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Two Decades Under Windmills

*Energy Transition and Entrenched Inequalities
in La Venta, Mexico*

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**Overcoming Inequalities in a Fractured World:
Between Elite Power and Social Mobilization**

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Acronyms

BID	Inter-American Development Bank
CEMEX	Mexican Cements
CFE	Mexican Energy Commission
CSR	Corporate Social Responsibility
INEGI	National Institute of Geography and Statistics
NREL	National Renewables Energy Laboratory
PROCEDE	Programme for the Certification of Ejido Land Rights and the Titling of Urban House Plots
RAN	National Agrarian Registry
USAID	United States Agency for International Development

Abstract

This paper seeks to analyse the process through which wind energy expansion has exacerbated patterns of rural inequality in La Venta, Mexico, the site of the first wind energy project in Latin America, established in 1994. Inequalities have arisen between landowners, and between landowners and landless people. Concerning landowners, wind energy rents have increased patterns of inequality among them because the wind industry reinforced long-standing inequalities in land ownership established with the foundation of the ejido—land that was collectively redistributed after the Mexican Revolution. In relation to landless people, they have been affected by a boom in the urban economy during the construction stage of the wind farms and a bust once the operational phase began, and by new kinds of exploitation resulting from non-agricultural labour. By analysing data on de-regularized landownership in the ejido and by drawing on fieldwork interviews, the paper shows that land has been concentrated in a few hands and that there has been a gradual productive shift from agriculture to cattle grazing activities. Asymmetric wind energy rents not only reinforce this trend but also result in different material and social relationships associated with wind energy, with actors benefiting from it in various ways—or not benefitting at all.

Keywords

Isthmus of Tehuantepec; land inequalities; Mexico; renewable energy; wind power

Bio

Gerardo A. Torres Contreras is a final year doctoral researcher at the Institute of Development Studies, Brighton (UK). He is working on the social impacts of wind farms in the global South. He explores land struggles, resistance and processes of social differentiation resulting from renewable energy projects in Mexico. He previously obtained a licenciatura in Political Science at National Autonomous University of Mexico and an MPhil in Development Studies at Oxford, UK. More recently, he has worked with Oxfam on issues of inequality and wellbeing in Mexico.

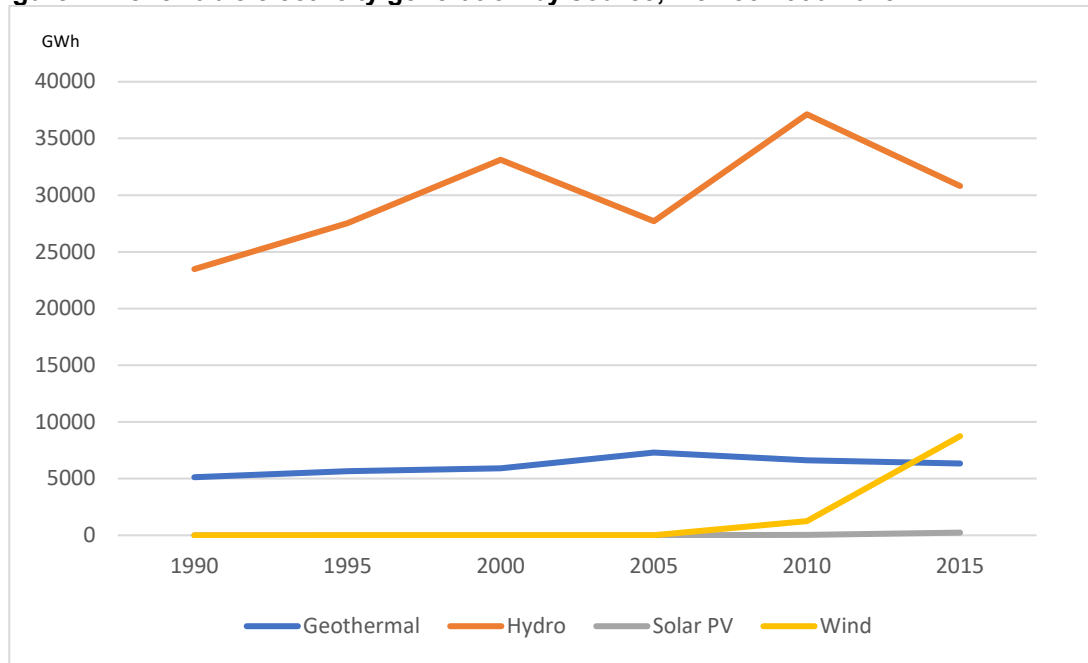
Introduction

Wind energy is playing a significant role in Mexico's energy transition towards the development of domestic renewable energy systems. It is estimated that the country has approximately 12,000 megawatts (MW) of economically viable wind resources, which represents an investment between approximately 13 and 15 billion dollars in the near future (AMDEE and PwC 2014). These climate change mitigation investments are meant to reduce environmental degradation related to fossil fuels, ensure energy security, and foster economic growth and social development (Government of Mexico 2013). The outlook is quite ambitious, with the General Law for Climate Change, passed in 2012, stating that by 2045 at least 35 percent of electricity in the country must be produced by clean energy sources (DOF 2012).¹

As figure 1 shows, wind energy generation in Mexico has skyrocketed since 2005 in comparison with other low-carbon sources like hydropower or geothermal. Unlike other renewable energy sources where land is enclosed, access is restricted and people are displaced from land (Yenneti et al. 2016; Rignall 2015), wind energy expansion entails particular socio-material arrangements (Baka 2016). Since wind power expansion allows productive land activities in combination with energy generation, the impacts of this industry on land and social dynamics are not clear-cut and have to be analysed in the long term. This is salient when considering that energy projects result in two types of social impacts: primary impacts, which occur on or immediately adjacent to a project site, and secondary impacts, which occur in the long run because of infrastructure development, such as road building, population movement, and changes in local economies (Narciso 2016). In the case of wind energy projects, these latter effects can result in a new agrarian structure generating processes of differentiation according to social aspects like gender, class or land ownership (Scoones et al. 2012) with fractured classes of rural labour (Kay 2015; Bernstein 2007). That is to say, the wind industry generates differentiated patterns of livelihood, with winners and losers. While some community members are able to profit, others are forced to engage in non-agricultural labour that carries unique forms of exploitation, as a consequence of productive trends accelerated by wind power (Bernstein 2010).

¹ The Mexican secondary regulation differentiates between clean and renewable energy sources, and includes in its target clean energy sources that are not renewable, such as methane and nuclear power (DOF 2014; 2015).

Figure 1: Renewable electricity generation by source, Mexico 1990-2015



Source: IEA 2020

The vast majority of wind energy development—almost 90 percent—is concentrated in the Isthmus of Tehuantepec, the narrowest point in Mexico between the Pacific Ocean and the Gulf of Mexico, where 25 wind farms operate. This paper will explore the town of La Venta, which saw the installation of its first windmill over 25 years ago and is surrounded by three wind energy projects amounting to 339 windmills,² as an important site for understanding the differentiated impacts of wind energy expansion. This case fills a gap in the scholarship on energy transition in Mexico, as only a handful of studies have elaborated on the long-term consequences resulting from wind energy expansion.³

This paper will argue that wind energy investments have exacerbated patterns of inequality in La Venta in two ways. On the one hand, because patterns of land ownership have shifted over time since the original ejidal allocations,⁴ landowners benefit from wind lease income in uneven ways. Whereas some of them are able to combine wind lease income with agriculture or cattle raising, for others wind leases do not make a difference in terms of livelihoods. On the other hand, landless people also experience the wind energy transition in varying ways. Patterns of differentiation in this group have to do with the urban economy boom during the construction stage, effects on local livelihood strategies and the rural diversification of labour. Acciona Energy, a wind energy enterprise operating in La Venta, has engaged in corporate social responsibility (CSR) initiatives that have tried to address these patterns of differentiation through, for example, the creation of a community centre and investment in infrastructure such as roads, sports centres and scholarships for youth. However, Acciona's social responsibility has not addressed the increasing differentiation affecting various groups of the community (Gay-Antaki 2016). Wind energy, in this sense, plays out in class dynamics and conflicting interests among the local populations by re-articulating accumulation processes and by shaping productive relations in La Venta.

² World Bank 2006; Andrade Saynez et al. 2012.

³ Huesca-Pérez et al. 2016; Juárez-Hernández and León 2014; Oceransky 2010.

⁴ Ejidal land is collective land that was redistributed after the Mexican Revolution of 1910.

By drawing on data on regularized ejidal land and on over 20 semi-structured interviews with *ejidatarios/as*—members of the ejido—and community members⁵ of La Venta between October 2017 and March 2018,⁶ this paper will start by explaining the case of La Venta and the process through which windmills have encroached on the town since 1994. Next, it will depict the patterns of differentiation arising between landowners due to wind energy expansion over the past 20 years. Thirdly, it will explore patterns of differentiation affecting landless people in the community. Finally, this paper will investigate how the wind energy company, Acciona Energy, has tried to address inequalities affecting both groups through the creation of social responsibility programmes, and what impact this has had.

The Case of La Venta: A Town Encroached by Windmills

Although windmill construction did not start until 1994, wind energy potential was identified in La Venta long before this date. Records show that investors began coming to La Venta in the 1970s to reserve productive land for future wind farms in exchange for 50 to 100 pesos (between USD 2 and 4) per hectare (Beas Torres and Girón 2010). The first formal tests, however, did not start until 1986, when experts from the Mexican Energy Commission (CFE), the US Agency for International Development (USAID) and the National Renewable Energy Laboratory (NREL) began gathering data to measure wind speed and power density in the region (Friede 2016). Following these tests, the Mexican government, via the CFE, decided to negotiate to rent land in the north of La Venta in 1993 in order to install seven Vestas windmills.⁷ Because wind energy infrastructure would only occupy between 5 and 7 percent of the leased land, CFE was not interested in expropriating land. Rather, CFE sought to rent the land for a period of 30 years with possibility of renewal, meaning landowners could continue with agricultural activities (Jiménez Maya 2005). Results obtained by the wind farm were so positive that, out of 1,600 windmills in the world with similar features, only those installed in New Zealand came close to the generation values reached by the seven windmills in La Venta (Hiriart Le Bert 1996; Borja Díaz et al. 2005).

⁵ *Ejidatarios* are those individuals who own land in the town (326 members). Community members, on the other hand, refers to those who do not own land, such as a family member of an ejidatario, an enterprise official or a landless individual.

⁶ Names have been changed in order to protect my informants.

⁷ Vestas is a Danish wind turbine manufacturer.

Figure 2: Location of La Venta



Source: Beas and Girón 2010

The installation of the first wind farm, the modification of the Law of the Public Service for Electric Energy in 1992—which allowed private actors to participate in power generation in specific contexts—and the positive capacity factor results from the seven windmills installed in 1994 attracted the attention of investors right away (Borja Díaz et al. 2005). Beginning in 1996, a great number of investors from the United States, Germany, Denmark, Belgium and Japan visited the Isthmus to embark on new business ventures and to negotiate with landowners. It is interesting to point out that a rumour that a few companies had already reserved all of the available land in the region promoted the idea that La Venta had one of the best wind resources worldwide. In this context, both the federal government and the government of Oaxaca started organizing conferences and seminars on the wind energy potential of the region. Also, they announced that collaboration with USAID was agreed to elaborate a “Wind Energy Resource Atlas of Oaxaca”, a report that identified and assessed the characteristics and distribution of wind resources in the region, and to assess whether a 100 MW wind farm could be built in the region (Borja Díaz et al. 2005). In August 2004, CFE announced the construction of the wind farm La Venta II with a projected generation capacity of just over 100 MW and approached landowners with the intention of renting 2,088 hectares of land for 30 years with the possibility of renewal for another 30. Three different annual payments were offered by the enterprise: 1,000 pesos (USD 41) per hectare for right of wind,⁸ 13,100 pesos (USD 542) per hectare for infrastructure building, and payment of between 8,000 and 18,800 pesos (between USD 331 and USD 778) for each windmill installed on the land,⁹ determined by generation capacity (Avilés Hernández 2008). The ejidal assembly approved the project and the construction of the wind farm was completed in 2006. The government’s willingness to facilitate wind energy investments, along with the publication of the Wind Energy Resource Atlas of Oaxaca, changed wind energy development in the Isthmus. This document produced by USAID and the National Laboratory of Renewable Energy states: “Excellent wind resources (power class 5 and above) are widespread in the Isthmus region. The

⁸ Right of wind refers to the payment per hectare of land leased inside a wind energy project (CFE 2012).

⁹ The placement of the windmills depends on the terrain, the wind direction and speed, and the turbine generation capacity. Landowners with large extensions are, thus, more likely to host a larger number of windmills.

highest resource (power class 7) in the Isthmus occurs near the foothills (including La Mata and La Venta), ridges and coast” (Elliott et al. 2003:vi).

The confirmation that Oaxaca had one of the best wind resources quickly drew the attention of the wind industry.¹⁰ While in other parts of the region such as Juchitán, Unión Hidalgo and La Ventosa, contracts were signed between landowners and wind companies (Pasqualetti 2011; Dunlap 2017), in La Venta, Mexican investors under the name of an enterprise called *Maderas y Granos de la Laguna* (Woods and Grains of the Lagoon) began negotiations with landowners (table 1). According to Nahmad, Nahón and Langlé (2014), *Maderas y Granos de la Laguna* offered certain productivity support services to convince landowners to rent the land, such as electronic milking systems or cattle sheds.¹¹ Leased land, in consequence, would be used for cattle grazing and for dairy farms infrastructure. Ejidatarios decided to accept the project because of the potential it offered to increase productivity and incomes. However, in 2008, the contracts were sold to Acciona Energy, in charge of producing energy in association with Mexican Cements (CEMEX) (Acciona Energy 2018). As Dunlap highlights, this also took place in neighbouring towns where enterprises were able to acquire land at the best possible price through middlemen (Dunlap 2017; 2019). Similarly, in 2009, the third wind farm in La Venta, Oaxaca IV, located in the northeast of town with a generation capacity of 101.4 MW, started its operational phase with support from the World Bank and Iberdrola¹² (Iberdrola 2012). Wind energy has spread so fast that today the town is surrounded by three wind farms with only a small amount of undeveloped land in the north of town. It is expected that with the new wave of wind energy farms coming to the region in 2022—when the infrastructure is ready—the remaining available land in the town will be targeted by new wind energy projects.

Table 1. Wind energy projects in La Venta

Project	Developer	Operator	Nominal Power	Turbines
La Venta I	CFE	CFE	1.125 MW	7
La Venta II	CFE	CFE	83.33 MW	98
Eurus	Acciona Energy*	Acciona Energy	250.5 MW	167
Oaxaca IV	Acciona Energy	CFE/Acciona Energy	102 MW	68

Source: Own elaboration

Note: *Land for this project was secured through an intermediary: *Maderas y Granos de la Laguna*

Land Dynamics and Wind Energy in La Venta

To understand how wind energy has exacerbated patterns of rural differentiation, it is important to analyse how land was allocated between ejidatarios when La Venta was founded in 1951 with a total extension of 5,815 hectares of land (World Bank 2006; Nahmad et al. 2014). In 1998, ejidatarios decided to regularise the land through the Programme for the Certification of Ejido Land Rights and the Titling of Urban House Plots (PROCEDE)¹³, dividing 4,707 hectares

¹⁰ Until 2013, the regulatory framework only allowed private electricity generation to be sold to CFE, acting as unique buyer, under three forms: self-generation, cogeneration and independent producer. The vast majority of projects in the Isthmus follow the self-generation scheme, meaning that private-private and private-public entities set up a partnership for the generation and commercialization of electricity among associates paying a fee to CFE. (Huesca-Pérez et al. 2016).

¹¹ Informant 50, 2018.

¹² Iberdrola is a Spanish multinational electric utility company.

¹³ This programme certified land titles and registered individual landowners in communal lands.

between 326 members and leaving 1,387 hectares for common use (RAN 2018a). Ejidatarios acquired property rights over the land and are now able to obtain and to cede the right of usufruct when complying with certain conditions.

Although the initial allocation of land when the ejido was founded sought to provide each member with the same extension of land, the distribution was skewed because of two elements. First, as Aurélia Michel (2009) documents, the lack of clear procedures concerning the ejidal political system allowed the same people to stay in power for periods longer than 10 years.¹⁴ This local elite not only controlled the transactions of land by expropriating or buying from small-scale cultivators but also fostered a process of land speculation, which priced poor landowners out of the market (Michel 2009). Secondly, because of the harsh climatic conditions of the region, land was used following the cycles of production and declining soil fertility. Most small-scale agriculturalists simply cleared, fenced, cultivated and abandoned land as necessary, leaving it unplowed until another ejidatario planted it once again. As Binford states: “claims to land were transient, meaningful as long as the land was actually under cultivation” (Binford 1993:88). These two elements have fostered, since the second half of the last century, unequal patterns in land ownership in the town. According to data by the National Institute of Geography and Statistics (INEGI), there are 300 plots of land in the ejido of La Venta: seven managed by groups and 285 by individuals (RAN 2018b).¹⁵ While the average plot of land owned by 249 ejidatarios with less than 10 hectares amounts to 3.69 hectares, there are 36 ejidatarios owning more than 10 hectares, with an average of 15.8 hectares. That is to say, 12 percent of landowners own 36.81 percent of the land and 88 percent of landowners—including individuals and groups—maintain property rights over the rest of the ejido, 63.19 percent of land (RAN 2018b). The uneven distribution of land at a local level is in line with findings at the national level suggesting that PROCEDURE has led to the selective reconcentration of land in a few hands (see de Ita 2006).

Wind energy rents accrue in this context of land disparity under four categories: the right of wind, payment for infrastructure, payment for windmills and payment for externalities caused by wind energy (Nahmad et al. 2014; Avilés Hernández 2008). The first, right of wind, refers to the only payment landowners are guaranteed to receive. It is a fixed quantity stipulated in the contract, ranging from 6,000 to 8,000 pesos (between USD 250 and 333), to be paid on a yearly basis around the month of March. The second payment has to do with the exact place where companies decide to build roads and infrastructure.¹⁶ This payment is based on the square meters of land the project is utilizing and amounts to up to 15,000 (USD 625) pesos per square hectare. However, considering that a wind farm occupies only from 5 to 7 percent of the available land, the payment is not significant for landowners. The payment for windmills depends on the exact place where the wind energy company places the turbines and on the wind turbine capacity. This payment can amount to up to 15,000 (USD 625) pesos per year. Finally, payment for externalities refers to compensation landowners can receive because of problems caused by wind infrastructure such as oil spills, floods or unevenness in the terrains. The quantities landowners receive vary according to infrastructure and land and, consequently, what they can do with these resources differs.

¹⁴ The ejido follows the Law for the Agrarian Reform. The ruling body is the ejidal assembly—made up of all of the landowners in La Venta—whose duty is to manage any arrangements having to do with land (DOF 2018). Every three years, the 326 landowners elect leaders, 12 persons divided into two committees: the ejidal commissariat—in charge of representing and enforcing agreements taken by the assembly—and the surveillance council—in charge of accountability (DOF 2018). The commissariat and the individual landowners can provide a third entity with the usufruct of land for a maximum of 30 years, with the possibility of renewal for another 30 years (DOF 2018).

¹⁵ There is no information available for seven plots of land.

¹⁶ Some wind farms include electrical transmission cables, others do not. These specificities are stipulated in the contracts between landowners and wind enterprises.

The effect of wind energy rents on patterns of inequality in the ejido is observed in relation to the productive activities taking place in the municipality. Because of the proximity of the town to an irrigation channel, the main activity of the ejido before wind was agriculture, including the cultivation of crops such as sugarcane, maize, beans, squash, watermelon, sorghum and sesame. However, due to the decrease in sugarcane prices, the permanent closure of the sugar mill in the neighbouring town, the constant plagues affecting maize and sorghum, the harsh climatic conditions, and wind energy rents, cattle grazing and related activities have replaced agriculture in La Venta (World Bank 2006). When analysing data from the INEGI at the municipal level, which encompasses several ejidos, it is possible to observe a transition from crops normally grown for human consumption, such as maize, to those intended for cattle grazing, such as grass and sorghum, from 1991 to 2007 (see table 1) (INEGI 1998, 2018a). Data on the ejido corroborates this transition at the local level. While maize is cultivated only on 183 hectares, cattle grazing activities account for 2,347 hectares. On the other hand, 1,754 hectares do not present any productive activity¹⁷ (INEGI 2016a). What this data suggests is that wind energy has accelerated a transition from agricultural activities to cattle raising (INEGI 2018a). This is because wind energy rents facilitate investments in less labour-intensive activities to the extent that 81 percent of the agricultural use in La Venta is related to cattle grazing (INEGI 2018a).

Table 2: Agricultural use in Juchitán 1991-2007

	Crops	Land Extension (hectares)
1991	Maize	10,835
	Sugarcane	2,168
	Sesame	304
	Beans	257
2007	Grass	3,000
	White Maize	2,093
	Sorghum	971
	Yellow Maize	757

Source: (INEGI 1998; 2018a)

For some of the landowners I interviewed, wind energy has played a salient role in these phenomena in combination with other aspects such as the irrigation channels. As one of my informants put it, wind lease income has allowed them to escape from the harsh climatic conditions of the region and the low prices affecting agriculture by allowing them to invest in high quality cattle, feedstock, and cattle sheds, among other things. By investing some of the additional income in cattle grazing, they are able to transition towards a more profitable productive activity. Miguel's experience owning and leasing out seven hectares of land is insightful in this regard. He told me that engaging with agricultural activities was not worth the effort anymore. Whereas with agriculture he can only aspire to make 4,000 or 5,000 pesos (between USD 166 to 208) provided there are no plagues, with cattle grazing one can make as much as 30 times that, around 150,000 pesos (USD 6,251) per year by just feeding, fattening and selling a small number of calves. Again, as this paper will explain below, this productive trend is socially differentiated. While some of the landowners benefit from wind lease income and transition towards cattle grazing, others rely on subsistence agriculture to meet their basic needs.

In addition to a productive shift in the ejido, wind energy has also nurtured a tendency to abandon agriculture at the local level. The regularity and certainty of wind energy rents has provided a

¹⁷ This makes reference to land, mostly in the communal area, that is not hosting a wind project.

safety net to ejidatarios, as their income is guaranteed for the next 30 years, or 60 if their contract is renewed. When analysing data from INEGI, it is possible to observe that over a period of 16 years, the number of productive units¹⁸ in Juchitan decreased by more than half. Whereas in 1991 there were 3,428 productive units (68,666 hectares), in 2007 there were only 1,990 units (25,296.57 hectares) (INEGI 1998, 2018).

The safety net provided by wind lease income has allowed landowners to shift their investments into education and training for their families. This has engendered a new generation of professionals in the town that do not engage with farming activities. Inés' case illustrates this trend. With the revenue her father obtained from renting his land, he decided to invest in his children's education. Inés went to Juchitan to earn a degree in business administration. When she came back to La Venta, Acciona Energy hired her to be the link between the community and the enterprise's local social responsibility department. Her role is to communicate the community's demands to the enterprise and vice-versa. Currently filing the paperwork to receive the rights to the piece of land that she inherited from her father, she is not interested in continuing with agricultural activities. Rather, she lets grass grow every year and then rents it for cattle grazing.¹⁹

The ejido thus faces a process of land concentration, a productive shift towards cattle grazing and a slow abandonment of agricultural activities. Wind energy production exacerbates and reproduces inequalities associated with these trends. For example, while some landowners are able to invest their lease income in high-quality cattle and a shed, other landowners can only afford to use their lease income to grow maize and sorghum for self-consumption purposes. These trends also affect the landless community members. The abandonment of agriculture and the low labour intensity of cattle grazing means that less people are required to work the land. As a result, many of them have been forced to look for jobs in non-agricultural sectors or to migrate, depending on their engagement with the urban economy, as this paper will explore.

Patterns of Inequality Between Landowners

Wind energy production has reproduced patterns of inequality within the community of La Venta, as not all ejidatarios benefit from wind energy in the same way. The level of investment, productive activities and money received by ejidatarios varies according to the extensions of land they own. In this sense, wind energy rents exacerbate the inequalities arising from uneven allocations of land in place since the foundation of the ejido. While some landowners have been able to embrace the shift to wind energy, others do not have the means to invest in their land and are forced to continue with agricultural activities, leaving them vulnerable to the harsh climatic conditions in the region as well as low prices affecting agriculture.

My informants tended to agree that the size of land area where wind energy rents start to make a difference in livelihood strategies is around 20 hectares.²⁰ This threshold represents the point at which landowners are generally able to earn enough revenue in wind lease incomes in order to invest in agriculture, cattle grazing and/or machinery. Take, for example, the case of Damian. He rents over 40 hectares of land to Eurús wind farm, although this land does not host a windmill. He is able to cultivate 35 hectares with sorghum and maize and on the remaining hectares he has

¹⁸ Defined as the economic unit formed by one or more terrains in the same municipality with agricultural or forestry activities under the same administration (INEGI 2018b).

¹⁹ Informant 7, 2018.

²⁰ Informant 30, 2017.

over 20 head of cattle that he feeds with the sorghum that he cultivates. Damian's income is therefore comprised of the payments he receives from leasing the land, the sale of both maize and surplus sorghum, and the sale of milk to cheesemakers in the region. In case of an economic shock affecting agricultural prices, Damian can fall back on milk sales, the selling cattle if needed, and, of course, the payments he receives from the wind energy company,²¹ which amount to 320,000 pesos (USD 13,335) per year according to my informant.²²

The case of Cirilo provides similar insights. He was part of the ejidal commissariat in 2004 when Acciona Energy sought to secure land in the southern part of the ejido for the wind farm. Because he was one of the local brokers promoting the project among the community, he managed to lease over 40 hectares of land. Just like Damian, Cirilo has been able to diversify his income resulting from productive activities. On his tract of land, he cultivates five hectares of maize that he sells to the community or that he consumes, and he has over a hundred head of cattle producing an average of 70 litres of milk per day, which he sells to cheesemakers for 6 pesos (USD 0.25) per litre. Most importantly, however, is that Cirilo bought a tractor to work his land and when he is not using it, he rents it to acquaintances or friends in the town. With his various sources of income—wind energy rents, cattle, milk production, maize sales and tractor rents—he is better equipped to face economic shocks and to continue investing in his land. With the profits obtained from selling crops, milk, and cattle, as well as wind lease income, many landowners with enough hectares are not only able to accumulate wealth, but some of them have also managed to buy more land on sale inside the wind energy farm.

These narratives contrast with the experiences of ejidatarios with smaller tracts of land, illustrated by José's case. He rents four hectares of land to Eurús wind farm. Although previously he worked the land with the help of his father, when he died, José had no means to continue with this productive activity. He recounted that the 20,000 pesos (USD 833) that he receives from leasing land to the wind company are barely enough to meet his basic needs. In consequence, unlike those with enough hectares to be able to invest their rent payments back into their land, José has not been able to invest in agriculture and his land is unproductive now.²³ Along the same lines, Victor Garcia explained that those who own less land are unable to invest in their terrains and, ultimately, and in case of a contingency, may be obliged to sell their land. Moreover, Victor noted that people with less leased land in the town are more vulnerable to suffer from the environmental externalities resulting from windmills. Wind energy infrastructure affects bird migration patterns and in turn agricultural activities in the ejido. In his years as a farmer, windmills have decreased the bat population in the region as a result of them becoming trapped in the wind blades (Rapp et al. 2011). Before the windmills, bats would feed on the aphid plagues that affect sorghum cultivation. Nowadays, with the diminished bat population, this plague runs freely and affects landowners in differentiated ways. Whereas those with vast extensions of land can use some of the money from wind energy rents to invest in hybrid sorghum seeds resistant to droughts and plagues, those with small extensions of land can do little to cope with this shock. Further, they are subject to losing more of their harvest because of the plague and therefore may not have the means to re-invest in productive activities in the future. They may even be obliged to sell their

²¹ Damian leases 40 hectares of the land, but he does not host windmills nor infrastructure works. This means that he only receives rent from the wind company for right of wind.

²² Informant 13, 2019.

²³ Informant 30, 2017.

land as a last resort.²⁴ Both of these narratives show that those with less land are more vulnerable to climatic changes²⁵ affecting agriculture and struggle to invest in necessary adaptations in the face of these.

The narratives and experiences of large and small landowners explored show the ways in which wind energy expansion generates uneven outcomes at the local level in the long term. This is because wind energy exacerbates land dynamics and processes of social inequality. While those with enough land manage to combine rents from windmills with investments in agriculture and machinery, those with less ultimately do not make enough from wind energy rents to invest in their land to increase productivity, as they must utilise most of this income to fulfil basic needs.

Living Without Land: Inequality in La Venta

According to INEGI, approximately 2,100 people live in La Venta (INEGI 2016b). Due to the nature of the ejidal system, the vast majority of its inhabitants are either landowners or immediate family of landowners; very few have no rights over land. When I asked landowners about landless people, I was told that there were approximately 90 to 100 individuals in town without land, falling under two broad categories. The first category is composed of migrants who came to La Venta from the neighbouring states of Chiapas and Veracruz for work. This is the case of Concepción. She was born in the neighbouring state of Chiapas. Before moving to La Venta, she lived in Mexico City where she met her husband. Through a relative, her husband was invited to work in town on the land of an ejidatario. In spite of having lived in town for over 30 years, they were never able to become ejidatarios²⁶.

The second category of landless people are female descendants of landowners who were not able to inherit land because of regulations in the Mexican Agrarian Law, resulting in only 16.3 percent of ejidatarios being women (Katz 1999). Since the beginning of the twentieth century, women have accounted for a small minority of ejido members. Women could become ejidatarias only if they were the sole breadwinner of a family; if they attained rights over land, they would cede them if they married an ejidatario. The agrarian reform of 1972 was the first regulatory framework that attributed the same rights to women to become ejidatarias. Women could gain rights over land without being head of a household and they would not lose the ejidatario status when marrying other men (Cotula 2007). Despite this reform, the percentage of female ejidatarias averaged 15 percent throughout the 1980s in Mexico because of two main reasons (Hamilton 2002): first, the nature of land inheritance²⁷ has favoured sons over spouses or daughters (Cotula 2007); second, women inheriting land from ejidarios who intestate tend to be elderly and they rely on male relatives for productivity or on renting their land to other ejidatarios. In addition, if they do not manage to have their land worked, the law establishes preference for long-term users, providing a legal basis for dispossession (Hamilton 2002). In this sense, while legally possible, female ownership rarely happened in la Venta. The experience of Carolina—whose brother, the

²⁴ Informant 22, 2017.

²⁵ The Isthmus of Tehuantepec been affected by changes in precipitation due to climate change (see Bravo-Cabrera et al. 2017; SMAEDSO 2018).

²⁶ The ejidal Assembly can decide to give the right of ejidatario to certain individuals according to their rules of procedure (see DOF 2018).

²⁷ Inheritance norms in many ejidos have favoured sons over spouses and daughters. According to the Agrarian Law, the ejidatarios have to select one person who will inherit the right to land (see DOF 2018).

first and only son in her family, was granted property rights when their father died—illustrates this process.²⁸ The experience of these two groups, migrants and landless community members, is valuable for understanding gendered processes of rural inequality in town.

The general narrative that landowners convey is that wind energy rents have benefited the extended community in La Venta. According to Pablo, after the installation of windmills in town, the minimum salary increased by almost 100 percent. Whereas before the expansion of wind energy, a landowner like him would pay around 80 pesos (USD 3) per day to someone working the land, now he has to pay around 150 (USD 6) pesos for the same labour. He attributes this change to the fact that when wind energy companies came to town, they started paying higher salaries to local people, responding to inflation caused by the urban economy boom (Dunlap 2017). This was characterized by a local boom in non-agricultural activities and opportunities for employment and service provision during the construction phase, followed by a reduction in such opportunities once the construction phase ended.²⁹ Therefore, he is obliged to do the same if he hopes to find someone willing to work for him. In this way, he is under the impression that he is not only helping his relatives but also the community in general by sharing some of the profits.³⁰ Along the same lines, Victor García recalls the time in the early 2000s when the ejidal commissariat decided to build over four kilometres of paved roads, or the time when, in collaboration with the wind energy company, they offered 10 scholarships for local youth to study in Juchitan. In addition, he emphasized how in collaboration with the wind energy company, the ejido has been able to build a community centre as well as a sports facility.³¹ However, despite the described positive effects of wind energy expansion, landless people's narratives and experiences contrast with landowners' viewpoints and challenge the idea that wind energy has brought benefits for the community in general.

Whether landless people have benefited or not from the arrival of the wind industry has depended to large extent on their engagement with the urban economy generated by it. While some of the landless people were able to keep their businesses—albeit with fewer customers than during the construction phase—like Ceci who runs the only canteen in town, some others were forced to close their business and branch out into smaller ventures. Valeria, for instance, opened a small canteen when the construction phase started where she would cook meals every day for five engineers. This, however, only lasted for a few months. When the construction phase ended and the operation phase began, most of the workers left town and she found herself struggling to keep the canteen open because of competition with other local businesses. Nowadays, she sells empanadas every fortnight to members of the community.³² Carolina's narrative is also insightful in this regard. Before the windmills, she had two ovens in her dwelling where she would prepare tortillas and other foods. In her experience, since people started to make money from windmills, they prefer to go to Juchitan or other towns to buy tortilla or to have them delivered directly to their homes. Carolina, as a result, stopped preparing tortillas and now has a small stationary shop in front of a high school where she sells soda and candies to students.³³

²⁸ Informant 11, 2018.

²⁹ The wind industry can create between 0.43 and 2.51 jobs per MW during the construction, manufacturing and installation phases, in comparison to 0.27 jobs during the operation phase (see Huesca-Pérez et al. 2016).

³⁰ Informant 21, 2017.

³¹ Informant 22, 2017.

³² Informant 46, 2018.

³³ Informant 11, 2018.

Landless people's narratives also challenge the idea that wind energy expansion has resulted in employment opportunities for the majority of the community. Octavia's children started working for Acciona Energy when the wind farm construction began. However, following construction, the company only kept two community members employed on the wind farm. Because of the aforementioned productive trends taking place in the ejido and the lack of employment in the operational phase, they could not find any work in La Venta and they decided to try their luck in Mexico City and the United States. In addition, wind energy has brought new kinds of exploitations related to non-agricultural labour. Octavia's children, during the very limited time they worked for the wind energy company, were obliged to sign a contract every two or three months. By establishing a zero-hour contract, the company avoided paying into their pension and contributing towards their social benefits.³⁴ Even if some individuals managed to engage with the urban economy, the pattern was still the same. Olivia's husband, after working for more than 20 years for the wind companies, never received social security. When he suffered a diabetic coma, he was refused treatment by the hospital and died. Now, Olivia is widowed and does not have the right to an allowance because her husband was never registered for social security by the wind enterprises.³⁵ It seems, in this sense, that once the wind energy construction phase ends, displaced labour cannot be re-absorbed into other productive sectors, changing employment levels and income distribution (Gamu et al.2015; Ross 2007).

Finally, landless people's narratives challenge the idea that the wind industry has brought benefits for the community through the construction of basic services and infrastructure. One of the most striking examples comes again from Olivia. She argues that although La Venta produces electric energy, her quarterly electricity bill often amounts to 4,000 pesos (USD 165).³⁶ For a widow who manages to survive on selling poultry and prepared food, this amount is unmanageable.³⁷ She does not understand, in this sense, why she has to pay 4,000 pesos when the company makes millions from the ejido.³⁸ Carolina's experience with the sports centre built right in front of her house follows the same pattern. When she first looked at the blueprint, she supported the idea because they were planning to build a common room, parking lots, showers and a football pitch. However, the project was never finished, and, from the original plan, they only managed to build a dusty running track and football field.³⁹ Landless community members do not feel that they have benefited from the infrastructure projects planned for the entire community. The cultural and sports centres have become white elephants, unfinished and unused.

Landless people in La Venta have contrasting experiences and narratives concerning wind energy expansion. Similar to landowners, the uneven outcomes are differentiated. The benefits landless people have received—or not—depend on their interaction with the urban economy resulting from wind energy. While some have been able to establish successful businesses, others have been forced to migrate or to branch out into other ventures like stationery or smaller canteens.

³⁴ Informant 9, 2018.

³⁵ Informant 9, 2018.

³⁶ Residents have no rights to the energy produced by the windmills. Because of the framework with which it is generated, the energy is only traded between Acciona Energy and CEMEX, meaning residents have no decrease in their electricity bill.

³⁷ Informant 9, 2018.

³⁸ Informant 9, 2018.

³⁹ Informant 11, 2018.

CSR Geared Towards a Differentiated Community

Acciona Energy has played an important role in corporate social responsibility (CSR) programmes in the region. Before the energy reform in 2013,⁴⁰ social responsibility towards host communities was not mandated in the wind industry regulatory framework. However, some enterprises chose to volunteer, for example Eurus wind farm. As one Acciona Energy employee in charge of managing Eurus wind farm puts it, they decided to invest in social responsibility as part of an agreement signed with CEMEX.⁴¹ CSR became a main objective in La Venta through two main axes: first, the creation of two permanent posts in town responsible for facilitating communication between landowners and the wind enterprise; second, the creation of a community centre to foster the participation of 600 people in 25 courses ranging from environmental education to embroidering to baking (Andrade Saynez et al. 2012:44). These are intended not only to help landowners but also the larger community.

Courses offered for landowners have to do with dairy and agriculture technification. One of these programmes, established in collaboration with the Technological Institute of Mexico and the Secretariat of Economy, sought to promote an entrepreneurial attitude among landowners by improving productivity and advising in terms of vaccination, genetics and hygiene. When the programme started, approximately 50 landowners were enrolled in the course. However, by the end of the year, only 24 were attending on a regular basis. By the time I conducted the interview, only 12 ejidatarios were regulars in the course and only seven received infrastructure support by the enterprise for cattle or poultry grazing.⁴² The decreasing number of people attending this course not only points to the lack of effectiveness of the activities offered by the community centre, but also to the fact that the enterprise is not catering to different needs determined by inequality as described above. While it is true that for some landowners the priority is to increase productivity, the concern for others may be production for self-consumption, to the extent that they might not even have the time to attend these courses. The limited impact of this programme reflects deeper phenomena taking place in town, related to inequality exacerbated by the growth of the wind industry.

On the other hand, the community centre has had some impact, offering courses for the larger community. The goal of these programmes is to foster the local economy by creating various entrepreneurs in town. An Acciona representative told me that these programmes have been successful in fostering economic activities by some women in the community so they no longer depend economically on their husbands or on their children.⁴³ Rather, they are able to bolster the local economy by selling products such as cakes, textiles or sandals to other community members. To put it in Acciona's terms, these programmes aim to build inclusive businesses in La Venta (Andrade Saynez et al. 2012). However, one interviewee told me not only that the courses take a long time to gather the minimum number of participants, but also that some of the landless people believe that the centre is for the exclusive use of ejidatarios. When interviewing community members on their thoughts on the community centre, they told me how they did not think attending these courses was actually worth it. They do not see the advantage of using this space

⁴⁰ Between August and December 2013, the Mexican Congress debated and then approved a Constitutional Reform that allowed private and foreign investments across the energy value chain since 1938.

⁴¹ Because of the framework under which renewable investments work, electricity generation would take place under a legal scheme called a self-generation partnership. In this scheme, private-private agreements could set up a partnership for generation and commercialization of electricity among associates. This is the case of CEMEX and Eurus. Informant 16, 2018.

⁴² Informant 16, 2018.

⁴³ Informant 18, 2018.

or they do not have the time because of their daily work preparing food or selling products in town. Octavia, for instance, expressed that the issue for her is the fact that they bring people from outside the community to teach them how to prepare food or to make crafts when someone local could do it. These courses fall into a gender trap because women's prescribed roles in the household are seen as natural and incontestable and are often equated with providing sustenance for family members through productive and reproductive activities (Gay-Antaki 2016:60; Leach 1992). To sum up, CSR programmes are insufficient compensatory mechanisms to offset the inequality patterns exacerbated by wind energy investments (Hinojosa 2013:430).

Wind, Land and Social Inequality: 20 Years of Change

This paper has argued that wind energy investments have resulted in increased patterns of inequality associated with uneven allocations of land since the foundation of the ejido, exacerbating and reproducing patterns of social inequality both among landowners, and between landowners and landless people. Concerning landowners, while some are able to combine wind lease income with investments in agriculture, cattle grazing and machinery, those with smaller tracts of land barely manage to survive, as their agricultural productivity is used mostly for self-consumption. The wind industry has also exacerbated inequality between landless people, as they experience and are impacted by it in uneven ways. Patterns of differentiation in this subgroup are related to the boom of the urban economy during the construction stage, impacts on livelihood strategies and the rural diversification of labour.

CSR programmes implemented by the wind energy company have tried to serve the entire community. However, such interventions can only go so far, as they do not address the root causes of this inequality, notably the uneven distribution of land in La Venta. All in all, wind energy rents in the long term seem to be reproducing and exacerbating land inequalities, allowing a small class of landowners to continue accumulating, while leaving others to survive through subsistence agriculture and to look for employment in non-agricultural sectors.

As renewable energy industries expand across the global South in response to the climate crisis, it is important to analyse and pay attention to how these investments articulate winners and losers at the local level and the ways in which they reproduce or exacerbate structural injustices. In order to avoid that vulnerable groups in rural settings carry the burden of energy transitions, certain recommendations could be drawn from the case of La Venta. First and most importantly, wind energy payment schemes to landowners must be complemented with productive opportunities for smallholders that allows them to escape from the pauperization they face. Secondly, climate mitigation efforts need to be complemented with analyses of place-based social and political dynamics that allow policy makers to understand the structural root causes of inequality, such as uneven land allocations or lack of access to land by women. Only by understanding such root causes will policy makers be able to complement mitigation efforts with policies targeting vulnerable groups. Finally, it is important to analyse the impact of CSR programmes on local communities to ensure that such interventions actually address inequalities and cater to differentiated needs.

While this paper has shown that certain patterns of inequality are based on land allocations, the interlinkages with issues of gender and age remain potential avenues of research for future projects dealing with agrarian change and energy production. Ultimately, a just transition to renewable energy which ensures the protection of vulnerable groups and ameliorates rather than

exacerbates inequalities is essential to building a sustainable future that all can participate in and benefit from.

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