fired combustion turbines and thermal plants, with significant variation among the three states. The neighboring state of Quintana Roo has the least installed capacity of the entire country, while Campeche is the 25th (out of 32) and Yucatan is the 19th. However, as seen in Figure 9, the peninsula relies primarily on electricity generated in the state of Yucatan –which accounts for over 70% of the installed capacity– and on imports coming from surrounding states (neighboring states of Veracruz is 1st producer of electricity in the country) (PLANEAS, 2022). Specifically, the state of Yucatan has one of the weakest connections of the existing energy system. It currently has an installed capacity of 3.2GW, of which combined cycle (gas turbines) represents 43.86% of its generation, liquid gas turbines, accounts for 38.04% and, with no hydropower plants, the rest is constituted of heavy oil (9.17%) generation with wind contributing with an additional 4.59%. This means that the region represents roughly 3.63% of the installed capacity. In 2020 the region generated only 2.1% of the total electricity fed into the National Electric System (SEN) (see Figure 9). Overall, the entire matrix consists mostly of natural gas and other fossil fuel-dependent technologies (with only 12% of generation coming from wind and solar sources (Figure 9).

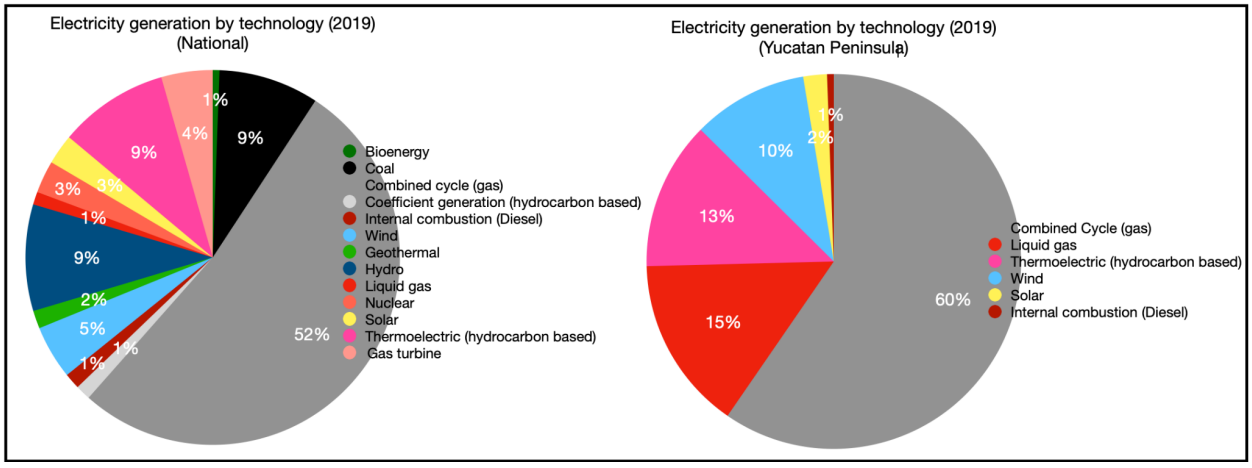


Figure 9: Electricity generation by technology of the Mexican electricity grid and the Yucatan Peninsula.

Source: Planeas, 2023; Bracho et al, 2022.

According to Bracho et al. (2022), the region holds some of the highest electricity tariffs in the country with the most frequent service outages. This has to do in part with only a few electricity interconnection lines of integration with the rest of the country's electricity system, which

usually results in saturation that cannot keep up with the rising electricity demands of the region (Gobierno de Yucatán, 2016) (See figure 10). The high cost of electricity is also closely linked to the geographical aspect and the way in which the Mexican power system was developed in the second half of the twentieth century. The peninsula has some of the highest indexes of energy poverty, which are linked to the high cost of generation, and create important pressures in the region, especially as the demand for cooling services increases as the region gets warmer.

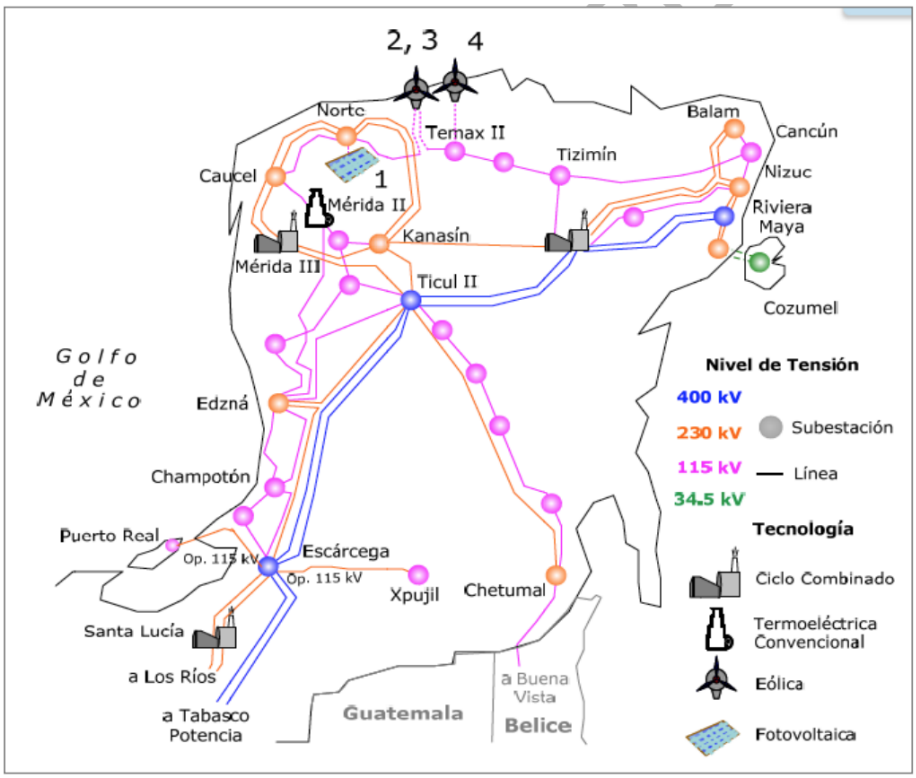


Figure 10: Map showing the energy transmission lines that interconnect the Yucatan Peninsula to the rest of the country. Source: Gobierno de Yucatán, 2018.

According to Graizbord and Ochoa (2016: 307) the level of energy poverty in the state reaches 51% of households, where the main lack of services are linked to refrigeration and cooling. However, because of the geographical location and topography of the Yucatan Peninsula, the region has one of the highest wind and solar potentials in Mexico. The state of Yucatan alone has a wind potential capacity that would allow the generation of 2,890.5 GWh of additional electricity, while the solar potential could contribute to the generation of 317.85 GWh.

According to Chavana et al. (2021: 32) these 2 renewable energy technologies could supply approximately 81.4% of the current demand for electricity in the state (see Figure 11).

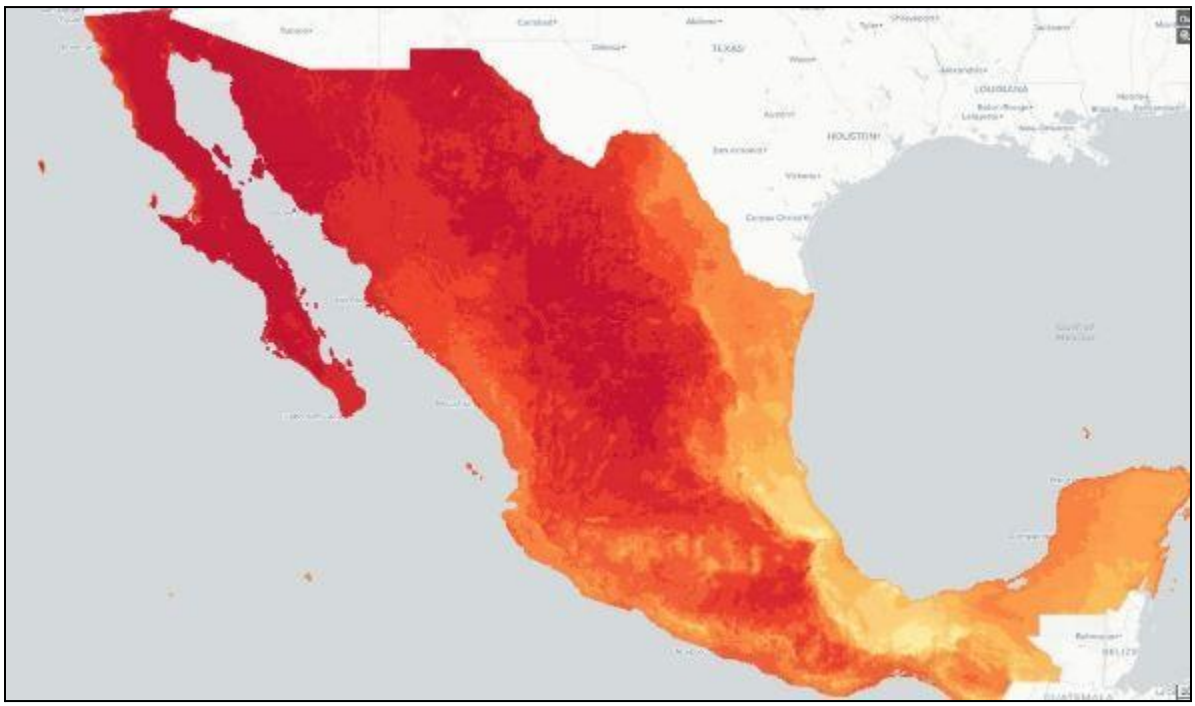


Figure 11: A map included in the AZEL tool depicting the solar potential of the country. Source: SENER, 2017b.

4.2.1. The Maya Train: 'making space' for energy

The previous section has laid out some of the main technical challenges and opportunities that the State of Yucatan faces to integrate low-carbon infrastructure. However, looming over these aspects, the case of the 'Maya Train' presents a whole new spatial, political and socio-ecological reconfiguration of the landscapes and territories in the peninsula, which demands to be taken into account to understand the current situation on the ground, what this entails for the deployment of low-carbon infrastructure and the future impacts this might hold for the region. In the process of gathering empirical evidence for this research project (as described in Chapter 3), the issue of the Maya Train came up in each individual conversation and interview on and off the record, as well as in journal notes and other media engaging with low-carbon infrastructure in Yucatan. The "Maya Train" or the "Maya Train Regional Project" which was briefly introduced in Chapter 1 –and described and analyzed in more detail in Articles 3 and 4– consists of a development

project that seeks to reorganize the territory of the Southeast of Mexico to "incentivise sustainable development and secure economic growth and prosperity" (FONATUR, 2019). The Train entails the construction of 1,525 km of track in the states of Tabasco, Chiapas, Campeche, Yucatan, and Quintana Roo, seeking to "reduce the time and cost of transporting goods, passengers and tourists within the peninsula (...) benefiting the development of the region and the quality of life of its inhabitants" (FONATUR, 2019).

In 2018, after being elected president, AMLO announced the project as a way to 'connect the Southeast of the country to the rest of the country and amend for a long history of lack of development in the area' (FONATUR, 2019). The project will cross directly through areas of the Yucatan Peninsula that combine communal held lands (*ejidos*) of Mayan communities, wetlands and nature reserves, sites with archaeological, biological and historical significance, as well as create significant socioecological pressures in the area through a complex set of socio-ecological impacts indirect impacts (such increased demand for housing and tourist accommodation spanking land speculation, as well as spring water and food demand, waste and sanitation needs) (GC-TTM, 2019; GeoComunes, 2019a; 2019b). In terms of energy, the train infrastructure itself has already sparked interest in developing new energy sources to 'move' the train, but the associated projects and impacts of the 18 'development poles' (Ceceña, 2019) planned along each of the train stations, will substantially increase energy demand and the deployment of low-carbon infrastructure (CRIPX, 2019). As some of its critics argue, it will also drive urbanization and land speculation, economic activities, and migration into the urbanizing areas, creating important pressures on water and other ecosystems in the region (Torres Mazuera, et al, 2021; GC-TTM, 2019).

The project was framed as one of AMLO's flagship projects, a process that was legitimated by the use of public consultation process (one not inline with the international standard of the 169 convention of the ILO to obtain the FPIC of Indigenous populations) in which, despite the fact that less than 2% of the national electorate took part (AUSM, 2022), was used to legitimize the decision (UNHCHR, 2019) of the project. However, the overwhelming support from this consultation (96% voted 'yes'), has served to support the development of the project through its many problems and issues, must of which include lack of transparency, increasing overspending, progressive militarization, human and ecological right violations and questionable environmental

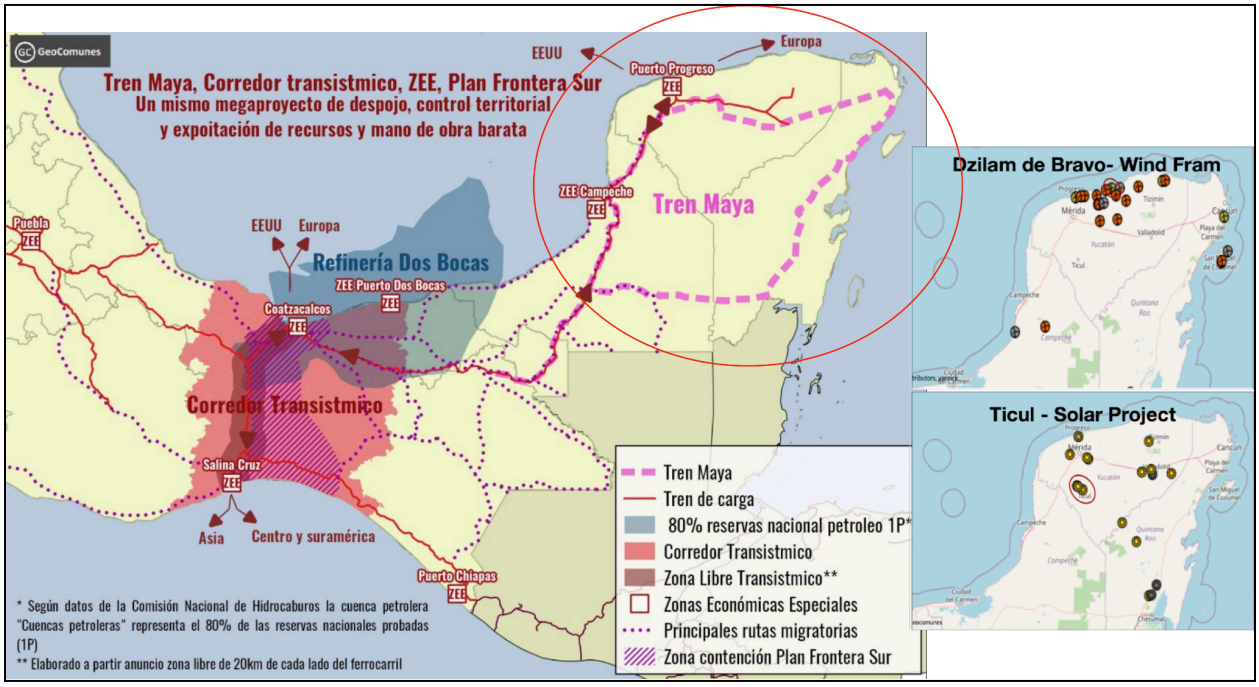
and social impacts assessments (see: Ceceña, 2019; Clavijo & Castrjon, 2019; Torres-Mazuera, et al, 2021; Ansotegui, 2021; GeoComunes, 2019b; 2020; Isla, 2022; Centro Pro, 2022).

AMLO's government has bypassed any legal, regulatory, spending or judicial restriction by labeling the project a 'national security issue', a denomination that also was used to justify the militarization of its construction and operation (AUSM, 2022). For this reason, the train is often understood as an imposed development project, which has been systematically contested by several local Indigenous communities demanding their rights to FPIC and denouncing the socio-ecological impacts (TIDN, 2023). As several authors, activists, and civil society organizations have explained, the name 'Maya Train' is a misnomer, as it incorrectly reflects the nature and the 'intent' of the project. As the GeoComunes (2019a: 11) collective argues: "The Mayan Train is actually composed of three trains: a tourist train, a passenger train and a freight train (...), (t)he main business of the train is the reduction of the cost of transporting goods to the main industrial centers and deep sea ports of the peninsula." In other words, the project entails the movement of products, fuels and people, while the 'Maya' in it, is usually seen as a way to promote 'cultural tourism' and extractivism exploiting the maya identity but with little direct benefits to the Indigenous communities (CRIPX, 2019; Múuch' Xíinbal, 2021; Ansotegui, 2021).

The Maya Train serves as an "articulating" mega-project: it links the peninsula's extractive frontiers to advance the exploitation of natural resources and 'cheap' labor (Clavijo & Castrejon 2020). The project is closely related to two other major projects developed by AMLO's government: the Dos Bocas refinery in the state of Tabasco –a new *mega*-refinery that will process 340,000 barrels of heavy crude-oil per day– and the Integral Development Program for the Isthmus of Tehuantepec (also known as the Tran-seismic corridor, which seeks to provide a transit route between the Pacific ocean and the Gulf of Mexico). The three projects seek to operate in a coordinated manner effectively creating a regional reconfiguration of the territory (see Figure 12), by enabling a transit route between oceans, creating a new commercialization route for resources such as oil (84% of proven oil reserves at the national level are located in this zone), minerals, water, land biodiversity and energy (GeoComunes, 2019a: 17).

In other words, it is a government strategy that simultaneously seeks to capture global over-accumulated financial capital (i.e. acting as a spatial-fix) and enable the creation of transit

routes in the region's overwhelming extractive potential (Gutierrez-Rivas, 2020). Geopolitically, the train enables a new transit route that can move raw materials and capture cheap labor –mostly coming from migrants of South and Central America in-route to the United States– creating a production chain between growing areas of pig and mono-crop farming, processing centers and export points of these and other resources more efficiently (Ceceña, 2019). These 'development poles' mimic previous governments declaration of "Special Economic Zones" (SEZ), or zones of exception where private enterprises have the power to define the organization of space based on their economic interests (Easterling, 2014). The reconfiguration of space then entails a further push towards making lands *legible* for capitalist extraction and investment and for the continued development model that at times very *literally*[25] seek to erase other relational understandings of nature, landscapes and territories. The Train will both create the *demand* needed to justify the expansion of low-carbon technologies and infrastructure by providing an outlet for the energy generated, and simultaneously justify the expansion of infrastructure projects by using the rhetoric of regional economic integration, free trade, sustainability, and job creation (FONATUR, 2019).



[25] In a notorious 'mistake' in the first Environmental Impact Assessment of the train and later retracted by the Ministry of Environment and Natural Resources (SEMARNAT), the government argued that "Ethnocide can have a positive twist, ethno-development. This can be possible if indigenous populations are involved in the development process and in the administration of benefits." (see Contreras, 2020).

Figure 12: Map of the renewable energy projects in the Yucatan Peninsula (right) juxtaposed with the train tracks planned for the "Maya Train". Source. GeoComunes, 2019b; 2020.

Thus, the Maya Train was included as an essential reference of the context in which the case studies were selected and analyzed in part due to the symbolic weight it carried during the interview process. Because of its 'articulating character', one cannot grasp how landscape and territories in the peninsula are understood (i.e. as a new frontier of capital accumulation, as a transit space capable of capturing resource, product and service (tourism) rents or as wasted space outside of development) by different actors. The significance the project has for other infrastructure projects (i.e., low-carbon, housing, tourism, etc.), land-grabbing and speculative practices (i.e., urban development and tourism) and extractive projects (i.e., large-scale pig farming and monocrop production) in the region is essential to understand how landscapes and policy changes are transforming, making space *legible* for low-carbon infrastructure deployment. As many of the interviewees noted, the announcement of the train is part of a much broader geopolitical project of global capitalist integration, as well as a reformulation of previous government's attempts to integrate the southeast of Mexico into the neoliberal-capitlist model, that seeks to transform the Yucatan Peninsula into a legible space for extraction and investment. On the one hand, it is transforming the peninsula into a *transit space*, enabling the massive movement of commodities and services, and on the other, it represents a massive spatio-temporal fix that can capture large sums of over accumulated capital, temporarily displacing social, economic and political crisis (Harvey, 2004; Gutierrez-Rivas, 2020).

In a nutshell, the train reproduces the colonial idea that southern Mexico is a land *outside* development (Hesketh, 2021), simultaneously justifying the intervention of socio-ecological harmful infrastructure in the region (see Articles 3 and 4 for a detailed discussion). As one activist and civil society member noted:

> The Mayan Train is by no means a new idea. It is the continuation of a colonial model that for centuries has identified the Yucatan Peninsula, specifically the south of the country, as a less-developed, backward area, left behind by development. The history of community struggles to maintain their self-determination has been a constant struggle against repeated attempts of

development. The Train will come to swallow this long history of resistance, making everything from Mayan culture to biodiversity and history commodifiable.[26]

4.3. Case study one: Ticul A and B

The 'Ticul A and B' project covers a surface of 738.23 hectares of ejidos (social) and private property, located mainly in the municipality of Muna, Yucatan, although it also includes the municipalities of Sacalum (Plan Chac) and Ticul, just ten kilometers away from the Pu'uc Biocultural State Reserve and 300 meters from the Mayan community of San José Tibceh (Figure 1). The project includes the removal of 604 hectares of jungle for the installation of 1,227,200 photovoltaic panels, a substation, transmission line, a road network and an operation and a maintenance building. The project would be developed and operated by the company Vega Solar 1 and 2, which intended to install a capacity to generate 310.5 MW of electricity (SEMARNAT, 2016) (Figure 5).

The developers split the project in two in hopes of presenting two different Environmental Impact Assessments (EIA) and Social Impact Assessments (SIA) to 'downplay the project's cumulative impact' as one of the interviewees told me.[27] Of the 738 hectares, 330 belong to the ejido of San José Tipcéh, with the remaining hectares belonging to a private owner, who signed a contract with the company. The project's social land was acquired by the private owner who would act as an intermediary for the company and who told *ejidatarios* that the land would be leased for 30 years to plant citrus trees. However, upon a revision of the contracts, the community realized the real purpose of the concession, and the illegal manner in which the lands were leased, prompting a complaint before the National Agrarian System (RAN) of Mexico. The denunciation then prompted a meeting with company officials who met with the community's assembly in November 2016 and signed a new contract, which was amended several times by the company after the meeting took place without properly notifying the community. This led the community and a network of civil society organizations to take the case to the Interamerican Court of Justice, a process that would force Mexican officials and company representatives to appear before a public audience (for a detailed review see Article 4).

[26] Interview No. 48 with an academic. Conducted on March 10th, 2022.
[27] Interview No. 24 with an Indigenous Community representative. Conducted on May 20th, 2021.

During this proceedings, the federal government agreed to carry out a consultation, recognizing that the free, prior and informed consent (FPIC) was not obtained as per the 169 ILO regulations that require consulting Indigenous people pertaining any development on their lands. However, despite consultations still going on (the community was still deciding the consultation protocol) the Ministry of Environment and Natural Resources (SEMARNAT) in Mexico had already approved the project. By 2017, the consultation protocol was finished but the length of the proceedings began dividing the community leading to tensions and in-fighting. By 2018, after several instances of physical violence, the community was completely divided, and the assemblies were turned into a simulation of procedure and institutional "good practices" (López Gómez & Islas, 2018). In November 2018, during the last consultative assembly, "consent" was granted for the construction of the Ticul A and Ticul B photovoltaic park, however, the meeting was coerced as no outside observers were allowed to present during the meeting and the meeting itself was carried out under pressure by more than fifty elements of the anti-riot state police.

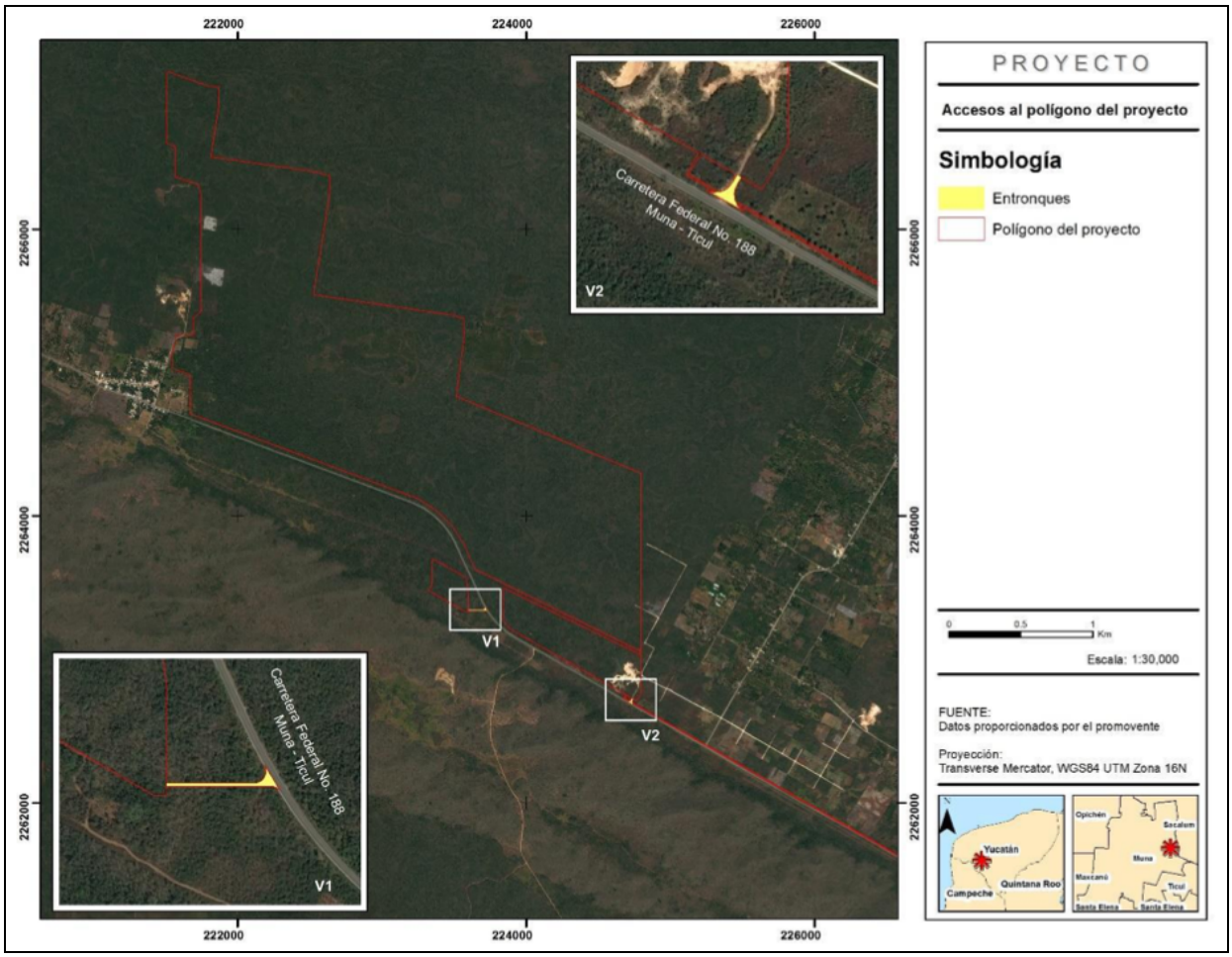


Figure 13: Map highlighting the areas selected for the project at the municipality of Muna (in red).Source: SEMARANT, 2016.

As López Gómez and Íslas (2020) argue, the consultation process lacked all the attributes required for an Indigenous consultation in accordance with international standards: It was not free, informed, prior, nor done in good faith and in culturally appropriate terms: The consultation took place after the project was already approved by several government authorities, it was plagued by a consistent concealment of information, a lack of transparency and access to information and it ultimately resulted in the imposition of a particular way of understanding the territory (as field with solar potential) that effectively eliminated any other possibility for negotiation.

The negotiations with the company focused on the so-called 'co-benefits'—the possibility of temporary employment and leasing contracts for more than 30 years. However, these

‘co-benefits’ did not include a reduction or cancellation of electricity tariffs, something the community repeatedly requested since most of the energy would be allocated for private consumption in other places (see Dunlap, 2019 on similar issues in Oaxaca). The community also had concerns about how the company presented project information. It failed to account for some of the community’s main concerns, including increasing local temperatures, problems with beekeeping, and difficulties maintaining traditional forms of farming and agriculture (i.e., milpa). As of now, the project remains contested through the court system, and while there has been judicial injunctions that were ruled in favor of the community –which highlights the flawed process of consultation, and a systematic problem with how Indigenous peoples are recognized through the mexican legal system[28] (CEMDA, 2022b)– the project has not been canceled.

The Ticul A and B project must be understood as a continuation of previous development and environmental policies in the region which pushed towards creating a new energy-extractive frontier, most notably the expansion of transgenic soya plantations since 2012 (Torres-Mazuera, 2018; Toledo, et al, 2015). A process that led most land defenders, activists and civil society networks working on environmental and social issues, to focus on low-carbon infrastructure in Yucatan since 2012 when the plans to build the first wind projects emerged in the region. Despite the differences in tactics and ontology (Morosin, 2020) the case of Yucatan resonates with other Indigenous and/or campesino non-violent territorial mobilizations, supported by civil society networks across Mexico. A process that, as Darcy Tetreault (2023: 64) argues, has become increasingly more violent and deadly during AMLO’s presidency. As the government continues to support the already-existing neoliberal-extractivist framework to expand extractive frontiers, and capture resource rents progressively militarizing almost all aspects of social life and repressing and antagonizing dissent (see also Centro Pro, 2022).

[28] According to the Mexican Constitution (Art. 2), communities that make up an Indigenous people are those that form a social, economic and cultural unit, settled in a territory and that recognize their own authorities in accordance with their uses and customs. Despite this being the case in San José Tipché, one of the judges in the case repeatedly asked the members of the community for ‘proof’ that they were in fact Maya Indigenous people. An argument the judge used to deny the claim that the community was not consulted as per the International Standard set by the Convention 169 of the ILO, a constitutional right guaranteed by article 1 of the Mexican Constitution.

4.4. Case study two: *Dzilam de Bravo*

The Dzilam Bravo wind park, or "Eólica del Golfo 1" is located in the coastal municipality of Dzilam de Bravo, in the state of Yucatan, and was developed by the Mexican company Vive Energía. Its area of influence includes other population centers such as Dzilam González and Temax, as well as areas designated as nature reserves. This wind farm was built on private land, used for cattle ranching, whose owners are mainly inhabitants of Dzilam González (SEMARANT, 2013). In 2012 a first plan was presented with the intention of operating a capacity of 50 MW by means of 16 wind turbines of just over 3 MW. It was planned to be built in a 600 hectare area within a conservation policy zone where industry is not permitted. The installation of the wind farm would be carried out through leases with private companies for 30 years with the possibility of extending to 50 years, in an area of low deciduous forest, on a plain of karst soil characterized as an immature, fragile, easily dissolved and fractured type of soil, which exposes the vulnerability of subsurface hydrological networks (Encalada & Sanches, 2020). Its area of influence includes wetland and mangrove areas protected by the Ramsar Convention (Figure 6).

Figure 14: Map of the Wind Park in Dzilam de Bravo. The red dots represent the wind turbines. Turbines, roads and the protected area in the north are clearly visible from the image. Source: EJAtlas, 2020.

In 2018, 28 wind turbines of 2.5 MW (each) were installed, expanding the total installed capacity to 70 MW under a self-supply permit and occupying a total of 1,300 hectares. Through this scheme the beneficiaries of the electricity generated are 39 private companies (CRE, 2019). The self supplying scheme meant that local populations would not benefit directly from the project, but from the 'co-benefits' generated from it, such as the construction of non-essential infrastructure (like recreational parks), the creation of temporary jobs and the reduction CO2 emitted (Gobierno de Yucatán, 2021). The project was proposed in an area where industrial development and the use of heavy machinery was prohibited, mostly due to the ecological frailty of the coastal areas. However, after creating political pressures and lobbying campaigns, the State government made changes to the *Ecological Management Program for the Yucatan Coastal*

Territory (POETCY), an instrument that prohibited the installation of industries in coastal areas (Gobierno de Yucatán, 2014: 10).

Changes to the program became a case in point for several environmentalists and local activists who saw the modification as a way of legitimizing extractive processes to ecologically sensitive areas and enabling the extraction of 'new resources' such as wind and solar power through the deployment of low-carbon infrastructure (Zarate Toledo, *et al.*, 2019). As several civil society organizations and academics declared in 2013, if SEMARNAT approved the environmental impact assessment of the project, the entire areas dedicated for conservation could be opened to new infrastructure projects that were now categorized as 'low impact infrastructure' (CEMDA, 2013). The adoption of the Electricity Industry Law in 2014, meant that the park was not required to present a Social Impact Assessment (SIA) and thus, because the EIA was later approved by SEMARNAT (despite the contestations) the park was approved without a need for consultations to the local communities in the sphere of influence of the project. Additionally, the change in the POETCY also justified the way the project was described in its EIA, prompting the energy regulatory commission (CRE) to grant a permit for the installation of the wind-farm under the self-supplying scheme (CRE, 2019).

As de Encalada Gómez (2019: 108), writes, because contracts and project information was handled through private exchanges between landowners and the company (which were only a handful), the rest of the population of Dzilam de Bravo did not have a chance to openly receive complete and accurate information of the project: "They were not asked for their opinion, nor invited to give their consent for the project". While several other activists and civil society organizations denounced the project (Zarate Toledo, et al, 2019; Articulación Yucatán, 2019) mainly because of its environmental impacts, including affectations to local biodiversity and wildlife. Encalada Gómez (2019) further argues that the company engaged in the use of 'soft' counterinsurgency tactics to engage the local population and dissuaded any real opposition to the installation and operation (p.174). This last aspect remains the most contentious as the promises of development, progress, jobs and other benefits such as increased tourism in the area, all arguments that were used to increase local support for the project, remain contested and with arguable results (Escalate, 2021). The main concern emerged from local populations that were

affected daily by the proximity of the turbines, as well as a perceived sense of injustice emerging from the impacts to their local landscape, and the electricity costs that are still increasing, while the economic benefits go directly to corporations and private companies (Escalante, 2021).

This section has introduced the case studies detailing how and why each case was selected. After a brief period of uncertainty due to the COVID-19 pandemic two low-carbon energy projects were selected because of four main categories: a) their difference in technology and impact, b) the different stages of development of each project, c) the different configurations of land ownership, c) and their different local, state and national reaction to each one. Afterwards, a brief section also introduced the context in which these projects are being developed or are already operational, with the first section introducing the configuration and the way that the energy system operates at the national level, in the Yucatan Peninsula and more specifically in the state of Yucatán. An additional subsection also introduced the regional integration project constituted around the wrongly called “May Train" and some of the ways that this project is directly influencing the deployment of low-carbon infrastructure in the peninsula, more specifically with the two selected case studies. Finally, this section introduced each case study with more detail, providing contextual information over how these are integrated into Articles 2, 3 and 4. The following section introduces the summary of each of these papers and highlights their main contributions, before presenting the conclusions for this research project, which appear in the last chapter of this *Capa*.

5. Summary of papers and other contributions

This section introduces the articles that constitute this thesis. Drawing on the analytical domains presented in chapter two, articles one, two and three address one of the theoretical contributions of the thesis respectively. While article two and three engage with the case studies presented in chapter four of this cape. Additionally, article 4 –which was co-written with two members of the community of San José Tipcéh in Yucatan– deals explicitly with this case study. The four papers presented here offer a comprehensive analysis of the energy transition process in Mexico from three perspectives: First, from a decolonial analysis of energy systems and their reproduction of the CMP; Second, from the reading of energy justice as a universalized conceptualization that reproduces colonial power, being and knowledge hierarchies, enabling and furthering extractive trends already existing in Latin America, and finally, it offers a possibility of transformative politics from the point of view of political ontology: through the 'new energy spaces' and territorialities in which low-carbon infrastructure is being deployed. The papers add a relational, spatial and structural critique to the energy transition literature, and open new avenues that can contribute to the work of human geographers, anthropologists and political ecologists/ontologists in the future, a process that will be dealt with in more detail in the following and final Chapter of this *Capa*.

5.1. Articles 1 - 4

Paper 1*: Decolonizing energy justice from the ground up: Political Ecology, Political Economy and Energy Landscapes.*

The purpose of the paper is to expand the concept of energy justice by considering the struggles over coloniality and cultural identity in the Global South and their interactions with the spatial and historical development of energy systems and the ongoing forms of energy transitions. The article argues that the current conceptualizations of energy justice cannot be separated from the politics of incumbency as, without a decolonial critique, they tend to reproduce rather than transform hegemonic power relations. To be transformative, energy justice must be articulated from the politics of actually existing unsustainability. In other words, the starting position for

energy justice must be that energy injustices are already embedded in existing energy systems and energy policies. Drawing on Latin-American decolonial thought, and the work of political ecologists around energy, this article advocates looking beyond a universalized conception of justice towards an approach where justice is based on a sense of place and is informed by the community's relationship with the land. Using the concept of energy landscapes, the article puts forth an alternative way of understanding energy systems and conceptualizations of justice in decolonial settings.

> The paper is single-authored and was published as a research article in the journal *Progress in Human Geography* in 2023.[29]

Paper 2: *The political economy of energy transitions: new energy spaces and decolonial politics in Mexico.*

This paper draws on Critical Political Economy (CPE) to explore energy transitions in Mexico. It analyzes struggles over competing energy visions from a decolonial, spatial and post-development perspective. The article frames energy transformations as more than a move away from fossil fuels; they are a radical overhaul of universalized Eurocentric capitalist modernity. CPE questions the role of the state as both a facilitator and driver of the energy transition. I examine two low-carbon infrastructure projects in the state of Yucatan, Mexico to build on Bridge and Gailing's (2020) notion of new energy spaces as the sites, scales and spatialities through which broader questions of political economy and contemporary struggle are being worked out. CPE of the energy transition must ensure that these infrastructures are not deployed as new forms of extraction, but rather informed by affected communities and their territorial struggles. Territorial struggles and studies on the political economy of energy transitions can benefit from an open dialogue about how socioecological transformations are imagined, designed and implemented.

> This single-authored manuscript was accepted by the journal *Review of International Political Economy*. Additionally, an early version of this article will be part of the book: *Economía política de las energías renovables en América Latina [The political economy*

[29] The published version of this paper can be found here: https://doi.org/10.1177/03091325221132561

of renewable energies in Latin America] edited by Edgar Talledos and Lorudes Alonso. Forthcoming by the Consejo Latinoamericano de Ciencias Sociales (CLACSO).

Paper 3: *Rethinking energy justice in an era of total extraction: The political ecology- ontology of renewable energy in Yucatan.*

This paper further questions the literature on energy justice by using the really existing unsustainability approach to analyze how a trend towards total extraction is incompatible with the Westernized proposition of energy justice and its commitment to a westernized conception of development. The paper argues that, as the world gets warmer, the deployment of low-carbon infrastructure is seen as the cornerstone to mitigate the pressures created by fossil capitalism. Prompting questions over what constitutes a 'just' energy transition? This has simultaneously broadened the discussion over what are the social justice and colonial legacies embedded in the infrastructural, technological and material composition of energy systems? Drawing on semi-structured interviews with different actors, this article looks at the deployment of low-carbon infrastructure in the Yucatan Peninsula, Mexico, as the colonial legacies, politics and power relations embedded in energy systems interact with the construction of the so-called "Maya Train" a regional integration project seeking to interconnect the southeast of Mexico. It asks the question: can we speak of energy justice in a context of total extraction? Drawing on the literature of green extractivism, it argues that as long as energy justice is linked to a Westernized conception of modernity and development it risks reproducing injustices instead of solving them. The article suggests that political ecology must pay closer attention to emancipatory struggles in defense of the territory as they move away from a universal definition of energy justice.

This single-authored manuscript was be published in the *Journal of Political Ecology*.[30]

Paper 4*: Resistance to renewable energy as a form of extractivism: The case and lessons learned from San José Tipcéh.*

The purpose of this paper is to document the experiences of the Indigenous community of San José Tipceh in the municipality of Muna, Yucatan, following their efforts to defend their territory against the development of a large-scale solar energy project. The paper is not meant to be an

[30] The published version of this paper can be found here: https://doi.org/10.2458/jpe.5485

academic publication but to voice the experience of some members of the community who lived through the consultation, negotiations and resistance surrounding the deployment of a mega solar farm within their community. The paper draws on their first hand accounts, and experiences to demonstrate the vital importance of recognizing the tools that Indigenous communities have to defend their territory in the face of the expansion and development of extractivism, including the reconfiguration of the territory to make it 'legible' for capital investment through the development of megaprojects. By focusing on this experience, the text seeks to contribute to a broader discussion on extractivism in Mexico and Latin America, as well as the implications of a reconfiguration of familiar landscapes through what can be called the 'new climate colonialism', or the emerging trend of 'green sacrifice zones' that is, in the spaces and people transformed and erased in the service of green capitalism's drive towards decarbonization and a supposed energy transition. The paper offers a series of 'lessons learned'- a term we draw from the corporate jargon used to legitimize the deployment of these types of projects, seeking to subvert its meaning by speaking to a different audience. The paper focuses on the instruments used to consult and ensure the participation of Indigenous communities by revealing their main limitations; the forms of structural, ontological and epistemological violence in which they operate, and finally, it offers a brief reflection on the implications that this process may have for Indigenous communities facing these types of extractive projects.

> Two versions of this paper that were not peer-reviewed were co-authored with two Indigenous leaders and published in Spanish by the Due Process Law Foundation and the Heinrich Böll Foundation in Mexico City. The version reproduced here is a translation by the author.[31]

5.2. List of other contributions

A number of other contributions authored during the course of this research project have been developed but have, for various reasons, been excluded. They are added here to show how this research has expanded and enabled a series of other projects that indirectly contribute to the overall aim of this thesis:

[31] The published version of this paper can be found here: https://www.dplf.org/es/resources/resistencia-frente-las-energias-renovables-como-formas-de-extractivismo-el-caso-y-las; and here: https://mx.boell.org/es/2023/08/22/defender-el-territorio

- Dunlap, A & Tornel, C. (2023). Pluralizing energy justice? Towards cultivating an unruly, autonomous and insurrectionary research agenda. *Energy Research and Social Science,* 103: 103217.
- Dunlap, A & Tornel, C. (2023) An insurrection in energy research: discussing energy justice, capitalist warfare, & decolonization in the academy with Carlos Tornel and Alexander Dunlap. *Globalizations*, 0(0): 1-23.
- Dunlap, A and Tornel, C. Exchanges in the Journal *Progress in Human Geography:* Dunlap, A. (2023) Decolonizing energy justice: Identity politics, attachment to land, and warfare, pp. 348–350; Tornel, C. (2023) Energy justice beyond identity: Planting anarchist seeds towards total liberation, pp. 351–352.
- Tornel, C. (2023) Book Review. *"Esteva, G. (2022) Gustavo Esteva: A critique of Development and other essays", Antipode, 0(0): 1-8.*
- Tornel, C. (2023) Book Review: "*Fraser, N (2022) Cannibal Capitalism. How our system is devouring democracy, care, and the planet - and what we can do about it." Capitalism Nature and Socialism* 0(0): 1-4.
- Tornel, C (2022) Seeking common ground: On possible dialogues between Marxisms and Political Ontology. *Nordia Geographical Publications,* 51(2):163 -174.
- Tornel, C & Lunden, A (2022) Editorial to Re-worlding: Pluriversal Politics in the Anthropocene. *Nordia Geographical Publications,* 51(2):1-9
- Tornel, C.; Fonseca, R. Tamborrel, AS. & Guevara, DM. (2022) *Transición energética en América Latina y el Caribe. Tendencias regionales y orientaciones de política pública para una transformación eco-social*. Fundación Frederich Ebert, Ciudad de México.
- Escobar, A., Tornel, C. & Lunden, A. (2022) On design, development and the axes of pluriversal politics: An interview with Arturo Escobar. *Nordia Geographical Publications,* 51(2): 103-122.
- Olivera, B.; Tornel, C. & Azamar, A. (2022) *Minerales Críticos para la transición energética: Conflictos y alternativas hacia una transformación socioecológica*. Ciudad de México: Fundación Heinrich Böll.
- Tornel, C. & Gozález Gomez, E. (2022) ¿Comunalizando a Marx?: La aportación de lo común y lo convivial desde Gustavo Esteva y Jaime Martínez Luna. *GEOgraphia*, 24 (53): 1-20.

- González Gómez, E. & Tornel, C. (2022) Bajo el volcán: Convivencialidad y comunalidad desde Gustavo Esteva y Jaime Martínez Luna. *Epikeia. Revista del Departamento de Ciencias Sociales y Humanidades*, 0(0): 1-18.
- Motaño, P & Tornel, C (2022) Balance de la Política Climática de AMLO. *Análisis Plural*, 1(1): 1-18.
- Tornel, C (2021) Petro-populism and infrastructural energy landscapes: The case of Mexico's Dos Bocas Refinery. *Nordia Geographical Publications*, 49(5): 6–31.

Additional to these contributions, this thesis has also had an impact beyond the academic sphere. At the time of writing, the solar project in Muna, Yucatan (Ticul A & B) was still an open court case, with judicial decisions pending. Drawing on some of the results of this thesis and in partnership with a number of academics, an *Amicus Curiae* was presented to the Court in Mérida Yucatan on January 9th, 2023. The document highlights some of the main problems of the deployment of renewable energy in Indigenous territories and, at the same time, presents some of the conclusions of this thesis as possible alternatives to enable other forms of ownership, scales, design and deployment of renewable energy projects. A translated and anonymised version of the Amicus is presented in Annex 3 of this thesis.

6. Concluding remarks

The main question that informed this thesis was ***How can struggles against low-carbon infrastructure inform multiple understandings of justice, energy and transitions from a decolonial perspective?*** This question drove an analysis over how energy systems are organized, the different actors involved in their production, hindering or progressing their transformations and how this organization manifests over time. The analysis suggests that the socioecological conflicts surrounding energy infrastructure are much more than rejections to landscape changes. Conflicts in the Global South are rooted in metabolically unequal forms of exchange that reproduce sacrifice zones, a process that is determined geographically and that is progressively advancing into new frontiers that were previously unavailable for extraction. The surge on socioecological conflicts throughout energy systems' value chains has revealed that struggles are epistemological and ontological in nature, that is, these are disagreements about the very nature of reality and how it is to be inhabited. The first part of this concluding chapter reflects on each of the research questions that animated this research project and answers them by drawing on the theoretical literature and the analysis of the empirical data. The first section presents the research questions again for the sake of clarity and engages with each of them individually. The second section highlights the main contributions of this research project, while the third section presents some of the ways in which this thesis can contribute to future research as well as some of the key challenges of studying and supporting autonomous movements for energy transitions in the Global South.

Overall, the main contributions of this thesis are fourfold: First, it argues that the political economy of energy transitions has systematically relied on technological determinisms, state and corporate actores, overlooking the role of societies in movement that are (re)shaping and (re)formulating the terms of the transition, the organization of energy systems and the multiple definitions of justice. Second, this thesis has shown that Political Ecology's (PE) focus on ecological distribution conflicts (EDC) is a welcomed expansion to PE treatment of energy as *just another resource* (Huber, 2015). However, this thesis draws on Political Ontology (PO) to understand these struggles as much more than distributive concerns, but as ontological

disagreements between worlds, often expressed as incommensurabilities within legal systems that reproduce the basis of the modern constitution (teleological progress, dualist separations between nature and culture and a narrowly defined form of eurocentric universalism). Third, this thesis has shown the relevance of assessing the deployment of low carbon infrastructure through a decolonial lens. This analysis shows how energy systems are symptomatic of a particular historical, political, metabolic and spatial configurations, shaped by the colonial legacies and histories. The focus on energy landscapes and territories, reveals the multiple ways in which histories, like layers of a palimpsest (Ingold, 2000), reveal histories and memories of oppression, resistance, struggle and emancipation through multiple forms, while at the same time, offers the possibility of centering the territory as a spaces that holds multiple sovereignties and relationalities (Halvorsen, 2019). This view of the territory gives way to alternative definitions of justice drawing on the otherwise discounted, oppressed or *othered* knowledges, forms of being and governing.

Taken together, these approximations shape a postdevelopment and pluriversal approximation to the study and praxis of energy transformations. They reveal a much more nuanced understanding of the energy transition process rejecting the multiple dichotomies (as discussed in Chapter 1) that shape its discussion at the hegemonic or structural level (Feola, 2020; Dunlap, 2021; Reyes, et al, 2022), without discounting its material manifestations through low carbon infrastructure (i.e. the coloniality of infrastructure, see Dunlap & Correa Acre, 2021). The result is the possibility of looking at the transformation of energy systems as struggles against neo-colonial impositions, a rejection of the extractivist tendencies that continue to shape contemporary capitalist modernity and its political economy, and as the possibilities of grounding normativities as emerging as paths towards a pluriversal transitions where many worlds and energy relationalities are possible.

6.1. Answering the research questions

Drawing on the aforementioned question that informed this research project, this thesis asked the following three questions:

1. *How are various modes of conceptualizing, imagining, representing and inhabiting energy landscapes by peasant and Indigenous communities incorporated and/or contested by the state through institutionalized, material and discursive practices?*

2. *Through what instruments, techniques, actions, and policies are concerns of energy justice distribution, recognition and participation- addressed by the Mexican government? and do these instruments offer a space for dialogue between different epistemologies and ontologies or are they used to sustain different forms of exploitation, accumulation and domination?*

3. *How can the concept of energy landscape, seen from a decolonial perspective, challenge existing notions of energy justice and open up new terrains for inquiry, design and relational meanings of what constitutes the right to the landscape around the deployment of large-scale low-carbon infrastructure in the Global South?*

Question 1 is concerned with the epistemological and ontological disagreements that sit at the core of this research project. While on the surface these appear to be 'simple' debates over how energy systems should be constituted (i.e. what type of technologies) and organized (i.e. who gets to make the decisions and crucially, who is excluded), the main argument presented here is that these disagreements are much more heterogeneous and convoluted, as they are rooted in a long history of oppression, extraction and exploitation of both humans and non-humans. The thesis suggests that notions like 'transition' have largely underestimated the structural and transnational harms spread through the production value-chains that underpin the transition process and the incorporation of low-carbon infrastructure into energy systems (see Sections 2.2 and Articles 2 and 3). As Dunlap (2020) argues, this term operates as a euphemism that presents an overly uncritical and sympathetic approach to the violent structures of land grabbing practices, mining, expulsions and occupation that are necessary for the deployment of low-carbon energy technologies to maintain the drive towards economic growth in capitalist modernity. The use of terms such as 'green' 'renewable' or 'sustainable' further encroaches the structural harms of these extractive practices, and crucially, detaches radical propositions that destabilize, interrupt and question the hegemonic and incumbent view of socio-ecological transformation –which not only includes the reduction of fossil fuel use and the incorporation of

low-carbon technology, but includes degrowth and other demand-side energy reductions that basically question the violent forms of dispossession required to sustain capitalism modernity–.

As this research project has shown (see Section 1.2 and 2.3), the role of different energy imaginaries that shape energy systems are rooted in different relational understandings of how these systems operate. On the one hand, the construction of high-energy modernity, as theorized by Mitchell (2011), Huber (2013), Malm (2016), Boyer (2014) and Franquesa (2018) enables an understanding of why the apparent ubiquitousness and abundance of energy shaped modern societies in metabolic, economic, political and spatial terms (see Section 2.1). This is then evident in the apparent invisibility of energy during high-energy modernity –the period over the last and current centuries– has informed imaginaries of perpetual economic growth and separated the multiple forms of violence that have shaped this form of capitalist modernity. On the other hand, other imaginaries and understandings of energy systems are rooted in that lived experience of violence, dispossession, occupation and harm created to sustain and maintain a singular vision of the transition operational (see Articles 3 and 4).

This last point is crucial to understand why disagreements over the nature of infrastructure can have multiple meanings. Concepts such as energy landscapes and territories reveals how energy systems are imbued with particular imaginaries (see Section 2.3 and Articles 1 and 2), something that in Latin America has been shaped by the persistence of a colonial project that seeks to impose a one-world world view to all social, political, economic and environmental problems: Development. The role of State institutions and most of the actors involved in sustaining this particular form of development are rooted in what colonial scholars refer to as the *dark side* of modernity (Mignolo, 2003), that is, they are rooted in the Coloniality of Power (COP). Development is here rendered synonyms the continuation of capitalist modernity, a process inaugurated over 500 years ago organized around the construction of a hierarchical organization and the international division on labor where a Eurocentric vision of the world sits at the top (Hesketh, 2021) (see Section 2.3 and Articles 1 and 2). The rejection of a unilinear, teleological and Western-focused form of development has been essential in justifying capitalist modernity and its turn towards the green economy. As Sachs (2019) reminds us, development stands like a ruin in the intellectual landscape, it is, after all, a monologue: deaf to the other and many alternatives that have been oppressed, silenced and *made absent* through multiple forms of

violence. The notion of post-development not only rejects the universalized view of development –through its many names and policies such as economic growth, progress and sustainability– but it recenters the struggle for the commons that is taking place through everyday forms of resistance, with 'people reclaiming their own, feasible, ways of living well' (Esteva & Escobar, 2017: 2562).

This view of development has systematically alienated, obscured and actively produced as invisible other knowledges and other forms of being that are presented as either non-existent or backward, underdeveloped, trivial or less relevant. Articles 2 and 3, demonstrate how the deployment of low-carbon infrastructure is tied to a discourse of *terra-nullius* and frontier-expansion. Article 2 highlights how CPE is key in (re)shaping our understanding of how energy transitions take place. New energy spaces—the landscapes and territories where low-carbon infrastructure is being deployed—operate as 'Thirdspaces' capturing the divergent spatial manifestations of the transition process, and as sites of autonomous possibilities where non-capitalist social relations can unfold (Zibechi, 2012: 28). These new territorialities include new pedagogies and commoning alternatives (Gills and Hoseini, 2022) that embody pluriversal approximations, inform transition alternatives, and contest capital's attempts to rebrand infrastructure, extractive practices, and colonial occupation as 'green'. Article 3 shows how the Yucatan Peninsula was reconfigured and reimagined as a 'new' extractive frontier that emerged as the Mexican energy system underwent a process of neo-liberalization. Territories and landscapes were made 'legible' through the assemblage of discourses and practices that enabled the expansion of capitalist frontiers. However, the cases outlined can also be analyzed from the perspective of 'new energy spaces' to de-center the state as the main actor and primary driver of energy transitions. Indigenous and non-Indigenous groups struggling against capitalism seek to contest and reorganize their relations with the territory and (re)formulate energy as a territorialized, emancipatory, pluriversal alternative beyond alienation, abstraction and commodification. The example of Indigenous communities depicted in Articles 3 and 4 speak to some of the other possibilities that can inform how energy landscapes and transition are conceptualized, imagined, represented and inhabited.

Furthermore, question 1 deals with the role of landscapes in shaping our understanding of energy systems from a historical and spatial perspective. While this concept is developed in more detail

in Article 1, it is essential to understand energy landscapes as 'the spatial arrangements of energy systems accumulated over time in particular places' (Castán Broto, 2019). These places are themselves manifestations of broader nation building projects, material evidence of the operations of political economy and as sites that reflect memories of struggle, sacrifice and uneven power relations (Castán Broto & Sansana Calvert, 2021). In other words, landscapes expose 'the spatial arrangements and material legacies of political projects and associated struggles, their memories and everyday actions and experiences accumulated over time in particular locations' (Kirshner, et al., 2019: 4). The role of landscapes in reflecting the role of political economy of energy transitions reveals multiple layers of uneven power relations shaped by particular projects over time. At the same time, if offers a particular reading of how energy systems and spatially connected to other places, be it through the creation of 'sacrifice' of 'wasted' spaces, and the discourses, institutional arrangements and power relations used to justify them (Bridge et al., 2013; Castán Broto & Sanzana Calvert, 2021).

The spatial character of the transition is also evident in the role that territories play in decentering the focus of political economy on the state and the actors favored by the hegemonic discourse of the transition and capitalist modernity (such as transnational corporations, development banks and organized civil society). The role of the territory –as developed in more detail in articles 2 and 4– is essential in the possibility of holding multiple knowledges, genealogies and sovereignities together in the same place (Halvorsen, 2019). This is not only crucial for grounding and recentering place-based alternatives to a universal definition of energy justice, but to decenter the role of the state as the main actor to implement the transition. As Zibechi (2012: 76-85) argues, the territorialization of politics in Latin America has enabled the politicization of social and cultural differences to open democratic alternatives to a long-lived representational crisis, and a rejection of top-down hierarchical forms of politics led by the state. These characteristics are expressed in the defense, reclaiming and/or of and the affirmation of differences.

Finally, the spatial manifestation of the transition is also rooted in the particular history and the reforms and land dispossession in Mexico. As Torres Mazuera (2022) and Avila et al. (2022) show, the agrarian reform enacted in 1992, in pair with the first major change of the Mexican Constitution allowing private sector participation in the energy sector, was crucial in

transforming the communal character of land, institutions and communities by 'allowing owners to sell communal land rights obtained after decades of social struggle' (Rivera-Herrejón, 2007). The dual liberalization process –of land and energy– was essential in creating legal and illegal markets that enabled rising demand and land speculation, specifically in the Yucatan Peninsula, where the progressive parcellation of communal land in a process of 'depeasantization' resulted in the creation of a land market, effectively institutionalizing dispossession. In other words, the process for land grabbing is and has been essential for the deployment of low carbon infrastructure, a process that has now been exacerbated by the Maya Train, as land speculation for tourism, urbanization, agricultural production and fossil fuel extraction has increased as a result of a regional reorganization of landscapes and territories in the name of sustainable development (GeoComunes, 2019).

Question 2 further examines the role of mechanisms that are seeking to promote a dialogue between what can be understood as different epistemologies and ontological understandings of the world. This thesis focused mostly on the role of Environmental and Social Impact Assessments (EIA/SIA) and procedures such as the right to a consultation for Indigenous communities to obtain Free, Prior and Informed Consent (FPIC) (see Section 2.3.1 and Article 1 for a theoretical discussion and Articles 3 and 4 for empirical evidence). The main concern here was whether these instruments offer or could offer a space for dialogue between different epistemologies and ontologies. In other words, the thesis is concerned with whether these instruments can effectively help us create a *dialogue of knowledges* (Santos, 2014; Leff, 2017) between the 'repressed knowledge' by the framework of modernity/coloniality and whether it enables the possibility of envisioning a 'real' energy transformation instead of following the same processes of extraction, occupation and dispossession that characterizes late liberal capitalist modernity (see Section 2.3.1 and Article 1).

The rapid rise of violence in Mexico and Latin America associated with the neo-extractivism framework that has captured most of the governments in the region over the last two decades stands as a the backdrop of actually existing unsustainability in which the energy transition is supposedly taking place (see Section 2.2.1 and Article 3). This framework reveals not only the rapid increase of mining and mega-development infrastructure projects that change entire regions into special zones for extraction, production and transit, but the actual toll of the uneven

metabolic relations and cost shifting strategies that continue to shape the energy transition. In the four years during which this research project was undertaken, the number of land defenders assassinated in Mexico has risen to 147 (Global Witness, 2022). Just in the last year (2022), activist networks have registered more than 582 aggressions against land defenders. This rise of physical violence is a direct result of the increased militarization of social life in Mexico (Centro Pro, 2022) and the continual deployment of development projects.

Procedures and mechanisms such as EIA-SIA or FPIC are usually deployed as tools that seek to redistribute, recognize and include people into decision-making procedures. The liberal framework of justice –informed by these three tenets– tends to transform injustices into a dichotomy of reform vs. revolution. Nancy Fraser's approximation to this dichotomy is perhaps one of the most informative –Fraser argues for transformative rather than affirmative struggles and the via of *Non-reformist reforms*– that is radical changes that happen over time. The argument that this thesis makes is that while these approximations are useful and necessary, there is an unwavering commitment to the structures of capitalist modernity and eurocentric coloniality in which these supposed reforms or revolutions take place (see Chapter 2 and Articles 2, 3 and 4). Mexico and Latin America are a case in point. States and governments are captured within the same Modernist and Eurocentric vision of the world. Drawing on several authors such as Anthias (2018), Riofrancos (2019); Walsh (2018) and Zibechi (2022), this thesis has argued that these tools tend to seek better distributive, recognition or participatory outcomes within a framework that is inherently colonial (i.e. they reproduce a *coloniality of justice*) and that cannot disassociate itself from the global economic integration of capitalism (see, Álvares and Coolseat, 2020). As Raquel Gutiérrez Aguilar (2020: 7) reminds us, liberal policies articulated around identity have built a rigid and sophisticated legal and procedural scaffolding both to distract and capture collective forces by directing them towards the negotiation of recognition, to reinstall renewed forms of dispossession and guardianship combined with the endless bargaining of unfulfilled rights. Ultimately, as it is shown in all of the articles, there is an unwavering commitment to the onto-epistemic framework of modernity and liberal justice embedded within these instruments, which operate in a context of actually existing unsustainability, and thus cannot produce truly emancipatory frameworks.

Question 3 is dealing specifically with the role of new energy spaces and how they can help create a different understanding of the energy system and the outcomes embedded in it (see section 2.2, 2.4 and Article 2). New energy spaces refers to a set of spatial categories that enable a relational and structural approach to the heterogeneous process of adding low-carbon infrastructure to the existing energy matrix (such as landscapes, territories, scales and place, see Bridge et al., 2013). The approximation to energy landscapes for example, encourages a broader understanding of landscapes as more than the backdrop on which energy systems take shape. Recognizing landscapes as the site where people shape and make sense of the world in relation to "shared meanings and values" (Olwig & Mitchell, 2007) highlights a phenomenological character of the landscape, revealing that struggles over land are much more than concerns over the distribution of environmental harms, recognition or participation in deployment of energy infrastructure. Instead, these are struggles over the meanings of energy and land, and the relationships between landscapes and everyday life (See Section 2.5 and Article 1).

In Latin America the role of the territory plays another key example. Question 3 is concerned with the possibilities that emerge from the other knowledges and realities that are actively produced as non-existent by the framework of the CMP. The core argument that is being presented here is that by looking at these spaces, or rather, by utilizing these spatial categorizations, struggles for alternative, relational and political approximations to energy, to the energy systems and their transformation, can become much more perceptible (see Article 2). The territory in Latin America holds different genealogies of state and non-state sovereignty, struggles and process of colonization, and socio-ecological constructions of identity. As Halvorsen (2018; 2019) argues, such genealogies not only embody situated knowledges that must inform particular definitions of justice, but they also highlight occasionally long histories of struggles, emancipation and resistance in the pursuit of emancipation and self-determination.

This is made evident in the way that Mayan communities have offered proposals to confront extractivism and promote post-development and *pluriversal* alternatives (Escobar, 2018; 2020), that is, forms in which ontological and epistemological violence of the capitalist-modern world is recognized and confronted by other struggles for justice embedded in a localized, grounded or territorialized (re)definition of what is meant by well-being and a good life (see Section 2.5 and Articles 2, 3 and 4). These struggles are 'rooted' in their territorial relations. As Willow (2018)

argues, where there is extractivism, there is also extrACTIVISM—projects and ontologies that challenge the extractive onto-logic or capitalist modernity. These forms of resistance are perhaps not as obvious as the traditional definition of struggles (i.e. social mobilization and protests), but rather are rooted in the defiance of maintaining one's language, identity, or politics in road blocks and other forms of everyday interruptions that manifest in multiple ways. These are what Guillermo Bonfil Batalla (2009:130-5) outlines as the everyday forms of resistance, embedded within the everyday practices that operate as the 'weapons of the weak' (Scott, 1985) and allow communities to retain their cultural values and traditions –what Gustavo Esteva brilliantly calls 'the tradition of changing tradition in a traditional way' (Esteva, 2022: 135)–. Strategies to increase autonomy and self-determination, like *autoconsultas*, further destabilize and unsettle the framework of energy justice, which is what the following section deals with (as depicted in Article 3).

6.2. Decolonizing energy justice and the main contributions of this research project

Drawing on the results obtained by the three research questions, it can be argued that the overall contributions that this thesis has made are threefold. The first of these can be captured and addressed by a passage of Caribbean decolonial thinker Aimé Cesaire 1956 letter renouncing the French Communist Party. In his letter of resignation, Cesaire rails against the possibility of a universal form of emancipation, he wrote:

> 'Provincialism? Not at all. I am not burying myself in a narrow particularism. But neither do I want to lose myself in an emancipated universalism. There are two ways to lose oneself: *Walled segregation in the particular or dilution in the 'universal.*' My conception of the universal is that of a universal enriched by all that is particular, a universal enriched by every particular: the deepening and coexistence of all particulars.' (Cesaire, 1956, my emphasis).

Cesarie's letter stands as one of the main arguments emerging from this discussion. First, it highlights the idea that while there can be no one-size-fits-all solution to questions of energy

justice. That is, it must be informed through the territorial and local contexts –itself determined by particular histories and legacies of power and struggles–, in other words, these 'particulars' are what must inform energy justice. The persistence of a CMP suggests that traditional approaches to environmental, climate and energy justice, which originated in the Global North, need to consider the struggles against (and the 'dark side' of) modernity that have shaped the lived experiences of peasant and Indigenous communities. As Walsh (2018: 35) explains, "the struggles over territory and land as the base and place of identity, knowledge, being, spirituality, cosmo-vision-existence, and life, have long organized the collective insurgent praxis of ancestral peoples, identified as Indigenous, Afro-descendant, or Black, and sometimes as peasants or campesino." It is through relations to places struggles against the imposition of development projects (both physical and ideological) that situated knowledges emerge.

Article 1 argues that the way that energy justice is informed maintains a geographical and epistemological commitment to Western modernity. The *reformulation* of energy justice –as argued in sections 2.4 of this thesis– starts by acknowledging and taking into account the persisting coloniality of justice (Álvares and Coolseat, 2020) that maintains the reproduction of harms, the misrecognition of subjectivities and, at times albeit unwillingly, the reproduction of the colonial problem of "speaking for others". Section 2.3.2 and more specifically Table 2 (p. 97) shows how the experience of late-liberalism has transformed recognition into a particular form of governance, infomed by the colonial strategies that manifest both in terms of the deployment of infrastructure in particular settings, and the mechanisms of disciplining, enrolling and producing subjectivities that result from their deployment. Articles 2, 3 and 4 sought to take this reformulated form of energy justice, –albeit at different stages and community organizing processes– and apply it to the context of Yucatan in the Southeast of Mexico. The rest of the contributions are rooted in the results that emerged from this application.

The second point can also be drawn from Cesarie's remarks, as it contributes directly towards the definition of the pluriverse presented in this research project. This thesis has argued, following Öslender (2019), that the pluriverse can be understood in *spatial* terms, that is, emerging from as *third spaces* or *new energy spaces,* where relations between old and new energy systems as well as struggles to resist and contest the advancement of capitalism are being worked out. Drawing

on the experiences of Latin America and how energy systems are contested, the framework deployed by political ecologists/ontologists reveals that these struggles are much more than simple disagreements about the transformations of landscapes and the uneven distribution of harms, but that they are rooted in broader onto-epistemic disagreements. As Article 2 highlighted, territories and landscapes in the southeast of Mexico hold different genealogies of state and non-state sovereignty, struggles, processes of colonization, and socio-ecological constructions of identity. Halvorsen (2019) argues, such genealogies embody situated knowledges that inform particular definitions of justice and foreground long histories of struggles and resistance in the pursuit of emancipation and self-determination. These new territorialities include new pedagogies and commoning alternatives (Gills and Hoseini, 2022) that embody pluriversal approximations, inform transition and civilizational alternatives, and contest capital's attempts to rebrand infrastructure, extractive practices, and colonial occupation as 'green'. The possibilities of addressing the energy transition and energy justice from the ground-up informed by the spatial relations embedded in this pluriversal approach, open up a series of possibilities for further research (described in the following section).

A third contribution is the relevance of acknowledging that understandings of energy systems and their transition must be rooted in the context of Actually Existing Injustice (AEI) and how certain tools and mechanisms are deployed to maintain the structures of capitalist modernity unquestioned. The particular experience of Mexico and Latin America shows that AEU is rooted in a colonial history that manifests through the CMP –power, knowledge and being– in the form of extractivism, development and state-led transformations of energy systems towards the incorporation of low-carbon technologies. Articles 2, 3 and 4 show how the Yucatan Peninsula was reconfigured and reimagined as a 'new' extractive frontier that emerged as the Mexican energy system underwent a process of liberalization. Territories and landscapes were made 'legible' through the assemblage of discourses, practices, legal and regulatory frameworks that enabled the expansion of 'renewable' capitalist frontiers. Furthermore, Articles 3 and 4 demonstrate how the state of Yucatan and low-carbon infrastructure companies deployed soft counterinsurgency strategies to inaugurate these 'new' frontiers and resist other transformative possibilities for energy transformations. The use of FPIC, EIA and SIA were used as tools to eliminate ontological incommensurabilities and imbalances, discipline and coerce populations

into accepting the terms in which low-carbon infrastructure is deployed, and mobilized as tools of social engineering in the expansion of green extractivism.

Overall, the experience of Indigenous and non-indigenous groups reveals how struggles against capitalist modernity seek to contest and reorganize their relations with the territory, (re)formulate the understanding of energy from an abstract, alienated and commodified entity, to a territorialized relation. The case studies in Dzilam de Bravo and San José Tipceh operate simultaneously as a heuristic that illustrates a broader trend that is shaping the so-called energy transition and as concrete examples of how low-carbon infrastructure deployment can have different manifestations and contestations. One of these case studies (Dzilam de Bravo) reveal the creation of spatial fixes for the incumbent regime of accumulation, while the other (San José Tipche) capture new 'territories of resistance' which embody new energy relationalities that shape energy emancipatory strategies and possibilities. Additionally, the cases show how the possibilities for emancipatory, democratic, autonomous and sovereign reconfiguration of territorial-energy relations became perceptible once communities experienced the 'threat' of low-carbon infrastructure being deployed in their communally owned land.

This research project encourages a more comprehensive understanding of the role of new energy spaces as sites where the possibilities of decolonizing energy justice can take place. The situated knowledges that emerge from relationships with the land are built in a constant struggle for autonomy. In other words, this is an open-ended process that requires work and cooperation, as well as constant redefinitions and dialogues. As decolonial, Indigenous scholars and social movements have shown, the struggle to occupy the state or use state power to achieve emancipation and/or recognition is not only limited, but also tends to translate demands for 'wellbeing' into a Westernized development project. Alternative forms of emancipation have focused on the possibility of organizing beyond the state and the market, a process that begins with a radical refusal or *negation*, and that ultimately "creates a new world of possibilities" by unsettling the given and enabling other prospects for attaining sovereignty, creating relationships and giving them legitimacy (Simpson, 2014; Dinerstein, 2015). Merging ontological politics with political ecology's work on energy and relationality reveals how power relations can be unsettled, and how the possibilities for alternatives are grounded in the relational character

between humans and non-humans in a particular place. This last point reveals that new energy spaces, and the possibilities for an emancipatory, democratic, autonomous and epistemically just energy transition can emerge not only in rural areas and through indigenous and peasant communities, but are also matters of urban spaces where different groups from different ethnicities, genders, classes and human and non-human interactions should also be accounted for. The study of energy transitions must then engage with the multiple definitions of *energy* and their relations to place and *societies in movement* in order to provide a grounded definition of energy justice, contest universally imposed narratives and advocate for the recognition of *pluriversal* paths towards multiple forms of energy justice and transitions.

6.3. New energy spaces: the possible application and the prospects for future research

Reflecting on the overall aim of the thesis, it can be argued that decoloniality is not an option but an urgent political necessity (Grosfoguel, 2022). As Mignolo (2018) argues, decoloniality is at once three concepts (modernity/coloniality/decoloniality) which creates a double task of rethinking how Western modernity has interpreted history through this lens and of recognizing the darker side that has been made invisible by this view, and one of actively engaging in the production of decolonial thought and praxis in the future. This entails a grand task that extends beyond the limits of what this research project has sought to contribute. However, this thesis has made a contribution by engaging with the coloniality of energy systems and the long lasting legacies of power, oppression and extraction that shape its material and political expressions. And yet, this is not to say that this research project should be read as a definite study of the decolonizing energy systems, but as the beginning of a much broader conversation over how to decolonize Western/modern conceptions of energy, the power structures that shape(d) energy systems and the forms of coloniality that manifest through different energy sources and technologies, without negating or rejecting critical insights to the modernity itself (see Santos, 2009).

In other words, this study seeks to encourage similar studies and methodological approaches coming from different parts of the world as discussions over: what constitutes energy justice?, how are energy systems to be designed and by whom?, and what are the particular challenges

that each territory faces in the struggle of enabling more democratic, autonomous and low-carbon energy systems?. With that said, the following four points seek to point to prospective future research agendas and also provide the basic points of what could inform policy making in future design of energy transitions.

The first point comes from one of this thesis' conclusions: If there is no universal definition of energy justice or a 'blueprint' for a just energy transition, the processes, practices and knowledges that inform energy transformations, the actors, institutions and overlapping territorialities that shape and define energy spaces, and the different relationalities with energy landscapes and places must be taken into account before attempting to deploy low-carbon infrastructure and design a transition process. As this thesis has argued, energy transitions are much more than questions about technology and 'hardware'. And yet, it might not be enough to engage with the 'politics' of energy transitions. In different places in the Global South transitions can also be about ontological and epistemological disagreements and past, present and future forms of violence over what places mean and how they are to be inhabited. Future researchers in the field of geography and anthropology, as well as critical political economists and ecologists should take into account other(ed) placed-based specific knowledges, practices and histories in their studies about energy systems as they interact with broader power imbalances.

Additionally, there is also a need to consider the limitations of addressing an energy transition from the supply-side perspective without considering how energy is used in modern energy systems. While this thesis has only addressed this in-part –mostly by recognizing the thermodynamic limits and relationalities implied in the use and definition of energy– there is an inherent question emerging from the territorial struggles in Mexico and Latin America that asks a poignant question: *what and for whom is energy for?* While simple, this question can provide guidance for future researchers, activists and policy and decision-makers alike. Attempting to answer the question can provides a critical starting point to uncover the long legacies of power, extraction and oppression that have shaped energy systems in the Global South; lays the theoretical and practical foundations to advocate for a decentralized, democratized and emancipatory energy systems as a response; and support broader pluriversal struggles and transition discourses such as *Buen Vivir* en Latin America, *degrowth* in some places in Europe or

any other pluriversal and post-development alternatives (see Escobar, 2015; Kothari, et al., 2019) informed by different societies in movement and their different knowledges.

A third point comes from recognizing the limits of a decolonial approach itself. While this thesis has shown the relevance and importance of adapting decolonial scholarship to the study of energy systems and their deployment, it is relevant to question how decolonial politics can foreclose further analysis towards transition and emancipatory strategies in the future. As discussed in section 3.5, there is a tendency within the academic literature to produce decolonial thought detaching it from what is happening on the ground. This trend is increasing the possibilities for decolonial scholarship to become irrelevant or inconsequential as terms and citations are reproduced like dogmas, while articles and books are written with no actual consequences on the ground (see: Halvorsen, 2018; Zibechi, 2023; Grosfoguel, 2022). In other words, while decolonial scholarship has produced important insights over how social scientists can approach questions over justice, power and politics in the Global South, it is important that scholars maintain a commitment to the struggles and the politics of what is happening on the ground to inform their scholarship and not the other way around.

A fourth consideration comes as a recommendation for future researchers to engage closely with the emergence of other actors, genealogies of sovereignty and multiple territorialities and the way that the energy transition can be de-centered from the State. The experiences of so-called progressive Latin American governments and the turn towards neo-extractivism have revealed some of the limits of decolonization and the possibilities of managing a form of 'benign' capitalism through the state (Machado and Zibechi, 2016). The eco-territorial turn that ensued in Latin America has placed indigenous communities (urban and rural) and peasants land-defenders with the support of activists, academics and broader 'networks of resistance' (Tetreault, et al. 2018: 24) as new actors challenging the traditional forms of sovereignty and power relations and this (re)shaping how energy transitions are designed. However, energy transitions and energy systems, as well as the legal and regulatory frameworks that operationalize energy justice principles, are closely associated with the nature of state-sovereignty, power, national identities and politics. It thus seems unlikely that the State will not play a central role in the energy transition in the near future. Nevertheless, as this research project has shown, the 'openings' or 'third spaces' created by the multiplicity of actors and 'overlapping territorialities' (Öslender,

2019: 1694) in which energy transitions processes are being worked out, offers the possibility of rethinking the role of the State as the central driver of the energy transition, enabling the possibility of a pluriversal energy transition, that is, an energy transition, definitions of justice and energy systems informed by a multiplicity of perspectives emerging from the situated knowledges embedded in particular places.

Finally, there are some implications and considerations that are useful for policy-makers and activists engaging and doing work around energy transitions. The matter of how to account for ontological incommensurabilities embedded within the legal systems that shapes and accounts for other forms of knowing, being and relating to nature/energy persists. Contesting or rejecting main tenets of the Modern Constitution –a teleological view of progress, a narrow modernist universalism and epistemic dualisms– also means reworking and reconceptualizing definitions and relations based on these notions for the last 500 years. There seems to be little to suggest over how policy makers could address this –without falling into the essay traps of late-liberalism such as multi or interculturality (as described in Chapter 2)–, indeed these tenets seems to be the basis of what constitutes modern legal systems (including private property and other taken-for-granted notions that inform capitalist modernity (See Temper, 2019 and Article 1)). However, I would advocate for what Fraser (2003) refers to as 'non-reformist reforms' that is, a process that while operating by affirming the existing order it holds the possibility for radical transformation. In other words, these are prefigurative actions that can be taken to progressively de-center the role of the state in energy systems and their transitions, and eventually eliminate or reduce it to a minimum (Cooper, 2016). Experiences like the ones depicted in articles 2 and 3 in Yucatan show the possibilities of recognizing other forms of territorial sovereignty, which includes the definition of participatory (self-determination), distributive (through traditional authority decision-making) and recognition (of other knowledges and forms of being/doing) that could lead towards emancipatory changes. A combination of formulating policies that seek to reject the tenets of the modern constitution and progressively recognize other territorial configurations could inform different approximations over how to fund, design and democratize energy transitions. This is a task that can inform future activism and policy-making.

Appendix 1: Selection of documents for review

Selection of documents for review. Including public policy, government (federal, state and local) plans, private sector and civil society reports and other public documents.

No.	Title, author and source[32]	Is relevant to	Brief description
Federal Government			
1	National Development Plan (NDP) 2012-2018 - Federal Government of Mexico (https://www.dof.gob.mx/nota_detalle.php?codigo=5565599&fecha=12/07/2019#gsc.tab=0)	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	The government sponsored plan of development from 2018-2024 which includes a vision of the country's development.
2	National Development Plan (NDP) 2018-2024- Federal Government of Mexico (https://conamer.gob.mx/documentos/marcojuridico/rev2016/PND%202013-2018.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	The government sponsored plan of development from 2018-2024 which includes a vision of the country's development.
3	Program for the Development of the National Electricity System 2018-2032 - SENER (https://www.gob.mx/cms/uploads/attachment/file/331770/PRODESEN-2018-2032-definitiva.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document makes an estimation of what the energy system will look like in 15 years and gives the most recent data of the electricity sector to the year of publication.
4	Program for the Development of the National Electricity System 2019-2033 - SENER (https://www.gob.mx/sener/articulos/prodesen-2019-2033-221654).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	
5	Environmental Impact Assessments for the Ticul A and B solar infrastructure project (https://articulacionyucatan.wordpress.com/manifestacion-de-impacto-ambiental-mia/mias-parques-fotovoltaicos/).	The case study in San José Tipché and the Maya Train.	These documents highlight the impact of the solar low-carbon infrastructure project in San José Tipché.
6	FPIC protocol for the solar park for the Ticul A and B project - SENER (https://transparencia.energia.gob.mx/transparencia_focalizada/archivos/EV_IMP_SOCIAL/Parque_Solar_Ticul_A_Dictamen_T%C3%A9cnico.pdf).		
7	Social Impact Assessment for Dzilam de Bravo's wind farm project - SEMARNAT (https://articulacionyucatan.wordpress.com/ev	Case Study at Dzilam de Bravo.	These documents highlight the impact of the wind low-carbon infrastructure project in Dzilam de

[32] Several of the documents presented here are in Spanish. Their respective titles were translated to English by the author.

	aluacion-de-impacto-social/).		Bravo.
8	Environmental Impact Assessment for Dzilam De Bravo wind farm project - SEMARNAT (https://articulacionyucatan.wordpress.com/manifestacion-de-impacto-ambiental-mia/mias-parques-fotovoltaicos/).		
9	Decree instructing the agencies and entities, in relation to the projects and public infrastructure works of the Government of Mexico are considered of public interest and national security, as well as priority and strategic for national development, to carry out the actions indicated. - Official Diary of the Federation (https://bitacoraordenamiento.yucatan.gob.mx/archivos/DECRETO_160_2014_POETCY.pdf).	Case study for the Maya Train.	This document highlights the Federal Government's decree to make the large-scale infrastructure projects and programs a national priority, unobstructing their construction.
10	Environmental Impact Assessment of the Maya Train - SEMARNAT (https://apps1.semarnat.gob.mx:8443/dgiraDocs/documentos/camp/resumenes/2020/04CA2020V0009.pdf).	Case study for the Maya Train.	This document outlines the federal government plan for the development of the first track of the Maya Train.
11	2021 National Audit Review - Federal Superior Audit Office (https://www.asf.gob.mx/Trans/Informes/IR2020c/Documentos/Auditorias/2020_1527_a.pdf).	Case study for the Maya Train.	This document highlights how AMLO's government directed specific funds to the construction of the Maya Train and the main faults of overspending in the process.
State Of Yucatan			
12	Analysis of the electricity sector at regional level - The state government of Yucatan (Ministry of Environment) (http://www.ccpy.gob.mx/agenda-yucatan/energia-sustentable/index.php).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document highlights the configuration of the energy sector in the state of Yucatan, highlighting a prospective for its development.
13	Co-benefits employment opportunities and local benefits of community participation in renewable energy projects in Yucatan in renewable energy projects in the Yucatan - The state government of Yucatan (Ministry of Environment) (https://iki-alliance.mx/wp-content/uploads/Factsheet-cobeneficios_G.pdf).	The case study of San José Tipché and Dzilam de Bravo.	This document highlights how companies and the Government of Yucatan develop a framework to account for co-benefit sharing.
14	Co-benefits of sustainable energy in Yucatan: renewable energy savings - The state government of Yucatan (Ministry of Environment) (https://sds.yucatan.gob.mx/co-beneficios/doc	The case study of San José Tipché and Dzilam de Bravo.	This document highlights how companies and the Government of Yucatan develop a framework to account for co-benefit sharing.

	umentos/Resultados_Estudio_Co_beneficios_de_la_energia_sustentable.pdf).		
15	Co-benefits of sustainable energy in Yucatan: job creation - The state government of Yucatan (Ministry of Environment) (https://iki-alliance.mx/co-beneficios-oportunidades-de-empleo-y-beneficios-locales-de-la-participacion-de-las-comunidades-en-proyectos-de-energia-renovable-en-yucatan/)	The case study of San José Tipché and Dzilam de Bravo.	This document highlights how companies and the Government of Yucatan develop a framework to account for co-benefit sharing.
16	Co-benefits of sustainable energy in Yucatan public policy options for climate action in Yucatan - The state government of Yucatan (Ministry of Environment) (https://sds.yucatan.gob.mx/co-beneficios/co-beneficio.php).	The case study of San José Tipché and Dzilam de Bravo.	This document highlights how companies and the Government of Yucatan develop a framework to account for co-benefit sharing.
17	Mid-term program, Yucatan 'green and sustainable'. Yucatan State Government, 2018-2024.(https://seplan.yucatan.gob.mx/archivos/pmps/4PMPYucatanverdeysustentable.pdf).	The case study of San José Tipché and Dzilam de Bravo and the Maya Train.	This document highlights the state and the prospected role of renewable energy in the State of Yucatan from 2018 to 2024.
18	Official Gazette of the State of Yucatan. Decree by which the program of ecological management of the coastal territory of the state of Yucatan is issued. - The state government of Yucatan (https://bitacoraordenamiento.yucatan.gob.mx/documentos/index.php?IdOrdenamiento=6).	The case study in San José Tipché and Dzilam de Bravo.	This document presents the changes made by the state of Yucatan to the POETCY in 2014.
19	Proposal for the Mayan milpa to be recognized as an important world agricultural heritage system (SIPAM). - The state government of Yucatan (https://www.gob.mx/sre/prensa/reconoce-fao-a-la-milpa-maya-peninsular-como-sistema-importante-del-patrimonio-agricola-mundial-sipam-334618?idiom=es).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document highlights a proposal presented by the State Government of Yucatan to recognize the traditional way of Maya harversing as a cultural heritage practice, something that would protect it under legal and regulatory frameworks.
Civil society			
20	Homún: Mayan town guardian of the water. Indignación A.C., 2021 (http://indignacion.org.mx/wp-content/uploads/2021/05/FD_Homun_0427.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document presents the struggle over water and against the deployment of a mega-pig farm in the Indigenous community of Homun.
21	Chablekal Mayan people against the agrarian system and real estate speculation - Indignación A.C, 2021 (https://indignacion.org.mx/chablekal-pueblo-maya-contra-el-sistema-agrario-y-la-especulac	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This monograph details the struggle of the Chablekal mayan people who have resisted and organized to defend the expansion of housing programs and defended

	ion-inmobiliaria/).		their right to the territory.
22	Energy transition in Yucatan: a proposal in times of political transition. - Articulación Yucatán, 2021 (https://articulacionyucatan.files.wordpress.com/2018/07/propuesta-candidatos.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document highlights some of the challenges, limitations and problems identified with the energy transition process in Yucatan.
23	Self-consultation of Mayan peoples in defense of their right to decide - Indignación A.C, 2021 (https://indignacion.org.mx/autoconsulta-pueblos-mayas-en-defensa-de-su-derecho-a-decidir/).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document gives a broad overview of the process of self-consultation carried out in the community of Homun, over a mega-pig farm.
24	General analysis of the Tehuantepec isthmus interoceanic corridor project - GeoComunes collective, 2020 (http://geocomunes.org/Analisis_PDF/GeoComunes_Trans%C3%ADstmico_22Abril2020.pdf).	The case study of the Maya Train.	Detailed cartographic análisis of the Interoceanic corridor and the Isthmus of Tehuantepec project of AMLO's government.
25	Mayan Train as a new infrastructure for the articulation of agro-industrial and real estate tourism capitals in the peninsula - GeoComunes collective, 2019 (http://geocomunes.org/Analisis_PDF/TrenMaya_AnalisisCartografico_Geocomunes.pdf).	The case study of the Maya Train.	Detailed cartographic análisis of the IMaya Train project of AMLO's government.
26	Statement on industrial megaprojects and the neocolonial train in the Yucatan Peninsula - Ka' kuxtal much meyaj Indigenous organization a.c, 2019 (https://www.facebook.com/100513201542695/posts/pronunciamiento-sobre-los-megaproyectos-industriales-y-el-tren-neocolonial-en-la/287916956135651/).	The case study of the Maya Train.	Statement from Maya communities rejecting the imposition of the so-called Maya Train and its process of approval.
27	(Press release) Statement on the Mayan train project in the framework of the presidential visit to promote it. - Asamblea Muúch Xiimbal, 2021 (https://www.cemda.org.mx/comunicado-sobre-el-proyecto-tren-maya-en-el-marco-de-la-visita-presidencial-para-su-promocion/).	The case study of the Maya Train.	Statement from Maya communities rejecting the imposition of the so-called Maya Train and its process of approval.
28	Mayan Train or Anti-Mayan Train? statement by INAH academics on megaprojects including the Maya Train - INAH, 2019 (http://www.enelvolcan.com/83-ediciones/058-julio-septiembre-2019/617-tren-maya-o-tren-antimaya)	The case study of the Maya Train.	Public statements from several Academics part of the Institute of History and Anthropology in Mexico questioning the validity and the assessments over the Maya Train.
29	(Press Release) Dzilam Bravo wind farm to be built in an incompatible land use zone -	The case of Dzilam de Bravo.	Press release from civil society organizations and academics

	CEMDA 2013 (https://www.cemda.org.mx/advierten-organizaciones-y-expertos-sobre-impactos-ambientales-de-proyecto-eolico-en-la-peninsula-de-yucatan/)		questioning the decision of the Yucatan state government to approve the Dzilam de Bravo wind farm in a protected and fragile area.
30	Decade of defiance Ten years of reporting land and environmental activism worldwide - Global Witness, 2022 (https://www.globalwitness.org/en/campaigns/environmental-activists/decade-defiance/#a-global-analysis-2021)	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Global Analysis of assassinations and murders against land defenders over the last decade - In Mexico the number of murdered land defenders has risen to 147 in the last 4 years alone.
31	Front Line Defenders. Global Analysis 2022. - Front Line Defenders, 2023 (https://www.frontlinedefenders.org/en/resource-publication/global-analysis-2022).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Global Analysis of assassinations and murders against land defenders in 2022.
32	Press release on the Maya Train tribunal - International Tribunal for the rights of nature, 2023 (https://www.rightsofnaturetribunal.org/tribunals/maya-train-tribunal-2023/).	The case study of the Maya Train.	An international tribunal led by internationally renowned experts who challenged the case and validity of the Maya Train.
33	Energy in Latin America: from a commodity to a common - Rosa Luxemburgo Foundation, 2019 (https://rosalux.org.br/wp-content/uploads/2021/03/Energy_in_latin_america_final.pdf).	The case study in San José Tipché and Dzilam de Bravo.	Analysis of how different places in Latin America are pursuing a de-commodification of energy in favor or other convivial ways of organizing energy as a commons.
34	The energy of the peoples - (documentary) - La Sandía Digital, 2019 (https://www.laenergiadelospueblos.com/el-documental)	The case study in San José Tipché and Dzilam de Bravo.	Documentary detailing 3 cases of energy autonomy in Mexico and Guatemala.
35	Special Economic Zones - GeoComunes collective - 2018 (http://geocomunes.org/Analisis_PDF/Analisis%20ZEE%20Parte%201.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the declaration of Special Economic Zones in Mexico and their geopolitical implications.
36	The (not so) hidden faces of the misnamed "Mayan train" - Grieta Collective, 2021 (http://www.grieta.org.mx/wp-content/uploads/2021/01/CompendioTren.pdf).	The case study of the Maya Train.	Analysis of the possible impacts and problems identified with the Maya Train project.
37	México's Path towards energy Justice (Olivera, B. 2020) GreenPeace Mexcio. (https://www.greenpeace.org/static/planet4-mexico-stateless/2021/02/d252044e-el-camino-de-mexico-hacia-la-justicia-energetica.pdf)	The case studies and an overview of the state of the energy system in Mexico.	This study isd
Academic articles and research			

38	The Fourth Transformation and the Future of Mexico - Autonomous University of Social Movements, 2022 (https://socialistproject.ca/2022/02/the-fourth-transformation-and-the-future-of-mexico/).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	General analysis and balance of AMLO's policies in Mexico.
39	Integrated analysis of the Mexican electricity sector: changes during the Covid-19 pandemic. - González López and Ortiz-Guerrero, 2022 (https://www.sciencedirect.com/science/article/pii/S1040619022000689).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis and changes to the electricity sector made during the COVID-19 pandemic in Mexico.
40	Participation on the edge: prior consultation and extractivism in Latin America - Zaremberg and Torres-Wong, 2018 (https://journals.sagepub.com/doi/full/10.1177/1866802X1801000302).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Detailed analysis of the effectiveness of FPIC mechanisms in Latin America.
41	Deciphering the mess: Participatory institutions and conflicts around megaprojects in Mexico. - Zaremberg, Torres-Wong and Guarneros-Meza, 2018 (https://revistas.usal.es/cuatro/index.php/1130-2887/article/view/alh20187981102).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of participatory mechanisms in Latin America and their relationship to extractive industries in the sub continent.
42	We say ma': The struggle against transgenic soy and the rearticulation of Mayan identity in the peńınsula of Yucatan. - Torres Mazuera, 2018. (https://anthrosource.onlinelibrary.wiley.com/doi/full/10.1111/jlca.12322).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the Mayan struggle against the advancement of transgenic soya plantations in the Yucatan Peninsula.
43	Agrarian and community assemblies in southeastern Mexico: grayscales of collective participation in wind projects in Indigenous regions - Torres Mazuera & Recondo, 2022. (https://desacatos.ciesas.edu.mx/index.php/Desacatos/article/view/2483).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the interaction between land ownership and tenureship and the deployment of low-carbon infrastructure in the Yucatan Peninsula
44	Three decades of privatization and dispossession of social property in the Yucatan Peninsula. - Torres Mazuera, et al., 2020 (https://www.ccmss.org.mx/wp-content/uploads/2020_22_TresDecadasPrivatizacion.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Detailed analysis of the way that land reforms and practices have given way to a privatization tendency that has enabled the deployment of large scale infrastructure and new commodity frontiers in the region.
45	Extracting the (un)productive from communal lands in the 21st century: land grabbing and capitalist expansion in the Yucatan Peninsula - Torres Mazuera, et al. 2021. (https://trace.org.mx/index.php/trace/article/view/794).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	The article presents the multiple ways in which land grabbing practices are employed in the Yucatan Peninsula and some of the interactions with other capitalist extractive frontiers.

46	From consultation to self-determination of the peoples: Report on the implementation of the right to consultation consultation and prior consent, free, prior and informed consent in Mexico - Gutiérrez-Rivas and del Pozo, 2018 (http://ru.juridicas.unam.mx/xmlui/handle/123456789/14034).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the right to a Free, Prior Informed Consent and how this right enables other more substantial rights such as the self-determination of Indigenous peoples in Mexico.
47	Wind energy development in Mexico: At what cost? Kim, 2018 (https://articulacionyucatan.files.wordpress.com/2018/10/ekim_pae_27mar18_final.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the way that low-carbon infrastructure projects have been deployed in Mexico and some of the socioecological conflicts around them.
48	Fighting for a just transition climate change mitigation does not guarantee social justice. To avoid deepening inequalities, clean energy transitions must prioritize communities over profit. - Baker, 2020 (https://www.tandfonline.com/doi/full/10.1080/10714839.2020.1768732).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the expansion of commodity frontiers in the Yucatan Peninsula and an assessment from the point of view of energy justice.
49	Expansion of large-scale renewable energy projects in the Yucatan Peninsula - Articulación Yucatan and GeoComunes, 2019 (http://geocomunes.org/Analisis_PDF/EnergiaRenovableYucatan.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	This document gives a detailed analysis of the energy transition process as planned in Yucatan and some of the main challenges, limitations and problems identified in the process.
50	Research progress on the Mayan Train - Ceceña and Veiga, 2019 (https://geopolitica.iiec.unam.mx/node/656).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of how the Maya Train would create new socio-ecological impacts and reorganize the region into a new capitalist frontier.
51	Production of the "Dzilam de Bravo wind farm" strategies to achieve control and exploitation of a space. - Encalada Gómez, 2019 (https://articulacionyucatan.files.wordpress.com/2020/05/encaladagc3b3mezjuancarlos2019tesis.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Master's Thesis form the University of Michoacan detailing the case and the development of the Dzilam de Bravo wind park.
52	Justice, social exclusion and Indigenous opposition: A case study of wind to energy development on the Isthmus of Tehuantepec, Mexico - Zárate Toledo, Wood & Patiño, 2019 (https://www.sciencedirect.com/science/article/pii/S2214629618302391?via%3Dihub).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Case Study analysis of the deployment of wind low-carbon infrastructure in the state of Oaxaca and some of the normative and regulatory problems that led to socioecological conflicts.
53	Social dispossession, the real 'benefit' of green projects in Yucatan - Reyes Maturano, 2021(https://ideas.repec.org/a/pal/develp/v65y2022i1d10.1057_s41301-021-00298-w.html).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the deployment of low-carbon infrastructure in the state of Yucatan and the multi-layered process of violence created through it.

54	In search of wind farm sustainability on the Yucatan coast: deficiencies and public perception of environmental impact assessment in Mexico - Zárate Toledo, Wood & Patiño, 2021 (https://doi.org/10.1016/j.enpol.2021.112525).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Regulatory analysis of the deployment of low-carbon infrastructure in the State of Yucatan and some of the main limitations and challenges of the regulatory framework.
55	Mexican wind energy policy: social and environmental controversies due to its territorial implementation. Case studies in Oaxaca and Yucatan - Zárate and Fraga, 2016 (http://dx.doi.org/10.22134/trace.v0i69.10).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Comparative analysis of the socioecological conflicts in Oaxaca and Yucatan through the deployment of low-carbon infrastructure in both States.
56	Energy sovereignty, self-sufficiency and sustainability - PRONACES, 2022 (https://conahcyt.mx/wp-content/uploads/documentos/Reforma%20El%C3%A9ctrica/PronacesECC_Pol%C3%ADticaEnerg%C3%A9tica_11abril2022.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the state of the Mexican energy system in 2021.
57	Energy transition: A path toward sustainable development for Mexico - Melgar, 2013 (https://doi.org/10.1111/j.2041-7373.2010.00006.x).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis and benefits to some of the main changes proposed in the Constitutional Energy Reform of 2013
58	Examining Mexico's energy policy under the 4T - Hernández & Ibarzábal, 2021 (https://doi.org/10.1016/j.exis.2020.03.002).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Analysis of the main changes to the energy system and regulatory framework in Mexico under AMLO's administration.
59	Procedural injustices in large-scale solar energy: a case study in the Mayan region of Yucatan, Mexico - Barragan-Contreras, 2021 (https://doi.org/10.1080/1523908X.2021.2000378).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Case Study of the Solar park Yucatan Solar in Yucatan and the flaws of procedural mechanisms in the Mexican regulatory framework.
60	"Not only the ejidatarios have rights". The emergency of the human rights of the Mayan people - Llanes Salazar, 2019 (https://www.revistas.unam.mx/index.php/peninsula/article/view/68819).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Article highlighting how Mayan people are facing the imposition of an economic model that has created new threats to their human rights.
61	Energy Assessment of the Yucatan Peninsula: Pathways to a Clean and Sustainable Energy System - Bracho et al. 2021 (https://www.nrel.gov/docs/fy21osti/79680.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	NREL study of the potentials and challenges for renewable energy integration in the State of Yucatan.
Private sector			
62	Wind energy initiative PRODESEN development support report. - PWC, 2016 (https://amdee.org/Publicaciones/3er-Estudio-	The case study of San Jose Tipché and Dzilam de	The Wind Energy Association analysis of the Federal Program for the development of the electricity

	Eolico-AMDEE-Documento-Prodesen-PwC.pdf).	Bravo.	sector in Mexico.
63	Solar initiative for the promotion of large-scale solar photovoltaic energy - ASOLMEX, 2019 (https://asolmex.org/2021/05/10/iniciativa-solar-para-el-impulso-de-la-energia-solar-fotovoltaica-de-gran-escala/).	The case study of San Jose Tipché and Dzilam de Bravo.	The Mexican Solar Association strategy for large-scale solar photovoltaic development in Mexico.
64	Study of clean energy in Mexico 2018-2032 - AMDEE 2018 (https://amdee.org/Publicaciones/EstudiodeEnergiasRenovablesenMexico2018a2032_v16.pdf).	The case study of San Jose Tipché and Dzilam de Bravo.	The Wind Energy Association study of renewable energy potential in Mexico.
65	AMDEE Annual Report 2021 - AMDEE, 2022 (https://amdee.org/nueva/img/INFORME%20AMDEE%202022.pdf).	The case study of San Jose Tipché and Dzilam de Bravo.	The Wind Energy Association annual report detailing some of the main challenges presented by the changing regulatory framework in Mexico.
66	CO-BENEFITS of Energy Efficiency and Renewable Energy for Sustainable Development - ASOLMEX - 2021 (https://asolmex.org/2021/05/14/new-energy-outlook-2020-2/).	The case study of San Jose Tipché and Dzilam de Bravo.	The Mexican Solar Association highlighting some of the main co-benefits of solar energy integration.
67	Solar Initiative - Promotion of Solar PV development in Mexico - ASOLMEX, 2022 (https://asolmex.org/Micrositio_GSD/Descargas/Iniciativa-solar-para-el-impulso-de-la-energia-fotovoltaica-de-gran-escala.pdf).	The case study of San Jose Tipché and Dzilam de Bravo.	The Mexican Solar Association route for the implementation of solar energy in Mexico.
Journal notes and other sources.			
68	"Wind energy in Mexico: wind project in Campeche with 35 wind generators" - EVWind, 2014 (https://www.evwind.com/2014/12/15/eolica-en-mexico-parque-eolico-dzilam-de-bravo-con-35-aerogeneradores/).	The case study of Dzilam de Bravo.	Article details Eolica del Golfo - the same company operating Dzilam de Bravo's wind park, other projects in the Yucatan Peninsula.
69	"Wind energy in Yucatan: Inauguration of the Dzilam Bravo wind farm with 66 wind turbines" - Energía Renovable, 2019 (https://www.energias-renovables.com/eolica/yucatan-inauguran-el-parque-eolico-dzilam-bravo-20190507).	The case study of Dzilam de Bravo.	Article gives some of the main positions around the inauguration of the wind park in Dzilam de Bravo.
70	"Yucatan wind farms benefit big business and overlook local citizens" - Diálogo Chino, 2021 (https://dialogochino.net/en/climate-energy/46334-yucatan-wind-farms-benefit-big-business-	The case study of Dzilam de Bravo.	Article detailing some of the main controversies around the wind farm in Dzilam de Bravo.

	and-overlook-local-citizens/).		
71	"The supreme court will analyze the wind project Mayans oppose" - La Jornada, 2020 (https://www.jornada.com.mx/2020/01/13/sociedad/031n2soc).	The case study of Dzilam de Bravo.	Article reflecting on how the supreme court reaffirmed the right to FRIC for wind farms in the state of Yucatan.
72	"Court protects Indigenous people opposing wind energy project in Yucatan" - Poresto.net, 2020 (https://www.poresto.net/yucatan/2020/5/7/corte-ampara-indigenas-que-se-oponen-al-proyecto-eolico-en-yucatan-202011.html).	The case study of Dzilam de Bravo.	Article reflecting on how the supreme court reaffirmed the right to FRIC for wind farms in the state of Yucatan.
73	"Beyond the train and the Mayan: neo-extractivism with a 'human face'". - Contralínea, 2019 (https://contralinea.com.mx/interno/semana/mas-alla-del-tren-y-lo-maya-el-neoextractivismo-con-rostro-humano/).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Social and ecological impacts for the human and nonhuman communities who will be affected by the Maya Train.
74	TUED Global Forum: Solidarity With Mexico's Fight For Energy Sovereignty - TUED, 2022 (Youtube video - Online conference) (https://www.youtube.com/watch?v=7ti-J_rR96I).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Webinar conducted with government officials about the federal government's plan and 'success' of rescuing the energy sector.
75	"Mayan Train will boost historic energy infrastructure in the southeast. Conference President AMLO" - AMLO press conference, 2023 (https://www.youtube.com/watch?v=47JAsCEeuE0).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Morning press briefing by AMLO about how the Maya Train will create new low-carbon energy infrastructure in the Yucatan Peninsula.
76	"Mayan train under review." - La Jornada, 2023 (https://www.jornada.com.mx/2023/02/27/opinion/020a2pol).	The case study of the Maya Train.	A review of the main data obtained by the federal auditing authority of the Maya Train Project.
77	"Bulletin 131: Defying U.SMexico's "second nationalization" of electricity moves forward" - TUED - 2023 (https://www.tuedglobal.org/bulletins/defying-u-s-mexicos-second-nationalisation-of-electricity-moves-forward).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	Trade Unions for Energy Democracy news bulletin about the denationalization of energy infrastructure in Mexico.
78	Mayan territories in the way of the train: Current situations and foreseeable risks. - Train Maya Working Group, CONACYT, 2019 (https://www.ccmss.org.mx/wp-content/uploads/Territorios_mayas_en_el_paso_del_tren_Tr.pdf).	The case study in San José Tipché, Dzilam de Bravo and the Maya Train.	The document presents a series of direct and indirect impacts of the construction and operation of the maya Train in the Yucatan Peninsula.

Source: My own. References for the selected documents appear in the table.

Appendix 2: List of field site visits, workshops and courses

Field site visits

- Visit to the San José Tipche Community during February and March 2022. The visit included pictures, audio and video recordings as well as written notes.
- Visit to the wind Park of Dzilam de Bravo, operated by Vive Energía on March 10th, 2022. The visit included pictures, audio and video recordings as well as written notes.
- Visit to the de Gran Maya Museum in the City of Merida, Yucatan. The visit included pictures, audio and video recordings as well as written notes.
- Visit to 4 Mayan archeological sites (Uxmal, Chichen Itza, Kabah and Sayil). The visit included pictures, audio and video recordings as well as written notes.

Summer schools, workshops and courses[33]

- Workshop (1): 'Critical ethnographies of green transition'. The University of Manchester, November 21-22, 2019 (Organizer: Dr. Nina Moeler, Geography, Manchester University).
- Workshop (2): ‘Origins, lives and afterlives of energy transitions in the global South.’ Eindhoven University of Technology, Eindhoven, the Netherlands. January 23-24, 2020 (Organizer: Dr. Ankit Kumar, Eindhoven University).
- Summer School (1): ‘Politics Ontologies Ecologies’, University of Pisa (Italy) June 29th - July 3rd, 2020 (Online) (Organizer: Dr. Luigi Pellizzoni. University of Pisa).
- Politics, State and Space (PSS) Human Geography Research Cluster Talk: ‘The social and environmental justice aspects of a 1.5°C word: Lessons from the decolonial thought and the Latin-American experience.’ With Dr. Iokiñe Rodriguez - University of East Anglia. 26th February 2021 (Online). Part of the series: ‘Life Under Overshoot, Living in a 1.5°C World’ (Co-organizer with Dr. Anna Secor, Geography, Durham University).
- Politics, State and Space (PSS) Human Geography Research Cluster Talk: ‘The Emerging Geographies of 1.5°C: Geoengineering, enclosures and the new frontiers of extractivism’ With Dr. Jessica Hope - University of St. Andrews and Dr. Kevin Surprise - Mount Holyoke College. March 5th, 2021 (Online). Part of the series: ‘Life Under Overshoot, Living in a 1.5°C World’ (Co-organizer with Dr. Anna Secor, Geography, Durham University).

[33] Entries are organized chronologically.

- Summer School (2): ‘Authoritarian Natures? Political Ecologies of Post-Truth, the State and Social Ruptures.’ Wageningen School of Social Sciences (WASS). June 21-30, 2021 (Organizer: Dr. Robert Fletcher, WASS).
- Summer School (3): ‘Renewable energy development and its contestation’. Norwegian University of Life Sciences. 8-11 June, 2021. (Organizer: Dr. John Andrew McNeish, Norwegian University of Life Sciences).
- CCE Talk: 'Cheap Energy in the Capitalocene' with Dr. Jason W Moore and Dr. Jaume Franquesa. Jul 27, 2021 (https://www.youtube.com/watch?v=uZs2_YyoGtc&t=26s) Co-Organizer with Dr. Kerstin Oloff, CCE Durham University and Dr. Andrew Baldwin, Human Geography, Durham University.
- Reading Group (1): ‘Petrocultures Reading group’. Spring and fall 2021, Chalmers University of Technology (Online) (Organizer: Anna Åberg, Susanna Lidström and Jens Millkrantz from Chalmers University of Technology).
- Reading Group (2): Center for Culture and Ecology (CCE): Are we living in the end of capitalism? 2022-2023 (Participant and organizer with Dr. Kerstin Oloff, CCE Durham).
- Workshop: ‘Inverting Colonial Worlds’ symposium on the (de)coloniality of knowledge for and from the Americas. Geography Department, Durham University, February 23rd, 2023 (Co-organizer with Danai Kontou).

Appendix 3: Information sheets and handouts to participants

a) Participant Information Sheet

Dear participant,

My name is Carlos Tornel, I am a researcher and PhD candidate at Durham University in England. If you are reading this it is because I am asking you to participate in an interview for my doctoral research. Before you decide whether or not you wish to participate, I would like to tell you a little about my research and what you can expect if you wish to participate. Therefore, I would appreciate it if you could read the following brief document carefully. Please feel free to ask any questions and take as much time as you need to decide.

Thank you in advance for taking the time to read it.

I. What are the research objectives and methods?

The objective of my dissertation is to identify how energy landscapes are changing in relation to energy transition processes, particularly in relation to the deployment of renewable energy projects. From the point of view of this research, the transformation of landscapes reflects a number of different perceptions and ways of assigning a value or the 'utility' of the landscape, but at the same time, it shows that landscapes are the result of everyday actions that operate alongside, but sometimes at the margins of, dominant relationships, i.e. landscapes are the result of the multiple processes through which humans and non-humans inhabit the world.

From both perspectives, energy landscapes are understood as spaces that connect experience and memory with the political histories of particular places. In this way, energy infrastructure, energy consumption patterns and relationships around energy use and coexistence actively participate in the spatial organization of the landscape, which act as a reflection of the material legacies of political projects, the associated struggles and resistances, their memories, and the everyday actions and experiences accumulated over time in specific places. In this sense, the interest of my

research is to investigate the multiple ways in which the legal framework, public policy and experiences from the territory in Mexico allow to recognize the multiple ways of valuing, relating and interacting in and with the landscape, as well as other ways in which other voices can be part of the representation process.

The research uses social science research methods to investigate changes in the landscape from two levels, from the public policy framework and the experiences from the territory. The research process will consist of interviews with actors working at both levels and will be complemented by the review of secondary materials such as journal and newspaper articles, reports and public statements, as well as additional archival research, maps and government documents, among others.

II. About the interviews

In this section I describe what you can expect during and after the interviews, as well as how your interview will be used for my research project. Please take the time to read it carefully.

a) What will be the format of the interview?

At the beginning of the interview I will ask you if you are willing to have the interview recorded in audio format (there will be no video recording enabled for the interviews, although they can be conducted with the video on). I will also mention the "consent form" and if you agree with what is stated there, I will ask you to sign it if you agree to participate in the interview. In the event that you are unable to provide me with a signed copy, I will take a few minutes to review the contents of the form and reaffirm that you agree with what is stated therein before beginning the recording. As part of Durham University's ethics requirements I will send you a copy of the consent form for your records (via email).

The interview will take the format of a semi-structured conversation in which you will be asked to talk about your relationship with the energy sector in Mexico with special emphasis on your field of expertise. Finally, I would like to inform you that at the beginning of the conversation I will give you a brief summary of my project, which will last only a couple of minutes (this information appears at the top of this document).

b) How long will the interview last?

The length of an interview varies, depending on what you have and want to say, but most interviews last at least an hour. If you prefer, I can interview you on two or more separate occasions. Remember, if you decide to stop the interview at any time, you may request to do so without giving any reason at all. All interviews are voluntary, so you should not feel pressured in any way to participate. Please feel free to express any discomfort before, during or after the interview.

c) How will the researcher use the tape and the interview transcript?

Prior to the interview you will be asked to sign the "consent form" to be part of the research interview. If you decide that you are satisfied with it, your interview will be recorded using an audio device (via an analog tape recorder), then transcribed and included as part of my research products (articles for academic journals, papers, book chapters, and theses). Interviews collected for the research will be used for transcription purposes only. Once transcription is complete, the recordings will be destroyed, while transcripts and audio recordings will be anonymized and will not be made public. Interviews will be indexed and stored in a password-protected folder on an external hard drive. No names, references or direct quotations with your name will appear in any of the results for academic purposes (such as research articles, papers, books, etc.). Your interview will not be used for advertising or any other commercial purpose.

d) What happens if I decide to withdraw during or after the interview?

If you choose to leave during the interview, all audio recordings, transcripts and notes from your interview will be destroyed. However, if you wish to withdraw after the interview or if you wish to review any of the topics and/or points you made during the interview, I will be happy to send you a copy of the interview files via email. You will be asked to read or listen to the interview and indicate any sections you wish to change or delete. Remember that all interviews will be anonymous and will only serve the purpose of academic research. You may take as much time as you need to make any of these requests. If you decide that the interview cannot be used at all, all recordings, transcripts and notes of the interview will be sent to you and then all files will be destroyed on my computer, no questions asked.

e) What will happen to the research project?

One of the objectives and commitments of this research is to contribute to strengthen the development of decentralized energy models based on democratic, autonomous and sovereign principles at the local level, so as far as possible this thesis and its results will be returned to the people, organizations, communities, movements and groups interviewed in order to contribute to the discussion on these issues in Mexico as well as to contribute to the development of social movements, public policies or other processes that seek a commitment to energy justice.

f) Contact for more information

I hope this information sheet has explained what you need to know before deciding whether or not to participate in the research. If you would like to receive a summary of the research results and/or my thesis, please let me know so that I can send you the appropriate documents. Finally, if you have any further questions about the project, the interview or any of the documents I sent you, please do not hesitate to contact me via the following email: carlos.a.tornel@durham.ac.uk.

Thank you very much for reading this information sheet and for your interest in the project.

Sincerely,

Carlos Tornel

Doctoral Researcher Durham University.

b) Consent form

If you are willing to participate in this research project, you are kindly requested to complete and sign the following consent form:

No.	Activities	Initials or "X"
1	I confirm that I have read the "Information Sheet for Participants (VF - VF) 07-02-2021)" attached for the study and that I have had the opportunity to consider the information presented to me. I further confirm that I have expressed all necessary questions and/or concerns about the project and that all have been satisfactorily addressed (if applicable).	
2	I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without any prejudice to me. I understand that it will not be possible to remove my data from the project once they have been anonymized and become part of the data set. I agree to participate based on the foregoing.	
3	I agree that interviews should be recorded in audio (not video) format. And that these recordings be used only for transcription and then deleted.	
4	I agree that the data collected in my interview may be published anonymously in books, reports or academic journals. This is on the understanding that no reference will be made to me personally or the comments made during the interview(s).	
5	I agree to have the investigator contact me in the future to discuss other research projects.	
6	I agree that the investigator may retain my contact information to provide me with a summary of the results of this study.	

7	I agree to participate in this study	

Data protection

Personal information collected and used to conduct this research will be treated in accordance with data protection law, as explained in the Participant Information Sheet and in the Privacy Notice for Research Participants.

Participant's Name Signature Date

Researcher's name Signature Date

[1 electronic copy for the participant, 1 copy for the researcher].

Information about the Researcher

Carlos Tornel holds a degree in International Studies from the Universidad Iberoamericana in Mexico City, a master's degree in environmental policy and regulation from the London School of Economics and Political Science (LSE) and another in Energy and Environmental Management from the Latin American Faculty of Social Sciences (FLACSO) in Mexico City. Since 2012 he has worked in various civil society organizations in Mexico on issues related to climate justice, energy transition and human rights advocacy. He is currently a PhD candidate in Human Geography at the University of Durham in England, his lines of research are climate justice and energy transition beyond capitalism, he often contributes to the Heinrich Böll Foundation in Mexico where he coordinates the Guide to false solutions to climate change. Some of his academic and non-academic publications can be found here and here, respectively.

c) Interview guiding questions.

- ***Questions for 'experts' (Government officials, Civil Society organizations, private sector representatives and consultants).***

1. What is your relation to the energy sector in Mexico, how have you studied/engaged with it?
2. How is the energy transition being conceptualized? (i.e. which dimension, such as technology, finance, politics, etc. is being highlighted over others?)
3. Who or which actors do you think are imagining/conceptualizing this definition of energy transitions?
4. What are the main obstacles for this transition to take place? (i.e. are they physical/material, infrastructural, financial, political, environmental, etc.)
5. What do you understand from the term 'energy justice'?
6. What in your opinion, would be necessary to achieve that vision of energy justice?
7. What justice principles have been incorporated into the energy transition policy and regulatory framework in Mexico?
8. How is participation incorporated into the energy transition? Who is counted and through what mechanisms? Do these mechanisms allow for people to directly influence the outcome of policies, programs, projects (etc.) if not, why? If so, how?
9. How is recognition incorporated into these policies? Are these policies effective in sustaining and producing dialogues with peasant and indigenous communities? Why yes or why not?
10. How are the costs and benefits of the transition distributed among different groups? How are these distributive processes experienced through space? In relation to rural and urban areas, but also in terms of energy access, how are the dynamics of distribution experienced in Mexico at the moment? Are there any mechanisms at work that account for such distributive measures?

11. How is the energy regulatory framework engaging with energy value chains? Is there an official policy for the energy production, transmission, distribution, and consumption (plus water disposal) that operates in Mexico, if so, how?
12. Based on the current process of the energy transition in Mexico, can you highlight what, in your opinion, are the main problems experienced with this process.
13. FPIC, evaluation and participation instruments in the energy sector have diverse origins (e.g. the Environmental Impact Assessment) and their performance has been questioned in terms of effectiveness, usefulness and performance (EVIS and indigenous consultation) by various stakeholders. From your point of view, how effective have these instruments been in addressing socio-ecological, spatial or participation conflicts, access to information or in resolving the power inequities in which renewable energy processes are embedded?
14. From your point of view, what role has climate change played in the design of legislation and instruments governing the energy system in Mexico and what challenges does the sector face in terms of climate?
15. Particularly in the Peninsula of Yucatán, Can you speak of the socio-ecological straggles in these areas? Is it similar to other states? If so, why or why not?
16. From your perspective, how could we 'organize' the energy system to make it more equitable, fair and low in emissions?

- ***Questions for Indigenous communities and ejidatarios in Yucatan***

1. Can you briefly introduce yourself and tell me what you do and where, please?
2. What is your relationship to this particular 'renewable' energy project?
3. How did the project arrive?
4. Have you been affected directly (or indirectly) by the renewable energy project? If so, how?
5. Do you feel that the project affects or alters your relationship with the people and place you live in/with? why or why not?
6. What has changed since the project was announced/constructed and during its lifetime or stage of development?

7. What other groups are involved with the project, can you tell what has been your and the community's relation with them?
8. Are there other ways in which the project could have been done differently? If so, could you explain them?
9. What is the strategy of the community at the moment? How are you coping with or rejecting these changes (i.e. legal strategies, dialogues, solidarity networks, etc.)
10. Were you/the community offered a space, procedure or mechanisms through which you express your opinions about the project? If so, how did that go?
11. Do you feel that your interests or the community's were taken into account by the project? Why or why not?
12. Since the arrival of the project has there been an increase in social conflict, violence or social confrontations?
13. Was there anything offered to you (money, job, service, etc.) and others in relation to the project? If so, are you willing to discuss what it was and if it was delivered?
14. Any final comments or commentary you would like to share about your experience with this or other renewable energy projects?

Appendix 4: *Amicus Curiae* for the case of San Jose Tipche

Subject: The following is submitted

AMICUS CURIAE[34]

"IMPACTS AND LIMITS OF RENEWABLE ENERGIES IN Mexico AND THE WORLD".

COLLEGIATE COURT IN CRIMINAL AND ADMINISTRATIVE MATTERS OF THE FOURTEENTH CIRCUIT.

Case of the Mayan communities of San José Tipcéh and Plan Chac, in the State of Yucatan and the Ticul A and B Solar-Photovoltaic Projects.

Amparo en Revisión 481/2022.

Signatories:

Carlos Tornel, PhD candidate in Human Geography, University of Durham, UK and CONACYT Fellow 2019-2023.[35]

Mexico City, January 9th, 2023.

[34] The version presented here was translated directly from Spanish by the author.
[35] The actual number of signatories of the document was 9, but because of the privacy of the document, the version reproduced here excludes the name of the rest of the signatories. This is a translated version of the document that was presented in Spanish.

1. Objective, methodology and organization of the document.

The purpose of this document is to provide this tribunal with technical elements and arguments about renewable energies, their nature, elements and limits in the context of the current climate crisis that will provide information to make an informed decision in the case of the solar-photovoltaic projects Ticul A and B and the communities of San José Tipcéh and Plan Chac. This document was prepared by academics specializing in energy transition issues from a technical point of view, as well as from the socio-ecological perspectives of the transition process, recovering national and international cases of its impacts.

Based on a review of the international literature on the energy transition process, the geopolitics of renewable energy and the documentation of cases that have registered affectations and impacts at the national and international level, the document offers a diagnosis of the current situation of the energy transition and its affectations. Based on the case of the solar projects Ticul A and B located in the municipalities of Muna, Ticul and Sacalum, Yucatan, this Amicus presents a diagnosis of the possible effects that renewable energies can have on the population and ecosystems at a local level, as well as the fight against climate change at a global level when the projects are not implemented in an adequate manner.

We present this document before this H. Tribunal Colegiado in order to provide some of the most recent data on the state of the energy transition at a global level, as well as to demonstrate that renewable energies, despite being one of the best ways to reduce greenhouse gas emissions to combat climate change, can also be a source of socio-ecological conflicts and impacts on individual and collective human rights associated with the great demand for space they require, their diffuse and difficult to capture nature, the need for works and activities that must be evaluated, as well as their constant dependence on minerals for their construction and on fossil fuels throughout their production chain and useful life.

The document is divided as follows. In the first section, the main problems and impacts identified from the use and dependence on fossil fuels in Mexico are presented. This section is key to recognizing why the transition to renewable energy should be a priority for the Mexican government. The second section addresses some of the material, technical and economic issues facing the energy transition. While establishing and acknowledging the urgency with which these

energies must begin to replace fossil fuels in the energy matrix, the third section addresses some of the costs, impacts and unequal effects that arise from this reconfiguration, focusing specifically on the potential human rights impacts. Finally, the fourth section offers an alternative perspective on the actions that the State could take to ensure that this transition is sustainable and democratic while guaranteeing human rights.

2. The limits of hydrocarbons: The case of Mexico.

During the second half of the 20th century, Mexico became the fifth largest oil producer in the world. The discovery of Cantarell in 1977, one of the world's largest oil fields in the Gulf of Mexico, considerably increased the country's production capacity, linking the oil industry and this resource with the country's social, political and economic development. The Cantarell field, which at its peak had more than 100 wells drilled, produced more than 2 million barrels per day (mbd). However, due to an accelerated exploitation of reserves, Mexico passed the peak of oil availability in 2004 (2009 for gas), when Cantarell's reserves began to decline.[1] Currently, the combination of all the country's wells produces between 1.6 and 1.7 million barrels of oil per day. This is only a fraction of what the Cantarell well was producing on its own.[2]

Mexico is in a stage in oil production that can be catalogued as "the era of expensive energy", where the most profitable deposits have already been exploited, which means that the remaining resources are increasingly difficult to obtain, with a significant increase in costs since they demand a greater amount of energy, investment and socio-ecological impacts to obtain them. This process is known in the literature as the *law of diminishing returns*, whose principles dictate that the Energy Rate of Return (ERR) - the quantity that indicates the ratio of energy invested to energy obtained - decreases over time.[3]

Oil reserves in Mexico have encountered geological-technical limits, which makes it increasingly difficult to maintain their exploitation. According to the National Hydrocarbons Commission (CNH) as of January 1, 2021, proven oil reserves in Mexico correspond to 6,120 mdb, which is equivalent to 9.7 years of 2020 production. If we take into account 3P reserves (3P reserves are the sum of proven, probable and possible reserves. The last two have a probability of exploitation under present technical and economic conditions of 50% and 10% respectively), we would be talking about an availability of 27 years.[4] This downward trend is reflected in each and

every one of the multiple ways in which oil continues to play a central role in the country's economy: oil revenues have continued to fall. From representing 44% of budget revenues in 2008, it will represent just over 11% in 2020, less than the remittances sent by immigrants from the United States.[5]

3. The role of renewable energies and the substitution of fossil fuels.

Given the decline of hydrocarbon production in Mexico, one of the most effective alternatives would be to start substituting the use of these fuels with renewable sources such as hydroelectric, geothermal, wind and solar energy. Mexico is a country with high energy generation potentials for almost all of these forms of generation.[6] However, the fact of having potential does not necessarily imply that the production of these energies is socially, politically, economically and ecologically viable.

Recognizing this era as one of expensive energy is based on three factors that are key to determining the viability, impacts and costs of these energies. These factors are: a) the plant factor of the different technologies, b) the energy rate of return (EROI) and c) the energy density of the different technologies. These three characteristics, described below, are key to understanding the limits of renewable energies, as well as to identifying their potential spatial, material and socio-ecological impacts.

a. **Plant factor**

The plant factor refers to the quotient between the actual energy generated during a period - usually annual - and the energy generated if a plant had worked at full load during the same period. The plant factor reveals that energies with constant flows such as nuclear, geothermal and hydrocarbons using technologies such as combined cycles have very high plant factors (between 60 and 90%), while other energies with intermittent flows such as solar and wind have very low plant factors (between 15 and 30%). These factors can be increased through the use of other technologies such as batteries, but these have an additional cost in material and spatial terms (as discussed below).

b. **Energy rate of return**

The energy rate of return is an indicator that compares the total amount of energy obtained during the process of exploiting an energy resource against the energy required to obtain the resource. The result of this equation can be translated into net energy, i.e., if one watt of energy is invested and 100 is obtained, the net energy ratio or energy return is 1:99. In the case of hydrocarbon sources, the EROI is decreasing over time: EROIs for renewables are between 10:1 and 20:1, compared to more than 50:1 for the earlier oil and coal fields. An economy fueled by a diffuse energy flow is then likely to be a lower net energy and lower output economy than one fueled by concentrated reserves. Several studies argue that maintaining economic growth on current terms requires a minimum EROI close to 11:1.[7] Clean energy investments may stimulate the economy in the short term, but in the long term growth may be constrained by their low EROI.

c. **The energy density of the different technologies.**

Energy density is understood as the division of annual electric power generation by the space occupied by the installation. Researchers such as Vaclav Smil have developed this concept to understand the spatial dimension of these technologies and how they could become a relevant factor in the reconfiguration of space and the way in which energy is generated.[8] Unlike other conventional sources of generation such as an oil field -whose configuration is usually vertical and confined to a specific extraction space- renewable energies require much larger spaces, which are usually destined to this activity, eliminating the possibility of using these spaces in other ways. In some cases, such as wind farms, it is possible to use the space in a shared manner, but the impact on the territory can be significant in the case of fragile ecosystems.

In addition to these three factors, there are other limitations that can make it difficult to exploit the potential, including the lack of networks and transmission lines in high potential areas, the existence of protected natural areas or other areas that are key to the conservation of biocultural heritage and the existence of biological corridors, such as forests and jungles, as well as the continued dependence on fossil fuels needed throughout the production chain and useful life of these technologies (see Figure No.2).

In this sense, even when the term 'renewable' refers to the energy source, its association with a way of producing 'clean' energy often obscures and/or erases the impacts that the development of these technologies can have at the local level and along the production chain. In terms of energy transition planning and development, the term 'clean energy' or 'renewable energy' should also recognize the way in which these projects are planned, developed, put into operation and decommissioned at the end of their useful life. Therefore, in socio-ecological terms and safeguarding human and collective rights, 'renewable' or 'clean' energies should only be considered as such when they respect the natural and social limits of the production, installation and exploitation of these energies.

Presenting the energy transition based on generation potential often neglects a series of impacts that are linked to the substitution of energy generation from concentrated and controllable sources -such as fossil fuels-, by diffuse and intermittent sources such as renewable energies (specifically technologies such as photovoltaic panels and wind turbines). Other technologies such as geothermal and hydroelectric power offer more stable sources of energy (i.e., they do not vary intermittently like the sun or wind), but most of the economically and technically viable resources have already been developed in Mexico, so their potential for expansion is very limited.

In the case of intermittent energies such as solar and wind, their limitations are linked to the use of and dependence on fossil fuels for their production and energy generation, as well as the use of materials whose ecological footprint is intensive and difficult to recycle. Impacts arise from the surface and space demands they require, as well as their association with other risky and unproven technologies to drastically reduce greenhouse gas emissions and contribute to climate change.

An essential point to understand the limitations of renewable energies has to do with their dependence on fossil fuels. Throughout the entire production chain of renewable energy generation, i.e., a process that goes from the extraction of minerals and components that make up the infrastructure of the technology, the transportation of these materials, their assembly, installation, operation and maintenance, as well as their dismantling and retirement, depend on fossil fuels. This is the result of the way in which national economies are inserted in a globalized

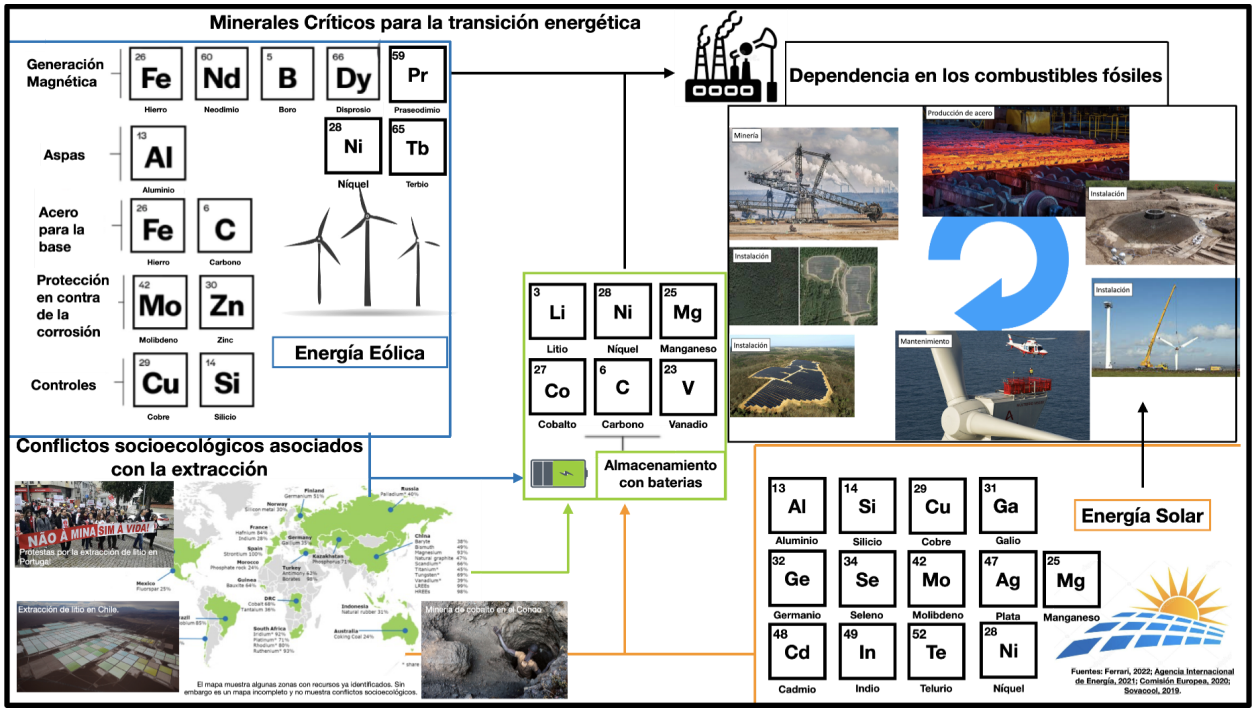
system, unequally distributing not only the availability of some of these minerals, but also the fact that assembly and production lines have been located in places where the cost is lower, making this process a global phenomenon.

In addition, the massive and large-scale use of these technologies also involves the mining and extraction of 'critical' minerals[10] to ensure the use of these technologies. Countries and entire regions such as the United States and the European Union have adopted policies that seek to advance in the decarbonization of their electricity matrices, promoting electric mobility (which relies heavily on lithium batteries), while the use of wind turbines requires significant amounts of minerals such as aluminum, iron, neodymium, boron and dysprosium, as well as significant amounts of cement, copper and steel for their installation.

In the case of photovoltaic panels, demand for aluminum, copper, cadmium, indium and tellurium will increase significantly by 2040. The International Energy Agency (IEA) estimates solar energy growth of up to 20 times, with demand for silicon increasing by 210%, demand for cadmium and tellurium by up to seven times, and up to 10 times for gallium.[11] The impacts associated with mining, transportation, installation and maintenance of renewable energies reflect the profound dependence on renewable energies in a globalized economy dependent on fossil fuels, as well as on activities with high ecological and social impacts such as mining.[12]

The following figure illustrates some of the minerals needed for each technology, the socio-ecological conflicts and the social and natural impacts that are arising associated with their extraction, as well as the dependence on fossil fuels that is still present throughout the production chain of these technologies.

Figure 1: Critical minerals for power generation, associated with socio-ecological impacts and dependence on fossil fuels.



Source: Own elaboration with data from Ferrari and Hernandez, 2022; European Commission, 2020; IEA, 2020.[13]

Figure 1 presents the minerals required for the construction of solar panels and wind turbines, as well as for energy storage through batteries. It also reflects some of the conflicts associated with the extraction of these minerals in different parts of the world[14], along with the stages of extraction, production, installation, operation and maintenance and their relationship with the use of fossil fuels.

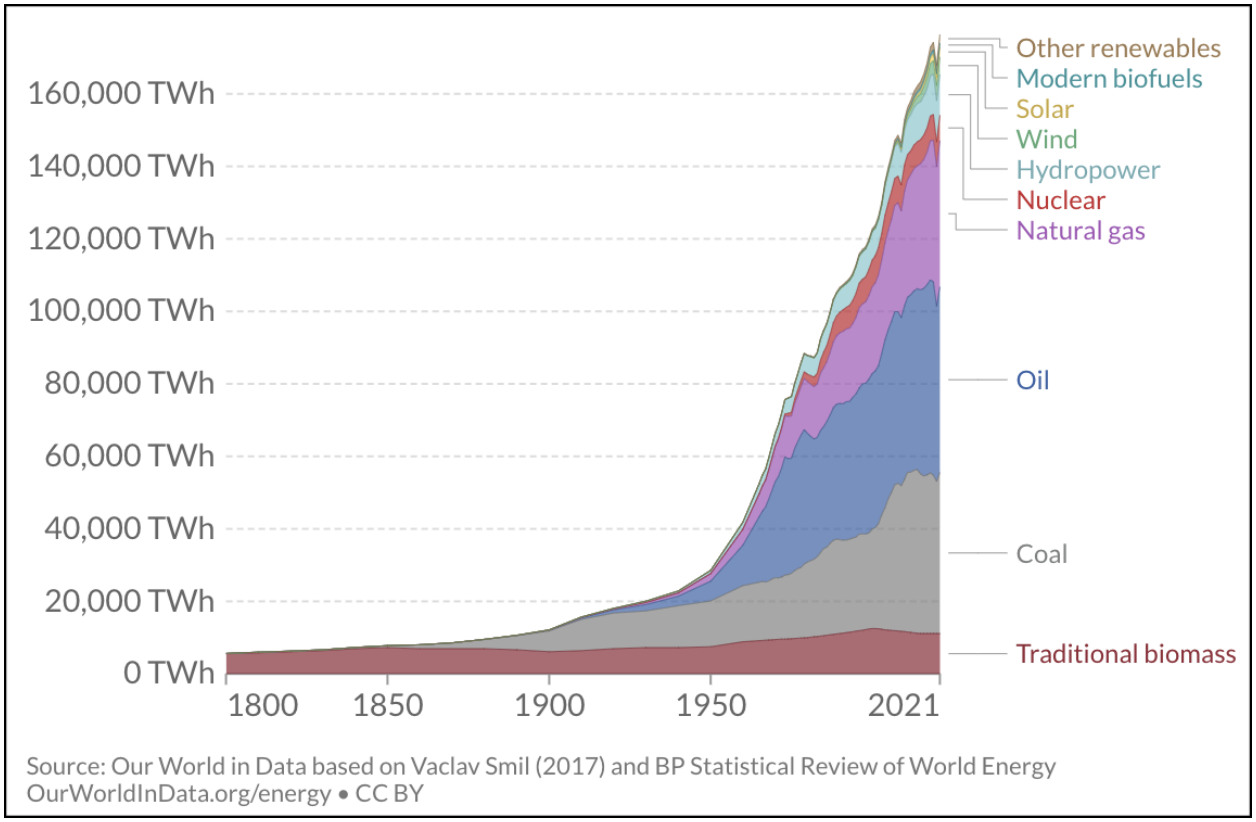
Understanding the impact of renewable energies along the production chain shows that: (a) these energies still depend to a large extent on the extraction and burning of fossil fuels, (b) these technologies, such as solar and wind, have a direct impact on the transformation of landscapes and territories due to the growing demand for mineral extraction, surface occupation that represents an opportunity cost for food production maintaining other productive or conservation activities, and; c) due to its diffuse and dispersed nature, the demand for minerals to guarantee the generation, storage and distribution of this energy will have differentiated impacts associated to where these resources are found, where there is a generation potential and where energy demands are identified.

4. Climate change and energy transition.

In addition to the declining rate of return in the era of expensive energy, we face the problem of climate change. Globally, there is a scientific consensus that the phenomenon has its origin in human activities and that the energy sector, i.e. the burning of fossil fuels, contributes ¾ of these emissions.[15] To a large extent, climate change is a direct cause of fossil fuel addiction (since fossil fuels are key to industrialized agriculture, mobility and transportation, as well as to energy generation and international trade), leading to the rapid degradation of socio-environmental indicators in a way that is inversely proportional to economic growth and the use of fossil fuels.[16]

Therefore, globally it is necessary to move from a model based on fossil fuels to one based on renewable energies, but to do so it is necessary to make better use of energy, distribute it better and ensure that its production is beneficial to the majority of people. However, as we have detailed here, the energy model being pursued globally is not solving the above, but is exacerbating socio-ecological, economic and political inequalities by adding to (rather than replacing) renewables. Globally, close to one billion people do not have access to electricity, while another billion cannot meet all their energy needs. [17]

Figure 2: The addition of renewables to the energy matrix is not replacing fossil sources.



Source: Our World in Data, 2022.[18]

5. The challenges of renewable energies.

Renewable energies are not exempt from socio-ecological impacts, nor are they, by their very nature, a problem-free option towards the decarbonization of economies. Even if the climate crisis demands the progressive elimination of fossil fuels, the energy transition model based mainly on these two technologies - wind and solar - that is currently being promoted is unsustainable: It implies replacing fossil energies with renewables without altering the bases of the growing energy demand, the enormous existing energy inequalities and without recognizing the limiting factors of these technologies.

As shown in Figure 2, the energy transition model that has been followed so far is not only failing to replace fossil fuels with renewable energies, but it is also making no progress in reducing and/or distributing energy consumption. In this sense, the definition of renewable energies seems misleading at first glance. By raising certain ideals such as emissions reduction, the fact that they take advantage of resources that have no or no impact on the environment (such

as the sun and the wind) are often presented as inherently good characteristics, hiding the impacts that we have described throughout this document.

In this sense, the term renewable energy can be misleading since it is only describing the source from which the energy is obtained (read sun or wind). If we consider the spatial and material limits, their dependence on fossil fuels, as well as their possible socioeconomic impacts, renewable energies, particularly those projects of large scale and surface occupation, should not be treated differently from any other productive process that affects the territory, even when the greenhouse gas mitigation potential of these projects is one of the most relevant factors.

The development of these large renewable energy projects (or megaprojects) - particularly solar and wind - are based on the development of studies such as the Environmental Impact Assessment (EIA) and the Social Impact Assessment (SIA). Although the intention of these studies is to identify the socio-ecological impacts that could result from project development before the project itself is developed, in practice, the installation of renewable energy megaprojects in Mexico has demonstrated that the capacity of these instruments to identify these impacts and adequately compensate them is limited at best.[19]

A renewable energy project must therefore include a social recognition model to ensure its democratic, fair and equitable operation and an adequate distribution of energy access and use. This implies recognizing that these projects can have socio-ecological impacts for particular groups, distributing equitably the costs and benefits of renewable energy generation. This is particularly true for rural areas where the energy that is produced is often used for other activities that are far from the points of generation.[20]

This is particularly important in the case of the Ticul A and B projects, located in the municipality of Muna, San Jose Tpiché and Sacalum. Based on the Social Impact Assessment (SIA) and the Environmental Impact Assessment (EIA) of both projects, if they are built in their entirety, they may affect or damage the Indigenous, campesino and ejido communities, taking into account the location of the projects, their scale, the proximity of the communities to the project, the type of vegetation present in the project area, among others.

In reviewing the projects, the proposal that includes the clearing of 604 hectares of secondary deciduous forest would directly affect the communities whose livelihoods depend on this territory, since the installation of photovoltaic solar panels in the area would hinder any other productive activity and use of the territory. Both documents mention the potential for reducing emissions that these projects would have to produce energy without generating greenhouse gasses, and although other possible impacts at the local level are mentioned, these are intended to be mitigated by establishing the energy transition towards the use of renewable energies and the fight against climate change as their greatest contributions.

Even though the term 'renewable' is describing the characteristic of the energy source, what has been argued here from the decreasing rate of return, energy density and plant factor of renewable energies it becomes evident that the planning of the energy transition, ie, meeting the emission reduction goals established in the General Law on Climate Change (LGCC) or the clean energy goals stipulated in the Energy Transition Law (ETL)[21] are not having a dialogue with territorial planning and organization, but are putting some of the federal government's goals above other features that are not only essential to address the climate crisis (such as forest conservation and biodiversity protection), but are ignoring many of the adverse impacts experienced at the local level.

In relation to these impacts, it is worth noting that there are many groups at the local level that have highlighted several of the possible effects of the development of this type of project including: impacts on local flora and fauna due to loss of vegetation, loss of resilience of the water catchment system in an area of karst soil, increase in temperature at the local level; and imbalances in the access and generation of energy for communities at the local level; impacts and losses particularly of pollinator species such as birds and bees; impacts on the microclimate (mainly in solar cases) due to the increase in temperature and loss of humidity; loss of local resilience to hydro-meteorological phenomena such as hurricanes and droughts; as well as direct social impacts for the communities living in core areas or neighboring the development of these projects, to mention some of the concerns documented.[22]

The reconfiguration of the territory associated with renewable energies poses new challenges for public policy, the legal and regulatory framework and the State's obligation to guarantee the

human rights and collective rights of Indigenous peoples and communities: On the one hand, the surface occupation of renewable energies implies a growing demand for space for the installation of these technologies that, when compared to the use of territory in a country like Mexico, involve possible socio-ecological tensions and conflicts when competing with other productive activities (such as agriculture and livestock); for the demand of other resources (such as water); the territory destined for the conservation of species and the country's biocultural heritage[23], as well as affectations to territories that are part of the Indigenous cosmovision.

Cases such as Ticul A and B put at risk the possibility of developing a democratic, fair and equitable way of carrying out small, medium and large-scale renewable energy projects, by not recognizing and respecting the different relationships with the land and territory that are specific to Indigenous communities and their environment. In the case of the Mayan communities, an affectation to the territory becomes an affectation to the Mayan people's cosmovision, since the link with the territory is ontologically different from the one that governs Western thought, which usually understands nature as a resource or a service. In the Mayan worldview, the environment is more than a reservoir of goods and services, but is understood as a living entity, whose relationship is intrinsically linked to the existence of the Mayan culture.[24]

Current trends in Latin America show that the advance of mining and the development of large infrastructure projects (also called megaprojects) has increased the number of people killed in defense of their territory exponentially in the last decade. Unfortunately, the case of renewable energies is no exception. The organization Global Witness records year after year the murders of land defenders. Since 2019, Mexico has been at the top of this list, with the unfortunate number one position in the registry for the year 2021 (with 54 murders). The organization has recorded the murder of 154 people, of which 131 were killed between 2017 and 2021.[25]

Since 2010, the Business and Human Rights Information Center has identified 197 allegations of human rights abuses related to renewable energy projects. These allegations include killings, threats and intimidation; land grabbing; hazardous working conditions and poverty wages; and harm to the lives and livelihoods of Indigenous peoples.[26] Other studies have identified more than 500 cases of social conflict associated with mining and megaproject development, some 44

of them related to renewable energy generation, plus a record of more than 500 attacks and threats against environmental defenders. [27]

Based on the above, it is necessary to consider how it would be possible to sustain the increase in energy demand of approximately 3% per year during the following decades, without generating greater inequalities in energy access and consumption, without exacerbating attacks and violence in the territory against human rights defenders, and without causing a rapid degradation of nature and natural resources in Mexico. In short, the role of renewable energies must play a central role in guaranteeing access to energy, without directly (for example through violent forms of mineral extraction, territorial occupation or energy generation, respectively) or indirectly (by fostering unequal access to energy) violating other human rights. As well as guaranteeing access to information, participation and decision-making for the communities that may be affected or benefit from the development of these projects.

In Mexico, at least 40% of households are in some degree of energy poverty[28], so they cannot meet their basic needs. The above suggests that the actions of the three levels of government in Mexico, should be to move towards the use of renewable and clean energy, reducing the superficial impacts in its installation and development, as well as ensuring equitable access to energy, allowing differentiated and democratic models of access and ownership, ensuring respect for human rights in the generation, distribution and consumption of this energy.

This explains that renewable or clean energy projects do not escape the possibility that they may cause environmental and social impacts. The production, assembly and installation of the necessary infrastructure to harness energies such as the sun and wind generate impacts at the local level, as well as in other places associated with the extraction of minerals, the use of fossil fuels for their production, transportation and installation. In terms of local socio-ecological impacts, these are associated with poor planning between the instruments that seek to measure and compensate these impacts (EIA and SIA) and land use planning and management.

It is no surprise that, due to the direct socio-ecological impacts, in addition to the dependence on minerals and hydrocarbons for extraction, processing, manufacturing and transportation, some theorists argue that the term "fossil fuels +"[29] is a more accurate way of referring to "renewable energies", because the impacts associated with large-scale infrastructure, surface occupation, as

well as their continued use and dependence on fossil fuels, continue to present local impacts and perpetuate the use of these fuels instead of avoiding and/or substituting them. Other associated effects include the lack of involvement of rural, urban, peasant and/or Indigenous communities in the design and development of these projects, which hinders an adequate design, scale, property regime and distribution of costs and benefits.

6. A just transition based on renewable energies.

The combination of the expensive energy era and the climate crisis puts Mexico in extraordinary circumstances. In very simple terms, this means that the country must move rapidly towards eliminating the use of fossil fuels in order to start relying on renewable energies. But this must be accompanied by a system that allows, in some cases, to reduce and in others, to better redistribute energy use.

Therefore, the obligation of the Mexican state must be to guarantee an energy transition based on the use of renewable energies, respecting, safeguarding and guaranteeing the human and collective rights of communities and Indigenous peoples. To this end, the design of the energy transition must ensure that the deployment of these technologies is carried out in a participatory, inclusive and transparent manner, through true environmental and social impact assessments, with sufficient prior information and with the possibility of influencing the design and decision-making on the energy transition process.

The above can become the basis for a progressive and novel regulatory framework by recognizing that the material and spatial configuration of renewable energy generation sources can have negative impacts and that therefore the importance of greenhouse gas mitigation and fossil fuel substitution must be weighed against local level impacts, land and territorial relations, as well as existing territorial impacts and injustices.

7. Conclusions.

Recovered from the above. Mexico is in an era of expensive energy. The accelerated extraction of hydrocarbons since the second half of the 20th century has eroded the reserves of easily accessible fuels with high energy returns. Furthermore, the advance of the global climate crisis means that all countries will necessarily have to change the way they generate and produce

energy. Despite rapid progress in the installation of renewable energies (largely due to their lower costs), the transition from one energy source (hydrocarbons) to another (renewables) is not only not making progress in leaving fossil fuels in the ground (as it is adding energy instead of substituting sources), but it is also not addressing the inequalities generated by the extraction and use of hydrocarbons.

In this sense, the case of Mexico, and in particular the Ticul A and B projects in the communities of Plan Chac and San José Tipcéh, demonstrate that, even though renewable energies have a high potential to reduce greenhouse gas emissions responsible for climate change and even though they can offer a solution to the constant dependence on hydrocarbon reserves that are becoming increasingly difficult to obtain and expensive, the lack of rigor in the measurement of socio-ecological impacts at the local level not only makes the project a threat to the human communities and ecosystems that inhabit the area, but also puts at risk the very process of socio-ecological transition itself, the lack of rigor in the measurement of socio-ecological impacts at the local level not only makes the project a threat to the human communities and ecosystems that inhabit the area, but also puts at risk the very process of energy transition in Mexico.

The lack of adequate and timely measurement of impacts, the lack of participation of the communities that would be affected in the early stages of the project (i.e. during its planning), the lack of communication between the authorities at the federal, state and local levels, especially with those in charge of territorial organization, and the lack of adequate instruments to listen to and acknowledge the concerns of the communities that would be affected at the local level by the development of the project have left a worrying precedent for the energy transition in Mexico.

It is for this reason that we submit this document for the consideration of the Honorable Judge, with the purpose of highlighting the technical arguments that characterize the energy transition process at a global level and, starting from the case of the Ticul A and B project, which may represent a bad practice of renewable energy projects in Mexico based on the effects that these projects may also have at a local level. We put to your consideration that the term renewable energy, when used discursively as one of how the energy transition (the substitution of fossil fuels for renewable energy) can contribute to face the climate crisis, obscures or eliminates the

possible impacts and negative effects that its development can have, when the priorities of the energy transition and the fight against the climate crisis are placed above the local effects.

If we consider the characteristics of these two projects, it becomes evident that local impacts such as deforestation of the rainforest, with all its associated effects such as loss of biodiversity, loss of productive activities such as beekeeping, change of microclimates, loss of local fuel spaces (firewood harvesting), loss of resilience to droughts and hurricanes in the area, and local temperature increase, to mention just a few, not only produce negative impacts, but also put at risk the possibilities for Mexico to reduce dependence on the rainforest, the loss of resilience to droughts and hurricanes in the area and the increase in local temperatures, to mention just a few, not only produce negative impacts, but also jeopardize Mexico's chances of reducing its dependence on fossil fuels and transitioning to a model based on renewable energies.

Considering the participation of urban, rural Indigenous and non-Indigenous communities in the development of these projects is an essential feature to safeguard human rights and ensure a just and adequate transition. This implies an early recognition of the impacts, as well as a reconsideration of the scale of the projects, their terms of ownership and planning at the local level to designate suitable areas for their development. In this sense, a transition based on renewable energies such as solar and wind should be understood as such only when the development of these projects is participatory, inclusive and respectful of human rights from the early stages of the project.

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[18] Energy needs include: i) Lighting, ii) Entertainment, iii) Water heating, iv) Food cooking, v) Food refrigeration, and vi) Thermal comfort in housing. See, Garcia Ochoa and Graizbord (2016)

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[19] Our World in Data (2022) *Energy Mix*. Available at: https://ourworldindata.org/energy-mix. Accessed on: 01/12/2022.

[20] For a documentation of renewable energy megaproject cases and their impacts see: Business and Human Rights (2019) Renewable Energy and Human Rights Index. Available at: https://www.business-humanrights.org/es/de-nosotros/informes/%C3%ADndice-de-energ%C3%ADa-renovable-y-derechos-humanos/. Accessed on: 01/12/2022.

[21] For an analysis of this problematic see: Avila, S. (2017) Contesting energy transitions: wind power and conflicts in the Isthmus of Tehuantepec. *Journal of Political Ecology*, 24: 992-1012.

[22] This is stipulated in the second transitory article of the General Law on Climate Change (LGCC) and in the third transitory article of the Energy Transition Law, respectively. Laws consulted at: https://www.diputados.gob.mx/LeyesBiblio/pdf/LGCC.pdf and https://www.diputados.gob.mx/LeyesBiblio/pdf/LTE.pdf. Accessed on: 01/12/2022.

[23] These issues have been documented for the case of San José Tipcéh and Sacalum in Yucatan. An analysis of these concerns can be found in: Ticul Photovoltaic Project A and B Yucatan: https://ejatlas.org/conflict/proyecto-fotovoltaico-ticul-a-y-b-Yucatan-Mexico. Accessed on: 01/12/2022.

[24] The daily management by Indigenous peoples and/or peasants of the natural resources and ecosystems within the territories where they settle, has generated over the centuries the so-called biocultural heritage, which refers, on the one hand, to the cultural elements indispensable for the Indigenous or peasant way of being and being, and on the other hand, to a process of co-evolution with the ecosystems they inhabit. Through biocultural heritage it is possible to make visible: (i) the deep ties between Indigenous peoples and their environment; (ii) that Indigenous peoples do not distinguish between biological and cultural resources, they treat them holistically; and (iii) that biological diversity depends directly on the cultural practices of Indigenous peoples and vice versa, that is, that culture and environment cannot be separated, nor converted into merchandise, See: Boege, E (2008) *El patrimonio biocultural de los pueblos*

indígenas de Mexico. Towards in situ conservation of biodiversity and agrodiversity in Indigenous territories. Mexico: National Institute of Anthropology and History and National Commission for the Development of Indigenous Peoples. Available at: https://idegeo.centrogeo.org.mx/uploaded/documents/El_patrimonio_biocultural-Eckart_Boege.pdf

[25] See: Uc, P. (2021) Resistencia del territorio maya frente al despojo. Available at: https://www.ceccam.org/sites/default/files/pedrouc.pdf; See also Article 13 of Convention 169 concerning Indigenous and Tribal Peoples in Independent Countries of the International Labor Organization (ILO Convention 169). The Convention is available at: https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/documents/publication/wcms_345065.pdf, Accessed: 01/12/2022.

[25] The Global Witness report (2022) can be found at the following link: https://www.globalwitness.org/en/campaigns/environmental-activists/decade-defiance/#a-global-analysis-2021. Access: 01/12/2022.

[26] Op. cit. Business and Human Rights (2019).

[27] Respectively the cases referred to are: Toledo, VM.; Garrido, D. and Barrera-Basols, N. (2013) Socio-environmental conflicts, citizen resistance and neoliberal violence in Mexico. *Ecología Política Cuadernos de Debate Internacional, Barcelona,* 46 (41): 115-124; 'Conversando con Goliat: Participación, movilización y represión en torno a conflictos neoextractivistas y medioambientales' (2019). Available at: https://conversingwithgoli.wixsite.com/misitio/el-proyecto; Centro Mexicando de Derecho Ambiental (2021) *Informe sobre la situación de las personas y comunidades defensoras de los derechos humanos ambientales.* Mexico City: CEMDA. Available at: https://www.cemda.org.mx/continua-en-ascenso-la-violencia-contra-las-personas-y-comunidades-defensoras-del-medio-ambiente-durante-2021/

[28] Garcia Ochoa and Graizbord (2016) Spatial characterization of energy poverty in Mexico. An analysis at the subnational scale. Economy Society and Territory, 16(51): 289-337.

[29] The term comes from the work done by Alexander Dunlap (2021) to describe the socio-ecological impacts of so-called renewable energies. The study is available at the following link: https://link.springer.com/chapter/10.1007/978-3-030-73699-6_5

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Research Articles

This section presents each individual research article in the version that was published (for Articles 1 and 3) or submitted for review (for Article 2) in different journals. In the case of article 4, the version presented here is a direct translation by the author of the version published in Spanish. Manuscripts were submitted following the editorial, reference and formatting guidelines of each journal. It is recommended that the articles be read in order after *Capa* to provide clarity and continuity for any prospective readers.

Article 1: Decolonizing energy justice from the ground up: Political ecology, ontology, and energy landscapes[36]

Abstract

The purpose of the paper is to expand the concept of energy justice by considering the struggles over coloniality and cultural identity in the Global South and their interactions with the spatial and historical development of energy systems and the ongoing forms of energy transitions. The article argues that the current conceptualizations of energy justice cannot be separated from the politics of incumbency as, without a decolonial critique, they tend to reproduce rather than transform hegemonic power relations. To be transformative, energy justice must be articulated from the politics of actually existing unsustainability. In other words, the starting position for energy justice must be that energy injustices are already embedded in existing energy systems and energy policies. Drawing on Latin-American decolonial thought, and the work of political ecologists around energy, this article advocates looking beyond a universalized conception of justice towards an approach where justice is based on a sense of place and is informed by the community's relationship with the land. Using the concept of energy landscapes, the article puts forth an alternative way of understanding energy systems and conceptualizations of justice in decolonial settings.

Keywords

Energy justice, energy landscapes, decoloniality, political ecology, political ontology.

Introduction

The surge of interest in the concept of energy justice over the last decade reflects human geography's increasing awareness that energy is the prime mediator between society and nature (Calvert, 2015). Energy geographers have led efforts to connect and spatialize the social and physical systems that transform energy. They encourage a "whole systems approach" that

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analyzes how energy systems reproduce uneven forms of development by linking sites of energy consumption, distribution, and production (Blondeel et al., 2021; Baka & Vaishanava, 2020). Such an approach allows us to engage with the metabolic character of energy systems, as it reveals energy's role in the uneven socio-spatial relations of contemporary capitalism (Huber, 2013; Moore, 2015; Malm, 2016).

The term 'energy justice' was initially understood as a universal challenge to "provid[e] all individuals, across all areas, with safe, affordable and sustainable energy" (McCauley et al., 2013: 3). For example, Goldthau and Sovacool (2012) define it as "a demand-side challenge related to access, in-door air pollution, affordability and disparities that intersect with other forms of injustices such as gender equity, social justice, and environmental degradation." The concept has now proliferated widely through studies on energy poverty (Bouzarovski and Simcock, 2017), energy transitions (Hazrati and Heffron, 2021), energy and space (Bridge et al., 2013; Bridge et al., 2018), and climate change (Bickerstaff et al. 2013). Contemporary energy justice seeks to accomplish many things: drawing on the energy trilemma - a framework that poses the multidimensional challenge of improving energy security while also addressing equity and sustainability issues. The concept conjures a "global energy system that fairly distributes both the benefits and costs of energy services, and one that contributes to more representative and inclusive energy decision-making" (Sovacool et al., 2017: 677).

Energy justice is broadly concerned with differences in access to the benefits of energy systems and the negative consequences of energy systems (Day, 2020). It foregrounds challenges like climate change, the technologically-induced availability of unconventional fossil fuels, the messiness of political economy, which involve collaboration, conflict and cooperation, and the rapid deployment and falling costs of renewables in an increasingly carbon-constrained world (Bridge et al., 2013; Bridge, et al. 2018). In other words, it considers the distribution of costs, risks, and deprivation associated with energy from the perspective of consumers and those affected by energy production (Sareen & Haarstad, 2018). As renewables become more common, a new set of actors, power struggles, and interdependencies will take place (Newell & Mulvaney, 2013). This energy transition must be weighted toward social justice concerns and the 'urgency' of addressing climate change (Newell et al., 2020), alongside the spatial reconfiguration of energy landscapes (Hornborg et al., 2019).

As several authors have shown, low-carbon energy systems based on renewables and electrification are not free of the geopolitical tensions associated with fossil fuels (Blondeel et al., 2021: 12; Vakulchuk et al., 2020). Solar and wind projects are paraded as ecologically sustainable, environmentally friendly answers to climate change and energy transition (Dunlap and Jackobsen, 2020). However, they also create and exacerbate pre-existing social tensions (Newell & Mulvaney, 2013; Temper et al., 2020;), including new forms of land grabbing (Yenetti et al., 2016, Dunalp, 2018), extraction of minerals and mining (Zografos and Robbins, 2020) and the reproduction of violences related to extraction (Le Billon and Middeldorp, 2021). An energy transition heeding justice principles should raise concerns about social injustices embedded in the multiple frontier-making capacities of energy transition processes (Hornborg et al., 2019).

Despite a solid foundation built on the normative principles of environmental, climate, and social justice movements, academic formulations of energy justice often rely on Western and universalistic notions of justice (Sovacool et al., 2017; Castán Broto et al., 2018). As such, they fail to consider how ontological and epistemological injustices (Santos, 2014) are embedded in energy systems. Recent formulations of energy justice tend to center policy-based solutions. They neglect how energy transitions usher in challenges for landscapes across different geographies and how energy systems are based on principles of colonial occupation, especially in the Global South (Nadaï & van der Horst, 2010).

This paper expands on the concept of energy justice by considering struggles over coloniality and cultural identity in the Global South, their interactions with the spatial and historical development of energy systems, and ongoing forms of energy transitions. It argues that current conceptualizations of energy justice cannot be separated from the politics of incumbency (that is, politics underpinning the existing energy regimes). Without a decolonial critique, energy justice tends to reproduce rather than transform hegemonic power relations. To be transformative, it must articulate *the politics of actually existing unsustainability* (Hayley and Barry, 2017), including acknowledging the energy injustices embedded in existing energy systems and policies. Examining the energy injustices occurring within energy systems allows us to trace the ideological and material manifestations of the concept of energy—understood as an abstract notion of 'work'— and how energy systems became entangled with the historical project of capitalism (Lohmann, 2021).

This article proceeds as follows: first, it unpacks the meaning of energy justice by analyzing its origins, virtues, and shortcomings. It traces the roots of energy justice from the core tenets of environmental justice (recognition, distribution, and participation) to the multi-scalar aspects of climate justice and the lived experience of energy poverty. Secondly, it reviews political ecologists, decolonial, and indigenous scholars' work on energy-environment conflicts and injustices. Drawing on the "decolonial turn" and recent work on political ontology, the paper argues for a broader critique of (in)justice and frames decolonial struggles over territory as ontological struggles. Thirdly, the article builds on these insights to explore how a decolonial form of energy justice problematizes the conventionally accepted core tenets and energy's entanglement in a system of power and domination that renders it invisible to social analysis (Franquesa, 2018). The fourth section introduces the concept of 'energy landscapes.' It highlights ontological and epistemological contestations of material changes to energy systems emerging from attachments to land (i.e., a sense of place) to challenge representations of landscapes as facilitating global capitalism's growing demand for space, materials, and energy (Castán Broto & Sanzana Calvert, 2021; Milbourne & Mason, 2017).

I. **Origins, virtues, and shortcomings of energy justice**

The term "environmental justice" is usually traced back to the 1980s and the work of Robert Bullard in the United States (Bullard, 1990; Murdock, 2021). The concept inherited key ideas from earlier work on the environment, climate, and fuel poverty. Recognizing the unequal allocation of environmental costs and benefits, researchers questioned the origins and experiences of environmental injustices. The central tenets of environmental justice—distribution, recognition, and participation—are an enduring contribution from this era (Schlosberg, 1998).

Distributional concerns consider how costs and benefits are allocated in the context of uneven power relations (Kaswan, 2021). Distribution is experienced at different scales (i.e., local, national and/or global) and in different timescales. Geographers have shown how injustices can be experienced via proximity to environmental harms, through historical legacies of changes in the landscape, and through the territorialization of power relations across space (Bridge et al., 2013). They have also noted how distributional concerns apply to energy systems and the production of infrastructures, landscapes, and residues at multiple scales (Day, 2021).

Environmental injustices are also measured in terms of (mis)recognition, which acknowledges identity differences. The debate over recognition in environmental justice emerged from efforts to accommodate different people, practices, and knowledge systems. However, recognition has played two seemingly opposing roles in environmental injustices: misrecognition is experienced when people are treated differently because of who they are, while “the differences of some people are rendered invisible when supposedly universal solutions are applied in the name of the environment” (Coolsaet & Néron, 2020: 59).

Finally, environmental justice seeks parity of participation or procedural justice. A key measure of (in)justice is the recognition of power asymmetries and different peoples’ opportunities to engage with and influence decision-making about the environment (Suiseeya, 2020:48). However, the "participatory turn” in environmental justice has brought about a series of technocratic and apolitical mechanisms that erase historical and political legacies and strip communities of their power (Ferguson, 1990). More issues are being discussed, but within a predetermined set of dialogical forms prioritizing consensus formation, technocratic management, and problem-focused governance (Swyngedouw, 2010).

Energy justice scholars draw on this tri-dimensional framework to argue that measuring injustices in the energy system retains the tenets of environmental and climate justice, but can also reveal the metabolic relations of environmental resources, and the uneven distributional character of these relations, reshaping landscapes throughout energy value chains (Day, 2021). As human geographers have noted, energy is the prime mediator of human-nature relations; therefore, understanding how power imbalances arise from these interactions can reveal where and how injustices occur throughout the entirety of the energy system (Calvert, 2015). Climate justice scholars and social movements raise ethical concerns about international and intergenerational justice, noting how multi-scalar structural inequalities allocate various responsibilities and rights to different states (Edwards, 2021; Bulkeley et al., 2014). Such concerns are also applicable to energy justice, as they reveal how injustices emerging from the production or consumption of energy can yield questions about rights and responsibility, and about who gets to use resources and with what consequences for others (Chatterton et al., 2013).

More recent dimensions of energy justice include *restorative* and *cosmopolitan* forms of justice, which refer to rectifying the injustice of the energy sector and considering the cross-border

effects of energy activities, respectively. These additions are said to constitute a comprehensive framework for action anchored in the application of human rights across the energy life-cycle (Heffron, 2022: 2). However, as decolonial scholars have shown, human rights frameworks are anchored in a Modern conception of the human (Wynter, 2015), which is underpinned by a Western construct of what it means to be human, grounded in a concrete socio-cognitive system that enables and reproduces ontological differences and hierarchies. Rights may be universally applied to the human, but not to those who appear "less human" or need to "wear masks" to appear human (Maldonado-Torres, 2017).

Finally, scholarship on Fuel and Energy Poverty (FEP) foregrounds injustices surrounding distribution, consumption, and energy's end-uses (Bouzarovski & Simcock, 2017). The FEP literature recognizes energy poverty as a lived experience or state of being underpinned by a series of social, spatial, and economic factors (Bouzarovski et al., 2013; Middlemiss & Gillard, 2015). Poverty is the result of geographical inequalities ingrained in energy systems and in "the fundamental infrastructure, economic, and cultural make-up of society" (Bouzarovski and Simcock, 2017: 640). FEP draws on the framework of distributional, recognition, and participatory injustices by exploring how injustices appear at multiple scales and because of social, cultural, and political factors (Walker and Day, 2012). For example, misrecognition (as non-recognition) renders certain groups invisible in mainstream policy discourse; while households that are energy poor may be stigmatized as 'irrational,' wasteful, or excessive. FEP literature is a key to understanding how energy injustices are experienced and for deconstructing and "actively confronting dominant discourses and value systems" (Simcock, et al., 2021: 8).

The virtues of energy justice

Energy justice thinking connects energy to the social and metabolic relations sustaining current forms of Western modernity and capitalism (Huber, 203). First, it examines the whole energy system—resource extraction, production, transmission, distribution, consumption, and waste disposal (Jenkins et al. 2016)—to identify where and how injustices occur. It understands energy systems as a spectrum of globally interconnected socio-technical processes that co-produce social and political power—a view mostly absent from traditional socio-technical perspectives (Sareen and Haarstad, 2018, Newell, 2019).

Secondly, the 'whole-systems' approach demonstrates how energy is essential for human wellbeing (Sovacool et al., 2017). By "bounding out" or separating energy concerns from wider environmental and climate justice campaigning (Bickerstaff et al., 2013:2), researchers can consider cultural, political, and social aspects of the energy system (not just technical and economic aspects) (Sovacool et al., 2017). This framework moves beyond 'traditional' concerns about the energy system (e.g., maintaining security, safety, and affordability), allowing researchers to explore the social and spatial configurations that shape energy systems' transitions toward low-carbon futures (Bickerstaff et al., 2013).

Finally, energy justice shows how injustices emerge throughout different lifecycle stages and spatial scales (Sovacool, 2021). Pre-existing, emerging, and innovative methodological foci consider how energy infrastructures are envisioned, the institutions that fashion, operate, and regulate energy systems, and the processes of deliberating and debating that create energy choices (Miller et al., 2013; Jenkins, 2018). Energy justice assesses how the different facets and scales of energy systems operate and interact, and how multiple types of experiences point to difficult-to-address injustices in the production, distribution, and consumption of energy-related services (Mulvaney, 2019).

The shortcomings of energy justice.

Sovacool et al. (2017) identify three main limitations of energy justice: a) the concept is rooted in Western thought and philosophies of justice; b) it is anthropocentric in character; and c) multi-scalar in nature. To address this, they briefly sketch multiple conceptions of non-western thought and their understandings of justice, as well as possible applications to energy justice. Similarly, they highlight the exclusion of non-humans from the energy field more generally, offering a series of questions pertinent for policy agendas that highlight the tensions between anthropocentric and non-anthropocentric views. Finally, they focus on the notion of multi-scalar dimensions of justice throughout energy systems, highlighting the importance of looking at the entirety of the energy system through space and time, where addressing energy justice from a system-wide, scalar perspective, enables analysts to better value the full cost of that system.

Sovacool et al. (2017) argue that energy systems are more than 'hardware' that is, purely technical, technological and economic matters; they are primarily political and social (Sareen &

Haarstad, 2018. See also: Newell and Mulvaney, 2013; Miller et al., 2013; Meadowcroft, 2009). Sovacool et al. (2017) are undoubtedly correct in highlighting the Western-centric character of contemporary work on energy justice. However, despite their efforts to include other narratives, their work remains monocentric, reproducing a Western system of thought. It does not absorb one of post- and decolonial scholarship's central critiques of environmental justice: "environment" and "justice" remain largely defined through Western ways of thinking (Agyeman et al. 2010). Without this critique, policy-oriented solutions cannot challenge the clash of Western and indigenous cosmo-visions that renders ontological incommensurability into technical matters (Li, 2007; Behn & Bakker, 2019).

Similarly, conventional work on energy justice still treats its foundational terms—'energy' and 'justice'—unproblematically. Energy is usually considered "prediscursive," even though it is inextricably entangled with social values and symbolic categories (Lennon, 2017). As Lohmann (2021) argues, the concept of energy only began to take shape in the XIX Century through the laws of thermodynamics as "a project of a certain privileged group of male Northern Europeans (...) to help machines provide business with labour productivity increases, labour discipline, labour concentrations and relative independence from a multitude of ingrained human and more-than-human rhythms, as well as speedier realization of the value of commodities" (87-88).

The physical laws of thermodynamics and the increased availability of energy powered by fossil fuels made multiple domains (e.g., heat and motion) and the transmutation of sunlight into thermal, chemical, and mechanical energy seem equivalent, commensurable, and measurable. Thermodynamics alienated energy from its social context, radically simplifying entire landscapes and places, which were 'put to work' in the name of productivity and efficiency. Under this framework, only one kind of stand-alone asset that can be abstracted, commodified, exchanged, and accumulated freely (e.g., energy production) matters—everything else is weeds and waste (Tsing, 2017; Franquesa, 2018).

Imperial reorganizations of human and non human relations easily accommodated the laws of thermodynamics (Lohmann, 2021: 90). The immense amount of energy availability brought about by fossil fuels was abstracted as 'work' through the hegemonic notion of abstract energy. Energy and nature were put *to work* for capitalism, reorganizing spaces into productivity and waste. This conceptualization of energy relies on the colonial notion of *terra nullius* (Blaser and

de la Cadena, 2018) and the "sacrifice" of extractive zones required for capitalist expansion (Gomez-Barris, 2017). It obscures and obfuscates how race, gender, class, and space underpin the physical and material manifestation of energy systems and how marginalized communities are disproportionately impacted by the universalistic temptation to abstract, alienate, and commodify energy (Piranni, 2022).

Similarly, Sovacool and Dworkin (2015), Jenkins (2018), Hefforn (2022) and others often assume that energy justice can be delivered through state energy policy, often underplaying the underlying conditions in which energy policy operates. Such an approach fails to recognize the embedded patterns of injustice in energy systems at the local, historical, and spatial levels and lacks a coherent assessment of global capitalism and structural oppression (Baptista, 2018). As a result, energy justice is overly positivistic and affirmative, excessively relying on policymakers, experts, managers, and consumers "making more informed energy choices" (Sovacool and Dworkin, 2015). This is particularly true when energy justice is coupled with, or based on, a series of one-size-fits-all policies promoted by international organizations like the World Bank or the International Energy Agency (IEA) (Labban, 2012). Projects like SDG 7 that seek to "modernize" or "develop" energy systems in the Global South could effectively transform energy systems and infrastructure into an 'apparatus' for neoliberal governmentality. In other words, energy infrastructure and electrification represent key means through which state formation, accumulation and political capture by economic elites is enacted and contested (Power and Kirshner, 2019). The material and symbolic work of large-scale infrastructure allows the state to discipline, enroll, and enlist citizens in modernization and development projects (Power and Kirshner, 2019. For a critique, see: Castán Broto et al., 2018, Munro et al., 2017; Urpelainen, 2018)

Due to these limitations, concepts like recognition, distribution, participation, cosmopolitanism, and restorative justice often affirm, rather than transform, the underlying conditions of social and environmental injustice embedded in the energy system (Fraser, 2003; Fraser & Jaeggi, 2018). The resulting policies are a form of "anti-politics"—a process that neutralizes, erases, and/or disavows contentious politics (Ferguson, 1990; Swyngedouw, 2010) by assimilating and domesticating pressures for radical and disruptive change into the dominant hegemonic order (Newell, 2019).

From this perspective, conceptualizations of energy justice cannot be separated from the politics of incumbency. To be transformative, energy justice should be articulated from a politics of *actually existing unsustainability* (Barry, 2012), that is, recognizing the injustices already embedded in existing energy systems. As Haley & Barry (2017: 452) put it, "[t]he fight against injustice (at different scales and domains) is not necessarily the same as outlining some positive conception of justice." Understanding how energy injustices occur throughout energy systems allows us to move beyond the affirmative-transformative duality to assess: a) how energy systems and political power become entangled (Boyer, 2019); b) how energy exploitation bolsters unique forms of occupation, distinct from other kinds of resource exploitation (Allen et al., 2021); and c) how the very concept of energy is ideological, materially/physically manifesting in an energy system underpinned by historical, political and spatial factors that reproduce racial hierarchies, class struggles, and gender imbalances (Baptista, 2018).

II Towards a political ontology of energy.

Political ecology is known for "thinking about the conflicts and struggles engendered by the forms of access to, and control over resources" (Peluso & Watts, 2001: 24-5). Since its origins, political ecology has been concerned with the rise of socio-ecological struggles generated by the capitalist appropriation of nature (Leff, 2017). However, the subfield's early engagement with energy was unpromising. Research often relied on mechanical definitions of energy (the capacity to do work) and conflated nature with labor (Daggett, 2019). Energy was treated as "just another resource" (Huber, 2015). A response to these shortcomings has been to focus on the "materiality" of resources (Bakker and Bridge, 2006; 2022), with others focusing on the metabolic character of energy's uneven distribution (Hornborg, 2015). A branch of political ecologists considered how fossil fuel technologies enable certain social powers through material and spatial configurations (Mitchell, 2011; Huber, 2013; Malm, 2016); paying closer attention to how energy differs from other resources. As Huber (2015) argues, a proper "political ecology" sees energy as a "social relation" mediated by historically specific political struggles.

For political ecologists like Joan Martínez-Alier (2021), the interaction between space and environmental justice is vital in identifying the role of situated knowledges (Haraway, 1988), participatory action, and collaborative research when defining environmental problems (Couch & Kroll-Smith, 2000). Their work makes two major contributions to the political ecology of

energy. First, they show how an ecologically unequal exchange of energy and materials creates an asymmetrical distribution of resources and risks across geographies, shaping societies in physically and socially uneven ways (Cederlöf, 2021: 71) giving rise to Ecological Distribution Conflicts (EDC). Secondly, they transformed the role of social movements (e.g., environmental organizations, indigenous peoples, peasants, neighbors, and citizens) from *objects* of study to knowledge producers who demand recognition of alternative valuation systems (Martínez-Alier 2021). Temper et al. (2015) refer to such knowledge production as '*activist knowledge*,' a process that calls for new forms of scientific production by destabilizing the boundaries between movements and academic (or other expert) domains. The EDC emerging from the expansion of commodity frontiers (from the continuous demand for materials and energy) as a geographical staple of neoliberal capitalism's accumulation by dispossession (Harvey, 2004) challenges the power dynamics of hegemonic systems of valuation through the production of these situated knowledges.

Environmental and cultural forms of degradation have propelled alternative proposals seeking to reconceptualize the relationships between humans, nature, and space. These proposals emerge from local actors' culture and resistance to universalized and homogenized visions of the future (Ulloa, 2015: 323). They are constituted through epistemological foundations and practices that move beyond proposing 'alternative' forms of development. Rather, they emerge from interactions with the territory and are focused on how knowledge production and practice emerge as a response to, or in contestation of, the imposition of one way of 'knowing nature' (Temper et al., 2015). A dialogue between political ecology and Latin American decolonial thought frames energy as a system of power relations that shapes material, distributional, and political relations at multiple scales as well as imaginaries, identities, and possibilities (Mitchell, 2011; Huber, 2015; Darin & Szeman, 2021).

The decolonial turn

The concept of energy justice is broadly built on the epistemic foundations of Northern environmental justice and resource management. Most work on socio-technical energy transitions has focused on the Global North and makes assumptions "about the nature of state capacity, markets, institutions and infrastructural systems which do not hold in other non-western and northern contexts" (Power et al., 2016: 12). Global North concerns about energy justice

generally center on the lack of effective participatory mechanisms, the failure of deliberative democracy, and distributional injustices (Mulvaney, 2019; Milbourne & Mason, 2017; Mason & Milbourne, 2014).

Despite acknowledging a colonial past, conventional frameworks on environmental and energy justice do not account for how injustices in the energy system interact with persistent colonial power and violence in the Global South. Similarly, discussions about energy transitions rarely consider the colonial and post-colonial path-dependencies and historical contingencies of energy systems in need of transformation (Baptista, 2018: 31). A decolonial approach to energy transition and energy justice would require reckoning with how the values, violence, and structures of coloniality shaped and continue to mold energy systems and energy itself.

For example, Peruvian sociologist Aníbal Quijano's work on decoloniality explores how a Eurocentric system of values and forms of power—what he refers to as the Colonial Matrix of Power (CMP)—persists, despite the end of colonial occupation. Such values are organized along two axes: 1) the concept and naturalization of race as a mental category of modernity and 2) economic relations as control over labor, resources, and products in a single capitalist market (Quijano, 2000). The CMP involves and affects us all by creating differences between modern and non modern subjects.

The CMP represents a historical repertoire of cultural, spatial, and signifying systems that stigmatize and depreciate some worldviews for the purposes of another's health, development, safety, profit, and pleasure. For Mignolo (2018), knowledge is the primary domain through which epistemologies are 'materialized,' a process that reproduces particular ways of understanding the world while simultaneously erasing or rendering otherness invisible through descriptions, explanations, representations, and interpretations. Similarly, Santos (2014: 119) argues that this *one* way of knowing (eurocentrism), characterized by Western modernity, "creates a subsystem of visible and invisible distinctions in such a way that the invisible ones become the foundation of the visible ones."

The decolonial turn in political ecology recognizes how the colonial and epistemic roots of injustices manifest in the Global South (Rodríguez & Inturias, 2018: 91). It argues that modernity has eroded the vital conditions for indigenous people's wellbeing through

displacement, exploitation of land, disregard for traditional knowledge and authority, and the imposition of a particular way of knowing and being in the world. The elimination or oppression of other forms of knowledge is the main source of violence. However, coloniality is experienced through three forms of structural oppression and violence: coloniality of power (economic, political, and cultural forms of domination), coloniality of knowledge (through epistemic and cognitive violence and the imposition of a singular way of knowing the world), and coloniality of being (subjective, individual, and collective identities) (Rodríguez, 2021). These forms of coloniality are also embedded in different spatial and temporal forms of 'slow' and/or structural violence that systematically reduce indigenous and peasant 'spaces' through occupation, contamination, and displacement (Nixon, 2011; Davis, 2019).

Most energy justice scholars ignore how social movements in both the North and South organize struggles against these forms of coloniality and violence using non-Western conceptions of justice, nature, difference, culture, and identity (Alvarez & Coolsaet, 2019). These aspects become evident when energy and environmental policies claim to speak for others. The unidirectional transfer of knowledge and obscuring of difference tempts a universalization that can perpetuate and/or lead to new forms of oppression and misrecognition (Alcoff, 1991). The challenge is to acknowledge the existence of different forms of knowledge while allowing them to disagree. Leff (2017) argues that social movements resisting extractivism in Latin America are striving "towards a politics of difference," a process that seeks to establish a dialogue of knowledges and sustain the notion that 'subalterns' can and do speak and, in fact, produce critiques of, and alternatives to, dominant power (Crehan, 2016; see also Rivera Cusicanqui, 2010; Spivak, 2010; Foucault, 2004; Scott, 1990; Gramsci, 1985).

The decolonial turn destabilizes the liberal conception of justice—distribution, recognition, and parity of participation (Fraser, 2008)—and extends the framework of cosmopolitanism and restorative justice in three ways. First, it shows how these tenets are underpinned by a modern, eurocentric epistemic and ontological construction of values and worldviews, where difference and otherness are devalued, sidelined, stigmatized, or romanticized (Rodriguez, 2021). Secondly, coloniality is revealed to operate through a matrix of power, knowledge, and being. Hierarchies of racial difference are codified into institutions, along with the domination of a symbolic system and the subjectification of the life, body, and mind of the colonized, distorting individual's

self-image and their perception of the world (Álvares and Coolseat, 2020). Reckoning with coloniality requires justice to deal with difference, otherness, and epistemic and ontological forms of violence perpetuated by the dominant form of Western-modernity and capitalism. Finally, it details how epistemic and ontological violences are reproduced through what Santos (2014) calls the sociology of absences, a process of questioning which is produced as non-existent or as non-credible alternatives to what exists. It questions whether modern tools like state policies, human rights, and democratic institutions can solve environmental (or energy) injustices. Decolonial justice decenters (in)justice through the state and other modern institutions; instead, focusing on self-governing authorities, undoing the ontology of land as property, and cognitive justice striving for autonomy (Temper, 2019).

Political ontology and epistemologies of the South

Drawing on decolonial theory and practice, Latin American scholars have initiated a turn toward 'ontological politics' (Blaser & de la Cadena, 2018) that centers the lived experiences of indigenous and peasant communities. They show how struggles over land and territories are not simply about the distribution of environmental harms and benefits, but the right of subalterns to live in accordance with their own identities, cultural imaginings, and ways of knowing the world (Leff, 2017). The socio-ecological conflicts emerging from indigenous, peasant, and other social movements' resistance to large-scale development projects, resource extraction, and mono-crop farming are not only about the destruction of territories. They are also ontological struggles—struggles for a right to exist differently—and for *a world* itself (Escobar, 2020).

Viewing these conflicts ontologically reveals another dimension of the dual crises of meaning and modernity in the Anthropocene (Escobar, 2020). The ontological dimension emerges from the gap between political economy and political ecology; early positions in both fields were incapable of thinking through antagonisms involving non-human nature (e.g., rivers, mountains, and forests). The former reduced them to "resources" (Shiva, 2010), while the latter could only 'see' disparities rooted in unequal distribution. Neither identified them as "subjects" (Blaser & de la Cadena, 2018: 5).

In response to this incommensurability, Escobar (2016) argues for the ontological dimensions promoted by Santos' (2014) Epistemologies of the South (EoS) framework. The EoS framework

builds on the notion of coloniality, arguing that multiple ways of knowing confront the logic of a monoculture based solely on scientific knowledge. Santos argues that other knowledges are actively produced or appear as invisible. They require a process of intercultural translation, an exercise that seeks to understand how different types of knowledges are born in the struggle against capitalism, colonialism, and patriarchy (Santos, 2014: 238).

The EoS framework shows that ways of knowing cannot be separated from inquiries into ways of intervening in the world. Santos calls for "cognitive justice" to reinvent struggles for social emancipation by "unthinking the dominant criteria by which we define social justice and fight against social injustice" (Santos, 2014: 237). The ongoing crisis of the Anthropocene is articulated into a particular set of ontological characteristics and world-making practices. As Eriksen (2016:18) notes, the Anthropocene ultimately "signifies that the growth ethos of capitalism and relentless optimism of Enlightenment thought may be nearing their end." Examining the 'world' in crisis reveals multiple crises tied to a particular ontological formulation of a 'single world' which has become universalized and understood as "*the (only) world*." Drawing on Law's (2011) notion of a One-World World (OWW), Escobar (2016) argues that escaping the crisis requires transitioning towards a pluriverse: "a world where many worlds fit."

Ontological politics—that is, analysis of how knowledges are actively made non-existent by the singular world—are 'resurfacing' (Ingold, 2018) and offer three main interventions for energy justice. First, knowledges that are repressed, disqualified as non-conceptual, subjugated by modernity and coloniality, or hierarchically inferior (Foucault, 2004: 7) are a source of emancipation and autonomy (Esteva, 2019). Second, it implies a radical reworking of the 'imaginary of politics' that enables political thought and practice beyond modernity's ontological and epistemic limits (Blaser & de la Cadena, 2018). Finally, it reveals the territorial dimension of ontological politics through the notion of radical relationality—where the defense of territory, life, and the commons is one and the same (Escobar, 2020). Knowledges produced from territorial struggles suggest that kinship with territory and a sense of place are built into the relational character of the pluriverse. The occupation of territory is an ontological occupation stemming from historical exploitations and representations (i.e., the translation of humans and non-humans into 'naturals' or 'resources'). Resisting occupation lays the foundation for a

grounded conceptualization of justice, a sense of place and identity that emerges from the relationship built in/with the territory (Coulthard & Simpson, 2016).

To produce a decolonial energy justice framework, we must join political ecology's analysis of energy and energy transitions with the emerging field of political ontology. Political ontology focuses on the situated knowledges emerging from the contestation of energy systems, which are rooted in broader cognitive and epistemic injustices and forms of violence. It argues that the lived experiences of indigenous and peasant communities in Latin America are not only determined by questions of distribution and participation nor their recognition in the design, operation, development, and transformation of energy systems but by a right to live in accordance with their own identities, cultural imaginings and ways of knowing the world (Leff, 2017). In other words, these are more than 'simple' struggles for resistance—they are struggles for re-existence (Porto, 2002). As Leff argues, political ontology emerging from Latin American political ecology

> is not reduced to a politics of cultural difference; it brings into play the existential ontologies of peoples linked to the environmental conditions of their territories, that is, the cultural meanings associated with ecological potentials and geographical conditions for the construction of their sustainable ways of life (...) It is not simply a matter of allowing all voices to express themselves, but of exercising an environmental democracy, of the right to inhabit the world from different cultural rationalities and territorial conditions (2017: 247)

In the same vein, Burman (2017) argues that political ecology and political ontology are not mutually exclusive domains of inquiry, but rather interconnected and overlapping dimensions of global justice. For Burman, the uneven distribution of ontological weigh -through the imposition of what he calls the 'coloniality of reality'-, and the uneven distribution of environmental burdens and privileges echos Santos' call for cognitive justice: a process that is both materially and epistemologically knitted together shaping whose knowledge, whose justice and ultimately, whose reality is allowed to be real. Burman's analysis is key to understanding how a dominant reality is imposed over others, revealing the nature of ontological conflicts when other realities are denied. Contesting the coloniality of reality requires 'ontological disobedience', that is, the

creation of spaces ‘for the generation of other realities within which other subjectivities may unfold while relations of production and consumption are transformed’ (Burman, 2017: 935).

This perspective traces energy systems’ spatial and historical role in reproducing such injustices through ontological and epistemological forms of violence and asks how energy justice might destabilize the power relations that shape them. A decolonial perspective on energy justice would focus on the everyday actions and the territorial relations that constitute energy systems operating alongside dominant power relations (Kirshner et al., 2020). This distinction reveals the entanglements of humans and non-humans that constitute energy systems and challenges understandings of energy as an abstracted force or “dead input,” which obscure energy’s connections to political power and domination (Franquesa, 2018). Energy justice can potentially deliver energy as an emancipatory project, destabilize the Western-centric conception of justice embedded in existing regulatory frameworks, and contest/resist epistemological forms of violence and ontological incommensurability in existing energy systems and their future forms (Castán Broto et al., 2018; Bhen and Bakker, 2019).

III. Decolonizing energy justice

Nancy Fraser’s (2003, 2008) bivalent conception of justice makes significant contributions toward a more pluralistic understanding of justice. Fraser conceives distribution and recognition as two mutually exclusive spheres, where class struggles appear separate from status or identity politics, as imbricated paradigms of injustice. Political strategies to ‘remedy’ maldistribution or misrecognition are either affirmative or transformative. Affirmative solutions aim to correct inequitable outcomes of social arrangements “without disturbing the underlying social structures that generate them.” Transformative strategies, in contrast, aim to correct injustices by restructuring the underlying generative framework—the root causes of the injustice (Fraser, 2003:74). The bivalent approach incorporates economic, cultural, and political dimensions to identify misframings and evaluate possible remedies (Fraser, 2008: 21).

However, this section argues that concepts like Fraser’s ‘bivalent' forms of justice (distribution and recognition with parity of participation), even in their transformative variations, can still benefit from a CMP (coloniality of power, knowledge, and being) analysis. While effective in highlighting how energy injustice may be experienced, such concepts ignore the coloniality of

knowledge, covert forms of ontological and epistemological violence, and incommensurable understandings of wellbeing. Decolonial and indigenous scholars, as well as social movements demanding energy justice, democracy, autonomy, and sovereignty argue that such concepts must be revised to articulate decolonial forms of justice (Temper, 2019; Rodriguez, 2020).

Álvarez and Coolsaet (2020:59) argue that Fraser's model does not provide the tools to problematize the state's role in the (re)production of injustices (i.e., via domestication through the creation of participatory spaces) and downplays the subjective dimension of coloniality in overcoming injustices. Concerns over distribution, participation, and recognition—while useful in exposing the unequal exchanges resulting from the dispossession of land—often fail to account for the experiences of indigenous communities and subaltern groups as they continue to face a much broader pattern of coloniality. This includes the material impacts of the maldistribution of harms and benefits and "the right to live in relation to one another and the natural world" (Coulthard, 2014:13).

Additionally, Álvarez and Coolsaet (2020: 56) argue that prioritizing a fair distribution of environmental costs and benefits encounters two problems from a decolonial perspective: first, "it may entail a misrecognition of other modes of life that are incompatible with a capitalist mode of production and/or with anthropocentric ways of understanding justice"; and second, "it sets aside the fact that even the requests of recognition from minority groups may be the expression of a desire that has been captured by coloniality." Only measuring the equality of exposure to environmental hazards can obscure misrecognition. While this may temporarily and locally address environmental injustices, in a global context, it will legitimize and expand the capitalist economy (Ibid, 2020: 58).

Political ecologists and environmental justice proponents often focus on the three core tenets in an effort to be inclusive and universal. However, decolonial scholars have shown how this forecloses questions about other understandings of justice, who the subject of justice should be, and how it should be delivered (Temper, 2019: 104). Such foreclosures entail the reproduction of epistemic and ontological violences that systematically impede other forms of knowledge (Rodríguez & Inturias, 2018). Inclusion, modernization, and/or development efforts may reaffirm forms of epistemological and ontological violence. Universalized policy objectives such as granting 'universal access' to energy or a 'right to energy' (Munro et al., 2017) also reproduce

injustices by ignoring other emancipatory strategies (Temper, 2019:98). They adhere to Western understandings of 'objective knowledge,' the good life, freedom, happiness, and development. The cultural logics of colonialism are reproduced by state-led inclusivity, which encourages recognition, participation, and even distribution (Coulthard, 2014: 15).

Post-Rawlsian approaches to justice have placed more emphasis on aspects of recognition and participation as a way of understanding the origins of maldistribution itself (Celermajer et al., 2021; Schlosberg, 2007). Similarly, the "relational turn" in political ecology has primed scholars to understand how power relations emerge and are shaped across and throughout energy systems (Ahlborg & Nightingale, 2018; Cerderlöf, 2019). This dual analysis is suitable for understanding how "the exercise of power depends on multi-layered sociotechnical networks that involve different institutional, material, and ecological arrangements" (Castán Broto & Sanzana, 2021: 282) while assessing how energy systems produce political subjectivities (Huber, 2013; Boyer, 2014). Building and maintaining energy infrastructure is a form of political domination (Mitchell, 2011; Malm, 2016). Various groups resist such projects of domination via their everyday interactions with energy, but these relationships vary in form and at different scales and places (Kirshner et al., 2020).

The materialities and thermodynamic relations of energy reveal how energy systems are inherently historical-geographical phenomena: historical in that entropy provides temporal direction, connecting places through processes of accumulation and geographical in that they require material inputs and generate material outputs (Cederlöf, 2021: 74). Yet, as Baptista (2018: 31) argues, "current energy initiatives rarely take into account the colonial and postcolonial path-dependencies and historical contingencies of the energy systems they seek to transform." Energy policy and other discourses fail to recognize the local, historical, and spatial contexts in which patterns of injustices are embedded (Baptista, 2018). Energy policies must account for the systems and structures of knowledge and the historical and spatial manifestations of past oppression and domination, considering the various materialities and physical manifestations of energy systems—power lines, grids, storage facilities, and renewable energy projects—connecting distant sites of consumption and disposal, extraction, and production.

Under capitalist modernity, energy projects are imagined, designed, and deployed by systems of ethics and values that render specific places, peoples, knowledges, and worlds non-existent

(Franquesa, 2018; Escobar, 2016). Making these entanglements visible reveals how energy systems obscure the connections between the power of energy as a productive force and power as a structure of domination. This double meaning is essential to the production and reproduction of peripheral zones, areas considered wasted space with realizable potential (Franquesa, 2018: 6; Armeiro, 2021; Gidwani, 2012). Indigenous and other local resistance foregrounds knowledges emerging from interactions between land and energy revealing an incommensurability that appears between two coexisting, but not integrated, realities of contemporary energy systems and their injustices: development and modernization on the one hand, and self-determination, autonomy and emancipatory potentials on the other (Castán Broto et al., 2018).

As Franquesa (2018: 6) reminds us, the apparent 'invisibility' of energy in modern energy systems is the result of a particular abstraction of energy, "detaching it from actual social relations, making it largely invisible to social analysis." This echoes Lennon's (2017) observation that energy is 'prediscursive' but inextricably entangled with social values and symbolic categories. Understanding energy abstractly tends to "reinforce systems of hierarchy through paternalistic narratives," wherein poor, racialized, gendered, and/or indigenous communities' knowledge is dismissed as inferior and unscientific (2017:19). Marginalized communities experience injustices and are rendered (alongside nature, non-human others, and spaces) 'wasteful' or 'cheapened' in an effort to exploit and extract value (Moore, 2015; Armeiro, 2021).

Energy policy must consider how vulnerable groups and communities are affected by an abstracted understanding of energy and how certain groups, knowledges, practices, and cosmologies are excluded from the design and purpose of the energy system (Lennon, 2017; Day, 2021). As Castán Broto et al. (2018) argue, hegemonic perspectives of energy development and the deployment of other universal or 'modern' energy systems tend to be overly focused on policy and formal decision-making. This obscures other forms of structural, historical, and spatial injustices embedded in the energy system's colonial and post-colonial path-dependencies.

Decolonizing energy justice is a double task. First, it must account for the persistence of the CMP in the spatial and historical nature of energy systems' design, deployment, and operation. This resonates with Horborg et al.'s (2019) call for energy justice to "take into account the continuities between pre-industrial labor, slavery, draft animals, windmills and water mills on the one hand, and the metabolism of modern energy technologies such as combustion engines (...) in

putting other segments of global society to work through subtle displacement strategies" (992). This is essential in understanding how injustices are perpetuated through policies that seek to transition, decarbonize, integrate communities, and grant access to energy services under universalized modernization or development pretenses. Low-carbon development and green-growth transitions are anchored in a thermodynamic, monolithic view of energy that includes a worldwide reconfiguration of land. Spaces appear empty, ready for the taking; territories are reorganized while populations and life become extractible data (Gómez-Barris, 2017). The second task is to contextualize and de-fetishize energy by revealing humans and non-humans' entanglements with energy systems (Franquesa, 2018:13). It challenges understandings of energy as a "dead input"—an abstracted entity or a "physical force"—and directs our attention to the relationships energy produces, maintains, and destabilizes (Cederlöf, 2021; Haarstad & Wanvik, 2017).

IV. Justice from the ground up: towards landscapes of decolonial energy justice

Decolonial scholars have shown how indigenous and peasant struggles against the extractive forces of capitalism cannot be measured in strikes or demonstrations, but through their relationships and struggles to transform their land into a territory, a process that seeks to (re)constitute their spatial, political and economic autonomies (Zibechi, 2020). A defining characteristic of these movements is their ancestral relationship with the land, a trait that informs a reciprocal relationship and highlights the possibility of living with one another and their surroundings in respectful, non-dominating, and non-exploitative ways (Coulthard, 2014: 60).

As Coulthard (2014:60) argues, these struggles focus on space (place) rather than on time (which is centrally important for Western modernity via 'progress' and 'development'). There is an inherent incommensurability between these two ontological perspectives, where land (like energy) builds an ontological and relational framework between nature and society. Simpson (2016: 155) adds that land plays a pedagogical role, forming the basis for indigenous identities, thoughts, relationships, and beliefs. A sense of place and particular knowledges emerge from relationships with the land: "it is the place where our ancestors reside, where spiritual beings exist, and where the spirits of living plants, animals, and humans interact." The land is a way of knowing, experiencing, and relating to the world and others; situated knowledges emerge through relational practices within a territory to "guide forms of resistance against other

rationalizations of the world that threaten to erase or destroy that collectively held sense of place" (Coulthard, 2014: 61).

Land cannot be reduced to its materialities but rather should be understood as a field of relationships between different beings. A sense of place enables a sense of being, experiencing, and relating to the world. The land 'grounds' a system of thought and produces a different sense of ethics, which necessarily reconstitutes how people relate to their surroundings (Cariou, 2017). Coulthard and Simpson (2016: 254) call this "grounded normativity"—that is, a system of place-based ethics at the core of struggles for dignity and self-preservation and against the abstraction embedded in capitalist modes of oppression and dispossession. Through grounded normativity, we can problematize what is just, for whom, and how universal ideals of justice operate through the core tenets of energy justice.

As Temper's (2019:104) decolonial analysis of environmental justice in Canada reveals, notions of participation are limited by the impossibility of instituting a self-governing authority—what is needed is epistemic justice and self-affirmation. Struggles in Latin America follow a similar pattern: in their struggle for autonomy, indigenous and peasant movements (Zibechi, 2011; Esteva, 2011) unsettle the core tenets of energy justice through what Dinerstein (2015:18) calls "*negative praxis,"* the process of negating or refusing recognition by and through the state, thereby enabling the creation of practical alternatives. Such a refusal blurs the modern separation of nature and society, unsettles private property relations through communitarian and collectivizing practices, privileges use over exchange-value, distinguishes between democracy and emancipation from the State, and seeks to create unique structures of governance, participation, and collective commitments (Barkin & Sánchez, 2019: 1423).

Energy landscapes as grounded normativity

The concept of energy landscapes helps geographers consider how material and physical changes to energy systems are ontologically and epistemologically contested through attachment to place. It challenges global capitalist expansionist representations of the landscape (Castán Broto & Sanzana Calvert, 2021; Milbourne and Mason, 2017). Energy landscapes describe "the constellation of activities and socio-technical relations associated with energy capture,

conversion, distribution and consumption" (Bridge et al., 2013: 335;). Landscape is more than a backdrop upon which energy systems are built—the landscape *does* several things.

First, landscapes locate and situate the heterogeneity and multi-scalar nature of energy systems, acting as "connective tissues" that mold the interactions between society and energy systems (Castán Broto, 2019). They mediate/shape the connections between sites of energy production and consumption in an increasingly global metabolic relationship (Nadaï & van der Horst, 2010). Second, geographers highlight a tension between experience and representation by showing how landscapes simultaneously reflect the social relations of domination and power under global capitalism (i.e., what is valued and what is 'waste') and result from the material and performative interactions of humans and non-humans (i.e., they are constituted through everyday interactions on the ground) (Ingold, 2000; Olwig, 2002; Wylie, 2011). Finally, landscapes emphasize the social processes and practices that shape energy systems and how these practices are themselves linked to the production of identities and imaginaries of modernity and development (Kuchler & Bridge, 2018; Baptista, 2018).

Kirshner et al. (2020) combine these dimensions, arguing that landscapes connect experience and memory with political histories and power dynamics in particular locations. The landscape preserves collective histories of oppression and the material legacies of extraction projects in particular places. Therefore, energy landscapes emerge from powerful groups' attempts to control people and places by reinventing the meanings of landscapes (Schama, 1995). As Castán Broto and Sanzana Calvert (2021) argue, capitalism relies on the transformation of specific localities to support the energy demands of its metabolism. Energy landscapes help us identify where and how such "sacrifice zones" are produced. These framings manifest in discourses and socio-technical assemblages seeking to define the meaning(s) and purpose(s) of the landscape (Bridge et al. 2018), allowing the powerful to "justify the way they belong and are entitled to take control of the landscapes they reinvent" (Fields, 2010). Hence, the landscape becomes a "non-human witness to social, economic and political forms of violence associated with colonialism, with the traumas of the past able to be read through the contours of the contemporary landscape" (Milbourne & Mason, 2017: 33).

Decolonial perspectives acknowledge the diverse colonial experiences of different countries and regions—places where histories of violence and dispossession are layered over and embedded

into the spatial, symbolic, and physical infrastructure constituting energy systems (Castán Broto et al., 2018: 647). Such perspectives consider how the CMP continues to produce the mental and material category of modernity through particular forms of power, knowledge, and being that devalue, sideline, and/or stigmatize the alternative worldviews of marginalized sectors of society—such as indigenous peoples—and contribute to these groups' structural oppression. Other ways of knowing, being, and doing will emerge when the meanings imposed on the landscape by 'outsiders' (i.e., settler-colonists) and the categories that facilitate the appropriation and exploitation of nature (i.e. 'second nature,' 'natural resources,' 'productivist nature') are removed (Milbourne & Mason, 2017: 32).

When energy justice is "grounded" in a set of contextual relations and interactions between humans and non-humans, the landscape becomes much more than a backdrop or a material feature of a particular setting. It simultaneously reveals the cultural values and emotional attachments of these material forms, directing our attention to the social injustices that result from the spatial arrangements and material legacies of energy production, distribution, and consumption. Following Mararena Gómez-Barris (2017: 11-12), I argue that "the possibility of decolonization moves within the landscapes." It lies in the multiplicity of 'submerged knowledges' within the extractive zones of capitalism that appear as excess—challenges to obliteration—that cannot be reduced to *terra nullius*. Decolonial justice is only possible when "raising the submerged perspectives instead of subsuming them into the existing disciplinary epistemes" (Gómez-Barris, 2017: 12).

Therefore, the core tenets of energy justice must be grounded in the contested nature and meaning of landscapes and the struggles to transform their meanings and values along with the material and sociotechnical nature of the energy systems. As many have noted, this process is bound to accelerate as the carbon constraints of the climate crisis demand more land and minerals for renewable energy deployment (Bridge et al., 2013; Day, 2021). The CMP underpins energy justice tenets through unequal access to information and participatory spaces (Torres-Wong, 2019; Le Billon and Middeldorp, 2021), simulated practices of inclusion in the design and operation of energy systems (Dunlap, 2018), and infrastructure projects like pipelines, dams, wind and solar factories (Simpson, 2014; Temper, 2019; Estes, 2019; Dunlap & Jakobsen, 2020). The metabolic interconnections of capitalism—like increased exposure to resource

mining and extraction, uneven access to energy services, and waste and pollution (Sovacool, 2021)—are experienced locally, often in distant landscapes represented as 'wasted space.'

As Cariou (2017) suggests, these processes are made visible by (re)embedding or grounding energy and contextualizing it as a socio-natural relation. Framing energy this way creates a sense of "intimacy," where value is derived from social use, not from its sameness, uniformity, and interchangeability. When energy is decontextualized, commodified, and circulated globally, it easily becomes fetishized and appears to have its own agency, blurring its entanglements with political power and its capacity to serve as a tool for subjugation and domination (Franquesa, 2018; Boyer, 2014; Huber, 2013; Mitchell, 2011). This sense of intimacy expresses energy through social relations, not scarcity (Illich, 2013; Szeman, 2019). For example, a forest-dwelling community might see no point in hoarding wood or depleting the forest to burn it but instead build an 'intimate' relationship with the energy 'source' over time (Lohmann, 2013).

Grounded normativity resists framing landscapes as reservoirs of resources (or energy) to be exploited through different technologies and practices (Allen, 2020). Rather, it notes how cultures and identities are built and materially shaped by relationships with the land. This insight forces us to reconsider how energy and energy systems become entangled with colonial and capitalist projects of domination, wherein energy is equated with nature and reduced to a resource for extraction, commodification, and global exchange. As political ecologists remind us, energy is not merely a resource; it is a political, socio-metabolic strategy for obtaining energy potential (Cederlöf, 2021). Extracting, harnessing, and/or exploiting energy under global capitalism reproduces a colonial narrative that sees landscapes as *terra nullius*—empty space amenable to abstraction and commodification via the various profitable technologies of the globalized system of production (Allen, 2020; Baka, 2017). Such colonial narratives reproduce a singular ontological practice that 'cheapens' landscapes as wasted space from which to extract value (Moore, 2015; Baka, 2017).

A decolonial form of energy justice requires us to destabilize Modern and eurocentric notions like human rights and participatory democracy (Maldonado-Torres, 2017). This unsettling reveals the role that energy and energy systems play in transforming landscapes and rendering extractible or wasted spaces through a matrix of symbolic, physical, and representational violence (Gómez-Barris, 2020:5). Landscapes reveal the multiple forms of resistance embedded

in everyday practices against national imaginaries of development and modernization. The struggles shaping these landscapes are more than manifestations of Ecological Distribution Conflicts (EDC); they are struggles for (re)existence through processes that contest current policy and planning practices, expose the tensions of future energy transitions, and reveal other forms of the possible (Castán Broto and Calvert, 2021: 283).

Landscapes "embody different forms of energy and labor" (Olwig and Mitchell, 2007: 526). These "other" or vernacular forms of labor and energy are inconsistent with the projects of growth and development that render landscapes legible to investment, productivity, and efficiency (Lohmann, 2021). They constitute a radical relational alternative; in contrast, recognition, distribution, and participation (and deeper views like cosmopolitan and restorative justice) enable limited emancipation possibilities. They tend to fall back on the state and its policies to provide the framework for justice. Emancipatory struggles showcase how grounded normativity radically destabilizes the tenets of energy justice. While energy systems and infrastructure expose the rather obdurate quality of state and institutional transformations (Boyer, 2014), possibilities for the emancipation and democratization of energy sovereignty exist in the alternative imaginaries of social organization in-against-and-beyond the state (Becker et al., 2022).

Grounding energy justice allows us to: a) trace how apparently distant or dissimilar landscapes interact across sites of consumption, production, extraction, and distribution; b) understand how landscapes are embedded in projects of modernity and national identity; and c) examine how particular knowledges and worlds linked to landscapes are simultaneously framed as waste and contested through people's everyday practices, experiences, and intimacies with the land. Indigenous and peasant communities (in the North and South, rural and urban) operate from a grounded framework of justice based on communal limits that lays the foundations for a renewed sense of energy ethics. They destabilize the core tenets of energy justice through demands for self-recognition, autonomy, and cognitive justice. Decolonizing energy justice requires seeing energy injustices through a whole-systems approach, while also disconnecting energy justice from the universalized/Western conception of justice and enabling other forms of emancipatory energy projects to emerge.

Conclusions

Traditional approaches to environmental, climate, and energy justice—which originated in the Global North—must consider the struggles against modernity that have shaped the lived experiences of peasant and indigenous communities. As Walsh (2018: 35) explains, "the struggles for and on territory and land as the base and place of identity, knowledge, being, spirituality, cosmo-vision-existence, and life, have long organized the collective insurgent praxis of ancestral peoples, identified as Indigenous, Afro-descendant, or Black, and sometimes as peasants or *campesino*." Situated knowledges emerge from relations to places and a defense of territories against the imposition of development projects (both physical and ideological). Energy justice must be informed by ethical frameworks of reciprocity and radical reformulations of justice, emancipation, and direct democracy that emerge from these struggles. However, recent assessments of energy justice tend to view energy and energy policy through a universalized and, at times, uncritical perspective linked to modernization, development, and a disregard for the historical and spatial nature of energy systems (e.g., Jenkins et al., 2016; Sovacool et al., 2017; Sovacool et al., 2019; Heffron, 2022). The core tenets of energy justice must be destabilized if the whole-system perspective is to account for the persistence of colonial forms of power, knowledge, and being in the Global South (Temper, 2019).

Political ecologists have helped unsettle our understanding of energy as a dead input or a fuel to drive modernity's progress. Their work has also challenged traditional approaches to environmental conflicts by framing activists as knowledge-producers. The framework emerging from these EDC is the main source of knowledges resisting the universalized forms of energy justice deployed by Western modernity. It offers insights into energy's past and present roles in empire and colonialism (Malm, 2016; Daggett, 2019; Lohmann, 2021), the continuous cycles of accumulation under global capitalism (Moore, 2015), and the deployment of infrastructure for high-energy modernity (Mitchell, 2011; Boyer, 2014; Franquesa, 2018). As Blaser and de la Cadena (2018:3) argue, high-energy modernity grants itself the right to assimilate all other worlds, presenting itself as exclusive and canceling any possibilities that lie beyond its limits.

The situated knowledges emerging from relationships with the land are built from a constant struggle for autonomy. As decolonial and indigenous scholars and social movements have shown, the struggle to occupy the state or use state power to achieve emancipation and/or

recognition produces limited results. It tends to translate demands for 'wellbeing' into a Westernized development model (See: Esteva, 2011; López Bárcenas, 2011; Dinerstein, 2015; Riofrancos, 2020; Zibechi, 2020). For example, Anthias (2018) shows how, during the declaration of Bolivia as a plurinational state, the struggles for territory emerged as a response to a history of colonial dispossession. These claims emerged alongside ongoing development agendas, struggles for recognition and control over resources where hydrocarbon interests collided with territorial rights. In other words, decolonization is not separated from the power relations that continue to enforce capitalist resource concessions, private property or state boundaries which are deeply entrenched in the extractivist logics of states like Bolivia. Alternative forms of emancipation focus on the possibility of organizing beyond the state and market, a process that begins with radical refusal or negation, and that ultimately "creates a new world of possibilities" by unsettling the given and enabling other prospects for attaining sovereignty, creating relationships, and giving them legitimacy (Simpson, 2014b; Temper, 2019). Merging ontological politics with political ecology's work on energy and relationality can unsettle power relations and illuminate possibilities for alternatives grounded in the relational character between humans and non-humans in a particular place.

The energy landscapes framework encourages us to see landscapes as more than the backdrop on which energy systems take shape. It highlights the phenomenological character of landscapes, revealing how struggles over land go beyond the distribution of environmental harms, recognition, or participation in the deployment of energy infrastructure. Landscapes are sites where people shape and make sense of the world in relation to "shared meanings and values" (Olwig & Mitchell, 2007). Struggles over the meanings of energy and land and the relationships between landscapes and everyday life highlight the multiple ways in which energy justice can be (re)formulated from the ground up.

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Article 2: The political economy of energy transitions: new energy spaces and decolonial politics in Mexico.[37]

Abstract

This paper draws on Critical Political Economy (CPE) to explore energy transitions in Mexico. It analyzes struggles over competing energy visions from a decolonial, spatial and post-development perspective. The article frames energy transformations as more than a move away from fossil fuels; they are a radical overhaul of universalized Eurocentric capitalist modernity. CPE questions the role of the state as both a facilitator and driver of the energy transition. I examine two low-carbon infrastructure projects in the state of Yucatan, Mexico to build on Bridge and Gailing's (2020) notion of new energy spaces as the sites, scales and spatialities through which broader questions of political economy and contemporary struggle are being worked out. CPE of the energy transition must ensure that these infrastructures are not deployed as new forms of extraction, but rather informed by affected communities and their territorial struggles. Territorial struggles and studies on the political economy of energy transitions can benefit from an open dialogue about how socioecological transformations are imagined, designed and implemented.

Keywords: Critical Political Economy, New energy spaces, Energy transitions, (De)Coloniality, Mexico.

I. Introduction

As climate change becomes a climate crisis, the transition from fossil fuels to low-carbon energy technologies assumes an increasingly central place in the international geopolitical agenda (Blondeel, et al. 2021). Yet, the substitution of energy sources has become an object of contestation and debate. On the one hand, a hegemonic coalition of incumbent actors (e.g., international institutions, development banks and (over)developed countries) advocate for a rapid technological substitution and offer financial incentives to maintain economic growth and (so-called) sustainable development (Spash, 2019). On the other, heterogeneous and myriad approaches understand the energy transformation as a rupture with at least one of the tenets of

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capitalist modernity—the centrality of accumulation, the dualist separation between nature and culture, the teleological notion of progress and development, and a narrowly defined universalism. Such insights offer multiple openings for pluriversal, emancipatory, democratic, autonomous, and bottom-up approximations of the transition (Öslender, 2019; de Onis, 2021; Post, 2023).

Political economists have (until recently) paid relatively little attention to the colonial-imperialist origins of energy transitions, the concept of energy itself (Lennon, 2017; Lohmann, 2019; Daggett, 2019), its physical manifestation through energy systems and infrastructures (Castán Broto, et al., 2018; Baptista, 2019), and the nature of their transformation (Newell & Simms, 2020). The transition process has progressively moved from a socio-technical conversation (Geels, 2011; Miller et al., 2014) into an engagement with the politics and power imbalances embedded within the transition (Newell & Mulvaney, 2013). While useful and necessary, this approach has systematically overlooked how capitalist modernity is uncritically presented as universally valid (Grosfoguel, 2018; Feola, 2020). As Clive Spash (2019) argues, scholars and policymakers have framed the energy transition as a passive revolution. Pundits become apologists for the unquestioned supremacy of economic growth that integrates various subaltern groups and emancipatory demands into a *trasformismo* (continuation of capitalist relations) instead of transformative, democratic, decolonial, and place-based energy transformations (Pearce, 2020; Newell, 2019; Becker et al., 2019; de Onis, 2021; Kirshner et al., 2020).

This article investigates how the debate over energy transitions and energy justice is related to the Coloniality of Power (COP) and an epistemological commitment to development (Hesketh, 2021). I draw on geography's contribution to Critical Political Economy (CPE) to examine 'new energy spaces' that combine new and old energy systems to (re)produce sites of struggle where 'broader questions of political economic governance (and the social relations of capitalism) are being worked out' (Bridge & Gailing, 2020: 4). In these spaces (territories, landscapes and places), the deployment of low-carbon infrastructure simultaneously reproduces possibilities for 1) extraction, violence and neo-colonial occupation and 2) emancipation, self-determination and new autonomous forms of governance. In the latter case, these possibilities embody what Raúl Zibechi (2012: 73) refers to as the *dispersion* of power—the internal logic by which societies and

movements transform their way of life through relationships with the territory that focus on a communitarian register and an ecology of knowledges.

This article critically questions the political economy (PE) of energy transitions and other critical appraisals that have centered the role of the state as the main driver/facilitator. Most analyses remain wedded to a Keynesian-type of reformism where the state plays a central role in leading the transition away from market-based solutions and fossil fuels and toward state-sponsored capitalism and low-carbon infrastructure (Newell & Simms, 2020; Sovacool, 2016; Scoones et al. 2015, for a critique see Spash, 2020; Dunlap, 2023a). In contrast, the CPE of energy transitions asks, 'energy for what (and for whom)?' This article draws on two case studies from Yucatan, Mexico to argue that attending to '*third*' or 'new energy spaces' can contest and reformulate how CPE engages with territorial, Indigenous and non-Indigenous-led struggles for democratic, autonomic, and sovereign energy transformations (Hesketh, 2023).

Methodologically, the article is based on 50 semi-structured interviews and site visits. It documents solar and wind factories in the municipalities of *Muna* and *Dzilam de Bravo*, respectively. These two cases were selected to contrast different technologies, regulatory and policy procedures, land-ownership configurations, and results. A first round of 36 interviews with Indigenous and peasant community leaders, civil society organizations, ex-local and federal government officials, private sector consultants, and academics working on the energy transition process in Mexico was conducted remotely from January to August 2021. A second round of 14 in-depth semi-structured interviews—including visits to project sites and the city of Mérida—took place between February and March 2022. The interviews were anonymized (reported here using *actor, date*) and analyzed alongside the other documentary evidence. Thematic analysis (Evans, 2017) helped identify patterns and themes within the data, including the meanings that people attach to 'energy justice,' 'energy transitions,' and 'territorial rights.'

The next section briefly outlines the literature on energy transitions, with special attention to geographical, decolonial, and anarchist critiques of PE. Section three contextualizes the Mexican energy transition process and the case studies to identify how energy systems produce uneven forms of development and deploy counter-insurgency and pacification tactics through interactions with historical-political regimes of power. The discussion section highlights the importance of *new energy spaces* as sites that contest the incorporation of low-carbon

infrastructure embodying the material, spatial, historical and political manifestations of contemporary struggles against capital accumulation. Lastly, the article reflects on the implications for the CPE of energy transitions and International Political Economy (IPE) more broadly. It advocates for an energy transformation informed by local struggle and rooted in a territorial and relational understanding of energy.

II. Critical Political Economy of energy transitions: Insights from anarchist and decolonial geographies

As Geoff Mann (2019) argues, political economy (PE) emerged as the preferred post-revolutionary science of Western liberalism. PE centers the role of power relations in preserving the established order. In contrast, CPE examines how a particular order came about through mechanisms of power and whether it is about to change (Wigger, 2022). CPE explains social phenomena and power relations in and through capitalism. It deconstructs and demystifies entrenched power asymmetries, exploitation, domination, and repression as the contradictions arising from the capitalist organization of production across time and place.

CPE asks who controls decision-making and how it becomes possible to govern (or not) energy systems (Newell, 2020). A CPE approach views transition processes from a historical, institutional, and material perspective that accounts for the centrality of energy in state geopolitics and international relations (Newell, 2021). Changes in energy sources and technologies, along with the physical infrastructures and spatial manifestations of energy systems, are associated with power relations emanating from contemporary capitalism (Bridge & Gailing, 2020). As Newell and Simms (2020) argue, relations, tensions and power imbalances (e.g., between governments, transnational corporations, and social movements) offer broader insights into how historical, political, social, economic, and technological conditions inform our understanding of how energy transitions take place.

Previous analyses of energy transitions have focused on their socio-technical character. The main drivers of transitions were said to be the market, finance, and the availability of new technologies and resources (e.g., solar or wind, scarcity or availability of land or minerals) (Wrigley, 2010; Brenner, 2007)). The most widespread approach for analyzing these interactions is the Multi-Level Perspective (MLP), which studies the interactions between technological innovation

niches, national-level management regimes, and some external pressures (usually referred to as the 'landscape') (Geels, 2010; Geels, et al., 2016). The MLP systematically failed to engage with politics and power relations, instead falling back on a 'socio-technical' understanding of the transition (for a critique see Shove & Walker, 2007; Meadowcroft, 2009; Newell & Mulvaney, 2013; Sareen & Haarstad, 2018; Bridge & Gailing, 2020). As Feola (2020: 242) argues, capitalism is much more than a simple 'landscape factor': it permeates the works and logics of socio-technical systems (contra most sustainability transition research (STR)). In the same vein, McCarthy (2012: 616) argues that PE's main contribution was to understand socioecological problems dialectically, that is, in relational, processual and political terms not as absolute, quantifiable, and discrete variables and limits.

CPE sees transitions as historical-materialist and power-laden processes shaped by 'economic, political and socio-cultural dimensions, with a view to its emerging contradictions and limits' (Gill, 1993: 16). It highlights the material, discursive and institutional arrangements that incumbent actors deploy to narrow transformative challenges and convert them into piecemeal, top-down approaches that operate as redistributive reforms. These are forms of passive revolution, a concept developed by Antonio Gramsci to describe a process of simultaneous revolutionary change and restoration that ultimately perpetuates class dominance (Hesketh, 2019). Radical and disruptive pressures and demands for transformative change are accommodated through a politics of reform (i.e., *trasformismo* (Newell, 2019)). Material, institutional, and discursive power ensures that any shifts do not disrupt prevailing social relations and distributions of political power. A CPE approach to energy transitions centers the uneven distribution of goods and bads (Newell & Mulvaney, 2013), the metabolic and interconnected character of the transition as experienced in different places (Cederlöf, 2021), the inherent interconnection of energy, the state as an 'environment making institution' (Parenti, 2015), and the crisis tendencies of capitalism (McCarthy, 2015; Pearce, 2020).

A rich literature exists on the political aspects of the energy transition (Meadowcroft, 2009; Striling, 2014; Stripple & Bulkeley, 2019; Newell & Simms, 2020). Such works engage with the transition's spatial character (Bridge & Gailing, 2020), links between energy transformations and other (broader) territorial and historical struggles (Becker et al., 2019; Kirshner et al., 2020), emancipatory possibilities rooted in the transformation of space, and relations with oppressive

energy infrastructure and state power (Dunlap, 2021b; Hesketh, 2021). As Alexander Dunlap (2021b) argues, terms such as 'energy transitions' and 'renewable energy' largely invisibilize the structural networks of harm and violence that are attached to the process of decarbonization. In other words, while scholarly work on the politically differentiated nature of energy transitions is a welcome and necessary push toward a more coherent understanding of how the transition operates, it also has imaginative limits.

a. *CPE of energy transitions and some of its limitations*

First, work on the CPE of energy transitions has consistently relied on state institutions, financial innovation, and technological development (Newell & Simms, 2020; Johnstone & Newell, 2018) to formulate a pathway for transitions. Most pundits argue that the state, markets, and finance can destabilize unsustainable pathways and/or generate progressive change (Newell & Simms, 2020). Secondly, as Kuzemko et al. (2019: 18) argue, CPE has only just begun to engage with the 'new pressures being placed on energy politics through the emergence of new actors attempting to open up new points of contestation over acceptable energy futures.'

The emergence of new actors—beyond the state and the market—and their multiple perspectives on energy futures contributes to a third limitation—the Coloniality of Power (COP) embedded in energy systems (see Howe & Boyer, 2016; Castán Broto et al., 2018; Baptista, 2018; Allen et al., 2021; Dunlap, 2021a, Hesketh, 2021; Tornel, 2023a). Decolonial logics from the emerging field of political ontology, specifically from Latin America, question energy transition processes. This body of work demonstrates how energy systems are closely tied to a hegemonic worldview that reproduces historical forms of oppression, including those integral to the COP like inequalities around race and class (Quijano, 2000). For instance, racial difference, as codified into an international division of labor, perpetuates ontological separations (body and mind, nature from culture) and Westernized forms of power (e.g., nation-states and private property) where Europe stands at the top of the hierarchy (Grosfoguel, 2022). The COP argument reveals how the project of capitalist modernity (and its multiple iterations like development and progress) entails a 'darker side' (Mignolo, 2018) and creates a ‘sociology of absences’ (Santos, 2014) resting on the institutionalization of colonial hierarchies of power, being, knowledge and gender and the erasure of non-western practices (Maldonado Torres, 2017; Lugones, 2010).

The COP is experienced through what Dunlap & Correa Acre (2021) call *Infrastructural Colonialism* (see also Batel, 2022), where infrastructure is utilized as a weapon of conquest. It becomes a dispositif to enroll people into a particular form of citizenship and modernity (Power & Kirshner, 2019) through spatial, economic, and psychological management (Dunlap & Correa Acre, 2021: 7). Hesketh (2023) refers to this as the 'coloniality of space,' a dual system of land accumulation and epistemic erasure that entails soft pacification techniques via structures like inclusion, recognition, and participation (core tenets of energy and environmental justice) that ultimately distract, disperse, and discipline communitarian struggles (Povinelli, 2011; Coulthard, 2014; Gutierrez Aguilar, 2020; Partridge, 2022; Tornel, 2023a). While often framed as socio-ecological conflicts, Indigenous, communitarian, peasant and other subaltern resistances entail many demands for epistemic justice to 'mak[e] visible and politically relevant ways of knowing, [being and doing] that have been marginalized as a result of the imposition of a dominant system over others' (Temper, 2019: 98). These are struggles for re-existence, shaped by the possibility of resisting the physical and ontological occupation of territories (Leff, 2017).

Fourthly, post-development and anarchist geographers have articulated principles against the key traits of capitalist modernity. They target its reliance on industrialization without social limits (Illich, 2004) and the notion of development through progress (Esteva, 2022). They also critique the limitations of state power and the possibilities of formulating plausible democratic, autonomous energy futures. As Wigger (2014) argues, anarchist political economy (APE) relays a healthy skepticism of coercive power relations organized through the state, the capture of state power (Holloway, 2022), and the intrinsic interdependency of capitalism and the state (Machado & Zibechi, 2017). Alternatives are, instead, embedded into prefigurative place-based practices and everyday forms of resistance (Scott, 1990)—what the Zapatistas refer to as *mandar obedeciendo* and *preguntando caminamos.* Such a project localizes production into horizontal and socialized alternatives that re-embed the economic into the social, contest the monopolistic nature of capitalist modernity (Öcalan, 2020), and articulate a confederation of multiple alternatives from below (EZLN, 2005). Knowledges and practices from the Global South—long marginalized by the dominant configuration of the state and the notion of territory—offer a fertile ground for emancipatory, autonomous, and pluriversal energy practices.

Fifthly, energy transition studies often fail to question the core notions of *transition* and *energy* themselves. An uncritical attachment to these terms allows certain myths to become rooted in state-policy orientations. In reality, there is no such thing as a transition. There is only the *addition* of primary energy resources (Bonneuil and Fressoz, 2016: 101), a process that has not yielded any emission reductions over the last 30 years (Stoddard, et al., 2021) but has increased the total amount of energy produced. This lack of substitution is predicated on the origin of the term 'transition' itself. It is a euphemism for crisis, 'designed to reduce popular anxiety after the 1973 oil crisis (...) paving the way for other developmental myths such as sustainable development and green growth' (Dunlap, 2021b: 4). It is no surprise that the transition process has adopted a plantation-like character by deploying large-scale infrastructure projects, securing access to new energy sources, and alienating energy from its social context to make it invisible to social analysis (Franquesa, 2018; Allen, et al., 2021; Stock, 2023). A similar problem exists with 'renewable energy,' another euphemism to reproduce the fossil fuel vs. renewable energy dichotomy. It perpetuates the myth of technological substitutions and uncritically embraces the mineral-intensive, fossil fuel-dependent, and spatial occupation of its infrastructure (Dunlap, 2022). The supposed ‘renewability’ of these systems often obscures any coercion, pacification, and subversion of socio-ecological opposition along these value chains (Sovacool, 2021; Verweijen & Dunlap, 2021).

As Larry Lohmann (2019: 4) explains, energy as a thermodynamic concept has always been about 'a particular pattern of exploitation of human as well as nonhuman beings.' It is historically shaped by capitalism's socioecological regimes of accumulation. For instance, the integration of non-human labor, colonial and imperialist politics, fossil fuels, and financial capitalism have all reshaped capitalist economy/nature relations over the last 500 years (Fraser, 2022: 92). Coal transformed capital-labor relations (Malm, 2016), while oil reshaped democratic politics and imperial ambitions (Mitchell, 2011), the spatial manifestation of *modernity,* and neoliberal subjectivities (Huber, 2013). The securitization of electricity and fuel that has shaped high-energy modernity also *enabled* biopolitical governance and control (Boyer, 2014). Acknowledging these limitations encourages a broader critique of the energy transition process.

Finally, low-carbon infrastructure to decarbonize and ‘green’ the economy is usually deployed to sustain the neoliberal ideology of facilitating private finance through state-led institutions

showcasing their ‘entrepreneurial credentials’ (Vela et al. 2023). These technologies aestheticize extraction (Ulloa, 2023). They legitimize cost-shifting strategies in ‘green’ sacrifice zones (Zografos & Robbins, 2020), global counterinsurgency, environmental anxieties, fragmenting dissent, and opening new ‘green’ conservation, bioenergy and energy infrastructure markets (Dunlap, 2023b). Crucially, the state disavows any rejections of neoliberal capitalism’s techno-managerial solutions and disrupts any attempts to transform actually existing unsustainability (Mann, 2019). Even most ‘left’ governments cannot break with the logics of capital and end up reinforcing or superficially reforming its logic (Machado & Zibechi, 2017).

a. *‘New’ actors and energy spaces.*

Recent contributions led by geographer Gavin Bridge reveal how energy transitions are space-making processes, simultaneously shaped by spatial contexts and powerful imaginaries like accumulation, nationalism, competition and social mobilizations (Bridge, et al., 2013; Bridge, 2018; Kuchler & Bridge, 2018; Bridge et al. 2018; Bridge & Gailing, 2020). The energy transition process is a geographically differentiated phenomenon that manifests through different sites and scales and constitutes space through its interactions (Bridge & Gailing, 2020: 1038). Bridge and Gailing use the term *new energy spaces* to denote the spatial character of transitions. It is constituted by 'novel combinations of energy systems and social relations across space [that entail] spaces characterized by social challenges to high-carbon incumbents as on the proliferation of renewable energy landscapes or marked by the creative-destructive effects of low carbon technologies' (*ibid*). This socio-spatial approach goes beyond energy systems’ physical and material transformations of space.

Spatial categories like *landscape*, *scale*, *place* and *territory* are relational and structural. They enable a broader understanding of energy systems and transitions as place-making phenomena and as uneven, dynamic and contested processes over time and space (Bridge & Gailing, 2020: 1043). For example, Becker et al. (2019) utilize the concepts of *scale* and *place* to highlight the possibilities for autonomous urban energy communities in London and Berlin. Kirshner et al. (2020) use the concept of *energy landscapes* to link energy transition processes to historical legacies and collective memories of colonialism in Mozambique. Categories such as *landscape* and *territory* offer additional ‘openings’ to theorize alternative futures and horizons of the possible and are essential tools for reworking and resisting state power (Sanzana Calvert &

Castán Broto, 2022). As Halvorsen (2019: 794) contends, the Latin American conception of territory reveals how knowledge is rooted in multiple genealogies that overlap with broader historical-political and emancipatory struggles. Such a process creates 'contact zones' where multiple onto-epistemic proposals—including the modern Eurocentric conception of a singular oppressive worldview—can come into dialogue with other onto-epistemic formulations of emancipation and liberation.

In other words, territory encompasses a plurality of power relations and political projects, both emancipatory and dominating, with multiple protagonists. Raul Zibechi (2012: 67) explains how a long history of political disenfranchisement and traditional movements' (e.g., unions, political parties, and governments) failures to create social change through the state in Latin America led to a re-territorialization of social struggle. This process was exacerbated in the first two decades of the 21st century when so-called 'progressive' governments increased material extraction and state-captured rents to finance social programs (during the so-called *Pink Tide*) (Tetreaut, 2023). Legitimacy and support from subaltern classes was mobilized for a supposedly 'post-neoliberal' alternative by superficially incorporating other onto-epistemic horizons such as *Buen Vivir* as territorialized alternatives to development (Machado & Zibechi, 2017). The 'eco-territorial turn' (Svampa, 2018)—consisting of a coalition of Indigenous, peasant, civil society organizations, and academics—emerged as a territorialized response to the extractive, superficial attempts to decolonize and reformulate the state (Anthias, 2018). While the state remains trapped in a modern, colonial framework (Halvorsen, 2019), this turn has (re)centered the multiple subjectivities and languages of valuation within a diverse set of place-based, onto-epistemic practices that recall the Zapatista slogan, *a world where many worlds fit*.

The Latin American experience reveals the limitations of depatriarchalizing, decolonizing and contesting capitalism through the state (Walsh, 2018). Nevertheless, the CPE of energy transitions literature continues to overwhelmingly center the state in the 'transition.' Green Keynesian programs respond to glib policies of ecological modernization such as the 'green economy' but continue to reproduce the fossil fuel vs. renewable dichotomy and disavow transformative challenges to liberalism and capitalist modernity (Goldstein & Tyfield, 2018; Dunlap, 2023b). CPE should understand energy transformations as more than moving *away* from fossil fuels. Transformations entail a radical overhaul of capitalist modernity and its unwavering

onto-epistemic commitment to teleological progress (i.e., economic growth and development, private property, dualistic (nature-culture) separations, and a narrowly defined universalism (Tornel, 2023a). As Bridge and Gailing (2020: 1040) argue, *new energy spaces* are 'key contemporary sites of struggle, through which broader questions of political economic governance are being worked out.' They constitute what geographer Edward Soja (1996: 2,5) labeled a *thirdspace*, 'a flexible term that attempts to capture what is actually and constantly shifting and changing milieu of ideas, events, appearances and meanings (...) to encompass a multiplicity of perspectives'.

These spaces reveal overlapping and entangled knowledges and practices and multiple ways of thinking about place through historical, material, political, and decolonial perspectives. They stand as 'territories in resistance'—places that coexist with the state's appropriation of space for modernizing and development projects—and as struggles that position the local as a powerful site of thought and praxis (Halvorsen, 2019: 802). Öslender (2019) argues that the pluriverse, the many ways of being and the coexistence of many worlds, challenges the Eurocentric formulations that see space as empty. It opens the possibility of coexistence for different cosmologies and life practices. Such insights reformulate how energy systems and their transformations are imagined, designed, owned, and governed; they create potentially emancipatory practices that contest the singular (modern) perspective. As Abrasky (2010) reminds us, affected communities and workers articulate a power shift (material, social, and political) from the actually existing power relations shaping prevailing energy transitions.

III. New Energy Spaces in Yucatan: Contesting the coloniality of energy transitions

Low-carbon infrastructure in Mexico emerged from a series of changes after the country reached peak oil and gas production in 2006 (Tetreault, 2020). The exhaustion of 'cheap' energy resources quickly drove up the cost of extraction, prompting the government to expand its pool of resources by spatially and geopolitically reconfiguring the territory (Boyer, 2014). In 2016, the Yucatan Peninsula experienced a significant deployment of low-carbon infrastructure (solar and wind). The peninsula, which historically had little to do with the energy industry (extracting, processing, or generating), was now positioned as a 'powerhouse' (Bracho et al., 2022) for low-carbon infrastructure deployment.

This process was catalyzed by the liberalization of the energy sector in Mexico, which began in 1992 and culminated with a Constitutional Energy Reform in 2013 (SENER 2013), the Electricity Industry Law (LIE) in 2014, and the Energy Transition Law (LTE) in 2015. That same year, the Mexican government announced important international commitments to reduce GHG emissions (36% by 2030, SEMARNAT, 2015), with additional commitments to increase 'clean energy' generation in the country (35% by 2024) (LTE, 2015). These announcements were backed by the creation of LIE's Wholesale Electricity Market (WEM) and the inauguration of long-term energy auctions (LTEA), which aimed to increase large-scale energy capacity by incentivizing private investment (SENER, 2016).

The relatively low cost of so-called renewable energy technologies through the auction model made them seem like a 'harmless' panacea with the potential to correct the burning of fossil fuels (Baker, 2016). The state of Yucatan was allocated 23 wind and 21 solar factories. These projects entailed the occupation of more than 14,000 hectares of land, of which 30% is communal (Sanchez, et al. 2019). As one of the interviewees argued:

> *The problem with the auction model was that everything was based on reaching a lower price. This became a perverse incentive that pushed companies to cut costs, leading to poorly done social and environmental impact assessments, as doing it right would have seriously increased the Kw/h costs. Yucatan shows that to actually create renewability you need mechanisms that cheapen land (like an agrarian mafia), supportive laws, regulations and political power. These projects have very little to do with renewable potential.*

Low-carbon infrastructure projects have already created significant tensions with Indigenous and peasant communities in Mexico. In the Isthmus of Tehuantepec, communities argued that projects violated their rights to Free Prior Informed Consent (FPIC) and advanced colonial and extractive policies in the region (Zaremberg & Torres-Wong, 2017; Dunlap, 2020; Ávila & Deniau, 2020). Some researchers have called this process aeolian extractivism (Howe and Boyer, 2016). Others have positioned regulatory tools like Environmental and Social Impact Assessments (EIA/SIA) as counterinsurgency strategies that undermine Indigenous and non-Indigenous autonomies and reinforce power asymmetries between state-corporate interests against local communities (Dunlap, 2018; Tornel, 2023b). This includes the use of corporate discursive practices (e.g., 'benefit sharing' schemes and 'social acceptance') that demobilize

and entrench participatory and decision-making inequalities within the regulatory framework (Reyes, 2022; Batel, 2022). Scholars and activists have also pointed to the lack of Strategic Environmental Assessments (SEA) in regions with high renewable energy potential; legal loopholes (e.g., varying baselines and loosely defined directly and indirectly affected areas) are regularly used (Zárate et al. 2021).

At the policy level, these projects are seen as a normative good—a so-called win-win scenario where Mexico drives foreign direct investment and economic growth by decarbonizing (Sener, 2016; Melgar, 2013). Yet, problems exist in how these projects were designed and how justice considerations were added to the energy reform regulatory framework. As a member of civil society argues:

> *Rural communities are facing the double problem of imposed energy infrastructure and mining. The question that has persisted in their struggles is who benefits from the electricity generated and additions of so-called renewable energy (as it is usually the mining, industrial and commercial sectors). (...) After years of work supporting and mapping the conflicts in many of these communities, I can see very little difference on whether it is the state or a company that is promoting the project. In the end, the energy is used to support a development model that is inherently unsustainable.*

Ticul A and B

The 'Ticul A and B' project covers 738.23 hectares of ejidos (communal) and private property, located mainly in the municipality of Muna, Yucatan. It also includes the municipalities of Sacalum (Plan Chac) and Ticul, just ten kilometers away from the Pu'uc Biocultural State Reserve and 300 meters from the Mayan community of San José Tipceh. The project plans to remove 604 hectares of jungle to install 1,227,200 photovoltaic panels, a substation, a transmission line, a road network, and an operation and maintenance building. The project would be developed and operated by the company Vega Solar 1 and 2, which intends to generate 310.5 MW of electricity (SEMARNAT, 2016). The developers split the project in two to 'downplay the project's cumulative impact' (González, et al, 2022) by submitting two different Environmental Impact Assessments (EIA) and Social Impact Assessments (SIA). Of the project's 738 hectares, 330 belong to the ejido of San José Tipceh and 408 hectares belong to a private

owner who signed a contract with the company. The project's social land was acquired by the private owner, who acted as an intermediary for the company and told the ejidatarios (landowners) that the land would be leased for 30 years to plant citrus trees. However, upon reviewing the contracts, the community realized the real purpose of the concession and the illegal manner in which the lands were leased, prompting a complaint to the National Agrarian System (RAN) of México. As one of the community members recalls:

> *The company and the intermediaries not only created false contracts, they withheld information from the landowners and the community throughout the process that eventually led to community in-fighting. We saw how, even after we asked for a consultation, the company and the authorities complicated each step of the process by not abiding to the terms of the contracts and coercing the community, mostly through tactics that forced them to sign and grant a coerced form of consent. (...) What we have today is a fractured community.*

The company officials met with the community's assembly in November 2016 to sign a new contract. However, it was amended several times by the company after the meeting, according to the ejidatarios. This led part of the community and a network of civil society organizations to take the case to the Interamerican Court of Justice to force Mexican officials and company representatives to appear before a public audience. During the proceedings, the federal energy ministry agreed to carry out a consultation and recognized that FPIC was not obtained as per the 169 ILO regulations that require consulting Indigenous people about any development on their lands. However, despite ongoing consultations, Mexico's Ministry of Environment and Natural Resources had already approved the project (SEMARNAT, 2016).

By 2017, the consultation protocol was finished but the long proceedings had begun to create in-fighting in the community. By 2018, after several instances of physical violence, the community was completely divided, and the assemblies became a simulation of 'institutional good practices' (López & Islas, 2020). In the last consultive assembly (November 2018), "consent" was granted, but the meeting was coerced—'carried out under pressure by anti-riot state police with no outside observers present.' As de López and Íslas (2020) argue, the consultation process lacked all the attributes required for an Indigenous consultation in accordance with international standards. There was no free, prior, informed consent nor any

good faith in culturally appropriate terms. The consultation took place after the project was already approved by several government authorities and was plagued by a lack of transparency and access to information; it ultimately imposed a particular way of understanding the territory (as a field with solar potential) that discounted other framings of possibility (González, et al., 2022). As a member of the community told me during a long conversation and site visit:

> *The outcome of the case demonstrates that companies and the government are not really interested in listening to communities. We suggested other locations for the project, we asked them to provide us with all the scientific data and to quell most of our concerns. The whole thing came down to the permits they had already obtained [such as interconnection, EIA, SIA] prior to an actual FPIC procedure, and not to the concerns expressed by the community. (...) The result was an increase in multiple forms of violence against us, including completely disregarding our way of doing things.*

Negotiations with the company focused on the so-called 'co-benefits'—the possibility of temporary employment and leasing contracts for more than 30 years. However, these did not include a reduction or cancellation of electricity tariffs, something the community repeatedly requested since most of the energy would be allocated for private consumption in other places (see Dunlap, 2019 on similar issues in Oaxaca). The community proposed other forms of co-ownership and 'actual' co-benefits like alternative locations for the project and distributed access to solar panels to reduce local families' energy costs. However, the negotiation 'boiled down to a series of pre-discussed terms that the company and the state had already agreed to, reducing everything to monetary compensations. In other words, there was no real chance for a proper negotiation.' The company and the state failed to account for some of the community's main concerns, including increasing local temperatures, problems with beekeeping, and difficulties maintaining traditional forms of farming and agriculture (i.e., milpa). The project has not been canceled, but remains contested in the court system.

Dzilam de Bravo

The Dzilam Bravo wind park (Eólica del Golfo 1) was developed by the Mexican company 'Vive Energía'. It is located in the coastal municipality of Dzilam de Bravo, Yucatan, near other population centers (e.g., Dzilam González and Temax) and designated nature reserves. The wind

factory was built on communally owned land that inhabitants of Dzilam González used for cattle ranching (SEMARNAT, 2013). In 2012, the first construction plan was presented with an intended operating capacity of 50 MW through 16 wind turbines of just over 3 MW each. It was to be built over 600 hectares of a conservation area. The wind factory would be installed through 30-year leases with private companies, with the possibility of extending to 50 years. The area is a low deciduous forest on a karst soil plain—a soil type characterized as immature and fragile; it is easily dissolved and fractured to expose vulnerable subterranean hydrological networks (Encalada & Sanches, 2020). This area also affects wetland and mangrove areas protected by the Ramsar Convention.

In 2018, 28 wind turbines (2.5 MW each) were installed over 1,300 hectares, expanding the total capacity to 70 MW under a self-supply permit. The scheme beneficiaries included 39 private companies (CRE, 2019). The self-supplying scheme meant that local populations would not directly benefit from the project. Instead, 'co-benefits' included the construction of non-essential infrastructure (like recreational parks), temporary jobs, and CO_2 reductions (Gobierno de Yucatán, 2021a). The project was proposed in an area where industrial development and the use of heavy machinery were prohibited, mostly due to the ecological frailty of the coastal areas. However, political pressures and lobbying campaigns convinced the state government to amend the Ecological Management Program for the Yucatan Coastal Territory (POETCY), which had prohibited the installation of industries. As a former member of the state government told me:

> *The POETCY did not mention electricity in its original inception. In 2012, when the first measurements of wind potential arrived, the pressure to add a definition into the program began. However, the definition adopted excluded wind parks from the prohibition of industrial development in coastal areas, as the projects were branded 'light' or 'low impact' (...). This definition was mostly informed by federal regulations and was not necessarily fit for the local environmental conditions of the Yucatan Peninsula.*

Several environmentalists and local activists cite modifications to this program as key to the increase of low-carbon energy infrastructure in the state (Zárate et al., 2019). In 2013, several civil society organizations and academics declared that SEMARNAT's acceptance of the wind park's environmental impact assessment would allow other conservation zones to be opened to new 'low impact infrastructure' projects (CEMDA, et al., 2013). Since the EIA and the

installation permit under a self-supplying scheme were already approved by SEMARNAT and the Energy Regulatory Commission (CRE), the park was approved without consulting local communities. Additionally, the EIA did not include the transmission line (which was evaluated separately) or the specific construction methods to be used in the fragile landscape (Zárate et al., 2019). As members of civil society told me:

> *In the case of the Dzilam wind farm, small houses can be seen near towers of more than 200 or 300 meters high. A logic of economizing everything persists as distributive solutions seem to be reduced to the possibility of receiving a payment for the occupation of the territory. This usually erases and invisibilizes other activities that existed in the territory or transforms them into technical issues, for example, 'we will move the trees and the bees to another place.'*

The population of Dzilam de Bravo did not have a chance to openly receive complete and accurate information about the project because the contracts were handled within a private exchange between the landowners and the company. As Encalada Gómez (2019: 108) writes, 'They were not asked for their opinion, nor invited to any event in which they could give their consent to the project.' Instead, the company undertook a set of 'soft' counterinsurgency tools to engage the local population and dissuade any real opposition to the installation and operation. The promises of development, progress, jobs and other benefits like increased tourism were used to generate local support for the project, but remain contested and have debatable results (Escalate, 2021). Local populations were mainly concerned with proximity to the turbines, a perceived sense of injustice emerging from impacts on their local landscape, and ever-increasing electricity costs. Despite Yucatan having some of the highest energy tariffs and rates of energy poverty in Mexico (García Ochoa et al., 2022), the electricity generated from this project goes directly to private companies.

In 2021, the company and the state government compiled a series of documents analyzing the project's 'co-benefits' (Gobierno de Yucatán, 2021a, 2021b). They garnered a series of lessons learned to be reproduced elsewhere, such as building infrastructure, job creation, protecting biodiversity, and mitigating GHG emissions. However, as local residents and activists have repeatedly denounced, the co-benefits mainly consist of non-essential infrastructure (like playgrounds) and other basic local government responsibilities like protecting biodiversity and

granting access to jobs (Reyes, 2022). Similarly, as one of the activists told me, discourses of GHG emission mitigation 'trump any other possible co-benefits and are used to discipline local populations [and dismiss] claims about the socioecological impacts as either non-scientific or manipulated by a few opposing voices.' The interviewee continued,

> *[T]he issues we face here are multiple: First, the state of Yucatan has not conducted a SEA to account for the cumulative impacts of these projects. There is also a discursive issue: the state government—and the company, of course—treat renewable energy as an unproblematic energy source (...) Wind and solar farms should have been evaluated as any other form of industrial infrastructure, something that is prohibited in the coastal areas. Finally, the fact that local communities are not the beneficiaries of these projects reveals that the tactics used to acquire land are usually manipulative and exploitative, as only people with land titles receive information and are consulted, while impacted communities are excluded.*

Several activists and civil society organizations denounced the project's environmental impacts on local biodiversity and wildlife (Zárate, et al., 2019; Articulación Yucatán, 2020). While some of the interviewees suggested that the turbines had mitigated most of their environmental impacts (such as weight in karstic soil and their impacts on local biodiversity). However, no SIA or SEA was required by law since the project was approved before the adoption of the EIL and the ETL. Furthermore, the project presented a local and not regional EIA (Zárate & Fraga, 2016). Activists pointed to a lack of adequate biodiversity conservation and migratory bird assessments in the area (Escalante, 2021). Overall, this critique extends beyond the case of Dzilam de Bravo to a 'sectorial and technocratic policy' that lacks proper mechanisms to adequately identify and mitigate environmental impacts due to an overwhelming emphasis on creating adequate technical and financial conditions for its development (Zárate & Fraga, 2016: 91).

IV. Decentering the state: new energy spaces and their contribution to the CPE of energy transitions

According to the Environmental Justice Atlas, there are 209 environmental conflicts in Mexico (EJAtlas, 2023). Most of these conflicts are embedded in an extractive form of development and land dispossession like mining and large-scale infrastructure. Such conflicts are also linked to a

substantial increase in the number of murdered land and human rights defenders, with at least 176 killings between 2017 and 2022. These trends result from a particular form of neoliberal extractivism that includes the re-primarization of the economy—an expansion of foreign direct investment and rent-seeking behavior to fund government programs but avoid economic redistribution (Ye et al., 2019). As Torres-Mazuera (2022) argues, the progressive privatization of communal land was made possible through a combination of legal and extra-legal means that offered access to land and resources. Terms such as ‘low-carbon,’ ‘transition,’ and ‘green’ aestheticize dispossession and accumulation, making them invisible, acceptable, and legitimate for governmental (local and national) pushes to address climate change (Ulloa, 2023).

Avila and colleagues (2021) argue that the federal government’s drive towards decarbonization often imagines empty spaces filled with renewable energy potential; this obscures the communal institutions, indigenous livelihoods, and biocultural dimensions of specific locales. Indeed, the entire Mexican territory is seen 'as ideally positioned to become a clean energy powerhouse given its world-class renewable energy resource potential and the low cost of renewable energy generation' (Bracho et al., 2021). Seeing the territory as 'filled with untapped potential' or with wasted spaces/opportunities reproduces an extractive gaze (see concepts like *terra nullius* (Gómez-Barris, 2018)). This framing has reconfigured land use, property, and ways of life for at least three decades. It reproduces multiple forms of violence through the continued expansion of capitalist frontiers and accumulation by dispossession (Cabrera Pacheco, 2017; Torres-Mazuera, et al., 2021). As an academic and ex-government official told me:

> *In Yucatan, there is a history of discrimination against Mayan knowledge. For the government, the Maya are poor if they do not have concrete floors and industrialized food production models. Thus, federal housing programs neglect traditional construction methods and materials as well as Milpa. This is a pattern that has existed since colonial times and that today justifies the continuous expansion of megaprojects in the area.*

The case of Dzilam de Bravo reveals how the state aestheticizes low-carbon infrastructure and uses regulatory tools to pacify and demobilize local populations. These included the fragmentation of the EIA procedure, the private sector’s lobbying to situate wind factories as ‘light industry,’ and reconstituting territory as ‘wasted space’ with an overabundance of resources (i.e., wind) (Gidwani, 2012). Social opposition was preemptively quelled by the

companies and the state of Yucatan through ‘social co-benefits’ that demobilized local populations; additionally, *ejidatarios* were contacted directly to avoid consultation procedures with communities. Company managers repeatedly stressed that low-carbon infrastructure had few socio-environmental impacts, and dismissed any oppositional or contestational claims as 'unscientific' and 'isolated voices' (Escalante, 2021). These ontologically and epistemologically violent strategies erased other situated knowledges from within the territory (Tornel, 2023b). They integrated subaltern groups into state-corporate structures through a passive revolution.

Similar tactics—fragmenting the EIA procedure and integrating the community through social-benefit schemes—were deployed in San José Tipceh. However, here, part of the community rejected the traditional development model due to a lack of transparency and deceitful tactics. The community contested the coloniality of infrastructure and called out the company and state for failing to recognize place-based knowledge and practices. As a member of the community told me:

> *During the consultation of the project, we repeatedly asked for alternatives. For example, in forms of ownership, in reductions to our electricity tariffs (...) we also proposed other sites to install the project. However, the negotiations with the company and the federal government were not possible in those terms (...). It is not surprising that many communities are not seeking to develop their own self-consultation mechanisms reaffirming their territorial authority over the state’s.*

These two cases offer insights into resistance, local articulations, and the role of energy more broadly. First, as Mayan thinker and writer Pedro Uc (2019) argues, Mayan resistance is embodied by their continued existence. After more than 500 years of colonization and extraction, resistance is expressed in the everyday practices that retain language, food, rituals, and beliefs. These are epistemic disobediences—knowledges and practices that challenge the dominant ways of knowing—that contest Mayan exclusion or reduction to folklore, myths and ‘non-developed’ beliefs.

Such everyday forms of resistance, or *hidden transcripts* (Scott, 1990), reject the structures of power. This was evident in San José Tipceh, where part of the community managed to organize with networks of activists to contest the project (Morosin, 2021). Given the skepticism and the

coercive nature of the procedures, it was no surprise that many communities in the Peninsula have now turned to the *self-consultation* processes to exercise their self-determination and communal governing authorities (Temper, 2019; Torres-Wong, 2022). Broader networks contest the expansion of 'sustainable' infrastructure and the local forces shaping extractivism (Svampa et al., 2023).

Secondly, territory is a core characteristic of social movements and their struggle for (re)existence (Leff, 2017). Calls for 'epistemic justice' emerging from these places go beyond simple integration, recognition, or participation within the existing structures of governance that shape energy systems and transitions. They question the persistent COP and infrastructure that shape energy-nature-society relations (e.g., legal incommensurability between worldviews, a modernist separation of nature-culture, and notions of private property). Struggles that contest the coloniality of space or the 'material project of territorial dispossession' and a negation of 'other imaginaries of the world that are contrary to the hegemonic order' (Hesketh, 2023: 2), must hold multiple knowledges, practices, memories, and configurations in a particular place. Conceiving territory as produced *not only* by the modern state opens it to a broader set of political values and objectives that (re)define territory from the position of struggle, and through a co-existing multiplicity of knowledges, practices and histories (Halvorsen, 2019: 804).

Third, ideas about how energy systems (generation, distribution and control) should be organized fit into broader political projects for autonomous forms of organization (e.g., energy democracy, energy autonomy and energy sovereignty) (Becker et al., 2020). Such projects deliver energy as an emancipatory project and acknowledge how energy systems are built into histories and colonial legacies (Castán Broto et al., 2018). Energy is relational, a natural commons and the basis of life for all (del Bene, et al. 2019). In both cases, the state and companies repeatedly translated community concerns into economic compensations and other 'co-benefits.' In San Jose, the consultation process devolved into incommensurable negotiations (Bhen & Bakker, 2019) that ultimately distracted and pacified collective forces for place-based alternatives. Framing the energy transition as a spatial category reveals multiple possibilities for going beyond the state as a spatial unit. Scales and landscapes are sites where definitions of social justice, well-being, democracy, and sovereignty are *actually* worked out (Kirshner et al., 2019; Becker et al., 2019; Bridge & Gailing, 2020).

The implications for CPE and IPE more generally are multiple. On the one hand, *new actors* and their interactions with territory are significant for energy transitions. The rise of neo-extractivism and the ensuing 'eco-territorial turn,' in Latin America have made 'the community' (or 'communitarian-popular horizon') into a unit of analysis and a social emancipatory subject (Gutierrez-Aguilar, 2017). These 'new' actors and spaces, articulated through territorialized, communitarian Indigenous and other 'subaltern' or non-Indigenous struggles, are contesting claims of nation-state sovereignty and articulating a form of 'international relations from below' (Hesketh, 2023). Additionally, these territorialities contest traditional PE approaches, highlighting other scales as significant in the (re)distribution of power. Other forms of ownership, knowledges, practices, and memories can offer post-colonial, democratic, and emancipatory horizons of the possible (Bridge & Gailing, 2020). As Torres-Contreras (2022) argues, there will always be disagreements between communities (Indigenous and non-Indigenous) and the institutions governing transition processes. However, the communitarian popular horizon challenges and (re)shapes how energy transformations are designed in favor of actual socio-ecological transformation and civilizatory alternatives (Escobar, 2015).

Additionally, there is a need to more explicitly focus on the state as a spatial unit that guides the energy transition, often within the limits of liberalism and 'green Keynesianism.' Transition processes and energy systems are closely associated with the nature of state sovereignty, power, national identities and politics, mostly through legal and regulatory frameworks (Baker et al., 2013). The state and (often) private finance promote 'green' infrastructure through counterinsurgency tactics to erase historical responsibilities, inaugurate new accumulation frontiers, and aestheticize and craft legitimacy for green capitalist solutions (Vela et al., 2023; Dunlap, 2023b). These tools reduce ontological differences into negotiating conditions for the deployment of infrastructure (i.e., co-benefits) and erase and/or reject others' forms of living, doing and being in the territory.

The multiplicity of actors and 'overlapping territorialities' of energy transitions create openings or 'third spaces' (Öslender, 2019: 1694). Here, transition can become an emancipatory place-based struggle where material energy ownership and an ecology of knowledges embodies emancipatory and autonomist potentials. Energy systems are a material basis that enables other

languages of valuation that are rooted in Indigenous cosmovisions and broader projects of autonomy (e.g., see Post (2023) on *proyectos de vida* (life projects) in Puebla, Mexico). We must also rethink the state as a single entity, either as a market facilitator or driver of the energy transition. Particularly at the local level, possibilities for transformation are concrete and prefigurative, not abstract and reactionary (as at the national level (Cooper, 2016)). As Latin American experiences show, the eco-territorial generally centers leaderless movements seeking to exercise and defend territorial autonomy and contest Western-modernity's assumption of nation-state politics (Hesketh, 2023; Gutierrez Aguilar, 2017; Machado & Zibechi, 2016; Zibechi, 2012)

Finally, this paper considered the dialectic between the coloniality of space and the possibility of articulating civilizatory alternatives from below as a guiding feature of CPE research into energy transitions. The communitarian-popular alternatives emerging in Latin America directly respond to the monopoly of violence and the limits of contesting capitalism, colonialism, and patriarchal relations from the nation-state (Machado & Zibechi, 2017). As Hesketh (2023: 20) argues, the expansion of neo-extractivism in the region provides a window into alternative territories of belonging that challenge the nation-state and enable possibilities to create new alliances from below. Sites can articulate other visions of the future rooted in everyday forms of resistance (Öslender, 2019). These alliances are constituted by a series of place-based struggles, assemblies, networks, and pluriversal alternatives that contain diverse political projects that exceed the modern state's definition of sovereignty. Emancipatory practices emerge from the multiple meanings attached to territory and the politicization of social and cultural differences (Zibechi, 2012). These places embody what Escobar (2015) refers to as transition discourses toward civilizatory alternatives. As the Zapatistas argued in 2005 and reinstated in 2021, such sites articulate multiple struggles from below that point toward other material and epistemic horizons for energy transformations.

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Article 3: Energy justice in the context of green extractivism: Perpetuating ontological and epistemological violence in the Yucatan Peninsula [38]

Abstract: As the world gets warmer, the deployment of low-carbon infrastructure is seen as the cornerstone to mitigate the pressures created by fossil capitalism. Prompting questions over what constitutes a 'just' energy transition? This has simultaneously broadened the discussion over what are the social justice and colonial legacies embedded in the infrastructural, technological and material composition of energy systems? Drawing on semi-structured interviews with different actors, this article looks at the deployment of low carbon infrastructure in the Yucatan Peninsula, Mexico, as the colonial legacies, politics and power relations embedded in energy systems interact with the construction of the so-called "Maya Train" a regional integration project seeking to interconnect the southeast of México. It asks the question: can we speak of energy justice in a context of total extraction? Drawing on the literature of green extractivism, it argues that as long as energy justice is linked to a Westernized conception of modernity and development it risks reproducing injustices instead of solving them. The article suggests that political ecology must pay closer attention to emancipatory struggles in defense of the territory as they move away from a universal definition of energy justice.

Keywords: Green Extractivism, Energy Justice, Political Ecology/Ontology, Coloniality, Fossil Fuel+

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1. Introduction

As Calvert (2016) argues, energy is the prime mediator between humans and nature, and the last decade has seen a surge in research on energy justice. New research frontiers of political ecology and geography have examined the spatial dimensions of energy systems, including how injustices are spatiotemporally linked across entire supply chains (Bridge *et al.* 2013; Kirshner *et al.* 2020; Sovacool 2021). Additionally, as the world warms, there is increasing pressure to rapidly transition from fossil fuels to so-called "renewable" (and sustainable, just, and affordable) energy (Newell *et al.* 2022). However, this energy transition is often framed by governments and corporations as a *trasformismo* or a 'passive revolution', a process of integration and subordination that keeps segments of society powerless (Spash 2021). As Peter Newell (2019: 28) explains, *tranformismo* describes "the ability to accommodate pressures for more radical and disruptive change and to employ combinations of material, institutional and discursive power to ensure that shifts which do occur in socio-technical configurations do not disrupt prevailing social relations and distributions of political power." Thus, this coopted form of transition discourse actually helps maintain the existing system of exploitation and extractivism that is causing the current socio-ecological crisis.

The concept of 'energy justice', according to some scholars, has emerged as a 'novel' way to counter these dominant frameworks. It adapts environmental justice's main tenets—distribution, recognition, and participation—to energy systems. Proponents contend that the concept can locate injustices, determine who is ignored, and establish a fair process when applied to the entirety of energy systems (i.e., mineral extraction, generation, transmission, distribution, and consumption) (Jenkins *et al.* 2016: 175; Sovacool *et al.* 2021). Energy justice is concerned with social differences in accessing and benefiting from energy systems—it centers those who suffer the negative consequences of new technologies and capitalist energy grids (Day 2021; Sovaccol 2021). Energy justice scholarship often directs its efforts at lobbying state and corporate actors and promoting policy recommendations (see Sovacool *et al.* 2016). Unfortunately, this means it often downplays oppositional movements and leaves colonial power dynamics and privilege intact.

The problem, as Healy and Barry (2017: 452) note, is that "the fight against injustice is not necessarily the same as outlining some positive conception of justice." Political ecology research on energy generally adopts environmental justice frameworks that prioritize the distributive character of injustices around energy infrastructure (Temper *et al.* 2015; Yanneti *et al.* 2016; Avila-Calero 2017). Recent contributions understand energy beyond a resource; it is also an interconnected metabolic and spatiotemporal political, economic, and social relation (Cederlöf 2019; Dunlap 2019, 2021; Knuth *et al.* 2022). Others have noted how coloniality and (neo)colonial projects continue to underpin what counts as 'just,' 'sustainable,' and 'renewable energy' (Dunlap 2018b; Lennon 2021; Lohmann 2021; Dunlap & Correa-Acre 2022; Tornel 2022). For example, recommendations from the International Energy Agency (IEA) and UN Sustainable Development Goals (SDG) usually align with Western modernity and colonial notions of progress and well-being. Chris Hesketh (2021) also reveals the colonial epistemology of development (i.e., a unilinear capitalist conception of well-being) embedded in wind factories[39] and other green initiatives like the Clean Development Mechanism (CDM). Finally, Anibal Quijano (2000) argues that this coloniality codifies racial difference by hierarchizing, institutionalizing, and naturalizing Western/modern knowledge to separate humans from nature and control labor systems.

So-called 'renewable energy' projects are often a manifestation of 'green extractivism'. Green extractivism promotes *green* (i.e., sustainable) practices and rhetoric to legitimize and further commodify nature (Dunlap 2019; Dunlap & Brock 2021; Verweijen & Dunlap 2021; Dunlap & Riquito 2023), all the while expanding extractivism. This may include counterinsurgency strategies to sustain and reproduce colonial and gendered structural violence and secure access to 'cheapened' nature, resources, land, labor, information, and data (Moore 2015; Verweijen & Dunlap 2021; Changon *et al.* 2022). The assemblage that justifies and legitimates green extractivism is rooted in what Dunlap & Jakobsen (2019: 6) call total extractivism: "the deployment of violent technologies aiming at integrating and reconfiguring the earth and absorbing its inhabitants, meanwhile normalizing its logics,

[39] This article uses the term wind and solar factories, instead of parks and farms, following the language of fossil fuel+ technologies, as explained below, it argues that such terms hide the real costs and socio-ecological impacts associated with their production, installment and decommissioning (Dunlap & Correa-Arce 2022). The term is adopted to call-out the use of 'renewable energy' and 'energy transition' in academic scholarship as misleading and inappropriate to describe the interconnected, multilayers and invisibilized supply-webs of destruction (Dunlap 2021b).

apparatuses, and subjectivities, as it violently colonizes and pacifies various natures." Total extractivism represents the capitalist aspiration to enclose, commodify, exploit, and extract everything. "Greening" gives the impression of fairer outcomes, inclusive decision-making, and the proliferation of participatory spaces around industrial activities while remaining firmly within the ontologies and epistemologies of capitalism.

The relationship between energy justice and extractivism—particularly green extractivism—remains underexplored. Most work on energy transitions and energy justice has steered clear of extractivism, and vice versa with a few exceptions focusing on environmental justice and extractivism around energy systems (see: Howe & Boyer 2016; Hesketh 2021; Bainton *et al.* 2021) with few others explicitly addressing it from the perspective of energy justice, (see: De Onis 2021; Partridge 2022). Therefore, this article bridges these two apparently disparate literatures to argue that energy justice's strict focus on 'just' and 'fair' energy development frequently accelerates and intensifies green extractivism. I question how energy justice accounts for or challenges this trajectory of total extractivism and responds to calls for more cognitive justice by considering how energy justice is limited by its Western and modern frameworks (Leff 2017; Santos 2014; Temper 2019; Rodriguez 2020). Without a de/anti-colonial critique, the framework will reproduce other forms of violent dispossession (e.g., cognitive, ontological, structural, and physical violence). This article contributes to the study of political ecology by bridging the recent work of environmental-energy justice and extractivism, identifying how the liberal framework of energy justice operates as tactic for 'inclusionary control' and, how energy justice, without a decolonial critique, normalizes Modern capitalist relations as universally valid and extractivism as an obligatory path towards 'development'.

This article draws on the case of a solar mega-project proposed in Yucatan, México. This project is part of an economic reorganization in southeast Mexico centered around a new freight and passenger railway problematically called 'the Maya Train' (*Tren Maya*). I draw on 50 semi-structured interviews, site visits, documentary evidence, and observations of the solar energy mega-project. The first round of 36 interviews was conducted remotely[40] (due to CoVID-19) from January to August 2021 with Indigenous and peasant community leaders, civil society organizations, former local and federal government officials, private

[40] The COVID-19 pandemic complicated the process of in-person fieldwork from 2020 to 2021.

sector consultants, and academics working on the energy transition process in Mexico. A second round of 14 in-depth semi-structured interviews, site visits, and field observations at low-carbon infrastructure projects in the Yucatán took place between February and March 2022. These interviews were conducted with the same sets of actors and included visits to project sites and the city of Mérida. The interviews were anonymized (and are reported as actor, date). I used thematic analysis (Evans 2017) to identify patterns and themes within the data, including the meanings people attach to "energy justice," "renewable energy," and "territorial rights."

I first came in contact with some of the civil society organizations supporting Indigenous legal cases in Yucatan in 2018. Using a snowballing sampling method, I was able to interview and establish a degree of trust by contacting existing activist and community networks via video calls in 2020-2021. This process was later reaffirmed by a site visit in 2022. However, doing research at a distance inevitably produced a series of limitations such as scheduling and technological disruptions, a lack of in-depth ethnographic research and issues with my own positionality as an 'outsider' trying to do research with Indigenous groups. Several actors refused to speak to me, particularly private companies and Civil Society Organizations (CSO) while others repeatedly questioned my intentions. As a mestizo, male researcher working at a northern university, these are legitimate questions that need to be addressed. To tackle a trend of epistemic extractivism (Grosfoguel 2016), which consists of extracting Indigenous ideas by removing them from their context and giving them new meanings. Following Halverson (2018) I sought to remain in dialogue with activists and communities, supporting their cause, albeit at a distance, and continued to publish research results in Spanish, meanwhile giving public talks in academic and non-academic spaces to bring attention to their struggles.[41]

The next section briefly reviews the energy justice concept and its intersections with the literature on conventional and green extractivism. I use the term "fossil fuels+" to emphasize how low-carbon energy technologies foster plantation economies that reproduce fossil-style political economies (Dunlap, 2021a). The third section examines two case studies—a proposed solar mega-factory and the so-called Maya Train—to highlight how

[41] Part of the research was translated into an *Amicus Curiae* that supported the community in their legal struggle and other articles were translated into Spanish and co-authored with members of the community to present, in their own words, their process of organization and resistance against green extractivism (See: González *et al*. 2022).

they make land legible for capitalist investment. The use of free prior informed consultations (FPIC) and social and environmental impact assessments (SIA/EIA)—the tools of energy justice—actually serve as counterinsurgency mechanisms for green extractivism and capitalist (re)organization of the Yucatan Peninsula. The fourth section reflects on the findings to consider whether the concept of energy justice can interrogate the dynamics of structural oppression and power inherent in energy systems. Finally, the article concludes by calling for an *energy research insurrection* (Dunlap 2022) and for moving beyond the notion of energy justice in favor of pluriversal, post-development, and radical energy autonomy.

2. From energy justice to green extractivism and beyond

The energy justice framework has emerged in political ecology and energy research to conceptualize multiple and complex energy-society relations (Sovacool 2021). Energy justice considers the entire energy system (Jenkins *et al.* 2016) and attempts to separate ('bound out') specifically energy concerns from broader environmental and climate justice challenges (Bickerstaff *et al.* 2013). The concept usefully captures how energy systems can produce maldistribution, misrecognition, and a lack of participation (Fraser 2003). The core energy justice tenets—participation, recognition, and distribution—are adapted from environmental justice frameworks (Schlosberg 2007). It assesses where, how and why injustices happen to formulate better energy policy (McCauley *et al.* 2013; Jenkins *et al.* 2016; Jenkins 2018). However, energy justice has not always acknowledged the concerns of social movements or the corresponding colonial and extractive continuities they identify.

While early iterations of the energy justice concept were mobilized by movements like the Energy Justice Network (Partridge 2022: 91), subsequent energy justice scholarship has ignored (or even completely disavowed) political movements' demands. Energy justice forgot its roots (i.e., environmental justice and the 'environmentalism of the poor' (Guha & Martinez-Alier 1997)) and now speaks directly to state and corporate actors. However, as Heffron and McCauley (2017: 664) argue, "to some degree environmental and climate justice as concepts have been naïve in their approach" since energy policy is dominated by economists and experts. Jenkins (2018: 119-120) goes further, suggesting that energy justice can benefit from its 'non-activist past,' focusing instead on this technocratic

approach. The concept remains committed to a liberal-modern view of justice that is oriented around policymaking and statist interventions (Sovacool & Brisbois 2019). This is despite Heffron's (2021) interventions to extend its core tenets to include cosmopolitanism and restorative justice. Other scholars have also highlighted the conflictive nature of mining and extraction needed to sustain energy systems (Sovacool 2021; Sovacool *et al.* 2021), the concept remains committed to a liberal-modern conception of justice oriented around policy-making and statist interventions (Sovacool & Brisbois 2019). The supposed naïvite with which these authors accuse social and political movements demands for justice, allows (neo-)colonial extractivist mentalities and capitalist development to go unchallenged. Like environmental justice, energy justice remains "geographically and conceptually bound to [the] hegemonic-Western idea of modernity [and] Western-inspired political ideals" (Álvares & Coolseat 2020: 55). The concept is presented as a universalized solution to be transposed onto different contexts, including where coloniality persists within energy infrastructure and its connections to global supply chains (De Onis 2021; Tornel 2022).

Energy justice should engage with criticisms of environmental justice and the ideas emerging from the extractivism literature. Scholars have disregarded the wider context that pressures energy systems to transition (Dunlap 2021b). The global extractive economy renders territories and people extractible, binds energy systems, and reproduces a necropolitics of domination and violence (Gomez Barris 2017). Studies on energy infrastructure and policy in the Global South often disregard colonial legacies (see Baptista 2018; Castán Broto *et al.* 2018; Allen *et al.* 2021) and obscure, invisibilize, and downplay the role of energy systems in the reproduction of coloniality (e.g., internal and cognitive forms of colonialism, extractive activities in the name of progress, sustainable development (Dunlap 2021b), and even development alternatives like *Buen Vivir* (Altmann, 2020) and the rights of nature (Tola 2018)). Grassroots movements struggling against large-scale low-carbon energy projects often employ concepts like energy sovereignty (Del Bene *et al.* 2019), energy democracy (Becker *et al.* 2020), and energy autonomy (Dunlap 2018b; 2022) to demand access, self-management, participatory design, and democratic deliberations. These demands go beyond energy justice's Western conception of development; as Rodriguez (2021) suggests, they draw on the roots of environmental justice.

Studies on extractivism (and extended concepts like 'total extractivism' (Dunlap & Jakobsen 2019); 'hyper-extractivism' (McNeish & Shapiro 2021) and 'green extractivism' (Verweijen & Dunlap 2021)) illustrate the limitations of the energy justice framework. Hyper/total extractivism draws on the Latin American concepts of *extractivismo* and neo-*extractivismo* (Gudynas 2021). Despite the end of colonialism, most extraction sustains colonial-style oppression over the Global South through the provision of raw materials and the international division of labor (Svampa 2015). However, the link between extractivism and global capitalism has become more spatially and temporally complex via expanding commodity frontiers. Martin Arboleda (2020: 25) argues that such expansion is underpinned by a technological and organizational modernization that has made the geographies of extraction ubiquitous at a global scale. Data flows in 'new' directions, not only along traditional North/South paths; extractive operations move from everywhere and in every direction. This, however, does not mean that the expansion or the experience of extractivism ceases to reproduce imperial and neocolonial forms of domination.

Mezzadra & Neilson (2019: 19) expand the concept of extraction to include financialization, logistics, and extractive global commodity chains to better understand the current politico-economic logic of capitalism. Durante and colleagues (2021: 20) also define extractivism as an ontology, "a particular way of thinking and the properties and practices organized towards the goal of maximizing benefit through extraction, which brings in its wake violence and destruction." McNeish & Shapiro (2021) demonstrate how multiple forms of 'resource' extraction—be it fossil fuel extraction, atomic power, hydropower, biomass and industrial agriculture, or low-carbon infrastructures—co-produce an accelerated global capitalism and give way to an interconnected "hyper-extractivism." The capitalism that created our socio-ecological and climate catastrophe is often equated with fossil fuels (Malm 2016); however, this fails to account for wider mineral extraction, chemical manufacturing, and nature commodification. Understanding this broader context of extraction is essential in accounting for "total extractivism."

'Total extractivism' alludes to the expansion of extractivism beyond its traditional purview as an economic activity with a material character. Total extractivism entails a 'new phase of capitalism' or "a particular mode or imperative of capitalist accumulation" (Machado Araoz 2013: 213; Ye *et al.* 2019) that moves toward a *global totality* of material and

resource appropriation. Extractivism is the "dominant mentality of our era" (McNeish & Shapiro 2021: 3). It now includes financial (through debt creation), logistical (expanding around the globe), digital (data and information mining) (Durante *et al.* 2021: 22), and epistemic (extracting knowledge) forms of extraction (Chagnon *et al.* 2022; Grosfoguel 2018), all of which perpetuate capitalism's violent logic of "accumulation for accumulation's sake" (Marx 1967: 416). Extractivism is ontological; it universalizes and normalizes multiple types of violence (Middeldorp & Le Billon 2020). It is also geographical, creating expanding sacrifice zones and cost-shifting strategies legitimized by 'green' promises (Zografos & Robbins 2020). Finally, extraction is necropolitics (Mbembe 2003: 39-40). It manifests as a system that institutionalizes, manages, and organizes coloniality through the subjugation of life and the power over death. This is even true of supposedly 'green,' 'clean,' and 'renewable' low-carbon infrastructures.

The concept of green extractivism emerges from extractivism and green grabbing research that focuses on how "the appropriation of land and resources" can be justified in the name of "environmental ends" (Fairhead *et al.* 2012: 237). While green grabbing is 'an act' to seize land (Dunlap & Riquito 2023), green extractivism is structural (i.e., systematic, intensive, and continuous). Green extractivism expands the notion of extraction beyond minerals and hydrocarbons; it pushes the frontiers into forestry, fishing, and farming (Acosta 2013) and incorporates so-called "renewable resources" (by calling their 'renewability' into question). Isla (2022) argues that greening is the "highest stage" of extractivism as it uses discourses of sustainable development to introduce new forms of global capital accumulation (Changon *et al.* 2022). It enrolls previously non-commodified nature and (women's) bodies to extract 'cheap' resources and labor. Green extractivism produces new extractive frontiers and justifies its expansion through narratives of 'cleaning' supply chains, mitigating GHG emissions, and providing the tools for green growth (Riofrancos 2019; Dunlap 2021a). Meanwhile, its colonial/racialized policy instruments continue to frame economic growth as the highest priority.

Assemblages of discourses, technologies, instruments, and actions enable capitalism's expansion into new frontiers and legitimate and naturalize the continued exploitation of already-existing modes of extraction. As Verweijen & Dunlap (2021: e5) argue, green extractivism legitimizes new opportunities for extraction. Bainton and colleagues (2021)

show how a growing number of mining and low-carbon technology companies adopt the language of 'transitions'—including adjectives like 'clean' or 'just'—that coincides with the proliferation of offsetting branding practices. Brock (2020) and Dunlap & Jakobsen (2019) argue that green extractivism also opens new avenues for 'green' investments and markets, while simultaneously quelling and dispersing opposition to extractive practices.

Green extractivism includes a series of strategies, practices, actors, and tactics that render extraction socially and politically feasible. It deploys social engineering to mold the 'hearts' and 'minds' of people, manage dissent, and manufacture consent (Verweijen & Dunlap 2021: e1). Such practices have a five-century history and draw from colonial discursive practices of land appropriation. They include imagining land through an "extractive gaze" and constructing *terra nullius* on supposedly "unoccupied" and "unutilized" land (Gomez-Barris 2017). As several scholars have recently argued, neoliberal practices like free, prior, informed consent (FPIC) that celebrate participation and multiculturalism give the appearance of democratic inclusion to pacify resistance and legitimize extractive practices (Ulloa 2015; Dunlap 2018b; Torres-Wong 2019; Le Billon & Middeldorp 2021).

Corporate and state actors use 'hard' and 'soft' social engineering techniques (Dunlap, 2020: 663) to either forcibly or persuasively enroll people into 'beneficial' schemes. They manipulate and weaponize ideas like development to mitigate political opposition and craft legitimacy. Under the liberal-modern regime of environmental/energy justice, indigeneity and ontological differences are translated into multi- or intercultural tools of "inclusionary control" (Coulthard 2014; Leff 2017; Dunalp 2018; Verweijen & Dunlap 2021). Recognition and participation are simply a condescending hospitality of Otherness (Walsh 2018). FPIC and corporate social responsibility (CSR) programs use the facade of dialogue and recognition to pacify, co-opt, and demobilize autonomous-seeking movements. Contrary to their publicly stated goals, FPIC and CSR legitimize forms of extraction and are adverse to inclusion. They extend dispossession by distracting and dispersing efforts for self-determination and engage in "endless bargaining over distributive 'benefits' and unfulfilled rights" (Gutierrez Aguilar 2020: 7).

The first form of inclusionary control involves political ontology. CSR and FPIC tactics suppress ontological incommensurability and seek to integrate ontologies and knowledges into the modernist project (Blaser 2013; de la Cadena 2015; Escobar 2016). The 'recognition' process weaponizes indigeneity and identity by dividing Indigenous groups (especially those without state recognition) and non-Indigenous people with similar visions and concerns. Colonial values and epistemologies, such as development and progress, legitimize extraction (Grosfoguel 2018; Maldonado Torres 2015) and material and epistemic injustices actively erase otherness and ways of being-in-the-world (Burman 2017). As Sullivan (2017) gestures, this is a key concern for political ecology, as it highlights how power imbalances over access to nature and resources are mediated by a particular way of seeing and understanding reality that devalues and obscures otherness.

Verweijen and Dunlap (2021: e5) identify two types of green extractivism: direct and indirect. Direct includes the "vital or kinetic energetic extraction from wind, solar, hydrological and bioenergy resources," while indirect refers to "the supply chain and extractive operations that produce the apparatuses that enable direct green extractivism." Both direct and indirect forms of green extractivism are embodied in "fossil fuel+ technologies" (Dunlap 2021a: 84). Fossil fuel+ rejects the "fossil fuel vs. renewable energy" dichotomy promoted by governments and industry; instead, it highlights how hydrocarbons underpin the entire low-carbon supply-web. So-called 'renewables' mirror the political economy of fossil fuels (Raman 2013) and reproduce a plantation economy that radically simplifies landscapes and perpetuates extractive relationships (Stock 2022). Acceptance of so-called "renewables" tends to disregard and invisibilize the mining, labor, and fossilized energy required to build, install, operate, and dismantle this infrastructure (Batel 2022).

Dunlap & Jakobsen (2019) conceptualize the "Renewable Energy-Extraction Nexus (REEN), which reveals how capitalist growth and the financial economy are prioritized. 'Greening' is a violent technology of extraction that enables the extractive potential of "fossil fuel+" technologies' (McCarthy & Thatcher 2019) and reorganizes entire regions and landscapes. As Franquesa (2018) reminds us, energy has long remained invisible in modern capitalist societies. This invisibility alienates energy from its socio-ecological context, making it appear as an abstract standalone entity. This is a key feature of the

plantation economy (Tsing 2015: 5-6)—a process that simplifies landscapes into standalone assets where "everything else becomes weeds or waste." Reorganizing territories into 'renewable energy zones' (McEwen 2017) often requires violent militarization, coercion, and dispossession to secure access to (grabbed) land (i.e., 'green sacrifice zones' (Zografos & Robbins 2020)). This is key to understanding how extractivism mediates multiple forms of violence through energy systems (e.g., immediate/displaced over time; overt/covert, structural/cognitive, ontological/epistemic (Davis 2022; Grosfoguel 2018; Santos, 2014; Nixon 2011)). As Partridge (2022: 8) notes, the logics of extraction and extractivism continue to define most global energy infrastructures. Unfortunately, political ecology of energy and energy justice research tends to neglect or openly disregard this fact. The next section examines how these forms of violence and totalizing processes of extraction unfolded in the Yucatan Peninsula.

3. A solar mega-factory in Muna, Yucatan

Unlike the neighboring states of Tabasco and Veracruz, the Yucatan Peninsula was not at the forefront of the Mexican oil boom in the 1970s and 1980s (Breglia 2013). Instead, the region received investments from the tourism and agricultural sectors. In the 2000s, the Yucatan Peninsula was recognized as a promising site for rapid low-carbon wind and solar infrastructural development. In 2003, the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) determined that Oaxaca was among the windiest places in the world (Oceransky 2011). This triggered a wind rush in the region (Dunlap 2019) and increased interest in developing low-carbon infrastructures in Northern Mexico and the Yucatan (despite ardent resistance).

The Peninsula became a 'viable' site for fossil fuel+ technologies only in the last decades, as solar and wind technologies lowered their costs and Mexico experienced a dwindling of its hydrocarbon reserves (Baker 2015). Therefore, in 2013, the newly-elected government of Enrique Peña Nieto (2013-2018) instituted a sweeping constitutional amendment to further liberalize the Mexican energy sector. Previously, private entities' involvement in the oil and electricity sectors was limited to specific activities like *autoabasto* (self-supplying) and the outsourced construction and maintenance of infrastructure (González-Lopez & Ortíz-Guerrero 2022). In 2015, the government approved the Energy Transition Law

(Cámara de Diputados 2015), which required achieving a 35% "clean energy"[42] target by 2024. The government also submitted an Intended Nationally Determined Contribution (INDC) (SEMARNAT, 2015) as part of the Paris Agreement. This included a firm commitment to reduce 22-36% of GHG emissions by 2030 and adhere to the 1.5°C global target by the end of the century. In 2018, president-elect Andres Manuel Lopez Obrador (AMLO) presented six so-called "priority projects" to integrate Mexico's south and south-east into the global financial economy (GeoComunes 2019; Clavijo & Castrejon 2020). These projects—physically linked by the newly-proposed "Maya Train"—were justified with a supposedly 'post-neoliberal' discourse that promoted 'sustainable development' and economic spillover for the 'benefit of the people' (López Gómez *et al.* 2020). The projects and railway were intended to reorder communal property, make space legible for capital investment (Torres Mazuera *et al.* 2021), and provide an outlet for the energy generated through the creation of new international transit, tourism and freight routes in the region.

The energy reforms approved projects to develop low-carbon infrastructure and contribute to Mexico's 'ambitious' climate commitments. Private entities were also now allowed to sell energy to Mexico's state-owned Federal Commission of Electricity[43] (CFE) through the newly inaugurated wholesale electricity market (WEM). In 2016, the ministry of energy (SENER) and the Center for Energy Control (CENACE) conducted the first of three long-term energy auctions (LTEA) (SENER 2017) as part of the newly developed WEM. Private actors submitted proposals to develop and operate power plants. Meanwhile, activists and land defenders argued that this system would reward bidders with the lowest generation cost, regardless of the technology chosen or the social, environmental, and political considerations (or lack thereof) (Articulación Yucatán 2018). Market-based cost-benefit analyses structurally subordinated socio-ecological considerations.

The first LTEA allocated 9 of 16 projects to Yucatan. The nine projects consisted of five large-scale wind and four solar factories, totaling 1,344 megawatts. The construction and operation of these nine projects has been characterized by a lack of transparency and a

[42] The definition of clean energy in Mexico's legal system includes so called "renewables" plus, high efficiency cogeneration, energy paired with carbon capture and storage technologies, as well as nuclear and hydroelectric power, (see: Cámara de Diputados, 2014).
[43] *Comisión Federal de Electricidad.*

tumultuous approval process (Articulación Yucatan, 2018). Local groups raised concerns over their impact on local biodiversity, with several actors complaining about the lack of territorial and spatial planning in the region (Zárate Toledo *et al.* 2021). The fossil fuel+ technologies prioritized energy potential and discounted environmental and social issues. As in Oaxaca, several academics and civil society organizations denounced the lack of an aggregate territorial impact evaluation (Dunlap 2017; 2018a; 2019; Avila-Calero 2017; Zárate Toledo *et al.* 2019). Without any assessment of the territory's carrying capacity, its landscapes became saturated with fossil fuel+ technologies and other extractive megaprojects like mega-pig farms, housing, tourism construction, agroindustrial plantations, and hydrocarbon infrastructure (Clavijo & Castrejón 2020; GeoComunes 2020). A process that, as highlighted by Morosin (2020), has drawn on Indigenous cosmovisions to articulate defensive strategies and networks of multiple actors against mining and low carbon energy infrastructure.

Indigenous communities, local activists, and civil society organizations argued that the projects were not appropriate given Yucatan's fragile *Geohydrogeological Reserve.*[44] They could impact the region's clean water supply (with knock-on effects for local tourism and traditional Mayan farming (GC-TTM 2019)). Their concerns centered around LTEA-allocated projects' lack of planning, territorial organizing, and communication.[45, 46] As local activists noted, the strategic impact assessment—a tool mandated by the Energy Transition Law (LTE)—was never conducted by the environment ministry (Articulación Yucatán 2019). According to Zárate Toledo and colleagues (2019; 2020), to properly assess the cumulative impacts of fossil fuel+ technologies in the state would require a planning mechanism that considers the carrying capacity and the aggregate impacts of energy, the railway, and other industries on peninsular landscapes. The next section examines two of the nine fossil fuel+ technologies proposed through the LTEA: Ticul A and B.

Ticul A and B

The 'Ticul A and B' project seeks to remove 604 hectares of jungle to deploy more than 1.2 million solar panels. Vega Solar split the project in two in hopes of presenting two different

[44] Which consists of cenotes and subterranean aquifers and rivers.
[45] Interview No. 45 with an ex-government official. Conducted on 12 March 2022.
[46] Interviewee No. 29 with local activists. Conducted on 4 June 2021.

Environmental Impact Assessments (EIA) and Social Impact Assessments (SIA) to downplay the project's cumulative impact. The total installation includes about 738 hectares, of which 330 belong to the *ejido*[47] of San José Tipcéh. The project's land was acquired by an intermediary who told *ejidatarios* (landowners) that the land would be used to plant citrus trees. When the community realized the real purpose of the land, they demanded a revision to the contracts, which should be voided under the current Mexican National Agrarian System (RAN).[48]

The group of Indigenous and ejidatarios I spoke with opposed the development of the project from the beginning. A process that has since divided the community and a tension that is still present as new government programs, such as "Planting Life" continue to roll into the region (see: AUSM 2022). These dialogues extended to networks of activists and academics supporting and/or researching the impacts of fossil fuel+ technologies in the Peninsula. The Ticul A and B project must be understood as a continuation of previous development and environmental policies in the region which pushed towards creating a new energy-extractive frontier, most notably the expansion of transgenic soya plantations since 2012 (Torres-Mazuera 2018; Toledo *et al.* 2015). A process that led most of these networks, working on environmental and social issues, to focus on low-carbon infrastructure in Yucatan since 2012 when the plans to build the first wind factories emerged in the region. Despite the differences in tactics and ontologies (Morosin, 2020) the case of Yucatan resonates with other Indigenous and/or campesino non-violent territorial mobilizations, supported by civil society networks across Mexico. A process that, as Darcy Tereault (2023: 64) argues, has peaked during AMLO's presidency, as the government continues to support the neoliberal-extractivist framework to exploit subterranean resources, regulate extractive activity and capture resource rent from previous governments. A process that has led to progressive militarization of social life and to an explosion of violence against land and human rights defenders.

Some members of the Indigenous community contested the project in the courts with the support of several Mexican environmental organizations. In the legal injunctions (CEMDA 2019), locals argued that the project was assigned by SENER and the ministry of

[47] Ejidos are communal land used for agriculture where community members have usufruct rights rather than ownership rights to land, which is held by the Mexican state.
[48] Interview No. 41 with Indigenous community members. Conducted on 25 February 2022.

environment (SEMARNAT), and approved by the local authorities, without ever carrying out a free, prior, informed consent (FPIC). This violated Convention 169 of the International Labour Organization, a constitutional guarantee ratified by the Mexican senate in 2011 (Gutiérrez-Rivas 2020). The *ejidatarios* and the Indigenous communities lamented how they were deceived by the operators and intermediaries to lease the land; these intermediaries resorted to deceptive tactics like gathering signatures in blank pages to later certify the lease.[49]

> A landowner in the San José *hacienda* contacted other *ejidatarios* and offered to buy their land for $20,000 pesos [$1,000. U.S. dollar eqvts] per hectare. The purpose, he said, was for a citrus and stevia plantation project. Many agreed to this deal. Later, with contracts already signed, this person announced that a solar project with more than one million solar panels (*sic*.) would be built instead. When we learned this, we felt deceived by the practices of the company and the intermediary. The citrus project was proposed in order to obtain the concession more easily, but more importantly, as this land is community owned, the sale was illegal -as it can only be leased- which led us to demand the nullity of the contracts.[50]

After the case went to the Interamerican Court of Justice (IACJ), SENER scheduled a consultation process in 2017. Prior to the consultation proceedings, tensions between landowners and some of the local Indigenous members increased, as the community was split on whether the project should be approved. After the consultation took place, the disagreements reached a point of violence and complete division.[51] As one member of the Indigenous community explained:

> They first argued [the government and the company] that there were no Indigenous in the area through the *EVIS* [Social Impact Assessment] and denied a consultation. They labeled the project "Ticul" because, according to them, there are no Indigenous in the city of Ticul, but this is actually Muna and San José. [...] I live here, I'm Indigenous and I speak Mayan, so we asked them for a consultation… but we had to go to Panama before the Interamerican Court to get to talk to SENER!

[49] Interview No. 42 with Indigenous community members. Conducted on 26 February 2022.
[50] Interview No. 43 with an Indigenous community member. Conducted on 27 February 2022.
[51] Interview No. 42 with Indigenous community members. Conducted on 26 February 2022.

> [...] During the first consultation, a year later, *ejidatarios* came to blows. This happened mainly because SENER and the company wanted to do everything in one day. The process took a long time. However, in the last consultation in 2018, when they asked for our supposed "consent," we were surrounded by armed police in an effort to coerce us to sign and grant it.[52]

As one of the community members argued: "The project was then approved in this 'coerced' assembly, with a part of the community contesting the results of the consultation and the occupation of land."[53] SENER fast-tracked this process since the federal government was in a transition period, and solar and wind project contracts were coming under intense scrutiny by the incoming government.[54] One activist working in the peninsula relayed:

> We don't see EIA or SIA or even public or Indigenous consultations as mechanisms that can guarantee community involvement, information or participation. Instead, we view them as mechanisms used to secure investments and already-agreed-upon land distribution deals. The language used in them elevates the discussion to a technical level, alienating communities and local populations; they are often presented in a rushed manner, without considering community understanding or involvement. [...] In other words, these are not instruments that seek to promote community autonomy or self-determination practices as the Constitution and even some civil society organizations claim.[55]

At the time of writing, the Ticul A and B project remains suspended— but not canceled—due to injunctions presented by the Indigenous community. The local *ejidatarios* and communities reflected on the struggle, noting the skewed participation and consultation process. The *ejidatarios* explained how the company and the state used EIA/SIA procedures to preemptively sow discord within the communities. An Indigenous land defender argues:

[52] Interview No. 42 with Indigenous community members. Conducted on 26 February 2022.
[53] Interview No. 42 with Indigenous community members. Conducted on 26 February 2022.
[54] Interview No. 30 with an Indigenous community member. Conducted on 10 June 2021.
[55] Interview No. 33 with a civil society and activist collective. Conducted on 5 August 2021.

> For the authorities, these are, by definition, good projects: they help us fight climate change, they allow us to reduce GHG emissions and also, they ensure that Mexico becomes a country that promotes green growth. However, renewable energies only affect us (peasant and Indigenous communities), while the benefits remain exclusively for corporations and cities. Why did they decide that it is the Indigenous territories that must be sacrificed for the advancement of clean energy goals? Isn't our way of seeing the world or relating to nature, equally valid as other visions? When they talk to us about megaprojects of any kind, we see an imposition of a model of life over ours, in which we are 'wrong' or 'backward' for opposing, because we do not want 'progress' or because we are poor and in need of their help.[56]

Some *ejidatarios* were offered money for their land, without consideration for Indigenous communal use of the territory.[57] Throughout the process, the Indigenous community had to certify their 'indigeneity' to access information. One local judge even refused to acknowledge their identity and denied their request for free access to information, participation, and recognition as outlined by FPIC procedures.[58] One community member reflects:

> Communities have realized that the companies have a very different vision of development from ours and that what they bring is more of the same (i.e., jobs, progress and infrastructure). For us, everything is alive (...), we do not understand nature as a resource but as something that coexists with us. But, according to the legal framework we can only contest extraction or occupation as subjects to the right to consultation when we suffer "direct" impacts on our "homes." Before the law, to have legitimate interest means that you need to prove that you are Indigenous and that the place where you live is at risk. But there is a small detail to consider! This cannot be understood in the same way between Indigenous and non-Indigenous people. For us Mayans, our home is the Peninsula, any harm on the territory is harming all of us and our relationship with the territory. So I ask myself, if we are really a multicultural country, why are we being judged according to the

[56] Interview No. 40 with an Indigenous community member. Conducted on 24 February 2022.
[57] Interview No. 29 with local activists, Conducted on 4 June 2021.
[58] Interview No. 46 with local activists. Conducted on 3 March 2022.

vision of the western culture and not according to Mayan culture? This is a form of racism![59]

The negotiations with the company focused on the so-called 'co-benefits'—the possibility of temporary employment and leasing contracts for more than 30 years. However, these 'co-benefits' did not include a reduction or cancellation of electricity tariffs, something the community repeatedly requested since most of the energy would be allocated for private consumption in other places (see, Dunlap 2019 on similar issues in Oaxaca).[60] The community also had concerns about how the company presented project information. It failed to account for some of the community's main concerns, including increasing local temperatures, problems with beekeeping, and difficulties maintaining traditional forms of farming and agriculture (i.e., *milpa*)[61] (see Figure 1).

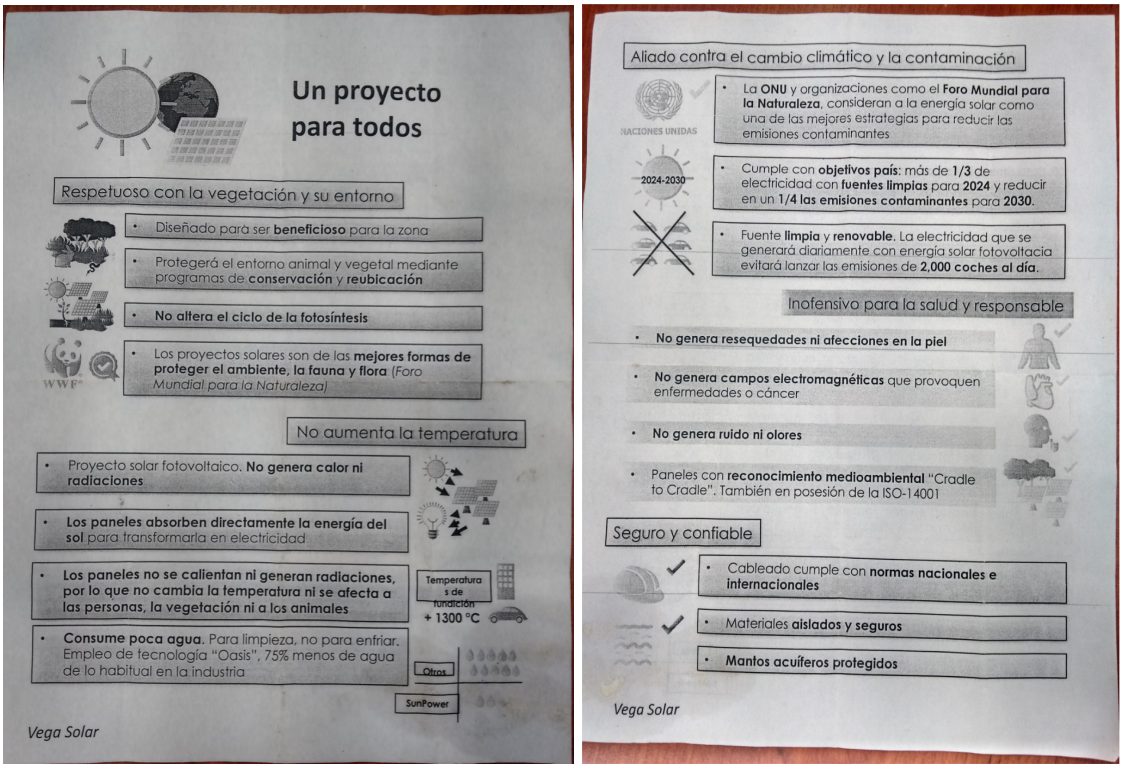

Figure 1: Information provided during the Indigenous consultation process. The print-out did not address any negative impacts or problems with the project. Source: Vega Solar. Picture credit: Luis David Patiño.

[59] Interview No. 30 with an Indigenous community member. Conducted on 10 July 2021.
[60] Interview No. 43 with Indigenous community members. Conducted on 27 February 2022.
[61] Interview No. 46 with local activists. Conducted on 3 March 2022.

Total extraction in Yucatan: ontological violence and the Maya Train

The 'Maya Train,' which consists of 1,525 km of track in the states of Tabasco, Chiapas, Campeche, Yucatan, and Quintana Roo, was framed as the inaugural project to connect southeastern Mexico. As several authors, activists, and civil society organizations have explained, the name 'Maya Train' is misleading, as this is a high-speed freight, tourism, and passenger train that will move products, fuels and people throughout the peninsula. The 'Maya' name is only a ploy to promote 'sustainable' and 'cultural tourism' (CRIPX 2019; Múuch' Xíinbal 2021; Ansotegui 2021). *Tren Maya* is a reformulation of *Plan Puebla-Panama* and *MesoAmerica,* which sought to promote modernist development, territorial control and capital accumulation by connecting central Mexico to the rest of central and South America via highways, megaprojects and telecommunication infrastructure (Veiga 2019; Isla 2022). The train reproduces the colonial idea that southern Mexico is a land 'outside' of development (Hesketh 2021). Ceceña (2019) argues that the railway fits into wider geopolitical reorganizations (which also include a new mega-refinery in Tabasco, a new airport in Mexico City, and the *transistmic train* that connects Oaxaca and Veracruz). These new 'development poles' seek to reorganize 'underdeveloped' territories into transit routes made legible for capitalist investment and mobility. One activist and civil society member noted:

> Although AMLO's discourse is presented as anti-neoliberal. When you look at what is being proposed, these infrastructure projects are a continuation of the same development model implemented since the seventies. Previous governments issued decrees to recognize most of these places as exclusive economic zones (SEE), it is not a coincidence that these projects are now being constructed in the same places [...] the only difference is that so-called new forms of 'development' are not for the benefit of the rich -although the Train will continue to increase foreign and private capital investments- but in the name of sustainability and the poor. [62]

Torres Mazuera (2021) has extensively documented Yucatan Peninsula's rapid land-ownership transformation over the last two decades (see also Torres Mazuera *et al.* 2021; Torres Mazuera *et al.* 2020). Land reorganization—often deployed through

[62] Interview No. 25 with members of a civil society organization. Conducted on 21 May 2021.

bureaucratic procedures and legal and illegal loopholes—has transformed Yucatan communal land into a market commodity. Land parceling enabled industrial expansion (e.g., tourism, housing, pig farming, mono-crop plantations and fossil fuel+ technologies), which will be linked by the Maya Train. The land rush in the Peninsula created new avenues for investment and new frontiers for capitalist expansion (usually through intermediaries).

The deployment of large-scale infrastructure projects and the progressive militarization of sites under AMLO's administration have systematically sidestepped consultation processes[63] and increased physical violence against land defenders, while maintaining previous efforts to expand extractive activities and a regional market integration with North America (Tetreault 2023). The Maya Train will both demand and enhance new fossil fuel+ technologies by providing an outlet for the energy generated. It is promoted using the rhetoric of economic integration to encourage free trade, sustainability, infrastructure improvement, and job creation (FONATUR 2019). New offshore exploration and exploitation sites on Yucatan's shores are also made possible since the train can move crude oil to the Dos Bocas refinery in Tabasco (Clavijo & Castrejon 2020). The government believes the train will inaugurate 18 new 'development poles' (Ceceña 2019) around train stations and increase the deployment of fossil fuel+ infrastructure and energy demand. It will also drive urbanization and land speculation, economic activities, and migration into the urbanizing areas, creating important pressures on water and other ecosystems in the region (GC-TTM 2019).

[63] A review by the federal auditing body of Mexico indicates that 97 of the 296 agreements resulting from the indigenous consultation on the project were not complied with. In addition, 2,749 petitions regarding the project were not validated. Although AMLO assured in 2018 that it would cost 120 billion pesos, the project now exceeds 371 billion pesos. He also said that not a single tree would be cut down. So far, only as far as the train track is concerned, almost 3.5 million have been cut down or moved (ASF, 2023).

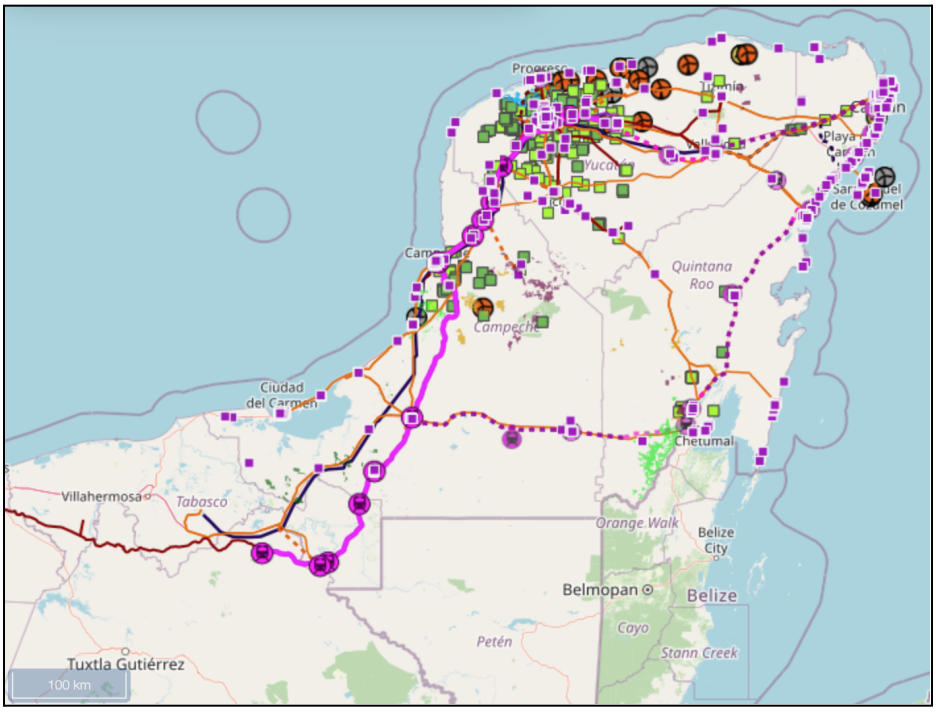

Figure 2: The extractive frontier in the Yucatan Peninsula. The map depicts the proposed "Maya Train's" route and the accompanying expansion of fossil fuel+ technologies, agribusiness, pig farms, and tourism. Source: (http://geocomunes.org/Visualizadores/PeninsulaYucatan/).

The Maya Train serves as an "articulating" mega-project: it links the peninsula's extractive frontiers to advance the exploitation of natural resources and cheap labor (see Figure 2) (Ceceña 2019; PODER 2019). It is a government strategy to simultaneously capture global over-accumulated financial capital and dump the region's overwhelming extractive output (Gutiérrez-Rivas 2020). Like with Ticul A and B, the train's EIAs were split into several sections that only accounted for the direct impacts of the tracks and disregarded indirect and cumulative socio-ecological pressures [64] (CRPIX 2019). The train is an infrastructural spatio-temporal fix: it can displace capitalist crises and provide new avenues for 'primitive accumulation' and 'accumulation by dispossession' (Cabrera Pacheco 2017). As a member of civil society highlighted:

> The Mayan Train is by no means a new idea. It is the continuation of a colonial model that for centuries has identified the Yucatan Peninsula, specifically the south

[64] Interview No. 31 with an Indigenous community member. Conducted on 10 July 2021.

> of the country, as a less-developed, backward area. The history of community struggles to maintain their self-determination has been a constant struggle against repeated attempts of development. The Train will come to swallow this long history of resistance, making everything from Mayan culture to biodiversity and history commodifiable.[65]

The project fits into Guillermo Bonfil Battalla's (2009) conception of coloniality in México: it exalts Mayans' Indigenous past while condemning contemporary Mayans to the past and using their narratives to increase 'cultural tourism' (Ansotegui 2021). This fits into a broader historical process of de-Indigenization and ethnocide built around Christinizing, civilizing, democratizing and developing missions that have shaped class and identity relations in independent Mexico. In this vein, advocates say the project will bring 'development' to a historically unproductive area. The Yucatan Peninsula was a plantation frontier, where sugarcane and *henequen* plantations proliferated through the deployment of *haciendas* that subsumed the Mayan population via debt and slavery throughout the 19th century (Barabas 2000: 198-99). The so-called 'War of the Casts' lasted well into the 20th century, and open insurrection was not quelled until the 1938 *reparto agrario* (land reform). As an ex-government official told me:

> In Yucatan there is a history of discrimination against Maya knowledge. Federal housing programs, for example, often neglect traditional construction methods and materials. For them, the Maya are poor if they do not have concrete floors. The same is true for Milpa production systems. The Western model is more concerned with yield and volume, while the former works in terms of sufficiency [...] Projects such as the Mayan Train and renewable energy projects do not include these types of knowledges and forms of production, and even if they do not explicitly say so, they imply a return to the same model of food, energy, merchandise, touristic production and services: The Mayan identity remains something 'folkloric,' while the Indigenous are classified as 'lazy' or as a 'bad workers.' This is a pattern that has existed since colonial times and that today justifies the continuous expansion of megaprojects in the area.[66]

[65] Interview No. 48 with an academic. Conducted on 10 March 2022.
[66] Interview No. 45 with an ex-government official. Conducted on 2 March 2022.

The National Tourism Development Fund (FONATUR) promotes solar projects in the peninsula as a "complement [to] the functionality of the Mayan Train" that will "bring benefits to local communities." (Chavez 2021). These projects utilize discourse like 'sustainability,' 'strengthening land use planning,' and 'invigorating the tourism industry for the region'. AMLO's government says that regional infrastructure will bring development to an impoverished region that needs to 'catch up' with the rest of the country. Like Ticul A and B, a nationwide consultation was carried out to either approve or reject the railway project (over two days—24 and 25 November). The consultation yielded over 92% approval; however, the process was criticized due to the lack of information presented at the ballot box, the limited number of participants (less than 2.4% of the national electorate and only 2% of the directly affected population, see AUSM (2022)),[67] and an open disregard for the international standards of Indigenous consultation (ONU-DH 2019). Yet, the government promoted these results to legitimate the construction and progressive militarization of the Maya Train, declaring it a "national security" issue and using the CoVID-19 pandemic to sidestep any legal challenges, quell and repress opposition (Ceceña 2019). As an activist in the peninsula argued:

> The government usually dictates the terms of the consultation as a fast-track legal procedure. These are the times and terms of capital and companies. People ask: why do we have to adapt to their times? So the proposal becomes: Give me the information, give me all the elements and let me, as a *pueblo*, go and talk in my own decision-making bodies and based on that, we'll decide which project is approved and how. We'll let you know in three months. That is real consent. The problem is that the company and the government say no, because they've already invested […] This reveals a lot about the nature of the process and its true purpose, as well as the possibilities that emerge through self consultation.[68]

Both peasant and Indigenous communities in the region now share a distrust of consultations. Opaque and flawed public and Indigenous consultations often focused on

[67] The question posed was: "Build the Maya Train that will connect the states of Chiapas, Campeche, Yucatan and Quintana Roo, which will boost the economy and tourism." As with the Ticul A and B 'project information sheet' (see figure 1), this question was framed as a simple 'yes or no'. No information was included about the possible 'side effects' (or even the benefits). See: https://lopezobrador.org.mx/2018/11/16/presenta-gobierno-electo-boleta-para-consulta-nacional-de-programas-prioritarios/. Accessed 21 December 2022.

[68] Interview No. 23 with an activist and civil society representative. Conducted on 19 May 2021.

rubber-stamping procedures, not obtaining democratic consent (Temper 2019; Torres-Wong 2019). In 2021, the community of Homun—which lies a few kilometers north of the Ticul A and B projects and near the Maya Train's tracks—held an Indigenous self-consultation about a proposed pig farm project in their territory (Indignación 2021; Torres-Wong 2022). According to several activists in the region, this process reimagined how energy projects are deployed and highlighted how:

> "(...) autonomy and self-determination have to begin with the Indigenous and peasant communities, which are the ones that lay down the guidelines, but not all communities have the same organizational processes or the same capacity to articulate themselves. Listening to the communities and their internal organizational processes, is the first step we need to take. This is a process that takes time and yet, most communities begin to organize as a result of the arrival of (imposed) projects. Slowly it becomes increasingly possible to see communities organized and proposing radical alternatives based on their own view of development."[69]

4. Discussion: From green extractivism to struggles for resistance/re-existence

These case studies demonstrated how the extractive political economy of fossil fuel+ technologies retains the organizing principles that shaped fossil's socio-ecological regime of accumulation in Mexico (Raman 2013; Boyer 2014; Dunlap 2018a). While so-called 'renewables' are said to usher in a just, clean, and safe energy future (see: UN 2015), the political ecology and ontology of energy infrastructure on the ground tells a very different story. On the one hand, the coloniality of so-called "renewable energy" (Batel 2022) is expressed in the remapping and reconfiguration of the Yucatan Peninsula (as connected by the Maya Train). As Isla (2022) reminds us, green extractivism—the highest form of total extractivism—is expressed by colonial necropolitics and sacrifice zones. On the other hand, it is mediated by Indigenous and peasant *daily strategies of resistance* (Bonfil Batalla 2009: 132), including resisting by preserving cultural spaces and collective beliefs, rejecting outside colonizing innovations, and appropriating cultural elements from the colonizers into their own beliefs and practices.

[69] Interview No. 29 with activist collective. Conducted on 4 June 2021.

The Ticul A and B projects show how fossil fuel+ technologies feed into colonial and settler colonial land occupation (Batel 2022; De Onís 2021). They also utilize *terra nullius* claims and broader colonial reconfiguration strategies to deploy infrastructure (Gomes Barris 2017; Allen *et al.* 2021). The racist legal system disregards, discounts, or completely obscures Mayan knowledge. As decolonial thinkers have long known, racism is the main driver of the capitalist political economy and provides access to land and cheap labor (Grosfoguel 2018). The rendering of these knowledges as either 'backward' or 'underdeveloped' has subjected Mayan territory, livelihoods, and identities to a long history of commodification and dispossession (Cabrera Pacheco 2017). As Sullivan (2017) argues, political ecology must recognize the diversity of environmental knowledges, explore ethical constructions of justice, and recognize their importance for identifying power imbalances. The ontological erasure of otherness in the peninsula is not limited to the imposition of energy infrastructure through mapping and highlighting particular aspects of the landscape (erasing others) (Kirsher *et al.* 2021; Avila *et al.* 2022), It is also deployed as a tactic for inclusionary control.

The case studies evidence the role of coloniality in shaping energy transitions and landscape transformations. As Castán Broto (2019) argues, energy landscapes reflect the spatial arrangements of energy systems accumulated over time in particular places. Thus, landscapes encapsulate memories of past development and 'civilizing' projects, and reflect particular spatial arrangements, material legacies, and collective memories (Kisrhner *et al.* 2020). The landscapes of Yucatan are imbued with a colonial and extractive history that cannot be separated from the discursive, material, spatial, and political framing of the current energy regime and its adoption of fossil fuel+ technologies. Extraction on so-called 'unproductive' communal land (including fossil fuel+ technologies, urbanization, tourism expansion, and mono-crop farming) feeds into the broader (colonial) peninsular land rush (Torres Mazuera *et al.* 2021).

Figure 3 depicts several manifestations of this colonial legacy. The statue of the *Montejos* (father and son) stands along Yucatan's capital city main avenue depicting how colonizers mapped supposedly 'empty' land (*terra nullius*), surveyed the territory, and claimed it for colonization and civilization. Similarly, the city's motto, "*Mérida, Ciudad Blanca"* (Mérida, the white city), describes more than the white facades of the capital's buildings.

For centuries, the peninsula has been seen as a fringe territory in need of 'civilization,' 'development' and 'progress' (Barabas 2000). The *henequen hacienda* a few meters from the proposed Ticul A and B site serves as a form of internal colonialism (Gonzáles Casanova 2004) and a remembrance of the colonial occupation. Energy systems and infrastructure are now spatially, historically, and politically embedded within the same structures of extraction and, sometimes, literally the same sites as the colonial occupation. These realities shape power imbalances (Allen *et al.* 2021) and contemporary politics of land access.

Figure 3: Images depicting Merida's "the white city" moniker (top left), the Montejos statue (top right), and the henequen San José Tipcéh Hacienda (bottom). Source: https://descubro.mx/merida-ciudad-blanca/; https://www.yucatan.gob.mx/?p=san_jose_tip_ceh.

'Sacrificable' spaces reproduce the ontological, necropolitical character of extraction into a *totalizing* enterprise. Mega-infrastructure projects to commodify wind and solar energies provide new avenues for unburdening extractive outputs via the inauguration of new

investment and transit routes, which are part of a broader logistical, operational, spatial and geopolitical reorganization of the south of Mexico (Ceceña 2019; Geocomunes 2019). These sites—'Special Economic Zones' or 'development poles'—are new 'green sacrifice zones' necessitated by the cost-shifting practices of the energy transition and the pursuit of sustainability (Zografos & Robbins 2020). They simultaneously inaugurate new capitalist extractive frontiers and displace capitalist crises through spatial fixes (McCarthy 2015; Gutiérrez-Rivas 2020). The necropolitics of total extraction determines who will live and who will die through the deployment of infrastructure and the remapping of the territory (e.g., the militarization of the Maya Train, skewed consultation processes, and 'ethnodevelopment'[70] framings). As Franquesa (2018) and Stock (2022) would argue, such processes entail radical simplification, an alienation of energy from its social context and the reproduction of plantation-like economies.

In the Ticul A and B project, concepts like 'green,' 'renewability,' 'GHG mitigation,' and 'transition' are deployed alongside CSR umbrella terms like 'local development' and 'co-benefits' to increase social participation and deploy so-called "renewable energy infrastructure." After deploying fossil fuel+ technologies (2014-2018), the Yucatan government produced a series of reports investigating 'co-benefits' (e.g., increasing capital investment, bringing jobs, and conserving biodiversity (see Gobierno de Yucatán 2021a; 2021b; 2021c)). Such CSR language and tactics depoliticize dissent, engineer consent, and 'divide and conquer' the opposition (Dunlap 2018; 2019). Government and company officials use these narratives to legitimize a fossil fuel+ socio-ecological regime of accumulation designed to discipline, enchant, and engineer the 'hearts and minds' of the 'target population.' The reports notoriously turn environmental impacts into commensurable 'co-benefits.' They fail to present the negative cumulative consequences of the projects (Zárate Toledo *et al.* 2021) while also discounting other ways of being, doing and living.

[70] In the EIA presented by the government for the first section of the train track, the government announced that they would put a 'positive spin' on ethnocide by transforming it into ethnodevelopment (FONATUR, 2019: 404-405). After a series of critiques, the government backed down calling it a 'mistake', arguing that: "ethno-development would be 'the positive opposite of ethnocide', because the consultation process will allow the project not only to respect and guarantee their rights, but also to accommodate their own values and future aspirations in order to achieve sustainable community development (Contreras Camero, 2020). As several critics argued, this 'correction' in fact made the mistake seem even worse, as it uses the notion of ethnodevelopment, discounting the fact that the project was imposed and that no FPIC consultation process was carried out under the 169 ILO Convention (For a critique see: Esteva (2020) and Ansotegui (2021)).

‘Hard’ coercive techniques (e.g., displacements and the threat of physical violence) are accompanied by ‘soft’ technologies of social engineering and discursive legitimation (e.g., promoting recognition, participation, and ‘lessons learned’) (Dunlap 2020). The tenets of energy and environmental justice (i.e., recognition, participation and distribution), as deployed through mechanisms like EIAs, SIAs and FPICs, become tools to subvert demands for radical autonomy, sovereignty, and pluriversal forms of well-being. These instruments impose a universalized notion of justice embedded in the epistemology of development that further entrenches the coloniality of power, being and knowledge (Rodriguez 2021). This inevitably reproduces ontological occupation—rendering everything into commensurable and interchangeable monetary terms. The Maya Train also used popular consultations and ethnodevelopment claims to weaponize identity and legitimize destruction in the name of sustainable development.

These tools constitute what Álvares & Coolseat (2020) call the ‘coloniality of justice,’ a process that sustains one epistemological and ontological reality over others. Ontological incommensurabilities (Escobar 2016; Burman 2017) are often translated into cognitive, material, and physical forms of violence (e.g., see Behn & Bakker’s (2019) analysis of EIAs on a hydroelectric dam in Canada and Milbourne & Mason’s (2017) analysis of participatory measures in coal mining in Wales). Inclusion through recognition, distributive, and participatory justice risks reducing local communities' different imaginaries and opposition into utilitarian and ‘transactional’ forms of justice (i.e., monetary compensations and ‘community benefits’) and rendering the sacred technical. These instruments fail to account for the ‘coloniality of justice’ and become counterinsurgency and social engineering tactics when deployed by bureaucratic, CSR, and other neoliberal-multicultural regimes. Such inclusionary control (Verweijen & Dunlap 2021) provides a legitimizing discourse. It weaponizes inclusión and recognition disarticulating community struggles for re-existence and against extractivism (Leff 2017: Escobar 2020) that attempt to reclaim community ways of being, doing and living in accordance with cultural traditions (as depicted in Figure 4).

Figure 4: The Maya Train and ontological extractivism: everything is rendered extractible, and struggles for re-existence oppose the project. Source: https://mujeresylasextaorg.com/2020/05/14/noaltrenmaya/

While the FPIC process appears to be inclusive, it actually operates as 'window-dressing' to further alienate communities from claims to resources, nature, territorial autonomy, and self-determination (Torres-Wong 2019; Dunlap 2018a). Top-down participatory spaces like FPIC and public information meetings can hardly account for local histories and complexities (Barragan Contreras 2021: 383). As Kimberly R. Marion Suiseeya (2021: 45-6) claims, the 'participatory turn' was largely "a response to distributive injustice and poor environmental outcomes and not firmly rooted in community concerns about procedural injustice." Processes like FPIC promote a form of 'condescending hospitality' and present the facade of dialogue through a discourse of citizenship and interculturality (Walsh 2018: 58). They also reduce diverse ontological differences into economic and CSR terms/language that ultimately facilitates extractive expansion and hinders democratic decision-making (Verweijen & Dunlap 2021; Middeldorp & Le Billon 2020). This includes

operationalizing ‘indigeneity’ to exclude Indigenous and non-Indigenous people with equally valid socio-ecological concerns and pacifying conflict in favor of extractive industries (Dunlap 2018b).

The community of Homun’s efforts for self-determination, as described above, can serve as a heuristic to reclaim energy justice from the reproduction of material, ontological and epistemic violence. The *autoconsultas* are a first step towards ontological and epistemological disobedience (i.e., disagreeing colonial terms of reality and the ‘right’ knowledge) (De Onis 2021; Burman 2017). As Torres-Wong (2022) argues, self-consultations are surging as a direct result of a disenchantment with state-led consultations and the obvious tendency towards the use of these instruments as tactics such as inclusionary control, manipulation and the obfuscation of legitimate socio-ecological concerns. While the community at San Jose Tipché was able to halt the development of the project via an international legal route, the continual militarization of the State now presents new concerns and possibilities. It might be too soon to tell if the experience of Homun could have broader legal and political consequences in the region, however, the shared history of a plantation economy, a lack of access to information about energy and other infrastructural and development programs (including the Maya Train), and a growing distrust in the efficacy of the tools available to the government (including FPIC, EIA, and SIA). This has mobilized several communities to seek alternatives based on what essentially constitutes cognitive justice (Santos 2014; Temper 2019): by simultaneously calling out the tendency towards a trasformismo built-in to the hegemonic notion of the energy transition and the way that these instruments exercise a form of tokenism through the facade of incusión and recognition, autoconsultas offer the possibility of de-linking energy justice form its Westen and Universal conception of development and creating other decolonized possibilities.

These case studies provide critical tools for political ecologists: they help us to understand how uneven burdens and privileges are experienced and answer calls to ‘ground’ material, ontological and cognitive practices, realities, and understandings of justice (Coulthard 2014; Cariou 2017; Tornel 2022). Unsettling energy justice is the first step towards denouncing the concept’s disavowal of colonial histories, territorial struggles for emancipation, self-determination, and autonomy. We must also denounce its complicity

with the coloniality of power, being and knowledge, which results in superficial inclusion, control, pacification, counterinsurgency and corporate sovereignty (Dunlap 2019). Energy justice facilitates, rather than question, the logics of green extractivism. It simplifies landscapes and alienates energy from its socio-ecological context. The haze of superficial recognition, inclusion, and potential distributive solutions distract and dissolve efforts for collective emancipation, reducing them to "an endless negotiation of unfulfilled rights" (Gutierrez-Aguilar 2020: 7). Simultaneously, it provides the tools to legitimize green extractivism, compatibilizing destruction and harm with the imperative economic growth in the name of sustainable development.

5. Conclusion

> We have the right to decide what type of development we want, the possibilities are endless. If we talk about generating clean energy in ways that do not affect the environment, solar panels could be installed on the roofs of houses to provide enough for the consumption of a family. If what we are really looking for is to create real benefits for communities, it would be possible to find ways in which technological advances coexist with the type of development, of housing, of harvesting and forms of living that already exist within our territories.[71]

This quote encapsulates this article's aims: to frame the energy transition as a form of trasformismo and consider how the universalized western conceptions of energy and justice reproduce colonial power that deploys fossil fuel+ technologies. The solar and wind factories that saturate the peninsula are juxtaposed with other extractive frontiers and, now, are articulated by the so-called Maya Train. Both of this article's cases highlight how green extractivism legitimizes new practices of extraction, expropriation and exploitation by deploying tactics, technologies, and discourses of green and sustainable development. This sustains the structures of epistemic, ontological, and physical violence and reproduces forms of internal colonialism and injustice.

The energy justice concept, in the context of green extractivism, can only grant distributive, recognition and participatory outcomes *within* the capitalist-colonial system. It actually perpetuates and sustains (not subverts or contests) the coloniality of power. Energy justice

[71] Interview No. 24 with an Indigenous community member. Conducted on 21 May 2021.

scholars overwhelmingly focus on policymaking and openly disavow ontological differences. Within this context, energy justice becomes the 'coloniality of justice' by negating other realities, forms of knowing, living and being (Álvares & Coolseat 2020). The tenets of environmental and energy justice must be unsettled, dislodged, and disturbed to create epistemic and ontological disobedience and resist the politics of injustice (see: Temper 2019; De Onis 2021; Tornel 2022). The decolonization of energy justice would first need to separate energy and justice from hegemonic development epistemologies guiding energy transitions in the Global South. Secondly, it would unsettle and contest the pervasive stage of capitalist exploitation and expropriation (total extractivism) now experienced in its highest form: green extractivism.

The Maya Train experience further entrenched the notion that consultations are equivalent to 'popular electoral democracy.'[72] It utilized concepts like 'sustainability' and 'ethnodevelopment' to promote ethnocide and (apparently ubiquitous) extractivism. The proliferation of green sacrifice zones, the necropolitical character that shapes the mapping and identification of potential for fossil fuel+ technologies and the 'naturalization' and legitimation of extractive practices in the name of sustainable development are all persistent in the reorganization of landscapes in the peninsula. FPICs and S/MIAs serve as counterinsurgency mechanisms; they weaponize indigeneity in favor of a particular form of development and integrate Indigenous and peasant ontologies into the spatiotemporal regime of capital accumulation. Thus, decolonial critiques simultaneously seek to abolish mechanisms that grant justice via the state, private property, and separation-ontology (all of which constitute capitalist modernity and are built from an epistemology of progress, civilization, and development).

Different Maya communities have offered proposals to confront extractivism and promote pluriversal alternatives (Escobar 2018) rooted in their traditions and historical links to the territory. As Willow (2018) argues, where there is extractivism, there is also extrACTIVISM—projects and ontologies that challenge the extractive onto-logic or capitalist modernity. Guillermo Bonfil Batalla (2009:130-5) outlines how everyday forms of resistance operate as 'weapons of the weak' (Scott 1985) and allow communities to

[72] Interview No. 46 with a civil society representative. Conducted on 3 March 2022.

retain their cultural values and traditions. Strategies to increase autonomy and self-determination, like *autoconsultas*, further destabilize and unsettle energy justice.

We must question whether energy justice is conceptually useful for supporting alternatives to development. Other concepts are more directly linked to struggles on the ground (e.g., energy autonomy, insurrection, sovereignty and democracy) and have 'grounded' praxis beyond the state, the market, and formal democratic measures (Becker *et al.* 2020; Del Bene 2019; Temper 2019; Author 2022). Critical energy research and praxis should go beyond the material and physical possibilities of emancipation (e.g., distributed generation, community energy, democratic decision-making) (Dunlap 2022). Political emancipation, a decolonization of the imagination, and insurrectionary possibilities are needed to resist further alienation, abstraction, and commodification of energy resources. Research and praxis should promote total liberation, self-determination, and emancipatory projects.

The tools available to address the current epochal crisis are outdated and inadequate (Zibechi 2022). As this article has shown, the state and capital are entangled with green extractivism practices, especially in Latin America. There are limitations to 'justice' within the persistent coloniality of 'green' and 'total' extractivism. If decolonization is, in fact, an urgent political project, then we likely do not need energy justice. The term can only be salvaged if it provides tools for decolonial self-determination, dismantling the ontological separation of nature, energy, and society, and questioning why energy is generated, from whom and how. In other words, energy justice must go beyond decentralization and the so-called 'acceptance' of fossil fuel+ technologies on the ground. It must link emancipatory energy projects with pluriversal alternatives emerging from the epistemic and ontological disobedience that goes beyond Westernized epistemologies of development.

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Article 4: Resistance to 'renewable energy' as a form of extractivism: The case and lessons learned from San José Tipceh.[73]

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Abstract

This text aims to document the experiences of the Indigenous community in the community of San José Tipché in the municipality of Muna, Yucatán following their efforts to defend their territory in the face of the development of a large-scale solar energy project. Based on a narrative of the voice and experience of some of the people who lived through the different stages of negotiation with companies and the federal government, the text takes up these experiences to demonstrate the vital importance of recognising the work that Indigenous communities have done to defend their territory in the face of the expansion and development of extractive processes, including the reconfiguration of the territory to make it 'legible' for capitalist investment through the development of mega-projects. By focusing on this experience, the text seeks to contribute to a broader discussion on extractivism in Mexico and Latin America, as well as the implications of a reconfiguration through climate colonialism, which has become a way of transforming landscapes in the service of decarbonisation and energy transition. The paper presents a series of lessons learned in relation to the instruments used to consult and ensure the participation of Indigenous communities by revealing their main limitations, the forms of structural, epistemological and ontological violence in which they operate, and finally, a brief reflection on the implications that this process may have for other communities facing these types of problems.

[73] The original version of this article was published in Spanish by the Due Process Law Foundation, and The Regional Council Indigenous Peoples of X'pujil. The article was co-authored with members of the community detailing their lived-experience of defending their land to what they came to see as an extractive and corrupt practice that would dispossess them from their land and their traditional ways of living and working. Another version of this article, with a photo-essay format, will be published by the Heinrich Böll foundation in Mexico City. This version serves as a continuation to the reflection presented here. The published version of the paper in Spanish can be accessed here: https://www.dplf.org/sites/default/files/estudio_-_cripx_y_dplf_-_resistencia_energias_renovables_el_caso_san_jose_tibceh.pdf. The version presented here is a direct translation from Spanish by the author. An additional version, also in Spanish can be found here: https://mx.boell.org/es/2023/08/22/defender-el-territorio

Keywords: Climate colonialism, energy transition, territorial defense, Indigenous consultation, Environmental Impact Assessment.

Introduction

This paper seeks to socialize the experience and the different expressions of resistance in the defense of the territory through which the Indigenous community of San José Tibceh managed to stop the development of a solar energy megaproject in their territory. Based on this case, the article seeks to document the experience of the Indigenous community and the *ejidatarios* who lived through the process in its different stages in the defense of the territory, through negotiations with the Vega Solar/Sunpower company, as well as with the state authorities, the federal government and among themselves. The process of dialogue between these actors reveals the various inconsistencies and limitations that exist within the Mexican legal framework in terms of energy, environmental, public and Indigenous participation, as well as the incommensurabilities of some of the instruments to safeguard the human rights of Indigenous communities when confronted with the reality experienced in the territory.

The text thus seeks to extensively document the decision-making process of an Indigenous community to reveal some of the lessons learned, so that this experience can serve as a strategy to strengthen the internal organization of other communities that may be affected by the development of infrastructure projects in their territory. In doing so, The paper does not intend to be a *de facto* opposition to the development of renewable energy projects or any type of infrastructure, but rather to lay down the foundations of what could be understood as a roadmap for communities to follow so that they can take the process of consultation, decision making, negotiation and access to information into their own hands in order to fully exercise their right to self-determination.

The text is divided into 5 parts. The first section seeks to introduce the context for the development of renewable energy projects in the Yucatan Peninsula. In this section, we briefly review the transformation of energy sector regulation over the last decade to identify how the rapid growth in demand for natural resources and renewable energy production has become one of the main sources of landscape and territorial transformation in Mexico.

In the second section, we address this trend from the perspective of what some theorists have termed climate colonialism (Mahoney and Enfield, 2018) or green extractivism (Dunlap 2018; Dunlap and Jacobsen, 2020). From this perspective, discourses such as combating climate change, energy transition and greenhouse gas (GHG) reduction have become a way of perpetuating metabolic dependencies between different places, producing a large-scale transformation of landscapes and allowing the advance of extractive frontiers into other places previously understood as non-productive or valueless zones (Tsing, 2017; Franquesa, 2018).

In this section the paper looks at the practical role of instruments such as Environmental Impact Assessments (EIA) and Social Impact Assessments (SIA) in the development of these projects. Experience dictates that these instruments often become administrative formalities and where there is no participation of local communities, unless they demand access to them (Martinez, 2020). In this sense, we see these instruments as part of a broader wave or trend in the literature on Corporate Social Responsibility, through which companies and governments seek to make extractive processes "more sustainable and socially inclusive" (Le Billon & Middeldorp, 2020), in turn legitimizing resource extraction through the development of regulation to try to address the harmful effects of extractive activities.

In the third section, we address the development of the solar project from a broader political economy perspective. Taking as a reference the development proposals for the region in the last 3 decades, which culminate with the construction of the Mayan Train (which is not just a train and is not Mayan)[74] and the development of the inter-oceanic corridor or the transisthmian train between Salina Cruz, Oaxaca and Coatzacoalcos, Veracruz (Ceceña, 2019). Within this framework, the paper understands renewable energy megaprojects as part of a broader reconfiguration of the territory in order to make it compatible with a development model that confronts extractivism from different angles and sectors: agrarian, urban, energy, transport and tourism (Torres-Mazuera and Geocomunes, 2020).

[74] The campaign of the Indigenous communities against the Mayan train has been extensively documented by the Consejo Indígena de Gobierno (see: El CNI-CIG en los espejos de la Resistencia - Congreso Nacional Indígena, by all the pronouncements promoted by the Consejo Regional Indígena y Popular de Xpujil (CRIPX) and its allies by the Asamblea Múuch' Xíinbal in the Yucatan Peninsula (see: Inicio | muuchxiinbal) and by the Latin American Observatory of Geopolitics of the UNAM, (see, Avances de investigación sobre el megaproyecto Tren Maya | Observatorio Latinoamericano de Geopolítica).

Building on this conceptual framework, the fourth section documents the communities' experience in three distinct stages: First, through the community's negotiations with the company's representatives and the dialogue between the ejidatarios; Second, through the dialogue with the government and the process of Indigenous consultation and; Third, a final stage documenting the legal strategies that have been used by the community to stop the project's progress and demand respect for their right to self-determination and to free, prior, informed, culturally appropriate and in good faith consultation (ILO, 169). The fifth and final section addresses some of the main lessons learned and discusses the possibilities of Indigenous communities to resist the advance of megaprojects of different kinds (agricultural, urban, energy, tourism, transport, telecommunications, among others), as well as some of the main recommendations regarding the form and substance of dialogue processes and the applicable legal framework.

Finally, it is worth clarifying that this text is the result of close dialogues with some members of the Indigenous communities that remained in opposition to the development of the project, and hence some clarifications may be said from the outset: First, the text aims to address the discussion from the point of view of some of the members of the community, so this text *is not* written on behalf of the *entire* community. Second, the text approaches the experience in a reflexive way and does not pretend to be exhaustive, i.e. we do not seek to document the process of each of the actors involved, but only that of a faction of the Indigenous community that remained in opposition to the project based on their direct experience. Finally, the text does not seek to make recommendations to the legal framework, but rather to strengthen and support other peasant and Indigenous movements that find themselves in a similar situation to the one described in these pages, which is why the text is aimed at those who are demonstrating to claim their rights in the face of dispossession, exploitation and the advance of extractive capitalism.

The project and the conceptual framework

On 31 March 2016, the Ministry of Energy announced the first long-term electricity auction. As a result of the process, 16 projects for electricity generation through wind and solar energy were awarded in different states of the republic. Nine of these projects were assigned to the state of Yucatan. The auction was held as one of the most effective ways to

promote the advancement of renewable energies, as they achieved some of the lowest costs for renewables (SENER, 2016).

One of the projects, the so-called "Ticul A and Ticul B Solar Park" consisted of the installation of 1,227,200 photovoltaic panels, an electrical substation, an electrical transmission line, a road network, an energy conduction network and an operation and maintenance building. The site is located mainly in the municipality of Muna, Yucatán, although it also includes the municipalities of Sacalum (Plan Chac) and Ticul, just 10 km from the Pu'uc Biocultural State Reserve, 5 km from the municipal capital of Muna and 300 meters from the Mayan community of San José Tibceh. The project would be operated by the company Vega Solar 1 and 2, which intended to install a capacity to generate 310.5 (approved by 500) Megawatts (MW) of electricity, in an area of 767.23 hectares -to be cleared- of social and private property of low and medium deciduous forest (SEMARNAT, 2016).

The deployment of energy megaprojects on the peninsula takes place in a much broader context of territorial reorganization in almost its entirety. Since 1979, the south and southeast of Mexico, but in particular the Yucatan Peninsula (including the states of Oaxaca, Chiapas, Veracruz, and Tabasco) has been under one or another proposal of a developmentalist vision that seeks to accelerate the integration of the region with the advance of the rest of the country (Vaiga, J, 2019). In 1985, the year Mexico joined the General Agreement on Tariffs and Trade (GATT), the southern region of the country accounted for more than 60% of the country's poverty, the six southern states of Mexico: Oaxaca, Tabasco, Veracruz, Campeche, Yucatan and Quintana Roo. The proposals that had been sought to integrate them into 'development' had had a high cost in the countryside and rural populations in order to concentrate the wealth extracted in the large cities of the center and north of the country.

However, the region is at the same time the richest in bio-cultural heritage in the country, concentrating more than 70% of the biodiversity of species as well as the highest concentration of pre-Hispanic languages and cultures (CONABIO, 2018). Following Guillermo Bonfil-Batalla's (1987) analysis, the south of the country can be described as the confluence of two Mexicos: the *imaginary Mexico* and the *deep Mexico*. The two Mexicos

have their origins in the conquest of Mexico in 1521, and since then the national identity has been marked by a separation from its Indigenous character to give way to a Euro-Westernised civilisation. In the more than 500 years that now mark this history, *deep Mexico* has been confined to history or to the past, while imaginary Mexico has sought to recover that Indigenous past as part of its national identity, but separating it from the conditions and Indigenous people of the present.

In this context, the development of renewable energy megaprojects (solar photovoltaic and wind) in the region is inserted within this logic of combating the region's 'backwardness' and lack of development. This proposal has become one of the ways in which contemporary capitalism seeks to resolve its crisis of accumulation - one of the two fundamental contradictions of capitalism, the other being the degradation of nature necessary for its operation (O'Connor, 1991). In this sense, megaprojects are understood as infrastructure works, usually of large dimensions, that seek to find a way to resolve or provide an outlet for the accumulation of production or capital that does not find an outlet in the form of investment (Gutierrez Rivas, 2020).

Megaprojects are spatio-temporal solutions to the crises of capitalism. As David Harvey (2014) rightly states, capitalism does not solve its crises, it only moves them around (2014).When the economic system reaches an impasse, it seeks new extractive frontiers from which it is possible to maintain productive processes and in its wake, it must cheapen or exploit other factors of social reproduction - such as care, nature (read minerals, energy and other 'ecosystem services') - advances in technology, as well as the institutionalization of a racial hierarchy in order to legitimize extractive forms of production become the way in which capital succeeds in perpetuating forms of accumulation.

Part of the spatio-temporal logic of megaprojects implies an in-depth reconfiguration of the territory in which they are inserted. From this perspective, an infrastructure megaproject usually implies a reconfiguration of the territory in which it is inserted in order to make it 'legible' for investment. Thus, the development of megaprojects in Exclusive Economic Zones (GeoComunes, 2018; McEwen, 2017) stands out, where governments end up facilitating the integration of entire areas and countries into globalized economic integration. From this perspective, 'states are instruments subordinated to the new central

actors of globalization that have ceased to represent the general interest of a nation in order to strengthen a transnational ideal based on the idea of progress and development' (Ansótegui, 2021: 126).

The 'boom' of renewable energy projects in Mexico that started in 2016 is largely due to the rapid reduction of renewable energy costs and the progressive liberalization of the electricity sector, which allowed, among other things, to identify high potentials for solar photovoltaic and wind power generation in several regions of the country (PwC, 2016; IRENA, 2015). The availability and accessibility of energy identified the potential as a form of capitalist expansion, which in turn found an outlet with the mechanism of electricity auctions.

Figure 1: Renewable energy projects allocated in the first long-term electricity auction.

Los 9 proyectos de Energías Limpias en Yucatán

Empresa	Energía	Central	Capacidad (MW)	Inversión (mdp)	Energia Mwh/año)
Energía Renovable de la Península, S.A.P.I. de C.V.	Eólica	Renovable de la Península	90	314	275,502
Aldesa Energias Renovables, S.L.U.	Eólica	Parque Eólico Chacabal (Motul)	30	117	113,199
Aldesa Energias Renovables, S.L.U.	Eólica	Parque Eólico Chacabal II	30	122	117,689
Vega Solar 1, S.A.P.I. de C.V.	Solar-Fotovoltaica	Ticul 1	500	478	493,303
Vega Solar 1, S.A.P.I. de C.V.	Solar-Fotovoltaica	Ticul I	500	249	246,832
Jinkosolar Investment Pte.	Solar-Fotovoltaica	Cuncunul	70	178	176,475
Jinkosolar Investment Pte.	Solar-Fotovoltaica	San Ignacio (Progreso)	18	53	48,748
Photoemeris Sustentable S.A. de C.V.	Solar-Fotovoltaica	Kambul (Motul)	30	64	54,975
Consorcio Energía Limpia	Eólica	Parque Eólico Tizimín	76	338	291,900
		Total	**1,344**	**1,915**	**1,818,623**

Fuente: CENACE

Source: CENACE, 2016

As shown in Figure 1, during the first long-term electricity auction, 16 power projects were awarded, all solar and photovoltaic and of which 9 were directly assigned to the State of Yucatan (CENACE, 2016). The allocation of these projects soon became a way of reinventing the territory to provide a new energy production service. However, as the proposed SunPower project demonstrated, this service provision tends to be realized through a vision that often discounts other relationships with the territory, radically

transforming landscapes to allow for the exploitation and generation of renewable energy (Franquesa, 2018). Paradoxically, the project would even drive deforestation and the degradation of traditional forms of planting (such as milpa) that are essential for biodiversity conservation and for mitigating and adapting to the effects of the climate crisis (Toledo, 2021).

The above reveals two fundamental problems with the proposed energy transition model and the one inscribed in the Mexican legal framework: **first**, it proposes a highly reductionist vision of energy transition based primarily on the substitution of energy sources. Based on this logic, which can be assumed to be what Antonio Gramsci called a "passive revolution": referring to the ability to accommodate pressures for more radical or disruptive transformations by using a combination of material, institutional and discursive discourses that serve to ensure that when changes occur, they do not destabilize prevailing power relations and political power (Newell, 2019: 28, our translation).

Presenting the energy transition as a technological challenge, which would only require technological modification, ignores the long history with which hydrocarbons have 'energized' capitalism since the early 19th century (Malm, 2016). The energy transition that seeks to 'green' or 'clean up' economic growth through technological substitutions tends to fail to recognise that substitutes have high socio-ecological impacts that in turn demand ever more minerals, energy for their production and space for installation (Dunlap, 2020). In this sense, the **second** point is that renewable energies such as solar and wind are intermittent and limited by their flow and in turn are diffuse and difficult to harness. Kallis et al. (2018), for example, argue that renewables are more like rain than a lake: To collect and concentrate a diffuse flow of energy, more energy and more space is needed. On top of this, the energy return on investment (EROI), i.e. the energy gained for the energy invested to produce it, is much lower with renewables than with fossil fuels, so that in an economy where infinite economic growth is the ultimate goal, the use of land for energy generation will start to systematically compete with other land uses such as food production (McCarthy, 2016).

The deployment of megaprojects also manifests a colonial character through what Aníbal Quijano calls the Colonial Matrix of Power (or the coloniality of power), which is

organized around two fundamental axes: (1) the codification of racial difference between Europeans and non-Europeans, which results in non-Europeans being understood as naturally inferior; and (2) the use of Western/modern institutional forms of power (such as the nation-state) in non-Western societies to organize and control labor, its resources and its products (Quijano 2000). This organizational process also defines the way in which relations between peoples and nature manifest themselves, especially with regard to the ownership of production resources" (Quijano 2014: 286).

Megaprojects reproduce this colonial character through two main features: First, through the reproduction of this hierarchy to control forms of labor, nature at the local level, which become 'resources' and products and services (Barca, 2020). In this way the energy system and energy itself come to configure an extractive colonial logic, through which it is possible to extract value from the territory and at the same time use energy - understood as a physical, pre-discursive force - that ends up reproducing sacrificial spaces (Lohmann, 2018). From this point of view, the energy system itself reproduces a form of control over the population, which has only been possible thanks to the enormous availability of energy at its service (Boyer, 2014), while aligning energy from the social relations in which it emerges, to make it an abstract concept, attached only to the laws of thermodynamics, it turns energy into a form of domination that constantly requires 'sinks' or whole zones to become 'sacrificial' in order to maintain the growing social metabolism of capitalist society (Lohmann, 2021).

Second, megaprojects are a manifestation of what some now call 'climate colonialism' (Mahoney and Enfield, 2018). On the one hand, the growing demand for renewable energy, as well as the shift towards electric mobility mainly in the global north, is enabling a new form of green extractivism, where mining and extraction of minerals such as cadmium, lithium, rare earths and other minerals such as neodymium that are essential for the energy transition (Dunlap and Jakobsen, 2020), reveal several ways in which extractivism is taking a 'green' turn where sacrifice zones, mainly in the Global South, are serving to drive the energy transition in the North (Zografos and Robins, 2020).

The link between energy transition and extractivism can be evidenced in these 'green sacrifice zones' which today can be identified in the extractive frontiers of renewable

energy (Avila, 2017; Mulvaney, 2019; Yenneti, Day and Golubchikov, 2016). Although this discourse is accompanied by nouns such as 'fair' or 'green', discussions at the international level and even in the national context often neglect the existing inequalities in energy systems, their discursive, material and institutional interaction with hegemonic ideas, and the way in which this transition process persists as a manifestation of capitalism at the global level.

This reconfiguration of the territory to take advantage of or convert it into a productive space has been further exacerbated by the announcement and construction of the Megaproject of the misnamed Mayan Train.[75] Megaprojects are "colossal works in size and scope; captivating for the engineering challenges they pose and their anti-aestheticism; expensive - usually with costs higher than projected; controversial; complex and with control problems" (Gutierres-Rivas, 2020: 243, emphasis added). These 'six Cs' (Frick, 2008) of megaprojects are part of a broader logic of extractive capitalism. As a project that articulates the territory and the entire region, the Train seeks to find a way out of the monoculture plantations (of plants and animals) that have gradually reconfigured the territory by transforming communal land ownership into private property and at the same time propitiating the development of energy projects, real estate speculation associated with the development of tourist resorts along the Yucatan Peninsula (CG-TTM, 2019).

Based on the above, in the next three sections we recover the community experience around the development of the solar megaproject, while in the following two sections we seek to bring this experience into the extractive context and the development of megaprojects in the southern and southeastern region of Mexico. In the last part of the text, we try to identify some key recommendations for organizing in the face of the extractive model, as well as to present some conclusions based on the review of the conceptual framework (theory) and the experience from the territory (praxis).

Stage One: From construction and occupation for a citrus project to negotiations with the solar company.

In February 2016, internal changes within the ejido of San José Tibceh resulted in the change of the commissariat, which left Mr. Gabriel Fuentes in charge. The comisario had

[75] Because, as local communities argue “the project is not “Mayan” and it entails much more than a train.”

made a deal with Ignacio and Mario Salomón[76] to sell some land for the planting of citrus trees on the ejido. The ejido commissioner knew that the process was to 'buy land'. Based on this, several ejidatarios go to the National Agrarian Registry (RAN) to sign the change of land use and secure the purchase/sale of the land. At a breakfast before signing, 30 hectares of forest are requested for 'a project underway' that includes the planting of stevia and lemons. The proposal of the ejidal commissariat was that, if the project 'stuck' or was successful, they would be paid for the land, otherwise the land would be returned plus all that was on it.

From the beginning, ejidatarios expressed concerns about the sale of the land, as the deal was quite limited and with few benefits in their favor. In several informal meetings with the ejidatarios, interested parties arrived with lunches and drinks in order to convince the landowners to convert the land into citrus and stevia plantations. During one of these meetings, the ejido commissioner approaches the attendees and asks them to sign an attendance sheet to corroborate that they had participated in the session. The sheet that was distributed to the attendees had a heading that read '*List of attendees'* and lines to sign. It is this sheet that would become a way of justifying the purchase/sale of ejido land. The ejidal commissioner, together with the intermediaries, used this document to falsify the attendance list for two supposed assemblies and attach the signature sheet as proof of attendance where they agreed to the purchase and sale of the land.

Two months later, the ejidatarios began to hear some machines on the land. Upon questioning the workers, the ejido commissioner shows the ejidatarios for the first time a document in which it appears that they had already ceded the land to those interested in the development of the project (through signatures that were forged). According to the document, the lands, a total of 300 hectares, were already registered in the RAN in the name of Mario Salomón (one of the intermediaries) to be used for the planting of citrus fruits.

This is the beginning of one of the first campaigns of pressure on the community by those interested in the development of the project. Initially, there were 17 ejidatarios who opposed the purchase and sale of the land, but as a result of threats and pressure created by

[76] They would later be revealed as the company's intermediaries.

the ejido commissioner, who basically threatened that if they did not sign or rather legitimized the spurious signatures that had already been entered into the RAN, the ejidatarios would lose their land completely (the phrase "if you've already signed, you're already screwed" stands out as part of these threats). Most of them, in order to avoid problems, accepted the land concession, signing to make way for the use of the land for the planting of these fruit trees. This generated a first internal conflict in the community because the "cession" of the land violated the applicable agrarian legislation.

Around the same time, the ejidatarios were being pressured to sign the purchase/sale of the land with those interested in the citrus project. Several anthropologists from the Autonomous University of Yucatan (UADY) and the National Autonomous University of Mexico (UNAM) began to arrive in the community asking various questions to the people living in the community of San José Tibceh. The people in the community did not know what their relationship to the projects was, or what their purpose was for conducting these interviews. According to several of the people interviewed, their purpose was to conduct a socio-economic study of the community. In reality, these interviews would be part of what would later become the Social Impact Assessment (SIA)[77] that the company interested in developing the solar PV project would have to submit to the Ministry of Energy.[78]

Somewhat paradoxically, although the project's EvIS indicates the existence of several Indigenous communities in the areas of influence of the project, it does not explicitly describe or recommend the need and obligation of the Mexican State and therefore of the company to carry out an Indigenous consultation in accordance with the Mexican legal framework and the international human rights framework.[79]

The anthropologists who carried out the study sought, according to what they told the inhabitants, to carry out an economic study of the community and to identify whether the

[77] The Social Impact Assessment can be found at the following link: https://www.dropbox.com/s/lb0t7spzvmc14r0/EVIS%20Ticul%20A%20Testado.pdf?dl=0

[78] According to the provisions of articles 101 and 104 of the Electricity Industry Law in Mexico, any interested party must submit a Social Impact Assessment in relation to the development of a project greater than 500 kW for the generation of electricity, as well as for any other type of infrastructure for the generation, distribution, transmission and/or sale of electricity. This obligation is also typified through the Regulation of the Electricity Industry Law and the Agreement by which the General Administrative Provisions on Social Impact Assessment in the Energy Sector are issued.

[79] See Articulación Yucatán. Analysis of MIAs and EvIS of renewable energy projects in the Yucatan Peninsula. https://articulacionyucatan.wordpress.com/evaluacion-de-impacto-social/

people living in the area were Indigenous, asking questions such as: *are there people who speak Mayan, what was the socio-economic status and what do the inhabitants do, do they use any traditional means of sowing such as milpa, are there any traditional Indigenous authorities in the area where the project would be carried out, and do they use any traditional means of sowing such as milpa, are there any traditional Indigenous authorities in the area where the project would be carried out*?

It was only through a conversation, 'almost in passing' (as one of the authors recalls), with one of the people conducting the study that it was mentioned that the information was being collected and would be used for the development of a solar photovoltaic project in the territory. At the same time, the workers operating the machines within the ejido also began to mention that they had been hired for the development of an energy project, which began to raise some concerns within the ejidatarios and communities in the area.

Based on this information, the ejidatarios met with the ejido commissioner to ask him about the relationship between the ejido and this supposed solar photovoltaic project. During these conversations, the ejidatarios realized that the land appeared under the name of the intermediary and had been granted to an energy company, and that the citrus and stevia project, for which they had been pressured to sell their land, had been transformed in the RAN into a photovoltaic solar park developed by Sunpower and its subsidiary, Vega Solar. This led some ejidatarios to approach the local press to try to draw attention to what was happening, which, as shown in Image 1, was published as part of a news story and later served to bring external attention to the case.

Image 1: Headline of the newspaper *Por Esto* denouncing the "Mega-Fraud" of the land purchase/sale (8 October 2016).

Muna

Ejidatarios denuncian megafraude

Decenas de campesinos de San José Tipceh acusan a Mario Salomón y a su hijo "Nacho" de haberlos engañado y, bajo presión y chantajes, obligado a firmar la venta de terrenos del ejido a una empresa, pero que en realidad era una renta anual que los vivales cobrarían

Decenas de ejidatarios de San José Tipceh denuncian que fueron engañados y estafados por Mario Salomón y su hijo Ignacio Salomón, al ser presionados para 360 hectáreas de tierras a la empresa *Sun Power*, dedicada al negocio de paneles solares, pero que los acusados se adjudicaron.

SAN JOSE TIPCEH, Muna, Yuc., 8 de octubre.-Decenas de campesinos ejidatarios de esta comunidad denuncian públicamente que fueron engañados y estafados por padre e hijo oportunistas, al ser presionados para

misario ejidal Gabriel Fuentes, en representación de los campesinos, mencionaron que en días pasados se presentaron a la comisaría ejidal el señor Mario Salomón y su hijo Nacho, quienes bajo

presionar a varios ejidatarios que, humildemente, creyeron que si no firmaban sufrirían las consecuencias de esta amenaza; adicionalmente, estas personas se presentaron con varios fajos de bi-

Source: Photo by Romel González.

Once the true purpose of the land and the way in which the intermediaries had lied to gain access to the territory and force the sale of the land was exposed, in mid-July of that year, the land commissioner called a meeting with the intermediaries, who assured that a payment would be made for the land. At this meeting, the middleman offered a payment of 3.2 million pesos.[80] Shortly afterwards, another meeting was called to formalize the sale of the land and to certify the total amount of land to be acquired. For this last point, the intermediaries brought a team of people to measure the total amount of land acquired. However, before the same meeting, the contracts were already made, which ended up presenting contracts that were manipulated from the beginning.

It is important to emphasize that some people in the community did want the project, but the reality is that no one in the community or the ejidatarios themselves knew the full extent and potential impacts of the project. This is based on the fact that up until this point no one in the community had had access to public information about the project (which at the time consisted of the Environmental Impact Assessment (MIA)). In a private meeting with ejidatarios, meetings were held with ejidatarios and the company's lawyers to present the project and inform the ejidatarios of how much they were going to be paid. The company mentioned in the meeting that a lease payment of 4 million pesos had already been made.

[80] The original payment was for 4 million pesos, but the ejidal commissioner only presented a total of 3.2 million pesos.

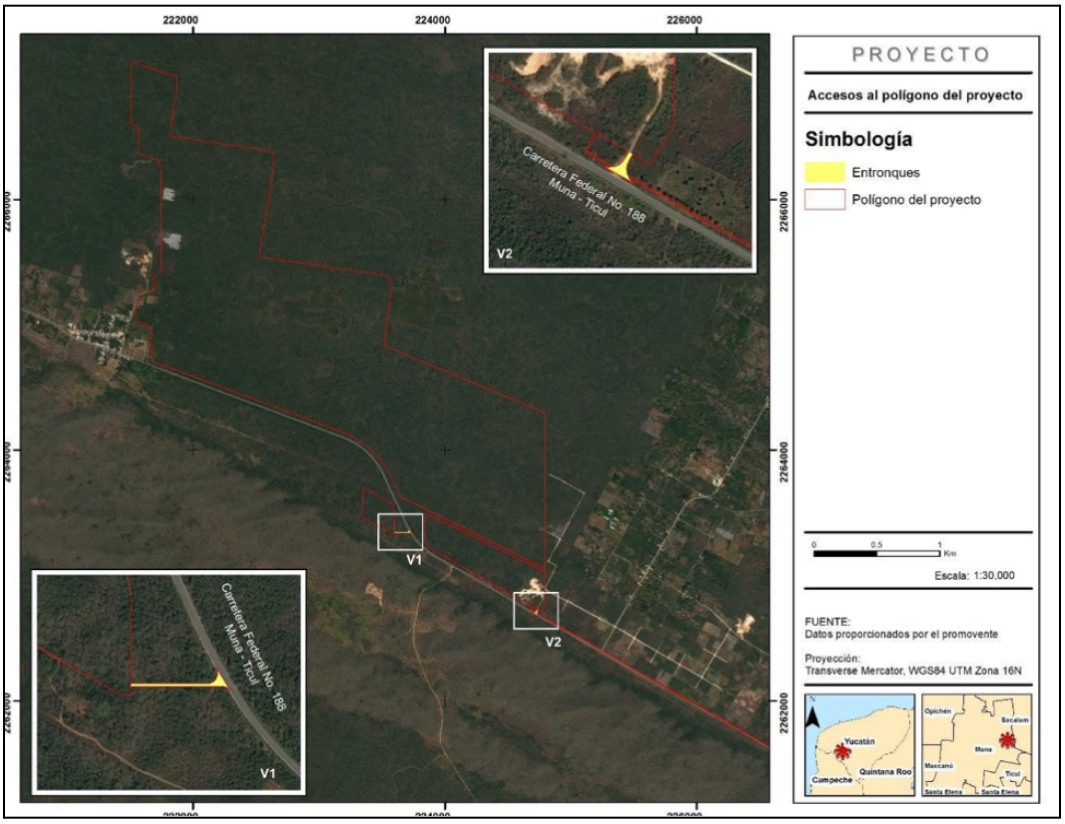
This first payment is what the intermediary used to buy the land and not to lease it, as the company had assumed. Not to mention that the payment had been less than the 4 million as only 3.2 million had been given to the ejidatarios.

The company operated on the understanding that the intermediary was already the owner of the land and that therefore the deal would be directly with him. It is revealed here that two meetings were held (which did not occur, and for which the signatures on the attendance sheet were used) in which it was claimed that all ejidatarios agreed to the sale of their land. Uncertainty about the project continued to increase as people from different bodies - such as INAH and company workers - began to arrive to the hectares where the project would be developed to measure the project's polygon (as shown in image 2), which began to produce various tensions within the ejido and among the ejidatarios, as very little is known about the size and impact of the project. These intrusions into territory that had been acquired illegally and under pressure led to some major internal divisions within the community and increased tensions with people who came to work on the ejido for the company.

In the face of rising tensions and increasing uncertainty. One of the ejidatarios sought out members of local organizations defending the territory as well as organizations specializing in the defense of human rights.[81] Thanks to these contacts, a first request to the authorities to carry out a public consultation of information on the project was organized, which was also supported by other broader movements of academics and members of civil society in the state of Yucatan seeking to document the impacts of energy projects in the region.[82]

Figure 2: Proposed project polygon

[81] Support came specifically from the *Indignation* organization and the *Chack Lol* organization.
[82] I refer specifically to the Yucatan Articulation: https://articulacionyucatan.wordpress.com/



Source: Image obtained from the Environmental Impact Assessment of the Ticul A and B Project. Vega Solar and SEMARNAT, 2016.

Such consultation was to be carried out in the framework of the Environmental Impact Assessment (EIA) by requesting it from the Ministry of Environment and Natural Resources (SEMARNAT). But according to the regulations, only 14 days are available to submit such a request once the Ministry receives the project's EIA. At that time, the community had not submitted the application, so the formal petition was submitted almost at the deadline. The lawyers who were supporting them were asked to make an official letter, which was delivered by a person from the community together with a member of the activist group. Following this request, a first meeting was organized at the Centro de Investigación y de Estudios Avanzados (CINVESTAV) in the city of Mérida to make the request and to make a presentation of the project.

This session, which was also attended by activists, people from the state and municipal government and representatives of the company, is formally the first approach that the community has had with the company, since before this session almost all the information

about the project had not been revealed to the local communities and little was known about the impacts that the project was intended to include. During the session, activists as well as community members present had the opportunity to ask some basic questions about the project (How will the community benefit? Would there be reductions in electricity tariffs?) which gave a much clearer picture of the possible impacts and magnitude of the project.

After this meeting and after learning in more detail about the implications of the project, the ejidatarios demanded the resignation of the intermediaries and sought to sign a new contract directly with the energy company, but this could not be registered with the National Agrarian Registry (RAN) due to the validity of the first contract. After canceling the original contract, the ejidatarios' intention was then to seek to put all documents in order and to establish some guarantees in the new contracts with the company. This process was carried out in several dialogue sessions with representatives of the company and once the parties had reached an agreement, at the end of the last of these sessions a copy of the new contract was requested from the company, but, under the excuse that their printers had run out of ink, they left the meeting without delivering the contract to the ejidatarios.

By this time some people had already counted on the company, who began to give money to the community to ensure that they could count on their vote when a decision was made. Out of a total of 102 ejidatarios, 97 had said they would accept the project and of these, all had accepted money from the company. Several of the people accepted the company's money in the sense that they were willing to lose their form of income in order to become dependent on the company - for example, colleagues who sold firewood would be left without forest, but in exchange they would receive a fixed income for the next 40 years. The concern of the ejidatarios who refused to grant the land was that there was no guarantee that this payment would be constant, as the project could become unprofitable and in the process people could lose their entire livelihood. This was one of the main reasons why some of the ejidatarios were reluctant to sign.

Once negotiations with the company continued, the relationship with the representatives began to deteriorate rapidly. In the following meetings it became evident that the guarantees that had been requested in the new contracts had disappeared. On several occasions, the

company changed the terms of the contract, modifying the agreements that had been made in previous meetings with the ejidatarios, and on other occasions they were reluctant or even unwilling to provide the community with adequate and relevant documentation to understand how the project would operate and what its impacts and guarantees would be. As a result, some ejidatarios and community members, with the support of a network of activists and academics, managed to file a complaint with the Inter-American Commission on Human Rights in Panama City, forcing the Mexican government to attend the session and take action. This process, along with the subsequent agreement to carry out an Indigenous consultation, is detailed in the following section.

The second stage: From the complaint to the Inter-American Commission on Human Rights, to the Indigenous Consultation

At that time (at the end of 2016) in the Yucatan Peninsula there were several movements in defense of the territory, resisting on different fronts. The most paradigmatic case was that of the Mayan Indigenous beekeepers against the planting of genetically modified soy and the use of pesticides. Taking up this experience, the community advisors and the ejidatarios proposed to present the case to the Inter-American Commission on Human Rights (IACHR) in order to draw attention to the inconsistencies that had manifested themselves in the process of leasing land in the agrarian sphere. Likewise, the meetings with the intermediary and the company became more tense every day, in relation to the affectations and violations of human rights due to the lack of Indigenous consultation as stipulated in Convention 169 of the International Labor Organization (ILO) and the guidelines that indicate that this must be free, prior, informed and in good faith.

In response to this, the network of advisors from various human rights and territorial defense organizations that were already assisting the community managed to have the case presented at a thematic hearing in December 2016 before the Inter-American Commission on Human Rights (IACHR) in Panama City. A representative of the Ministry of Energy was present at this session, where, for the first time, it was recognised that the project had been approved and was planned for development without free, prior, informed and culturally appropriate Indigenous consultation. Thus, after the hearing, in the corridors of the IACHR,

representatives of the community agreed with the Mexican government to carry out an Indigenous consultation regarding the project.

Faced with this decision, the community representatives began to establish some terms and conditions for the consultation: 1) that the community be given *all* documents related to the project; 2) that only people living in the community be consulted; and 3) to ensure that there are external observers and social witnesses throughout the consultation process. All of the above were requirements that were negotiated with the Ministry of Energy (SENER) and the company during 4 sessions where a consultation protocol was designed.

On 23 April 2017, almost two years after the concession had been granted to the company, and because SENER, through CENACE, had developed an energy auction, the first assembly was held as a "prior consultation" in which the community participated.[83] This process was identified as an Indigenous consultation despite the fact that SEMARNAT had previously issued environmental authorisations for both projects in a conditional manner, thus allowing not only the deforestation of more than 600,000 trees, but also a biased and partial evaluation of the environmental impacts of both projects[84] , as well as other authorisations that had already been granted, such as the interconnection permit through the Energy Regulatory Commission.

Among the irregularities in the consultation process, it is possible to see that the authorities began to bring in people who did not belong to the community to be consulted, since they were in favor of the solar park. In the same way, they began to change addresses, residences appeared or were occupied by people who "claimed to be from here", and there were even votes for people who had already died. As a result of the project, the shape of the village gradually began to change and a rift began to develop within the community between those who wanted the project and those who resisted it. It is because of this and other inconsistencies that the bonds of trust with the federal government began to break down.

A second point that also undermined the process was that, based on the consultation protocol that had been agreed, SENER was asked to bring some external observers to the

[83] As recognised by the UN Special Rapporteur on the rights of Indigenous peoples, Victoria Tauli-Corpus, in the report of her visit to Mexico in June 2018.
[84] Environmental Justice Atlas (EJATLAS) 2020: Photovoltaic Project Ticul A and B Yucatan, Mexico | Ejatlas. Accessed on: 21/03/2022.

community, and as the community already knew the methodology of the consultation, it was suggested that they participate in an impartial and objective manner, but despite this the authorities refused to include observers.

The truth is that the company, in order to try to get approval more quickly, gave in to several of the community's requests. For example, the community requested that a model be made, that an interpreter be present, and that they could visit other projects, which led them to Guanajuato to see another solar park. However, despite their goodwill, these conditions did not mean that the community would ultimately be convinced to give consent. The company's logic, says one of the community members, is that "if it complied with all our requests, the consultation would meet the legal requirements and therefore be approved, i.e. it was not clear to them that at the end of the consultation process there would be a community deliberation that would serve as the final outcome of the process." [85]

The community had requested that experts from the Comisión Federal para la Protección contra Riesgos Sanitarios (Cofepris), researchers and others be brought in to measure the environmental impacts so that the information could be assessed by the community to make an informed decision. The attitude of the company or at least its representatives was that by providing this information they took compliance with the consultation as a requirement for granted, but did not see it as a necessary requirement to inform people about the potential impacts so that they could make an independent decision. In other words, consent was outside the discussion.

In this way, the discussion with the communities was reduced to a description and a debate between experts. For example, there were agrarian lawyers or people who came to represent the company, but at the time of the discussion with the community they only saw one issue and did not address the full extent of the issue. By seeing things in a partial way, the conflicts and internal divisions in the community were accentuated until the tensions culminated in the presence of an external advisor (paid by the company) who, because of his origin and being the son of Indigenous leaders (from another region of Mexico) tried to

[85] Interview with community members, February, 2022.

give legitimacy to the project in front of the ejido assembly, so he was in charge of dividing the community and doing social management in favor of the company. [86]

At the beginning of September 2018, in one of the meetings, the ejidatarios came to blows and threatened each other with firearms due to the lack of an agreement between the ejidatarios, the Indigenous community and the company, while two people were injured after being attacked with machetes. Since then, the community has been completely divided, and the assemblies have become processes of simulation and/or the appearance of business and institutional "good practices", as during the consultative phase the authorities took on a decisive and completely manipulative role in favor of the company.

By the end of November 2018, with a new federal administration in place. The last consultative assembly was held, in which "consent" for the construction of the project was obtained. However, the tone and manner in which the consultation was conducted already defined the way in which it was possible to obtain consent, which was obtained at the expense of the characteristics: free, prior, informed and in good faith. From the beginning of the meeting, community members were warned that consent would have to be the outcome of the meeting. The process, which was active until 03:00 am, was marked by pressure from the state, when SENER brought in riot police, who surrounded the site of the consultation as a form of intimidation. Likewise, the media was not allowed access, nor was one of the opposition advisors allowed to participate. In the end the vote was positive, as the way in which it was agreed to carry out the closing process did not allow the majority of people the freedom to exercise their vote in a clear manner.

Opponents of the project, consisting of some ejidatarios, plus a large part of the Indigenous community, have continued their resistance in the legal arena, citing the rights that have been violated, both in terms of agrarian law and human rights. It is thanks to these efforts that the project has been halted. This last point is addressed in the next section.

[86] Environmental Justice Atlas (EJATLAS) 2020: Photovoltaic Project Ticul A and B Yucatan, Mexico | EJAtlas. Accessed on: 21/03/2022.

Third stage: After the Indigenous consultation, legal strategy and defense of the territory.

Despite the positive outcome of the consultation, in the sense that SENER and the company obtained "consent" for the development of the project, part of the Indigenous community and at least 5 ejidatarios have remained opposed to the development of the project. This is based on irregularities in three areas: agrarian, access to information related to ecological and social impacts, and human rights. The community was able to articulate, sometimes thanks to the support and help of external groups of activists, civil society and academics who supported the community's defense strategy, to use these flaws and inconsistencies to defend themselves against the imposition of the project despite their will and intention.

In the agrarian sphere, the community's strategy was to cancel the agreement and the contract that had been signed between the intermediary and the ejidatarios, as it had been proven that there had been irregularities in the purchase/sale of the land between the intermediary and the ejidatarios and between the usufruct contract with the company and the intermediary. In this way, the ejidatarios sought that the 3.2 million pesos that had been handed over would constitute payment of damages and compensation to the ejidatarios for fraud and cancellation of the first contracts. The ejido filed an act to cancel all previous contracts with the RAN.

In the area of consultation, the community sought through an injunction to recognise that the Indigenous consultation that was carried out did not comply with any of the standards established in the consultation guidelines according to ILO Convention 169. In other words, the community's argument was that the consultation was not prior, since it was implemented after the allocation of the project, the energy auction held by SENER and even the approval of the MIA by SEMARNAT. At the same time, the consultation did not comply with the requirements of being free and informed, because constantly and systematically throughout the process of negotiations with the company, they did not provide all relevant documents or adequate information to the community. Finally, Convention 169 also establishes that the consultation must be in good faith, something that was not reflected during the consultation processes, as the company and SENER altered the previous agreements that had been reached with the community.

The strategy designed on the basis of these three areas was aimed at "stretching the league" as far as possible. That is to say, by exhausting all national instances under this argument, taking the complaint to the highest levels of the Mexican judicial system and, if necessary, the Latin American one. The strategy consisted of filing amparos and complaints about these violations. At present, the project is not only stopped, but the company has already abandoned the possibility of building a solar park in this area. This legal tactic, which is usually implemented to tire and exhaust the people who are involved in these processes, sometimes involuntarily, in this case became a defense strategy that was only possible due to the activism of a large part of the community, the willingness of some ejidatarios to continue with a legal process, as well as the support and advice of several civil society organizations and networks of activists and defenders of the territory.

A second part of the strategy was to design a "template" of minimum conditions through which not only a community consultation, but also any negotiations with the community and the ejido could be carried out. This template was used to design and ensure that there would be guarantees from the community for the possible renegotiation of contracts with this or other companies at a later date. This template arose from the constant dialogue processes with the company that ended up being rigged by its representatives. By this we mean the changes to protocols that the community had agreed in previous meetings and how these are modified or transformed when the company presents the protocols in the following meetings. The point of producing a document like this is to make it clear, from the outset, how it is possible to enter into negotiations with the community and the ejidatarios.

For example, one of the clauses in the document concerned the succession of rights once the contracts with the company had been made. Both the community and the ejidatarios were concerned that if the company for some reason or another could not pay or terminated the project, the impacts on the area would be left without adequate remuneration, and they would lose their land if the company decided to pass the contract to another entity. These were some ways of setting certain 'padlocks' or irreducible terms that today have not only maintained traditional land use, but can be used as a roadmap for communities and ejidos that find themselves in similar situations.

Finally, one of the legal processes that was also argued was that of the effects on the healthy environment, giving a vision that questions the logic of both the project's MIA, as well as its discursive logic to address climate change. The project was celebrated as a way to combat the excess greenhouse gasses (GHGs) that give rise to and exacerbate the climate crisis, as well as a significant move by the country towards a transition to the use of renewable energies to drive "green" or "clean growth". However, the proposal argued that at least 600 hectares of secondary deciduous forest would need to be cleared to drive this energy transition.

The appeal argued that the compensation or mitigation measures for the damage caused by forest clearing would be much greater than the potential benefits of the energy transition at the national level, not only because of the local impacts, but also because the forest is of fundamental importance in regulating local and global temperature, as well as having a number of 'services' that are often not taken into account when a deforestation proposal is presented (see Figure 3).

Image 3: Photo highlighting the type of secondary jungle in the ejido, which was to be cleared in the name of climate change mitigation.

Source: Photo by Carlos Tornel, 2022.

Discussion and lessons learned

The purpose of this article is to identify the main lessons learned from the community in order to try to juxtapose these experiences in the context of extractivism and territorial reorganization in the Yucatan Peninsula. Based on the experiences of the Mayan Indigenous community in the ejido of San José Tibceh, it is possible to recognise a series of lessons

learned that can be used for other communities facing other development projects, whether in the energy sector or elsewhere. From the discussion presented in the conceptual framework, it is possible to identify a tendency for extractivism to advance, becoming a way of understanding the territory in those places that are willingly converted into productive zones, or zones of sacrifice in the service of capitalism (Dunlap, 2020).

As Gutierrez-Rivas (2020) rightly points out, infrastructure megaprojects are a way in which capitalism manages to solve internal contradictions such as overaccumulation through the spatio-temporal displacement of crises. In short, this means that megaprojects serve to spatially reorganize the characteristics of a place in order to absorb surplus capital and labor. In this way the development of megaprojects is cyclically tied to an extractivist model, which constantly requires space (land) to keep the accumulation process afloat.

At the same time, trends suggest that this is an increasingly violent process in various forms: from forms of oppression and physical violence, to forms of violence that are exercised from a structural point of view (by reproducing and legitimizing violent forms of extraction through institutions), as well as other forms that are instituted in epistemological and ontological violence, made perceptible through the instruments of consultation and participation, and through ‘recognising’ the Indigeneity communities (Le Billon & Middeldorp, 2020). But care must be taken so that these consultations do not contribute to the legitimisation of the dispossession of communities from their territories.

These types of violence not only operate by 'discounting' or devaluing certain types of knowledge and even worldviews or ways of understanding the world (Santos, 2014; Escobar 2016), but also manifest themselves in temporally diverse ways. That is to say, the violence experienced in these territories tends to manifest itself in different temporalities: sometimes it is a form of immediate violence (when there are forced displacements, coercive forms of buying/selling land), while sometimes it can result in a type of slow violence, where the degradation of nature and the social fabric progressively causes damage to the community that is difficult to repair (Nixon, 2011).

This is part of a process that has sought to insert the South and Southeast region of Mexico into a process of development and extractive capitalism through the construction of megaprojects and extractive processes that seek to make the territory 'legible' for capitalist

expansion (Li, 2014). This process often seeks to turn certain areas into 'special economic zones', *'Hubs'* or development poles (GeoComunes, 2019) that rely on territorial fragmentation, in turn transforming natural and social relations within the territory (Ceceña, 2019). The role of the state contributes to this dispossession by legitimizing or supporting a national or foreign private initiative project.

The inauguration of the extractivist development process in the region can be traced back centuries, but one of the milestones that accelerated this trend was undoubtedly the region's clean energy auctions. The availability of cheap solar and wind technology presented a reformulation of the territory to make it legible for this sector. The subsequent reconfiguration of the territory by this means became perceptible once 9 of the 16 projects that were allocated in the first energy auction held by SENER in 2017 were established only in the state of Yucatan. The *'peripheralization'* of the Yucatan Peninsula inaugurated a way of reconfiguring the national territory by seeing it as high-potential or 'underutilized' spaces that could be extracted by the expansion of renewable energy in the region (Franquesa, 2018). In short, this is a way in which capitalism, through the advance of technology, manages to expand its commodity frontiers, using a discourse in which it is necessary to take advantage of those wasted spaces, something that paradoxically leaves waste in its wake in the name of accumulation (Tsing, 2017).

This trend increased further with the announcement and construction of the misnamed "Mayan Train". Although the announcement and construction of renewable energy megaprojects took place before the project was announced, the proposal to integrate the south and southeast of Mexico into a broader vision of reordering the territory regionally, the project is presented as a way to articulate all productive activities in the region: transgenic plantations and monocultures, providing an outlet for fuel transport and agribusiness, as well as triggering real estate speculation associated with the significant increase in tourists in the region (GeoComunes, 2019).

The above, not to mention the direct ecological impacts of the project, which may involve high impacts associated not only directly with the construction of the project, but also with its operation (e.g. the increase in the number of tourists to the region, implications on the karst soil and water reserves, loss of biodiversity and fragmentation of ecosystems, among

others) (see: Ansótegui, 2021; Casanova Casaña, 2021; López Gómez, et al, 2020; GC-TTM, 2019) Likewise, the process is presented as a way not only to rearticulate the territory to facilitate extraction, traffic of goods and mobility of people, but it is also a way to capture and accelerate foreign direct investment (FDI) which has international origins and benefits (PODER, 2019).

As Ana Ester Ceceña (2019: n.d.) points out, "the traffic of finished products, of goods, is accompanied by a growing traffic of parts in manufacturing or assembly processes that only become merchandise through transit". In this sense, contemporary capitalism, which is already in a phase of globalized economic integration, depends to a large extent on constituting a securitisation by the state to facilitate and speed up these integration processes through the creation and securitisation of the transit routes and processes and therefore relies on the armed forces (the latter will be the ones to finish the work, manage the train and the profits go to their pension fund).

Trafficking is thus a way of transforming lands and territories into sacrifice zones, or whole places to be put to work in the name of capital and thus to be stripped of their content, of their other ways of existing and relating to other human and non-human groups. In this way, capitalism reorganizes the territory on the basis of a dual dialectic of productivity and waste. Based on this logic, capitalism defines territory as something useful or useless according to a vision that has deeply colonial origins and that, by valuing certain characteristics of territory (its capacity to produce merchandise, transit routes, etc.) tends to eliminate and discount other ways of being, existing and inhabiting these spaces.

When the community speaks of the (neo-)colonialism of these projects, it does not mean that they are projects proposed by colonial entities (such as countries or states), but that when they are developed they incur in a reproduction of the hierarchies and socio-ecological organization that is inaugurated and persists through what Aníbal Quijano calls the Colonial Matrix of Power (CCM). From this point of view, the idea of development and that which is valued as productive has to value other ways of life, of being and of existing as retrograde, primitive or even as obstacles to a specific construction of reality. The imposition of these hierarchies in terms of knowledge, power and being (Santos, 2014) often involves forms of epistemological and even ontological violence,

where that which is different or *the other* is discounted, obscured or eliminated in order to ensure a single form of progress.

This colonial vision is manifested in the use of instruments such as the MIA and the EvIS, where Indigenous communities are often described as poor, in need of development and economic growth, and should therefore benefit from the project. This vision tends to leave aside the richness of the communities, their traditional ways of relating, organizing themselves and even their worldviews, which are incommensurable with the way in which the benefits or impacts of projects are assessed in these instruments (see: Behn and Bakker, 2019).

In the Mayan cosmovision, territory is much more than a source of provisions and merchandise, but represents the very origin of human beings, which is constituted through their relationship with it. For example, the ancient Mayan myth of the creation of the human being starts from the relationship with maize (in the Popol Vuh), while other forms of cultivation such as the milpa are traditional forms of sowing, which constitute a polyculture, where a great diversity of plants are harvested, as well as other practices that are essential to sustain the rest of the ecosystems.

In spite of this, under the vision of "development" and "progress", these traditional forms of sowing, of subsistence, of relating to the territory and therefore the Mayan cosmovision itself are often discounted or even seen as obstacles to sustainable development in the region, which does not recognise the milpa as a more effective system of cultivation that also tends to conserve the biocultural heritage, but at best 'values' the 'services' that emanate from this process, but only by giving them a twist of 'services' that can be commercialized. From the Mayan cosmovision, the affectation of the territory is a direct affectation of the way of life, since it directly affects the possibility of maintaining certain customs that have become ancestrally rooted in the land (Uc, 2021).

This process of services and commodification is similar to what is happening in the case that manifests itself most forcefully in the public discourse in Mexico and its relation to the climate crisis. The discourse of sustainable development inaugurated in 1985 and reaffirmed with the 2030 agenda, as well as the proposals that seek to green both economic growth and the economy (Ver: Tornel, 2019) are not only a way of reconfiguring the

territory by making it 'legible' for the energy sector, but often postulate needs to mitigate greenhouse gas (GHG) emissions, which are key to reducing global warming, as urgent, without paying attention to how the deployment of renewable technologies is often done under the same development model based on accumulation by dispossession (Harvey, 2004).

The signing of the Paris Agreement in 2015 and the enactment of the Energy Transition Law (LTE) in Mexico that same year are part of this narrative in which *the energy transition is often reduced to a mere substitution of the technologies* used to produce energy. This vision often obscures the implications of this model both at the territorial level (which can be recognised in the socio-ecological impacts and conflicts), along with the implication that, for this vision of energy transition to be possible, it is necessary to reconfigure territories to be understood as sacrifice zones that would be essential to satisfy the growing social metabolism and voracious appetite for energy of the 'centers', while the peripheries multiply.

As noted in the theoretical framework, our concern is not to delegitimize the importance of renewables in the struggle to try to ameliorate the climate crisis. On the contrary, ***our argument is that this process cannot result from a superficial modification (such as greening) of capitalism, but must come from a radical reconfiguration of energy use, the way in which it is distributed, highly unequal consumption patterns, and above all, the possibility for Indigenous (or not) rural and urban communities to manage their own energy, exercising a model of energy sovereignty from the territory*** (See: XSE, 2019; Lights for Resistance, 2022).

In this sense, the 4T, as the community's experience also documents, may have taken some steps in the right directions: During Lopez Obrador's campaign, there was explicit acknowledgement of the affectations of the prevailing energy model, as well as mentions of the importance of decentralizing the electricity system (See: NaturAMLO, 2018; Project 18). However, the federal government's current position - that of centralizing the electricity system in the Federal Electricity Commission and favoring the generation of energy through dirty sources, the development of mega-projects - has demonstrated not only a lack

of congruence, but a total disinterest in the struggles that defend the territory[87] and the democratic, sovereign and autonomous ways of generating energy.

The Indigenous community's experience in the territory

The legal strategy pursued by the community soon became more than a way of claiming their human rights, but became a way of defending the territory, of recognising the importance of their ways of life, and of establishing, internally, the ways in which 'development' would be possible. This last point is essential, since for the community development does not mean the possibility of having a job and depending on a salary. Nor does it mean or translate into abstract concepts such as economic growth or energy transition. Within the community, development is a concrete definition, which is determined by what can be valued through their relationship with the territory. Concepts such as *Buen Vivir* and community, which have emerged in other regions, are a way in which this relationship can also be expressed in the territory of the Mayan communities of the Yucatan Peninsula (see: Kothari, et al. 2019).

The community's defense process was divided into three areas: a) the process before the RAN, b) the Indigenous consultation and possible environmental impacts, and c) the broader struggle for energy sovereignty. In the first instance, the various 'errors' in the negotiation and consultation processes, both by the company and the federal authorities, respectively, generated mistrust among several ejidatarios and community members who perceived the process as an attempt to appropriate their lands in various ways. In the agrarian sphere, this became evident with the signing of spurious contracts, as well as non-transparent and corrupt processes that allowed the company, through intermediaries, to gain access to the use of the land. For this defense, it was extremely important to consult the RAN records, reread the basic folder, learn about agrarian law and document the intermediaries' violations (sometimes with sound recorders or using mobile phones), which made it possible to rescind these false contracts and reclaim ownership of the land.

[87] The most paradigmatic cases are the integral Morelos project and the consultation carried out by the president just three days after the assassination of the ombudsman Samir Flores. Other such examples can be seen in the increasing militarisation of the construction of infrastructure works and the forced expulsion of the Altepelmecalli, the People's House at the Bonafont water plant in Puebla. See: Tetreault (2020) and Llaven (2022).

With regard to the Indigenous consultation process, the manner in which it was carried out lacked all the attributes required for Indigenous consultation in accordance with international standards:

- First, it was not free as it was surrounded by aggression, in addition to the clear intimidation caused by the presence of state security forces to obtain consent.
- Second, it was also not informed, as on several occasions partial information was provided on the scope and implications of the project, nor its environmental, social, economic and health impacts.
- Third, it was not prior, because it was carried out two years after the government granted the concession and permits through the auctions and the MIA to the company on the development of the project in proximity to the community of San José Tibceh, without first informing and involving the community, forcing the company to dialogue about possible social benefits. In general terms, the approval of the nine renewable energy projects in the state of Yucatan that emerged from the energy auctions had already violated the principle of free, prior and informed consultation in good faith and culturally appropriate to the Indigenous communities, since the development of projects such as these directly affect the relationship that exists in the territory.
- Finally, it also failed to meet the characteristics of being 'bona fide' or culturally appropriate, which was made evident by the failure to change pre-established agreements and protocols with the community (EJATLAS, 2020).

Likewise, Indigenous consultation cannot be understood in a profound way, if we do not start from the fact that there are 2 visions of what is conceived as "Development" and "Good Living", for those who subscribe to the first vision, nature is reduced to a resource, or even a service (which can be conserved or not) in order to satisfy a human need. From this perspective, a project such as the one presented in the community of San José Tibceh makes sense, since nature can be substituted for social benefits or other economic services such as employment. For the community, which adheres to a different vision of development such as "Buen Vivir", the question is not to care for nature for its services, but to understand our existence as a reciprocal relationship, where nature also has rights, which

complicates the economisation or commodification of nature's products and services, since they are relationships that constitute us.

One of the main lessons was that the community joined the conflict and initiated an internal process of organization among other actions to appropriate land that was being usurped by the middleman for lack of information (who also initiated legal proceedings to criminalize one of the members of the opposition, which did not proceed) in the Ejido of San José Tibceh with other broader struggles for the defense of the territory. This process was achieved through the participation of territorial defenders who advised the community, as well as other networks of civil society organizations. When defending the territory, there are threats, acts of violence, deception and corruption, among others. Resistance to the imposition of a project such as this meant that the community recognised itself as a defender of its territory, and was able to value its relationship with the territory beyond the monetary system, giving value to traditional practices such as the cornfield for sowing and harvesting, things that for the developers are seen as an obstacle or as problematic cultivation practices that can also be exchanged for economic benefits or the economic benefits of the projects.

It is thanks to this process that the community was also able to become better informed about possible routes of resistance, as well as find advice and support from a wider network of academics, activists, advocates and advisors. It was thanks to this process, for example, that the community was able to request a Thematic Hearing before the Inter-American Commission on Human Rights in December 2016. The same process forced the federal authorities (SENER) to hear the case and through this means to carry out a consultation, which, although it violated all international standards, was a key process to reveal the implications and impacts that the project could have. Also the fact that with the exchange of experiences, several people from the community exchanged knowledge in different forums, meetings, meetings, leadership training workshops, and even had contact with the Rapporteur for Indigenous Peoples, Victoria Taoli.

Finally, something to highlight is that the community learned a lot, but despite this, defenders often do not receive the necessary merits and recognition for their work, which sometimes end up in theses and academic articles that have little to do with their day-to-day

experience of resistance. In the end, the community process was only possible because the community acted collectively, as a team. Although it is also true that the community is not a monolith. It is therefore important to recognise that processes such as the consultation are decisive moments because in one way they united the community in the construction of a narrative in defense of the territory, a process that is also key to articulating the characteristic of what it means to be Mayan (from the point of view of the relationship with the territory), but on the other hand, it had an important impact within the community, as it divided us internally between those who wanted the development of the project and those who decided to oppose it.

Conclusions and recommendations.

The process of negotiations for land acquisition, the way in which the community managed to get advice, act and present a case of legal resistance are, in the end, a way of defending the territory, but also a way of learning from the community, a way of strengthening the community and collective social fabric and of (re)valuing the practices of subsistence, hospitality and care that are often devalued by the traditional model of development. Although the entry of the company meant a breakdown of the social fabric, which will take time to restore and rebuild, the actions of several of the ejidatarios to defend their territory present this as a success story in which it was possible to resist the imposition of this vision of development.

As this article had shown, this is not an isolated case where the negotiations between the ejidatarios and the Indigenous community were irregular, but rather, despite the irregularities that are specific to this particular case, the case exhibits conditions that respond to a broader trend that is manifest in Mexican and Latin American territory. The reconfiguration of the territory in order to make it legible for the extractive process of capitalism or to resolve its accumulation crises through the development of mega-projects tends to have direct and indirect costs for the communities that inhabit them.

Likewise, the use of instruments to carry out consultations, to provide access to information and transparency, as well as mechanisms for participation and recognition, even when these have the best intentions on the part of some authorities or private entities, are often subordinated to other processes (such as extractivism and the advance of global capitalism)

that end up turning these instruments into processes that legitimize the development of projects despite their socio-ecological impacts, these are often subordinated to other processes (such as extractivism and the advance of global capitalism) that end up turning these instruments into processes that legitimize the development of projects despite their socio-ecological impacts, or simply become mechanisms for access to information, but do not offer the possibility of modifying, altering or transforming the development of projects based on what is collectively and locally important. It is therefore important for communities to progressively abandon, as far as possible, the logic of exchange value in order to become a subject of collective rights based on use value. [88]

Discourses such as growth or the *green* economy have proposed a reconfiguration of the territory, making it *legible* for the expansion of the energy sector, without questioning the enormous inequalities that persist in the metabolic relations of capitalism. In this sense, the expansion of energy megaprojects cannot take place without first reformulating the way in which energy is inserted to *move* capitalism. This reflection is important because it puts at the center of the discussion on the energy transition: for whom and for what is energy? How is this energy generated? And how do individuals, communities or groups have a say over this energy?

The way in which processes such as Indigenous consultation are codified in the Mexican legal framework tends to reduce consultation to an administrative process. Similar to what happens with the EVIS in the Electricity Industry Law (LIE), the right to consultation is reduced to the obligation of the state to consult those who call themselves Indigenous, yet in reality communities often have problems even proving that they are Indigenous and that

[88] In *Capital (1867)* Marx distinguishes between the use-value and exchange-value of the commodity. Use-value is inextricably linked to "the physical properties of the commodity" (126); that is, to the material uses to which the object can be put, to the human needs it satisfies. In the exchange of commodities on the capitalist market, however, exchange value dominates: two commodities can be exchanged on the open market because they are always compared with a third term that functions as their "universal equivalent", a function that money ultimately assumes. Exchange-value must always be distinguished from use-value, because "the exchange relation of commodities is characterized precisely by its abstraction from their use-values" (127). In capitalism, money takes the form of this equivalence; however, money in fact hides the real equivalent behind exchange: labor. The more labor it takes to produce a commodity, the greater its value. Marx therefore concludes that "as exchange values, all commodities are nothing but definite quantities of frozen labor-time" (130).

consultation is applicable.[89] Therefore, it is necessary to elevate the right of consent of Indigenous peoples to a constitutional level with the ultimate goal of free, prior, informed and culturally appropriate consent, but above all to recognise the self-determination of peoples. This could be a significant step forward in recognising Indigenous peoples' self-determination beyond its typification, focusing then on autonomy, i.e. to stop depending on the state and the market, as the objective of these rights.

It is important to remember that Indigenous consultation is an instrument, which seeks to provide access to information, through an in-depth analysis of 'development' proposals in a region. The objective should be to inform communities about the way in which it would be possible to carry out activities of any kind in Indigenous territories, and this process should be totally independent of the authorities at any level, and above all of the company. In the end, the process of self-determination is much more than a constitutionally guaranteed right or an obligation of the state, for Indigenous communities it is a way of recognising themselves as such and celebrating their diversity and difference, rather than being integrated into the legal standards of the state framework.

Likewise, the process of legal defense tends to be complicated and costly for communities. Although the support of human rights organizations is very valuable, this work tends to be reduced to reactive defense of the territory, leaving little space for the community to propose, imagine and develop an alternative development proposal based on their own principles of good living. Struggles such as that of the community of San José Tibceh demonstrate that by reviving a form of defense of the territory against the imposition of an external development project, the community itself begins to imagine other forms of 'development' in which other types of projects are proposed (usually with the community as participants and decision-makers), other forms of management of 'energy resources', for example through distributed generation, and even other designs for the project that could give autonomy to the community and allow for some external development respecting and in accordance with local uses and customs, promoting internal normative systems.

[89] In the case of San José Tibceh, a hearing in which a judge asked the lovers for 'proof' that they were indeed Indigenous, when there is no such recognition by the state and it even goes against the provisions of article 2 of the CPEUM, which recognises that Indigenous identity is through self-ascription.

Finally, there are other types of modifications to the legal framework which, although they are proposals that do not seek to transform reality, can be effective in ensuring the defense of the communities' territory. Among these proposals, the following stand out: a) The Environmental Impact Assessment (MIA) or the Social Impact Assessment (EvIS) are extensive documents, technically, but which can be translated into simple and culturally appropriate language; b) The prohibition of mechanisms such as Auctions, authorisations, permits or licenses for the establishment of projects for the generation of any type of energy, agricultural production, forestry or services, or communication without having obtained the consent of the Indigenous peoples; c) The provision of prior, timely, complete and comprehensive information covering different aspects, not only by the company as presented in the MIA and EvIS, but also by government institutions and independent researchers or experts, i.e. a real, scientific opinion with a strategic vision.

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