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**The conflict surrounding wind
energy projects in the Mexican
Isthmus of Tehuantepec.
Renewable energies and politics
of scale**

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The conflict surrounding wind energy projects in the Mexican Isthmus of Tehuantepec. Renewable energies and politics of scale

Abstract

Großflächige Windenergieanlagen, wie sie seit einigen Jahren im Südosten Mexiko geplant und gebaut werden, sind hoch umstritten. Vor allem auf lokaler Ebene gibt es große Widerstände gegen diese Projekte transnationaler Unternehmen, die Strom für Kund_innen in anderen Regionen Mexikos erzeugen. Das Working Paper thematisiert die Hintergründe und wichtigsten Konfliktpunkte und fragt mit einer raumtheoretischen Perspektive danach, warum und auf welchen Ebenen Akteure von den Windkraftanlagen profitieren oder nicht, welche multiskalaren Strategien die beteiligten Akteure verfolgen, um ihre Interessen durchzusetzen und auf welche Ressourcen sie dabei zurückgreifen können. Das Paper argumentiert, dass diese Perspektive sinnvoll ist, um politische Prozesse und Konflikte rund um erneuerbare Energien zu untersuchen.

Kurzbiographie

Rosa Lehmann ist Mitarbeiterin in der BMBF-Nachwuchsgruppe „Bioökonomie und soziale Ungleichheiten“ an der Friedrich-Schiller-Universität Jena. Sie arbeitet derzeit zu Bioenergie in Deutschland im Kontext der entstehenden Bioökonomie und untersucht aus einer Ungleichheitsperspektive politische Debatten und Maßnahmen sowie technologische Entwicklungen im Hinblick auf Möglichkeiten eines dezentralen Energieregimes. Sie forschte von 2012-2016 zu dem Konflikt um die Windkraftanlagen in Mexiko im Rahmen eines von der Rosa-Luxemburg-Stiftung geförderten Promotionsprojektes.

Schlagnworte: Erneuerbare Energien, Mexiko, Politics of Scale, Soziale Konflikte, Windenergie

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Abstract

Large-scale wind farms are highly contested. In southern Mexico, especially local residents protest against the construction of these projects of transnational companies, which generate electricity from renewable resources for end consumers in other parts of the country. The Working Paper describes the context and the main issues of conflict. It examines with a perspective on scale, power relations and politics, why and on which scale actors benefit or not, which strategies actors pursue to assert their interests, and on which power resources they can rely on in this process of rescaling. The paper argues that this is a fruitful perspective to analyze political processes and conflicts related to renewable energies.

Biographical Note

Rosa Lehmann is researcher at the BMBF-Junior Research Group „Bioeconomy and Inequalities“ at the Friedrich Schiller University Jena. Currently she works on bio-energy in Germany in the context of the emerging bioeconomy and examines political debates and actions as well as technological inventions with a perspective on inequalities and possibilities for a decentralized energy system. Between 2012 and 2016 she researched for her PhD on the conflict surrounding wind farms in Mexico. The research project on contested wind energy was funded by the Rosa-Luxemburg-Stiftung.

Keywords: Mexico, politics of scale, renewable energies, social conflicts, wind energy

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1 Introduction: socio-environmental conflicts over renewable energies

Bioenergy is an important pillar in strategy and policy papers on the emerging bio-economy (EU 2007; OECD 2009). Certain studies have analyzed its controversial sides, like the demand for land which rivals with the production of plants needed as food and feedstock, the (re)production of inequalities, a negative CO₂ balance, or social contention surrounding biomass production (e.g. Backhouse 2015; Borrás et al. 2010; Brad et al. 2015). Although researchers and policy makers at least in Europe now see the future of bioenergy in the more efficient use of agricultural or forestry waste products, or in biotechnological innovations related to the use of enzymes or algae¹, analyses point out that we have to be careful to count on biomass potential to sustainably satisfy the global need for energy in the medium-term future (see e.g. Haberl et al. 2010). In these debates on the future of the energy system, sun and wind energy serve as supplement and alternative to bioenergy.² One argument in this respect is that wind farms and solar parks are considered to compete to a lesser extent with agricultural land needed for edible crops.

Existing conflicts related to wind energy projects teach us, that the construction and operation of wind turbines can reinforce preexisting controversies over land use, ownership and decision-making processes. These controversies are not limited to Europe and North America (e.g. Pasqualetti 2011). In the last years, Latin American countries like Brazil, Chile or Mexico have become a target for investment in renewable energies. The business magazines Forbes states that “[w]ind power, in particular, seems to have caught investors’ eyes.”³ In Mexico, “one of the world’s most promising new wind markets”, optimists expect an annual installation of 700 MW.⁴ In fact, former and current federal governments have launched ambitious plans to increase the share of renewables in the national energy matrix: Between 2012 and 2017, the installed production capacity to generate renewable energy grew to 11

¹ See for an overview: Grefe 2016, also e.g.

<https://www.pflanzenforschung.de/de/journal/journalbeitrage/endlich-rentabler-biosprit-das-bakterium-zymomonas-mobi-10378>,

<https://www.pflanzenforschung.de/de/journal/journalbeitrage/vom-gras-zum-sprit-einem-schritt-bakterien-vereinfachen-10265>, <https://www.spektrum.de/news/energiewende-mit-algen-zu-sauberer-energie/1352317>, last access 2018-07-03.

² See <https://www.umweltbundesamt.de/themen/klima-energie/erneuerbare-energien/bioenergie#textpart-6>, <https://www.solarify.eu/2017/08/30/214-bioenergie-auf-dem-weg-zum-flexiblen-strom-und-waermelieferanten>, last access 2018-04-05.

³ See <https://www.forbes.com/sites/mergermarket/2017/07/14/wind-investors-blow-into-latin-america/#91770a6dd62f>, last access 2018-04-05.

⁴ Quote by Ramon Fiestas, chair of Global Wind Energy Council Latin American Committee <https://www.windpowermonthly.com/article/1389241/market-status-latin-america#Mexico>, last access 2018-04-21. For comparison: In Germany, experts predict the installation of 4,000 MW in 2018, that is 25% less than in 2017. Still, for the fossil-based energy system in Mexico, 700 MW is not negligible.

times the amount of 2012.⁵ So far, the lion's share of renewable energy for electricity (around 20 percent) in Mexico is produced in large hydroelectric dams.⁶ Wind energy, on the other hand, had an overall capacity of 3,000 MW in 2016⁷ and is, to this day, almost exclusively produced in 24 large-scale wind farms located on the Pacific coast of the Isthmus of Tehuantepec in the southern state of Oaxaca.⁸ Although wind energy still contributes a relatively small percentage of Mexico's share of renewable energy production (4.7 percent⁹), wind has become "big business"¹⁰.

Meanwhile, the construction of more than 1,000 turbines in the semi-rural region of the Isthmus is a highly contested issue. Local organizations and assemblies question the economic benefits and criticize ecological impacts of the wind energy projects. With support from (trans-)national NGOs, they denounce central planning without considering possible impacts on the local level and speak against the defiance of participation rights for peasants and indigenous communities (cf. Baker 2012; Castillo Jara 2011; Friede/Lehmann 2016; Grunstein Dickter 2016; Oceransky 2009). Many of these actors question the global narrative on wind energy and claim that the idea of wind energy does not live up to its promise of creating an economically, ecologically and socially sustainable alternative to the prevailing fossil fuel regime (cf. Friede n.d.; Jiménez Maya 2011; Lehmann 2014). While critics in and outside the Isthmus are intimidated and harassed by security agencies and police forces (cf. Dunlap 2017), disputes between and within communities can also develop into physical violence. The link of transnationally organized crime with powerful proponents of the wind farms make the situation even more dangerous for critics in the Isthmus.

This short description shows that 'energy' and the transformation of the energy system cannot be understood properly with a technocratic focus preponderantly inherent in most of bioeconomy related strategy papers (see Backhouse et al. 2017) on the most efficient use of the resource. Instead, 'energy', or the appropriation of natural resources for energetic purpose, is inseparably linked to social relations and therefore reflects historical conflicts and power asymmetries between actors (cf. Lohmann/Hildyard 2014; Mitchell 2009). Thus, the transformation of the energy system has to be considered as a social process (cf. Wissen 2016). These processes are

⁵ See <https://www.forbes.com/sites/mergermarket/2017/07/14/wind-investors-blow-into-latin-america/#91770a6dd62f>, last access 2018-04-05.

⁶ See <https://www.eleconomista.com.mx/empresas/Capacidad-eolica-crecera-70-al-2018-Amdee-20170223-0086.html>, last access 2018-04-05.

⁷ See <http://www.mittelstand-nachrichten.de/verschiedenes/weltweit-schlagen-herzen-fuer-windenergie-20160916.html>, last access 2018-04-05.

⁸ BBC News, 20th of August 2017, <http://www.bbc.com/news/av/world-latin-america-40992087/the-winners-and-losers-of-mexico-s-wind-power-boom>, last access 2018-04-05.

⁹ See <http://www.mittelstand-nachrichten.de/verschiedenes/weltweit-schlagen-herzen-fuer-windenergie-20160916.html>, last access 2018-04-05.

¹⁰ BBC News, 20th of August 2017, <http://www.bbc.com/news/av/world-latin-america-40992087/the-winners-and-losers-of-mexico-s-wind-power-boom>, last access 2018-04-05.

contested in many places, and unequal actors on different scales legitimize and forcefully negotiate their interests regarding the current and future arrangements of the energy system.¹¹ Thus, the following paper seeks to analyze the contested process surrounding the appropriation of wind in the Mexican Isthmus of Tehuantepec. Three questions guide the paper: Who benefits economically and socially on what scales from the windmills, and who does not? How and on what scales do different actors try to utter, legitimize and institutionalize their interests, what processes of rescaling can be observed? And how do these aspects shape and affect their power resources? The theoretical background for the analysis are concepts which emphasize the dialectic relationship between nature and society (cf. Brand/Görg 2003; Bryant/Bailey 1997; Görg 2004) as well as a scalar perspective and debates on 'politics of scale' (Smith 1992; Swyngedouw 2001; Wissen 2007, 2008).

The paper is structured as follows: After this introduction, I will sketch my analytical framework in section two. In section three I will describe the context for wind energy development: (historical) land issues, economic projects, and political processes. In section four, I will portray the arrival of the wind turbines stressing the role of information, decision-making processes, and relevant regulation. In section five, I will outline the distribution of costs and benefits and in the section six, I will examine narratives surrounding wind energy development and show how actors legitimize their interests. Although I sum up the main findings in relation to the theoretical approach at the end of each section, I will elaborate some further conclusions in section seven and give a short outlook for future research.

The paper is based on empirical fieldwork in Mexico in 2014 and 2015. The results of the field research were triangulated with grey literature (government documents, NGO papers etc.) as well as with existing scientific studies (e.g. Jiménez Maya 2011; Nahmad et al. 2014; Oceransky 2009). The period analyzed encompasses the development of wind energy from the late 1980s onwards, with a focus on the years between 2010 and 2015. In the research as well as in the paper I neither focus on a local entity, e.g. a community or a town, nor a single project. Instead, I refer to the conflicting dynamics spreading across the whole region, because the wind energy development entails a regional dimension and actors behave in reference to events in other communities, since social networks transcend village borders.

¹¹ I am aware that current energy regime still relies heavily on fossils and will so in the nearer future since the dominance of the fossil-nuclear-actor coalition is nowhere broken (see e.g. Haas 2017; Rodríguez 2018).

2 Scale, power, and the social construction of nature

To analyze the conflict related to wind energy projects in Mexico I refer to concepts within the research fields of Political Ecology (e.g. Alimonda et al. 2017a and 2017b; Perreault et al. 2015) namely Critical Geography (e.g. Smith 2008) and studies on nature inspired by Political Economy (e.g. energy, climate, biodiversity; see Brand/Görg 2003; Dietz/Vogelpohl 2015; Koch 2012; Lohmann/Hildyard 2014; Mitchell 2009; Wissen 2016). The central assumption of research within these fields is that nature and society are inseparably connected (cf. Bryant/Bailey 1997; Görg 2004; Robbins 2012). Humans have to transform nature via work, language and knowledge to reproduce their conditions of survival. This process happens “under specific ‘social relations of production’” (Swyngedouw 2001: 3; also, Koch 2012: 17-24). Or, as Markus Wissen puts it, nature is (up to a certain degree) “socially produced materiality” (Wissen 2008: 74), i.e. it inscribes itself

“in social power relations and conversely, the specific form of production (transformation, appropriation, control) of nature is itself constitutive for social domination.” (ibid., own translation)

This implies, that “societal relationships with nature” (Görg 2004) are contested and subject to constant struggle and change. Therefore it is necessary to include a historical perspective and contextualization in the analysis on conflicts related to the appropriation of nature. Further, as notably scholars from Critical Geography stress, such conflicts are even in a globalized world necessarily place based:

“Under capitalism, place as (produced) nature (socially transformed or given) becomes a central element in the forces of production that shape and partly condition accumulation trajectories and strategies [...]. At the same time, place embodies a historical layering of crystallised social relations.” (Swyngedouw 2001: 4)

The place and space where these contested social transformations of nature occur are “socially produced” (Castree 2015: 4-10). Moreover, according to this argumentative line, societies are spatially organized according to vertical scales (cf. Swyngedouw 2001: 5; Wissen 2007: 235-238). This means that,

“[t]he construction of scale is not simply a spatial solidification or materialization of contested social forces and processes [...] Scale is an active progenitor of specific social processes. In a literal as much as metaphorical way, scale both contains social activity, and at the same time provides an already partitioned geography within which social activity takes place.” (Smith 1992: 66)

Scalar configurations are not fixed levels, but “the outcome of socio-spatial processes that regulate and organize social power relations.” (Swyngedouw 2001: 5) During these contested processes of reshuffling and reshaping e.g. a certain mode of political regulation (rescaling), unequal actors relate intentionally or not to specific scales to reshape power geometries in their interests, they do “politics of scale” (Wissen 2007: 230). In this political process of rescaling, power asymmetries can be disar-

ranged to the advantage of some and detriment of others (cf. *ibid*; Swyngedouw 2004).

In general, studies and theoretical discussions, which analyze the potential of examining social processes with the perspective on politics of scale, therefore emphasize the following questions for research: On what scales can actors institutionalize their interests? How can scale influence their power resources and how can actors relate to different scales for their purposes? (cf. Wissen 2007: 235-238; see also Hein 2016; Kurtz 2003; McCarthy 2005; Wicke 2018) Some use the category of scale jumping or „jumping scales“ (Smith 1992: 60, 66), if an actor is successful in a process of rescaling and e.g. can broaden actor coalitions or narratives legitimizing its interests on a higher scale. For empirical analysis, it seems further fruitful to adopt the analytical separation into “scales of regulation” and “scales of meaning” (cf. Wicke 2018: 9): Scales of regulation refer to norms, rules and laws, where they are negotiated, what geographic range they imply, and what contested social processes surround them (*ibid.*). Scales of meaning refer to “scalar narratives attributing different meanings to places and landscapes express social conflict on scales of meaning” (Hein 2016: 19).

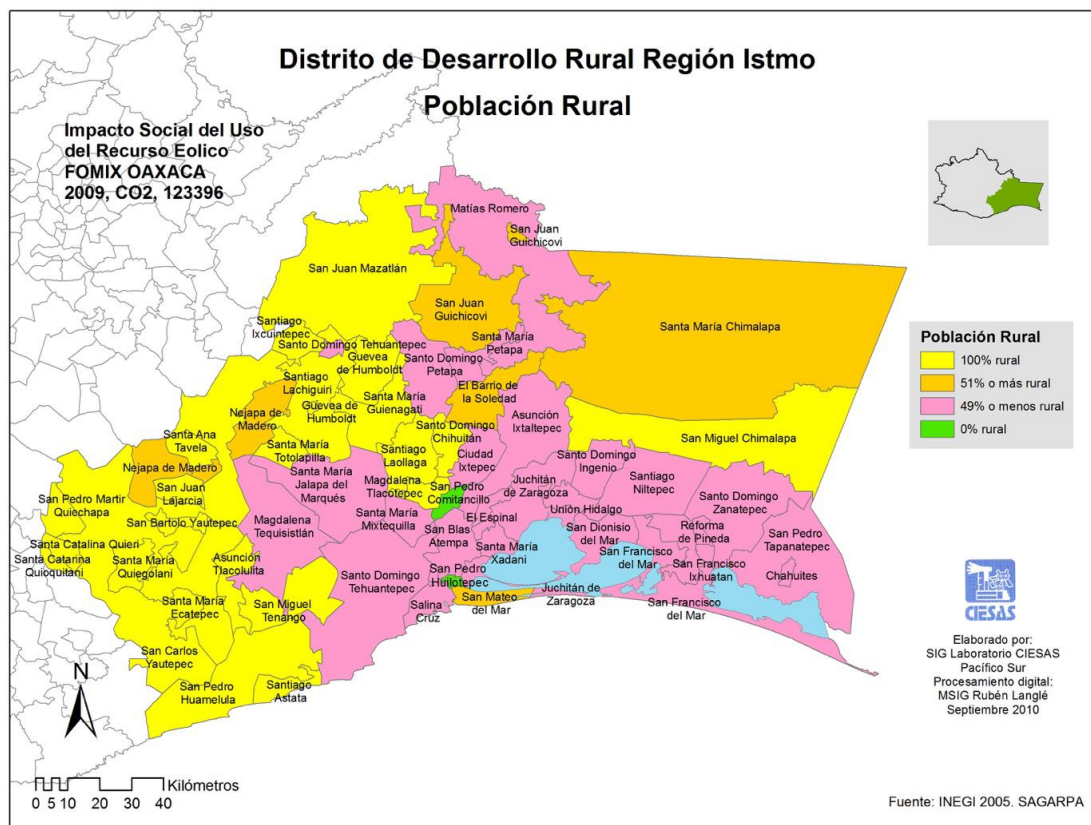
For a conflict surrounding the appropriation of wind, this perspective seems useful for three reasons. First, it includes the ‘social’ as inextricable bound to the appropriation of nature (wind). Renewable energy is always situated in relations of production and (historical) social processes. Second, globalized dynamics as wind energy development can be set in relation to local, regional, or national dynamics without privileging one dimension and the related actors. Third, studies including the scale perspective on environmental issues emphasize, that unequal actors not only dispose of different power resources to pursue politics of scale, but also “contribute to, are affected by, or seek to resolve environmental problems at different scales” (Bryant/Bailey 1997: 33, 34-37), thus adding a perspective on ecological inequalities to the debate on scale and scalar politics. In this regard, I understand power

“in relation to the ability of an actor to control their own interaction with the environment and the interaction of other actors with the environment” (Bryant/Bailey 1997: 39).

As actor I define a social group which shares a common position in a given conflict, articulate and act according to this position, and can empirically be separated from other actors (cf. Boris 2008: 10-13; Dietz/Engels 2014), without implying that actor groups are totally homogenous (cf. Buckel et al. 2014: 55). Class position, but also categories of difference like race (in the case of the Isthmus an indigenous ethnicity) and gender, as well as age and formal education influence what power resources actors can rely on (cf. Winker/Degele 2009) and thus deploy in scalar struggles related to the appropriation of nature. In the paper, the term ‘power resources’ relates to the (access to) information and political arenas of decision-making, financial means for lobbying, who can utter their interpretation of a named problem and who is heard,

who benefits economically and socially from policies and projects and who does not (cf. Bryant/Bailey 1997: 39-43; Dietz 2011: 176-181).

Graphic 1: Municipalities and rural/urban population in the Isthmus of Tehuantepec



The map is titled "Districts of rural development in the region Isthmus of Tehuantepec, rural population". The colors indicate if 100% (yellow), 51% or more (orange), 49% or less (pink), or 0% of the population lives in rural areas. Map by CIESAS Pacífico Sur, based on dates of INEGI and SAGARPA, https://langleruben.files.wordpress.com/2014/06/010-poblacion-rural_istmo.jpg, last access 2017-07-17.

3 Scalar struggles over land, 'development' projects, and the influence of centralized (state) authority

Historically, the Isthmus of Tehuantepec has been a bottleneck for trade in precolonial and colonial times (coffee, salt, indigo and cochineal). Control of trade routes and territory has always been related to questions of political authority. The economic basis of the Isthmenians relied on trade, agriculture and cattle raising (cf. Tutino 1993: 45-47). After Spanish conquest in the mid-15th century as well as after independence from Spain in 1821, indigenous groups questioned political and socio-spatial authority of the centralized political power, e.g. regarding taxes and trade routes (cf. Bautista

Martínez 2010: 56-57; Tutino 1993: 53-60). Nonetheless, indigenous Zapotecs of the Isthmus, notably the town of Juchitán, fought with President Benito Juárez against French soldiers, who had the task of forcing Mexico to pay off war debts to its international creditors (cf. Bernecker et al. 2007: 203-217). The attempt of Isthmian Republicans to gain political autonomy after the Mexican Revolution (1910-1920) failed, and it was up to the powerful Isthmian *cacique*¹² Heliodoro Charís to pacify rebellions in the following years by a combination of social concessions to loyal followers and severe repression against opponents (cf. Binford/Campbell 1993: 7; Purnell 2006).

Until the mid-20th century, there was still land available, which eventually became the object of an extensive appropriation process. Peasants and cattle farmers had been using land according to informal use rights. The plans of dictator Porfirio Díaz (1876-1911) to build an interoceanic canal, a trans-isthmian railway, as well as the construction of an intercontinental road at the beginning of the 20th century, boosted speculation and land purchase up to the 1950s (cf. Bernecker et al. 2007: 226-240; Tutino 1993: 60). After the revolution, *cacique* Charís distributed land among his followers (cf. CódigoDH 2014: 21), thereby perpetuating colonial practices of giving large land plots to loyal conquistadors. Nonetheless, multiple claims on land did exist, especially around Juchitán and Unión Hidalgo: Indigenous peasants referred to it as communal land¹³, while others claimed to have privately bought land plots in the context of the canal-and-railway-plans. This situation became serious around 1960, when the local inhabitants became acquainted with the federal government's propositions to construct the large Benito-Juárez-dam and the connected irrigation system DR 19 (Distrito de Riego 19) covering large areas of the Isthmus. These envisioned projects further fueled land purchases and claims for land. Competing decrees by two successive presidents decided that a large area around Juchitán and Unión Hidalgo were to become a collectively organized agrarian community (López Mateos-decree 1962), and that private titles issued before 1955 would be valid in spite of the previous enactment of the agrarian community (Díaz-Ordáz-resolution 1965; cf. Binford 1993: 89-94). These multiple land claims and the connected land conflicts around the DR 19, together with growing discontent with the local branch of the authoritarian PRI,¹⁴ laid the grounds for the Coalition of Workers, Peasants and Students of the Isthmus CO-CEI (*Coalición Obrera, Campesina, Estudiantil del Istmo*). Starting as a social move-

¹² *Caciques*. Local leaders in rural Mexico; *Caciques* were a central pillar of the authoritarian regime of the Institutional Revolutionary Party PRI (*Partido Revolucionario Institucional*, governing the country between 1929-2000). *Caciquismo*, which can be translated as "boss politics" (Knight 2005: 5), is part of Mexican political culture. It is based on informality, patronage, charismatic leadership and repression (ibid.).

¹³ Communal land or land of an agrarian community (span. *comunidad agrarian*) is the term for a collective form of land tenure and organization related to land use issues. An agrarian community needs to have a so-called 'Indigenous root'.

¹⁴ The PRI emerged out of different fractions after the Mexican civil war and was in power from 1929 to 2000 (and again since 2012). PRI-rule was based on the incorporation of large sectors of the society by social concession and brutal repression against any opposition.

ment with a socialist program based on the cultural identity of the Zapotecs (cf. Campbell 1993; Zermeño 1993: 194), the COCEI of Juchitán became the first opposition party in Mexico to win (municipal) elections against the PRI in 1981. The latter did not accept the results. During a decade of political fights, COCEI not only mobilized in Juchitán, but also was a central part of a growing protest movement against authoritarian PRI-rule. COCEI-intellectuals and artists successfully presented themselves in the international human and Indigenous rights scene (cf. Campbell et al. 1993; Giebeler 1994: 97-99). After the PRI had accepted electoral victory of the COCEI in 1989, the political party was divided in different fractions, which respectively built different coalitions with Mexican parties at the federal level. Despite their emphasis on land-redistribution in the beginning, COCEI-fractions have been demonstrating similar dynamics of paternalism and patronage as do other Mexican parties (cf. Bautista Martínez 2010: 206-214). Some of those COCEI-istas who had criticized the COCEI for adopting a reformist, state-supporting attitude while taking distance from radical politics, are now politically active in the opposition against the wind farms. Although the COCEI certainly did distribute land to landless peasants (sometimes by means of occupying large estates), a significant part of the fertile land remains in the hands of private landowners and/or is used for cash crops (sorghum, sugar cane). Therefore, the problems of unevenly distributed land as well as the multiple land claims on large areas around Juchitán and Unión Hidalgo are not resolved. The irrigation system did bring some possibilities for planting cash crops but did not live up to the 'development dreams' its proponents had promised (cf. Warman 1993: 101-104).

Parts of the Isthmus were not included in the irrigation system DR 19. Especially around the lagoon, indigenous *Ikoots*-communities have faced a significant deterioration in the quality of agricultural land (salination, pollution, deforestation, erosion) due to green-revolution-agriculture and the nearby oil refinery (cf. Nahmad et al. 2014: 91, 105-106; Zarate Toledo 2010: 273-275). Moreover, these strongly marginalized communities still face harsh disputes over land control. Generally, different land claims have been associated with different forms of political representation. For instance, up to the 1990s, fishermen in the *Ikoots* village San Mateo del Mar have been more or less represented by PRI-members elected by consuetudinary law¹⁵ in the urban nucleus. By contrast, those who wanted to establish an agrarian community live(d) in different *barrios* and allied with the opposing Party of the Democratic Revolution PRD (*Partido de la Revolución Democrática*)¹⁶ in the 1980s, supporting secret ballots and lists of candidates based on a multi-party-system (Interviews San Mateo del Mar and Tepeyac; cf. Cruz Rueda 2011; Hernández-Díaz/Zarate Toledo 2007).

In this situation, rumors of plans for a "mysterious project" (La Jornada del campo, 2010-04-17, own translation) grew stronger in the Isthmus in the 1990s and early

¹⁵ On customary law in Oaxaca see e.g. Anaya Muñoz 2005 and Eisenstadt 2007.

¹⁶ The PRD was founded in 1989 by dissident PRIistas. It is now one of the three well-established Mexican parties and cooperated with the PRI regarding contested reforms in the last years.

2000s, although Isthmenians have been used to plans issued at the desk in Mexico-City for them and their region: All presidents since the 1960 had sought to boost container transport via train or road on the transisthmian corridor, planned new oil- and gas pipelines from the Caribbean to the Pacific and launched plans for regional integration and development (cf. CódigoDH 2014: 18).¹⁷ In the beginning of the 2000s, the Plan Puebla Panamá (now Mesoamerican Project) sought the economic, infrastructural and energetic integration encompassing Mexico's southern states and different Central American countries (cf. IDB/Proyectomesoamerica n.d.; Maihold 2010: 141-143). Wind energy exploitation in the Isthmus, often labelled wind corridor in company, political or media documents, is seen in this context. The latest initiative for 'economic develop-ment' in the Isthmus came from president Peña Nieto (2012-2018), and his successor Lopez Obrador immediately assumed the plans for vast Free Trade Zones in the whole south of Mexico with the Isthmus as one core¹⁸. All these initiatives have been facing critique and protest by parts of the inhabitants in the Isthmus, often with linkages to other (Indigenous) groups in southern Mexico and Mesoamerica¹⁹.

To sum up, political authority and control of land (e.g. for agricultural production, trade routes, economic and infrastructural projects) in the Isthmus are bound to a long history of political struggles. Actors on different scales took distinct positions regarding the land question and the integration of local politics, especially in Juchitán, into centralized institutional structures of the colonial, postcolonial and revolutionary state: Actors outside the Isthmus together with some parts of the Isthmenian population transformed the region for infrastructure projects and cash crop production. Local actors struggled with and against the impact of these projects on land control, seeking some sort of political autonomy from the federal state before, during and after the Mexican Revolution. Especially COCEI was an important actor in Indigenous social movements struggles for Indigenous rights in Latin America since the 1970s, had transnational networks and challenged the Mexican PRI-regime in the Isthmus as well as on a national level. Of further importance for this paper is that, at least since the beginning of the 20th century, the mentioned economic and infrastructure projects have not only been planned in Mexico City but also justified with global narratives on economic progress, modernization and development. Localized conflicts surrounding the distribution and use of land on the local level have also been (re)produced due to these decisions on the national level and global narratives.

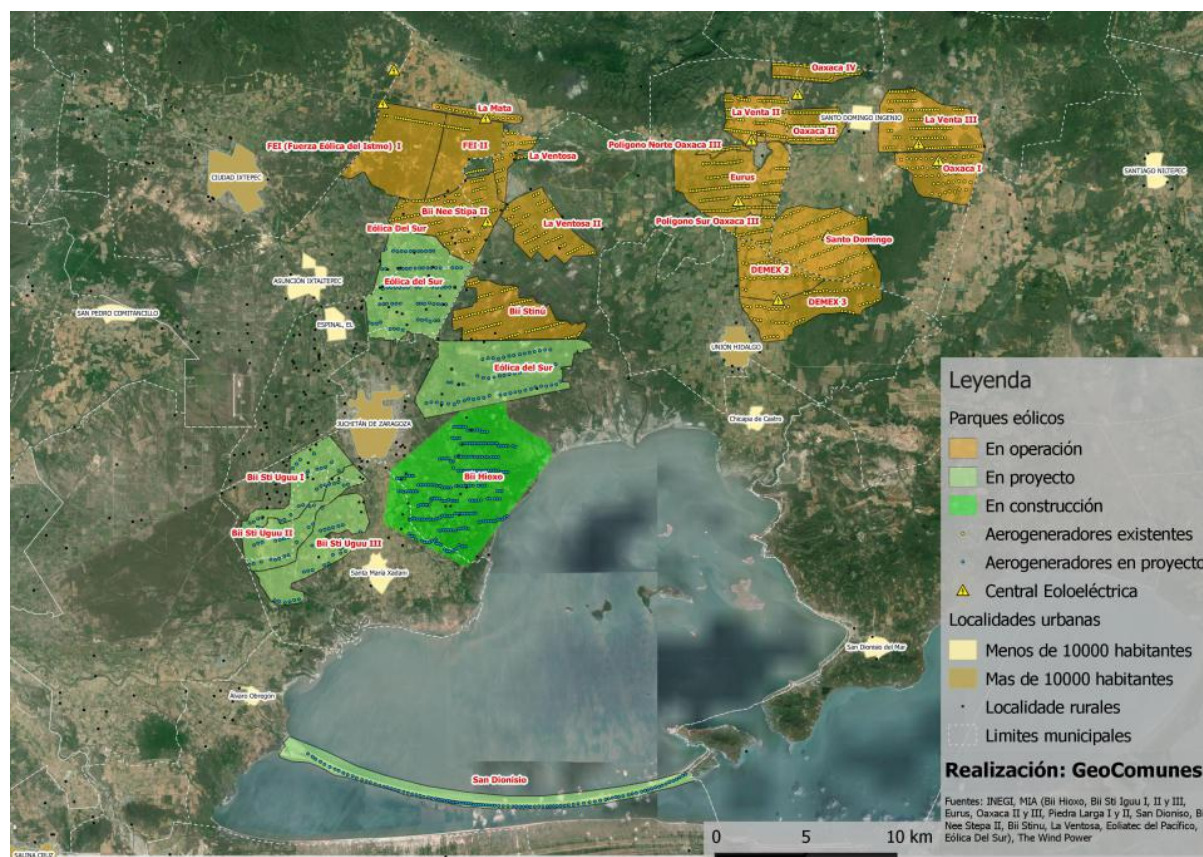
¹⁷ See <http://www.jornada.com.mx/2018/07/31/opinion/017a1pol>; also <https://oaxaca.quadratin.com.mx/el-corredor-transistmico-de-diaz-a-lopez-obrador/>, last access 2018-08-08

¹⁸ See <http://www.elfinanciero.com.mx/economia/corredor-del-istmo-sera-la-columna-vertebral-de-las-zee-expertos>, last access 2018-08-04.

¹⁹ Often, (Indigenous) political activists refer to Mesoamerica rather than Central America when talking about networks and related struggles e.g. against mining in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica or Panamá.

These localized land conflicts have not been addressed by neither local actors, nor regional (state), or federal state authorities.

Graphic 2: Projected and existing wind farms in the Isthmus of Tehuantepec (by autumn 2014)



The map shows already operating (orange), prospected (light green) and wind farms under construction (green) in 2014. The urban settlements indicate a population of less than 10,000 residents (beige) and more than 10,000 residents (light brown) within municipalities (white dashed line). Map by GeoComunes, based on data by INEGI, MIA (Bii Hioxo, Bii Sti Iguu I, II and III, Eurus, Oaxaca II and III, Piedra Larga I and II, San Dionisio, Bi Nee Stipa II, Bii Stinu, La Ventosa, Eoliatic del Pacifico, Eólica del Sur). <http://geocomunes.org>, last access 2017-07-17.

4 Scales of regulation: actors and decisions on wind turbines

In this context of contested land control and political disputes context, windmills were installed. Up to now, the turbines face rejections from parts of the population. In the following section, I examine who was interested in, discussed and decided over wind energy projects and on what scale.

4.1 Regulatory framework and pro-wind-actors

In Mexico, development of wind energy is deeply connected to the geographic conditions and technological potential of the Isthmus. Different sources emphasize the excellent quality of the wind²⁰. Historically, the Mexican energy system and its politics have been based on oil (cf. Maihold 2010; Wolf 2007). Although scientists from the Isthmian Institute for Electric Research (*Instituto de Investigaciones Eléctricas*) pointed out the good quality of the wind in the 1980s, neither politicians nor the state-owned Federal Electricity Commission CFE (*Comisión Federal de Electricidad*) showed much interest. At the beginning of the 1990s, private actors from the energy sector became more and more interested in wind energy, notably European developers. In 1994, CFE set up a first small wind farm with six turbines (cf. Borja Díaz et al. 2005: 41-48). Concurrently, private corporations and real estate agents began to lease land slots in the late 1990s. From 2000 onwards, in the coastal town of Huatulco, private corporations, state officials, and landowners have been discussing wind quality and the “allocation of land prior to the tender process” (PODER 2011: 33). Many of these corporations had linkages to politicians, especially in the networks of the Spanish People’s Party PP (*Partido Popular*) and the Mexican neoliberal-conservative-rightwing Party of National Action PAN (*Partido Acción Nacional*, in government from 2000-2012). One agricultural corporation later sold the lease contracts to wind energy firms, which had already obtained licenses from the Commission for Energy Regulation CRE (*Comisión Reguladora de Energía*) to exploit wind energy (Interview La Venta; Nahmad et al. 2014: 147).

The regulatory framework which enabled private actors to enter the, up to 2013 highly nationalized, energy market in Mexico dates back to 1992. President Salinas changed the ‘Law on Public Services for Electricity’ LSPEE (*Ley del Servicio Público de Energía Eléctrica*) from 1975 in order to modernize production and reduce state spending through the attraction of private investment (cf. Borja Díaz et al. 2005: 44). The regulation foresaw “loopholes” (Wind Power Monthly, 2014-07-31) for the private sector to produce electricity as independent energy producer (IEP) and – a somehow misleading term – self-supplier (*autoabasto*). An IEP sells energy to the CFE, which holds the monopoly on transmission lines; a self-supplier does not directly produce energy for himself, but instead has bilateral contracts with private corporations for some years (cf. Oceransky 2009: 208). *Autoabasto*-producers enjoy some indirect subsidies, e.g. they do not have to sell surplus electricity in times of strong winds to the CFE to fixed prices, but they can stretch it over the year to balance different wind densities (cf. PODER 2011: 8). The *autoabasto* model represented the dominant form for energy production in the Isthmus of Tehuantepec at least up to 2015, with mostly large companies like Walt Mart Mexico, Peñoles (mining), CEMEX (cement), Heineken and Femsá-Coca Cola as end consumers. Investors or developers

²⁰ The average speed in 50 meters height is more than 8.5 m/s, i.e. it has a potential of 6,250 MW (cf. Cancino-Solórzano et al. 2011: 3554; also, NREL 2004).

have to participate in a tender process and are obligated to make financial contributions to the construction of substations and transmission lines. Still, developers have complained about unclear circumstances regarding grid development and feed-in rates. Competing interests and duties between the state agencies CFE and CRE have caused the delay of some projects, which wind energy developers have come to perceive as 'Mexico-made problems' (Interviews World Bank, EDF and Acciona; cf. Borja Díaz et al. 2005: 48-51). The 'Law on the Use of Renewable Energies and the Financing of the Energy Transition' LAERFTE ('Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética'), promoted by former president and green economy advocate Felipe Calderón²¹ in 2008, laid an additional basis for the liberalization of the energy sector (cf. Wolf 2007: 23-24), although several questions regarding the regulation of grid and rates remained open (cf. GIZ 2015: 21; PODER 2011: 7; SENER/GTZ 2009). A detailed regulation for wind turbine construction on the local level, for example, was not mentioned in the policy papers on wind energy development in Mexico up to 2015 (Interview SENER).

Against the backdrop of this fragmentary regulatory framework, already strong actors in the renewable energy sector – European and North American corporations and transnational consortia – entered the market and built wind farms and operate mainly as self-suppliers. They could afford the long tender processes until they obtained allowances to start with the construction and disposed of the technology and the financial stock (e.g. shareholder capital as well as loans for climate protection projects) needed for the CRE and the CFE to accept participation in the bidding process as well as the networks and knowhow to be successful (Interviews EDF, Acciona, Developer; cf. Kreiner 2012: 13; GIZ 2015). Accióna/Nordex, Iberdrola, Gas Natural Fenosa, Gamesa/Siemens, EDF, ENEL, Vestas and Clipper are the main energy producers and manufacturers for turbines in the Isthmus of Tehuantepec, normally operating through a Mexican subsidiary company. Wind farms need high investment for the developing and construction process due to technological, transportation and construction reasons, whereas operating costs are relatively low (Interview Developer). Money for the installations in the Isthmus came from private banks, through the Clean Development Mechanism, the Clean Technology Fund, the European Investment Bank, the EU-Latin American Investment Facility (LAIF), the World Bank and the Inter-American Development Bank (IDB). This means that powerful transnational actors and actor coalitions benefit from the particularly strong winds in the Isthmus of Tehuantepec.

²¹ Calderón was e.g. keynote speaker in 2011 at the 'Clinton Global Initiative' for climate protection and renewable energies, and fervently argued in favor of business possibilities in the 'Green Solutions Forum', a parallel event of the COP 16. See <https://www.clintonfoundation.org/clinton-global-initiative/meetings/annual-meetings/2011>, and http://www.greensolutionscop16.com/pdfs/boletin2GS_en_05dic.pdf, last access 2016-03-25.

4.2 Dis-/Information and uncertainty

Since December 2006, companies have been obligated to present studies to the Ministry of Environment and Natural Resources SEMARNAT (Secretaría del Medio Ambiente y Recursos Naturales) on possible ecological impacts (Ecological Impact Assessments/EIAs; cf. Cancino-Solórzano 2011: 3553; Huesca-Pérez et al. 2016: 956-957), a prerequisite for the CRE to issue the licenses for the projected wind farm. Private consulting agencies or the wind company itself investigated potential ecological impacts (e.g. for Fuerza Eólica del Istmo/Peñoles and Clipper, SIGEA 2007). Moreover, companies – and in the case of Ixtepec the state enterprise CFE – largely failed to discuss the obligated EIAs with affected inhabitants (Interviews Unión Hidalgo and Ixtepec). The EIAs prognosticate rather briefly the impact of one specific wind farm but exclude the multiplying effects of hundreds of turbines in different parks in short distance to each other, e.g. on rain water systems due to concrete sealing.

The issuing of EIAs and discussions on wind potentials and licenses for wind farms all happened ‘outside’ the Isthmus – e.g. in Huatulco or Mexico-City. This reflects the perception and claim of political actors in federal institutions that politics on energy are federal government concerns (Interview SENER; cf. Maihold 2010; Wolf 2007). On the local level, residents of La Venta, where the first wind farms were built, recall increasing rumors after the beginning of the new millennium, of a ‘great project’ for the Isthmus (Interview La Venta). In the following years in many locations of the Isthmus, inhabitants repeatedly have been remarking that ‘something happens’, e.g. ‘outsiders’ conducting measurements or construction vehicles being parked in the area of potentially licensed land. Questions to federal, state (Oaxaca) and district officials on the respective situation were not answered and this reinforced the feeling of being left in abeyance and uncertainty on projected wind farms and their impacts (Interviews La Venta, Unión Hidalgo, San Francisco del Mar, San Mateo del Mar, Tepeyac). This is why the Isthmus is an example of what Anthony Bebbington, Nicholas Cuba and John Rogan refer to as “geographies of uncertainty” (in their case related to mining projects; Bebbington et al. 2014). As soon as residents of a certain area notice plans of some sort of economic or infrastructural project, insecurity and uncertainty on the projects prevail and dominate their perception. Visions of the future alter, “all imagined on a relatively large scale (lots of jobs, lots of pollution, big roads [...])” (ibid.). Moreover, this relates to a common skepticism to rely on information provided by state officials and consultants, which reflects the distant relationship to state institutions based on a highly exclusive and selective presence of the state in Mexico (cf. Müller 2006; Pansters 2012).

Furthermore, it is contested what could be the ‘adequate’ (distribution of) information. For instance, an official of the Inter-American Development Bank claimed that the transnational consortia Mareña Renovables and the IDB as creditor had provided thorough information on the planned wind farm ‘San Dionisio’ (132 turbines), they even had provided the study by a PowerPoint-presentation, and that the infor-

mation on ecological impacts, e.g. on fish, was publicly available. While this statement by itself is correct and the study was available in Spanish and on the internet, it did not seem to occur to the IDB-official that many people living in the Isthmus of Tehuantepec do not speak Spanish as their first language, or that especially elderly land holders and members of marginalized communities did not finish primary school and thus cannot read fluently. Furthermore, many do not dispose of the skills and the access to retrieve information from the internet. By contrast, local critics question the information provided by the companies, financial institutions and in the EIAs. They refer to own experiences and to 'local', 'Indigenous knowledge' (for the concept and the discussion around it see e.g. Horowitz 2015; Lanzano 2013; Hauck/Köbler 2004). In some cases, activists work together with scientific researcher on inquiries to federal state institutions concerning future wind energy projects in the Isthmus and their impacts.

4.3 Contested wind: critics and protest

Protest against the wind farms was spatially and temporary related to the installation and construction of the turbines. The social base of the opposition movement differs in each location: small landholders (with collective and private land titles) who want better conditions for land plots they previously had rented out to wind companies; land holders who consider themselves part of collective land regimes (*ejido*²² or agrarian community); residents and community members who feel left out by fellow land holders who rent out land to wind companies and ignore collective decision making processes; fishermen fearing pollution and the loss of livelihood due to projected wind farms in the lagoon area (i.e. in shallow water, on sand banks); local activists with experience in political struggle, often assuming the role of 'speakers' due to their educational background. The opposition has had support regarding legal matters and media relations by (inter)national activists and human rights organizations from Oaxaca de Juárez (the state capital) and the capital of Mexico (Mexico D.F.), and in transnational activist networks the cause 'wind in the Isthmus' had gained some attention especially between 2011-2014, when confrontations got severe.

Protest started in La Venta and La Ventosa, where *ejido*-members criticized low rent payments and unfulfilled promises of 'development' by the CFE related to the first wind farm of 1994. After 2008 and parallel to the "wind park boom" (Interview EDF), more and more locals began to get uneasy with the lack of information and the big construction sites next door. Critics set up road blockages and faced some legal pro-

²² *Ejido*: The *ejido* consists of land plots for individual and common use and collective practices for using it. It was broadly established during land reforms in the 1930s, distributing land to small-scale farmers. With changes to the constitution in 1992 in the context of the NAFTA negotiations, agrarian law was altered, which enabled privatization processes.

cesses (Interview La Venta). After the construction of wind farms and some successful negotiations on higher rent payments, protest moved on further to Unión Hidalgo, Juchitán, and to the communities on the direct shore of the lagoon.

Between 2011 and 2014, confrontations between proponents and opponents of the wind farms led to higher levels of attention to the conflict. When a *presidente municipal*²³ in the coastal village of San Dionisio del Mar confessed in 2012 that he did not distribute financial grants of the transnational consortium Mareña Renovables as 'social benefit for the local community', protests became stronger and gained some (inter)national attention. Several NGOs, (inter)national activist networks, journalists and academics critically commented on the issue. When in December 2012 a municipal judge put a halt to the construction of the projected 132 turbines. The judicial explanation contained that the Indigenous *Ikoots* had not been consulted in a free, prior and informed consultation before the onset of the operations although this is foreseen by the Convention 169 on Indigenous Rights of the International Labour Organization which Mexico had ratified. The right on consultation relates to development or economic projects on Indigenous territory. Following this decision, Mareña Renovables cancelled the project for the proposed area. For an alternative land plot, state agencies conducted an up to the date highly contested free, prior and informed consultation (*consulta*, see below). Currently, the conflict rotates around new concessions for wind farms, like in San Blás Atempa, where the Secretary of Defense wants to set up a new wind park. The town of Unión Hidalgo, where 80 percent of the houses are profoundly damaged after heavy earthquakes in September 2017, the Ministry of Energy began to conduct a free, prior and informed consultation on a new wind farm 'Gunaá Sicarú' (115 turbines) of the EDF daughter 'Eólica de Oaxaca', irrespective of the devastating consequences of the earthquake. The consultation process was recently halted by strong protest and a notification of the National Commission on Human Rights²⁴.

4.4 Contested land: decisions on land use change

A contentious issue is the role of participation decision-making process. This is linked either to agrarian law and land use systems or to Indigenous rights. The first wind farms were constructed around the area of La Ventosa, La Mata, La Venta and Santo Domingo Ingenio. This is not only due to very high wind quality and close political ties between Spanish and Mexican politicians like in the case of La Ventosa (cf. Howe/Boyer 2015: 8). Moreover, land around La Mata and La Ventosa is mainly

²³ *Presidente municipal* cannot be properly translated, since he has a function between a mayor and the head of a municipality.

²⁴ See <http://www.nvnoticias.com/nota/90289/eolicas-con-viento-en-contra-rechazo-en-union-hidalgo-oaxaca>, last access 2018-05-05.

owned by private land owners. Although, in the 1970s and 1980s, the COCEI unsuccessfully tried to occupy land plots for collective purpose (ibid.), the individual tenure is not much contested and has facilitated negotiations between landowners and operator firms, e.g. EDF France. Around La Venta, though, the situation is more complicated. Land is organized under the *ejido*-regime, a collective land title. Up to 1992 with the reform of the 21st Article of the Mexican Constitution, land holders of an *ejido* (*ejidatari@s*²⁵) had to decide concordantly and collectively in an assembly on land use change, e.g. from agrarian to industrial purpose. After the reform and a corresponding state-led certification program (PROCEDE/*Programa de Certificación de Derechos Ejidales y Titulación de Solares*) with the goal to gradually privatize collective land the assembly of *ejidatari@s* now only needs a majority of two thirds who are able to vote e.g. for industrial use (cf. Appendini 2001: 16-51; de Ita 2006: 151-164). PROCEDE was not very successful in many parts of the country, but in the Isthmus and around La Venta, many joined the program and consequently considered themselves more as individual owners than as parts of a still existing collective structure (Interviews La Venta and Yansa). When wind farms were installed in the region, the elections of the *ejido* chair²⁶ became highly conflictual and the Oaxaca-state government interfered by supporting openly a proponent for the wind projects (Interview La Venta).

Around Unión Hidalgo and Juchitán, multiple land claims have historic roots and became serious after contradictory presidential decrees (see above). Still, individual landholders leased out land, an act that is condemned by those who demand a collective decision of all members of the agrarian community. In the 1970s, attempts of COCEI activists to officially recognize the agrarian community in that area met resistance of private land owners, a leading activist got killed. When COCEI officially took power in the late 1980s, it seemed obvious that the movement's demands would be put into practice. However, the agrarian community was never officially established (Interview Educa). In 2012, members of the agrarian community of Unión Hidalgo took legal measures and have been trying to prove in court that individual contracts for the wind farms 'Piedra Larga I and II' are null and void, because the company DEMEX would have had to ask the whole agrarian community for land use change (Interview ProDESC).

In the lagoon region around San Francisco del Mar, San Dionisio del Mar and San Mateo del Mar, land control is also contentious (cf. Zarate Toledo 2010, see above). Latent historic conflicts became evident when in San Dionisio del Mar, as well as in San Mateo del Mar, the *presidentes municipales* retained money and manipulated a list of members of the agrarian community as proof of their approval to construct 132 wind turbines (cf. Gerber 2013). Concurrently, critics had demanded that state

²⁵ In Spanish, one form to gender nouns is with the @.

²⁶ The *ejido* council and its chair are in charge of organizing assemblies and execute the decisions taken by the members of the *ejido*.

agencies would conduct a free, prior and informed consultation on every wind farm planned for the Isthmus. Mexico signed the relevant ILO-agreement in 1990, and these international agreements are binding (cf. Binder 2004: 127). After the judicial decision that no consultation had been conducted in these communities, state agencies like the Secretary of Energy SENER (*Secretaría de Energía*) or the municipal administration of Juchitán conducted a consultation process from October 2014 to July 2015. The *consulta* ended with a unanimous 'Yes' in favor of the project (only two out of nearly a thousand being present in the final session voted for 'No', the overall population of Juchitán is more than 95.000; cf. Gerber 2015). The opposition was absence in this last session because during the process, the standards of the *consulta* according to the ILO 169 – free, prior, and informed, with good will, culturally adequate – were not met. The actors who had been in charge of the consultation process were in the past 'pro-wind' and by no means impartial. Moreover, the corridor of decision-making was largely predefined: lease contracts were negotiated years ago by the Mareña Renovables predecessor Preneal, concessions and bank loans were issued, and the turbines were stored in a warehouse in neighboring Salina Cruz. During the consultation, requests on information, e.g. on the socio-economic impact, by community members were not satisfactorily answered neither by company staff nor by state officials (cf. Gerber 2015). Sessions were announced above all via internet in a region with a wide digital gap and many elderly people who hardly finished primary school. Due to these facts, and the harassment of opposition activists, some activists of the opposition movement posed an *amparo*, i.e. a halt to the project, until the cause for the *amparo* is resolved. It was first dismissed but is currently dealt with by the Supreme Court. Meanwhile and in contradiction to law, the wind farm is under construction and the company Eólica del Sur, the successor of Mareña Renovables, payed taxes on land use changes to the municipality and funds for social benefits.²⁷

This reveals that decision-making institutions and processes are in themselves highly problematic and controversial. Different actors refer to different procedures and regulations. So far, those who favor private land regime and who are in the legal position to decide on land lease, because they dispose of land plots, have been to some extent in a more favorable position than those without land or those privileging and struggling for collective decision-making. International agreements like the ILO 169 can provide a wider tool for participation – although it is a matter of identity who defines her/himself and is seen as part of 'the Indigenous population'. The *de facto* application is ambivalent and a matter of academic as well as political discussion in many Latin American countries (cf. Baker 2012; Schilling-Vacaflor 2014; Schilling-Vacaflor/Flemmer 2015).

²⁷ See <http://www.prodesc.org.mx/index.php/es/2014-04-21-22-19-14/2014-04-21-23-13-29/672-comunicado-suprema-corte-de-justicia-de-la-nacion-atrae-amparos-interpuestos-por-comunidad-zapoteca-de-juchitan-sobre-consulta-indigena-de-proyecto-eolico>, last access 2018-05-05.

Summing up: From the first 'ideas' on using wind energy in the Isthmus, different actors were involved on different scales. Transnational wind companies who disposed of technology, knowledge and together with finance institutions of the necessary financial capital entered the Mexican market. For negotiating the scale of regulation, they could rely on political allies and on the fact that renewables had not been interesting for the wider Mexican public and political actors, since loopholes for privatizing the fossil sector would have been more contested Mexico-wide (Interview Heinrich-Böll-Foundation; Academic Staff PT; cf. Wolf 2007). Decisions on the installation of wind farms were first and foremost taken outside the Isthmus by the pro-wind-coalition. In the Isthmus, local administration and landholders faced issued licenses, and inhabitants saw the construction of wind farms they did not have much or any information on. Land use changes were made possible due to conflictive agrarian regulation and historical land conflicts (multiple decrees). Concessions, geographies of uncertainty, changes in access to land due to wind contracts (see below) as well as the construction of turbines and substations constituted new forms of produced nature (see below). Critics of wind farms dispose of far less resources. Still, they pursued the strategy of jumping scales, using international agreements as well as the power of some parts of the Mexican judiciary.

5 Who profits? Costs and benefits for society and nature

Federal state agencies, wind companies and their middlemen, as well as international organizations promote the wind farms in the Isthmus with benefits for the local inhabitants (see below). So far, experiences with wind turbines' impacts on living conditions, job creation and income generation, land relations are punctual and contrast enthusiastic promises. In the following section, I describe these highly contested issues describing costs and benefits on different scales and for different actors.

5.1 Impact on environment-related living conditions of local residents

Wind turbines consist, roughly speaking, of a dome, a pole, the engine pod and the blades (cf. Hau 2014: 67). The turbines in the Isthmus are mostly more than a 100m tall, e.g. turbines of Vestas²⁸ und Gamesa²⁹ have a hub height of 140m and 134m respectively. The foundation of the dome has an extension of up to 19 meters (cf. *ibid.* 532-538). The distance between the poles differ, but they should be set up so that they do not reduce wind mutually. The blades of the turbines are e.g. 112 meter (Ves-

²⁸ See <http://www.wind-turbine-models.com/turbines/693-vestas-v-112-3.3>, last access 2018-05-05.

²⁹ See <http://www.wind-turbine-models.com/turbines/1336-gamesa-g132-3.3mw>, last access 2018-05-05.

tas) or 132 Meter (Gamesa), and the turbines have an average level of performance of 2-3 MW. Wind farms need a high investment sum at the beginning; once the farm is built, there are significantly lower costs for maintenance (Interview developer). In the climate balance of companies and state agencies, the wind farms in the Mexican Isthmus avoid the emission of CO₂. In the case of one of the largest farms, 'Eurus' (167 turbines of 1,5 MW) this implies the avoidance of emission of 600.000 metric tons CO₂ in the global atmosphere per year.³⁰

In the Isthmus, due to the lack of regulation, turbines have been constructed up to a few meters away from houses. Records of sound emissions by locals together with an NGO in Unión Hidalgo show that the 91.5 decibel sound emission measured exceed the limit set by the WHO (55 decibels; WHO, 2010-03-11). After sunset, it is even higher due to heavier windfall (La Jornada en línea, 2014-02-20). At night, the 'disco effect' of the red lights is of negative concern for residents. The deconstruction of the turbines in the case of an accident or expiration – the average life circle of a turbine is 20 years – is unclear to many locals. Although it is the task of the operator, e.g. the CFE has not yet removed two broken turbines of 'La Venta I', fueling skepticism by locals of being left with hundreds of turbines in the case that technological inventions make wind turbines not profitable any more (Interviews Unión Hidalgo and La Venta).

The domes of the turbines have to be anchored around 5m into the ground (,Révolte et morts', 2014-10-05). The Isthmus of Tehuantepec is full of aquifers, the groundwater level is at 1.5 meters at some parts and the communities are living only a few meters above sea level. Peasants around La Venta and Unión Hidalgo observe that the ground has become drier and the water level for agriculture more and more incalculable since the arrival of the turbines (Interview Unión Hidalgo; cf. Oceransky 2009: 206). Although this could also be due to climate change, whose consequences fiercely hit the Isthmus regularly (drought, heavy rains), it is hard to believe that the tons of concrete in relatively small distance do not have any influence on the aquifer. Simultaneously to the increasing dryness of micro regions, it has become harder for rainwater to find its way into the lagoon in those parts where new concrete roads for accessing the wind parks and dozens of turbine domes cut its way off. This leads to a higher level of niter in the stagnant water, as well as on agricultural fields (Interview Unión Hidalgo; statement S.V., consulta Juchitán, 2015-03-03; cf. Nahmad et al. 2014: 148).

In the lagoon region, EIAs (e.g. of Mareña Renovables) claim that the construction of turbines would be harmless for the ecosystem of shallow water, sandbank, shrimp and small fish. Residents however doubt that the insertion of tons of concrete on the thin and shallow sandbank of Santa Teresa would do no harm to the maritime eco-

³⁰ See <https://www.accion.com/pressroom/news/2010/november/mexico-installs-an-accion-wind-turbine-for-the-world-climate-summit-in-cancun/>, last access 2018-05-06.

system. Seafood is essential for the alimentation and income of the local inhabitants (Interviews San Mateo del Mar and San Dionisio del Mar).

Further, most contracts limit the height of vegetation within the wind parks to 2m (cf. Oceransky 2009: 212). People have observed that since the construction of the turbines, endemic fauna like the bird Zanate have become far less present in the region. The Zanate is an important bug eater and thus preventing crop diseases (Interviews Unión Hidalgo and La Venta).

5.2 Jobs, income generation, ownership

Agriculture and fishery still serve to sustain peasant families, and a significant share of local products (e.g. corn, beans, melon, tomato, pumpkin, shrimp, small fish) provides the diet of the inhabitants. Cattle raising is important; goats, for their part, graze only in the drier and saltier area around the lagoon. Formal wage labor opportunities can be pursued in some parts of the service sector; in the huge state-owned PEMEX-refinery in Salina Cruz, or in the construction and transportation sector (Interview Ixtepec and Tepeyac; Nahmad et al. 2014: 85-121). It is mostly within these latter sectors that people find work related to wind energy development. Work is allocated only during a couple of months, namely during those months needed for the construction in situ. For some months, a lot of labor is needed for construction. The contracts are fixed term, and thus without social security (cf. PODER 2011: 19). Contracts for the construction are outsourced by the operators to other firms. The dominant union Confederation of Workers CTM (*Confederación de Trabajadores de México*) is part of PRI corporatism and there have been complaints with yellow CTM-sub-unions. In 2003/2004 the rather oppositional Union of Mexican Electricity Workers SME (*Sindicato Mexicano de Electricistas*) with some small success struggled for better working conditions (ibid; Interview La Venta).

When work is temporarily available, consumption in the villages rises. This tendency drops drastically after the end of the construction phase of the particular wind farm. After that, a handful of engineers, mostly from other parts of the country or from the country of the operator firm, are in charge of the technical service, the turbines of Vestas for instance are operated from Denmark (Interview Yansa and Wind developer; cf. Gerber 2013). Another dozen jobs are in the security sector or maintenance of the terrain, i.e. trimming the plants on the areal and taking care of the access roads (Interviews EDF and La Venta). Wind turbines and related technology is up to now not produced in the Isthmus. Already contested plans for a construction site in a biological reserve area exist. Although technology transfer is one of the goals of the Clean Development Mechanism CDM, under which many wind farms operate, Mexico has the highest import rate for technology compared to other important CDM-countries (cf. Gartmann et al. 2014: 496).

Moreover, due to the regulatory framework, small-scale wind developers or models of community wind farms cannot compete with transnational companies. In Ixtepec, members of the agrarian communities together with the British NGO Yansa founded a 'company with community interest'. This is a figure based on US law, which makes it possible to split income between two equal associates. The projected middle-scale wind park would rely to a large extent on private creditors. In order to enter the bidding process, the company would have had to provide evidence of possessing an annual liquidity of 548 million Pesos to SENER – an amount of money they did not have at their disposal (Interviews Ixtepec and Yansa; El Universal, 2016-07-20). With a scalar perspective, this shows that ownership is concentrated on big transnational companies, which benefit from the particular regulation mentioned above. The project in Ixtepec originated from ideas of local residents and already existing plans for community wind farms in countries outside of Europe and North America of the NGO Yansa. So far, this multiscale coalition has only been successful to a certain extent, since the community of Ixtepec and Yansa have not been able to realize the project. Notwithstanding, ideas of community-ownership and alternatives within wind energy development were supported by this idea: During the consultation in Juchitán, the municipal administration negotiated a small community wind farm – two turbines – the company Eólica del Sur should build by the end of 2018 (El Universal, 2016-07-20). Local ownership in the sense of e.g. German *Bürgerenergiewindparks* (e.g. Radtke 2016) is not possible and seem – at least in the medium-term future – unrealistic in the context of the described power relations.

5.3 Reconfigurations of land relations

The operator firms lease the land, whereby contracts significantly vary, especially regarding payments for lease. To a broad extent, contracts prohibit access to the land once it is leased out, normally for 30 years. The *terrenos* are watched over by a semi-state-private police force Auxiliary Police for Banks, Industry and Commerce PABIC (*Policía Auxiliar Bancaria, Industrial y Comercial*).

Due to the lack of regulation and procedures for implementing wind farms in communities, local municipal and agrarian authorities had and have to negotiate with the private wind firm about regulation (cf. Howe/Boyer 2015: 8; Nahmad et al. 2014: 152). Scholars from the Oaxacan-based social science research institute CIESAS emphasize that after decades of political paternalism and centralistic state decisions, political authorities were not used to negotiate with private economic actors (cf. *ibid.*). This is one reason why regulation for e.g. sound emissions, construction distance to houses and payments of rents left many discontent. The other source of anger is the widespread practices by agents of the operator firms to promise landholders literally the pie in the sky (see below) if they sign contracts. In many

communities, residents report that middlemen of transnational corporations payed for *fiestas* during land lease negotiations, or urged e.g. elderly, illiterate peasants to sign different versions of documents they did not fully understand (Interviews La Venta, Unión Hidalgo, Ixtepec, PODER, ProDESC; cf. Gerber 2013).

The payments for land lease differ from 98 up to 360 Dollar in 2015 annually and per hectare (cf. Huesca-Pérez et al. 2016: 959) and are mostly fixed prices payed exclusively to the land owner or *ejido*-members, leaving out for instance mostly younger people, women and immigrants, since *ejido*-titles were given to male heads of the family. Owners with more than just a few hectares can indeed save money from the lease, especially those with large land plots (cf. Howe/Boyer 2015: 5; Huesca-Pérez et al. 2016: 958). However, landholders who leased out land and other critiques with and without land titles question the benefit from the trade-off of leasing out the land. Apart from lease payments, renting out land for industrial purpose means losing the possibility for subsistence agriculture for decades (Interview Unión Hidalgo; Statement S.V., consulta Juchitán, 2015-03-03).

5.4 Corporate Social Responsibility, distribution of electricity, and taxes

In the last years, an increasing number of private companies pay for social or ecological projects or launch voluntary memoranda of intent related to sustainability (Corporate Social Responsibility/CSR, cf. Burckhardt 2011). The social contributions from private firms are foreseen in the code of conduct of many companies and also in the LAERFTE. In general, CSR projects differ significantly in that aspect as well, and have been under critique (cf. *ibid*; Rajak 2011). In the Isthmus, companies repaired roads, also to have easier access to construction sites, and payed for community activities. E.g. Acciona promoted its commercial activities with paying scholarships and grant funds for a master program for wind energy in the *Instituto Tecnológico del Istmo*. After six years, however, they stopped funding the master program (Interview Instituto Tecnológico). While critics in the Isthmus state that these contributions are small compared to the earnings wind companies make with selling 'Isthmenian' wind, one could ask why these tasks are not considered as responsibilities of the state.

In 2014, based on changes in the taxation law, some *presidentes municipales* began to demand direct taxes from the companies, explaining that tax revenue was to benefit first and foremost the affected communities. This has been an ongoing judicial and political fight, with the companies and federal and state government on the other side claiming that taxes had been payed and extra taxes would be a heavy burden for the investment capability of private actors (La Jornada, 2016-07-19; RIOaxaca, 2015-03-11). This conflict between different governmental actors is also due to the election of mayors belonging to opposition parties than e.g. federal and state government, especially in Juchitán, one of the mayor towns in the region. Furthermore,

the increasing pressure for more social benefits and regulation on the local level does not only root in the activities of the opposition movement, but also in growing demands by land owners and proponents of wind energy projects with a strong discourse on higher leases and gains "for the community", which particularly emerged in the context of a consultation process in Juchitán (see below). These social benefits would e.g. consist of free electricity, or at least for lower prices. Protest against high electricity fees are common in southern Mexico (e.g. Noticiasnet, 2015-02-19). In the Isthmus, more and more inhabitants especially point out to the circumstance that wind energy is produced on their territory, while fees remain the same and marginalized communities do not dispose of enough access to electricity for e.g. daily cooking activities (Interview Tepeyac, San Mateo del Mar; also, La Jornada, 2018-08-14).

5.5 Physical confrontations, harassment, and (death) threats

Physical confrontations in relation to wind energy development are common in the Isthmus of Tehuantepec. Especially between 2008 and 2014, but also in the years around the new millennia, local critics set up blockades to prevent the access to a windmill construction site. There have been several confrontations around these blockades between protestors from different villages and proponents of the wind farms. In the context of incidents around Unión Hidalgo and Juchitán, members of the PRI and the Confederation of Workers CTM attacked protestors, sometimes with arms (machetes, clubs), also sometimes together with the police (cf. Hernández Navarro 2012: 115-117).

In San Dionisio del Mar, municipal elections of 2013 were annulated by the election authority. PRI-members challenged the victory of the PRD-candidate (rather an opponent to wind energy development). Attempts to hold elections again failed due to resistance of the PRDistas who feared electoral fraud. Severe confrontations have been part of this process. Opponents of wind energy, who are also in opposition to the PRI, have been occupying the administration building since 2013. In March 2018, one person was killed when critics of large-scale wind energy development in San Dionisio del Mar were attacked the village with fire guns (RedTDT 2018). In San Mateo del Mar, those who want to further establish an agrarian community and thus collective decision-making processes on land use changes, equally oppose projected wind farms in the area. Furthermore, there is a historical dispute concerning community borders and consequently on the questions who decides on land use changes e.g. for windmills with the neighboring Santa Maria del Mar (see above).

Those opposing wind energy projects were regularly detained, but accusations were dropped after a while due to the lack of proof. In 2012, members of the Resistance Committee of Unión Hidalgo withdrew from negotiations with state officials and company representatives due to severe intimidations and received protective

measures for individuals, whose human rights have been violated (Interviews ProDESC and Unión Hidalgo). In Juchitán, one activist of the opposing Popular Assembly of the Juchitec People APPJ (*Asamblea Popular del Pueblo Juchiteco*) was shot and killed in 2013 by local proponents in company of the Auxiliary Police for Banks, Industry and Commerce PABIC (cf. CódigoDH 2014: 24-28). Different 'speakers' of the opposition movement left the region in 2011-2014 due to death threats, but harassment and threats (dark caravan in front of the house, strange phone calls) are still common.

This happens in a context where organized crime has close links or is intertwined with state institutions (cf. Jenss 2016). Local criminal structures are part of Mexico-wide and transnationalized criminal networks, and the Isthmus is one of the trade routes for drugs. Similarly, Central American migrants have to traverse the Isthmus on their way to central and north Mexico or the United States. For many locals in the Isthmus it is no secret that drug cartels invest in windfarms and that those intimidating critics have linkages or are part of political networks and organized crime.

In sum, the process of appropriation of land by the installation of wind turbines produces different costs and benefits. Transnational wind corporations as well as their money lending institutions profit directly from the heavy winds in the Isthmus. For the 'global atmosphere' CO₂-emissions are avoided by simple counting, leaving out the question of rebound-effects and ecological impacts of the end-consumers of wind energy, like in the mining sectors. Taxes had remained in Mexico-City, and although taxation law makes a different system possible, disputes over taxation for the benefit of the municipality remain and reflects scalar struggles on financial resources and political credibility in the Mexican federal system³¹. While landholders with larger land plots do benefit from the economic activity on their land, and even temporary job opportunities are important for family incomes in the Isthmus of Tehuantepec, land lease rents, jobs and income, as well as CSR, do not alter structural socio-economic inequalities in the region. From 2000 until 2010, the degree of marginalization³² increased in the region, notably in those municipalities where the first wind farms have been constructed (especially Santo Domingo Ingenio and La Ventosa). In 2010, a significantly larger amount of communities disposed of a higher marginalization grade (cf. CONAPO 2000; CONAPO 2010).

³¹ See e.g. Jenss (2018) on disputes surrounding taxation, decentralization, municipal households and austerity policies in the capital of Oaxaca.

³² I refer to the marginalization index (*grado de marginación*) of the Mexican agency National Population Council CONAPO (Consejo Nacional de Población). CONAPO combines access to education, housing situation, and income opportunities in relation to geographical locality and access to infrastructure (cf. Flores-Jiménez et al. n.d.: 3).

6 With the airplane to Denmark?! Scales of meaning and narratives around contested wind farms

State institutions, private companies and international organization relate wind energy development to 'climate protection', often with reference to 'sustainability'. For instance, the Spanish wind company Acciona states in its 'Report on Sustainability' that the company's principles are based on

"sustainability and common good as goals for economic growth, the ecological equilibrium and societal progress." (Acciona 2012: 10, own translation)

The Inter-American Development Bank (IDB) foresees that the projects "simultaneously advance human development and low-carbon economic growth" (IDB 2009). On the level of Mexican government officials, this is complemented with arguments for 'national sovereignty', 'energy security', and also 'development', notably for the local communities. On the local level however, wind farms are not so much connected to climate protection but to narratives on 'development' and 'progress', which first and foremost refers to job creation. This is related to promises made by company staff. Members of the Solidarity Group La Venta (*Grupo Solidario de la Venta*) remember company middlemen promising them that it would be

"the paradise, that they would even give us airplanes, [...] an airport, to fly away from here, to visit Spain, [...] Denmark..." (Interview La Venta, own translation).

Local proponents of wind energy development emphasize direct benefits for those having jobs and/or renting out lands. Implicitly, the 'development' by trickle-down effect plays an important role, since in the time of construction, consumption levels rose in some villages, and in its wake, the opening of some small shops generated further income. During the *consulta* in Juchitán, residents in favor of the projected wind farm continuously shouted "we want work and investment" and "welcome to the company". The opposition on the other hand, refers to 'development' implicitly and explicitly as imposed, or at least not self-determined, or in the words of a member of the oppositional APPJ:

"Nobody is against development. But yes, we want a development for all" (M.L., consulta Juchitán, 3.03.2015, own translation)

Climate protection does not play a significant role on the local level as overarching goal why one should support wind energy development, although the effects of climate change hit the Isthmus regularly (e.g. droughts). Still, critics refer to the environment and its protection turning the promise of 'green development': Wind energy development in the Isthmus of Tehuantepec "no es verde" ('is not green'), is a returning dictum of opposition activists. The *verde* in this sense includes the idea of sustainability, including social sustainability. The latter is seen as being neglected by wind energy development in the Isthmus for the described reasons.

Local proponents of the wind turbines set 'development' in relation to the *campo abandonado*³³. Small scale agriculture and peasantry (*campesin@s*) are seen as having no future, the wind farms as relief to the suffering *campesino*. Wind has always been a great burden, "the wind filled our mouth with sand" but "thanks to God", the companies "knocked on the door", as an inhabitant of Juchitán states during the *consulta*. He further explained to the audience:

"There are no campesinos in Juchitán, because the sons of the campesinos don't want to live as campesinos. But there are engineers who fight for contracts for the construction of wind turbines." (A.C., consulta Juchitán, 3.03.2015, own translation)

In this interpretation, those criticizing the wind farms are against 'development'. 'Development' is understood by those who connect 'wind farms' with 'progress' and 'job creation' in the meaning of modernization theory (cf. Kolland 2007).

Other strong elements in the narratives on wind farm development revolve around locality, collective identities and inside-outside-dynamics and can be connected to the interpretations different actors have on their role in wind energy development in the Isthmus. None of the interviewed developers or public investors perceived themselves as part of the conflict. The 'rebellious locals', 'outsiders from Juchitán and Mexico City', as many put it, with 'unclear or individual political ambitions' were made responsible for the confrontations in 2011-2014, or the bad implementation and behavior of one developer, referring implicitly to Mareña Renovables. Also, state agencies are made responsible for the lack of regulation, moderation of the process and support for local administration (local politicians) or for not intervening more "thoroughly" against protestors (Interview IDB).

Proponents of wind farms, especially actors based outside the Isthmus, frame Oaxaca and especially the Isthmus of Tehuantepec as different from the rest of the country. As a staff member of SENER utters during an interview on the situation in the Isthmus and the *consulta*

"It is a laboratory, especially due to social factors [...] because there exist many phenomena which normally don't exist in other parts." (Interview SENER, own translation)

This discourse has deep roots and is nourished by tales of the brave *Juchitec@s* resisting against the French invasion and other 'foreign' (European or Creole, or central Mexican) influences. When the COCEI challenged PRI domination and contributed extensively to large protests in Mexico in late the 1960s and 1970s, Juchitán became a synonym for dissidence. Scales of meaning related to contested wind energy development thus have historic references to scalar struggles of local actors.

³³ *Campo abandonado*: abandoned land; *el campo* also refers to rurality, small agriculture and is often connected with marginalization and even backwardness.

The opposition movement refers in their interpretation of wind energy development on transnational narratives and mobilizations on universal human rights, including social, environmental and Indigenous rights. Human rights in the Isthmus of Tehuantepec are violated by government agencies and the companies, as well as by security firms and the police. Like in many parts of Mexico, economic projects (especially resource extraction and the related infrastructure) are seen as the main reason for human rights violations (environmental degradation, ignorance of Indigenous rights, and murder of activists). This narrative made alliances between human rights organizations and (fractions of) the opposition movement possible.

Moreover, as mentioned before, wind energy development is largely perceived as 'invasion'. With recurring references to the resistance against the former 'invasions', the arrival of (mostly Spanish/European) developers is seen as "a new *conquista*" (Interview San Francisco del Mar, own translation). To some extent, changes in the mode of consumption, especially the emergence of fast food and the increasing use of drugs, are perceived as secondary invasions, directly connected to the primary invasion of windmills. Proponents of the wind energy projects are considered "to be bought" by local PRI-Caciques and company staff.

The oppositional 'other' to the 'invasion' is the local '(Indigenous) community', which resisted for centuries against 'theft and exploitation' of 'wind, land and territory' by central state actors or capitalist companies from 'outside'. References to ancestors, pre-Colombian goddesses and a 'pure', primordial connection to the land are at the core of claims against resource exploitation, dishonest state officials and capitalist companies. It is important to highlight though, that proponents also refer to the local Indigenous identity as Zapotecs. For instance, during a session of the free, prior and informed consultation in Juchitán, a young man concluded his contribution in favor of the projected wind park with the rhetoric question:

"Are we Indigenous peoples condemned to poverty? What do we leave to the next generation?" (M.S., consulta Juchitán, 2015-03-04, own translation).

Thus, at the core of local narratives, which can only analytically be separated from trans-/national narratives, lies the projected future of the region: What kind of economic activity brings jobs and income? What kind social changes are related to this, and what do they mean for the Isthmenian society? What does 'development' mean at all and what is the role of indigeneity and the peasantry in it? The corridor for this debate is already predefined due to 'nature' as produced place by transnational wind energy development (roads, transmissions lines, turbines, substations), the global narrative of powerful actors on 'climate protection' and 'development'; or, as law professor Shalanda Baker puts it:

"Indeed, the elephant in the room is that development is always already required and consent is viewed within an extraordinarily narrow spectrum." (Baker 2012: 19/FN 93)

Synoptically it can be stated that scales of meaning are part of actor's multiscale strategies to legitimize their political position and actions in the conflict surrounding wind energy in the Isthmus. Actors on different scales can, as a power resource, rely on global narratives on 'climate change/protection' and 'development', and, in the case of the opposition, on 'human rights'. Further, from a scalar perspective, the 'inside-outside' imaginary in the narrative on 'invasion' versus 'indigeneity/locality' (values, practices) seems to mirror to some extent the narrative on the rebellious and different Isthmenians from the perspective of 'the outsiders'. Overall, responsibility for conflict is attributed to actors on another scale. As a result, e.g. state officials and company representatives in Mexico-City do not have to engage themselves in local contexts since the conflict is localized in the Isthmus of Tehuantepec, and thus geographically and politically far from Mexico-City.

7 Conclusion

The dynamics surrounding the construction and installation of large-scale wind farms in the Isthmus of Tehuantepec show that wind energy cannot generally be considered as alternative to fossil fuels. Turbines, substations and transmission lines need land and space, and this constitutes drastic changes in the produced nature. The idea of a neutral technology misleads analysis, since technology for the appropriation of wind for energy is part of society-nature relationships. These relationships are characterized by unequal positions of actors on different scales, e.g. regarding control of land for agriculture or infrastructure or resources to assert their interests.

The history of the Isthmus displays that control of place has been linked to political authority and decision-making processes at least since colonial times. Recurring ideas to link the Caribbean with the Pacific with some sort of transisthmian project and to transform the Isthmus into a development hub – be it by railroad system, cash crop cultivation or wind energy – altered and correspond to scales of regulation. Multiple land claims as well as "geographies of uncertainty" (Bebbington/Cuba/Rogan 2014) produce space, not only locally in the Isthmus, but in connection to different scales since decisions on projects for economic development have been taken outside the Isthmus for decades.

Although in the Mexican context renewable energies were not on the agenda, a powerful coalition of politicians, transnational companies and international organizations asserted the implementation of large-scale windfarm. They refer to climate protection and development with a classical view of trickle-down-effects, and thus have a powerful claim in the context of current debates on climate change. Thereby they reshape the frame of societal relationships with nature, and, to paraphrase Bryant and Bailey, this has further taken away the control over the relationship with nature and concentrates it in the hands of a few (cf. Bryant/Bailey 1997: 39). Costs and bene-

fits of the wind farms are so far highly unevenly distributed and who gets what depends on class position, race, gender and generation, but also on the disposal of technology, political networks, and bank loans.

Against the decision-making process on international and national scales, local critics, faced with the Mexico-wide violence against human rights defenders by the post-PRI-narco-state institutions, claim their right to be consulted according to international agreements, thus forwarding “politics of scale” (Wissen 2007). This not only enables coalitions with national human rights organizations, but also with other movements in Mexico, e.g. against mining or large dams. The *consulta* held in Juchitán was certainly a success for the opposition movement. It opened a space for debates and influenced current initiatives for Indigenous consultation in Mexico (cf. Zarembek et al. 2018). Still, so far, the result is bitter, since the *consulta* proved to be rather the opposite of what it should have been and in current Mexico, a wind company can go on constructing a wind farm even when a legal halt is being scrutinized in the Supreme Court.

Further concessions for wind farms around Unión Hidalgo, San Mateo del Mar and other localities, as well as for mining activities will aggravate the conflictive dynamics described in this paper. The (growing) entanglement of organized crime with political conflicts shape the context of the conflict and become more and more part of it. So far, it seems that Mexico, as a hot spot for wind and increasingly solar energy in other parts of the country (c.f. Zarate Toledo/Fraga 2016), will face further struggles surrounding renewables.

Social science research should place greater emphasis on analyzing further dynamics and associated conflicts on renewable energies, especially in peripheral regions. In particular, scholars of political science should not only concentrate on governance processes and questions of implementation and planning, but on the social construction of nature and space and respective power relations. With the continuing tendency of wind, solar and bioenergy to be of crucial importance for the global energy transition, perceiving nature and society as connected and emphasizing a scalar perspective for “glocalized” (cf. Swyngedouw 2004) and multiscale conflicts.

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