

Wind Power in Mexico

Projects and Legislation



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March, 2012

Glossary

AMDEE	– Mexican Association of Wind Energy (Asociación Mexicana de Energía Eólica)
dB	– Decibel
CFE	– Federal Commission of Electricity (Comisión Federal de Electricidad)
CONUEE	– National Commission for the Efficient Use of Energy (Comisión Federal para el Uso Eficiente de la Energía)
CRE	– Energy Regulatory Commission (Comisión Reguladora de Energía)
EIA	– Environmental Impact Assessment
EU	– European Union
GHG	– Greenhouse Gas
GW	– Giga Watt
km	– kilometer
km²	– square kilometer
kWh	– kilowatt-hour
LAERFTE	– Law for the Use of Renewable Energy and Financing of Energy Transition (Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética)
LCRE	– Law of the Energy Regulatory Commission (Ley de la Comisión Reguladora de Energía)
LGEEPA	– General Law of Ecologic Equilibrium and Environmental Protection (Ley General del Equilibrio Ecológico y Protección al Medio Ambiente)
LIE	– Law of Foreign Investment (Ley de Inversión Extranjera)
LSPEE	– Law of the Public Service of Electricity (Ley del Servicio Público de Energía)

m	– Meter
MIA	– Environmental Impact Assessment (Manifiesto de Impacto Ambiental)
MW	– Mega Watt
R&D	– Research and Development
RLAERFTE	– By-Law for the Use of Renewable Energy and Financing of Energy Transition (Reglamento de la Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética)
RLGEEPA	– General By-Law of Ecologic Equilibrium and Environmental Protection (Reglamento de la Ley General del Equilibrio Ecológico y Protección al Medio Ambiente)
RLSPEE	– By-Law of the Public Service of Electricity (Reglamento de la Ley del Servicio Público de Energía)
SAT	– Tax Administration Service (Servicio de Administración Tributaria)
SE	– Ministry of Economy (Secretaría de Economía)
SEMARNAT	– Ministry of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales)
SENER	– Ministry of Energy (Secretaría de Energía)
SRE	– Ministry of Foreign Affairs (Secretaría de Relaciones Exteriores)

Summary of Laws and Authorities

Table 1. Summary of Authorities

Initials	Name	English Translation
CRE	Comisión Reguladora de Energía	Energy Regulatory Commission
SENER	Secretaría de Energía	Ministry of Energy
SE	Secretaría de Economía	Ministry of Economy
CFE	Comisión Federal de Electricidad	Federal Commission of Electricity
CONUEE	Comisión Nacional para el Uso Eficiente de Energía	National Commission for the Efficient Use of Energy
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales	Ministry of Environment and Natural Resources

Table 2. Summary of Laws and Regulations

Initials	Name	English Translation
LSPEE	Ley del Servicio Público de Energía	Law of the Public Service of Electricity
RLSPEE	Reglamento de la Ley del Servicio Público de Energía	By-Law of the Public Service of Electricity
LAERFTE	Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética	Law for the Use of Renewable Energy and Financing of Energy Transition
RLAERFTE	Reglamento de la Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética	By-Law for the Use of Renewable Energy and Financing of Energy Transition
LCRE	Ley de la Comisión Reguladora de Energía (CRE)	Law of the Energy Regulatory Commission
LIE	Ley de Inversión Extranjera	Law of Foreign Investment
LGEEPA	Ley General del Equilibrio Ecológico y Protección al Medio Ambiente	General Law of Ecologic Equilibrium and Environmental Protection
RLGEEPA	Reglamento de la Ley General del Equilibrio Ecológico y Protección al Medio Ambiente	General By-Law of Ecologic Equilibrium and Environmental Protection

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Overview

The following report contains information about Wind power in Mexico. First, the background and wind potential of Mexico is explained, along with its general energy strategies. Then, the relevant authorities in the developing of renewable energy projects are introduced (Section 2). In the section following the authorities, the applicable legislation to energy projects is listed and shortly explained (Section3). Section 4 of this report deals with the permit applications for energy generation, and Section 5 shows some examples of ongoing wind power projects in Mexico, while Section 6 deals with partnerships between Mexico and EU in wind power matters.

1. Background

There are many possibilities for the use of sustainable energies in Mexico for electricity generation by private companies. As part of its Legal Framework, Mexico allows private companies to generate electricity for own consumption or selling, mainly through the Law of the Public Service of Electricity (Ley del Servicio Público de Energía Eléctrica LSPEE), which was published in 1992 and the Law for the Use of Renewable Energies and Financing of Energy Transition (Ley para el Aprovechamiento de las Energías Renovables y el Financiamiento de la Transición Energética LAERFTE), published in 2008 [1]. Additionally, with regards to fiscal matters, the Income Tax Law stipulates a depreciation rate of 100% for investments in machinery and equipment for renewable energy generation. The machinery and equipment must be in operation for productive uses during a minimum period of five years. [2].

1.1. Mexico

Mexico is known for its historic and current cultural wealth [3]. It has a land surface of 1 964 375 km² with 31 States and one Federal District. Mexico borders more than 3000 km with the USA [4] and a population of 112 million inhabitants, with median age of 26 years old [5]. Being a neighbor country to the USA, Mexico counts with experience and infrastructure regarding exports of good in services, exporting as of 2006 88% of them to USA [6].

Mexico has trade agreements signed on three continents, making it a gateway for a potential market of more than one million consumers and 60 percent of the world's GDP. Mexico has a network of 11 FTA's (Free Trade Agreements) in 43 countries, as well as Economic Complementation agreements, and Investment Promotion and Protection Agreements (promoting legal protection of capital flows to the productive sector) with 2 countries. It has negotiated Double Taxation (DT) treaties with more than 31 countries, preventing the taxation by two or more countries of the same income, asses, or transaction [7].

1.2. Renewable energy in Mexico

Mexico has many natural resources that favor the development of a large number of production activities, including those related to renewable energy generation. Due to climate change and the rise in cost of fossil fuels, the interest has been increasingly on renewable energy sources, such as hydroelectric, solar, wind, geothermal, biofuels, and biomass. Currently, renewable energy

amounts for 5.9 percent of the total electricity generation capacity (280 GW). Mexico offers a great potential for the development of the renewable energy industry. According to the National Renewable Energy Laboratory in the U.S., the wind potential of Mexico lies above 40 000 MW (current capacity is 185 MW). Regarding solar energy, about 90% of the country presents an insolation average of 5 kWh per square meter per day, one of the best levels in the world. Mexico is a world-leader in producing electricity from geothermal sources, occupying the third place with an installed capacity of 843 MW and a potential of 2400 MW. The country's hydroelectric potential is estimated at 53000 MW of which it only has 11300 MW installed. Besides having an excellent geographical location and abundant natural resources, Mexico has great potential in the equipment manufacture are regarding renewables, having low costs and highly skilled workforce to offer [8]. Until 2010, the installed capacity of renewable energy was of 2365 MW, as seen on Figure 1, which is only a 3.3% of the total capacity (Figure 2).

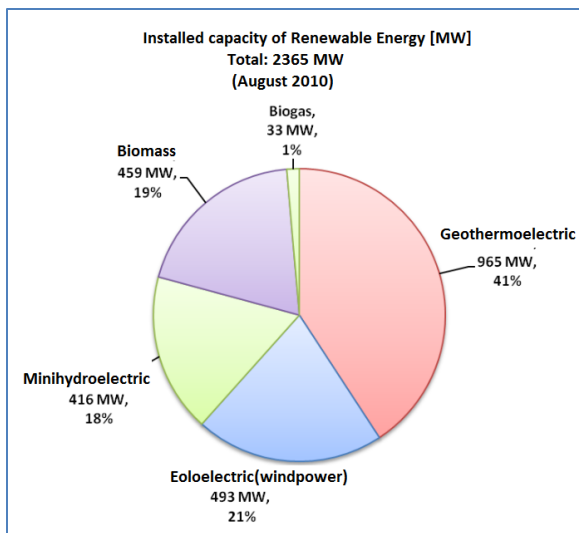


Figure 1. Capacity of renewables in Mexico [9]

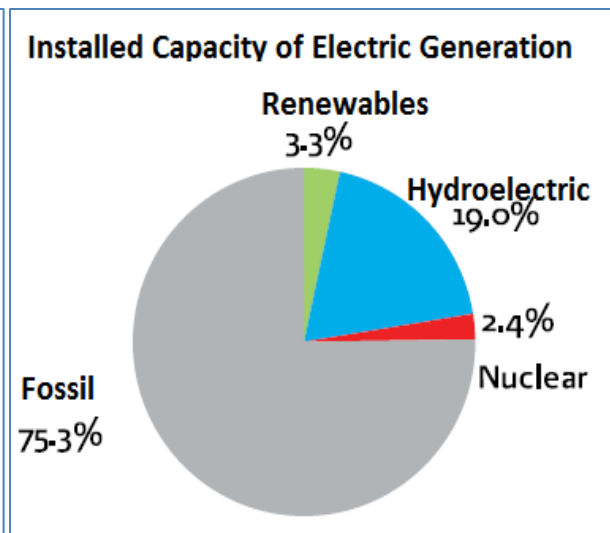


Figure 2. Total Electric Capacity Mexico [10]

1.3. Mexican Strategies and Programs for Sustainability

Among the strategies and programs for sustainability, two of them are the National Strategy for Energy Transition and Sustainable Use of Energy, and the Special Program for the Use of Renewable Energy.

1.3.1. National Strategy for Energy Transition and Sustainable Use of Energy [11]

According to the LAERFTE, the Strategy promotes and incentivizes the application of clean technologies for the use of renewable energy, as well as efficiency and energy saving, in all productive activities and domestic use. It will also promote the diversification of primary energy sources, increasing the offer of renewable energy, establish a program for standardization of energy efficiency, promote and spread measures for the energy efficiency, energy saving, and will propose necessary measures so that the population has access to reliable information about electric consumption of equipment [12].

1.3.2. Special Program for the Use of Renewable Energy [10]

According to the RLAERFTE, the Special Program for the Use of Renewable Energy (Programa Especial para el Aprovechamiento de Energías Renovables), will establish the goals for renewable energy generation, electricity transport, promotion of renewable energy, rural electrification with renewable energy, and support for technological R&D in renewable energy [13]. The goals of this program are shown in Table 3.

Table 3. Goals of the Special Program for the Use of Renewable Energy [14]

Objective	Impulse development of the industry of renewable energies	Extend energetic portfolio of the country	Extend the coverage of the electric service in rural communities using renewable energy
Indicator	Installed capacity through renewable energy sources.	Percentage of electric generation through renewable energy sources	Communities with Access to electricity from renewable energy sources
Measure Unit	MW	%	# of communities
Initial status	1993 (2008)	3.9 (2008)	0 (2008)
Breakdown:			
Air	90 MW	0.09%	
Minihydro	389 MW	0.64%	
Geothermal	994 MW	2.86%	
Biomass/-gas	515 MW	0.33%	
Goal	5,146 (2012)	4.5 - 6.623 (2012)	2500
Breakdown:			
Air	2939 MW	1.74 - 2.91	
Minihydro	521 MW	0.36 - 0.61	
Geothermal	1117 MW	2.19 - 2.74	
Biomass/-gas	576 MW	0.19 - 0.32	

1.4. Wind power potential in Mexico

The potential power in Mexico from wind energy is estimated by different organisms: the Mexican Wind Power Association (AMDEE) estimates a capacity of 10 GW, the Electrical Research Institute of 5 GW (competitive) and 15 GW(probable potential), and the Federal Commission of Electricity estimates it at 7 GW (Figure 3) [15]. These values are estimations, which could be higher, as reported by the Renewable Energy Laboratory in the U.S (see Section 1.2).

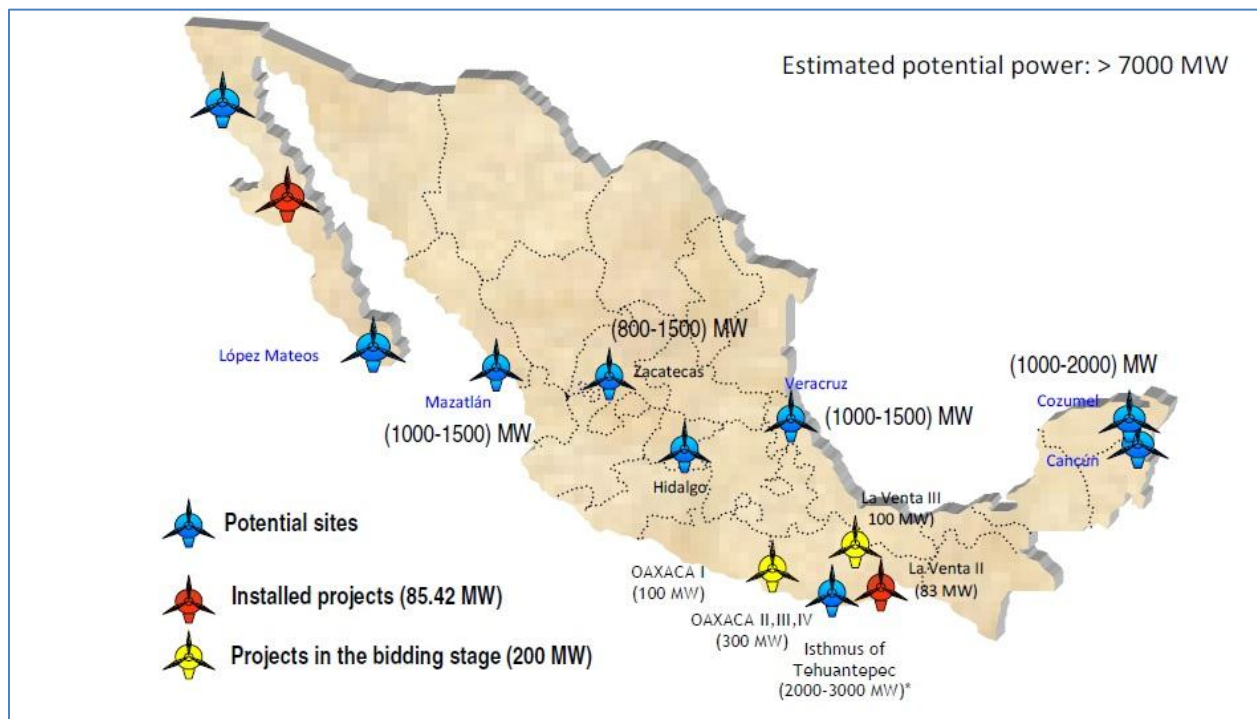


Figure 3. Wind power potential in Mexico [15]

2. Authorities

The following authorities are dependences of the Mexican Federal Government (Gobierno Federal de los Estados Unidos Mexicanos):

2.1. Energy Regulatory Commission CRE(Comisión Reguladora de Energía)

The Energy Regulatory Commission is a government institution which has the objective of promoting the development of the supply and selling of electricity to the users of the public service; the generation, export, and import of electricity by private entities; the acquisition of electricity destined for the public service; among other activities. The functions of the CRE are to participate in the establishment of the tariffs for supply and selling of electricity, to verify that the electricity for the public service is obtained from the lowest cost source, to determine the geographic zones where the activities of energy generation can be carried out. Also, the CRE is responsible to grant and revoke permits and authorizations required for regulated activities, and to approve and issue contractual models for the realization of said activities [16].

2.2. Ministry of Energy SENER (Secretaría de Energía)

The Ministry of Energy deals with the design of public energy policies and the strategic leading of the activities in energy procurement and distribution, to ensure the supply of high quality safe energy in an efficient fashion, while being profitable and environmental friendly, in which it reaffirms its character as the rector of Mexico's energetic ambit [17].

2.3. Ministry of Economy SE (Secretaría de Economía)

The Ministry of Economy is responsible for formulating and conducting the general industrial policies, external and internal commerce, among others. It regulates, promotes and watches over commercialization, distribution, and consumption of goods and services. It also foment the external commerce of the country. The Ministry studies, projects, and determines the import duties and fixes official prices. It norms and registers the industrial property, as well as regulating and orienting foreign investment and technology transfers [18].

2.4. Federal Commission of Electricity CFE (Comisión Federal de Electricidad)

The Federal Commission of Electricity is an enterprise of the Mexican government. It generates, transmits, distributes, and commercializes electricity. It has a generation capacity of 52515 MW. 22.6% of this capacity comes from private capital. It generates electricity through various

technologies. It has thermoelectric, hydroelectric, carboelectric, geothermoelectric, and eolelectric centrals, as well as one nuclear. From its production volume, 99% is sold to the public and 1% is exported. The domestic sector accounts for 88.39% of the clients, but the sales amount to only 25.82%, while in the industrial sector, less than 1% of the clients represent more than 50% of the sales. The CFE provides electricity for more than 35.3 million clients, representing 100 million inhabitants, and incorporates yearly one million new clients. The Commission of Electricity is also responsible of planning the national electric system, through the Program of Works and Investments of the Electric Sector POISE (Programa de Obras e Inversiones del Sector Eléctrico) [19].

2.5. National Commission for the Efficient Use of Energy (CONUEE)

The Comisión Nacional para el Uso Eficiente de la Energía or CONUEE, is an administrative institution which counts with technical and operational autonomy. Its objective is to promote energy efficiency and use of sustainable energy. The CONUEE holds authority over various subjects: Norms, Public Policy, Promotion, and Evaluation.

The CONUEE implements the registry of users which have obtained the certificate of energetic responsibility. It issues opinions and recommendations on the best practices with regard to the sustainable use of energy to the Federal Administration, Federal entities, municipalities and private entities. Finally it orders audits to verify the activities of entities with regard to the sustainable use of energy. It propitiates the optimal use of energy, from exploitation to its consumption, while formulating and issuing methodologies for the quantification of GHG emissions. It also prepares catalogs, manuals, articles and technical reports about their projects, and publishes results from projects and studies which promote the sustainable use of energy [20].

2.6. Ministry of Environment and Natural Resources (SEMARNAT)

The Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) is the agency which promotes the protection, restoration, and conservation of natural systems and their resources, including environmental goods and service through the promotion of sustainable use and sustainable development. Its main objectives include the conservation of Mexico's biodiversity and ecosystems, the reversion of loss of natural resources and pollution of water, soil, and earth, as well the promotion of compliance with environmental legislation, and the management and reservation of water resources, promoting responsible participation from every social sector [21].

3 Energy legislation in Mexico

In order to generate electricity using renewable energy, including wind power, various documents from the Mexican Legal Framework come into play. These are The Constitution, the Laws, and the By-Laws (Regulaciones).

3.1. The Mexican Constitution [22; 23]

The articles from The Constitution which concern renewable energy are Articles 25, 27 and 28, dealing with sustainability, land and water, and monopolies respectively.

3.1.1. Article 25

This article states that the State will foment the sustainable development of the Nation. The public sector will have power over the strategic areas specified in paragraph 4 of Article 28, and will act alone or otherwise with private and social sectors, stimulating the development of the areas of national priority. The law will promote both public and private enterprises through mechanisms which take into account the best public interests, the conservation of resources, and the environment.

3.1.2. Article 27

Article 27 states that only born or naturalized Mexicans, as well as Mexican corporations have the right to acquire the legal domain of land and water. The State can grant the same right to foreigners, as long as they register with the Ministry of Foreign Affairs as Nationals with regard to the land of water resources; that is, decline the protection of their government with regard to any issue concerning the land or water, lest the resources return to the Nation as a penalization. Within 100 kilometers from the land borders and 50 kilometers from the beaches, no foreigner shall acquire legal domain over land or water.

The law protects the lands of rural land owner groups, protecting their integrity and potential for human development, and regulates their use. The State shall establish prerequisites and procedures of how the rural land-owners, the State, and third parties will be able to join

3.1.3. Article 28

Article 28 of The Constitution states that monopolies and monopolistic activities are prohibited in Mexico. An activity regulated exclusively by the State in accordance to its strategic areas

(including electricity generation) is not considered monopolistic. The State can work in its strategic areas alone or joint with social or private enterprises.

3.2. Laws and by-laws [24]

The most relevant legislation for the building of wind power parks are: Law of the Public Service of Electricity (LSPEE) and its by-law (RLSPEE), Law for the Use of Renewable Energy and Financing of Energy Transition (LAERFTE) and its by-law (RLAERFTE), Law of the Energy Regulatory Commission (Ley de la Comisión Reguladora de Energía) and the Law of Foreign Investment (Ley de Inversión Extranjera).

3.2.1. Law of the Public Service of Electricity (LSPEE) [25] and it's by-law (RLSPEE) [26]

The LSPEE states that only the Mexican Nation can generate, transport, transform, distribute, and supply electricity which is destined for public service. These activities shall be carried out by the Federal Commission of Electricity.

The following activities are not considered to be public service and therefore can be done by private companies: self-generation, co-generation, small generation, independent generation for selling electricity to the Federal Commission of Electricity, and generation of electricity for export (derived from co-generation, independent generation, or small generation). Also allowed is the import of electricity by businesses and individuals exclusively for own supply, and generation of electricity destined for use in emergencies derived from interruptions in the public energy service.

Article 36 of this law states that the Ministry of Energy, heeding the opinion of the Federal Commission of Electricity shall grant permits for self-generation, co-generation, independent generation, small generation, or import or export depending on the case, as shown in Table 4.

Table 4. Types of generation and their main permit conditions according to the law

Type	Definition	Conditions for permit	Reference
Self-generation	Generation for self-consumption.	-Cannot deliver electricity for third-parties unless modification and approval of the conditions take place. -The solicitor must let the CFE dispose of the exceeding generation according to Art. 36BIS.	LSPEE Art. 36 Sec. I & RLSPEE Art. 77, 101
Co-generation	Electricity generation with generation of steam or other secondary thermal energy. Secondary generation of electricity due to thermal processes.	-Energy must be utilized among the co-owners of the corporation. -CFE is allowed to dispose of excess generation of electricity	LSPEE Art. 36 Sec. II & RLSPEE Art. 77, 103-106
Independent generation	Electricity generation from a plant with capacity above 30 MW, destined exclusively for export or selling to CFE.	-Solicitors must reside in Mexico -The generation capacity has to be congruent with CFE's plan (updated at least every year) -Electricity must be sold exclusively to CFE through long-term contracts according to Art. 36 BIS or to export totally or partially with prior approval by the Ministry of Energy.	LSPEE Art. 36 Sec. III & RLSPEE Art. 77, 108-110
Small generation	-Electricity generation from a plant with maximum capacity 30 MW, destined exclusively for export or selling to CFE or -Self-generation of rural areas without access to electricity (max capacity 1 MW)	-Solicitors must reside in Mexico -Solicitor cannot be responsible of projects with a sum of more than 30 MW in the same area -The generation capacity has to be congruent with CFE's plan (updated at least every year) -Electricity must be sold exclusively to CFE through long-term contracts according to Art. 36 BIS or to export totally or partially with prior approval by the Ministry of Energy.	LSPEE Art. 36 Sec. IV & RLSPEE Art. 77, 111-115
Export	-Export through co-generation, independent generation and small generation -Temporal use of CFE network	-An export agreement must be shown to the Energy Regulatory Commission (CRE) or -A letter of intention of export -Produced electricity cannot be utilized in National territory without permission from the Ministry of Energy to change the destiny of the electricity	LSPEE Art. 36 Sec. V & RLSPEE Art. 77, 116-119
Import	-Import of electricity from foreign countries	-Fulfillment of equivalent prerequisites in case of not being connected to the CFE network -Payment of import duties	LSPEE Art. 3 Sec. III, IV; Art. 36 Sec. V & RLSPEE Art. 77, 120-123

Article 36-BIS establishes that the CFE, by law, and for the public service, shall use the electricity which results in the lower cost. The considerations for this are the environmental externalities for each technology, their stability, quality, and safety.

Article 38 states that permits which are for self-generation, co-generation, small generation, export, and import will have indefinite duration. Permits for independent generation have duration of up to 30 years, and can be renewed by complying with the existing norms.

Article 113 Sec. I and II of the RLSPEE states that when it comes to small rural communities or isolated areas, the solicitors will have to establish consumption cooperatives, co-properties, associations or civil societies, or sign agreements of solidary cooperation for the purpose of self-generation. They will also have to mention to whom and under which conditions the electricity will be delivered.

3.2.2. Law for the Use of Renewable Energy and Financing of Energy Transition (LAERFTE) [12] and its by-law (RLAERFTE) [13]

The objective of this Law and its by-law is to set the rules for the use of renewable energies and clean technologies for power generation which are intended for different purposes than providing electricity for the public service. The LAERFTE establishes the national strategy on renewables, as well as instruments for financing the energy transition [15].

According to Art. 4 of the RLAERFTE, the established criteria by the Ministry of Energy for the utilization of renewable energy are strengthening of the energetic security of the country, reduction in cost variation of electricity, reduction of operating costs, fomenting of social development of the communities where the projects take place, further development of the country and job creation, reduction of impacts on the environment and public health by fossil fuels, reduction of GHG's, and use of clean technologies in industrial activities.

Any project with a capacity above 2.5 MW shall have to promote social development of the community in which the project is being executed, following international best practices for the sustainable rural development and the protection of the environment.

3.2.3. Law of the Energy Regulatory Commission (LCRE) [16]

The Energy Regulatory Commission has as its objective to promote the development of electricity generation activities and has the power of granting and revoking permits which allow the activities of generation, import, and export of electricity by private entities, as well as the approval and drawing up of contract models for the realization of these activities. The CRE participates in the establishment of the tariffs for the supply and selling of electricity. Also, the Commission can do public contract biddings, in case that it is required for the public service electricity supply.

3.3.4. Law of Foreign Investment [27]

The objective of this law is to establish the rule-set to channelize foreign investment. It states that foreign investment is equal to Mexican investment, after the investor has arranged the migratory status with the immigration authorities.

Foreign investment can participate in any proportion in the social capital of Mexican corporations, acquire assets, enter new fields of economic activity or manufacture new lines of products, open and operate establishments, and expand or re-locate existing ones.

In order to authorize foreign corporations to invest in Mexico, they must fulfill the following requirement: The corporations must be established according to the laws of their countries; the legal framework through which they were established cannot go against Mexican laws; in order to establish a branch in Mexico, they will have to appoint a representative with permanent domicile in Mexico. It is compulsory that foreign investors are registered in the National Register of Foreign Investment (Registro Nacional de Inversiones Extranjeras) within the first 40 working days, counted from the date of constitution of the corporation, and will have to renew the registration every year.

4. Legal Procedures and Permits in Mexico

4.1. List of procedures to develop a wind power project [28]

There are several procedures that need to be carried out in order to develop a project of wind power, and they vary depending on the amount of power involved in the project; that is, if it is above or equal to 0.5 MW or below 0.5 MW.

4.1.1. Procedures for a wind power project above or equal to 0.5 MW

In order to develop large wind power projects ($\geq 0.5\text{MW}$), several steps have to be carried out, corresponding to several procedures in various agencies: the procedure to establish a corporation (Table 5), to generate electricity (Table 6), to obtain backup service (Table 7), of environment and use of natural resources (Table 8), of local installation (Table 9), and for the activity report (Table 10).

Table 5. Procedures to establish a corporation

Step	Procedure	Agency
1	Issuing of the Articles of Incorporation	Notary
2	Application for registration in the National Registry of Foreign Investments (Registro Nacional de Inversiones Extranjeras)	SE
3	Notice of the use of permits for the establishment of a corporation	SRE
4	Application for registration in the Federal Registry of Taxpayers (Registro Federal de Contribuyentes)	SAT
5	Permit for the Incorporation of a company	SRE
6	Issuing of the export permits	CFE

Table 6. Procedures to generate electricity ($\geq 0.5\text{ MW}$)

Step	Procedure	Agency
7	Interconnection feasibility study	CFE
8	Portage study	CFE
9	Application for the permit for self-generation	CRE
10	Application for the permit for independent generation	CRE
11	Application for the permit for small generation	CRE
12	Application for energy export permits	CRE

Table 7. Procedures to obtain backup service

Step	Procedure	Agency
13	Interconnection contract	CFE
14	Agreement of purchase and sale of exceeding energy generation	CFE
15	Transmission agreement	CFE
16	Backup agreement	CFE

Table 8. Environmental Processes and for the Use of the Natural Resource

Step	Procedure	Agency
17	Environmental Impact Assessment (Particular)	SEMARNAT
18	Environmental Impact Assessment (Regional)	SEMARNAT
19	Preventive report	SEMARNAT
20	Authorization of land-use change in forest areas	SEMARNAT
21	Wildlife use report	SEMARNAT

Table 9. Procedures for local installation (≥ 0.5 MW)

Step	Procedure	Agency
22	Operating license	Local
23	Land-use license	Local
24	Feasibility of the drinking water service, sewage, and wastewater treatment	Local
25	Feasibility of the electricity service	Local
26	Approval by the Protección Civil (Civil Protection) unit	Local
27	Feasibility of business	Local
28	Building license	Local
29	Public Registry of the property and the commerce	Local
30	Notice of completion of building	Local
31	Authorization of occupancy	Local
32	Authorization for the extension or modification of an edification	Local
33	Beaconing (signaling for aerial navigation)	Local

Table 10. Procedures for the activity report

Step	Procedure	Agency
34	Statistical report of electric operation	CRE

4.1.2. Procedures for a wind power project below 0.5 MW

For smaller wind power projects (< 0.5MW), the procedures are the procedure to generate electricity (Table 11) and of local installation (Table 12).

Table 11. Procedures to generate electricity (<0.5 MW)

Step	Procedure	Agency
1	Interconnection feasibility study	CFE
2	Portage study	CFE
3	Interconnection contract	CFE
4	Agreement of purchase and sale of exceeding energy generation	CFE
5	Transmission agreement	CFE
6	Backup agreement	CFE

Additionally, the Preventive Report has to be presented, to determine whether an EIA is warranted (See section 4.3).

Table 12. Procedures for local installation (< 0.5 MW)

Step	Procedure	Agency
7	Operating license	Local
8	Land-use license	Local
9	Feasibility of the drinking water service, sewage, and wastewater treatment	Local
10	Feasibility of the electricity service	Local
11	Approval by the Protección Civil (Civil Protection) unit	Local
12	Feasibility of business	Local
13	Building license	Local
14	Public Registry of the property and the commerce	Local
15	Notice of completion of building	Local
16	Authorization of occupancy	Local
17	Authorization for the extension or modification of an edification	Local
18	Beaconing (signaling for aerial navigation)	Local

4.2. Generation permit applications and their required documentation

Permit applications for the different types of generation can be found in the webpage of the Federal Commission of Electricity [29]. The required documentation and processing time for each application can be seen in Table 13.

Table 13. Permit applications for electricity [29]

Permit Application for	Application code	Required Documentation	Processing time
Self-generation	CRE-DGE-001	<ul style="list-style-type: none"> a) Documentation which accredits the legal existence of the solicitor or co-proprietors of the facilities. b) Testimony of the notarial power from the legal representative c) General description of the project, including plant characteristics and secondary installations. d) Information concerning use of national waters (if applicable) e) Information regarding the compliance of ecological norms f) Information about land use g) Documentation with accredits the property, possession, or authorization for the use of the surface which the installations will use or, alternatively, an inform about the legal acts foreseen for such effect h) Program of the building work, including dates of initiation and finalization of the respective constructions, including the date of start-up and considering the successive stages i) Security systems of the installations and considerations of civil protection (Protección Civil) j) Letter directed to the CRE, in which the solicitor has the obligation to let the CFE dispose of any exceeding electricity generation k) Process Flow Diagram and Energy Balance in the case of thermoelectric plants l) Sketch of the transmission lines required (if applicable) m) Expansion plans and inclusion of new partners (if applicable) n) Receipt of the payment for rights (if applicable) 	50 working days
Co-generation	CRE-DGE-002	<ul style="list-style-type: none"> -Same as self-generation plus : -signed agreement in which it shows that the corporation is properly established for the purpose of the project 	50 working days
Independent generation	CRE-DGE-003	<ul style="list-style-type: none"> -Same as self-generation except j) and m), plus : - Copy of the Legal Document in which CFE adjudicates the producer 	20 working days
Small generation	CRE-DGE-004	<ul style="list-style-type: none"> -Same as self-generation except j) and m), plus : -Sketch of the area where the solicitor will operate -Information about the compliance with Article 113 Sec.I &II of the RLSPEE (in case of supply to rural communities) 	50 working days
Import	CRE-DGE-005	<ul style="list-style-type: none"> -Same as self-generation except i),j),k),l),m),plus -Legal agreements signed directly between supplier and consumer -Letter which contains the conditions and terms of the termination of energy importation 	50 working days
Export	CRE-DGE-006	<ul style="list-style-type: none"> -Same as self-generation except m) plus : -Copy of the purchase agreement of the energy which will be produced or the letter of intent -Copy of the previous permit (if applicable) -In case of co-generation project : <ul style="list-style-type: none"> ---Disponibility of exceeding power per day, month, and year --- Letter directed to the CRE, in which the solicitor has the obligation to let the CFE dispose of any exceeding electricity generation ---signed agreement in which it shows that the corporation is properly established for the purpose of the projects 	50 working days

4.3. Environmental Impact Assessment (MIA) and Preventive Report [30]

As stated in section 4.1.1 the EIA and Preventive Report are necessary in wind power projects above 0.5 MW. The EIA is not necessary in projects below 0.5 MW; the Preventive Report, however, must still be presented. These reports are bound by Articles 28 & 31 of the LGEEPA [31] and 5 & 29 of the RLGEEPA [32]. The Preventive Report (which should always be presented) is the document through which the general information of a construction is given, in order to determine whether they apply to Article 31 of the LGEEPA (and therefore do not require an EIA) or if they must be evaluated through an EIA. The EIA is the document by which, through studies, the significant and potential environmental impact that a construction or activity would produce is reported. Also, the EIA reports on how to avoid, mitigate, or compensate the aforementioned impacts [33].

4.3.1. Preventive Report Procedure [34]

The procedure for the preventive report (which has to be made regardless of whether the project is below or above 0.5 MW) can be seen in Table 14. The result will define if an EIA is warranted. In the case of projects above 0.5 MW, the EIA is compulsory, see Section 4.3.2.

Table 14. Procedure for the preventive report

	Legal framework	Procedure	Response time and costs	Results
Preventive report	In order to carry out a construction or activity as stated in the Article 28 & 31 of the LGEEPA and 29th of RLGEEPA.	<p>I. Must be presented:</p> <ul style="list-style-type: none"> -1 hard copy of the Preventive Report and 3 CD's containing a copy. The case must be labeled "Consulta al Público" (Public Consultation) -Payment receipt <p>II.-Preventive Report must contain</p> <ol style="list-style-type: none"> 1. Name and place of the Project 2. Contact information of the applicant 3. Contact information of the responsible for the elaboration of the Preventive Report 4. Mexican standard norms (NOM's) which apply 5. Partial plan of the urban development or Partial plan of the ecologic ordainment 6. If applicable, authorization from the Ministry of the industrial park in which the activity takes place 7. General description of the project 8. Identification of substances that will be used that can impact the environment 9. Estimation of emissions and control measures 10. Description of the surroundings and identification of other possible sources of emission 11. Identification of relevant environmental impacts and prevention and mitigation measures. 12. Localization drawings of the area 	<p>20 work days</p> <p>Cost:</p> <p>\$9,731.51. Approx. € 580</p>	SEMARNAT will notify the applicant if the Project can go through or if it requires an Environmental Impact Assessment.

4.3.2. Environmental Impact Assessment Procedure

There are two types of EIA that have to be done (if applicable): Particular and Regional. In the case of wind power projects above 0.5 MW, the EIA is compulsory. The determination of which EIA (Particular or Regional) has to be presented will depend on the reach, characteristics, and location of the project, according to Article 11, Sec. I,II,III,IV of the RLGEEPA.

Table 15. Particular EIA procedure

	Legal framework	Procedure	Response time and costs	Results
Particular EIA	In order to carry out a construction or activity as stated in the Article 28 & 30 of the LGEEPA and 5, 9, and 10(Sec.II) of RLGEEPA.	<p>I. Must be presented:</p> <ul style="list-style-type: none"> -1 hard copy of the EIA Report and 3 CD's containing a copy. The case must be labeled "Consulta al Público" (Public Consultation) -Executive summary of the EIA (1 hard copy and 2 copies in CD) -Payment receipt <p>II.-EIA must contain:</p> <ol style="list-style-type: none"> 1. Name and place of the Project. Contact information of the applicant and of the responsible for the elaboration of the EIA 2. Project description 3. Links to the legal framework in environmental issues and land use 4. Description of the environment system and the detected environmental problematic within the influence area of the project 5. Identification, description, and evaluation of environmental impacts 6. Prevention and mitigation measures. 7. Environmental forecasting, and evaluation of scenarios 8. Identification of the methods and techniques which sustain the information provided in the aforementioned contents. 	<p>60 work days</p> <p>Cost (Depending on the complexity of the study):</p> <p>a). \$26169.81 €1560</p> <p>b). \$52340.86 €3122</p> <p>c). \$78511.91 €4683</p>	SEMARNAT will notify the applicant if the Project has been authorized or conditionally authorized.
Regional EIA	According to Article 11, Sec. I,II,III,IV of the RLGEEPA	As in Particular EIA	<p>60 work days</p> <p>Cost (Depending on the complexity of the study):</p> <p>a). \$34247 €2042</p> <p>b). \$68492.77 €4085</p> <p>c). \$102738.53 €6128</p>	

5. Wind Power Projects

Wind power projects in Mexico are summarized by the AMDEE in Figure 4.

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	Eléctrica 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/EYRA	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 Stinú	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
Zopilooapan	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 Comondú	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
Vaquerías-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
Sempre	Baja California	Export	Sempre	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 México	TBD	2011-2020	500
Fuerza Eólica de Baja California	Baja California	Export	Fuerza Eólica de Baja California	TBD	2011-2020	300
						4,871.0
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						
Total MW						9,469.725

Figure 4. Wind Energy Projects in Mexico by 2011 [35]

6. Technical cooperation between Mexico and EU/Scandinavia

6.1. Mexico – Germany Cooperation

Mexico and Germany have an agreement since 2005, where the German Technical Cooperation (GTZ) implemented its “Renewable Energy Promotion-Promover” project, with the objective of contributing to efficiently promoting renewable energy markets by the responsible institutions. The focus areas are: the strategy and policy development, focused on biofuels in a first stage; the advice in adjusting the legal and regulatory frameworks; and the project and market development, focused on solar heaters in a first stage; as well as South-South cooperation [2].

6.2. Mexico – Scandinavia Cooperation

In October 2009, the General Director of ProMéxico, Bruno Ferrari, made a work tour around Finland, Denmark, and Sweden to promote the renewable energy sector. Representatives of enterprises from these three countries learned about the new legal framework of Mexico which favors the use of technology in the field of renewables [36].

6.2.1. Mexico – Denmark Cooperation

Mexico and Denmark signed an agreement in 2005 which the main cooperation methods include : exchange of technical skills, including best practice information ; technology transfer, strengthening institutional capabilities; promotion of technical cooperation, including professional and undergraduate exchange; design of and implementation of studies, projects, and programs; joint research and workshops; joint commercial applications; development of quantitative tools for the analysis and the methodologies of strategic long-term planning; and promotion of favorable conditions for the production of energy, conservation and energy efficiency, and a broader application of renewable energy sources [37].

6.2.2. Mexico – Finland Cooperation

The Embassy of Finland in Mexico carries out projects of the Fondo Local (Local Fund) for the cooperation for the development in Mexico, as well as Belize and Haiti. The prioritized activities in Mexico are: support life conditions, culture and bilingual teaching in native towns; promote sustainable development, especially renewable energy, water and forest; and promote the social cohesion (equality, civil rights, democracy, and strengthening of the civil society [38].

Mexico and Finland have signed an agreement which formalizes commitments of bilateral cooperation regarding commercialization of forest products, promotion and investment in this sector, as well as technical and scientific support for the management of the forest resources of both countries [39].

Mexico and Finland, through the National Water Commission (CONAGUA) and the Finnish Environment Institute (SYKE) signed an agreement for the technological development regarding hydrological issues (especially wastewater treatment), following the already implemented technical exchanges between the institutions. This cooperation facilitates the implementation of the Mexican Water Agenda 2030, a long-term policy aiming for clean hydrological resources [40].

7. Conclusion

Mexico is nowadays an emerging economy, with potential in many areas. A very important area is renewable energy, in particular wind power – considering the large wind potential. It is a country with plenty of opportunity, which promotes local investment and technology, and welcomes foreign ones.

Recent modifications to the laws and fiscal incentives (e.g. the 100% depreciation rate of equipment and machinery destined for sustainable energy generation) aim to attract foreign investors for the purpose of developing wind power projects, as well as other sustainable energy projects. Mexico represents a prime opportunity for local and foreign enterprises to make use of the wind resource, land for that purpose, and local workforce in the assessment, engineering, construction, and maintenance phases.

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