

# **The Dirty Side of the Wind Industry**

**Development and Human Rights in the  
Isthmus of Tehuantepec, Oaxaca**

**Translated from the Spanish**



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## Executive Summary

On September 5, 1866, in the vicinity of Juchitán de Zaragoza in the state of Oaxaca, a skeletal battalion of the Mexican army, undermined by fatigue and hunger, sought out and formed an alliance with neighboring indigenous populations to put an end to the French battalion known as the Devil's Tail. The indigenous peoples' weaponry consisted of rudimentary shotguns, machetes, and slingshots, but above all their collective spirit and thirst for justice prevailed in a region where the yoke of the Spanish and French conquerors had left open wounds. The Isthmus of Tehuantepec region is rich with epic stories of resistance that spur current generations of Zapotecs and Ikoots to cling to their cultural identity in the face of often rapacious modernity. This is a region blessed with indigenous cultural diversity, fertile lands, and, crucially in the current energy context, some of the best wind conditions on Earth.

Since 1993, the Mexican government has accelerated its transition towards renewable energy, necessitated by the depletion of oil reserves. Consequently, it has opened the doors to foreign direct investment, especially Spanish, to build wind farms and begin developing the wind industry in Mexico. This is a strategic industry that, under agreements such as the Kyoto Protocol and the United Nations Framework Convention on Climate Change, receives financial support from the World Bank, among others. Bearing these considerations in mind, it is easy to understand why the Felipe Calderón administration of Mexico has sought to develop its wind industry by presenting ambitious energy plans and pushing the Energy Secretariat (in Spanish, *Secretaría de Energía*, or SENER) and the Federal Electricity Commission (in Spanish, *Comisión Federal de Electricidad*, or CFE) to fulfill them.

However, this institutional impulse has come face to face with an ineffective regulatory regime. On one hand, it has created incentives that have resulted in the emergence of certain irregularities, especially in regards to public bidding processes under the "open season" regimen. On the other hand, existing energy legislation prioritizes economic criteria and does not safeguard basic environmental, land, or labor rights. Consequently, the wind development model imposed on the Isthmus of Tehuantepec benefits businesses at the expense of communities, which in turn are subject to serious abuses. Thus, this region stands as an emblem of the dirty side of an industry that the government promotes as clean and sustainable. Clinging to their history of resistance, the Zapotec and Ikoots peoples have been organizing themselves in a growing resistance movement that seeks to defend their right to free, prior, and informed consent and sustainable development. Should the abuses persist and the opportunity to build symmetrical relations grounded in basic principles of justice is wasted, this movement has the potential to impede or even halt the development of future wind projects.

The collective organization of these communities reminds us of the social and environmental costs incurred by the energy transition in Mexico. Hence, in this report we pose a basic question: wind development, yes, but under what terms and conditions? PODER and ProDESC – two civil society organizations – have partnered to propose an alternative solution to the development paradigm in the wind industry. This model seeks to articulate and implement a framework that guarantees compliance with human rights and transcends the false dichotomy between the interests of companies, characterized by the profit motive, and respect for the heritage and dignity of local community stakeholders. Once in place, this model would guarantee the free, prior, and informed participation of the communities in development decision-making processes. In addition, it would endorse the position of the community stakeholders as the political subject with the power to autonomously decide what model of development is more favorable to their interests, including the option of choosing an agricultural model, or rejecting a development model dictated from the outside. Ultimately, the objective is nothing more than to guarantee social and environmental sustainability in the Isthmus of Tehuantepec.

## 1. Introduction

The gradual depletion of fossil fuels and their high environmental cost obligate us to rethink the energy options that exist globally. Technological development coupled with an increasingly

developed ecological conscience has triggered the emergence and boom of renewable energies – virtually inexhaustible energy generation alternatives that seek to coexist with the environment in a more harmonious way. Renewable energies include hydroelectric energy, wind, solar, geothermal, tidal energy, biomass, and biofuels.

However, the reasons for promoting renewable energies do not always stem from a growing ecological awareness. On the contrary, vast business interests that hold sway over the energy transition often impose development models on regions inhabited by people traditionally marginalized by virtue of their race, ethnicity, or cultural customs and practices. As a result, the energy transition, driven by the imperatives of capital, despite the friendly denomination of “clean energy,” cannot be disassociated from the negative consequences of the global neoliberal economic model. Furthermore, much of the renewable resources are located in areas characterized by long histories of exclusion and the presence of indigenous peoples.<sup>1</sup> To this we must add the weak capacity of many developing states to tightly regulate the operations of multinational corporations in their territory, which creates a scenario whereby many citizens, devoid of real power, see their rights compromised – including the right to determine what development model is to be adopted for their families and communities. In this regard, it bears mention that the right to free, prior, and informed consent is enshrined in both Convention No. 169 of the International Labor Organization (ILO) and the United Nations Declaration on the Rights of Indigenous Peoples. This is a right that empowers stakeholders of wind projects, and the legitimate owners of the land in particular, to reject the forms of development imposed upon them that are not in accordance with their uses and customs.

As this report demonstrates, the ongoing energy transition, far from being guided by basic principles of justice and democracy, risks becoming a framework that generates further exclusion by imposing development models detrimental to basic collective rights in cases where states are too weak to hold multinational corporations accountable. Also, we question the assumption as officially articulated that the energy transition is necessary to meet consumption, which is often a choice, not an obligation, by business interests to consume ever-increasing amounts of energy. From the perspective of communities in the global south affected by development models imposed without their full consent, it does not make sense to move forward with the implementation of alternative energy projects on their lands without first addressing key underlying structural issues.

The wind industry worldwide has achieved significant advances since the 1980’s, the decade in which the first wind farms were constructed. And the last decade in particular has been of paramount importance. The growth of the wind industry is a strategic response by the world’s major economies to the depletion of national deposits of fossil fuels as well as to the agreements and obligations created under the Kyoto Protocol (1997).<sup>2</sup> On one hand, these deposits were no longer sufficient to meet the growing demand of these economies, especially in electricity generation. On the other, problems associated with major oil producers – mainly in the Middle East since the oil embargo – forced Germany, Spain, Denmark, Norway, Great Britain, the U.S., and China, among other leading countries, to invest in the wind industry.<sup>3</sup>

The worldwide capacity for wind power generation has been doubling every 3.5 years since 1990. According to the International Energy Agency, it is an industry that captures 43% of investment in the electricity sector worldwide and is growing at a rate of 20-30% per year (see Figure 1).<sup>4</sup>

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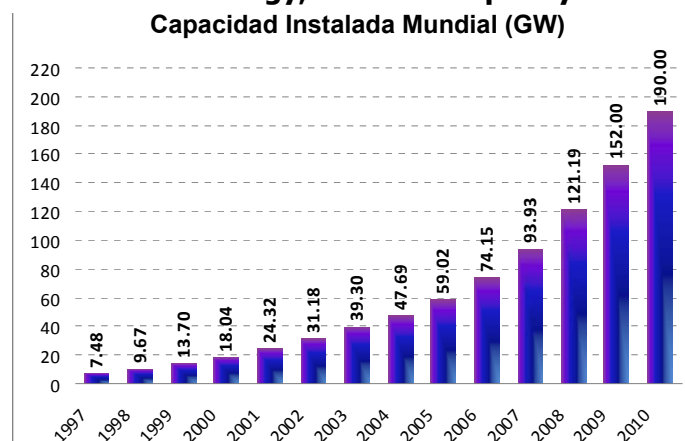
<sup>1</sup> “Mapa de Condiciones Geoestratégicas del Sureste Mexicano,” *Observatorio Latinoamericano de Geopolítica*, 2005. For more information on the coincidental presence of strategically valuable energy resources and indigenous peoples, visit the website of the Latin American Observatory of Geopolitics and the Aboriginal Mapping Network ([www.nativemaps.org](http://www.nativemaps.org)).

<sup>2</sup> “World Wind Energy Report,” *World Wind Energy Association*, 2009.

<sup>3</sup> “Elementos para la Promoción de la Energía Eólica en México,” *United States Agency for International Development (USAID)*, 2009.

<sup>4</sup> “World Wind Energy Report,” *World Wind Energy Association*, 2009.

**Figure 1 – Wind energy, installed capacity worldwide<sup>5</sup>**



It is important to note that countries such as China increased their wind energy capacities by 107%, from 5,912 MW in 2007 to 12,210 MW by the end of 2008. Likewise, if 2006 is taken as the base year, then growth was 127%.<sup>6</sup> The United States' capacity grew by 50% after installing 16,819 MW in 2007. By the end of 2008, its capacity rose to 25,170 MW. This achievement led the U.S. to oust Germany as the world leader in installed capacity.<sup>7</sup>

In 2009, the installed wind capacity in Mexico doubled compared to 2008, rising from 84.5 MW to 202.28 MW. This increase was a result of two new self-supply projects.<sup>8</sup> This upward trend has consolidated dramatically since; according to the Mexican Wind Energy Association (in Spanish, *Asociación Mexicana de Energía Eólica*, or AMDEE), in just two years installed wind capacity in 2011 reached 6,792 MW (to see a list produced by AMDEE of all Mexican wind projects and their corresponding capacities, refer to Annex 1; for a map, refer to Annex 2).

According to Mexico's energy balance of 2008, renewable energy accounted for a marginal 2% of the country's energy generation. That year Mexico placed last among the other members of the Organization for Economic Cooperation and Development (OECD).<sup>9</sup> Although there is still no reliable data to make a comparative evaluation with respect to 2011, it is presumed that Mexico, in light of its wind industry's apogee, has gained ground relative to leading countries such as the U.S. and Germany.

The Mexican wind industry still has room for growth considering that wind energy potential is higher than the current total power generation capacity. Furthermore, this idea is reinforced if we consider the uncertain future of conventional energies, such as oil, and their limited reserves. Studies by the American National Renewable Energy Laboratory (NREL) and various Mexican institutions (AMDEE, ANES, IEE) have quantified the country's wind energy potential at more than 40,000 MW, with the most promising regions being the Isthmus of Tehuantepec, the Yucatan peninsula, and Baja California (see Figure 2).<sup>10</sup>

<sup>5</sup> "Elementos para la Promoción de la Energía Eólica en México," United States Agency for International Development (USAID), 2009.

<sup>6</sup> In this respect it is important to note that wind investments continued to grow despite the global economic crisis that began in 2008 and severely affected the world's major banks and financial institutions.

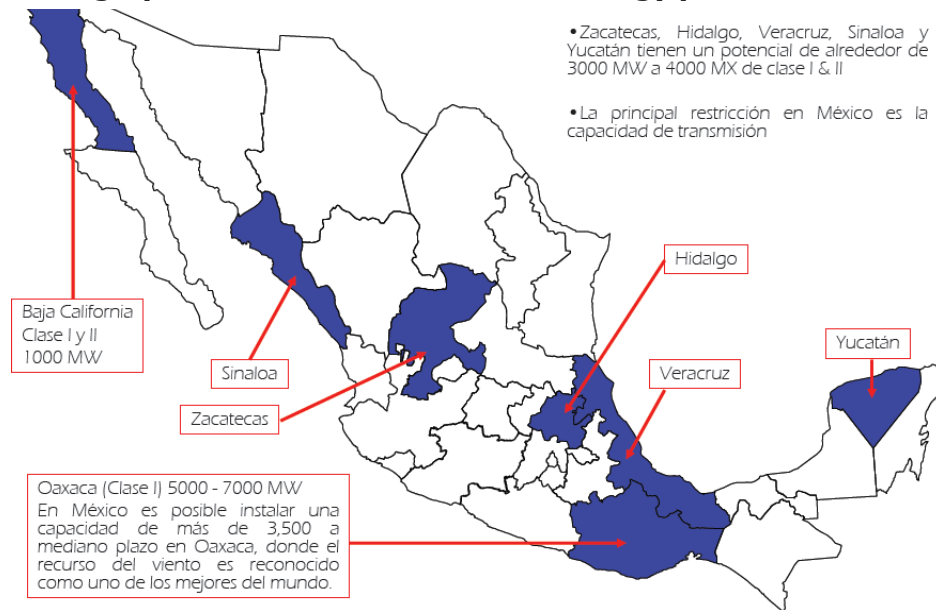
<sup>7</sup> "World Wind Energy Report," World Wind Energy Association, 2009.

<sup>8</sup> *Ibid.*

<sup>9</sup> "Elementos para la Promoción de la Energía Eólica en México," United States Agency for International Development (USAID), 2009.

<sup>10</sup> *Ibid.*

**Figure 2 – Geographic distribution of the wind energy potential in Mexico<sup>11</sup>**



Fuente: AMDEE

The wind conditions in the Isthmus of Tehuantepec are among the best in the world, and it is precisely in this region where a vast majority of wind developments are concentrated (to see a map of wind potential in the Isthmus of Tehuantepec, refer to Annex 3; likewise, to see a list of all wind developments in the Isthmus and key information about them, refer to Annexes 4 and 5). In agreement with NREL calculations, the Isthmus of Tehuantepec has the potential to produce up to 35,000 MW; the Mexican Institute for Electrical Research (in Spanish, *Instituto de Investigaciones Eléctricas*) conservatively calculates the wind potential of the region at 5,000 MW.<sup>12</sup> Coincidentally, indigenous communities, mainly Zapotecs and Ikoots, that have a rich cultural history with a long history of exclusion, also inhabit this region.

To conclude this section, it should be noted that the proliferation of wind energy development in this region is a direct result of the self-supply regimen in which European companies (mainly Spanish) act as providers of wind energy, and Mexican and international companies as recipients or off-takers. In the absence of appropriate regulation by the Mexican state – characterized by weak law enforcement capacity and frequent capitulation to the imperatives of foreign multinationals – the region's indigenous groups claim self-determination over development models by evoking international instruments and standards that guarantee their right to free, prior, and informed consent.

We have already presented data and exposed key arguments that help us understand the strategic importance of wind energy, and the Isthmus of Tehuantepec in particular, in the transition towards renewable energy in Mexico. We have also introduced the existing tension between the global energy transition that obeys the dictates of the neoliberal model and the perspectives of collective indigenous subjects who, far from being properly consulted, are exposed to development models at odds with their traditions and hazardous to their overall well being. Moreover, as we will learn in the next section, this investment in wind energy implies environmental and social costs that the official narrative, often triumphalist and biased, tends to ignore. Let us take a closer look at the dirty side of the wind industry.

<sup>11</sup> *Ibid.*

<sup>12</sup> *Ibid.*



## 2. The Dirty Side of the Wind Industry

### 2.1. The Felipe Calderón presidency and the regulatory framework of the wind industry

Renewable energy sources have become a part of Mexican energy policy primarily for reasons of energy diversification and not because of environmental or social concerns. Similarly, the pressure exerted as a result of environmental agreements signed by Mexico, coupled with the post-presidential aspirations of Felipe Calderón to establish himself as a leader in the field of renewable energy, are factors that help explain the importance granted to renewable energy during the Calderón presidency (2006-12).<sup>13</sup> However, it should be emphasized that the motor driving the concerted efforts of the United Nations, the 16th Conference of the Parties to the United Nations Framework Convention on Climate Change, and the 6th Conference of the Parties serving as the meeting of The Parties to the Kyoto Protocol (COP 16) is carbon markets, which have largely been co-opted by companies to monetize pollution through carbon credit trading. In this context, the official narrative of the transition towards renewable energies must be examined, especially if we bear in mind the disproportionate amount of energy that corporations consume worldwide.

As stated in the National Energy Strategy (in Spanish, *Estrategia Nacional de Energía*) based on a vision of Mexico for 2024, in order to meet domestic demand for electricity it is imperative to mitigate the decline in oil production by increasing efforts to develop renewable energy.<sup>14</sup> Oil production in Mexico declined at a rate of 5% per year between 2004-09.<sup>15</sup> Similarly, in 2009 it was 23% lower than the maximum production of 2004.<sup>16</sup>

In December 2010, Mexico hosted the COP16. At this summit it was agreed to allocate 30 billion USD in funding from industrialized countries to support action on climate change in developing countries through 2012. It was also agreed to establish a Green Fund managed by the World Bank.<sup>17</sup> As a consequence of this forum, Mexico obtained a total of 807 million USD in loans to finance the transition to renewable energy. The Inter-American Development Bank (IDB) approved a loan of 400 million USD to develop programs at the state level against climate change; the World Bank gave another 400 million USD to support government policies to increase renewable energy; and the Global Environment Facility donated 7.1 million USD to support a national energy efficiency program.<sup>18</sup> It should be noted that, since 1999, the World Bank has already provided 672 million USD to develop 43 low-carbon economic efficiency, renewable energy, sustainable transportation, and air quality projects.<sup>19</sup>

Given the imperative of minimizing dependence on the oil industry and responding to the carbon credits aimed at implementing concrete measures to accelerate the transition to renewable energy, the Calderón administration has been obliged to promote plans for energy reform.<sup>20</sup> And

<sup>13</sup> Institutional interview with Yansa Group ([www.yansa.org](http://www.yansa.org)). It is also worth noting that, in 2009, Felipe Calderón was awarded the International Globe award and, in 2011, the United Nations Champions of the Earth Program for Environment award in recognition of his environmental leadership. Furthermore, in September 2011, Calderón was the keynote speaker at the Clinton Global Initiative meeting where leaders of different countries, specialists, academics, and regulators discussed ideas for how to tackle climate change. During his speech, Calderón stressed the importance of the wind industry and explained the benefits of wind energy development in Mexico.

<sup>14</sup> "Estrategia Nacional de Energía," *SENER*, 2011.

<sup>15</sup> *Ibid.*

<sup>16</sup> According to *SENER*, this decline is due mainly to the stage of maturity of the Cantarell field, whose production fell from 2.1 MBD to 0.7 MBD in the period 2004-09, and a corresponding fall in the share of total production of crude oil, which fell from 63% in 2004 to 26% in 2009. While more than half of the probable and possible reserves can be found in Chicontepec, the project faces numerous exploitation challenges.

<sup>17</sup> "Estrategia Nacional para la Transición Energética y el Aprovechamiento Sustentable de la Energía," *SENER*, 2011.

<sup>18</sup> "México recibe financiación para invertir en energías renovables," *Energías Renovables*, December 9, 2010.

<sup>19</sup> "Ministro mexicano destaca avances de financiación en cumbre COP16," *El País*, December 14, 2010.

<sup>20</sup> Among these include the National Energy Strategy, the National Strategy for Energy Transition and Sustainable Use of Energy, and the Special Program for the Development of Renewable Energy.

with respect to wind power, the administration has placed immense pressure on the Mexican government to fulfill its ambitious plans and to achieve its stated goals, while encountering obstacles in the form of an underdeveloped, ineffective legal and regulatory regime.

In October 2008, the Mexican Congress passed the Energy Reform Bill, which had been proposed since the beginning of the Calderón administration in 2006 but postponed during previous administrations<sup>21,22</sup> As part of this reform, on November 28, 2008, the *Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética* law (henceforth referred to as LAERFTE) was passed. It set the goal of increasing the margin for renewable energy capacity from 3.3% (1,900 MW) of all energy generated at the national level to 7.6% (4,500 MW) by 2012.<sup>23</sup> In addition to wind energy contributing to more than half of all renewable energy, the law includes the following initiatives: (1) the establishment of the Program for the Development of Renewable Energy; (2) the creation of a Fund for Energy Transition and the Sustainable Use of Energy; and (3) assigning SENER with the responsibility to articulate a National Program for Renewable Energy.<sup>24</sup>

From its very first article, the LAERFTE establishes limitations “to regulate the use of renewable energy sources and clean technologies to generate electricity for purposes other than providing the public electricity service.”<sup>25</sup> This underlines the unique character that the Mexican State reserves for the direct commercialization of electricity, subjecting the content of this latest law to the electricity clauses previously established by the *Ley de Servicio Público de Energía* (1992). Despite the reforms it introduces, the LAERFTE does not ultimately generate new opportunities for private sector participation in the development of wind energy. Therefore, as discussed later on, the CFE has had to resort to an “open season” regimen to accomplish this, which results in irregularities.

In Mexico, the Federal Electricity Commission has a monopoly over the electric grid and most electricity production as stated in Article 27 of the Mexican Constitution, which mandates that the CFE generate electricity as cheaply as possible. This has important implications regarding wind development, as the cost of generation is higher than conventional sources.<sup>26</sup>

The *Ley de Servicio Público de Energía* specifies which private producers can participate in the industry: a) self-suppliers, b) independent producers, and c) exporters.<sup>27</sup> Because they are most relevant, in this report we only address the first two types of producers.

### **Category A – Self-supply category (and the “Open Season” Regimen)**

The self-supply category corresponds to the generation of electricity for consumption purposes, provided that such power is intended to meet the needs of individuals or corporations, and is not counterproductive for the country.<sup>28</sup> The generated power is delivered to the national electricity system’s point of interconnection and is then carried to the consumption centers. This allows companies under the self-supply category to receive electricity at a price well below current official rates, thereby increasing these companies’ competitiveness.<sup>29</sup>

This type of generation is profitable because the wind power producers compete with the price that the CFE charges its customers, which is generally higher than the price of wind electricity production.<sup>30</sup> This is especially true for clients that would otherwise pay the industrial tariff or public

<sup>21</sup> “Memoria de Labores,” PEMEX, 2008.

<sup>22</sup> The root causes of this delay were political and ideological, which have always accompanied the various proposals on the subject. Mexico still has a state monopoly over basic energy sources, which has meant that any attempt to open a window to direct private investment (domestic or foreign) in exploration, development, and commercialization in the case of oil, or transmission, distribution, and marketing in the case of electricity, is neutralized by competing political factions.

<sup>23</sup> Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética.

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*

<sup>26</sup> Institutional interview with Yansa Group ([www.yansa.org](http://www.yansa.org)).

<sup>27</sup> Ley de Servicio Público de Energía.

<sup>28</sup> “Prospectiva del Sector Eléctrico 2008-2017”, SENER, 2008.

<sup>29</sup> *Ibid.*

<sup>30</sup> Institutional interview with Yansa Group ([www.yansa.org](http://www.yansa.org)).



illumination rates, which are considerably more expensive than the fees charged to household customers.<sup>31</sup> In this regard, it should be noted that, during 2011, the price of industrial electricity increased by 36.9% in Mexico.<sup>32</sup>

Furthermore, the self-supply category is profitable due to various indirect subsidies derived from the regulatory framework that the Energy Regulatory Agency (in Spanish, *Comisión Reguladora de Energía*, or CRE) approved. The most important of these is the possibility to charge electricity consumption up to one year after production (within different time zones in which different rates apply). This allows the consortia of companies under the self-supply category to avoid selling the surplus of electricity produced during the windiest months to the CFE at the normal price (which in the case of Oaxaca tends to be low due to the hydroelectric dams in Chiapas that share the same electricity network, which bring down prices due to an abundance of supply), thereby avoiding paying the CFE for the energy production deficit during months with less wind.

In addition, there are other indirect and non-transparent subsidies that the consortia of companies under the self-supply category receive. One is the comparatively small fee they pay for the transportation of electricity. This fee happens to be much less than the rate paid by other producers under the self-supply regimen and is clearly insufficient to cover transmission losses that occur when transporting energy over long distances. Another indirect subsidy is the elimination of administrative payments to the CRE. This allows the companies under this regimen to apply for and obtain permits without yet having viable projects, which in turn allows them to push for the construction of transmission capacity and then extend those permits almost indefinitely while speculating with their transmission capacity. The last indirect subsidy is an accelerated depreciation of equipment, which entails a fiscal advantage.<sup>33,34,35</sup>

The main obstacle faced by the self-supply projects is the lack of transmission capacity from the Isthmus of Tehuantepec to the center and north of the country, where most electricity is consumed, especially by manufacturing and resource extraction companies. On one hand, the CFE cannot commit public funds for the construction of new transmission infrastructure without a self-supply company's commitment to pay for the new capacity.<sup>36</sup> On the other hand, the licensees cannot close the partnership agreements if the portage capacities are not guaranteed. As a result, the CRE, the CFE, and SENER agreed to create the "open season" regimen. This is a mechanism to determine the transmission capacity that the private developers would be ordered to reserve, with the objective of having the necessary elements to justify the authorization of the resources required for the CFE to execute a publicly financed project. Likewise, in agreement with the existing regulatory framework, open seasons are created on the basis that the electricity infrastructure is received as a donation by investors to the State. The investors pay for the infrastructure based on their total installed capacity. Currently, there are 16 projects in the Isthmus of Tehuantepec developed under an "open season" regimen with a total capacity of 2,474 MW (to access a list of these, refer to Annexes 6 and 7).<sup>37</sup>

<sup>31</sup> *Ibid.*

<sup>32</sup> López, Alejandra. "Sube la luz industrial 37% en 2011", *Hidrocálido*, December 2, 2011.

<sup>33</sup> Institutional interview with Yansa Group ([www.yansa.org](http://www.yansa.org)).

<sup>34</sup> "Prospectiva del Sector Eléctrico 2008-2017", SENER, 2008.

<sup>35</sup> Likewise, the surplus electricity can be sold to the CFE. However, the CFE cannot pay more for energy than the marginal cost of production at that time and region, which does not make this option economically attractive. In general, the electricity is consumed during peak hours (during the daytime, when electricity prices are higher), and the differential between the rate and cost of generation is the basis of profitability for these projects. Investors who wish to sell surplus to the network must sign a contract.

<sup>36</sup> "Temporada Abierta – Soluciones para el Desarrollo de Energías Renovables y Eficiencia Energética en Regiones Fronterizas," CRE, 2011.

<sup>37</sup> *Ibid.*

## Category B – Independent Production

This category pertains to plants that generate electricity at capacities greater than 30 MW, used exclusively for sale to the CFE or for export.<sup>38</sup> Moreover, it is a service contract with the CFE in which the investor owns the facilities and delivers energy to the CFE in exchange for the delivered energy. The best example of this type of production is La Venta III in the Isthmus of Tehuantepec. This wind farm was built through a series of incentives funded by the Global Environment Facility via the World Bank.<sup>39</sup> These incentives seek to promote renewable energy penetration in Mexico as part of a global World Bank initiative called the *Large Scale Renewable Energy Project*.<sup>40</sup> The Calderón administration expects to install a total of 500 MW in the Isthmus of Tehuantepec by 2012 under this framework.<sup>41</sup>

In conclusion, the current legal framework is not based on environmental or social objectives, but rather on economic criteria. Consequently, the existing energy legislation offers no protection for the rights and interests of communities in regions where wind resources are abundant.

## 2.2. The Isthmus of Tehuantepec as a landmark case

As established in the introduction to this report, the Isthmus of Tehuantepec is paramount in the transition to renewable energy in Mexico. The wind conditions at this location are among the best in the world and, as a result, it is here that the large majority of wind development is concentrated (to access a chronology of wind development in this region, refer to Annex 8). However, for the reasons presented in the preceding section, this development has not been accompanied by effective government regulation. Ultimately, this has generated incentives for businesses to operate at the expense of community stakeholders.

To justify their presence and the abusive contracts that they sign with the communities that own the land, the wind developers and off-takers tend to minimize the value of the land leased for establishing wind farms. However, the 3 million hectares of the Isthmus of Tehuantepec are not wastelands. There is a predominance of communally owned land with a total of 1,230 agrarian centers, of which 95% are *ejidos* – or communal lands – and 5% are communities. In addition, 249 agrarian centers are located in municipalities that have an estimated indigenous population of 51-100%; another 73 centers are in the range of 30-50%, and 908 with 30% or less.<sup>42</sup> Although there are five different indigenous peoples, the most populous and of greatest historical importance are the Zapotecs and Ikoos. This is essentially an agricultural and livestock region with land rich in water resources. The farmers in this region produce three crops per year on irrigated land and two crops on dry land. In the Ikoos zone, a large part of the population are fishing men and women.

Therefore, the Isthmus of Tehuantepec accurately illustrates the existing tension between wind development by multinational corporations and historically marginalized communities in the context of the global energy transition. This tension can be extrapolated to many other emerging economies. On one hand, wind power is a lifeline enabling these economies to minimize their dependence on depleting energy resources and to open the door to new forms of foreign investment. On the other hand, in the absence of functioning democracies and effective law-enforcement mechanisms, as in the case of Mexico, this industry can become yet another symbol of oppression. This is the dirty side of the wind industry that bears no mention in the official discourse.

<sup>38</sup> "Prospectiva del Sector Eléctrico 2008-2017", SENER, 2008.

<sup>39</sup> "Energía Limpia en México: El éxito sólido de una institución discreta, el Fondo para el Medio Ambiente Mundial (FMAM)," *Teorema Ambiental*, December 2, 2010

<sup>40</sup> *Ibid.*

<sup>41</sup> Institutional interview with Yansa Group ([www.yansa.org](http://www.yansa.org)).

<sup>42</sup> "Istmo de Tehuantepec: De lo regional a la globalización," Nemesio J. Rodríguez, Secretaría de Asuntos Indígenas del Gobierno de Oaxaca, 2003.

### 2.2.1. A brief portrayal of the wind industry in the Isthmus of Tehuantepec

According to research conducted by PODER, there are currently a total of 19 wind projects in the Isthmus of Tehuantepec, of which 14 were developed under the self-supply regimen (to access a list of self-supply projects, refer to Annex 6; to access a list of self-supply projects and their associated substations, refer to Annex 7). Likewise, two projects (La Venta and La Venta II) were carried out under a financed public works regimen, and three others (La Venta III, Oaxaca I, and Oaxaca II, III, IV) under the independent production regimen. The most important developers are Spanish multinationals such as Acciona, Iberdrola, Gamesa, and Gas Natural Fenosa; all are part of the Ibex 35, the main benchmark of the Spanish stock exchange. The French state energy giant, EDF, is also present, as well as junior developers Renovalia and Preneal Group.

- **Acciona** was one of the major Spanish infrastructure builders less than a decade ago. During 2008, and after the sale of 25% of Endesa to the Italian company Enel in 2009, it completed its transformation as a leader in renewable energy.<sup>43</sup> In November 2009, CEMEX, the largest cement company in Mexico, and Acciona constructed the Eurús wind farm to supply 25% of CEMEX's plants. This investment totaled approximately 550 million USD and includes Acciona turbines.<sup>44</sup>
- **Iberdrola** is the first Spanish energy group and one of the five largest electricity companies in the world. In addition, it is the global leader in wind energy with 30 million customers.<sup>45</sup> In January 2009, Iberdrola developed the La Ventosa wind farm with Clipper turbines. It was the first wind project to be constructed, controlled, and operated by a private company in Mexico, and cost more than 170 million USD. President Calderón attended the inauguration.<sup>46</sup> La Ventosa was registered by the United Nations as a Clean Development Mechanism.<sup>47</sup> In January 2011, Iberdrola bought the Bii Nee Stipa wind farm from Gamesa, cementing its position as a leader in Mexico's renewable energy sector. It is noteworthy that all Iberdrola wind farms in Mexico use Gamesa technology, consolidating the latter as the world's leading supplier.<sup>48</sup>
- **Gamesa** is a company specializing in sustainable energy technologies, mainly wind power. It is a leader in wind development in Spain and is positioned among the top wind turbine manufacturers worldwide.<sup>49</sup> After the sale of Bii Nee Stipa, it no longer operates any wind farms in Mexico. However, it is the leading supplier of turbines for the Isthmus of Tehuantepec.
- **Gas Natural Fenosa** is a fusion between Fenosa and Gas Natural, one of the top ten European energy multinationals and leader in the vertical integration of gas and power in Spain and Latin America in 2009.<sup>50</sup> Its only wind project to date in the Isthmus of Tehuantepec is the Bii Hioxio, currently under development.
- **EDF**, under the name Eléctrica del Valle de México, developed the La Ventosa wind project at a total cost of 198 million USD, including a loan of 30 million USD from the Inter-American Development Bank (IDB). The project was developed under the self-supply regimen and will sell its energy to four subsidiaries of Wal-Mart of Mexico for a period of 15 years.<sup>51</sup> In April

<sup>43</sup> Acciona, Annual Report, 2010.

<sup>44</sup> "Cemex anuncia conclusión de construcción de parque eólico Eurús en el Estado de Oaxaca," *Sala de Prensa Cemex*, November 23, 2009.

<sup>45</sup> Iberdrola, Annual Report, 2010.

<sup>46</sup> "Calderón Inaugura Parque Eólico La Ventosa de Iberdrola," *Business News Americas*, January 23, 2009.

<sup>47</sup> "Iberdrola Renovables Compra a Gamesa el Parque Eólico de Bii Nee Stipa," *Renewable Energies*, January 28, 2011.

<sup>48</sup> *Ibid.*

<sup>49</sup> Gamesa, Annual Report, 2010.

<sup>50</sup> Gas Natural Fenosa, Annual Report, 2010.

<sup>51</sup> EDF La Ventosa Project, Environmental and Social Management Report, *Inter-American Development Bank*, 2009.

2011, EDF bought the Eoliatec del Istmo (164 MW) and Eoliatec del Pacífico (160 MW) projects, both utilizing Vestas turbines.

- The Parque Eólico de Piedra Larga will provide power to 14 subsidiaries of Grupo Bimbo through a self-supply contract of 18 years. The project was developed by DEMEX, a subsidiary of the Spanish company **Renovalia Energy**, and includes Gamesa turbines. In addition it has received 160 million USD in loans financed by the Mexican government (Nafinsa, Bancomext y Banobras-Fonadin) and private banks (Banco Espíritu Santo de Portugal, y Santander y CaixaBank de España).<sup>52</sup>
- Vientos del Istmo, Energía Alterna Istmeña, and Energía Eólica Mareña were all subsidiaries of **Grupo Preneal**, headquartered in Spain. In March 2011, this group closed its sale to a consortium of Mexican and Australian business groups, including Fomento Económico Mexicano (FEMSA), the Fondo de Infraestructura Macquarie México (FIMM), and Macquarie Capital, for a total of 89 million USD.<sup>53</sup> FEMSA is a leading company engaged in the beverage industry through Coca-Cola FEMSA, the largest independent bottler of Coca-Cola in the world.<sup>54</sup> Macquarie is the most important investment bank in Australia and owner of Macquarie Bank Limited.<sup>55</sup> 85% of the clean electricity that Vientos del Istmo (now denominated as Mareña Renovables) generates will be consumed by FEMSA and its business units: FEMSA Comercio (OXXO), Coca-Cola FEMSA México, and FEMSA Insumos Estratégicos, and the rest by Cuauhtémoc Moctezuma, the Heineken operating company in Mexico. It is estimated that the project will become operational in 2013. The wind project includes Vestas turbines.<sup>56</sup>

It should be noted that most of the companies described above are part of the Dow Jones Sustainability Index, one of the leading international mechanisms certifying the sustainability of multinational corporations using basic environmental, social, and governance (ESG) principles.<sup>57</sup> Moreover, Iberdrola and Gamesa are certified by FTSE4Good, another mechanism that monitors the performance of multinationals with respect to ESG principles.<sup>58</sup> Despite these certifications, the performance of these companies as socially responsible entities is far from exemplary.

In fact, despite pending research, it appears that the behavior of these wind companies in social and environmental matters more satisfactorily adheres to international standards in Europe. For example, in Europe these companies created an average of 10,503 sustainable jobs a year during the period 2002-07. For this reason the industrial expansion strategy for 2020 proposed by the European Wind Energy Association enjoys the support of the European Trade Union Federation, the Alliance of Liberals and Democrats, Free Alliance of the European Green Party, and the Alliance of Progressives and Democrats, among other groups to the left of the political spectrum in Europe.<sup>59</sup>

Along the same lines, it is pertinent to note that, in 2011, the main Spanish trade unions (UGT and CCOO) and the *Asociación Empresarial Eólica* (AEE), which groups the Spanish wind companies, agreed to the creation of an observatory for the wind sector with the aim to train workers to improve job security and monitor environmental impact.<sup>60</sup> In 2010, the same wind

<sup>52</sup> "Parque Eólico Piedra Larga," *Fondo Nacional de Infraestructura*, 2011.

López, Marisela. "Renovalia obtiene el crédito para parque eólico en México," *Milenio*, December 28, 2010.

<sup>53</sup> "FEMSA de México integra un consorcio que adquirió dos proyectos de energía eólica por US\$ 89 millones," *Diario de Fusiones y Adquisiciones*, March 23, 2011.

<sup>54</sup> FEMSA website.

<sup>55</sup> Macquarie Group website.

<sup>56</sup> "FEMSA de México integra un consorcio que adquirió dos proyectos de energía eólica por US\$ 89 millones," *Diario de Fusiones y Adquisiciones*, March 23, 2011.

<sup>57</sup> Asociación Española Eólica (AEE).

<sup>58</sup> Iberdrola, Annual Report, 2010; Gamesa, Annual Report, 2010.

<sup>59</sup> "Green Jobs" The European Wind Energy Association, 2008.

<sup>60</sup> "La Asociación Empresarial Eólica y los Sindicatos Crean Observatorio para el Sector Eólico" *Regulación Eólica*, May 6, 2011.

companies and unions signed a joint manifesto for sustainable job creation in the sector.<sup>61</sup> Finally, in 2006 the aforementioned unions (UGT and CCOO), Greenpeace, Ecologists in Action, WWF/ADENA, the Association of Renewable Energy Producers (APPA), and the AEE called for a joint proposal for wind energy regulation by the Spanish government.<sup>62</sup>

These examples illustrate a degree of civic participation in the articulation of proposals, in conjunction with the private sector, that suggests compliance with international standards of environmental and human rights by companies in Europe, and in Spain in particular. As discussed in the following section, these same companies have substantially different practices in Mexico.

### **2.2.2. Bad business practices and rights violations**

The lack of effective regulation and the absence of mechanisms for corporate accountability have increased the incidence of bad business practices, resulting in serious human rights violations for community stakeholders in wind project development. The following irregularities are noteworthy as evidence of the collusion between public and private actors: the existence of direct and indirect subsidies benefiting wind energy companies, which are disguised as public tender processes; the lack of competition between wind energy companies in the allocation of land for wind project development; and the recruitment of government officials for management positions in the Mexican subsidiaries of multinational wind energy companies.

With regards to land rights, community stakeholders have been systematically precluded from exercising their right to free, prior, and informed consent. This right is guaranteed by Convention 169 of the International Labor Organization and the United Nations Declaration on the Rights of Indigenous Peoples, and has also been expressly regulated by the High Commissioner of the United Nations and the Special Rapporteur for Indigenous Peoples. This violation has inexorably led to the creation of asymmetrical relationships and abusive lease agreements. These contracts *inter alia* are characterized by the misrepresentation of the permanent damage that wind farms cause to agricultural lands, the lack of fair compensation for such damage, the lack of translators in the negotiation processes between companies and non-Spanish speaking local community stakeholders, inconsistent and unfair land rental prices, and clauses that allow companies to obtain automatic contract extensions in violation of Mexican law, among others. With regards to labor rights, PODER has documented the presence of non-democratic unions. These are only the tip of the iceberg of the precarious labor model that characterizes the industry in Mexico.

In addition to human and labor rights violations, the lack of regulation has negatively impacted the environment by undermining the food security of farming and fishing communities, and allegedly affecting areas protected by special environmental regulations. Wind farm construction has also negatively impacted many different species of birds and bats that fly through the skies of the Isthmus.

Finally, the La Parota hydroelectric project in the State of Guerrero sets an interesting precedent. In this case both the UN High Commissioner for Human Rights and the UN Special Rapporteur for Human Rights and Fundamental Freedoms of Indigenous Peoples defended the indigenous community stakeholders, recognizing their right to self-determination and requiring that, as a collective political subject, they be included in the decision-making process around the future of the project.

#### **2.2.2.1. Irregularities resulting from collusion between the public and private sectors<sup>63</sup>**

As described previously, the figure of the “open season” regimen has paved the way for irregularities. The best example can be found in the two public tenders that the CFE had planned to

<sup>61</sup> “La Patronal Eólica y Los Sindicatos Piden a Industria en Manifiesto que adelante cupos,” *El Economista*, March 16, 2010.

<sup>62</sup> “Propuesta de Regulación para la Energía Eólica,” *Ecologistas en Acción*, December, 2006.

<sup>63</sup> Interview with wind businessperson in the Isthmus of Tehuantepec, Oaxaca, November 2011.



announce in 2011, ostensibly to award contracts for the sale of electricity totaling 500 MW of installed capacity, equivalent to an investment of approximately 1.2 billion USD. Despite their public character, participation in these tenders would have been restricted to a limited number of companies that had not yet fulfilled their contracts with the CFE to develop wind farms under self-supply licenses.

This group of companies committed to having their projects in operation by the end of 2012. The ultimate objective, as stated above, is to comply with the percentage of installed wind power as established by the National Renewable Energy Program. These businesses participate in an open season through which they co-finance the construction of an electric substation and a transmission line to accomplish their self-supply projects. While a majority of the licensees are progressing towards the construction of their wind farms, a small group of them, due primarily to poor project management, have not received funding and have not yet begun construction. As a result, about 500 MW remain unoccupied in the new electrical substation, which has a total capacity of 1,897 MW. In response, the CFE had planned to publish two tenders for a total of 507 MW (Phase I Southeast I 202 MW and 304 MW East II) in which only the latter licensees would be able to participate. Thus, the CFE, rather than penalizing the companies that did not meet their obligations, would instead grant them a financial bailout disguised as a public tender. Moreover, this would allow these companies to define the prices of the electricity they sell – presumably high – in clear violation of the constitutional mandate to develop and provide electricity as cheaply as possible.

Furthermore, the process that led to the distribution of wind resources between companies is another instance of flagrant irregularity. During this process, sponsored by the Government of Oaxaca's Ministry of Economy (in Spanish, *Centro de Negocios de la Secretaría de Economía del Gobierno de Oaxaca*), it was proposed that interested investors operate in previously designated areas, thereby preventing any subsequent competition. Thus, the Isthmus was divided into areas of influence before development even began, rendering it impossible for local community stakeholders to negotiate lease contracts with competitor companies and seek more favorable terms. Finally, PODER has had access to information that suggests the existence of links between government agencies and companies whereby multinational developers lull government officials into the private sector to manage their projects in Mexico.

#### **2.2.2.2. Land rights violations**

The government poorly regulates the lease of private and community land, which creates incentives for wind developers to reach asymmetric agreements with and act unfairly towards proprietors, usually small landowners or *ejidos* (communal lands; for a legal definition of *ejido*, refer to Annex 9). Section 8 of the LAERFTE establishes that private companies signing agreements or coordination arrangements with states and municipalities must allow for the establishment of "land use regulations and structures that take into account the interests of the owners or occupiers of land for the use of renewable energy."<sup>64</sup> Furthermore, Article 21 states that all power generation projects based on renewable energies that develop capacities greater than 2.5 MW should:

- 1) "Ensure the participation of local and regional communities (this is understood to mean those located near such projects) through meetings and public consultations convened by the municipal authorities or communal cooperative; in these meetings they should agree to participate in the development projects of the community;
- 2) As agreed in the respective contract, pay rent to the owners of the premises or land occupied by the renewable energy project; the frequency of payments will be agreed upon with the stakeholders, but in no case will it be less than twice a year;
- 3) Promote social development in the community in which the renewable energy power projects are implemented, abide by international best practices, and meet the applicable standards in sustainable rural development, environmental protection, and land rights."<sup>65</sup>

<sup>64</sup> Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética.

<sup>65</sup> *Ibid.*

However, despite these provisions, this law is not enforced. PODER has not found a single case in which the right to free, prior, and informed consent has been guaranteed by either the government or operating business. In fact, among the most flagrant abuses, it is worth noting the large presence of abusive contracts:

- Most lease contracts consulted by PODER do not fully stipulate the damages that wind development will inflict on the land. In fact, it is stated that once the contract expires, the lands will be returned to their owners in the same condition as when they were leased. However, usually the installation of wind turbines requires the drilling of approximately 15 meters and a cement-based filler, which permanently disables an important part of the land for agriculture.<sup>66</sup>
- Both the Mexican Constitution and the *Ley de Derechos de los Pueblos y Comunidades Indígenas del Estado de Oaxaca* require the presence of an interpreter at the signing of contracts when they involve indigenous communities whose members do not speak Spanish as a first language. Nevertheless, PODER has documented cases in which leases were signed without the Zapotec or Ikoote community having knowledge of their contents because the contracts were only available in Spanish, and a majority of these communities only speak their respective native languages.<sup>67</sup>
- It has also been documented that development companies commonly persuade the *comisariados ejidales* – or leaders of the communal lands – or community members to sign leases without showing them the contents or annexes of these contracts, in particular the annex of restrictions that limits the activities that peasants may conduct once the park is operational.<sup>68</sup>
- Most lease contracts do not have suitable environmental impact provisions, rendering it very difficult, if not impossible, for the owners of the land to monetize any form of permanent damage inflicted by a specific project.<sup>69,70</sup>
- Finally, we note that, although the civil code of Oaxaca requires that contracts must not exceed 30 years, there are cases where development companies retain exclusive rights to renegotiate lease contracts for additional periods once the initial term expires. Clauses that guarantee exclusive renegotiation rights are illegal.<sup>71</sup>

Having undertaken this extensive review of irregularities that are, again, but a sample of the asymmetric power relations that flourish in the absence of regulation, it is unsurprising that in recent years approximately 180 lawsuits have been brought to nullify lease contracts for lands in the Isthmus of Tehuantepec. The primary legal has been the vice of consent: claims asserting that the companies acted with malice (omission of information), intent, premeditation, and advantage.<sup>72</sup>

Needless to say, these claims of invalidity are merely a prelude to a larger confrontation that is looming, which will multiply the number of community-led human rights protests in the region and likely inhibit regional wind investment. Nonetheless, it is clear that this understandable reactionary tactic by indigenous communities can be avoided if the State, fulfilling its regulatory role,

<sup>66</sup> Legal analysis completed by ProDESC.

<sup>67</sup> *Ibid.*

<sup>68</sup> Institutional interview with Yansa Group ([www.yansa.org](http://www.yansa.org)).

<sup>69</sup> "Información Sobre Arrendamiento de Tierras y Potencial de Generación de Empleos Relacionado con el Desarrollo de Proyectos Eoleoeléctricos en México," *Winrock Study*, 2003.

<sup>70</sup> Preliminary studies indicate that the prices that development companies pay to lease the land are insufficient. In general, three types of payments are imposed for the purchase or lease of land:

- Fixed fee: "The developer(s) and the owner(s) agree to a fixed fee per turbine or per unit of land (...) to be paid by the developer on a monthly or annual basis, reflecting the total amount of land provided by the owner(s)."
- Royalties: "The developer pays the owner a percentage of revenue received for electricity produced by turbines that are on the land of the owner(s). This percentage is negotiated between the owner(s) and the developer."
- A combination of royalties and minimum-guaranteed payments.

<sup>71</sup> Legal analysis completed by ProDESC.

<sup>72</sup> Source: Asamblea de los Pueblos Indígenas del Istmo de Tehuantepec en Defensa de la Tierra y el Territorio.

ensures the sustainability of investments by imposing a development paradigm that seeks to balance firms' profit motive with the demands of the communities, in accordance with law and international best practices.

### 2.2.2.3. Environmental rights violations

The environmental aspect of the wind industry is no exception as it, too, is poorly regulated. This is particularly significant when we consider that wind power is far from clean. To provide just one example, in the case of La Venta II, the World Bank lists the following environmental effects of the project during three different phases – preparation for construction, construction itself, and operation: the air quality will be affected through the use of vehicles and machinery by increasing the concentration of CO, HC, and NO<sub>x</sub>; civil works, transportation, and earth removal will increase the presence of dust; the area will be affected by noise resulting from the use of vehicles and machinery; the preparations for carrying out civil works, especially the flattening of soil, could result in the loss of land; the movement of heavy machinery could result in depletion of soil quality; the discharge of oil during the construction of the turbines could contaminate the land; the opening of access roads could affect the drainage of water; the civil works for the construction of wind farms and access roads could impact vegetation; the civil works, the use of machinery and vehicles, and staff presence could affect the mortality of wildlife inhabiting the area, especially during the construction phase; and finally, during operation, there is a risk of an increase of bird mortality due to collisions with wind turbine blades.<sup>73</sup>

Most environmental impact statements (in Mexico, MIAs) submitted to the *Secretaría de Medio Ambiente y Recursos Naturales* (SEMARNAT) – the government body responsible for ensuring the protection and preservation of the environment – to which PODER has had access display a worrisome lack of rigor in their analyses and are characterized by serious omissions.<sup>74</sup> Although SEMARNAT sets standards, nevertheless environmental laws are articulated in such a manner as to leave ample room for interpretation.<sup>75</sup> Below are some examples of environmental concerns surrounding wind developments in the Isthmus of Tehuantepec.

- FEMSA and Macquarie Capital intend to develop the most environmentally-sensitive wind project in the region, called Energía Alterna Istmeña (now denominated Mareña Renovables), along the Santa Teresa Bar and near the middle of the San Francisco Bar located in the upper and lower Lagunas, the largest lagoon-estuarine system in Oaxaca (in the previous section we saw that this project previously belonged to Preneal). The Laguna Superior is the largest of five in a complex of interconnected lakes in the Mexican South Pacific.<sup>76</sup> These lakes are connected to the Gulf of Tehuantepec through the mouth of San Francisco, one of the main shrimp fishing

<sup>73</sup> "Project appraisal document on a proposed grant from the global environment trust fund in the amount of US\$ 25 million to the United Mexican States for a large-scale renewable energy development project," *World Bank*, 2006.

<sup>74</sup> SEMARNAT defines environmental impact as the modification of the environment as caused by the action of man or nature. While a hurricane or earthquake can cause environmental impact, the environmental impact statement (MIA) is focused on those impacts that could possibly be caused by work or activities found in the design stage (potential impacts), i.e. those that have not been initiated. From here we discover the preventive character of the instrument. There are several types of environmental impacts that exist, but that can basically be classified according to their origin as those caused by:

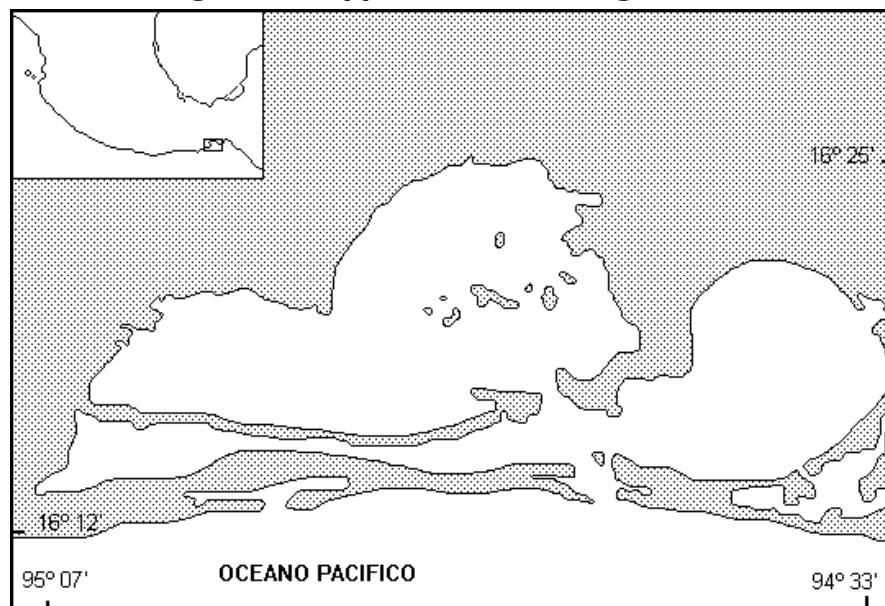
- The use of renewable natural resources, such as forestry or fishing; or non-renewable, such as the extraction of oil or coal.
- Pollution. All projects produce some waste (hazardous or not) that emits gases into the atmosphere or pours liquids into the environment.
- Occupation of territory. The projects that occupy a territory alter the natural conditions by actions such as deforestation, soil compaction, and others.

<sup>75</sup> Legal analysis completed by ProDESC.

<sup>76</sup> Arroyo H., J., S. Ortega H. y J. A. Vilchis M. "Fauna malacológica de playa Vicente, laguna Superior, Oaxaca," *Res. V Cong. Nal. Zool.* 73, 1981.

areas in Mexico.<sup>77</sup> In addition to shrimp (mainly brown shrimp (*Penaeus californiensis*), white shrimp (*P. vannamei*), and to a lesser extent blue shrimp (*P. stylirostris*)), several scientific studies have confirmed the presence of 16 different native species of mollusks and 97 fish species.<sup>78</sup> As a result, about 20,000 Ikoots, distributed among the towns of San Dionisio del Mar, San Mateo del Mar, and Santa María del Mar, live in the area and depend heavily on the fishing economy.<sup>79</sup> Figure 3 illustrates the Upper and Lower Laguna and the two bars that divide them.

**Figure 3 – Upper and Lower Laguna**



- Several independent environmental impact studies have warned of the possible effects that wind farms may have in contexts similar to Energía Alternativa Istmeña, noting that the artificial electric and magnetic fields generated by the cable connections affect the orientation of fish and marine mammals. They have also stressed that wind farm construction can disturb the fauna of the sea, for example by causing spills that alter marine habitats.<sup>80</sup> Although no empirical studies exist yet to justify its concerns, PODER has found that the fishing communities of the Lagunas are extremely worried about the potential impact of the intense vibrations that, as a result of wind projects, could drive away the shrimp, compromising the main source of income in the area. As far as PODER has been able to determine, in its MIAs the Energía Alternativa Istmeña project does not incorporate any evaluation of the negative effects that the project could have on the sustainability of community stakeholders.

<sup>77</sup> Báez V., E. Bravo, S. Díaz, V. Juárez y S. Beltrán. "Variaciones nictemerales de la diversidad de las comunidades de peces de la laguna Superior, Oaxaca," *Res. VII Cong. Nal. Oceanog.* 157, 1987.

<sup>78</sup> Chávez A. "Análisis de la comunidad de una laguna costera en la costa sur occidental de México," *An. Centr. Cienc. del Mar y Limnol.* UNAM 6 (2): 15-44, 1979; Tapia G., E. Segura M. y E. Rodríguez T., 1998. "Composición y abundancia de la ictiofauna de las lagunas Superior-Inferior y Mar Tileme, Oaxaca," *Res. VI Congreso Nacional de Ictiología*, 1998.

<sup>79</sup> Informe Sobre el Pueblo Huave, *Organización de las Naciones Unidas para la Educación la Ciencia y la Cultura (UNESCO)*, 2008.

<sup>80</sup> Los Aspectos Jurídico-Ambientales de la Construcción de la Instalaciones Eólicas en el Mar," *Medio Ambiente y Derecho*, 2006. For example, the Spanish Environmental Impact Association's Methodological Guide for Environmental Impact Assessment (EIA) includes the following environmental aspects for the construction of wind farms: geology / soil (alteration of the local stratigraphy, alteration of geomorphic processes, removal of the seabed, seabed pollution), air (effects of vibration and noise, emission savings, lighting and beacon signals), water (hydrography: alteration of ocean currents, sediment excavation, effects of accidents (oil spills), impact of electromagnetic fields from power lines, seabed / benthos (elimination of habitat and specimens, the absence of fish and positive effects), birds (collisions, action of the turbines as barriers, scared birds), marine mammals (loss of habitat, vibration, low frequency sounds and electromagnetic field), and fish (noise and vibration, sedimentation and water turbidity, foundations and natural reefs, electric and magnetic fields).

- In 2007, the *Consejo Nacional de Ciencia y Tecnología* (CONACyT) reported that, by means of a research program using radar, it was able to certify the passage of over 12 million birds belonging to 130 different species each season through the Isthmus of Tehuantepec.<sup>81</sup> However, the *Sección Mexicana del Consejo Internacional para la Preservación de las Aves* (CIPAMEX), which has among its main objectives the study and conservation of Mexican birds and their habitat, claimed that SEMARNAT regulation NOM-151, which aims to protect fauna and flora, is too ambiguous to offer sufficient protection. Furthermore, it allows for discretion in its implementation and verification, and does not include any measures to predict or diagnose the possible negative effects of wind farms on birds and other wildlife. Nor does it make any reference to mitigation measures.<sup>82</sup> As far as PODER has been able to determine, none of the four MIAs consulted include any reference to harmful effects suffered by either diurnal or nocturnal birds.

#### 2.2.2.4. Labor rights violations

Serious labor rights abuses have been reported among employees working in the construction of the wind projects. On one hand, the existing employment model is highly precarious. Many workers are subject to short duration contracts, some as brief as a week, preventing them from being registered with the national social security system and thus obtaining the legal benefits contained in Mexico's Federal Labor Law. Moreover, this model of job insecurity contradicts the developers' own claims that their presence as socially responsible companies contributes to sustainable development in the region.

On the other hand, the unions that should be representing the workers in most of the projects have significant democratic deficits. For example, the *Sindicato Único de Trabajadores Electricistas de la República Mexicana* (SUTERM), which represents workers in the Federal Electricity Commission, is a union far from being democratic or participatory. It is affiliated with the *Confederación de Trabajadores de México* (CTM), one of the most visible emblems of the existing corporatist labor system, a product of the P.R.I.'s single party rule for over 70 years. For example, 700 workers employed in the Oaxaca II, III, and IV project, developed by Acciona in Ingenio Santo Domingo, were subjected to weekly contracts. SUTERM charged these workers union dues without the workers ever actually being enrolled in the union (to see a sample of a pay stub, refer to Annex 10). Upon asking the SUTERM in early 2011 for a copy of their alleged collective bargaining agreement after the labor subcontractor, ElioCom, failed to comply with the Mexican Federal Labor Law, 500 of the 700 workers were dismissed.<sup>83</sup> Finally, there is reasonable suspicion of the presence of Employer Protection Contract Unions (EPCUs) in Oaxaca's wind industry. EPCUs are unions that exist only in name, since the collective agreement is signed behind the backs of the workers directly between the union and the employer. Often "negotiations" for the collective bargaining agreement occur before any worker is even hired, and workers have no knowledge of being members of a union apart from the membership dues periodically deducted from their wages.

<sup>81</sup> "Elementos para la Promoción de la Energía Eólica en México," *United States Agency for International Development* (USAID), 2009.

<sup>82</sup> "Parques eólicos, una amenaza para la fauna," *El Universal*, February 27, 2007.

<sup>83</sup> Source: Fieldwork conducted by PODER.



### 3. An alternative development model for the wind industry

As we have seen, the current wind industry development model suffers from the following defects:

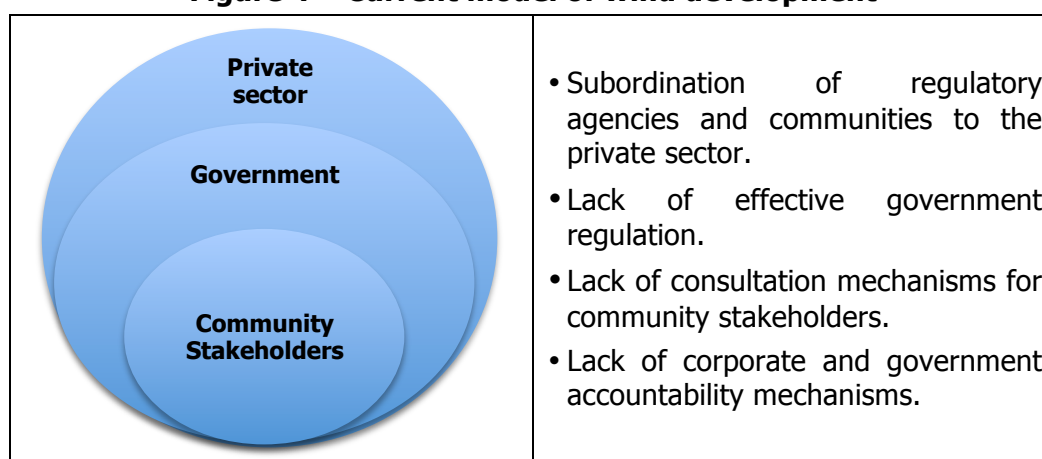
- (i) It excludes communities from the wind project planning and decision-making process;
- (ii) It is characterized by a substantial gap in access to information around land lease agreements, especially with respect to the value of local wind resources and the profitability of the projects;
- (iii) It results in human rights, labor, and environmental violations; and
- (iv) It is not subjected to government or corporate accountability mechanisms that incentivize businesses to act as genuinely socially responsible entities.

Thus, unsurprisingly community conflicts have proliferated in recent years and organized groups in the affected communities have formed a social resistance movement that threatens to paralyze those projects already approved or under development. Another much more serious consequence of these disagreements would be a negative change in the perception and acknowledged value of wind energy, both in the affected communities and in society at large, which could in turn erect barriers to the transition to renewable sources of energy in Mexico.

What follows is a concise dissection of the current wind energy development model and a tentative alternative proposal for its replacement. The alternative model acknowledges and respects indigenous communities' right to free, prior, and informed consent and seeks to create opportunities for sustainable development that recognize their rights as a collective subject, allowing them to develop their land in accordance with their communal uses and traditions.

As illustrated in Figure 4, the prevailing wind development model is characterized by the superiority of the private sector. In this case, the private sector, comprised of two types of entities, the development companies that act as energy providers and the off-taker companies that act as energy recipients, subordinates the other two sectors. In the first instance, government regulators ignore corporate abuses and recuse themselves from enforcement responsibilities, thereby becoming complicit in these abuses. And in the second instance, the communities, devoid of real power that would have derived from prior consultation, access to information, and accountability tools, suffer the brunt of these abuses.

**Figure 4 – Current model of wind development**



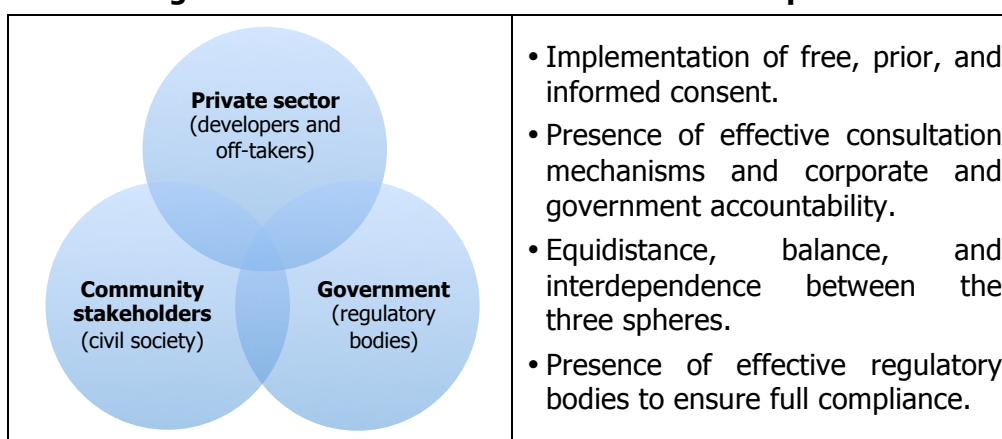
As shown in Figure 5, the alternative model of development presented in this document is based on equidistance, balance, and interdependence between the three spheres: the private sector (both the wind developers and the off-takers), the public sector (regulatory bodies), and the communities in conjunction with civil society organizations.

From our point of view, this new horizontal relation of forces would maximize sustainability. The right to free, prior, and informed consent would act as a guiding principle in the new equilibrium, and all other rights would emanate from it. As a result, legitimate landowners could make decisions about whatever development model they choose to adopt, including the option of

refusing to allow wind development, once all requirements for access to information and so on are satisfactorily met.<sup>84</sup>

This new model has numerous advantages. First, the empowered communities could exert an essential counterweight to the regulatory entities in order to ensure full compliance with environmental regulations and human and labor rights, also creating corporate and government accountability. Second, business investment could be strengthened as there would be a significant reduction in material risks, such as liabilities for breaching national and international environmental, human rights, and labor regulations. The implementation of effective consultation mechanisms that ensure full compliance with these principles would put an end to the pernicious asymmetry in the access to information. As a result, wind projects would be undertaken within a comprehensive framework for sustainable community development.

**Figure 5 – Alternative model of wind development**



### 3.1. Objective: To ensure free, prior, and informed consent

As the area attracting the largest number of wind developments and the most visible emblem of the dirty side of the wind industry in Mexico, the Isthmus of Tehuantepec should be the focus of efforts to ensure free, prior, and informed consent in development projects. Its indigenous communities, mainly Zapotec and Ikoots, historically marginalized and oppressed, have a long history of resistance. Despite the ravages of colonialism and often-rapacious modernity, they have managed to preserve their customs. Therefore, faced with the abuses of wind developers and the negligence of the Mexican state, they are clinging to this epic narrative of resistance in their opposition to wind development, seeing it, in the case of the Spanish multinationals, as a new avatar of the *conquista*. However, PODER and ProDESC recognize that this situation also presents an opportunity to implement an alternative model of development, one that would ensure free, prior, and informed consent and the participation of communities in decision-making processes with respect to wind projects. The success of this effort could serve as a precedent to encourage responsible wind development in other emerging economies, both in Mexico and around the world. The goal is to articulate a sustainability framework that generates opportunities for development in accordance with the traditions and land uses of community stakeholders.

<sup>84</sup> Several international instruments, such as the Declaration of the Rights of Indigenous Peoples, ILO Convention 169, and the Convention on Biological Diversity, establish this principle and provide a normative basis to demand compliance.

## 4. Annexes

### Annex 1. Wind projects in Mexico<sup>85</sup>

Wind Energy Projects in Mexico 2011						
Wind Projects in Operation (using Previous Transmission Lines)						
Project	Location	Scheme	Sponsor	Turbines	DCO	MW
La Venta	Oaxaca	OPF	CFE	Vestas	1994	1.58
La Venta II	Oaxaca	OPF	CFE	Gamesa	2006	83.3
Parques Ecológicos de México	Oaxaca	Self-Supply	Iberdrola	Gamesa	2009	79.9
Eurus, 1st Phase	Oaxaca	Self-Supply	Cemex/Acciona	Acciona	2009	37.5
Eurus 2nd Phase	Oaxaca	Self-Supply	Cemex/Acciona	Acciona	2010	212.5
Gobierno Baja California	Baja California	OPF	GBC/Turbo Power Services	Gamesa	2010	10
Bii Nee Stipa I	Oaxaca	Self-Supply	Cisa-Gamesa	Gamesa	2010	26.35
La Mata - La Ventosa	Oaxaca	Self-Supply	Elctrica del Valle de México (EDF-EN)	Clipper	2010	67.5
						518.63
Wind Projects under Construction (Open Season)						
Project	Location	Scheme	Sponsor	Turbines	DCO	MW
Fuerza Eólica del Istmo I	Oaxaca	Self-Supply	Peñoles	Clipper	2010-2011	50
Fuerza Eólica del Istmo II	Oaxaca	Self-Supply	Peñoles	Clipper	2011-2012	30
La Venta III	Oaxaca	IPP	CFE/Iberdrola	Gamesa	2011	101
Oaxaca I	Oaxaca	IPP	CFE/EVRA	Vestas	2010	101
Oaxaca II, III y IV	Oaxaca	IPP	CFE/Acciona	Acciona	2011-2012	304.2
Demex Fase I	Oaxaca	Self-Supply	Renovalia	Gamesa	2011-2012	90
Stipa Nayaa	Oaxaca	Self-Supply	CISA-Gamesa	Gamesa	2012	74
Los Vergeles	Tamaulipas	Self-Supply	GSEER	Siemens	2011	161
						911.2
Wind Projects under Development with Transmission Capacity (or under Open Season)						
Project	Location	Scheme	Sponsor	Turbines	DCO	MW
Demex Fase II	Oaxaca	Self-Supply	Renovalia	Gamesa	2012-2013	137.5
Sureste I	Oaxaca	IPP	CFE	TBD	2012	100
Energía Alterna Istmeña	Oaxaca	Self-Supply	FEMSA-Macquaire (antes Preneal)	Vestas	2012	215.9
Energía Eólica Mareña	Oaxaca	Self-Supply	FEMSA-Macquaire (antes Preneal)	Vestas	2013-2014	180
Bii Stinu	Oaxaca	Self-Supply	EDF-EVM Eoliatec del Istmo (antes Eolia)	Gamesa	2012-2013	164
Santo Domingo	Oaxaca	Self-Supply	EDF-EVM Eoliatec del Istmo (antes Eolia)	Gamesa	2012-2013	160
Zopilopan	Oaxaca	Self-Supply	CISA-Gamesa	Gamesa	2012	70
Dos Arbolitos	Oaxaca	Self-Supply	CISA-Gamesa	Gamesa	2012	70
El Retiro	Oaxaca	Self-Supply	CISA-Gamesa	Gamesa	2013	74
Bii Hioxio	Oaxaca	Self-Supply	Gas Natural-Fenosa	TBD	2013-2014	227.5
						1398.9
Wind Projects in Development without Secured Transmission Capacity						
Project	Location	Scheme	Sponsor	Turbines	DCO	MW
Zapoteca de Energía	Oaxaca	Self-Supply	Grupomar	TBD	2014	140
ENEL	Oaxaca	Self-Supply	ENEL	TBD	2014	150
Central Eólica de México I	Oaxaca	Self-Supply	Mexión	TBD	2014	200
CFE-POISE Surestes II, III y IV	Oaxaca	IPP	CFE	TBD	2014	1100
Fuerza Eólica del Istmo III	Oaxaca	Self-Supply	Peñoles	TBD	2014	100
Fuerza Eólica del Istmo IV	Oaxaca	Self-Supply	Peñoles	TBD	2015	80
						1,770.00
Wind Projects in Development in Other States						
Project	Location	Scheme	Sponsor	Turbines	DCO	MW
Eólica Santa Catarina, S.A. de C.V.	Nuevo León	Self-Supply	Next Energy de México, S.A. de C.V.	TBD	2012	22
Proyecto Municipio de Comondu	Baja California	Self-Supply	Next Energy de México, S.A. de C.V.	TBD	2012	16
Proyecto Eólico en BC	Baja California	Self-Supply	Geomex, S.A. de C.V.	TBD	2012	870
Proyecto Eólico en Chiapas	Chiapas	Self-Supply	Geomex, S.A. de C.V.	TBD	2012	39
Vaqueras-La Paz	Jalisco	Self-Supply	Eoliatec de México	TBD	2014	60
Chinanpas	Jalisco	Self-Supply	Eoliatec de México	TBD	2014	64
Unión Fenosa	Baja California	Export	Gas Natural/Unión Fenosa	TBD	2011-2020	1000
Sempra	Baja California	Export	Sempra	TBD	2011-2020	1000
Asociados Panamericanos	Baja California	Export	Asociados Panamericanos	TBD	2011-2020	1000
Wind Power de México	Baja California	Export	Wind Power de Mexico	TBD	2011-2020	500
Fuerza Eólica de Baja California	Baja California	Export	Fuerza Eólica de Baja California	TBD	2011-2020	300
						4,871.0
Total MW						9,469.725

OPF: Obra Pública Financiada or Financed Public Work (CFE's bids)  
 DCO: Date of Commercial Operation  
 PIE: Productor Independiente de Energía or Independent Power Producer (CFE's bids)  
 Autoabastecimiento: se trata de proyectos privados

<sup>85</sup> Source: AMDEE. There are versions in Spanish and English, but the English version is more complete and updated.

## Annex 2. Map of wind farms<sup>86</sup>



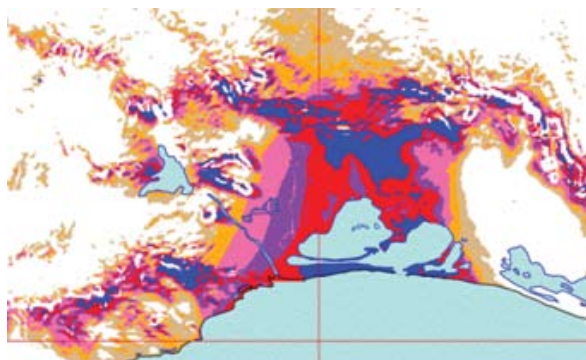
<sup>86</sup> "Potencial Eólico del Corredor Eólico del Istmo de Tehuantepec, Oaxaca," Universidad Tecnológica de los Valles Centrales, 2009.



## Annex 3. Wind energy potential in Oaxaca<sup>87,88</sup>

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50m (W/m <sup>2</sup> )	Wind Speed* at 50 m (m/s)
1	Poor	0-200	0-5.3
2	Marginal	200-300	5.3-6.1
3	Moderate	300-400	6.1-6.7
4	Good	400-500	6.7-7.3
5	Excellent	500-600	7.3-7.7
6		600-800	7.7-8.5
7		>800	>8.5



\*Wind speeds are based on a Weibull k value of 1.8

Fuente: Wind Energy Resource Atlas of Oaxaca, National Renewable Energy Laboratory (NREL), 2003.



<sup>87</sup> "Elementos para la Promoción de la Energía Eólica en México," Agencia de los Estados Unidos para el Desarrollo Internacional (USAID), 2009.

<sup>88</sup> Source: AMDEE.



#### Annex 4. List of the wind projects in the Isthmus of Tehuantepec – Developers and location<sup>89</sup>

Name of wind project	Name of developer		Community project location	
Name	Name	Company name	Town	Municipality
La Venta I	CFE	To be determined	La Venta	Juchitán de Zaragoza, Oaxaca
La Venta II	Maderas y Granos de la Laguna; Acciona; C.F.E.; Energy Holdings	Maderas y Granos de la Laguna S.A. de C.V.; the rest to be determined	La Venta	Juchitán de Zaragoza, Oaxaca
La Venta III	Iberdrola; Gamesa Eólica; CFE	Iberdrola Ingeniería y Construcción México, S.A. de C.V.; the rest to be determined	Santo Domingo Ingenio	Santo Domingo, Oaxaca
La Venta IV	Maderas y Granos de la Laguna; Acciona	Maderas y Granos de la Laguna, S.A de C.V.; Eurus, S.A de C.V.	La Venta	Juchitán de Zaragoza, Oaxaca
Parque Eólico San Dionisio	Vientos de Istmo; Preneal México	Vientos del Istmo, S.A. De C.V.; the rest to be determined	San Dionisio del Mar	San Dionisio Del Mar, Oaxaca
La Ventosa	Parques Ecológicos de México (PEM); Iberdrola	Parques Ecológicos de México S.A. de C.V.; the rest to be determined	La Venta and La Mata	Juchitán de Zaragoza and Asunción Ixtaltepec, Oaxaca
Aprovechamiento de Banco de material "Arena Limosa con Grava Ligeramente Plásticas" *Complement of La Ventosa	Iberdrola	Iberdrola Ingeniería y Construcción México, S.A. de C.V.	El Espinal	Juchitán de Zaragoza, Oaxaca
Proyecto Eoloeléctrico Fuerza Eólica del Istmo	To be determined	Fuerza Eólica del Istmo S.A. de C.V.	La Venta; El Espiral	Juchitán de Zaragoza, Oaxaca
Central Eoleoeléctrica Piedra Larga	To be determined	Desarrollos Eólicos Mexicanos, S.A. de C.V.	Unión Hidalgo	Juchitán de Zaragoza, Oaxaca
Parque Eólico Eurus	Acciona/CEMEX	Eurus, S.A. de C.V.; the rest to	La Venta	Juchitán de Zaragoza, Oaxaca

<sup>89</sup> Source: PODER.

		be determined		
Central Eoleoeléctrica, en el Istmo de Tehuantepec, Oaxaca	EDF Energies Nouvelles	Eléctrica del Valle de México, S. de R.L. de C.V.	To be determined	Asunción Ixtaltepec and Juchitán de Zaragoza, Oaxaca
Parques Ecológicos de México	Iberdrola	Iberdrola Ingeniería y Construcción México, S.A. de C.V.	La Ventosa	Juchitán de Zaragoza, Oaxaca
To be determined	Unión Fenosa	Unión Fenosa Energías Renovables México, S.A. de C.V.	Santo Domingo de Tehuantepec	Juchitán de Zaragoza, Oaxaca
Parque Eólico Bií Stinú	To be determined	EDF Energies Nouvelles (it used to be Eoliatec del Istmo, S.A. de C.V.); Gregal de Inversiones, S.C.R., S.A.	La Mata	Juchitán de Zaragoza, Oaxaca
Xadani	Enel	Enel Green Power España SL (formerly Endesa Cogeneración y Renovables)	Xadani	Santa María Xadani, Oaxaca
Xadani	Preneal	Preneal México, S.A. de C.V.	Xadani	Santa María Xadani, Oaxaca
CISA	CISA/Gamesa	Cableados Industriales, S.A de C.V. (CISA)	To be determined	To be determined
EDF Energies Nouvelles (it used to be Eoliatec del Istmo, S.A. de C.V.).	To be determined	To be determined	To be determined	Juchitán de Zaragoza, Oaxaca
Preneal México, S.A de C.V.	To be determined	To be determined	Unión Hidalgo	Juchitán de Zaragoza, Oaxaca
Parque Eólico Montañas Negras	To be determined	To be determined	To be determined	To be determined
Eurus Wind Farm	Acciona	Eurus S.A. de C.V.; CEMEX MEXICO S.A. de C.V.	La Venta	Juchitán de Zaragoza, Oaxaca
Bií Nee Stipa I	Iberdrola; CISA; Gamesa	Iberdrola Ingeniería y Construcción México, S.A. de C.V.; the rest to be determined	La Ventosa	Juchitán de Zaragoza, Oaxaca

La Mata- La Ventosa	CFE; EDF Energies Nouvelles	Eléctrica del Valle de México, S. de R. L. de C. V.	La Mata; La Ventosa	Juchitán de Zaragoza, Oaxaca
Oaxaca I	Generadora de Energía de Oaxaca; CFE; Acciona	To be determined	Santo Domingo de Ingenio	Santo Domingo, Oaxaca
Oaxaca II, III, IV	Acciona; CFE	Acciona S.A. de C.V.; Brisas del Istmo, S.A. de C.V.	Santo Domingo de Ingenio	Santo Domingo, Oaxaca
DEMEX Fase I	DEMEX/Renovalia	Desarrollos Eólicos Mexicanos de Oaxaca S. A. de C. V.; the rest to be determined	Piedra Larga	Unión Hidalgo, Oaxaca
Stipa Nayaa	Energía Limpia de CISA/Gamesa	Cableados Industriales, S.A. De C.V.	El Espinal	Juchitán de Zaragoza, Oaxaca
DEMEX Fase II	DEMEX/Renovalia	Renovalia Energy, S.A. de C.V.	Piedra Larga	Unión Hidalgo, Oaxaca
Energía Alterna Istmeña; Energía Eólica Mareña	FEMSA; Macquarie (before it was Preneal)	Fomento Económico Mexicano, S.A. de C.V.; the rest to be determined	La Ventosa	Juchitán de Zaragoza, Oaxaca
Santo Domingo	EDF Energies Nouvelles	EDF Energies Nouvelles (it used to be Eoliatec del Istmo, S.A. de C.V.); Eléctrica del Valle de México, S. de R. L. de C.V.	Santo Domingo de Ingenio	Santo Domingo de Ingenio, Oaxaca
Sureste I	CFE; Acciona	To be determined	To be determined	To be determined
Zopilopan	CISA/Gamesa	Cableados Industriales, S.A. de C.V.	To be determined	Ixtepec, Oaxaca
Dos Arbolitos	CISA/Gamesa	Cableados Industriales, S.A. de C.V.	Dos Arbolitos	Juchitán de Zaragoza, Oaxaca
El Retiro	CISA/Gamesa	Cableados Industriales, S.A. de C.V.	To be determined	To be determined
Bií Hioxio	Gas Natural; Fenosa	Gas Natural SDG, S.A. de C.V.	To be determined	Juchitán de Zaragoza, Oaxaca

## Annex 5. List of the wind projects in the Isthmus of Tehuantepec – Lease agreements<sup>90</sup>

Name of wind project	Name of community or communal land			If individual land, how many parcels are in the project?		Size (m <sup>2</sup> or h <sup>2</sup> ) assigned to project
Name	Community or communal land #1	Community or communal land #2	Community or communal land #3	Location	Number	Number
La Venta I	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
La Venta II	Parcela de la Esc. Sec. Canal y Camino	Terreno de Uso Común	Oralia Jiménez López	To be determined	7	949.84 h2
La Venta III	La Venta	To be determined	To be determined	N 283 Z-1 P1/1	To be determined	1000 h2
La Venta IV	Alfredo Manuel Carrasco- La Venta	To be determined	To be determined	500 Z-1 P1/1	1	To be determined
Parque Eólico San Dionisio	To be determined	To be determined	To be determined	To be determined	To be determined	1643.46 h2
La Ventosa	Sr. Henri Valdivieso López (communal land owner)	To be determined	To be determined	To be determined	To be determined	1,719 h2
Aprovechamiento de Banco de material "Arena Limosa con Grava Ligeramente Plásticas" *Complement of La Ventosa	Juan Villalobos Marin	Amado Salinas Sánchez	Amado Salinas Sánchez	To be determined	To be determined	2.48 h2 (the total area the communal land of El Espinal covers is 8,293 h2)
Proyecto Eoloeléctrico	To be determined	To be determined	To be determined	To be	To be	622 m2

<sup>90</sup> *Ibid.*

Fuerza Eólica del Istmo				determined	determined	
Central Eoleoeléctrica Piedra Larga	To be determined	To be determined	To be determined	To be determined	To be determined	3,646 h2
Parque Eólico Eurús	To be determined	To be determined	To be determined	To be determined	To be determined	18,525 h2
Central Eoleoeléctrica, en el Istmo de Tehuantepec, Oaxaca	To be determined	To be determined	To be determined	To be determined	To be determined	3,249,600 m2
Parques Ecológicos de México	Imelda Valdivieso López- propietario	To be determined	To be determined	To be determined	To be determined	4 h2
To be determined	Juan Sánchez Toledo	Alberto Regalado Vicente	Faustina López	To be determined	To be determined	To be determined
Queda por determinar	Ricardo Ramírez Vázquez (president); Antonio Valdivieso (secretary); Crescencio Sánchez Orozco (treasury).	To be determined	To be determined	To be determined	To be determined	25,175 h2 (of which 3,787 h2 is communal comuneros)
Parque Eólico Bií Stinú	To be determined	To be determined	To be determined	To be determined	To be determined	1,000 h2
Xadani (Enel)	To be determined	To be determined	To be determined	Parcelas	To be determined	To be determined
CISA	Manuel Sánchez Castillo	To be determined	To be determined	To be determined	1	200,264 h2
EDF Energies Nouvelles (era Eoliatec del Istmo, S.A. de C.V.)	Víctor Sánchez Castillo	To be determined	To be determined	To be determined	To be determined	To be determined
Preneal México, S.A de C.V.	Juan Villalobos Marin	Martín Alonso Rasgado	To be determined	8765-0, 8770-0, 8760-0, 8765-0, 30-80-00	4, 1	To be determined



Parque Eólico Montañas Negras	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
Eurus Wind Farm	To be determined	To be determined	To be determined	94° 49' 41" W y 16° 34' 31" N	To be determined	1,825 h2
Bií Nee Stipa I	To be determined	To be determined	To be determined	To be determined	To be determined	1,500 h2
La Mata- La Ventosa	To be determined	To be determined	To be determined	To be determined	To be determined	
Oaxaca I	To be determined	To be determined	To be determined	To be determined	To be determined	800 h2
Oaxaca II, III, IV	To be determined	To be determined	To be determined	To be determined	To be determined	600 h2
DEMEX Fase I	To be determined	To be determined	To be determined	To be determined	To be determined	1000 h2
Stipa Nayaa	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
DEMEX Fase II	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
Energía Alterna Istmeña/ Energía Eólica Mareña	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
Santo Domingo	To be determined	To be determined	To be determined	To be determined	To be determined	1785.09 h2
Sureste I	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
Zopilopan	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
Dos Arbolitos	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
El Retiro	To be determined	To be determined	To be determined	To be determined	To be determined	To be determined
Bií Hioxio	To be determined	To be determined	To be determined	To be determined	To be determined	2050 h2

## Annex 6. List of projects – “Open Season” Regimen<sup>91</sup>

Proyecto	Desarrollador	Modalidad	Capacidad MW
La Venta III	CFE	PIE	101.4
Oaxaca I-IV	CFE	PIE	405.6
Subtotal 1			507.0
Eurus	Acciona	Aut	250.0
Parques Ecológicos de México	Iberdrola	Aut	80.0
Fuerza Eólica del Istmo	Fuerza Eólica-Peñoles	Aut	30.0
Eléctrica del Valle de México	EdF Energies Nouvelles-Mitsui	Aut	67.5
Eoliatec del Istmo	Eoliatec	Aut	22.0
Bii Nee Stipa Energía Eólica	CISA-Gamesa	Aut	26.3
Desarrollos Eólicos Mexicanos	Demex	Aut	227.5
Eoliatec del Pacífico	Eoliatec	Aut	160.5
Eoliatec del Istmo (2a fase)	Eoliatec	Aut	142.2
Gamesa Energía	Gamesa	Aut	288.0
Unión Fenosa Generación México	Unión Fenosa	Aut	227.5
Vientos del Istmo	Preneal México	Aut	180.0
Energía Alterna Istmeña	Preneal México	Aut	215.9
Fuerza Eólica del Istmo (2a fase)	Fuerza Eólica	Aut	50.0
Subtotal 2			1,967.4
Total			2474.4

<sup>91</sup> “Temporada Abierta – Soluciones para el Desarrollo de Energías Renovables y Eficiencia Energética en Regiones Fronterizas,” CRE, 2011.

## Annex 7. List of projects – Open Season Regimen with its respective substations<sup>92</sup>

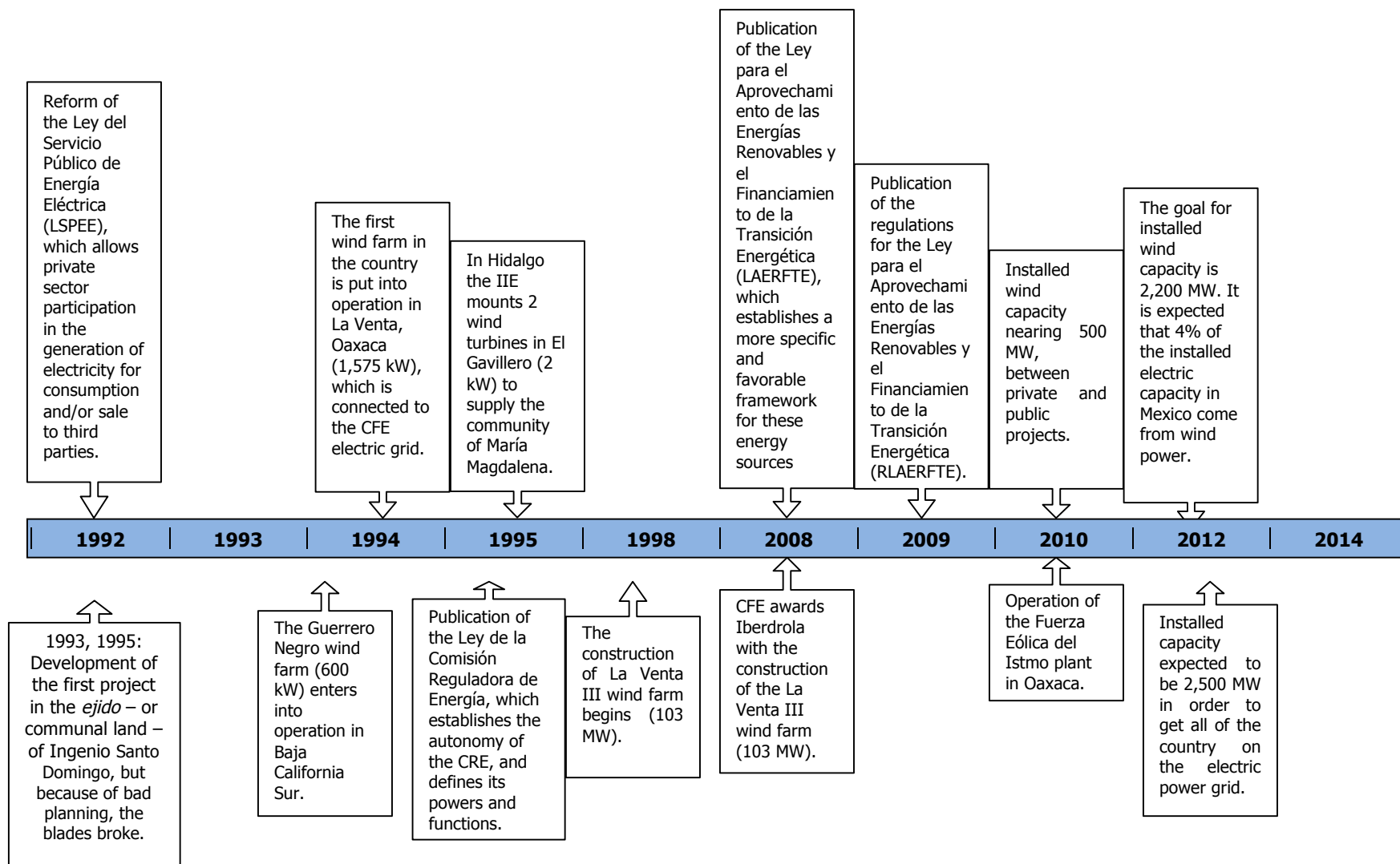
Subestación	Juchitán II 115kV
Fecha de Entrada en Operación	Mayo 2009
Proyecto	Capacidad (MW)
Eléctrica del Valle de México, S. de R.L. de C.V.	68
Bii Nee Stipa Energía Eólica, S.A. de C.V.	26
Eoliatec del Istmo, S.A.P.I. de C.V.	22
Fuerza Eólica del Istmo, S.A. de C.V.	30
Total	146

Proyecto	Subestación	Capacidad (MW)	
		2010	2011
Fuerza Eólica del Istmo, S.A. de C.V.	La Ventosa 115 kV	50	
Unión Fenosa Generación México, S.A. de C.V.		227.5	
Eoliatec del Istmo, S.A.P.I. de C.V.		142.2	
Gamesa Energía, S.A.		192	96
Preneal México, S.A de C.V.	La Ventosa 230 kV	395.9	
Desarrollos Eólicos Mexicanos, S.A. de C.V.		227.5	
Eoliatec del Pacífico, S.A.P.I. de C.V.		160.5	
Oaxaca I (CFE)		101	
Oaxaca II, III y IV (CFE)			303
Subtotal		1,799	96
Total			1,897

Subestación	Juchitán II 230kV
Fecha de Entrada en Operación	2008 <sup>1/</sup>
Proyecto	Capacidad (MW)
Parques Ecológicos de México, S.A. de C.V.	80
Eurus, S.A.P.I. de C. V.	250
Total	330

<sup>92</sup> "Proyectos de Energía Eólica" Comisión Federal de Energía (CFE), 2009.

## Annex 8. Chronology of the wind projects in the Isthmus of Tehuantepec





**1970's** – The first study of wind quality is completed by the Institute of Electric Studies (IIE) in the Isthmus of Tehuantepec, with the sponsorship of the Federal Electricity Commission (CFE). However, almost 20 years later, small projects begin to emerge, some experimental, even before the first wind farm is installed in La Ventosa, Oaxaca.

**1991** – The IIE is hired by the CFE to conduct a feasibility study on the installation in the Cerro de la Virgen, Zacatecas, of an electricity plant with a capacity of 2 MW to power the public lighting system of the municipality of the same name, including 25 turbines 80 kW each. Due to bureaucratic problems, the project fails to materialize despite the resource potential of the site.

**1991** – IIE begins taking wind measurements in different villages near La Ventosa, Oaxaca, as part of the *Generación de Electricidad con Sistemas Eólicos* project for pumping water in the Isthmus of Tehuantepec.

**1992** – In the fishing community X-Calak, Quintana Roo, a hybrid system is installed, consisting of six wind turbines, each with a capacity of 10 kW, and 11.2 kW photovoltaic panels. However, due primarily to mixed opinions in the community, the system only operates until 1999, despite the fact that it is monitored by experts from Sandia National Laboratories (SNL) and NREL, both prestigious U.S. wind institutions.

**1992** – The *Ley del Servicio Público de Energía Eléctrica* (LSPEE) is reformed, which allows for private sector participation in the generation of electricity for consumption and/or its sale to third parties.

**1993** – A wind project is conceived based on measurements taken in 1992 by the IIE in La Ventosa, Oaxaca. The project seeks to improve the conservation of fish in Rancho Salinas by means of two 5 kW wind turbines. Due to design problems it is not carried out.

**1993–95** – An early wind project is built in the *ejido* of Ingenio Santo Domingo, Oaxaca, but the blades break due to poor planning.

**1993** – Two wind turbines are installed in Isla Arenas, Campeche, with the objective of serving as energy sources to power a water pumping and desalination system. The project falls through due to problems with the capacity of the well.

**1994** – The first wind farm in the country goes on line in La Venta, Oaxaca (1,575 kW), connected to the CFE grid.

**1995** – The *Ley de la Comisión Reguladora de Energía* is published, which establishes the autonomy of the CRE, defining its regulatory powers and functions.

**1995** – In the State of Hidalgo, the IIE mounts two wind turbines in The Gavillero (2 kW) to supply the community of María Magdalena.

**1996** – A wind system is installed for pumping water in Rancho Minerva, municipality of Juchitán, Oaxaca, using a 1.5 kW turbine. The system is struck by lightening on two occasions, disabling its facilities.





**1996** – A wind-diesel based hybrid system (7.5 kW) is installed in an ecotourism hotel in Costa de Cocos, Quintana Roo, with the support of the SNL, under its *Programa Mexicano de Energías Renovables*.

**1997** – A wind-solar-diesel hybrid system (62.3 kW) is installed in Puerto Alcatraz, Isla Santa Margarita, Baja California Sur. Two turbines, 5kW each, operate and are complemented by a 50 kW diesel generator and a 2.3-kW photovoltaic cell to serve a population of 200 people.

**1998** – The wind farm at Guerrero Negro (600 kW) goes into operation in Baja California Sur.

**1999** – A wind-solar-diesel hybrid plant (187 kW) is installed in San Juanico, Baja California Sur. 100 kW are provided for 10 wind turbines with a capacity of 10 kW each.

**2000** – The First Wind Colloquium takes place in Huatulco under the auspices of the Oaxaca government and the *Fundación para el Desarrollo del Corredor Eólico del Istmo*. Each year for seven subsequent years more seminars are held to attract foreign investment. Another government agency, *Centro de Negocios de la Secretaría de Economía de Oaxaca*, is responsible for overseeing the process, which results in the allocation of land to development companies prior to their participation in tender processes.

**2002** – PEMEX incorporates hybrid systems in its offshore network integrated by photovoltaic modules and wind turbines, highlighting the case of Akal-I, which installs a 400-watt wind generator, marine-grade type from Southwest Windpower.

**2007** – CFE begins operating the La Venta II (85 MW) wind farm in Oaxaca, the first large-scale farm in Mexico.

**2008** – The *Ley para el Aprovechamiento de las Energías Renovables y el Financiamiento de la Transición Energética* (LAERFTE) is published, which establishes a specific, more favorable framework for renewable energy.

**2008** – CFE awards Iberdrola (Spain) a public tender to build the La Venta III (103 MW) park in Oaxaca.

**2009** – The *Reglamento de la Ley para el Aprovechamiento de las Energías Renovables y el Financiamiento de la Transición Energética* (RLAERFTE) is published.

**2009** – Huatulco hosts the LAWEA Workshop "Development, implementation, and operation of wind projects in Latin America."

**2009** – A North American company wins a public tender bid to install a wind park with public funds from the State of Baja California in La Rumorosa (10 MW). In this area there are numerous monitoring and measurement systems to determine feasibility of wind power generation systems, mainly by Spanish companies.

**2009** – The La Venta III (103 MW) park begins construction.

**2010** – Mexico's total installed wind capacity nears 500 MW, between public and private projects.



**2010** – The Isthmus’s Fuerza Eólica wind park goes on line in Oaxaca.

**2012** – Mexico’s goal for installed wind capacity will reach 2,200 MW. It is expected that 4% of installed electrical capacity will come from wind energy.

**2020** – Mexico targets that 20% of electricity consumed by institutions and public agencies will come from renewable sources.



## **Annex 9. Forms of land tenure in the Isthmus of Tehuantepec**

In the region of the Isthmus of Tehuantepec there are different forms of land tenure, the two most common of which are small private property and *ejido* (communal) land. Previously, an *ejido* was characterized as inalienable, meaning that communal landowners could not sell, lease, mortgage, or encumber any part of the land since it was meant to provide economic sustenance to all of its members.<sup>93</sup>

However, with the advent of the 1992 Agrarian law, the concept of *ejido* changed. Since then, communal landowners have been able to legally decide whether to lease their lands, partially or totally. The duration of the lease contracts must be commensurate with the productive (lease) project and under no circumstance cannot exceed a 30-year period. Only once the 30-year lease is over can the lease agreement be extended further. Furthermore, the maximum governing authority over the *ejido* is granted to a general assembly. The democratically elected *comisariado ejidal* is in charge of executing all assembly resolutions.<sup>94</sup>

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<sup>93</sup> "Elementos para la Promoción de la Energía Eólica en México," United States Agency for International Development (USAID), 2009.

<sup>94</sup> *Ibid.*

## Annex 10. Copy of pay stub from Ingenio Santo Domingo

[REDACTED]		1630	
30-MAR-11	7	[REDACTED]	142.3
SALARIO	166.00	996.10	ISR
VACACIONES	0.28	27.29	AJUSTE POR
REDONDEO			
TRANSPORTE	19.92	99.61	SINDICATO OAXACA
RENTA		105.59	
ANTIGUEDAD		95.53	
AGUINALDO		103.69	
COMIDA		122.50	
PRIMA VACACIONAL		10.92	
DESPENSA OAXACA		263.97	
Deducciones:	Total Percepciones:	\$ 1,825.20	Total
	\$ 186.20		
	1,639.00		