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Renewable energy sources in the Mexican electricity sector

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Abstract

This paper analyzes the role of renewable energy sources (RES) in the Mexican electricity sector in the context of the proposed renewable energy bill currently under consideration in the Mexican Congress. This paper was divided into three parts. The first part presents a chronology of institutional background related to the RES. This is followed by an analysis of the coordination and management system of the Mexican electricity sector, which can facilitate the promotion and integration of the RES without significant structural changes. Finally, the pros and cons of the renewable energy bill are analyzed in order to demonstrate the need for greater coherence between the bill and the coordination system of the sector. It is concluded that when inconsistency is eliminated, RES would strongly be promoted in Mexico.

Keywords: Renewable energy sources; Mexican electricity sector; Renewable energy policies

1. Introduction

Mexico has a great potential of renewable energy sources (RES) that could be realized to generate electricity. According to the Mexican Department of Energy, Mexico could develop an electrical capacity of 5000 MW from wind energy, around 10–20 MW from photovoltaic solar energy, about 30–50 MW from thermal solar energy, 150 MW from biomass, and 2400 MW from geothermal energy [1–3]. However, there is the tendency for capacity to be acquired from increases to thermal plants, which results in RES not playing an important role in total electrical generation. In 2005, 218 971 GWh of electricity was generated by the Mexican interconnected electrical sector, 80% of which came from thermoelectric plants based on oil, gas, or coal; 12% came from large hydroelectric plants;[1] 4.9% came from nuclear plants; 3.3% came from geothermal plants; and only 0.0023% came from wind turbines [3]. In addition, decentralized electrical generation systems contributed 13.89 GWh from wind energy, and 8.89 GWh from photovoltaic[2] systems [4].

The gross electrical generation during 1980–2005 is shown in Fig. 1. The main contribution was from the thermal plants—turbo-gas, steam, dual thermal, internal combustion and combined cycle. Between 1995 and 2004, the generation from combined-cycle thermal plants increased from 5.7% to 26.4% [4], and according to the Mexican Department of Energy this is expected to increase to 68.7% by 2010 [3].

Further, Mexican oil reserves are expected to be depleted in the next 11.45 years to about 14 119.6 million barrels [6]. The depletion of the oil resources and the large potential of

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[1]It is important that the negative social and environmental impacts of large hydropower stations be emphasized. The fact that it is renewable energy does not eliminate the disequilibrium produced in the regions where these projects are built. Those disequilibria are mainly related to the displacement of the local peoples and the environmental changes to local ecosystems. For instance: the change in the river level impacts fish habitat; consequently, this change is damaging to small communities where economies are dependent on fishing. The agricultural activity close to the rivers is also changed due to the fact that the salinity of the ground is modified too.

[2]Data related to the off-grid photovoltaic systems were given by the National Solar Energy Association of Mexico to the Mexican Department of Energy.

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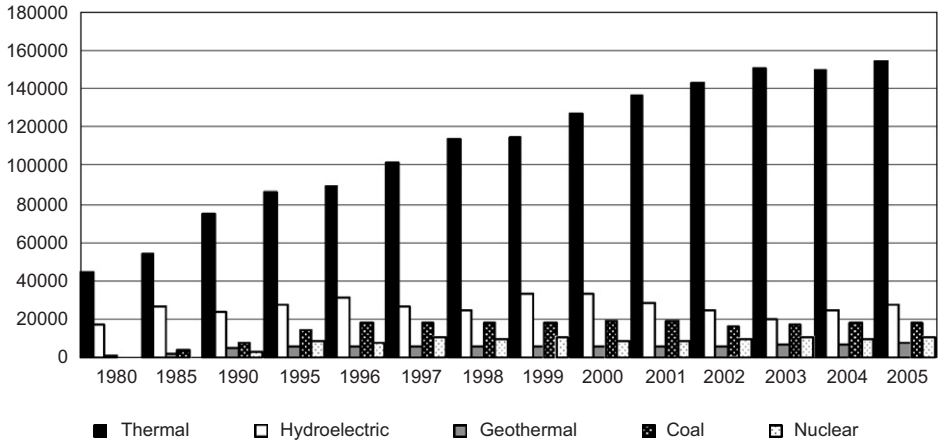

Fig. 1. Gross electrical generation in Mexico from 1980 to 2004 (GWh) [1–5].

Mexican RES favor the formulation of policies that can promote RES in the country. Nonetheless, the institutions, the coordination and management system of the electricity sector and the RES regulation will have to be harmonized in order to facilitate the process.

2. Institutional background

To date, the implementation of renewable energy technologies (RETs) in Mexico has mainly focused on rural areas. The RETs typically utilized are: photovoltaic, wind energy, geothermal energy, cane bagasse, and small hydroelectricity. Every technology has had different developmental time frames because the programs and projects have been executed separately. The Mexican government through its annual prospective studies shows the activities that have been implemented through its energy policy. In these institutional documents, it is evident that the renewable energy systems do not form an integral part of the national energy objectives because there are no aims to achieve increases in the implementation of these systems, the information on RES is not updated, and even there are some inconsistencies,[3] and, unlike geothermal projects, the few projects related to RES are private enterprises that serve to satisfy private interests only. The following are the activities related to each RET that have been developed and are organized chronologically.

2.1. Solar energy (1989–2004)

2.1.1. 1989

The Mexican National Commission for Energy Savings[4] was established so as to lead the activities related to the rational use of energy in Mexico. Its functions are mainly to formulate technical norms, to train technicians for installing photovoltaic systems, and to diffuse information about the rational use of energy and RES. However, up to now, the most outstanding aspect of its work has been the establishment of standards for the minimum level of energy efficiency and maximum level of electrical consumption for some domestic appliances [7].

2.1.2. 1990

The Mexican government established a relationship with Sandia National Laboratories, United States Department of Energy, in order to carry out the PRONASOL[5] program. The scope of the program was to install photovoltaic systems and small wind turbines in the Mexican countryside. Out of this program came the Renewable Energy Cooperation Program[6] under the direction of Sandia National Laboratories. The objective of the cooperation program was to offer technical training and to develop some renewable energy pilot projects.

2.1.3. 1991

The state-owned company, the Unit for Electrifying Rural Areas from Federal Electricity Commission, in collaboration with the governments of the certain states launched a program in 1991 to install photovoltaic systems within those states. The project activities were framed under the PRONASOL program and were managed by the Federal Electricity Commission, which was also in charge of designing the systems [8].

In the same year, the Geothermal Division from Federal Electricity Commission created the Office for New Energy Sources, which administered the projects related to wind energy, solar energy, biomass, and hybrid systems.

2.1.4. 1992

When the Renewable Energy Cooperation Program began, Mexico did not have an institution charged with the promotion of RES, so an association modality was

[3]The Mexican Energy Balances from 1996 and 1997 show data which do not match the subsequent publications. In addition, the prospective studies have always talked about the potentialities of the RES, but it has rarely talked about the objectives to achieve these potentials.

[4]This institution is referred to as CONAE in Spanish.

[5]PRONASOL is the Mexican National Solidarity Program.

[6]This program is known as PROCER in Spanish.

established in order to undertake this function. Consequently, the Electrical Research Institute of Mexico, the National Energy Solar Association representing Mexican industry, and Renewable Energy Export Council of the United States joined the program. As Mexico became an attractive market for the renewable energy industry of the United States,[7] the Agency for International Development of United States (USAID) was incorporated into the Renewable Energy Cooperation Program at the end of 1992 so as to strengthen the activities promoted by the United States Department of Energy. The photovoltaic industry within the United States was the main beneficiary from this program since it created a captive market for its products. The projects developed under this program were focused on electrifying rural areas and pumping water.

Subsequently, the Sandia National Laboratories, the Federal Electricity Commission, FIRCO,[8] and the government of the State of Chihuahua created the Mexican Renewable Energy Program, which was administered by the Sandia National Laboratories and financed by the USAID and the United States Department of Energy. This program became an extension of the Renewable Energy Cooperation Program.

2.1.5. 1994

The Sandia National Laboratories created a work team with organizations and institutions of both countries[9] in order to carry out the Mexican Renewable Energy Program. The first stage (1994–1997) consisted of: (1) technical training in order to install photovoltaic systems; (2) executing projects by FIRCO and the Chihuahua State's renewable energy group, which was composed of a dozen of private and public organizations; and (3) signing contracts with The Nature Conservancy, World Wildlife Fund, and Conservation International for installing renewable energy systems in protected areas.

2.1.6. 1996

The Mexican government stated the Alliance for the Countryside Program in order to improve the agricultural productivity through financing of investment projects and support services. This program had three objectives: (1) to award investment subsidies to farmers who purchased energy systems (Higher subsidies were granted to people who purchased renewable technologies.); (2) to offer technical training to farmers in isolated areas; and (3) to provide suppliers of energy systems with financial support. This latest objective was started in 2000.

In the same year, the Mexican National Commission for Energy Savings and some social organizations created the Advisory Council to Promote Renewable Energies in Mexico[10] in order to identify some diffusion strategies for RETs, offer specialized training about RETs, and identify sponsors for the installation of large renewable energy systems [9].

2.1.7. 1997

Between 1997 and 2004, the second and third stages of the Mexican Renewable Energy Program were developed. Although each stage had its own objectives, both of them promoted mainly shared cost projects related to technical training.

In the second stage decentralized solar energy projects were developed, and in the third stage the objective was to develop large-scale projects.

2.1.8. 1998

The Mexican Renewable Energy Program was placed in the Annex-1 of the Bilateral Agreement for the Energy Cooperation between United States and Mexico. The coordinators of this agreement were the Mexican National Commission for Energy Savings and the Sandia National Laboratories [10].

2.1.9. 2000

The Mexican Government requested a loan from the World Bank in order to finance the Renewable Energy for Agricultural Sector Project that was administered by FIRCO during 2000–2003. This project belonged to the Alliance for the Countryside Program and was started in 1996 [11].

2.1.10. 2004

The Mexican Committee for Projects of Emission Reduction and Greenhouses Gases Capture was created in order to sell emission reduction certificates through the Clean Development Mechanism of the Kyoto Protocol. It was envisioned that a portion of funds collected would be assigned to RES projects [12].

2.2. Wind energy (1985–2006)

Although there has not been any specific wind energy program in Mexico, some wind projects have been developed. Decentralized projects have come from the private sector, and grid-connected projects have come from the public sector, specifically from the Federal Electricity Commission (Table 1).

[7]Mexico presents an attractive market for the renewable energy industry of the United States (Hanley, 1998) because more than 5 million Mexicans in 88 000 villages do not have access to electrical network, and more than 100 000 rural communities need drinking water. In addition, at least 600 000 ranches need water for livestock and/or irrigation. If those requirements were supplied by renewable energy systems, these markets alone would total more than a billion dollars (Barnett, DiGregorio 1998) [10].

[8]FIRCO is the Spanish acronym of the Shared Risk Trusteeship. This institution is a shared risk trusteeship which belongs to the Department of Agriculture, Livestock, Rural Development, Fishing and Feeding.

[9]National Renewable Energy Laboratory, Southwest Technology Development Institute of the University of New Mexico, *Ecoturismo* and *Nuevas Tecnologías*, Enersol Associates and Winrock International.

[10]COFER is Spanish acronym of the Advisory Council to Promote Renewable Energy in Mexico.

Table 1
Wind energy projects

Year	Project	State (city)	Institution	Owned by
1985	Demonstrative project 250 kW	Baja California Sur	Export Company of Salt and Mitsubishi	Private
1987	Wind turbine Fénix 1.5 kW	Hidalgo	Electrical Research Institute	Public
1991	Small turbines Ehecatl	Estado de México (Toluca)	Ehecatl S.A. and FIUAEM	Mixed
1992	Hybrid system	Quintana Roo (X-Calak)	Government of Quintana Roo and Condumex	Private
1992	Three hybrid systems	Zacatecas (Mazapil)	Entec Company S.A.	Private
1993	Hybrid system	Estado de México (Tenancingo)	Westinghouse and IPC	Private
1994	Wind farm "La Venta I" seven generators of 225 kW each one	Oaxaca (Istmo de Tehuantepec)	Federal Electricity Commission	Public
1998	Wind turbine 600 kW	Baja California Sur	Federal Electricity Commission	Public
2006	Wind farm "La Venta II" 85 MW	Oaxaca (Istmo de Tehuantepec)	Federal Electricity Commission	Public

Sources: [3,13–15].

2.3. Geothermal (1973–2001)

In Mexico, there are four geothermal plants which have been installed and operated by the Federal Electricity Commission (Table 2). In 2004 these plants generated 3.15% of the electricity gross generation, and according to the Mexican Department of Energy there will not be development of any additional geothermal projects for the next 10 years [2].

2.4. Cane bagasse, biomass, and small hydroelectric plants

Cane bagasse, biogas, and small hydroelectric plants have been utilized by the private sector for self-supply [17]. Table 3 shows the installed capacity and electrical generation data from these technologies in 2002.

In summary, it has been suggested that the activities promoting solar energy in Mexico during 1994–2005 were encouraged by the United States Department of Energy in order to create a captive market for its photovoltaic industry.

Until 1994, when the Federal Electricity Commission started construction of the wind park *La Venta I*, the wind energy projects came solely from private initiatives, and presently public participation in wind projects is limited to grid-connected systems.

Geothermal energy has always been the responsibility of the state-owned company—Federal Electricity Commission.

In 2004, the decentralized renewable systems generated 22.78 GWh, of which 8.89 GWh came from solar energy and 13.89 GWh came from wind energy. Grid-connected renewable energy systems generated 12.58 GWh, of which 6.58 GWh came from geothermal plants, and 6 GWh came from wind plants. Decentralized wind projects are twice as large as those from grid-connected projects.

What do the previous data indicate? The Mexican Department of Energy argues that high costs of RES and the coordination and management system of the Mexican electricity sector make it impossible to develop investment projects by the government and the private sector. Therefore, it proposes to liberalize the Mexican electricity market as the solution to promote RES. However, due to the fact that renewable costs have significantly decreased with technological improvements, the arguments of the

Table 2
Geothermal projects

Year	Project	State (City)
1973	The project started with 37.5 MW Currently, the electrical capacity is 720 MW	Baja California (Cerro Pietro)
1982	The project started with 5 MW Currently, the electrical capacity is 92.9 MW	Michoacán (Los Azufres)
1991	The project started with 6 MW Currently, the electrical capacity is 42 MW	Puebla (Los Humeros)
2001	Electrical capacity 10 MW This plant is not connected to the national electrical network	Baja California (Tres Vírgenes)

Sources: [15,16].

Table 3
Other RES (2002)

Technology	MW/GWh
Small hydroelectric stations	28/143
Cane bagasse	393/708
Biogas	11/54

Source: [18].

government are unsubstantiated. Currently, wind turbines are competitive; particularly when wind conditions are advantageous, as occurs in the state of Oaxaca. Additionally, an analysis of the coordination and management system of the Mexican electricity sector will show that it is possible to develop investment projects of the private and public sector, given the appropriate policy perspective.

3. Coordination and management system of the Mexican electricity sector

The regulatory and normative framework, the institutions, and the management, all of them define the coordination and management system of the Mexican electricity sector. In this part, it is important to emphasize the role of RES with respect to these three aspects since our objective is to show that a structural reform is not necessary to promote the RES. In fact, it is sufficient to do only some small adjustments.

3.1. Regulatory and normative framework

The directives for the Mexican electricity sector are led by the Department of Energy and determined by the 27th and 28th Articles of the National Constitution and the Public Electricity Service Act[11] that was reformed in December 1992 in order to allow the private sector to generate electricity under certain modalities [18].

The 27th Article establishes that the Nation will perform exclusively the production of electricity for public service. This also stipulates that no concession will be awarded to the private sector [19]. The 28th Article states that electricity is a strategic element and the activities performed by the Mexican State in the electricity sector will not be considered a monopoly.

The reform to the Public Electricity Service Act in 1992 carried out a partial liberalization of the Mexican electricity sector; consequently, the regulatory framework was modified in order to favor the new participants. The reform inserted six modalities which entitle the private sector to generate electricity. Moreover, this reform stated that electricity generated under the six modalities would not be considered any public service; hence, the 27th Article of the National Constitution, which entitled the Mexican Nation to generate electricity exclusively, would not be contradicted. The modalities defined in the Public Electricity Service Act are: electrical self-supply,[12] cogeneration,[13] small production,[14] independent production,[15] export,[16] and import [20].

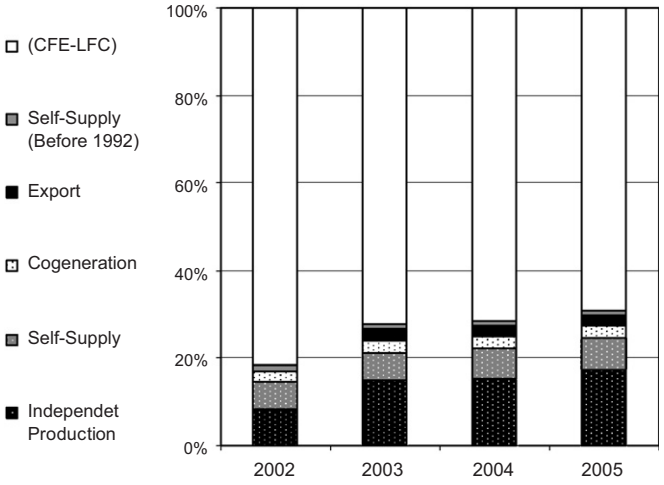

Fig. 2. The private sector under modalities from the Public Electricity Service Act [1–5].

During 2002–2005, the private sector raised its participation according to the new modalities of the Public Electricity Service Act. The average increments were the following: independent production 35%; self-supply 22%; cogeneration 18%; export 57%; and import 1.9% (Fig. 2). Datum related to import corresponds to the stage 2004–2005 since the information published from former years is inconsistent. In 2005, the total participation of the private sector was 30.4% of the electricity gross generation.

Transmission, transformation, and distribution of electricity were done by the Federal Electricity Commission and Light and Power Company, which are state-owned institutions.

3.2. Mexican electricity sector institutions

3.2.1. Department of Energy

The Department of Energy is in charge of planning and leading the Mexican energy policy. Its activities with regard to the electricity sector are coordinated with the Federal Electricity Commission and Light and Power Company.

[11] LSPEE is the law's acronym in Spanish.

[12] Electricity for self-supply must come from electric plants owned by the beneficiaries of such electricity [20].

[13] Cogeneration consists of producing electricity with steam or some kind of secondary thermal energy or both, direct or indirect production of electricity coming from thermal energy which is not utilized in process, or direct or indirect production of electricity using fuels that are produced in respective process [20].

[14] It is considered small production: 1. electricity coming from smaller plants of 30 MW and sold to Federal Electricity Commission; 2. self-supplying of electricity coming from smaller plants of 1 MW owned by small rural communities that do not have public electricity service; 3. and the electricity exported up to 30 MW [20].

[15] It is considered independent production to the electricity coming from plants with higher electrical capacity of 30 MW and destined to Federal Electricity Commission, or to export [20].

[16] Electricity for exporting should be generated through following modalities: cogeneration, independent generation and small generation [20].

3.2.2. Energy Regulatory Commission

The Energy Regulatory Commission regulates the following:

1. supply and sale of electricity to the public service consumers;
2. generation, export, and import of electricity by the private sector;
3. purchase of electricity for public utility; and
4. relationship between public utilities and private sector related to services of transmission, transformation, and supply of electricity [22].

3.2.3. Federal Electricity Commission

The Federal Electricity Commission is the most important state-owned company that performs the activities related to generation, transmission, transformation, and supply of electricity in the national scope. Since 1992, this company has played the role of a single buyer as it ordered the reform to the Public Electricity Service Act. Therefore, the Federal Electricity Commission must purchase the electricity coming from plants under the modality of independent and small production. In 2005, the Federal Electricity Commission generated 69% of the electricity gross generation [3].

3.2.4. Light and Power Company

The Light and Power Company is the second most important state-owned company that performs the activities of generation, transmission, and supply of electricity pertaining to public electricity service. While Federal Electricity Commission offers public electricity service throughout the country, the Light and Power Company offers public electricity service to the Mexico City and some towns belonging to the States of México, Morelos, Hidalgo and Puebla. Although the Light and Power Company's coverage is 1.04% of the national territory, its electrical capacity is not enough to satisfy the demand because that territory has a big population density of 3589 hab/km^2 [23]. Therefore, the electrical demand is completed with electricity coming from plants of the Federal Electricity Commission.

3.3. Coordination and management system of the Mexican electricity sector

The main change from the reform of the Public Electricity Service Act was to transform the central control system of the Mexican electricity sector into the single-buyer system [24]. The single-buyer system has three main components: (1) participation of the private sector, generally in the generation segment; (2) concession of the status of single buyer to the state-owned company in order to purchase electricity coming from the private sector; and (3) creation of a competitive market through a public tender system.

At present, these three aspects can be distinguished easily. (1) Private participation was inserted under the six modalities to generate electricity. (2) Status of single buyer from the Federal Electricity Commission is based on the fact that independent production modality exists. This modality is defined in the 108th Article of the Regulation of the Public Electricity Service Act [20] and consists of granting permission to private sector entities to generate and sell their electricity to the single buyer or to export it [25]. (3) The public tender system is mentioned in the 124th to 134th articles of the Regulation of the Public Electricity Service Act. These indicate how much additional annual installed capacity is planned by the Mexican Department of Energy, hence the need to open a public tender in order to achieve the goal of the planned capacity additions. The private sector can participate in the public tender system under the modality of independent production [20].

4. RES Bill: the pros and cons

In December 2005, the RES Bill was discussed in the Mexican Congress, but even though the Bill was approved by the House of Representatives and passed to the Senate in order to complete the procedure, its passage through the Senate was postponed [26].

The RES Bill is summarized thus:

1. *Short-term objective*: It is expected that RES plants would generate 8% of the electricity gross generation by 2012.
2. *Program*: The RES Bill proposes a program with objectives, strategies, and actions that would be led by the Mexican Department of Energy.
3. *Mechanisms or support systems*: It is proposed that a public tender system coordinated by a trusteeship[17] would be in charge of granting incentives through six funds:
   a. a green fund for the interconnection of mature technologies to the national electrical network;
   b. a fund to interconnect costly emergent technologies to the national electrical network in order to diversify the energy balance;
   c. a fund for rural electrification under the modalities of self-supply and small production;
   d. a fund for biofuels;
   e. a general fund for RETs which do not have electricity generation as their main objective; and
   f. a fund for investment projects and technological development in order to support the national industry and evaluate the Mexican renewable energy potential.
4. *Regulation*: The RES Bill gives additional functions to the Energy Regulatory Commission with regard to the

[17] Trusteeship funds could come from: 1. Federal Law; 2. Federation Outlay Budget; 3. contributions of the States, Mexico City and Metropolitan Zone; 4. voluntary contributions; 5. contributions from international organizations; 6. renewable energy certificates [25].

issuance of regulations and standards, the formulation of directives, methodologies, and juridical dispositions, and the design of contracts.
5. *National industry*: It is proposed that a minimum percentage of national technological integration be established for each RES technology.
6. *Actors*: Incentives would be granted to the private sector that would participate under the modalities of small production, self-supply, and cogeneration. Hence, the Federal Electricity Commission would publish yearly the additional electrical capacity or substitutable capacity through RES. Moreover, it would publish the expansion plans of the electrical networks so as to allow the interconnection of the new plants.
7. *Social*: The RES Bill proposes two actions: the first is to require private investors to set aside 2% of their incentives for local communities; and the second is to create a committee to evaluate greater hydroelectric projects than 30 MW capacity.

Defining a quantitative objective and developing a program are the two main aspects of the RES Bill; however, the financial mechanism proposed to support them has been deemed not to be the most suitable according to the Mexican electricity sector.

As the Mexican electricity sector still operates under the single-buyer system, initially the support systems would have to support the state-owned companies—Federal Electricity Commission and Light and Power Company—in order to develop the program and achieve its objective. Secondly, these will have to support the private sector so that it could participate under the modalities established in the Public Electricity Service Act. On the other hand, modalities from the Public Electricity Service Act must insert a percentage of RES technologies.

The support system proposed would funnel financial resources from the Mexican State to the private sector by means of subsidies for purchasing and installing RES technologies. It is convenient to underline that financial resources funneled to the Federal Electricity Commission and the Light and Power Company would have a bigger impact on the economy of scale, social coverage, short-term objective, and reduction of costs since financial intermediaries would not be necessary. Moreover, efforts between the academic institutions and national industry to build RES technology or improve it would be strengthened.

The Department of Energy showed in its prospective study for 2005–2014 that 64 649 MW of the electrical capacity would be installed, of which 1.3% would come from RES. That is, 8% of the electricity generated from RES for 2010 would be in private hands mainly, since the state-owned companies would only contribute 1.3%. In this regard, the RES Bill and the Department of Energy are consistent because they do not concede a fundamental role to the state-owned companies. However, the position of the Department of Energy to liberalize the electricity market in order to promote RES is contradictory to the single-buyer system of the Mexican electricity sector because under this system the state-owned companies are principal to the management and development of the electricity productive process. Besides the different interests, there is an important jurisprudence problem that cannot be underestimated. While the Mexican electrical policy is a State policy based on the National Constitution, the RES Bill belongs to a government policy that does not obey the constitutional dictates.

Defining a minimum percentage of technological integration for national industry and creating a fund for research and technological development are appropriate policy instruments in creating new jobs and promoting the small industry.

Returning to the target of 8%, there is an additional aspect that needs to be highlighted. This target is not explicitly divided up among the different RES technologies. Setting individual targets for each technology is very useful in order to choose a suitable support system.

The RES Bill should also clearly distinguish whether the 8% objective is based on effectiveness and/or efficiency criteria. From the European experience, it is concluded that legislations based on effectiveness criteria have been more successful than those based on efficiency criteria. RES policies from Germany and United Kingdom can be contrasted in order to deem the differences between both criteria. Germany legislation promotes all RES technologies by means of granting guaranteed fixed tariffs that oscillate between a minimum and a maximum level. Technologies with initially higher costs get a higher incentive, and technologies that are more competitive get smaller incentives. The United Kingdom policies promote a market-based system; hence, this system encourages the most competitive technologies but with prices determined unpredictably by the market. In other words, the German system creates a more stable investment environment. Although both countries have policies that promote RES, the scope and results have been different. In 2004, while Germany had a capacity installed of 27 GW from RES, the United Kingdom had 4.7 GW [27].

5. Conclusions

The development of programs and projects related to photovoltaic and wind energy in Mexico during the latest decades had their impetus from the United States private industry. Because Mexico became an important market for photovoltaic industry of the neighbor country, United States institutions—Department of Energy, USAID, Sandia National Laboratories—supported their industry through cooperation programs with Mexican institutions. However, these programs did not translate from the foreign initiative to a national initiative. For this reason, programs and projects were neither articulated nor led by a framework policy and were never able to achieve a national objective.

The absence of a RES policy contrasts itself with unremitting oil exploitation and accelerated installation of combined cycle electric power plants that will reach 11 683 MW in 2014. Consequently, it was expected that the development of the RES Bill would adjust the imbalance. The RES Bill has important elements like the target of 8%, and a minimum percentage of technological integration. However, the support system considered is not the most appropriate as it focuses on promoting to the private sector to a greater extent than that of the state-owned companies, which are in charge of producing, transporting, and supplying electricity in Mexico. The RES Bill has certain gaps which can impede the main objective promoting RES. The support system proposed in the RES Bill is applicable to an open market system, but this is not the Mexican situation.

Mexico will have an effective RES policy when the Bill proposed is consistent with the electricity sector system. For this to occur, the current RES Bill will have to be reformulated.

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