APEC 21st Century Renewable Energy Development Bill (Collaborative VIII): Local Bank Training Program for Financing Energy Efficiency and Renewable Energy Projects

Expert Group on New and Renewable Energy Technologies
APEC Energy Working Group
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FOREWORD

This handbook has been prepared partly as a result of recognizing that in Mexico as well as in other APEC economies, financial institutions are skeptical of energy efficiency (EE) and renewable energy (RE) projects, and also as a result of acknowledging that increasing the use of RE resources may bring about economic benefits and may also help to ensure a brighter outlook for present and future generations. Our intent is to develop a capacity-building tool for local banking institutions, to reduce barriers that project developers face to access financing for EE and RE projects. We hope to support local banking officers in order to attain knowledge regarding the use of EE and RE technologies, as well as to contribute to the growth of a sustainable EE and RE market in Mexico and other APEC economies.

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LIST OF ABBREVIATIONS

AMDEE: Mexican Windpower Association
APEC: Asia Pacific Economic Cooperation
BCM: billion cubic meters
CONANP: Mexico's National Commission of Protected Areas
CRE; Mexico's Energy Regulatory Commission
DOE: U.S. Department of Energy
EBA: European Biomass Association
EE: Energy Efficiency
ECLAC: United Nations Economic Commission for Latin America and the Caribbean
EIA: U.S. Energy Information Administration
ESCO: Energy-Saving Companies
EWG: APEC's Energy Working Group
FIDE: Energy-Saving Trust
FIRA: Agriculture Trust Funds
FIRCO: Trust Fund for Shared Risk
GDP: gross domestic product
GHG: greenhouse gases
GMO: Genetically-Modified Organism
g/kWh: grams per kilowatt-hour (used to measure the emissions caused by the generation of one unit of electricity)
GNP: gross national product
GRP: gross regional product
GTL: gas to liquids
GW: gigawatt
GWEC: Global World Energy Council
GWh: gigawatt-hour
GWP gross world product
HC : (un-combusted) hydrocarbons
HOV: high occupancy vehicle
IEA: International Energy Agency
IGA: International Geothermal Association
INEGI: Mexico's National Institute of Statistics, Geography and Computer Science.
IPCC: The United Nation's Intergovernmental Panel on Climate Change
kgoe: kilogram of oil equivalent
ktoe: thousand tons of oil equivalent
LPG: liquefied petroleum gas
mbd: million barrels per day
MCM: million cubic meters
MMBTU: Million British Thermal Units
MSW: Municipal Solid Waste
Mtoe: million tons of oil equivalent
NAFTA: North American Free Trade Agreement
NGV: natural gas vehicle
NRE: new and renewable energy
NREL: U.S. National Renewable Energies Laboratory
NOx: unspecified nitrogen oxide
NO_2 :nitrogen dioxide
O3: (surface) ozone
OECD: Organization for Economic Co-operation and Development
OLADE: Latin American Energy Organization
OPEC: Organization of the Petroleum Exporting Countries
PEMEX: Petroleos Mexicanos
PERA: Agriculture Renewable Energy Project
PINE: Gross Internal Environmental Product
PPM: parts per million
R&D: research and development
RE: Renewable Energies
SAGARPA: Ministry of Agriculture, Livestock and Rural Development
SCEEM: System of Economic and Environmental Accounts
SE: Ministry of Economy (Mexico)
SENER: Ministry of Energy (Mexico)
SIN: Singapore
SOFOLES: Limited Financial Purpose Companies
tCO_2e:Ton of CO_2 equivalent
WWF: World Wildlife Fund

SUMMARY OF CHAPTER A
"ENERGY DEMAND"

There is little doubt that worldwide energy demand continues to rise. Current tendencies demonstrate that in order to satisfy the energy demand in the year 2030, it will be necessary to invest a total of $16 billion U.S. dollars within the period of 2000 to 2030 in all energy sectors[1], as well as to increase production of crude oil barrels[2] by up to 50% from current levels. The rising energy demand is the result of diverse factors to be mentioned throughout this chapter.

Currently, more than 90% of the fuel required by power producing facilities to operate, comes from non-renewable resources, such as coal and hydrocarbons[3]. Worldwide, the %age of electric energy generated from renewable sources, such as solar energy or wind, is still minimal. Nevertheless, it is estimated that the cost of crude may not reach levels bellow 40 or 50 dollars per barrel, since accessible oil resources, such as those which require less technology for their extraction, are becoming harder to find. The rise in oil prices may be the determinant factor for the increase in consumption of alternative energy sources, a topic which is discussed in this Handbook.

In Mexico, revenue from oil profits represents approximately 35% of the total annual tax collections of the Federal Government[4]. Mexican crude oil sales in 2004 reached 830 billion pesos (approximately 76 billion U.S. dollars). The increase in oil prices has clearly benefited the Mexican government's finances during the last administration[5]. It is important to mention that proven oil reserves of *Petróleos Mexicanos* (PEMEX), the state-owned company, have been decreasing. Moreover, Mexico's energy demand problem has worsened due to technical and legal barriers faced by the oil sector.

Furthermore, if you add to the aforementioned problems the environmental contingencies that have been caused by the improper exploitation and use of fossil fuels, it will become necessary to recognize that in order to cover the worldwide energy demand, it will necessary to use current resources efficiently, as well as to develop new technologies that will enable mankind to improve the efficiency of these fuels, or even to reduce dependency on these resources, wherever possible.

A. ENERGY DEMAND

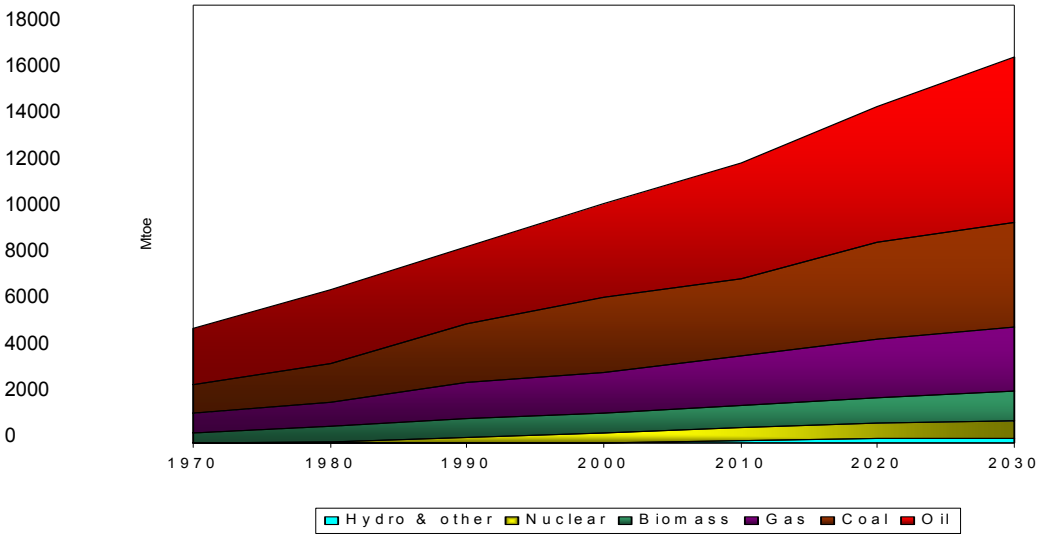
1. Historic worldwide scenario of energy supply and electricity demand

At the beginning of the XX Century, 98 % of the energy used by commercial sources was found in Europe and North America[6]. It was not until the development of Asia and Latin America that this tendency started to shift. Mexico, for example, will require 62% more energy, 42% more oil, and 76% more electricity by 2010 than in 1999[7].

2. Prospective of the World Primary Energy Demand by Fuel

There are several studies that indicate that in order to maintain or even increase the current prosperity levels of the World's economies, it will be necessary to increase the supply of electric energy, because worldwide energy consumption will increase by 75% in 2020 and such demand will triple by 2050, according to the World Energy Council[8]. In this regard, the International Energy Agency (EIA) has made the following energy demand projections:

Figure 1.1



Word Primary Demand by Fuel in the Reference Scenario
Source: International Energy Agency, "*World Energy Outlook*" 2006.

3. Why does worldwide energy demand rise?

The rising energy demand is a result of the following factors, among others:

1. An increase in the worldwide population from 6.5 billion to 8 billion by 2030; and

2. An increase in income and living standards in different parts of the developing world particularly in China and India, countries whose energy demand is increasing annually at a rate of 3.2%.[9].

4. How much has energy demand risen in Mexico?

Even though Mexico is the only Latin American country that is a member of the Organization for Economic Cooperation and Development (OECD), from 1970 to 1990 energy production in Mexico only increased by 5.7% in comparison to other OECD-member countries, which in the same period increased their energy production by an average of 35.3% [10]. However, from 1993 to 2003, energy consumption and electricity generation increased 60.7% in Mexico, while the increase in OECD averaged 23.3%[11].

5. What are the most common fuels for energy generation in the world?

Currently most of the fuels used in energy generation facilities (91%) are non-renewable fuels such as hydrocarbons[12] and coal[13]. Therefore, in order to cover the currently increasing worldwide energy demand, it will necessary to use existing resources efficiently and develop new technologies that will enable mankind to reduce its dependency on resources such as oil and coal.

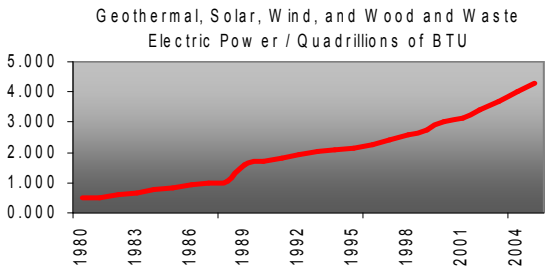
6. What is the relevance of oil for the worldwide economy?

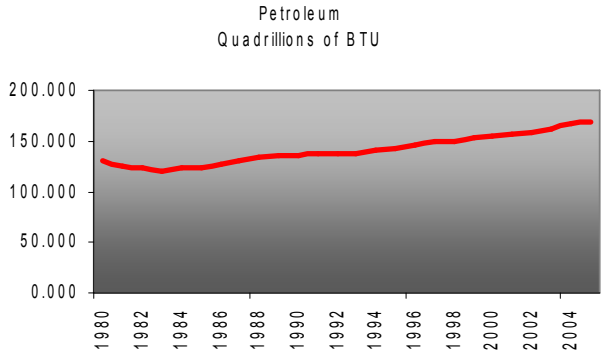
Oil is used worldwide to fuel power plants as well as a by-product to produce a wide-range of consumer products, from plastic products to garments. Demand for oil generated by the automotive industry and the petrochemical sector is still growing[14] and will continue to do so unless viable alternative energy sources start becoming more attractive from an economic standpoint. The world has begun the process to use and exploit renewable energy sources at a significant scale.

7. What is the future for crude oil?

On a global scale, we are observing a decline in four of the major oil fields in the world (Ghawar in Saudi Arabia, Cantarell in Mexico, Burgan in Kuwait, and Daqing in China) that represent more than 50% of the production of their respective countries and 14% of the worldwide production. Existing oil fields and those being developed are located in areas where production costs are higher than in the larger oil fields. Furthermore, there has been a sustained increase in the demand of oil that has lead to higher prices for consumers. This scenario has created the incentives for the development of new technologies that are causing a partial readjustment of the energy portfolio with a tangible reduction of the oil share in the energy sector. This is especially relevant when we compare the growing share of alternative energy sources like geothermal, solar, wind, and biomass. Therefore, even when oil will continue to be the main source of energy for the next two decades, there is clear evidence that alternative fuels will become more relevant in satifying the global energy demand.

Figures 1.2





Comparison between crude oil and renewable energies
Source: Energy Information Administration. *"Energy International Annual 2005"*

The main suppliers of crude oil for the United States are: Nigeria, Saudi Arabia, Venezuela, Canada, Mexico and the same U.S., according to table 1.2. The following table shows the reserves and production output of these countries. Except for Mexico and the U.S., countries mentioned in this Table increased their reserves from 1995 to 2005. However, energy demand is expecting to increase more rapidly than crude oil production.

Table 1.3

Crude Oil Reserves – Production in US main suppliers						
	U.S.	**Nigeria**	**Saudi Arabia**	**Venezuela**	**Canada**	**Mexico**
1995						
Reserves	29.8	20.8	261.5	66.3	10.5	48.8
Production	8,322	1,998	9,127	2,959	2,402	3,065
2005						
Reserves	29.3	35.9	264.2	79.7	16.5	13.7
Production	6,830	2,580	11,035	3,007	3,047	3,759

Reserves in billions of barrels of crude oil equivalent; production in billions of daily barrels of crude oil equivalent
Source: Statistical Review of World Energy 2006, BP.

Additionally, many power plants built back in the 1960s and 1970s that are located in developed countries, are completing their projected lifespan. Meanwhile, concern among the major importers of oil and gas is increasing due to its limited number of producers, price volatility and reliability of those energy sources. The solution to this conundrum in the eyes of some governments, is the use of nuclear power and alternative energy sources like bio-fuels. The promotion of Renewable Energy (RE) is less controversial than nuclear power; therefore, it has become a priority in many countries of the world. Currently, numerous alternative sources of energy are being developed due to the future panorama of oil prices (which several sources estimate will not be lower than 40 or 50 U.S. dollars per barrel)[15]. For additional information describing RE please refer to Chapter B of this Handbook[16].

8. What is the future for crude oil in Mexico?

Mexico is not an exception in the world regarding the crude oil trends. The country will require greater investments in order to maintain its leadership as crude oil producer and exporter. Regarding this matter, the President of the Organization of Petroleum-Exporting Countries (OPEC) declared on August 3, 2004 that if oil fields such as Cantarell (Mexico's main oil field) continue its decline without adequate new oil fields, the worldwide oil supply problem could worsen[17]. According to Luis Ramirez Corzo, a former chairman of PEMEX, the Cantarell decline rate is likely to average 14% per year from 2007 to 2015, implying that PEMEX will have to develop other fields if it is to offset the decline of its most important one[18].

9. Why is coal relevant for the world economy?

Currently coal dependency in some economies is still high. The following table details the five APEC member economies with the highest coal consumption.

Table 1.4

Economies with the highest coal consumption	Millions of Tons (Mt)
China	159
Australia	112
Russia	55
USA	40
Canada	23

Source: EIA, Energy International Agency 2004

It is evident that coal still plays an important role in the worldwide fuel mix. The dependency on this resource varies from country to country, being China, Australia, and Indonesia not just great coal consumers but also coal dependent. This dependency has generated short term economic benefits to coal production in many economies. The development of newer and cleaner technologies may reduce the negative impacts of this fossil fuel. For instance, the use of exhaust gases from coal fired power in greenhouses could reduce the emissions produced by coal-fired stations.[19] Therefore, new policies are trying to encourage the use of more efficient and cleaner technologies.

10. Is coal relevant for the Mexican power supply?

In Mexico coal only accounts for 10% of electric power generation[20], and 5.3%[21] of national mining production, approximately 7 million tons per year, even though the mining industry in the state of Coahuila has located vast coal reserves.

11. What financing risks in Mexico are related to coal and oil?

a. Oil

PEMEX's proven oil reserves have been decreasing and the resources available for exploration and production are limited due to PEMEX's tax restrictions. Furthermore, there are several legal barriers that restrict PEMEX collaboration with private companies for the development of upstream and downstream activities. As a result, Mexico's Ministry of Energy (SENER) has

established a strategy that promotes the diversification of its fuel mix for power generation. This is especially relevant in order to avoid its dependency on a single source of fuel.

b. Coal

Mexico's power generation does not depend on its coal production and therefore the economic benefit that could be generated from the use of this resource is still very limited. World scenarios show a complex and contradictory future for coal[22]; nevertheless, the development of cleaner coal-burning power plants would propel coal to play a more relevant role in the power sector in Mexico[23].

12. Energy and its historic consequences to the environment and economy

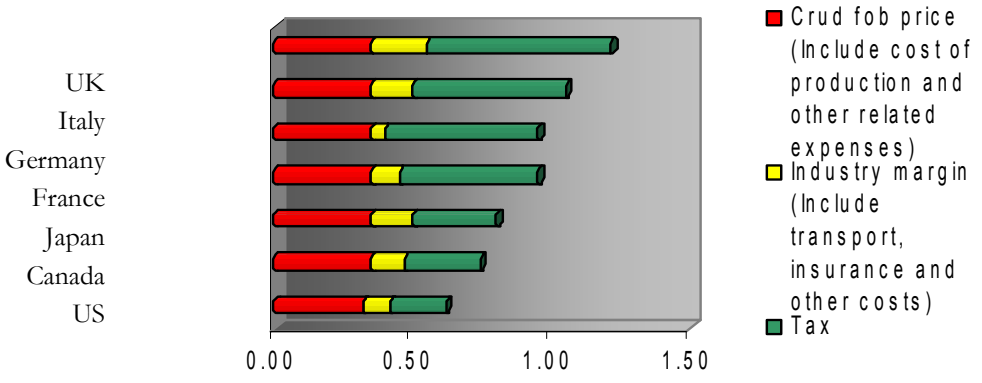
The historical use of coal, oil and other fossil fuels do not include certain externalities such as the environmental costs associated with the extraction, transportation, and consumption of these natural resources. China, for example, increased its crude oil demand in 2000 for the purpose of trying to lower its coal consumption due to environmental and health problems, such as respiratory illnesses and high death rates of carbon miners[24].

The use of fossil fuels for power generation purposes has been partially responsible for the emission of Greenhouse Gases (GHG) into the atmosphere. The United Nation's Intergovernmental Panel on Climate-Change (IPCC) has concluded that Carbon Dioxide (CO_2)is responsible for almost 60% of greenhouse effects, methane is responsible for 20%, halocarbons 14%, and nitrous oxide 6%[25].

13. Policies to discourage the excessive use of oil and coal

As a response to the consequences attributable to the indiscriminate use of fossil fuels such as oil and coal, some countries have developed environmental policies that try to discourage the indiscriminate use of non-renewable energy resources. The following table details how environmental policies in some countries lead to, among other consequences, to a high oil consumption taxation.

Figure 1.5



This bar represents taxation imposed by each country in USD/ liter. These are 2006 values.
Source: OPEC's Research Division in Vienna Austria, 2007. Webpage updated in June, 18 2007.

As provided by Alain Lipietz, there are three ways to respond to an increase in hydrocarbon prices:

1. Reduce the final consumption;
2. Increase the product's Energy Efficiency (EE); and/or
3. Modify the fossil fuel sources by using RE[26]. This last idea is supported by numerous experts that declare that the high oil prices provide an appropriate opportunity to intensify the development of alternative fuels[27].

14. What is the PINE?

PINE is an economic index which takes into account the environmental impact factor. It is called Gross Internal Environmental Product (PINE, for its Spanish acronym[28]). The PINE is calculated through the production method, which includes the effects corresponding to the reduction of oil reserves, groundwater, and deforestation, which also constitute measurable environmental impacts and which directly reflect the deterioration and degradation of the air, water, and soil[29]. Through the expense method, the adjustment to the Gross National Product (GNP) for environmental reasons, comes from the net accumulation of economic capital that includes changes in economic resources that were not produced (oil increases and decreases, forestry resources due to the modification in the land-use); moreover, the net accumulation of environmental assets that are reflected both in the exhaustion of timber-yielding forests as the degradation of air, water, and soil[30] are reflected.

15. Historical consequences to the Mexican economy

During 2002, the costs of the depredation and exhaustion of Mexico's natural resources reached 623,075 million Mexican pesos; 10% of the country's GNP. The most relevant being the costs generated due to air pollution, the reduction of oil reserves and water pollution due to wastewater discharges[31]. The reduction and prevention of these hazards require investment both from the public and private sectors. Nevertheless, Mexico's National Institute of Statistics, Geography and Computer Science (INEGI) reported that in 2002 only 33,099 million pesos were invested, amount that represents only 5.3% of the environmental costs generated on that same year[32].

16. Policies in Mexico to discourage the excessive use of fossil fuels

One of the consequences of the serious problems described above has been the creation of environmental accounting mechanisms that may allow a precise evaluation and quantification of environmental damages.

In July 18, 2004 INEGI published the annual results of its 1997-2002 System of Economic and Environmental Accounts (SCEEM, for its Spanish acronym)[33] with current values. Such results enable us to know the consequences that economic affairs have had on natural resources and the environment. One of the main conclusions reached through the SCEEM is that Mexico has depredated and exhausted its natural resources to such an extent, that the environmental impact represented an average of 10.5% of the GNP at current values during the 5-year period[34].

SUMMARY OF CHAPTER B
"CONCEPT OF ENERGY EFFICIENCY AND TYPES OF RENEWABLE ENERGY"

As a result of the energy demand for fossil fuels, such as coal or hydrocarbons (mainly petroleum and its derivatives), a greater emphasis has been placed in a more efficient consumption of non renewable resources. This movement has propelled the development of EE projects, which are defined in this chapter.

An option to reduce the reliance on fossil fuels has been the investment in alternative energy sources that derive from theoretically unlimited resources or short term renewable resources. The following are examples of these types of sources: sun, wind, water, organic wastes, and even geothermal energy[35]. These may be used as an alternative source of electric energy generation, only to mention a few examples. For electricity generation RE sources currently represent 1% of all of the world's energy sources[36] (without considering neither energy derived from hydroelectric plants nor nuclear energy[37]). Nevertheless, it is expected that by the year 2030, RE sources will satisfy 20% of the worldwide demand[38].

Image courtesy of Lucia Todd

ENERGY EFFICIENCY CONCEPT AND TYPES OF RENEWABLE ENERGY

1. What is EE?

According to the Massachusetts Technology Collaborative Renewable Energy Trust, EE refers to products or systems designed to use less energy for the same or higher performance than regular products or systems[39]. This concept commonly refers to the energy which is reduced by specific end-use devices and systems, typically without affecting the services provided. Such savings are generally achieved by substituting technologically more advanced equipment to produce the same level of end-use services (e.g. lighting, heating, motor drive) with less energy.[40]

EE is a powerful and cost-effective tool for achieving a sustainable energy future[41]. Moreover, it is also believed that EE is the best solution to reduce greenhouse gas emissions, in accordance with the IEA (2006[42]).

2. What is the purpose of the EE?

The EE's purpose is not to have a lower productivity or to reduce progress, development, or comfort, but rather to use the energy in a rational and efficient manner, and obtaining the same results[43]. Because of the increasing energy demand of conventional fuels, such as energy derived from hydrocarbons, a greater emphasis in reducing the indiscriminate consumption of the limited resources through a more efficient use of the technology has been made, developing this concept called EE.

3. How is EE calculated?

It is necessary to consider the energy output, which means the work performed (calculated in watts) and the energy intake, which is the amount of work or energy resource used to operate a certain process (measured in joules).

EE = energy output / energy intake

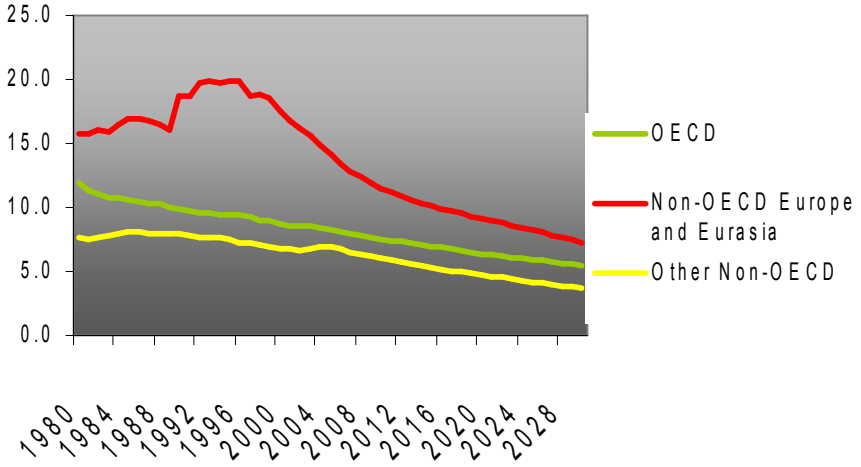
As result of the principle of energy conservation, EE, within a close system, will never be able to exceed 100%. An incandescent light bulb, for example, might have 2% efficiency at emitting light yet still be 98% efficient at heating a room or wasted. On the other hand, a compact fluorescent lamp luminous efficiency is about 7 to 9 %.

4. What is the meaning of Energy Intensity?

EI is the energy use – GDP ratio[44]. The term "energy intensity" is better used for sectoral or sub-sectoral ratios of energy use to output.[45] Numerators of national energy intensities are not made up solely of fuel and primary electricity inputs used in productive processes: they also include all energies consumed in households and for personal mobility[46].

Efficient use of raw materials, extensive recycling of materials with high embedded energy content, flexible manufacturing processes, inventories minimized by just-in-time deliveries, and efficient distribution networks are among the desirable infrastructural attributes contributing to low EI.[47] According to the following graph, the EI has been diminishing inequitably worldwide:

Figure 2.1

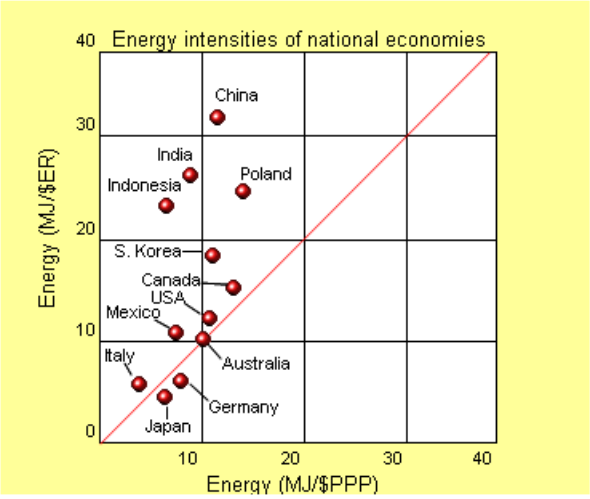


EI by Region, 1980-2030. Thousand Btu per 2000 US dollar of GDP
Source: EIA, Energy International Agency. May 2007.

5. Energy intensity in selected economies

The following graph details the amount of energy, in Mega Joules, to produce a US dollar of GNP for selected economies. The GNP is based on 2004 purchasing power parity and 2000 US dollars adjusted for inflation.

Figure 2.2



Source: International Energy Agency and SMIL, Vaclav. "*Energy at the Crossroads*".

6. What EE programs have been implemented worldwide?

Many programs have been implemented throughout the world; however, in this section you will find only a few samples of said programs for your information.

6.1 China

Under the leadership of Mr. Teng Hsiao-p'ing (Deng Xiaoping[48]) China restructured its industrial sector for the purpose of manufacturing products with greater added value[49]. Between 1980 and 1990, China's EI decreased 40% due to a greater EE. This EI reduction in China has continued due to diverse factors such as a smaller economic growth compared to the previous growth and the efforts of reducing the contamination levels of urban atmosphere through technological improvements[50].

6.2 Latin America

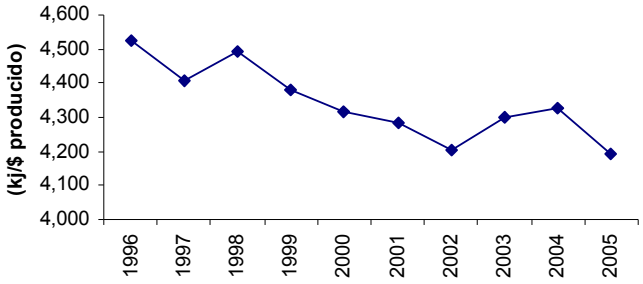
In Latin America, according to the Energy Prospective Study for Latin America and the Caribbean, drafted by the Latin American Energy Organization (OLADE) for the period 2005 to 2018, it is believed that the benefits for developing and applying EE programs in countries of the Southern Hemisphere (Argentina, Brazil, Bolivia, Chile, Paraguay, and Uruguay) could reach up to 77 billion dollars during this period[51]. In order to contribute to achieving these programs, OLADE has drafted a 6-year Energy Efficiency Regional Program for the purpose of helping the member countries to consolidate national EE programs[52]. In accordance with the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), Chile has developed a program called *"Energy Conservation and Rational Use Program"* and Peru has implemented a project called *"Energy Saving Project"*.[53]

7. What programs regarding EE have been implemented in Mexico?

In Mexico, two programs were implemented in the last decade with the support of the National Commission for Energy Conservation (CONAE) in order to improve EE across the country and in different sectors and industries: the Daylight Savings Time[54] and the issuance of EE in the Official Mexican Standards[55] for several electric equipments[56]. Mexico leads the Latin American region in terms of its EI after 1995, according to the ECLAC.[57]

Figure 2.3

EI in Mexico (kj/ $ produced)



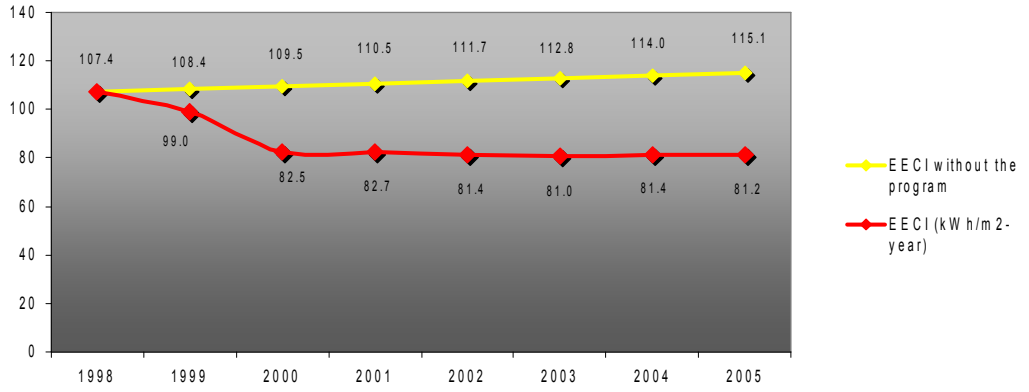
Source: CONAE, 2007.

8. EE program for public buildings in Mexico

The Federal Administration has been promoting since 1998 an EE program that demonstrates savings generated yearly. An EE program has been implemented in many public buildings of the Federal Government Administration. During the period of 1998 – 2005 the benefits of the implementation of EE programs were evident in certain public buildings, in comparison with public buildings without any EE programs in place.

The following graph clearly shows the reductions of energy consumption in the governmental offices which have implemented this Saving Energy Program. These savings may be replicable in percentages to private businesses:

Figure 2.4



EECI = Electric Energy Consumption Index
Source: CONAE, 2006

9. What are RE and what are their most common sources?

RE are sources that replenish naturally but are flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time[58]. The most commonly referred types of RE are: biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

10. What type of RE is generated in Mexico?

Wind farms and geothermal power stations (in addition to hydroelectric plants) are the main sources of RE in Mexico. Biomass and solar projects are the two other types of technologies making inroads in this sector in Mexico.

Table 2.5

Description	MW	Jan/2007	Feb/2007	Mar/2007	Apr/2007
Geothermal		959.500	959.500	959.500	959.500
Wind		85.475	85.475	85.475	85.475
Hydroelectric		10,531.308	10,531.308	10,906.308	10,906.308
Total		**11,576.283**	**11,576.283**	**11,951.283**	**11,951.283**

Energy Information System: Energy Sector: Effective Capacity of Renewable Energies CFE and LFC. REAL-MONTHLY
Source: Energetic Information System with information of the CFE and the LFC

11. What is the importance of RE?

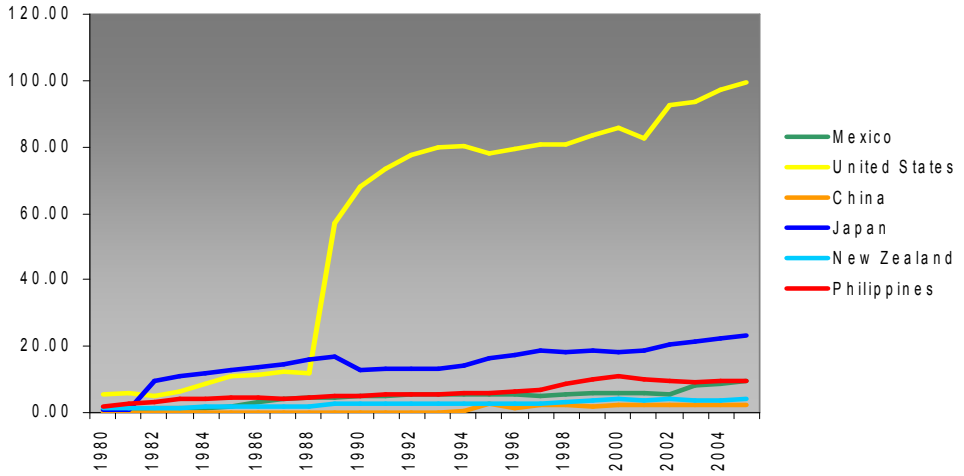
RE allow countries to diversify its power generation portfolio and reduces its dependency on fossil fuels. The European Union has recommended that up to 21% of its energy come from RE from now to 2010[59], and it is expected that for 2030 RE sources should satisfy 20% of the worldwide demand[60]. The U.S. Government proposed a "Twenty in Ten" goal, in order to

increase the use of biofuels by 20% during the next ten years, which would imply to produce 35 billion gallons of alternative fuels by the year 2017 in order to displace 15% of the gasoline production and provide an additional 5% through the improvement of car and truck standard efficiency[61].

12. What is the current demand of RE worldwide?

RE sources currently represent 1% of the energy sources worldwide[62] (without considering energy derived from hydroelectric plants that produce approximately 20% of the electric energy worldwide, nor nuclear energy, which supplies electric energy to 17% of the total World population[63]). The following figure shows how selected countries have increased the consumption of RE since 1980 to 2005.

Figure 2.6

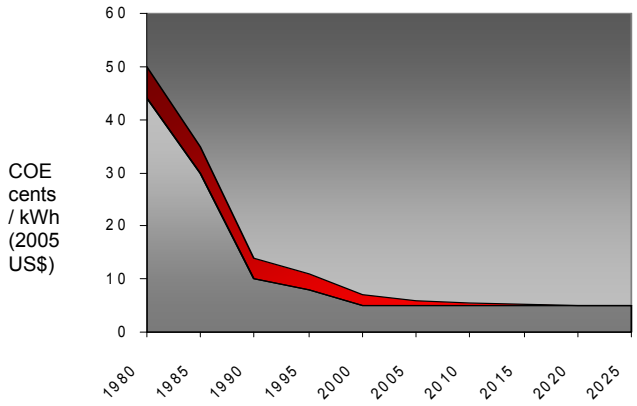


World Net Geothermal, Solar, Wind, Wood and Waste Electric Power Consumption, Annual Estimates, 1980-2006. (Billion Kilowatthours)
Source: US Energy Information Administration, 2005.

13. Are capital investments for the generation of RE expensive?

Capital investment costs have significantly reduced over the last 25 years. Technology is driving down the production costs of Photovoltaic Solar, Wind, Thermal Solar and Ethanol. Furthermore, it is advisable to review Chapter C of this Handbook to conduct an integral evaluation of how cost-effective a technology may be at a given project. Below you will find a description of how the production cost of Kwh have been reduced and are expected to continue being reduced in the following years.

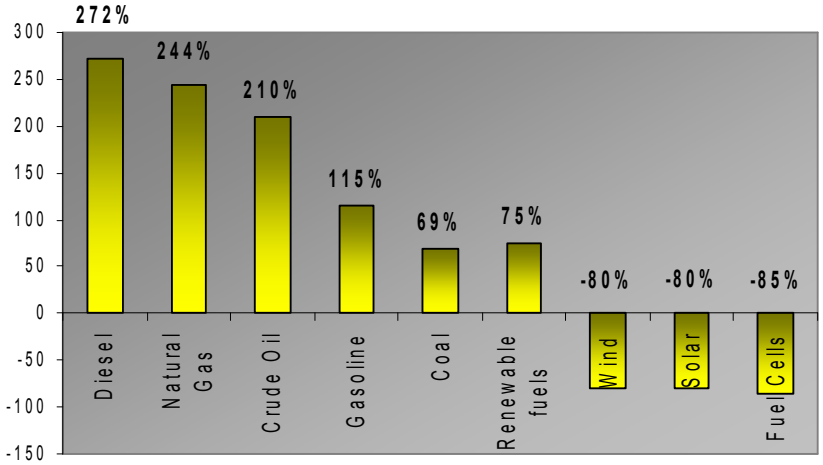
Figure 2.7



Wind
SOURCE: Based on the NREL Energy Analysis Office. Represents U.S. statistics.

Additionally, in the following graph fossil fuels demonstrate the changes in the costs of different types of technologies. Wind power in this graph represents the change in costs per kW of installed capacity since 1993. Solar energy represents the change in the production costs of photovoltaic cells since 1993, and the energy cells represent the change of costs per kW of the installed capacity since 1993. Fuel cell represents the change in price per kW of installed capacity.

Figure 2.8



Change in cost of fuels
Source: LAZARD, April 23, 2007.

14. What is Solar Energy?

Solar energy is a RE that is mainly used through two types of technologies:

Photovoltaic: Transforms solar energy into electric energy through photoelectric cells, mainly made from silicon that reacts with light.

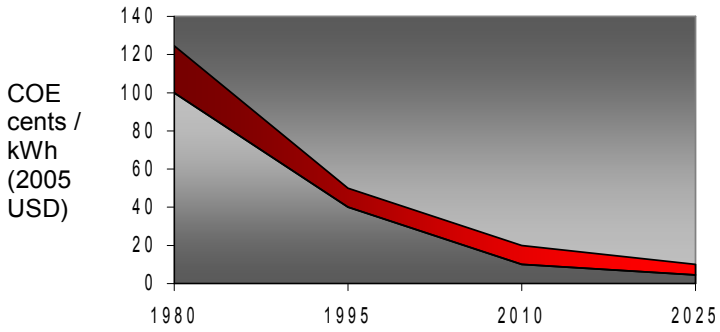
Thermal: Uses energy from the sun in order to heat fluids through solar collectors, which reach temperatures from 40 to 100°C (plain), or by "concentrators" through which temperatures of up to 500°C may be obtained. Some thermal-solar developments are usually associated with thermoelectric power stations (fossils) and are used to improve their efficiency[64].

15. What is the current status of solar energy worldwide?

Solar thermal collectors are already widely used in certain countries, primarily for hot water production. Various technologies are becoming more widely used, such as unglazed, glazed and evacuated tube water collectors, which have market shares of 30, 50 and 20 %, respectively. In principle, larger systems may be used for residential space heating and –in conjunction with absorption heat pumps – for cooling.[65]

With the decline of the price for the photovoltaic module, this source of RE is becoming more competitive and therefore investment in it is increasing. It is important to analyze the cost-benefit of each solar energy project on case by case basis, in accordance with the Chapter C of this Handbook.

Figure 2.9



Photovoltaic solar
Source: Based on the NREL Energy Analysis Office. Represents US Statistics. Sources related: Jose Arias Chavez. *"The utopia of the renewable energy",* Energy in Debate, based on Dr. John Bryne, data by Paul Maycock, 2002.

16. What is the potential of solar energy worldwide?

In accordance to the International Solar Energy Society (ISES) concentrating solar power (CSP) technology may provide up 100,000 MW worldwide by 2025.[66]

17. What is the current status and potential of solar energy in Mexico?

Current status: From 1993 to 2003 the installed capacity of photovoltaic systems increased from 7 to 15 MW, generating more than 8,000 MWh/year for rural electrification, water pumping, and refrigeration. More than 570 thousand square meters of flat solar heaters had been installed with a radiation average of 18,841 kJ/m² per day. This system has generated more than 270 gigajoules of energy that has been captured to heat-water.

Potential: With average sunshine ratio of 5 kWh/m², Mexico's potential is one of the highest in the world. It is expected to have an installed capacity of 25 MW, through photovoltaic technology by 2013, and is expected to generate 14 GWh/year. In addition by 2009, it is expected

to be able to connect a combined cycle hybrid system to a 25 MW solar field (in Agua Prieta II, Sonora, Mexico).

Incentives: A model contract was created for small solar projects that will allow parties to exchange power to the public grid with a bi-directional measuring device. In this initial phase, it will be limited to 10kW for residential use and up to 30 kW for other users.

18. What is Eolic Energy or Wind Power?

Wind can be simply defined as air in motion[67], and eolic energy is the energy obtained from turbine engines[68] powered by wind.[69] Recent analyses show that wind power is considerably more environmentally friendly than electricity produced by coal-fired power stations.[70]

19. What is the current status of wind energy in North America?

Demand for wind power is booming, according to the American Wind Energy Association (AWEA), because wind is a source of energy that is both clean and cost-effective[71]. Also in the region of North America, the Canadian wind market had a record year, with installed capacity more than doubling from 683 MW in 2005 to 1,459 MW by the end of 2006. The Canadian Wind Energy Association (CanWEA) estimates that Canada is on the edge of a wind energy boom as provincial governments are now targeting to have a minimum of 10,000 MW of installed wind energy capacity in place by 2015.[72]

20. What is the potential of wind energy worldwide?

According to the DOE, the world's wind could theoretically supply the equivalent of 5,800 quadrillion BTUs (quads) of energy each year--more than 15 times the current world energy demand. (A quad is equal to about 172 million barrels of oil or 45 million tons of coal.)[73] However, the potential of wind energy varies regionally and locally. In order to increase business opportunities and provide a credible and representative forum for the entire wind energy sector at an international level, in early 2005 the Global Wind Energy Council (GWEC) was established.[74]

Table 2.10

For example:

U.S.	The installed capacity of wind power energy sources in the U.S. is expected to increase 27% during 2006. Moreover, it is expected that during 2007 it will increase an additional 26%[75]. Actually, the U.S. could generate up to 20 % of its electricity needs through wind power. California and Texas have led the wind development boom in North America (Mexico-US-Canada), and today it has more installed capacity than all of Canada[76].
China	China is rich in potential wind energy, because a potential power generation capacity of 253 GW has been identified. Despite China's growing electricity demand and its huge need of reducing air pollution wind power has a difficult stand to compete against the much cheaper coal-fired generation. Only large scale projects and local manufacturing can ensure cheap wind power generation.[77]

21. What is the current status and potential of wind energy in Mexico?

The Mexican Wind Power Association (AMDEE) was created in January 2005. The AMDEE has successfully promoted potential projects within its members, because in accordance with Mexico's Energy Regulatory Commission (CRE), the interest of potential investors in projects of wind power generation in Mexico has increased considerably.[78] In fact, in anticipation of large

commercial wind developments in the State of Oaxaca, Mexico, a new 2,300 MW transmission line will be built in the Isthmus (south of Mexico) by late 2009 to carry the power generated by the wind farms into the National Grid[79]. Other projects are being analyzed in the states of Tamaulipas and Baja California.

22. What is biomass energy?

According to the U.S. National Renewable Energies Laboratory (NREL), biomass energy or "bio-energy" is the energy from plants and plant-derived materials. Human beings have used it since people began burning wood to cook food and keep warm[80].

Wood is still the largest biomass energy resource today, but other sources of biomass can also be used. These include food crops, grassy and woody plants, residues from agriculture or forestry, and the organic component of municipal and industrial wastes. Even the fumes from landfills (which are methane, a natural gas) may be used as a biomass energy source[81].

23. What are bio-fuels?

Biofuels are described by the Mexican Bioufuels Law as those: "fuels obtained from biomass derived from organic material in the following activities: agriculture, farming, forestry, aquaculture, algaeculture, fisheries products, households, commerce and industry, through microorganisms, enzymes, and their derivatives"[82].The two most common types of bio-fuels are ethanol and bio-diesel.[83]

24. What is bio-diesel?

Bio-diesel is the substance produced through a process in which organically derived oils are combined with alcohol (ethanol or methanol) in the presence of a catalyst to form ethyl or methyl ester. Bio-diesel may be made from soybean or canola oils, animal fats, waste vegetable oils, or microalgae oils.[84] Bio-diesel is currently used as a component of diesel fuel and it is expected to substitute traditional diesel.[85]

25. What is ethanol?

Ethanol is a fuel that generates low air emissions that may be obtained from RE. Traditionally, it is obtained through simple sugar fermentation, by converting starches into simple sugars. In the case of corn, the grains in a cob represent less than 5% of its weight, and this is why this process generates huge quantities of organic waste. The rest of the plant is comprised mainly of cellulose and cellulose hydrolysis processes have been developed in order to obtain ethanol" [86].

26. What is methane?

Methane is a colorless, nonpoisonous, flammable gas created by anaerobic decomposition of organic compounds.[87] It is also the principal component of natural gas.[88]

27. What is the current and potential use of biomass energy worldwide?

Worldwide, biomass could satisfy 9% of global primary energy and 24% of electricity requirements by 2020[89]. Biomass use in combined heat and power production systems is the most efficient. According to a report by the World Wildlife Fund (WWF) and the European Biomass Association (EBA), biomass could meet 15% of OECD's electricity needs by 2020[90]. The U.S., Canada and Japan are considered the largest producers of biomass within OECD countries,[91] while Brazil has lead the development in technology, production and use in the emerging economies. In 2006, Brazil reached energetic independence by the use of biofuels

obtained from sugar cane primarily[92]. Biomass constitutes 93% of the total direct heat production from RE; geothermal represents 5 % and solar heating 2%[93].

28. What is the current use and potential for biomass energy in Mexico?

The sugar cane industry and the agave processing industry have long been using biomass to partially cover part of their energy needs in their production processes. More recently biogas has been obtained and used from landfills and manure treatment systems. On February 6, 2008 the Biofuels Law became effective in Mexico. Mexico has wide array of topographic and climatic conditions that range from tropical forests in the southern part of the country, vast coastal areas, mild climate in the central part of the country, mountainous areas and arid regions that may allow the adaptation of several varieties of crops that have been used in other latitudes for successful biofuel projects. In addition, Mexico has already enacted a law that will regulate the use of Genetically-Modified Organisms (GOMs) that may potentially open the door for the use of specific types of energy crops under controlled conditions.

29. What is Geothermal Energy?

Geothermal Energy is heat (thermal) derived from the earth (geo). According to the Geothermal Resources Council, geothermal is the thermal energy contained in the rock and fluid (that fills the fractures and pores within the rock) in the crust of the earth.[94]

The use of this energy source has been limited to areas in which geological conditions allow a carrier (water in the liquid phase or steam) to "transfer" the heat from deep hot zones to or near the surface, thus giving rise to geothermal resources. Innovative techniques in the near future, however, may offer new perspectives in this sector, because the thermal energy of the Earth is immense.[95]

30. What is the current status of geothermal energy worldwide?

The following table summarizes the installed geothermal generating capacities worldwide from 1995 to 2000 (from Huttrer, 2001), and at the end of 2003, based on information of the The International Geothermal Association (IGA).

Table 2.11

Country	1995 (MW_e)	2000 (MW_e)	1995-2000 (increase in MW_e)	% increase (1995-2000)	2003 (MW_e)
Australia	0.15	0.15	-	-	0.15
China	28.78	29.17	0.39	1.35	28.18
Indonesia	309.75	589.5	279.75	90.3	807
Japan	413.7	546.9	133.2	32.2	560.9
Mexico	753	755	2	0.3	953
New Zealand	286	437	151	52.8	421.3
Philippines	1227	1909	682	55.8	1931
Russia	11	23	12	109	73
Thailand	0.3	0.3	-	-	0.3
U.S.	2816.7	2228	-	-	2020

Source: International Geothermal Energy

The U.S. is the world leader in online capacity of geothermal energy and the generation of electric power from geothermal energy. According to the Energy International Agency, geothermal energy in 2005 generated approximately 16,010 Gigawatt hours (GWh) of electric generation or about 0.36 % of U.S. annual electricity generation. Capacity is rated at 2,850.9 MW, in accordance with the Geothermal Energy Association[96].

31. What is the current status of Geothermal Energy in Mexico?

Mexico is one of the most active countries in geothermal development for electricity production. Since 2000, eight new single flash units went on-line: four at Cerro Prieto (100 MW), four at Los Azufres (100 MW) and a new field, Las Tres Virgenes, has started its exploitation with the first 10 MW installed. Further installations are planned at Los Humeros (50 MW) and at another area, La Primavera (75 MW).[97]

SUMMARY OF CHAPTER C
"*DEVELOPERS OF EE AND RE PROJECTS*"

The rising energy demand has motivated the development of RE sources, as well as the creation of new technologies and administration programs, which are focused on EE development. Main energy users have supported the creation of governmental and academic institutions, and even of private companies that specialize in the energy saving sector, as they also have the same objective of helping energy users reduce their operation costs.

A developer of an EE project is different from a developer of an RE project. Their needs and objectives differ; for such reason, it is important that credit institutions offer viable and suitable financing alternatives for each type of developer.

Private sector companies that provide energy-saving and EE services, have been in existence in the American market since the late 70s. Nevertheless, the niche of the Mexican market has not been serviced by the same companies because of several factors, one of which may be the lack of financing for medium-sized projects. These energy-saving service providers, also known as Energy-Saving Companies (ESCOs), usually obtain their profits proportionally to the financial savings that their clients obtain through the implementation of the suggested practices or the development of the designed projects.

It is important to mention that other public financial sources also exist (trusts, governmental institutions with economic promotion approach, institutions whose origins derive from a treaty or international agreement, etc). As an example of these financial sources, we find the ones which derive from the signature and ratification of the Kyoto Protocol. According to this international Treaty, only industrialized countries have committed to a specific target, while developing countries (or non Annex 1 parties to the Protocol) are only required to take significant steps to reduce its greenhouse gas emissions without establishing a specific target.

A. DEVELOPERS OF EE AND RE PROJECTS

1. What is an EE project developer?

It is a governmental, private company or a public-private partnership that has the purpose of increasing its EE, generally of an existing project. To achieve a measurable reduction in the consumption of energy, the developer uses to seek advice of experts in environmental management or an ESCO.

2. What is a RE project developer?

It is a public entity, a private company or a public-private partnership whose purposes is to use RE in a completely new project or switching fossil energies used in a project by a specific RE. RE projects tend to be more complex than EE projects.

3. What economies are APEC members?

The economies that are part of APEC are Australia, Brunei Darussalam, Canada, Chile, The People's Republic of China (China), Hong Kong China, Indonesia, Japan, the Republic of Korea (South Korea), Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, the Philippines, The Russian Federation (Russia), Singapore, Chinese Taipei, Thailand, the United States of America (U.S.) and Viet Nam.

4. What economies have a greater generation of RE Projects?

Table 3.1

Main economies	*1*	*2*	*3*	*4*	*5*
Yearly investment	Germany/ China	--	U.S.	Japan	Spain
Wind energy	U.S.	Germany	Spain	India	China
Solar energy (photovoltaic)	Germany	Japan	U.S.	Spain	France
Solar heat of water	China	Turkey	Germany	India	Austria/Greece /Japan/Australia
Ethanol production	Brazil/U.S.	--	China	--	Spain / India
Bio-diesel production	Germany	France	Italy	U.S.	
2005					
Renewable energy electricity	China	Germany	U.S.	Spain	India
Big hydroelectric	U.S.	China	Brazil	Canada	Japan/Russia
Mini-hydroelectric	China	Japan	U.S.	Italy	Brazil
Wind energy	Germany	Spain	U.S.	India	Denmark
Electricity by biomass	U.S.	Brazil	Philippines	Germany /Sweden/Finland	
Geothermic	U.S.	Philippines	Mexico	Indonesia / Italy	
Solar photovoltaic	Germany	Japan	U.S.	Spain	Holland
Solar heat of water	China	Turkey	Japan	Germany	Israel

Source: CONAE. REN21, 2006 Update, 2006.

5. How is the Energy Public Sector organized in Mexico?

SENER is the authority in charge of the energy matters in Mexico. SENER has created three commissions and has control about two national institutes, three companies managed exclusively by the government and supports an energy-savings Trust. The following figure was prepared by SENER. It summarizes the administrative organization of the energy public sector in Mexico.

Figure 3.2

6. What is SENER?

It is a cabinet Ministry of the Federal Executive Branch. The mandate of this Ministry is defined by Article 33 of the Internal Law of the Federal Public Administration. The purpose of SENER is to control national energy policy, in order to guarantee the competitive supply of energy, following the criteria of quality, environmental sustainability and economic viability required for the development of the national life.

7. What is CRE?

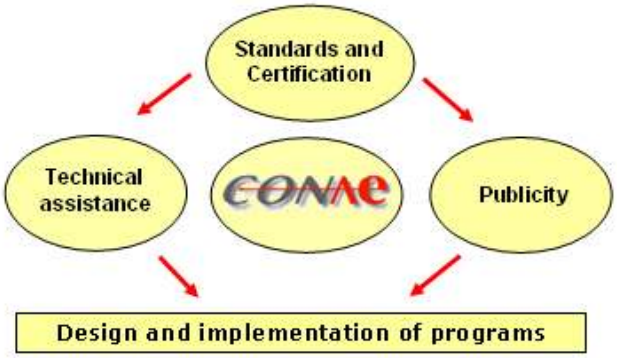
CRE is an agency of SENER. It is a commission which has technical and management autonomy according to the Law of the Commission of Energy Regulation. CRE regulates power generation, exportation, importation, acquisition and sale, as well as the distribution, transportation and sale of natural gas and liquefied gas,

8. What is CONAE?

SENER has delegated part of its functions to CONAE. Specifically, CONAE is a governmental commission which has technical and management autonomy regarding energy savings and use of RE. The main purpose of CONAE is to be the technical council of the offices and entities of the Federal Public Administration, as well as of the State and Municipal Governments and the general public, regarding savings and efficiency as well as the use of RE. According the following

figure, several governmental activities are related to CONAE, with the purpose of supporting social, governmental and private organizations:

Figure 3.3



Source: CONAE, 2007.

9. What is FIRCO?

The Trust Fund for Shared Risk (FIRCO), for its abbreviation is a governmental agency of the Ministry of Agriculture, Livestock and Rural Development (SAGARPA). This organization supports RE projects in agro-industries, and is the technical and operative agent of the Agriculture Renewable Energy Project (PERA)[98]. PERA is financed by the Global Environment Fund (GEF), with its financial agent, National Financiera and the World Bank as supervisor. In order to provide technical assistance on this project, 6,022 events have been developed thought Mexico[99].

In order to obtain the support of PERA, it is necessary for land producers to have previously secured an authorization or support of the "Alianza Contigo," or of another Federal Government program, for the productive project in which the RE system is required.[100]

10. What is FIRA?

The Agriculture Trust Funds (FIRA) are four public trusts formed for the Mexican Central Bank by the Federal Government for 50 years. The purpose of FIRA is to grant credits, warranties, training, technical consultancy and technology transfer to rural and fishing sectors of the country.[101] It mainly operates like a second floor bank, with its own estate and it places its resources through the private bank and other Financing Intermediates, such as:

1. Credit Unions
2. Limited Financial Purpose Companies (SOFOLES)
3. Financial Leases
4. General Deposit Warehouses
5. PROCREA Agents
6. Factoring companies[102]

In their quality of Developing Bank, FIRA directs its resources to the agro-food and rural sectors through diverse Financial Intermediates, such as: private banks, SOFOLES, General Deposit Warehouses, Financial Leases and Factoring Companies, which can obtain support from the

Credit Unions, PROCREA Agents, and Post-financial Agents.[103] Last 12 July 2007, a Decree was published in the Federal Official Gazette by which the Operation Rules for the Supporting Program to Access the Rural Financing System were modified. These modifications include Rural Financing Intermediates as the FIRA.

11. What is FIDE?

The Energy-Saving Trust (FIDE) provides consultancy and training services, and grants financing for the performance of energy diagnosis. The energy diagnosis is an energy study through which a set of techniques are applied such as areas of opportunity in energy-saving, verifying its technical feasibility and economic profitability, without discrediting neither the comfort nor the quality of company products.[104]

The National Program for Efficient Use and Saving of Energy was the first specialized institutional arrangement with which the energy sector promoted the efficient use of energy, and is the predecessor of the FIDE.[105] The financing available to FIDE is directed to the replacement of inefficient equipment with others of high EE, as well as the execution of automation projects, control of demand, remote monitoring, implementation of high energy efficient equipment or machines, and optimization of process.[106]

12. What is the Kyoto Protocol?

This Protocol was negotiated under the United Nations Framework Convention on Climate Change (UNFCCC), assigning mandatory emission limitations for the reduction of greenhouse gas emissions to the signatory nations. It was adopted at the Third Conference of the Parties to the Convention in Kyoto, Japan on December 11th 1997. The purpose of the Kyoto Protocol to the UNFCCC is the reduction of GHG concentration in the air. Parties who signed and ratified the Kyoto Protocol were divided in two groups:

1. Developed countries, which must reduce a specific percentage of their greenhouse gases generated (Annex 1 parties), and
2.
3. Developing countries, which are not subject to pre-established reduction.

13. What is the Clean Development Mechanism (CDM)?

It is a mechanism defined by Article 12 of the Kyoto Protocol. The purpose is to allow the investment in projects that reduce emissions in developing countries as an alternative to more expensive emission reductions (ERs) in their own countries. These projects are registered before the CDM Executive Board and the emission reductions are allocated in a public site.

14. What is a Certified Emission Reduction or CER?

A Certified Emission Reduction is equivalent to one metric ton of Carbon Dioxide or its equivalent and it is issued by the CDM Executive Board after a project registered under the CDM evidences the reduction of GHG emissions.

15. What are the benefits of the CDM?

Different methodologies have been issued by the CDM Executive Board to measure the reduction of GHG due to the substitution of fossil fuels with RE[107]. Furthermore EE projects[108] may qualify under both the small scale and programmatic methodologies that simplify the monitoring process of each project. For those projects that have a long term of investment return or higher costs for their implementation, the income associated with the CER generation and trade would allow project developers to monetize the reduction of GHG and at the same

time it would provide those additional resources needed to materialize those projects in the short term. It is an additional source of revenue that it is not dependant on the specific tax policies of each country and that would allow parties to freely trade the CERs generated by each EE and RE project registered in the CDM.

16. What is FOMECAR?

The Mexican Carbon Fund (FOMECAR, for its abbreviation in Spanish) was created as an instrument for promoting CDM culture in Mexico through the following actions:

1. Seminars and training courses;
2. The identification of GHG ERs projects with opportunity to succeed among those presented to FOMECAR, supporting them with technical assistance, financing, document preparation, as well as expenses related to their registration and certification before CDM Executive Board, and
3. Acquisition and trading of ERs under the best terms and conditions available in the carbon market.

17. What is the potential of EE and RE projects in Mexico?

According to the FOMECAR[109], Mexico has an annual emission reduction potential generation of approximately 81 million metric tons of CO_2 during the period of 2008-2012, and the immediate CO_2 emission reductions potential in Mexico is 33 million metric tons of CO_2 on a yearly basis, without considering forestry projects and those of CO_2 capture and storage. Considering those projects as potentially eligible for the CDM, it is estimated that they may generate annual additional revenue for the Mexican economy of $350 to 400 million U.S. dollars approximately, at an average price of $10.00 dollars per ton of CO_2 equivalent (tCO_2e). Therefore, FOMECAR considers that in the short term, the number of projects could increase significantly.

18. What are the Mexican Green Funds ("Fondos Verdes")?

The Monex Financing Group, the National Commission of Protected Areas ("CONANP"), and the civil association Ecobanca, created the Green Funds ("Fondos Verdes" in Spanish), which is an instrument of debt listed in the Mexican Stock Exchange. The purpose of this financing instrument is to empower projects with environmental preservation project in different regions such as the rainforest Lacandona, the Popocatepetl and the deserts of Mexico, among others natural areas.

19. APEC's Declaration on Climate Change, Energy Security and Clean Development.

Last September 9, 2007 in Sydney Australia, the APEC Leaders' Declaration on Climate Change, Energy Security and Clean Development was signed[110]. The leaders decided the following:

1. To highlight the importance of improving EE by working towards achieving an APEC-wide regional aspirational goal of reducing energy intensity of at least 25% by 2030 (with 2005 as the base year);
2. Work to achieve an APEC-wide aspirational goal of increasing forest cover in the region by at least 20 million hectares of all types of forests by 2020 – a goal which if achieved would store approximately 1.4 billion tons of carbon, equivalent to around 11% of annual global emissions (in 2004);
3. Establish an Asia-Pacific Network for Energy Technology (APNet) to strengthen collaboration on energy research in our region particularly in areas such as clean fossil energy and RE;

4. Establish an Asia-Pacific Network for Sustainable Forest Management and Rehabilitation to enhance capacity building and strengthen information sharing in the forestry sector; and
5. Further measures in trade in environmental goods and services, aviation transport, alternative and low carbon energy uses, energy security, the protection of marine biological resources, policy analysis capabilities and a co-benefit approach.

The APEC region has a major stake in global responses to the challenges of climate change, energy security and clean development. Economic growth and technology development are indispensable elements of our agreed future approach. The scale of these challenges demands new and innovative forms of international cooperation. Within this Declaration, the APEC Leaders also reaffirmed their commitment to work with all members of the international community for an enduring global solution to climate change.

20. How many permits regarding EE and RE projects has SENER issued?

As of 2007 SENER through CRE has issued permits for the equivalent of 1,831 MW of total capacity, 552 MW of the same are in operation.

21. RE Generation Permits issued by CRE to the private sector

Table 3.4

Energy source	Permits	Capacity [MW]	Energy [GWh/a]
Wind	7	956.73	3,645.31
Water	12	159.08	736.33
Cane of sugar	4	70.85	205.30
Bio-fuel	3	19.28	120.80
Hybrids: RE with fossil fuels	28	248.68	475.40
Total	**54**	**1,454.62**	**5,183.14**

Source: CRE, 2007

22. Real Estate Developers

The spectrum of the private developers of EE and RE projects is not limited to the industrial sector or to the electric energy service sector. It also includes project developers in the real estate sector. The U.S. real estate sector, for example, contributes with 30% of the GHG emissions, and with 65% of the electricity consumed in that country.[111] This has resulted in real estate sector "green" projects currently being designed in such a way that they promote the use of EE alternatives, and sometimes the use of RE ones.

At an international level, different EE real estate models exist. These models are granted distinction depending on the level of EE achieved. One of the most recognized certifications is the one created by the United States Green Building Council's Leadership in Energy and Environmental Design (LEED).[112] The relevance of this certification has had a dramatic impact on new developments. Case in point: 5% of all the new commercial constructions of the U.S. currently have this LEED certification, and 20% of the governmental buildings in the U.S. are constructed under LEED standards.[113]

23. What are Energy Services Companies – ESCO?

These are private companies dedicated to energy administration, engineering firms and power generation companies. They have been in existence in the American market since the late 1970s and the beginning of the 1980s[114]. The Mexican market has not been completely explored by

these companies due to several factors, one of which could be the small amount of financing granted by the credit organizations. In order to provide the maximum investment return for the consumer, the services of an ESCO can be hired through an Energy Service Agreement or through some energy administration mechanism identified by the ESCO.[115] It is important to mention that the number of ESCOs grew 24% in the US during the 1990s,[116] which gives a notion about the profitability of this kind of business in that country.

24. How does an ESCO operate?

An ESCO is in charge of identifying and evaluating energy-saving opportunities and they usually recommend the implementation of improvement plans or projects, consequently obtaining income like a service provider company while they produce direct savings for their clients. Thus, an ESCO usually warranties that the savings will be produced or they request annual payments in order to cover the entire costs of the project in agreements with seven- to ten-year terms.[117] Risk for the implementation, design and results of an EE project are assumed by the ESCO, if the minimal savings are not obtained, the ESCO pays the difference. An ESCO can also offer training or long-term maintenance services.[118]

An ESCO is in charge among other issues, of evaluating projects which are convenient for each client. The ESCO National Association indicates that when light saving projects are implemented, the medium reduction in such matter is 47 %, and when integral electric energy saving projects, the reduction of such projects is 23 %.[119] Nevertheless, an ESCO not only evaluates, but also usually includes the design and engineering, financing, installation, and maintenance of retrofit measures to improve EE, and is also in charge of helping the client search for financial alternatives.[120]

25. Cash flow associated with the services provided by ESCO

ESCOs usually obtain their profits proportionally to the savings that they generate for their clients through the implementation of the suggested practices or to the development of designed projects. Nevertheless, while flat-fee payments tend to be structured to maintain a positive cash flow to the customer, an ESCO usually establishes savings-based fees which indicate in the project description what they wanted to implement.[121] For such reason, it is advisable to know how complete the project description is and what factors are being considered. In order to know what minimum aspects a project of this nature must contain, it is advisable that financial organizations review the section of *"How to evaluate projects"* contained in the Chapter *"Cost-effective EE and RE projects."*

26. Current and potential EE and RE projects

CRE has made this table (for year 2007) regarding RE generation authorized by SENER for self-supply purposes:

Table 3.5

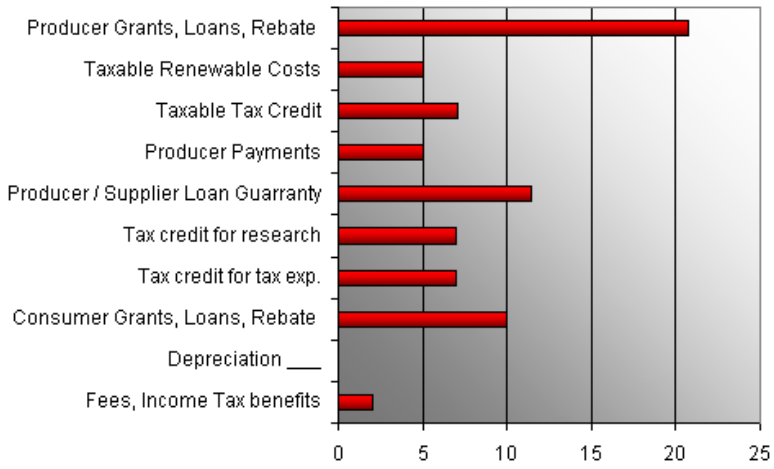
Renewable energy	In operation	In construction	Total
Hydraulic energy	46.5	104.1	150.6
Wind energy	-	1,252.5	1,252.5
Biomass	464.8	40.0	504.8
Biogas	20.3		20.3
Total	**531.6**	**1,396.6**	**1,926.2**

Installed capacity for auto-consumption (MW)
Source: CRE, March 1st, 2007.

27. What are the most important financial incentives required for the development of these projects?

According to several actors involved in the process of promotion and the development of biomass projects in the State of California in the U.S.,[122] the most important financial incentives are the following:

Figure 3.6



Source: California's Energy Commission. June 2004. Figure A.10 (Policies analysis: main incentives according to the poll performed by PIER). Axis X shows the number of votes.

SUMMARY OF CHAPTER D
"*COST EFFECTIVE EE AND RE PROJECTS*"

In order to identify if an EE or RE Project is financially viable, the first step is to identify the main legal and technical benefits and risks related to EE and RE projects in the country where their development is planned. In the case of Mexico, EE and RE projects usually face several risks, which will be described in this chapter. Due to its natural conditions, Mexico is an extremely attractive country for investment in wind, solar energy, biofuels and geothermal.

This chapter also includes suggestions about how to evaluate the projects that need financing, with the purpose of identifying "cost effective" EE and RE projects.

Image courtesy of Lucia Todd

1. Legal, Environmental and Financial Benefits and Risks Related to EE and RE Projects

a. Environmental benefits

Most RE and EE projects avoid the emission of methane and CO_2 to the atmosphere and the associated carbon footprint and environmental impact of the oil exploration. For example, in the case of a landfill in Nuevo Leon, Mexico, where electric energy is generated through the recovery of methane and CO_2, that is intrinsic to the organic material that is in putrefaction process, this project has avoided the emission into the atmosphere of 68 m^3/min of biogas (50% of methane, 50% of CO_2) and at the same time, the equivalent of 0.99 million metric tons of coal are not being consumed and the equivalent of 90 thousand vehicles are being put out from circulation. This 7.42 MWh project, avoids the emissions of 200 thousand tons of methane per year.[123]

b. Financing risks

The following issues may directly or indirectly affect the financial sustainability of a project. Therefore, it is advisable to consider them:

1. Lack of governmental policies for a specific RE.
2. Lack of financial benefits to offset costs.
3. Unequal policies for RE and EE projects.
4. Inconsistency in laws and regulations.
5. Problems in connectivity –Grid/Facilities.
6. Access to other credits and capital.
7. Feedstock transportation and access in the case of biofuels and ethanol.

In order to identify the financing risks, please review the section below entitled "*How to evaluate projects: General recommendations to identify EE and RE cost-effective projects.*"

c. Legal incentives

SENER recently published in the Federal Official Gazette of Mexico several provisions that have the purpose of promoting RE in the country. Some of these provisions are described below.

1. The Model of Interconnection Agreement for Intermittent RE was published in 2001 as well as the methodology regarding the transmission services of the same. In 2004 this Model of Interconnection Agreement was amended in order to include certain hydroelectric projects. In 2006 another amendment for this Model was published, in order to add a recognized methodology of the capacity in an interconnection agreement.

2. Since January 2005, the Income Tax Law provides a tax incentive equal to depreciating the full costs (100%) of the machinery and equipment that generates energy from alternative sources (solar, wind, nitrogen, etc.) during the year in which it was purchased. This incentive is only valid where the machinery and equipment being depreciated at a 100% rate is put into operation at least for a 5-year period. Where the machinery and equipment is not operated at least for the 5-year period, the taxpayer will be required to recapture the percentage of the deductions corresponding to those years in which the machinery was not operated and characterize the recaptured amount as taxable income.

3. On June 27, 2007 resolution number RES/176/2007 was published by SENER in the Federal Official Gazette. This Resolution contains an interconnection adhesion model contract for small scale[124] solar projects. This model contract will allow the exchange and direct compensation of electric energy through the installation of bidirectional meters, allowing a final user or project

developers to install and operate solar cells and receive a preferential treatment in their energy consumption. Under this scheme, consumers may continue to be connected to the network and when a power surplus is generated, the same will be admitted by the network and accounted in favor of the user; when the user requires power and cannot use photovoltaic energy, it may obtain power directly from the grid and a direct registry of the amounts consumed and surplus generated will be made.

4. On July 9, 2007 SENER published resolution number 192/2007 that approves several amendments to the interconnection model contract and to the methodology for the determination of the power transmission service fees for RE. This methodology provides the same benefits of the Interconnection Contract for RE that was previously limited to intermittent sources for those permit-holders that deliver its power output exclusively to government facilities. The objective of this incentive is for municipal or state governments to take advantage of their non-intermittent RE such as: energy generated by biogas in sanitary landfills, waste processing, and small hydraulic developments. Developers of projects in which the government consumes power derived from the process of such projects, will receive preferential treatment for such transfer of energy. Also, there are changes in the Methodology for the Determination of Power Transmission Fees, for the purpose of reducing transmission fees of RE permit holders connected to the national medium voltage grid. The above is a direct result of savings generated to the grid, by reducing losses in power-flow transformation.

5. The Law for the Promotion and Development of Biofuels ("the Biofuels Law") became effective on February 6th, 2008. The Biofuels Law includes an independent legal definition for biofuels and a separate legal framework for their regulation that is not be limited by traditional fossil fuels laws being applied. As a result, it would be possible to develop several projects for mass production, distribution and marketing of biofuels in Mexico after obtaining the applicable permits[125]. This law distributes the jurisdiction of different ministries for the regulation of this industry and it mandates the formation of an Inter-Ministerial Commission for the Development of Biofuels with the participation of the following ministries: SENER, SEMARNAT, SAGARPA, Economy (SECON) and Tax Collection and Administration (SHCP). The Biofuels law will promote and regulate the development of the agricultural sector in Mexico and the development of national policies for the promotion, marketing and use of RE[126].

6. Furthermore, the Mexican Congress is discussing a major energy reform that will create additional incentives for the development of RE and a greater participation of the private sector.

2. How to evaluate projects: General recommendations to identify EE and RE cost-effective projects

Each project developer must define the methodology for establishing its baseline costs and the cost savings, as well as the distribution of the savings to the parties.[127] Another factor mentioned by the U.S. Department of Energy is the need to hire experienced attorneys during the negotiation of large or complicated contracts;[128] the absence of attorneys during the negotiation of these contracts could increases the risk profile and potential liabilities associated with a project.

The energy sector in APEC economies faces great challenges regarding the mobilization of private capital and international financial resources needed to increase energy investments from US$3.4 trillion to US$4.4 trillion over the next 20 years.[129] Thus, in order to ensure the sustainability of the investments required, private capital and financial resources have to assess the socioeconomic impacts of such mobilizations in an integral way, considering matters as climate change, job generation, population growth and the macroeconomic impacts of fossil fuel production.

3. Recommendations to identify cost-effective RE projects

Although the focus of RE projects should be on securing long-term debt construction and obtaining financing for these projects, there is a need for significant capital before and after the indispensable construction and financing; therefore it is necessary to have relevant information regarding a project in order to identify its cost-effectiveness. It is advisable to have a Detailed Project Description that includes the following aspects:

Table 4.2

1. Project Objective and Phases.	4. Incentives identified and market policies.
2. Trigger Conditions.	5. Project development objective and key indicators.
3. Strategic Choices Underlying the Project Design.	6. Project components: technical assistance; project management and other financial mechanisms obtained.

It is also necessary to require enough information from the credit applicant regarding the technology and processes which are going to be implemented during the project in order to identify possible inappropriate investments, such as the use of inefficient materials, the wasting of materials, and others.

Table 4.3

RE projects should consider the cost and fees of the following items:	4. Preliminary permitting analysis
1. Land rights: to lease or purchase it.	5. Employee compensation.
2. Required equipment.	6. Permits.
3. Technical and environmental studies.	7. Legal fees, including negotiation of the power purchase agreements ("PPA"), in case of power generation projects.[130]

4. How can the risk in RE and some EE projects be measured?

The following questions were originally structured in 2007 by Jaime Wimberly in relation to wind power energy. Nevertheless, these questions have been reworded in order to take into consideration different types of RE:

Table 4.4

Regulatory:	What are the risks if regulations change or governmental incentives are reduced?
Potential:	Can the generator increase the installed energy capacity?
Reliability:	Can operation costs be reduced if the project and the agreement are replicable?
Environment:	Could the environmental implications slow the project down or make the project more expensive?[131]

Other possible evaluation questions that could help determine if the project is cost-effective are:

Table 4.5

Technology:	What are the risks of selecting the wrong technology or making mistakes in the implementation of such technology?
Operation:	How does the project function?
Costs:	What will be the impact of an increase in the cost of raw material or of other resources in the case of a fuel or RE substitution project?
Distribution:	If the project is not of electric energy, is the project developer sure of using any distribution line that will allow said developer to meet the demand, for example, for interconnection of transmission lines, gas ducts, transportation, and other equipment?
Transmission:	Is the transmission capacity enough in order to manage the project?[132]

5. Recommendations to identify cost-effective EE projects to be carried out by ESCO

The US Department of Energy offers some guidelines for a successful ESCO project. While the following guidelines are primarily of interest to ESCO clients, they can also be used by financial organizations in order to obtain major elements for evaluation:

1. Look for more than the low bid. On selecting an ESCO, it is important to review its track record, project design, installation and maintenance experience.
2. Negotiate a contract that reasonably limits ESCO profit-making and establishes a win-win arrangement. Carefully weigh the pros and cons of shared savings versus fees for services and other contractual arrangements.
3. Require the ESCO to take a comprehensive approach for energy conservation—identify the measures with rapid paybacks and the measures with longer paybacks—rather than in easy, quick payback measures.
4. Ensure that the agreement does not allow the ESCO to sacrifice quality for energy savings.
5. Ask your ESCO to incorporate extended product warranties and personnel training into the bid specifications.
6. Organize an in-house project team to work with the ESCO to choose appropriate energy measures, prepare bid specs, pre-qualify prospective bidders when the contract is executed.
7. Work with the ESCO to test new technologies in order to determine their performance and applicability.
8. Design the project and coordinate its construction in a way that minimizes disruption of the building's functions.
9. Document both energy and non-energy benefits of your project and publicize its success to the community.[133]

It is also advisable that the service provider specifies how the savings will be determined and how contingencies in the use and occupancy of the building will be addressed.

CHAPTER E
OBSTACLES AND BARRIERS FOR FINANCING ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS IN MEXICO

1. Given the benefits attributed to RE projects, why have they been slowly adopted?

In general, the reasons vary from lack of familiarity among decision makers and users about existing alternatives and market failures which have favored a supply-oriented approach to energy planning and continuous use of fossil fuels. One of the main obstacles is access to appropriate financing.

Historically, the absence of clear internal policies in each country have played a significant role in the development of the applicable legislation that regulates EE and RE projects and that are relevant for their financing. The following aspects constitute some obstacles to implement the development of EE and RE projects in Mexico:

Economical Issues

In the case of RE, the primary task is to achieve a competitive position in a liberalized energy market. In the case of the energy generation, it has been shown that will be more difficult to make RE competitive in the short run, if the points of comparison with conventional fossil fuel technologies are only the investment and the average costs to generate energy,[134] and if it fails to consider other externalities such as carbon restrictions and environmental impacts.

Source: Renewable energy sources: Analysis of international environment and proposals for its penetration in America Latina and the Caribbean" (Fuentes Renovables de energía: análisis del entorno internacional y propuestas para su penetración sostenida en los países de América Latina y el Caribe") Natural Resources and Infrastructure, ECLAC series, at press.

Likewise, costs of energy produced by RE continue to be significantly higher than those of fossil fuels. For example, it costs twice as much to generate 1kWh from biomass as from natural gas, and the investment required is three times as great per MW installed (Table 5.1).[135]

Table 5.1

AVERAGE GENERATING COSTS AND INVESTMENT		
Technology	**Average generating cost** (U.S cents/kWh)	**Average investment** (U.S. cents/Watt)
Gas combined cycle	3.5 (3.0-4.0)	0.6 (0.4-0.8)
Coal	4.8 (4.0-5.5)	1.2 (1.0-1.3)
Nuclear	4.8 (2.4-7.2)	1.8 (1.6-2.2)
Wind	5.5(3.0-8.0)	1.4 (0.8-2.0)
Biomass (25 MW combustion)	6.5 (4.0-9.0)	2.0 (1.5-2.5)
Geothermal	6.5 (4.5-8.5)	1.5 (1.2-1.8)
Small hydroelectric plants	7.5 (5.0-10.0)	1.0 (0.8-1.2)
Photovoltaic	55.0 (30.0-80.0)	7.0 (6.0-8.0)

- It must be noted that equipment prices, in what is still a small and immature market for RE technologies is variable, depending on the country and location, the source, and quality of equipment, and the taxes or subsidies applied.[136] However, there are prospects for future cost reductions as the different markets develop. The cheapest schemes are where the equipment is manufactured locally and the majority of the civil works are completed by the owner with the help of local contractors.

- The initial cost is only one element in the overall economics of a system. Some type of economic assessment is required to determine which system from a number of choices will give the best value for money in the long run, either for the customer or for the economy as a whole.[137]

- The economics of RE are rather different from conventional small power systems, in that:

1. The capital cost of the equipment is high
2. The running costs are low and there are no fuel costs
3. The output of the system depends on its location

Figure 5.2

Note: Grossed-up values based on disclosed deals. Figures marked * are based on NEF Desktop database; all other figures are based on industry estimates derived from various sources.
Source: Global Investment in Sustainable Energy 2006. New Energy Finance

- In particular it is the high capital cost of RE which makes them appear unattractive when compared with a diesel generating set, and makes an appreciation of the longer-term economic picture so important. This is normally achieved through the method of life-cycle costing.

Financial Issues

Regarding the financial sector, the most important factors that have influence over the investment of projects with RE and EE are:

1. The absence or insufficiency of clear and stable market mechanisms within the framework of a regulatory system designed to reduce investment risk (Based on the assumption that projects will need to become competitive at market prices, an attempt should be made to reduce market risk by concluding long-term purchase contracts with appropriate payment guarantees).

2. The lack of interest from the government to serve as a vehicle for national development banks;
3. Shortage of systems for providing guarantees for credits extended to small and medium-sized enterprises, and
4. Absence of legislation that will free business enterprises from the risks posed by the legal or tax contingencies that currently hamper their operations.

2. Why would anyone invest in RE projects?

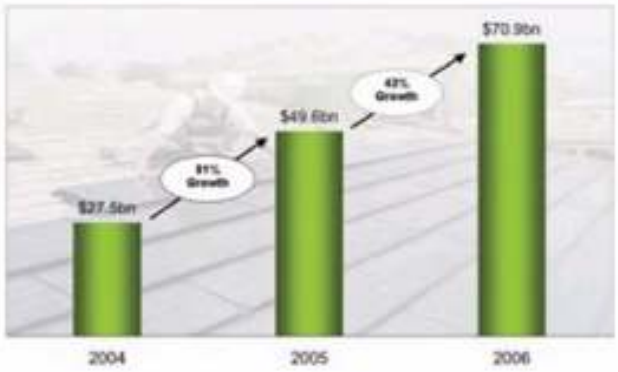
We should consider these reasons:

1. It is very important to consider that the lack of energy infrastructure remains a serious constraint in the development of many countries. Together with transport and communication systems, an effective energy system contributes to increasing efficiency in traditional production activities, establishing new industries and diversifying the economy, thus contributing to economic development.

2. Access to affordable energy is considered as an essential component of any sustainable socio-economic development strategy. It is fundamental for the improvement of the living standards of populations that lack access to reliable and efficient energy, particularly electricity.

3. Although fossil fuels are still by far the dominant source of energy in the world, RE systems have been increasingly applied in both small and large scales in industrialized and developing countries. Small RE systems are very attractive for many developing countries. They provide the least cost electricity service in isolated rural areas particularly in areas that are not connected to the electricity grid. These systems include solar photovoltaic (PV), micro-hydro, wind power and biogas. Solar water heaters, solar stills, solar cookers, biomass for efficient cookstoves and wind pumps are other often cost-effective RE with relevant applications in both rural an urban areas.[138]

Figure 5.3



Note: Grossed-up values based on disclosed deals. The figures represent new investment only, and do not include PE-buy-outs, acquisitions of renewable energy projects, nor investor exists made through public market / OTC offerings.
Source: Global Investment in Sustainable Energy 2004-2006. New Energy Finance

3. Which are the benefits of the investment in RE projects?

RE systems can provide direct benefits at national and local levels which justify their wide use in developing countries. They can contribute to substantial savings in import bills for fossil fuels, which are a main drain in the economy of these countries. At the local level, the availability of electricity will contribute to improved productivity in existing cottage industries and create

opportunities for the establishment of new ones. Indirect positive effects include the provision of jobs through local manufacturing installation and maintenance of equipment.[139]

Other examples of benefits of RE technologies to both the community and individuals include:

1. Education (through the provision of lighting and TV);
2. Drinking water (water pumping, solar stills and desalination);
3. Increased opportunities for growing crops (water pumping);
4. Reduced labor foraging for fuel (improved cook stoves and solar cookers),
5. Increased health services (PV lighting and refrigeration, solar water heaters and solar stills).

There are many different types of RE technologies available on the market which can bring electricity to villages and communities which do not have access to grid electricity. Each of these systems has advantages and disadvantages, and each must be assessed in relation to the resource available to power it, so that the most appropriate systems are installed for the climatic conditions. The following table outlines many of the different applications for RE technologies by sector.

Table 5.4

Applications for renewable energy technologies, by sector						
TECHNOLOGY	**SECTORS**					
	Domestic	Small business	Agriculture	Health	Community	Other
Solar energy						
PV	•	•	•	•	•	•
solar thermal electric		•			•	•
solar water heating	•	•		•	•	•
solar cookers	•	•			•	
Biomass						
improved cookstoves	•					
Briquetting	•	•				•
district heating					•	•
electricity generation						•
Biogas						
electricity generation	•	•		•	•	•
transport fuels		•				•
Micro/small hydro		•			•	•
Wind						
Turbines	•	•		•	•	•
Pumps	•		•	•	•	

Source: *GREGORY, Jenny; SILVEIRA, Semida; DERRICK, Anthony; COWLEY, Paul; ALLINSON, Catherine; PAISH, Oliver. "Financing Renewable Energy Projects", Intermediate Technology Publications in association with The Stockholm Environment Institute 1997.

As shown by recent experiences of industrialized countries, the government's role and public policies are vital to support the companies searching financing for available resources. In Latin America, this role has been limited, since efforts to implement the development of alternate resources have been confined to information and demonstration of projects, and constrained as a result of a lack of concrete steps to implement the mechanisms that may be adopted permanently in this field.

4. What can government do to increase the investment in EE and ER projects?

There are four essential functions which governments ought to perform so that private-sector financial agents or State enterprises may invest in clean technologies:[140]

1. Use the regulatory framework to establish clear, stable market mechanisms that help lower the risk investors are required to take on. This means that investors can work with lower rates of return, so that more ventures may be financed and the providers of credit lines have the necessary guarantees.[141]

2. Establish that projects ought to attain competitiveness at market prices, that pricing mechanisms to be clear and stable and for market risk to be reduced by means of long-term energy procurement contracts with appropriate payment guarantees.[142]

3. Act through domestic development banks to provide a vehicle for channeling international resources, setting up joint credit lines with multilateral or bilateral financial institutions which will be operated by the domestic banking systems.

4. Create guarantee systems for bank financing provided to the small and medium-sized enterprises that are usually the ones implementing clean technology projects.

5. Draft and enact legislation to free companies in this sector from the risks posed by the legal or tax contingencies that currently hamper their operations because of inconsistencies with current tax laws, something that in turn makes it harder for them to draw on venture capital and other financing sources.

Within the general framework created by governments, companies working with clean technologies will be able to tap into financing from multilateral and bilateral organizations operated by the private-sector banking system in the form of special credit lines. Subsequently, their own banks will gain greater knowledge of this business and will feel more confident and enthusiastic about financing operations of this kind of projects from their own resources. Likewise, international capital may flow in larger quantities to the countries when their economies are recovered and the country risk levels are lower.

However, the fact is that public- and private-sector organizations, particularly in developing countries, have gradually become less enthusiastic about applying to international funds for co-financing of their RE programs, because of the complexity and delays involved in drafting proposals and, in many cases, the small likelihood that these will be approved. Now, it is necessary to identify new public-private financing mechanisms so that public resources, both international and local, may be used more efficiently and effectively.

A major effort should be made to refocus attention away from projects-based structures and toward business-based ones in order to create new confidence in the viability of initiatives once the public support stage is over.

The concept of "risk versus return" is probably the main factor preventing the RE sector from opening on to greater public-and private-sector investment and therefore to the implementation

of operational projects. The greatest risk for private investment in RE projects are political uncertainty and the commercial hazards involved in RE exploration activities and the industrial development of plants to turn these resources into energy.

Generally, risks are basically connected with the availability and reliability of information, i.e., the quantity and quality of the resource: wind, sunlight, timber, cane products, organic residues, geothermal steam, etc. This information is used to gauge the characteristics of the "potential RE business" and therefore the financial viability of investments, and its reliability is crucial in determining whether the margin of investment risk is acceptable.[143]

As the market stands at present, however, there are no mechanisms covering the commercial risks associated with exploration and implementation of RE projects. Countries should jointly endeavor to create their own instruments that can respond effectively to their needs.

Political Issues

Politically, private investors cannot be confident about the permanence of particular regulations (legal security).

Once EE and RE have been recognized a political priority, the fundamental question is whether public-sector action is required to solve the problem and, if so, to what extent. Political acceptance of the idea that energy resources should be used efficiently does not automatically mean that State must intervene in the energy sector. The general idea is that State intervention is justified if the costs of intervening (actual cost plus externalities) are less than the costs of not intervening.[144]

Once the need for State intervention has been demonstrated, governments need to gauge how politically feasible it is. It is likely that few public authorities are willing to intervene in the market unless they are assured that there is substantial support for this in society. In seeking to generate support from social and economic stakeholders, coalitions should be formed to support such policies by involving social interest groups that advocate the aims of the proposed intervention.[145]

Another way of gauging the position of EE and RE on the political agenda is to examine the public funding allocated to institutions, programs and other activities related to the promotion of EE and RE. In most of the countries, with just a few exceptions, State budget allocations and public funding for specialist institutions promoting EE and RE in the public and/or private sector are marginal and in some cases non-existent. International experience with the promotion of EE and RE shows that permanent, concrete results cannot be achieved in the medium and long term unless budgetary allocations are substantial and sustained over time.

5. What are the facts which generally have influence over financial entities to finance of EE and RE projects?

Regarding credit policies in general, financial entities prefer to participate in projects that imply lower capital fluctuations in order to avoid risks around the credit payments and to guarantee the success in their investment.

In some cases, the size of EE and EE projects is too small, and this situation generates lack of interest from financial entities that consider such projects not profitable. Financial entities consider the costs of the financial structure to be too high compared with their size. Therefore, financial entities grant financing based on higher interest rates in order to minimize the risk derived from the investment of funds in projects considered as high risk projects.

In general, factors that have influence in investment over these projects are comprised by the social conduct as a whole. This phenomenon has different stages:[146]

1. Individual versus collective behavior;

2. Lack of knowledge, ideology, perceptions or a lack of public support and the predominance of a liberal economic doctrine that hampers sustainable development in the energy sector;

3. The market power and dominance wielded by electricity, gas and oil companies, and

4. Changes in the organization of energy production chains, in conjunction with the introduction of pricing and fiscal policies applying to both electrical power and fuels that have various implications for EE and the market penetration of RE.

The foregoing is followed for the lack of experience of financial entities in financing this kind of projects derived from their novelty. However, tendencies marked by the participation of World Bank, International Bank, *Banco de México* and commercial banks, indicates that in the next decade these projects will generate major employments and energy for the countries.

Actually, a sophisticated structure has been implemented worldwide in order to attend this new market of clients: EE and RE project developers. This indicates a major advance and an interest directed to support the development of financial structures to allow the implementation of EE and RE projects in Mexico, creating a paradigm and the guidelines for this new economical structure destined to the countries with a big energy potential such as Mexico.

6. Conservative lending and investment policies.

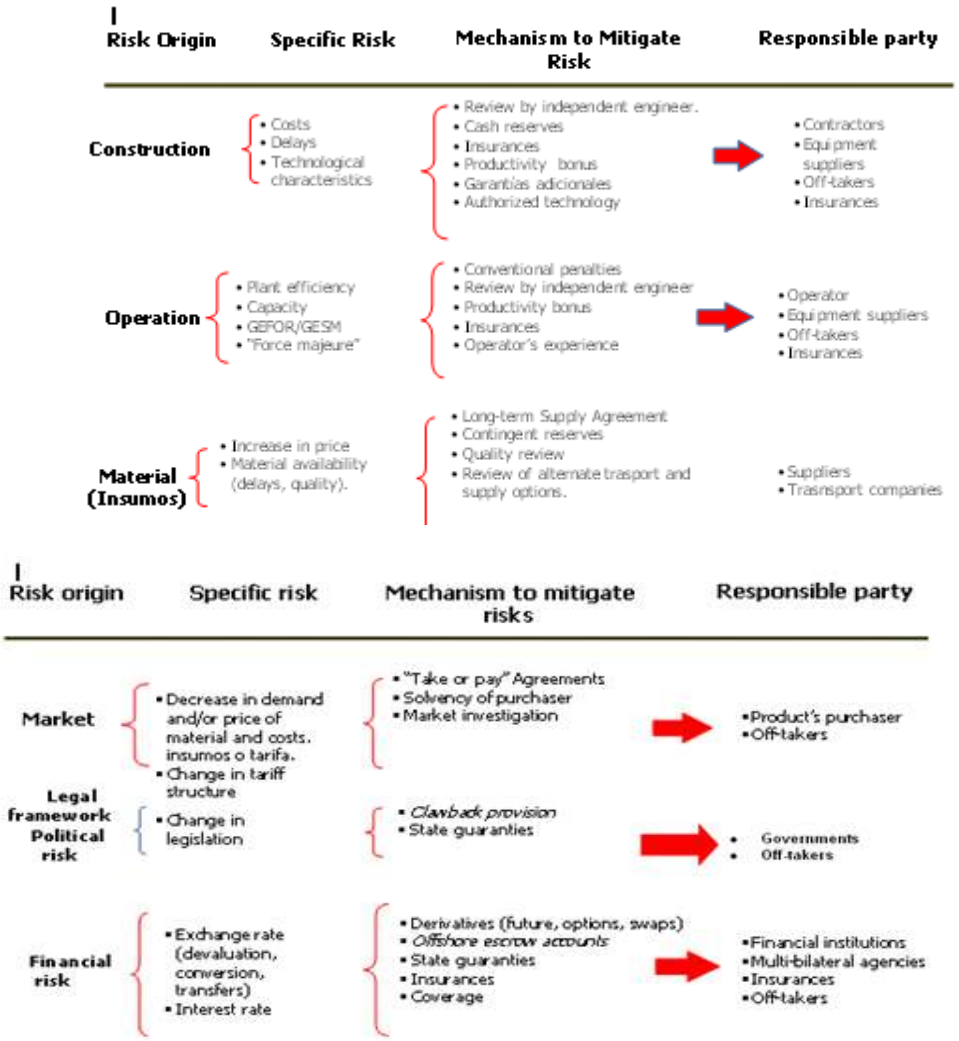
The main reasons that marked the financial sector's tendencies in previous years to finance any project, were defined as a preferential treatment to projects with profitable results visible in a short term and with minimal presence of risks. It is easy to understand the foregoing, especially in developing countries as Mexico, due to their economical fluctuations are radical and depend of the changes and conditions of other economies to conserve their balance. In addition, it is important to consider that Mexico has an abundance of non-renewable resources such as oil and natural gas, and this situation has caused RE projects to be developed at a very slow pace.

These factors have caused a lack of interest and confidence from financial entities with respect to projects that produce environmental benefits such as EE and RE projects, due to their innovative nature that involves novelty in technological resources, purpose, and a major number of risks at the outset, because sometimes the circumstances involved in their development can be out of control of their developers. This situation is different regarding business projects that are more predictable and include the requirements usually required by financial entities to provide financing.

One of the main requirements to obtain financing is the solvency of developers, since, in some cases, it is possible to create companies exclusively to develop a project, and the numbers of the investment are predictable and based in calculated flows, the assets of the company and in contractual guaranties, all of which constitute incentives and create a perception of security and economical balance about the project, specially if the new company has been created to develop the project assuming all the liabilities of the debt, and the obligations derived from the financing are guaranteed by the existing assets.

Under this outline, it is possible to detect and determinate risks and take measurements to mitigate them as shown in the following example of analysis and risk allocations:

Figure 5.5



Source: Project Financing in the Energy Sector. Auto-generation and Peak Shaving Plants, Antonio Souza, Protego, July 2006 Web page: http://www.cre.gob.mx/discursos/sem-elec06/SeminarioEficiencia/18.pps

As shown above, the risk origin and the specific risks assumed in a project different from an EE or RE project do not present a substantial difference with the risk assumed before an EE or a RE project. On the contrary, is the mechanism used to mitigate the possible risk which determines the project profitability. Therefore, we may consider that the increase in finance and support of EE and ER projects is subject to the development of a structure adjusted to circumstances and nature of the projects in order to modify the paradigm used to finance projects, which hampers the implementation of these kind of projects that constitute a new way to generate capital and energy for the countries.

The measures that may be applied to implement and increase the development of policies relating to efficient energy and RE are the following:[147]

1. Separating actions and policy instruments for efficient energy use from those relating to RE. It would seem appropriate to design converging instruments and actions but they should at the same time be autonomous and independent, inasmuch as the strategic objectives and

actors on which such policies are intended to have a timely and positive impact are completely different. In addition, the measures relating to pricing policies, fiscal incentives, regulations and market structure which Governments can implement are different as well.

2. Integrating regulatory instruments and the national energy policy as part of a comprehensive approach. A regulatory framework or law cannot be effective unless they are firmly grounded in the country's energy policy and are backed up by an institutional structure that serves their purposes, together with a range of appropriate instruments, programs and funds. The point of discussion should not be whether or not it is appropriate to pass legislation but rather which concrete issues warrant legislation and what would be the best way of designing and applying it.

3. Establishing a medium-term horizon for the achievement of results. In many cases, there has been a lag between investments in EE programs and the production of tangible results. This would appear to suggest that programs for promoting EE and RE involve substantial lead time and thus medium-or long-term time horizons for the achievement of visible results.

4. Building upon existing international agreements on climate change and RE sources. Governments should take advantage of forums, such forums could provide an opportunity to expand the agenda for discussion to include issues that encompass the design of a joint regional proposal aimed to identify a strategy to affront the current global scenario for EE and RE. It is worth mentioning that Mexico has established and consolidated several international activities related to EE and sustainable development, for example[148]:

Dialogue Regarding Climate Change, Clean Energy and Sustainable Development. Mexico participated at the Head of State's Meeting of G8 and 5 invited countries at Gleneagles, Scotland, in order to negotiate a jointly plan to confront problems related to global climate change, complementing the United Nations Framework Convention on Climate Change. Subsequently, Mexico participated as host country in the Dialogue Regarding Climate Change, Clean Energy and Sustainable Development in 2006.

Collaborative Agreement between Energy Secretary and United Kingdom's Fund for Global Opportunities. In 2005 a collaborative agreement was entered by these institutions in order to support the work of the Climate Change Committee for the Energy Sector and make promotional activities of projects under the CDM. During the execution of this agreement a Dialogue regarding technology transfer and a workshop to implement CDM projects Mexico-United Kingdom was made. These events included several experts in technologies to reduce emission of GHG and brought to local companies for energy generation, governmental representatives and private developers the opportunity to increase the generation and a sustainable use of energy through the exchange of experiences and opinions between the representatives of the countries.

This Agreement included the following studies:

1. Complementary analysis for the National Strategy for Climate Action regarding the generation and use of energy (in coordination with SEMARNAT).
2. Update of methods applicable to greenhouse gases to calculate emissions for EE and RE projects.

During the Eleventh Conference of Parties of United Nations Framework Convention on Climate Change in Montreal, Canada, Mexico and Canada's Provincial Governments entered into a collaborative agreement regarding climate change. In this context and with Climate Change Committee of Energy Sector, SENER, SEMARNAT and Embassy of Canada in Mexico prepared a CDM workshop related to Climate Change Mexico-Canada, RE and EE.

Project to Promote Renewable Energy SENER- Proyecto Promoción de Energías Renovables SENER-German Technical Cooperation Agency. To help institutions to implement efficiently the development of RE markets. Since July 2005, German Technical Cooperation through the German Technical Cooperation Agency has implemented this project. To achieve its purpose they collaborate with principal actors and impulse the use of RE through assistance focus on the adjustment of legal frameworks, development of markets and projects. Actually the attention has been concentrated in the following actions: development of policies and strategies (regarding biofuels); assistance to adjust the legal frameworks; development of markets and projects (solar heaters) and South-South coordination. The Mexican participant entities are SENER, CRE, CONAE, IIE and SEMARNAT.

Partnership of Renewable Energy and Energy Efficiency Latin America-Caribbean. As member of this Partnership, México was the host country of the first Regional Preparatory Meeting for Latin America and the Caribbean, with the following objectives: define the Regional Program of Partnership of RE and EE for 2006; update the study of needs and strategies of the countries to implement RE and EE. At this meeting Mexico was designated, for period 2005-2007, as the representative before the Partnership of RE and EE; consequently, México is responsible to compile information regarding the current situation and needs of the countries, and follow up and promote the actions of this Partnership.

Methane to Markets Partnership. With the participation of SENER, Mexico has participated in several initiatives promoting usage of clean forms to generate energy, and in several work groups regarding the capture of carbon and Methane to Markets, both promoted by the United States. The International Methane to Markets Partnership has the objective to promote, in a short term, recovery of methane and its international use as a clean energy source. This objective is possible to achieve through strategic partnerships between the developed economies, developing economies and transitional economies, including the participation of private sector. This initiative pretends to be a "win-win" project because of the promotion of economical development, energy safe, and improvement of air quality and reduction of greenhouse gases emission.

7. What aspects are relevant to implement EE and RE policies and programs?

1. It becomes more important to have efficient institutions as transaction cost rise. The promotion of EE use and, to a lesser degree, RE entails large transaction costs.

2. Efficient institutions are vital when the information available is incomplete, as is characteristically the case with the promotion of EE and RE.

3. The third aspect is whether or not the institutional framework provides incentives for organizations whose business is to foster EE and RE.

Notwithstanding the foregoing, the claim that the "shortcomings in actual implementation of efficient energy use and RE policies, laws an programs are due to the ineffectiveness of institutional frameworks" needs to be examined critically. There may be other reasons that need to be identified and examined, for example, economic factors, which may include the comparative pricing of different energy types and the treatment of externalities, among other things.

In many countries, the lack of grass-roots democracy and civic participation and culture often means that decision-making in the energy sector is left entirely in the hands of central government and energy companies. This being so, a crucial issue is the potential role of the so called "information society" in terms of how effective it might actually be in involving citizens more actively in decisions affecting their energy supply and consumption. It is widely believed that democratic reforms and the information society could foster the decentralization of the

energy sector and the development of intermediate organizations based on strengthened democratic institutions.

8. What are the principles to promote RE incentives?

The general policy principles to promote RE technology are the following:[149]

1. Establish an integral and consistent verification system of production and RE consumption in the country.

2. Create a common and coordinated strategy to introduce RE resources and identify options to implement coordination between the countries.

3. Include the environment, social and macro economical costs of energy in its market prices.

4. Establish consistent long-term policies and incentives to promote RE resources to allow investors to have major certainty over the rates of their investments dividends.

5. Adjust RE Portfolio Standards and other local provisions, including NAFTA (*North America Free Trade Agreement*) to improve their consistency and promote the acceptance of RE.

6. Consider that incentives to attract demand, such constant prices, are generally more effective than strategies to impulse offer by means of the development of technology.

7. Impulse the purchase of RE technology, through fiscal credits for its installation and use, and eliminate purchase and property taxes over RE technology and infrastructure.

8. Eliminate obstacles to allow sources to use network by means of the opening of transmission systems to all producers without consider their dimension.

9. Implement new environmental policies to incentive companies to replace current pollutant technologies for clean resources in a specific future time period, and not to conserve the old technologies by requiring them their partial modernization in a short-time period just to comply with the current provisions regarding the pollution.

10. Generally, fiscal incentives for energy production are more effective than fiscal credits for investments[150].

Research and development.[151]

1. Create incentives for the research and development of RE by the private sector.

2. Direct the public expense to research and development in order to solve problems of systems and technological matters not attractive for private sector.

3. To expand federal and local budgets for the purchase of energy and fuels generated from RE.

9. What is the impact of the transactional and financial cost on Small size RE or EE projects?

Both lack of experience and the size of the EE and RE projects are derived from their novelty. We have to remember that our current energy system was new in the past and had implications that were solved over the years and through the experience obtained to manage the sources.

Actually, this new energy phase proposes new legal and technological instruments necessary for the adaptation to the global economy in this matter.

It is important to recognize that transaction costs of these projects are higher than the costs of other kind of projects due to the absence of working and exploitation of the sources and the lack of an integral legal support, these points have caused mistrust and apathy to projects supporting EE and RE. However, if we consider the results obtained in a long-time period we will find a major benefit, because we can help to improve the environmental conditions and to generate new energy sources and forms to use them, both aspects are helpful for the creation of new employments and for the opening of the economy to new international markets.

Obviously, during a project's development it is important to consider the costs, including the transaction costs, defined as all additional costs incurred by a project (i.e. capital and operatives), necessary to finish with its cycle. There are several factors that have influence on the estimate costs and it is difficult to give exact scenarios and alternatives that cover all options.

Likewise, such factors may determine the impact of transactional costs over the project. These factors depend of: the size of the project, usage of local personal for the design, implementation and management processes, and payment of costs until the operation of the project. Generally, transactional costs are not proportional to the project's size. Thus, if more credits are generated, the impact of transactional costs will be minor than incomes generated from the project's operation, and investor will have more incentives to develop the EE or RE projects.

Considering that all business activities imply risks, in case of initial activities like EE or RE projects it is possible that the experience and development of an international framework regarding these matters allow the availability of information and quality to manage the risks efficiently. The correspondent authorities shall dedicate time and effort to observe the evolution of the financial market for these projects in order to identify new ways to improve the management of risks and improve the implementation of EE or RE projects and investors will have a lesser uncertainty, the rates will be accessible, and the number of EE and ER projects will be increased.

During the risk evaluation it is important to considerate the following principles: [152]

- *"Major risk, mayor income"*

This principle indicates that companies operating projects under a high risk level, shall to offer to their stockholders higher returns than those stockholders of companies operating projects under lower risk levels. Capital flows into investment opportunities under a lower risk level.

-*Delegate risks to entities prepared to assume them.*

It is not recommendable that big companies assume all risks. There are specialized companies with a major capacity to assume certain risks for a lower cost. Normally, these companies require payments and considerations attractive for investors and bigger companies, and this coordination may generate an efficient relationship among several companies that will help to implement more EE and RE projects.

- *Operations with complementary risk profiles.*

These operations are logical and are more understandable by means of an example: A raw material's producer is subject to variable prices and a businessman requires the same raw material as an input, both are interested into obtain predictable cash flows, and they may agree on an exchange of such raw material on a fixed price. The producer assigns his possibility to obtain superior profits, but he shall not to assume loss in case of a price decrease.

-Risk culture at business organizations.

During the last years, the business sector interest regarding the risk management has changed. Normally, all annual reports of the companies quoted on the stock exchange include extensive sections of identified risks, the actions adopted to manage them and instruments for their prevention.

As a conclusion, these are the traditional principles applicable all projects: *identification of the risks*; *preparation* to assume them individually, and to prevent the possibility of a simultaneous presence of risks; *vigilance* of risk levels; to take immediate *measures* in case of any unforeseen event.

CHAPTER F
LEGAL OPTIONS AND STRUCTURES AVAILABLE FOR THE FINANCING OF EE & RE PROJECTS IN MEXICO

There are many factors and tangibles that may affect the successful implementation of a financing structure for EE and RE Projects ("EE/REP"). These factors vary depending on the local conditions of the region where the EE/REP will be established and the type of financing structure selected, but there are a number of key issues that must be considered in all projects to assure a successful financing structure:

1. The project must be very well defined, with clear objectives and a good business plan, as well as technically sound and efficient in all of its aspects. The lack of a good business prospectus, availability of appropriate information, or the use of old or unproven technologies usually limits the interest of lenders and investors alike. A well-trained staff in the administration and operation of the project is always a key factor. The energy demands and financial capacities of the beneficiaries must also be factored in.

2. The roles and responsibilities of all entities and organizations participating in the project must be very clear and well defined. Confusions among the participants or lack of communication are always obstacles for the timely and satisfactory completion of all phases in the project.

3. The financial self-sustainability of the project is essential. The project must generate by itself sufficient cash flow to repay any debts for a long period of time, as most of the financing required for these projects is provided under long-term repayment schemes.

4. Any financing scheme selected must be appropriate for the type of project financed. The financial institutions understand that the project requires time to mature and start generating sufficient cash flow.

5. Maintenance and operational costs must be very small compared to the size of the project and the income generated.

6. All the risks involved in the operation of the project must be carefully analyzed and evaluated in the project. Such risks must be mitigated with adequate insurance coverage and guarantees provided by the contractors and suppliers of the project.

7. Several intangibles must be considered in any analysis, as the mitigation or elimination of the influence of external factors may be the key to a successful EE/REP. Political risks, fluctuation of the market interest rates, inflation, labor environment and applicable tax regimes must be considered. Easy and efficient access to the consumers must be also being pondered, as unforeseen increases in the marketing and distribution costs may risk the profitability of the project.

8. Since all of the EE/REP financing structures are based on basic project finance principle, these type of financing are usually "non-recourse" or "limited-recourse" facilities against the entities that will own or operate the project. Otherwise, investors may discouraged or less inclined to risk their funds in the project, particularly if investors are public entities that are not allowed to incur into public debt with the authorization of the domestic legislative bodies.

9. The project must also include an effective marketing strategy and have strong local support from public and private sectors. If the community or region that will benefit from the project places little value or consideration on the project (as necessary as it may be), the

local communities or governmental authorities may be very reluctant to accept RE as better options to satisfy the needs of the consumers.

10. Collaboration with the authorities and domestic and international organizations is very important, as this grants access to several benefits available for these types of projects. Many countries have tax and legal incentives that allow the EE/REP to receive grants, subsidies or profits from the marketing of carbon certificates.

I. FINANCING STRUCTURES, TECHNIQUES, AND STRATEGIES

1. Market Approach and Participation of the Private Sector.

In any effort aimed to implement a RE system, a market-driven approach is always the best option, notwithstanding that in these countries the market is sufficiently developed to support big industries. This is why a joint effort between the public and private sectors is required, but the private sector plays a significant role in all cases, providing financial or technical assistance to develop a sustainable RE market. We could separate the roles of the private sector in two groups:

1. **Financial Activities**. International and domestic organizations may provide or facilitate funding for the development of infrastructure projects or training programs.

2. **Technical Activities**. International and domestic organizations may participate supplying equipment or assisting in the manufacturing, installation and maintenance of equipment and infrastructure.

The following are the types of private entities and organizations that take these roles in the private sector:

- **Non-Governmental Organizations ("NGOs")**: NGOs may be very important in disseminating information and promoting technology acquisition. There is a small number of NGOs that are providing or facilitating financing from international markets to local borrowers.

- **Private Companies:** Private companies and businesses may play several different roles in the implementation of EE/REPs. They are not in the business of lending money, so their main role has been the contribution of infrastructure, equipment and new technologies which allow the development of rural communities. Many of these private companies may also assist with training or maintenance programs or the transfer of new technologies.

- **Financial Institutions:** In practically any EE/REPs, the participation of domestic and international credit institutions is required to provide funding and assistance. This is particularly necessary as RE technologies are expensive, with high initial installation costs and long periods of time required to amortize their investment. For this reason, the financing required is these types of projects needs to be more affordable, with long-term repayment schemes and generous grace periods to repay the principal.

- **Credit Unions and Credit Cooperatives:** Credit Unions and Credit Cooperatives already exist in several countries and concentrate in rural areas. They are often focused in agricultural activities, but in some countries such as Bolivia and Sri-Lanka, they have been involved in the development of energy infrastructure.

2. Types of Credit Facilities and Structures Commonly Used.

As discussed in previous sections, the generation and administration costs of an appropriate financing scheme may be very high, whereas the implementation of a RE project must take into

consideration that the project needs a long period of time to generate enough revenues to repay the debt incurred and return the investment. The main alternatives for long-term financing of EE/REPs can fall into four different categories:

1. Consumer finance.
2. Revolving funds.
3. Customary Credit Facilities.
4. Project Finance

a) Consumer Finance.

Hire Purchase: Like retailers of any other products, producers and distributors of RE systems try to secure the sale of their goods. In many countries they have successfully used a hire-purchase arrangement, which is a method that vendors use to make expensive goods affordable to consumers who cannot make a single payment for the price of the assets purchased. Under this scheme, a credit institution will pay the price of the system or equipment to the seller, and the ownership of the assets will be transferred to the consumer, who will pay to the bank monthly partial payments charged with interest and fees, and will place some collateral in favor of the bank, probably over the same assets acquired.

Peer Group Lending: This a group lending scheme normally used among solidarity groups of cooperatives in which groups of individuals usually supported by a NGO assume individual and joint liability for paying their loan. This may be an attractive form of financing for commercial banks as the risk is allocated in not one single individual or entity, and the probability of a default is reduced since each one of the borrowers is co-responsible for the others.

Leasing: A leasing scheme is very alike a hire-purchase scheme, with the difference that in a leasing the bank or entity providing the funding will maintain ownership of the assets or system financed, and the consumer will pay a monthly rent with an option to acquire ownership of the assets upon termination of the lease.

b) Revolving Funds.

The idea behind a revolving fund is that an organization (or sometimes an individual) has a reserve of money (the fund) which is used to lend to one or more borrowers. Over a given period of time, the borrower is expected to repay the original sum that restocks the fund. Usually, an additional sum is charged (interest) to the borrower that acts as a fee for providing the service (administrative costs) and helps to protect the fund from being depleted. These include inflation, non-payments and the cost to the lender of getting outside finance. Revolving funds are often used in developing countries to provide affordable access to credit for those wishing to borrow money for anything from buying food and productive inputs, to infrastructure and RE projects.

While informal revolving funds are based or paid for by community savings, a formal revolving fund usually uses money from an outside organization or agency. The capital fund is managed by a local organization or NGO and not the community themselves. The funds are used to pay for the system or infrastructure, and the repayment by the original borrowers over an agreed period of time, puts money back into the fund for other people or projects to borrow.

c) Customary Credit Facilities.

Customary credit facilities such as direct loans, whether secured with collateral or not, are normally used in smaller-scale projects. This type of financing is not the most commonly used in RE projects since they are granted based on the solvency of the borrower and its payment capacity more than in the merits of the project. In other words, the lender expects the borrower to pay and is not so much concerned on the cash flow generated by the project.

d) Project Finance.

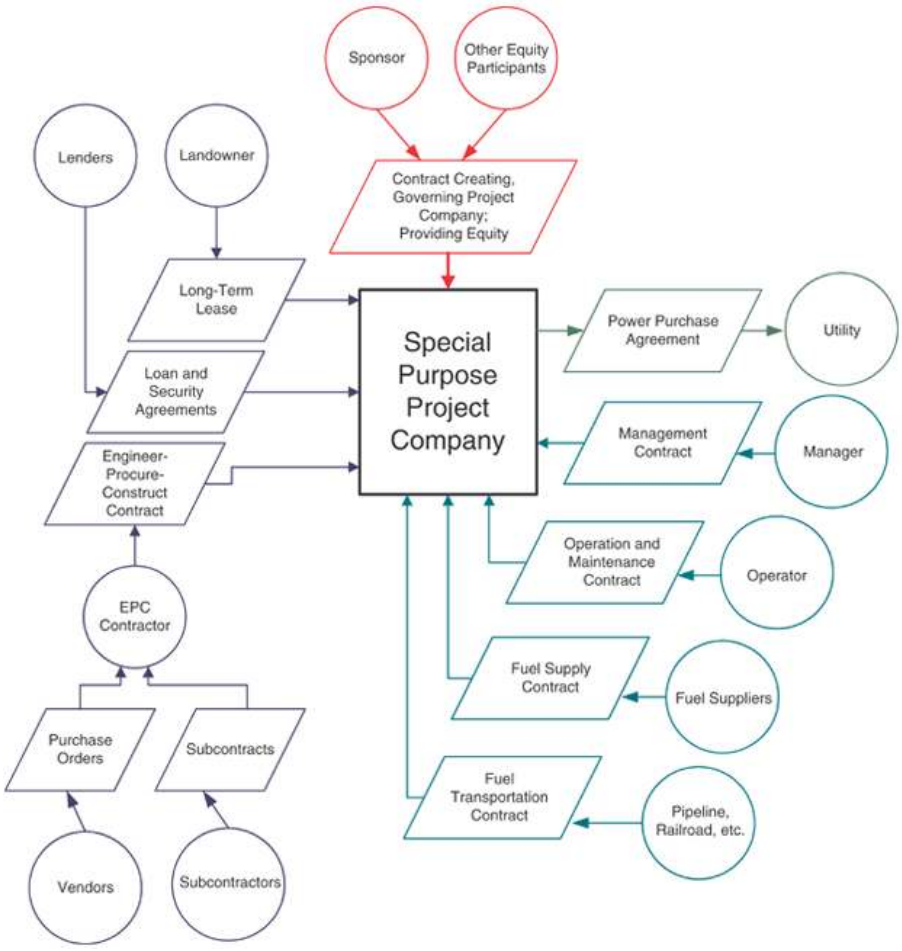
Under a Project Finance scheme, a credit facility is assembled by a lender or a syndicate of lenders for the development and construction of a particular project. The loan and equity returns are tied to the cash flows and fortunes of the project under a non-recourse scheme in which the lender looks principally to the revenues expected to be generated by the project for the repayment of its loan rather than the payment capacity of the project sponsor.

Project finance is commonly used as a financing method in capital-intensive industries for projects requiring large investments of funds, such as RE projects. The sponsors of such projects frequently are not sufficiently creditworthy to obtain traditional financing or are unwilling to take the risks and assume the debt obligations associated with traditional financing. Project finance allows the risks associated with such projects to be allocated among a number of parties at levels acceptable to each party.

Depending on the structure of a project finance, the project sponsor may not be required to report any of the project debt on its balance sheet because such debt is non-recourse or of limited recourse to the sponsor. Off-balance-sheet treatment can have the added practical benefit of helping the sponsor comply with covenants and restrictions relating to borrowing funds contained in other indentures and credit agreements to which the sponsor is a party.

Diagram of a Typical Project-Financed Deal:

Figure 6.1



II. SECURITY INTEREST VEHICLES AND PERSONAL GUARANTEES AVAILABLE IN MEXICO FOR LENDERS AND INVESTORS IN RE PROJECTS.

A. Security Interest Vehicles.

1. Mortgages

According to Article 2893 of the Federal Civil Code ("CCF"), a mortgage is a right *in rem* granted over real or personal property, for the purpose of securing the payment or performance of an obligation, as well as its priority for payment. Under a mortgage, the possession and the ownership of the assets are maintained by the mortgagor. Upon default of the obligation secured, the mortgagee has the right to request the foreclosure of the mortgage before a court and pay the indebtedness with the proceeds derived from the foreclosure. Any remaining balance has to be returned to the mortgagor.

Mortgages are primarily governed by the local civil codes of the States of Mexico and in the Federal District by the Federal Civil Code. Most of the provisions in each local civil code are similar, but some differences exist in each State.

A mortgage may be granted over real property and property rights (such as the usufruct, co-ownership rights on a real estate, easements together with the dominant estate, etc.). In this case, the mortgage extends to all natural accessions, improvements made by the owner and movable property fixed permanently to the real property.

Mortgages on real property are only valid if formalized by means of a public instrument. Their recording in the Public Registry of Property is not a validity requirement, but it is necessary to make it enforceable against third parties.

Mortgages on Industrial Units: An "industrial mortgage" is one of the traditional security interest vehicles in Mexico that grant a floating lien in favor of its beneficiary. This is a special type of mortgage that extends to all of the assets, operational cash and accounts receivable of an industrial or commercial unit. Its primary regulation is found in Article 67 of the Credit Institutions Law ("LIC" after its acronym in Spanish). Although it is not necessary that the industrial mortgage includes real property, most industrial mortgages do.

One of the main reasons (if not the main reason) why industrial mortgages are not used more frequently, is that until 2006 this type of mortgage could only be granted in favor of: (1) financial institutions duly chartered in Mexico, under the provisions set forth by Article 67 of the LIC and (2) other entities and individuals, as long as the mortgage is granted in one of the few States in which the applicable Civil Code allows for this type of mortgage. These States are: Coahuila[153], Guerrero[154], Jalisco[155], Puebla[156] and Quintana Roo[157].

Notwithstanding the foregoing, on July 18, 2006 Mexico's Congress approved several amendments to its commercial and financial laws, pursuant to which a new entity called "Financial Corporation with Multiple Purpose" (*SOFOMES*)[158] was created. Under its new regulations, SOFOMES may also be beneficiaries of industrial mortgages regardless of where the mortgage is granted[159].

Just like the traditional mortgage, the industrial mortgage may be enforceable against third parties only upon its registration in the Public Registry of Property of the place in which the property is located.

2. Pledges

A pledge is a security interest that may be granted over personal property like machinery and equipment, accounts receivable, negotiable instruments, shares, social quotas and future fruits from real property, for the purpose of securing the performance of an obligation and its priority for payment. The method of formalization may vary since Mexico's laws provide different rules depending on the type of right or good that is pledged. As in the mortgage, upon default of the obligation secured, the pledgee has the right to request the execution of the asset pledged before a court and pay for the indebtedness with the resulting proceeds. Any remaining balance has to be returned to the pledgor. Following are the different types of pledges regulated by Mexican law:

a. Civil Pledges.

A pledge regulated by the local civil codes in each State and by the Federal Civil Code. For the pledge to be perfected, the assets pledged must be delivered physically or legally[160] to the beneficiary of the pledge (pledgee) or to a depositary appointed by the parties in the corresponding contract.

b. Commercial Pledges.

This type of pledge is regulated by the General Law of Negotiable Instruments and Credit Operations ("LGTOC" after its acronym in Spanish), albeit very similar to a civil pledge. The LGTOC does not provide any definition for the "commercial" pledge, but Article 334 provides certain rules for the creation of a pledge under said law. In general, for anything not provided in the LGTOC, the commercial pledge will be governed by the Federal Civil Code.

c. Non-Possessory Pledges.

Pursuant to Article 346 of the LGTOC, a non-possessory pledge is a right *in rem* over personal property granted for the purpose of securing the payment or performance of an obligation and its priority in payment. It is a floating lien that may be granted over all or part of the assets that are used in the ordinary course of business by a debtor for its preponderant activities (machinery and equipment, account receivable, cash, etc.). Upon default, the pledgee may have the right to request the foreclosure of the assets pledged before a court, or in certain cases, their foreclosure through an out of court foreclosure procedure (without the need for any prior judgment or participation of a court, as long as an extrajudicial procedure is agreed upon by the parties).

This is a commercial pledge also regulated by the LGTOC. It is similar to the floating lien granted under Article 9 of the Uniform Commercial Code of the United States of America. This type of pledge is still a novel introduction to Mexico's legal system as it was incorporated in 2000. During the first years of its existence, it was not used very much because Article 379 of the LGTOC provided a non-recourse clause that prevented creditors from exercising any other remedies against the debtor if a non-possessory pledge was granted to secure an obligation. In 2003, the non-recourse provision in Article 379 of the LGTOC was lifted and the non-possessory pledge finally had the characteristics required to become an effective vehicle to grant a floating lien.

3. Guaranty Trusts.

By means of a guaranty trust agreement, the settlor conveys certain assets to an institution duly authorized by Federal authorities to act as trustee, for the purpose of securing the payment and priority of an obligation[161]. The trust corpus can be conformed by real property, personal property and intellectual property rights. Upon default, the trustee is entitled to dispose of the trust corpus in order to pay to the beneficiary of the principal obligation, and the beneficiary is able to request the execution of the trust corpus before a court, or in certain cases, through an

out of court foreclosure procedure (without the need for any prior judgment or participation of a court, provided that an extrajudicial procedure is agreed upon by the parties).

The guaranty trust is also similar in some ways to the floating lien granted under Article 9 of the Uniform Commercial Code of the United States of America. Although trusts have existed in Mexican law for several decades, only until the year 2000 did the guaranty trusts receive a special set of rules.

4. Fixed Asset Financing (*Crédito Refaccionario*) and Working Capital Financing (*Crédito de Habilitación o Avío*).

These are special forms of credit facilities that are found in Articles 321 and 323 of the LGTOC, which may not be used for any purpose not stated in the contract entered to document their conditions. There are specific provisions that obligate the borrowers to use the proceeds from the credit facilities only for business or production purposes. Under these credits, a security interest is automatically constituted over the real or personal property financed, and this security interest is a floating lien that extends to the products received by the borrowers and the improvements and accessions made to the real property.

5. Sale with Reservation of Title.

This is not a formal guaranty or security interest. It is modality of a purchase and sales contract, pursuant to which the possession of the property or assets subject matter of the transaction is rendered to the buyer; however, the ownership is maintained by the seller until the price is paid in full to the seller or the obligations set forth in the corresponding agreement are met. Hence, in the event of default, the seller may claim either: (i) the specific performance consisting in the payment of the consideration or the compliance of the obligations pending, or (ii) the rescission of the contract and the repossession of the assets sold. In most cases, sales with reservations of title must be formalized by means of a public instrument and recorded before the Public Registry of Property. This vehicle is also known in the international legal jargon as a conditional sale.

B. Personal Guarantees.

Personal guarantees are payment obligations assumed by a person to secure an obligation assumed by a third party. The most commonly used personal guarantees are the surety ship bond ("*fianza*") and the unconditional guaranty endorsement ("*aval*"), which may only be granted in negotiable instruments.[162]

1. Fianza

A *fianza* is a surety ship bond given by a third party in an agreement pursuant to which an individual, a legal entity or a bonding company agrees to pay the obligation assumed by a debtor in another agreement upon the occurrence of an event of default. It is very similar to the guarantees under U.S. law. In principle, the guarantor has the right to be called upon to meet its obligations until the creditor has exhausted all of its rights against the debtor and its assets; however, the guarantor may wave this benefit.

There are civil and commercial *fianzas* under our legal system, but both have different features and characteristics. Whereas any person or corporation may grant civil *fianzas*, only bonding companies duly authorized by the Federal Ministry of Finance ("SHCP" after its acronym in Spanish) may issue commercial *fianzas*[163]. The activities of bonding companies are deemed as specialized financial activities that must be regulated by the Federal financial authorities.

2. Unconditional Guaranty Endorsement ("*Aval*").

The *aval* is an unconditional guaranty of payment granted by a third party (called an "*avalista*") in a negotiable instrument (i.e. a promissory note), pursuant to which the guarantor agrees to be jointly and severally liable for the debt documented in the negotiable instrument. The holder of the negotiable instrument has the right to collect payment directly from the *avalista* without exhausting its rights against the debtor first. It also grants to the creditor the possibility of collecting the payment through a summary legal procedure before the courts and allows the creditor to provisionally attach sufficient assets of the debtor or the guarantor upon the servicing of process to secure the payment.

3. Joint and/or Solidary Obligations.

Although these are not guarantees *per se*, it is common practice to secure a debt by having two or more individuals or entities as joint and/or solidary obligors, in which case all the obligors will be debtors of the obligations. In both cases, the creditor will have the right to demand the payment of the debt from the joint obligor without first exhausting its rights against the main debtor. Nevertheless, there is a difference of degree between a "joint" obligor and a "joint and solidary" obligor. If the joint obligor is also a solidary obligor, it will also have to respond for the obligation in its entirety, and the creditor will have the right to demand the payment in full from the debtor or the solidary obligor; whereas if the joint obligor is not also a solidary obligor, the debt is equally divided between the debtor and the joint obligor, and the creditor will only have the right to claim a pro-rata fraction of the payment from each one of the debtors.

4. Stand-by Letters of Credit.

Commonly Used In Mexico But Not Regulated By Mexican Law, a stand-by letter of credit is an instrument in which a bank (in most cases) acting upon request and following instructions from a customer, agrees to pay a certain amount of money to a third party against the presentation of certain specific documents. These letters of credit are commonly regulated by the International Standby Practices published in 1998 ("ISP98") by the International Chamber of Commerce[164], although many banks in Mexico are still using the Uniform Customs and Practice for Documentary Credits ("UCP") as its main source of provisions[165].

The LGTOC and the LIC provide a few specific rules that must be met by all stand-by letters of credit granted in Mexico; however, these provisions are very scarce and do not contain any differences or limitations to the provisions contained in the ISP98 and the UCP.

III. DOMESTIC ASSISTANCE PROGRAMS

Banco Nacional de Obras y Servicios Públicos, S.N.C. (BANOBRAS): BANOBRAS is a development bank which provides financing and technical assistance for infrastructure projects undertaken by State and Municipal governments and private investors, provided that said projects benefit the population. BANOBRAS has facilitated more than 300 credits for EE projects.

Nacional Financiera, S.N.C. ('NAFIN"): NAFIN is another development bank which provides financing and technical assistance for infrastructure projects undertaken by private investors.

Programa Promoviendo un Sector Público Energéticamente Eficiente ("PEPS"): PEPS is a public program operating since 2004, in

conjunction with CONAE, the Lawrence Berkeley Laboratories, the U.S. DOE and the U.S. International Development Agency. PEPS have the purpose of convincing local governments to adopt policies to promote the saving of energy and the reduction of GHG emissions.

IV. INTERNATIONAL INSTITUTIONS AND PROGRAMS

International Institutions have played a vital role in the promotion and implementation of financing structures of RE projects in developing countries. The following are some of the most important organizations which have contributed substantially in the development of these types of projects:

The World Bank: The World Bank is a very important source of financial and technical assistance in the development of EE/REs around the world. However, this is not a bank in the common sense[166]. It is comprised of two different development institutions owned by the 185 member countries: (i) the International Bank for Reconstruction and Development ("IBRD"); and (ii) the International Development Association ("IDA"). Each institution plays a different role. While the IDA focuses in the implementation of programs to combat poverty in the most challenged countries in the world, the IBRD focuses on developing projects in countries and regions with higher income and creditworthiness in the population. For this reason, most of the financing for RE projects comes from the IBRD. This institution borrows most of its funds from the capital markets, and lends such funds to credit-worthy developing countries for projects that reunite the characteristics and principles described in the first section of this chapter, under better financial terms and conditions than those demanded by commercial credit institutions. Just during the past two years, the World Bank has participated in the financing and development of EE/REPs in Kosovo, South Africa, Serbia, Sri Lanka, the Pacific Islands, Morocco, Macedonia, Mongolia, Mexico[167], Armenia and China, among other countries.

The International Finance Corporation ("IFC"): The International Finance Corporation is a member of the World Bank owned by 179 member countries, created to make long-term loans, subscriptions of capital in privately owned companies, and provide assistance to support projects and companies in developing countries. The IFC currently holds a portfolio of US$2.3 billion in investments worldwide in power generation, distribution, transmission, and EE projects. The IFC also has a number of investments in power investment funds. Some of the most recent projects financed by the IFC are located in Brazil, Guatemala, India and Egypt.

The Energy Sector Management Assistance Program (ESMAP): ESMAP is multi-donor trust fund managed by the Energy, Transport and Water Department (ETW) of the World Bank that promotes the role of energy in poverty reduction and economic growth. It is also a global technical assistance program which helps to build consensus and provide policy advice on sustainable energy development to governments of developing countries and economies in transition, and contributes to the transfer of technology and knowledge in energy sector management and the delivery of modern energy services.

ESMAP was established in 1983 under the joint sponsorship of the World Bank and United Nations Development Program (UNDP) in response to the

prospect of a global energy crisis. ESMAP's mandate has evolved over time to meet the changing needs of its clients. Since its creation, ESMAP has supported hundreds of energy projects in more than 100 different countries.

The Global Environment Facility (GEF): Established in 1991, helps developing countries funding projects and programs focused on protecting the global environment. GEF grants support projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. GEF is an independent financial organization that provides grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities. It has provided grants for more than 1,300 projects in 140 countries. In Mexico GEF has participated in several projects for the protection of biodiversity, the reduction of GHG emissions and the development of large scale RE development programs.

The Inter-American Development Bank ("IDB"): The Inter-American Development Bank was established in 1959 as a multilateral finance institution for the development of the region. Its loans and grants help finance sustainable economic and social development projects and support strategies to reduce poverty, expand growth, increase trade, investment and regional integration, and promote private sector development and modernization of the state. The IDB assists its Latin American and Caribbean borrowing member countries in formulating development policies and provides financing and technical assistance. By the end of 2006, the IDB had approved over US$145 billion in loans and guarantees to finance projects with investments totaling US$336 billion, as well as US $2.2 billion in grants and contingent-recovery technical cooperation financing. In Mexico, the IDB has some supported EE/REPs, although not in a continuous basis.

The North American Development Bank (NADB): The NADB is a binational financial institution capitalized and governed equally by the United States and Mexico for the purpose of financing environmental projects certified by the Border Environment Cooperation Commission (BECC). The two institutions work together with communities and project sponsors in both countries to develop and finance infrastructure necessary for a clean and healthy environment for border residents

The Japan Bank for International Cooperation (JBIC): is a Japanese governmental financial aid institution created in October 1, 1999, through the merging of the Export-Import Bank of Japan (JEXIM) and the Overseas Economic Cooperation Fund, Japan (OECF). The bank's presence can be seen both in developed and developing countries. It tries to contribute to the stability of the international financial order and to the promotion of sustainable development. It follows a policy of not competing with ordinary financial institutions. The bank is one of the instruments of Japan's official development assistance (ODA), which contributes to the execution of the country's foreign policy. As it aims at sustainable development, JBIC is concerned about social and environmental issues, and requires Environmental Impact Assessment studies in order to provide funding to any project.

The Renewable Energy & Energy Efficiency Partnership's (REEEP): The REEEP goal is to accelerate the global market for sustainable energy by acting as an international and regional enabler, multiplier and catalyst to change and develop sustainable energy systems. REEEP works with

Governments, Businesses, Industry, Financiers and Civil Society across the world in order to expand the global market for RE and EE technologies.

On March 15, 2007, Mexico became a partner to the REEEP[168], which is why the Mexican Institute of Petroleum hopes that the Mexican authorities now can count with the cooperation of the REEEP members to accelerate and expand the RE and EE development in the country energy portfolio[169].

REFERENCES

Bibliographic Sources *(By author)*

AEC Daily. *"UnitedHealth Groups announce New Environmental Friendly, LEED –Certified* Green *Building"*. http://www.aecdaily.com/en/1600494/default/content/show_detail Updated Webpage. June, 21 2007.

AGUILAR GONZALEZ, Jorge Luis. "*Alternative fuels: option for Mexico*". Magazine Energia a Debate. May-June 2007.

ALTOMONTE, Hugo; COVIELLO, Manlio; LUTZ, Wolfgang F. "Renewable energy and energy efficiency in Latin America and the Caribbean; constraints and prospects. Division of Natural Resources and Infrastructure. Santiago, Chile. October, 2003.

APEC, "*APEC Secretariat*". http://www.apec.org/apec/about_apec/apec_secretariat.html Updated Webpage. June, 21 2007.

APEC, "*Energy Working Group"* http://www.apec.org/apec/apec_groups/working_groups/energy.html Updated Webpage. June, 212007.

APEC, "*Member economies*" http://www.apec.org/content/apec/member_economies.html Updated Webpage June, 21 2007.

APEC, "*MAPA 1996 Overview*". http://www.mofa.jp/policy/economy/apec/1996/mapa/vol3/vol3over.html Updated Webpage June, 20 2007.

Australian Academy of Sciences http://www.science.org.au/nova/037/037glo.htm

AusWEA, "Wind Farm Basics" http://www.auswea.com.au/WIDP/assets/1WindFarmBasics.pdf

AWEA, "Wind power outlook 2007" http://www.awea.org/pubs/documents/Outlook_2007.pdf

BAZAN NAVARRETE, Gerardo. "*Pasado y presente en el ahorro y uso eficiente de la energía*". Magazine Energía a Debate. March-April 2007.

BLACK, Thomas "*Pemex Says Cantarell Field to Begin Decline in 2005*". March, 1 2005. http://www.bloomberg.com/apps/news?pid=10000086&sid=aPgrH2d7FvKQ Updated Webpage June 18, 2007.

BLOYD, Cary, Ph.D. "*Technology Cooperation on New and Renewable Energy Technologies in the APEC Region*". APEC, National Laboratory "Argonne" http://lib.kier.re.kr/balpyo/renew14/01.pdf Updated Webpage June 20, 2007.

CEMDA –Environmental Law Mexican Center: Case the CEMDA and inhabitants of Coatzacoalcos vs PEMEX –"*Veredictos de la Primera Audiencia Pública del 13 al 20 de marzo de 2006 en la ciudad de México*".

Coalition for Affordable and Reliable Energy http://www.careenergy.com/fueling_growth/strategic.asp

Deputies Chamber (Mexico). "*Bulletin number 1491*" http://www3.diputados.gob.mx/francais/content/view/full/10830/ Updated Webpage June 15, 2007.

ECLAC, "*Anuario Estadístico para Latinoamérica y el Caribe 2006 / Renewable energy and energy efficiency in Latin America & the Caribbean: constraints and prospects."* http://www.eclac.cl/publicaciones/xml/4/28074/LCG2332B_3.pdf Updated Webpage June 19 2007.

Energy Commission of California. "*Report on the future of the California Biomass Collaborative*" Figure A.3. June 2004. http://biomass.ucdavis.edu/pages/reports/CBC_Futures_Report_Appendix.pdf Updated Webpage June 20, 2007.

EIA, Energy International Agency "Reassessing the Potential for Oil Production in Mexico", 2007. http://www.eia.doe.gov/oiaf/ieo/special_topics.html

Energy Services Coalition. *"What is energy performance contracting"* http://www.energyservicescoalition.org/resources/whatis.htm

EURACTIV, *"Electricity sector cautious on carbon storage"* http://www.euractiv.com/en/energy/electricity-sector-cautious-carbon-storage/article-164511 Updated Webpage June 10, 2007.

European Fuel Association of Bioethanol. Comunicado de prensa "*Record Growth in Bioethanol Fuel Production 2005*". Published in June 12, 2006 by eBIO –a non profit organization from Germany.

Federal Commission of Electricity (CFE). "*Acciones ambientales*" http://www.cfe.gob.mx/es/LaEmpresa/proteccionambiental/accambientales/ Updated Webpage June 18, 2007.

FIDE, Trust for the Electric Energy Saving. http://www.fide.org.mx/el_fide/objetivos.html Updated Webpage July 4, 2007.

FIDE, Trust for the Electric Energy Saving. *"Ahorre energía eléctrica empleando en su empresa TECNOLOGÍAS ALTERNATIVAS*

FIRA, Trusts created in connection with agriculture http://portal.fira.gob.mx/irj/portal/anonymous?NavigationTarget=ROLES://portal_content/fira.www.Internet/fira.www.Roles/fira.www.Anonimo/fira.www.Iniciofiragobmx/fira.www.AcercadeNosotros Updated Webpage July 4, 2007.

FIRCO http://www.firco.gob.mx/ Updated Webpage July, 3 2007.

FOMECAR. *"Carbon Market Potential in Mexico"*. November 2006 http://regserver.unfccc.int/seors/file_storage/vhbddq8z2vqor7e.pdf

GILBREATH, Jan. "*Environment and Development in Mexico: Recommendations for reconciliation*". Published by the CSIS, in cooperation with Yale. 2003.

Gazette IMP. "*Se incorpora México a la Asociación para la Energía Renovable y la Eficiencia Energética*". Published in April 17, 2007.

GASCA NERI, Rogelio. ITAM. Economic perspectives workshop 2007 "*Desafíos para el sexenio 2006-2012. RETOS DEL SEXENIO*" Energy Sector. January 11, 2007.
G.R. Morton *"Cantarell, The Third Largest Oil Field in the World Is Dying"* Copyright 2004, 2007 http://home.entouch.net/dmd/cantarell.htm Updated Webpage June 18, 2007.

Geothermal Energy Association http://www.geo-energy.org/information/plants.asp

Global Wind Energy Council http://www.gwec.net/index.php?id=24

Geothermal Resources Council http://www.geothermal.org/what.html

GORE, Al. "*An Inconvenient Truth*" http://www.climatecrisis.net/takeaction/whatyoucando/index6.html Updated Webpage June 18, 2007.

GREGORY, Jenny; SILVEIRA, Semida; DERRICK, Anthony; COWLEY, Paul; ALLINSON, Catherine; PAISH, Oliver. *"Financing Renewable Energy Projects"*, Intermediate Technology Publications *in association with* The Stockholm Environment Institute 1997

IEA, International Energy Agency http://www.iea.org/Textbase/subjectqueries/keyresult.asp?KEYWORD_ID=4122

INEGI. "*Comunicados especiales de prensa*". Bulletin 070/2004 published in Aguascalientes, Mexico. June 4, 2004. http://www.inegi.gob.mx/inegi/contenidos/espanol/prensa/Boletines/Boletin/Comunicados/Especiales/2004/Junio/comunica3.doc Updated Webpage June 15, 2007.

International Geothermal Energy iga.igg.cnr.it/geo/geoenergy.php

Iowa State University www.biorenew.iastate.edu/resources/glossary.php

ISES International Solar Energy Society http://www.ises.org/shortcut.nsf/to/wp

JIMENEZ, Gilberto. Diario Olmeca http://www.diarioolmeca.com.mx/articulo.php?nid=4381&sid=14

KNOTHE, Gerald (USDA / ARS / NCAUR). "*2nd Annual Renewable Energy Finance & Investment Summit 2007*". April 23-25, 2007 in Phoenix, AZ.

LBNL & NAESCO, *"Market Trends in the U.S. ESCO Industry: Results from the NAESCO Database Project"*. http://eetd.lbl.gov/ea/EMS/EMS_pubs.html Charles A. Goldman, Julie G. Osborn, y Nicole C. Hopper de LBNL y Terry E. Singer de NAESCO. Publisher by the Department of Energetic Analysis of the Division of Technologies of Environmental Energies "Ernest Orlando Lawrence" National Laboratory of Berkeley University, California in May 2002.

LYNCH, David J. *"Brazil hopes to build on its ethanol success"* http://www.usatoday.com/money/world/2006-03-28-brazil-ethanol-cover_x.htm New published by the USA TODAY in March 28, 2006. Updated Webpage June 19 2007.

Mario Molina Center www.centromariomolina.org Updated Webpage July 4 2007.

MARTINEZ, Alfonso. Latin American Meeting: *"Construyendo la Educación para el Desarrollo Sostenible en América Latina"* From October 31 to November 2, 2006. San José, Costa Rica http://www.earthcharter.org/foro2006/files/Memoria%20Encuentro%20Latinoamericano%20ene%2007.doc Updated Webpage June 18, 2007.

Massachusetts Technology Collaborative Renewable Energy Trust http://www.mtpc.org/cleanenergy/energy/glossaryefficiency.htm

Ministry of Agriculture and Forestry, Pastoral House, New Zealand Government. Future Focus: Signposts to Success for New Zealand's Primary Industries http://www.maf.govt.nz/mafnet/publications/future-focus/page-02.htm

Ministry of Economy of the Federal Government in Mexico. "*Mexican Mining Industry Report 2006*" http://www.economia.gob.mx/pics/p/p1032/inf2006ing.pdf

MOOMAW, William R. Escuela Fletcher, Universidad de Tufts *"Evaluación de obstáculos y oportunidades para la energía renovable en América del Norte."* May 2002.

MORTON G.R. "*Cantarell, The Third Largest Oil Field in the World Is Dying"* http://home.entouch.net/dmd/cantarell.htm

NADB, North American Development Bank *"¿Quiénes somos?"* http://www.nadb.org/espanol/quienessomos/or%c3%adgenes.html

NAESCO, National Association of Energy Service Companies. http://www.naesco.org Updated Webpage June 15 2007.

NREL, National Renewable Energy Laboratory http://www.nrel.gov/learning/re_biomass.html

OECD, 2005. http://ocde.p4.siteinternet.com/publications/doifiles/012005061T020.xls

Olmeca Newspaper http://www.diarioolmeca.com.mx/articulo.php?nid=4381&sid=14 Published in January 8, 2005. Updated Webpage June, 15 2007.

Ontario Environthon, 2007
http://www.ontarioenvirothon.on.ca/Pages/Modules/Special%20Topic/current%20issue%202007/pdfs/Biomass%20Worldwide.pdf

OPEC. *"Who gets what 2007"* http://www.opec.org/library/Special%20Publications/pdf/WGW2007.pdf Updated Webpage June 18, 2007.

OPEC. Research Division of the OPEC in Vienna Austria, 2007. Webpage updated in June, 18 2007.
http://www.opec.org/library/Special%20Publications/pdf/WGW2007.pdf

PIDWIRNY, Michael, Physical Geography http://www.physicalgeography.net/fundamentals/7n.html

RENDÓN-CASTAÑEDA, Cándido. "*La relación entre la ciencia y las políticas ambientales en México: la primera década de transición hacia el Desarrollo Sustentable"*. Becario de la Agencia Española de Cooperación Internacional, Universidad de La Laguna. La Laguna. Tenerife, España.
http://www.ocyt.org.co/esocite/Ponencias_ESOCITEPDF/4ESP003.pdf Updated Webpage June 18, 2007.

REY, Guillaume. *"El petróleo genera beneficios pero también mata"*
http://www.cafebabel.com/es/article.asp?T=T&Id=3355 European Magazine Beta. Updated Webpage June 18 2007.

REZESSY, Silvia, "Energy Service Companies in Europe: assembling the puzzle. Preliminary analysis of the results to date from the first European ESCO database". 2003.

RIOS ROCA, Alvaro. *"Clima global y la captura de CO2"*. Magazine Energía a Debate. Mach-April 2007.

RÍOS ROCA, Álvaro. *"Eficiencia, reto regional"*. Magazine Energía a Debate. May-June 2007.

SAGARPA –Ministry of Agriculture, Farming, Rural Development, Fisihing and Food
http://www.energiarenovable.com.mx/index.html Updated Webpage July 4 2007.

SALINAS DE GORTARI, Carlos. "México: un paso difícil a la modernidad".

SALINAS DE GORTARI, Carlos. Interview published in the Magazine Poder in 2007.

SENER, Ministry of Energy. "*Mexican Mining Industry Report 2006*"
http://www.economia.gob.mx/pics/p/p1032/inf2006ing.pdf Updated Webpage June 19, 2007.

SENER, Ministry of Energy. "*Prospectiva del sector energético 2006-2015*". Mexico. First Edition 2007.
SENER, 2001.
http://www.conae.gob.mx/work/sites/CONAE/resources/LocalContent/1483/1/images/sener.pdf

SENER and GTZ, "*Energías Renovables para el Desarrollo Sustentable en México / Renewable energies for the Sustainable Development in Mexico*"
http://www.sener.gob.mx/webSener/res/PE_y_DT/pub/FolletoERenMex-SENER-GTZ_ISBN.pdf
First Edition 2006.

SMA –Ministry of the Environment of the Federal District of Mexico. Official Bulletin, August 2006.
http://www.sma.df.gob.mx/imecaweb/boletin/bol0806/pdf/07.pdf

SMIL, Vaclav. "*Energy at the Crossroads: Global perspectives and uncertainties*". The MIT Press. 2003.

SUÁREZ, Rosio Vargas. "*The diplomacy of ethanol*". Magazine Energia a Debate. May-June 2007.

TAYLOR, Michael. "*Energy Technology Perspectives Scenarios & Strategies to 2050*". Lecture on May 24th, 2006. Energy Technology Policy Division International Energy Agency.

http://www.all-energy.co.uk/UserFiles/File/2007MichaelTaylor.pdf

The Franklin Institute http://sln.fi.edu/franklin/glossary.html

The International Nuclear Forum. "*Nuclear Energy & Climate*" http://www.climatechange.org/eandc.htm Updated Webpage June, 18 2007.

United Nations http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/isd-ms2001economicB.htm

University of Texas at Austin http://www.ci.austin.tx.us/cleancities/afterms.htm

US. Department of Energy *"Program of EE and ER*". http://www.eere.energy.gov/buildings/info/plan/financing/contracts.html Updated Webpage June, 15 2007.

U.S. Energy Information Administration. http://www.eia.doe.gov/glossary/glossary_e.htm

U.S. Environmental Protection Agency http://www.epa.gov/OCEPAterms/mterms.html

USGBC, US. Green Building Council *"Why Build Green"* http://www.usgbc.org/DisplayPage.aspx?CMSPageID=291& Updated Webpage June 21, 2007.

VISCA, Paola. "*América Latina: Las transnacionales siguen creciendo*". March 12, 2007. http://www.omal.info/www/article.php3?id_article=717 Updated Webpage June 15, 2007.

WIMBERLY, Jamie. Distributed Energy Financial Group, LLC. Renewable Energy Finance & Investment Summit 2007.

WOLPERT KURI, Jorge. "*Hacia el uso masivo de calentadores solares de agua".* Magazine Energía a Debate. May-June 2007.

World Coal Institute. "*The coal resource: a Comprehensive Overview of Coal*" Fourth Section: "*How is coal used?*" http://www.worldcoal.org/assets_cm/files/PDF/howiscoalused.pdf. Updated Webpage June 18, 2007.

World Coal Institute. "*Coal Facts 2006".* http://www.worldcoal.org/pages/content/index.asp?PageID=188

WWF, 2006 http://www.panda.org/about_wwf/what_we_do/climate_change/solutions/energy_solutions/renewable_energy/biomass/index.cfm

Other Bibliographic Sources

Bulletin from the European Union Commission to the European Union Council and the European Union Parlament. "*Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020*". Bruselas, Bélgica. January, 10 2007.

Bulletin from Baker & McKenzie. Biofuel Law Impact in Mexico: How may the Biofuel Law impact the development of this market in Mexico? Raul Felix Saul. 2008.

Civil Code for the Federal District, Mexico

Civil Code for the State of Coahuila, Mexico

Civil Code for the State of Guerrero, Mexico

Civil Code for the State of Jalisco, Mexico

Civil Code for the State of Puebla, Mexico

Civil Code for the State of Quintana Roo, Mexico

General Law for Ancillary Credit Organizations and Activities, Mexico

General Law of Negotiable Instruments and Credit Transactions, Mexico

Magazine "*Inmobiliare Magazine México: edición construcción y desarrollo sustentable*". Published in March-April 2007

Mazagine LEXIS NEXIS, Year 2 number 10, published on September 19, 2007

Magazine The Economist: Technology Quarterly. September 8th 2007. Page 24 The Economist. September 8th, 2007.

Magazine "*Windpower monthly*" June, 2007.

News AEC. *"UnitedHealth Groups announce New Environmental Friendly, LEED –Certified* Green *Building"* http://www.aecdaily.com/en/1600494/default/content/show_detail

VANGUARDIA Newspaper *"Pide Mario Molina invertir el 1% del PIB para revertir el Cambio Climático"* http://noticias.vanguardia.com.mx/d_i_604227_t_Pide-Mario-Molina-invertir-1%25-del-PIB-para-revertir-el-cambio-clim%C3%A1tico.htm Updated Webpage July 4, 2007.

Tables and figures

Endnotes

[1] Preference of balance sheet versus cash flow financing.
[2] Projects are sometimes too small to attract the interest of lenders, or companies are too small to afford the project themselves.
[3] In many transactions, the cost of the financing structure is very high in relation to the size of the projects.
[4] Interest rates charged by lenders tend to be very high (20% per annum or more).
[5] Lenders are not familiarized or do not have experience with performance contracts or energy service companies (ESCOs).
[6] Domestic banks require from borrowers too much leverage (1.5:1 or more), or a very strong equity in the project (30% or more).
[7] The cash flow generated by the ESCO can vary from month to month depending on several factors that may affect or limit the production of energy.
[8] Legal uncertainly on some available alternatives and scenarios that have not been reviewed by the courts.
[9] Historical behavior of comparable projects is difficult to assess in most cases.
[10] Banks may implement mechanisms to receive the proceeds generated by the operation of the ESCOs and ensure they are devoted to the purposes setout in the assumptions (including debt service).
[11] Effect of withholding clauses and strategies to mitigate its financial effects.
[12] Involvement of domestic development banks such as BANOBRAS or NAFIN and international organizations such as the Inter-American Development Bank and the World Bank.
[13] Vehicles available, including letters of credit, governmental support, and credit insurance.
[14] Training programs, technical assistance and cooperation agreements available from several companies and organizations.
1 APEC "Energy Working Group" http://www.apec.org/apec/apec_groups/working_groups/energy.html
2 RIOS ROCA, Alvaro. *"Clima global y la captura de CO2"*. Magazine Energía a Debate. Mach-April 2007.
3 WOLPERT KURI, Jorge. "*Hacia el uso masivo de calentadores solares de agua".* Revista Energía a Debate. Mayo-junio 2007.
4 VISCA, Paola. "América Latina: Las transnacionales siguen creciendo". 12 de marzo de 2007. http://www.omal.info/www/article.php3?id_article=717 Basado en la Revista América Economía número 326. julio 2006.
5 SALINAS DE GORTARI, Carlos. Interview Published in the Magazine Poder in 2007.
6 SMIL, Vaclav. "*Energy at the Crossroads*". 2003. Page. 49.
7 SENER, 2001. http://www.conae.gob.mx/work/sites/CONAE/resources/LocalContent/1483/1/images/sener.pdf
8 "*Nuclear Energy & Climate*" http://www.climatechange.org/eandc.htm
9 RÍOS ROCA, Álvaro. *"Clima global y la captura de CO2"*. Magazine Energía a Debate. March-April 2007.
10 GILBREATH, Jan. "*Environment and Development in Mexico*". Page 11.
11 OECD, 2005. http://ocde.p4.siteinternet.com/publications/doifiles/012005061T020.xls
12 In this chapter hydrocarbons only means crude oil, except specification in written. The Natural Gas issues will be discussed in Chapter two.
13 WOLPERT KURI, Jorge. "*Hacia el uso masivo de calentadores solares de agua".* Magazine Energía a Debate. May-June 2007.
14 IEA, International Energy Agency. http://www.iea.org/Textbase/npsum/30YearsSUM.pdf
15 RÍOS ROCA, Álvaro. *"Eficiencia, reto regional"*. Magazine Energía a Debate. May-June 2007.
16 The Economist: Technology Quarterly. September 8th 2007. Page 24 The Economist. September 8th, 2007. Page 71
17 MORTON G.R. "*Cantarell, The Third Largest Oil Field in the World Is Dying"* http://home.entouch.net/dmd/cantarell.htm
18 EIA, Energy International Agency "*Reassessing the Potential for Oil Production in Mexico*", 2007. http://www.eia.doe.gov/oiaf/ieo/special_topics.html
19 The Economist: Technology Quarterly. September 8th 2007. Page 6
20 SENER. "*Prospectiva del Sector Energético 2006-2015".* http://www.sener.gob.mx/webSener/res/PE_y_DT/pub/prospsectelec2006.pdf
21 Ministry of Economy. "*Mexican Mining Industry Report 2006*" http://www.economia.gob.mx/pics/p/p1032/inf2006ing.pdf
22 Ministry of Agriculture and Forestry, Pastoral House, New Zealand Government. Future Focus: Signposts to Success for New Zealand's Primary Industries http://www.maf.govt.nz/mafnet/publications/future-focus/page-02.htm
Coalition for Affordable and Reliable Energy http://www.careenergy.com/fueling_growth/strategic.asp
23 Sandia National Laboratories, 2006 http://www.sandia.gov/news-center/news-releases/2006/comb-research-auto/clean-coal.html
24 SMIL, Vaclav. "*Energy at the Crossroads*". 2003. Page. 144.
25 Mario Molina Center www.centromariomolina.org
26 "*El petróleo genera beneficios pero también mata*" http://www.cafebabel.com/es/article.asp?T=T&Id=3355
27 AGUILAR GONZÁLEZ, Jorge Luis. "*Combustibles alternativos: opciones para México*". Magazine Energía a Debate. May - June 2007.

[28] Obtained from two costs from the Gross Domestic Product: the fixed consumption capital and the costs related to environmental matters, where the environmental costs include the depletion of natural resources and environmental deterioration. The results are expressed in physical units and monetary units (thousands of Mexican pesos).
[29] INEGI. "*Comunicados especiales de prensa*". Bulletin 070/2004 published in June 4, 2004.
[30] Idem
[31] INEGI. "*Comunicados especiales de prensa*". Bulletin 070/2004 published in June 4, 2004.
[32] Idem
[33] SCEEM is an environmental account made as an extension of the National Accountability System, with the purpose to include in detail, economic and environmental statistics in an integral path, providing information regarding the use of natural resources and the environment degradation.
[34] Idem
[35] The natural heat of the Earth.
[36] The International Nuclear Forum. "*Nuclear Energy & Climate*" http://www.climatechange.org/eandc.htm
[37] Idem.
[38] RIOS ROCA, Alvaro. " *Clima Global y la Captura de CO2 /Global climate and the capture of CO2*". Magazine Energia a Debate. March-April 2007.
[39] Massachusetts Technology Collaborative Renewable Energy Trust
http://www.mtpc.org/cleanenergy/energy/glossaryefficiency.htm
[40] U.S. Energy Information Administration. http://www.eia.doe.gov/glossary/glossary_e.htm
[41] IEA, International Energy Agency
http://www.iea.org/Textbase/subjectqueries/keyresult.asp?KEYWORD_ID=4122
[42] TAYLOR, Michael. "*Energy Technology Perspectives Scenarios & Strategies to 2050*". Lecture on May 24th, 2006. Energy Technology Policy Division International Energy Agency. http://www.all-energy.co.uk/UserFiles/File/2007MichaelTaylor.pdf
[43] RIOS ROCA, Alvaro. *"Eficiencia, Reto Global / Efficiency, regional challenge"*. Magazine Energy Debate. May-June 2007.
[44] ECLAC *"Renewable energy and energy efficiency in Latin America and the Caribbean: constraints and prospects", page 28*.
[45]United Nations http://www.un.org/esa/sustdev/natlinfo/indicators/isdms2001/isd-ms2001economicB.htm
[46] SMIL, Vaclav. "*Energy at the Crossroads*". 2003. Page 77.
[47] Idem. Page 68.
[48] Deng never governed the People's Republic of China, but he acted like the political and reformist leader of 1978 until beginnings of the decade of 1990s.
[49] SMIL, Vaclav. "*Energy at the Crossroads*". 2003. Page 139.
[50] Idem. Page 143.
[51] RÍOS ROCA, Alvaro. *"Efficiency, regional challenge"*. Energy to Debate Magazine. May-June 2007.
[52] Idem
[53] ECLAC "*Renewable energy and energy efficiency in Latin America and the Caribbean: constraints and prospects"*. Page 49
[54] Daylight Savings Time is going to avoid a total of 1,245 MW during the period of 1995-2010. Moreover, the Ministry of Energy is expecting to save 36,227 gigawatts hour (GWh) of energy during the period of 2005-2015.
[55] See Appendix with the list of NOM applicable to EE.
[56] BAZAN NAVARRETE, Gerardo. "*Past and present in the saving and efficient use of the energy"*. Magazine "*Energia"*. March-April 2007.
[57] ECLAC "*Renewable energy and energy efficiency in Latin America and the Caribbean: constraints and prospects"*. Page 34
[58] U.S. Department of Energy http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/gl.html
[59] "E*l petróleo genera beneficios pero también mata*" http://www.cafebabel.com/es/article.asp?T=T&Id=3355
[60] RIOS ROCA, Alvaro. *"Global climate and capture of CO2"*. Magazine Energia a Debate. March-April 2007.
[61] SUÁREZ, Rosio Vargas. "*The diplomacy of ethanol*". Magazine Energia a Debate. May-June 2007.
[62] The International Nuclear Forum. "*Nuclear Energy & Climate*" http://www.climatechange.org/eandc.htm
[63] Idem
[64] SENER. "*Perspective of the Energy Sector 2006-2015*".
[65] IEA http://www.iea.org/textbase/papers/2006/renewable_factsheet.pdf
[66] ISES http://www.ises.org/shortcut.nsf/to/wp
[67] PIDWIRNY, Michael, Physical Geography http://www.physicalgeography.net/fundamentals/7n.html
[68] A Wind Turbine Generator is a device in which a stream of water or gas turns a bladed wheel, converting the kinetic energy of the fluid flow into mechanical energy available from the turbine shaft. The Wind Turbine Generator consists in a foundation, tower, nacelle, and a rotor (three blades mounted on a central hub).
[69] The Franklin Institute http://sln.fi.edu/franklin/glossary.html
[70] Australian Academy of Sciences http://www.science.org.au/nova/037/037box02.htm
[71] AWEA, "Wind power outlook 2007" http://www.awea.org/pubs/documents/Outlook_2007.pdf
[72]Global Wind Energy Council http://www.gwec.net/index.php?id=24
[73] AWEA. American Wind Energy Association
http://www.awea.org/faq/wwt_potential.html#How%20much%20energy%20can%20wind%20supply%20worldwide
[74] Global Wind Energy Council http://www.gwec.net/index.php?id=21
[75] WIMBERLY, Jamie. Distributed Energy Financial Group, LLC. Renewable Energy Finance & Investment Summit 2007.

[76] National Research Council of the National Academy of Sciences, "Environmental Impact of Wind-Energy Projects", 2007. Data presented during the "Energy Independence for North America: An Alternative Future", organized by the North American NAMI Institute in May 29-30, 2007.
[77] Global Wind Energy Council http://www.gwec.net/index.php?id=21
[78] SMA –Ministry of the Environment of the Federal District of Mexico. Official Bulletin, August 2006. http://www.sma.df.gob.mx/imecaweb/boletin/bol0806/pdf/07.pdf
[79] Data presented by Pasqualetti, Martin during the "Energy Independence for North America: An Alternative Future", organized by the North American NAMI Institute in May 29-30, 2007.
[80] NREL –National Renewable Energy Laboratory http://www.nrel.gov/learning/re_biomass.html
[81] Idem
[82] As provided by article 2 section II, of the Law for the Promotion and Development of Biofuels published in the Federal Official Gazette in Mexico on February 1st, 2008.
[83] NREL http://www.nrel.gov/learning/re_biofuels.html
[84] Iowa State University www.biorenew.iastate.edu/resources/glossary.php
[85] University of Texas at Austin http://www.ci.austin.tx.us/cleancities/afterms.htm
[86] AGUILAR GONZALEZ, Jorge Luis. "*Alternative fuels: option for Mexico*". Magazine Energia a Debate. May-June 2007.
[87] U.S. Environmental Protection Agency http://www.epa.gov/OCEPAterms/mterms.html
[88] U.S. Department of Energy http://www.eia.doe.gov/oiaf/1605/95report/glossary.html
[89] WWF, 2006
http://www.panda.org/about_wwf/what_we_do/climate_change/solutions/energy_solutions/renewable_energy/biomass/index.cfm
[90] Idem.
[91] Ontario Environthon, 2007
http://www.ontarioenvirothon.on.ca/Pages/Modules/Special%20Topic/current%20issue%202007/pdfs/Biomass%20Worldwide.pdf
[92] LYNCH, David J. "*Brazil hopes to build on its ethanol success"* http://www.usatoday.com/money/world/2006-03-28-brazil-ethanol-cover_x.htm
[93] International Geothermal Energy iga.igg.cnr.it/geo/geoenergy.php
[94] Geothermal Resources Council http://www.geothermal.org/what.html
[95] International Geothermal Energy iga.igg.cnr.it/geo/geoenergy.php
[96] Geothermal Energy Association http://www.geo-energy.org/information/plants.asp
[97] IGE http://iga.igg.cnr.it/geoworld/geoworld.php?sub=elgen&country=mexico
[98] FIRCO http://www.firco.gob.mx/
[99] SAGARPA http://www.energiarenovable.com.mx/index.html
[100] FIRA Institute Trusts related to Agriculture
http://portal.fira.gob.mx/irj/portal/anonymous?NavigationTarget=ROLES://portal_content/fira.www.Internet/fira.www.Roles/fira.www.Anonimo/fira.www.Iniciofiragobmx/fira.www.AcercadeNosotros
[101] Idem
[102] Idem
[103] Idem
[104] FIDE http://www.fide.org.mx/Industria/industria.html
[105] BAZAN NAVARRETE, Gerardo. "*Pasado y presente en el ahorro y uso eficiente de la energía*". Magazine Energía a Debate. March-April 2007.
[106] FIDE http://www.fide.org.mx/Industria/industria.html
[107] The CDM Executive Board has approved several methodologies AM0019, AM0026, AM0027 and the consolidated methodologies ACM0002. Website http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html
[108] Idem, methodologies AM0017, AM0020, AM0038, AM0044, AM0054, AM0056, AM0061, AM0062.
[109] FOMECAR. *"Carbon Market Potential in Mexico"*. November 2006
http://regserver.unfccc.int/seors/file_storage/vhbddq8z2vqor7e.pdf
[110] LEXIS NEXIS, Year 2 number 10, published on September 19, 2007 and the Official Web site of the APEC.
[111] USGBC, US. Green Building Council http://www.usgbc.org/DisplayPage.aspx?CMSPageID=291&
[112] Inmobiliare Magazine México –Edición Construcción y Desarrollo Sustentable. "*El desarrollo verde se convierte en la tendencia dominante*". Page 11. March-April 2007
[113] News AEC. *"UnitedHealth Groups announce New Environmental Friendly, LEED –Certified* Green *Building"*
http://www.aecdaily.com/en/1600494/default/content/show_detail
[114] NAESCO, National Association of Energy Services Companies http://www.naesco.org
[115] REZESSY, Silvia, "Energy Service Companies in Europe: assembling the puzzle. Preliminary analysis of the results to date from the first European ESCO database". 2003.
http://re.jrc.cec.eu.int/energyefficiency/pdf/publications/ECEEE%202005%20paper%204%20209%20final.pdf
[116] "Market Trends in the U.S. ESCO Industry: Results from the NAESCO Database Project". Published in 2002.
[117] NAESCO, National Association of Energy Services Companies http://www.naesco.org
[118] Energy Services Coalition. *"What is energy performance contracting"*
http://www.energyservicescoalition.org/resources/whatis.htm
[119] NAESCO "*Market Trends in the U.S. ESCO Industry: Results from the NAESCO Database Project*". 2002.

[120] US Department of Energy –Program of EE and RE.
http://www.eere.energy.gov/buildings/info/plan/financing/contracts.html
[121] Idem
[122] In January 8, 2004 was performed a Forum regarding biomass energy in the State of California. Participants answer a questionnaire regarding diverse topics related to biomass.
[123] Inmobiliare Magazine México –Edition "Construcción y Desarrollo Sustentable." "*SEISA apuesta a la utilización de fuentes alternas de energía*". Page 55. March - April 2007.
[124] This program is only applicable for small projects whose installed capacity does not exceed 10 kW for residential use or up to 30 kW for general use in low voltage.
[125] Idem
[126] Biofuel Law Impact in Mexico: How may the Biofuel Law impact the development of this market in Mexico? Raúl Félix-Saúl. Baker & McKenzie, 2008.
[127]US. Department of Energy –Program in EE and ER.
http://www.eere.energy.gov/buildings/info/plan/financing/contracts.html
[128] Idem
[129] APEC, "*Energy Working Group"* http://www.apec.org/apec/apec_groups/working_groups/energy.html
[130] Bullet points based on the lecture of Mr. Edw. D. Einowski and Mr. David Benson: "*Capital Stress Points for Renewable Energy Projects"*. Tempe, AZ. April 2007.
[131] WIMBERLY, Jamie. Distributed Energy Financial Group, LLC. Renewable Energy Finance & Investment Summit 2007
[132] Idem
[133] US. Department of Energy –Program in EE and ER.
http://www.eere.energy.gov/buildings/info/plan/financing/contracts.html
[134] GREGORY, Jenny; SILVEIRA, Semida; DERRICK, Anthony; COWLEY, Paul; ALLINSON, Catherine; PAISH, Oliver. *"Financing Renewable Energy Projects"*, Intermediate Technology Publications *in association with* The Stockholm Environment Institute 1997.
[135] Idem.
[136] Idem.
[4,5,6,7] Idem.
[138] Idem.
[139,10] Idem.
[140] MOOMAW, William R. Escuela Fletcher, Universidad de Tufts *"Evaluación de obstáculos y oportunidades para la energía renovable en América del Norte."Mayo de 2002.*
[141] Idem.
[142 ,14,15,16,17,18] Idem.
[19] Idem.
[144] ALTOMONTE, Hugo; COVIELLO, Manlio; LUTZ, Wolfgang F. "Renewable energy and energy efficiency in Latin America and the Caribbean; constraints and prospects. Division of Natural Resources and Infrastructure. Santiago, Chile. October, 2003.
[145 ,22,23,24] Idem.
[146] Idem.
[147] Idem.
[148] Activities Report of the *SENER 2005-2006 regarding Climate Change.* Comisión Intersecretarial de Cambio Climático.
[149] MOOMAW, William R. Escuela Fletcher, Universidad de Tufts *"Evaluación de obstáculos y oportunidades para la energía renovable en América del Norte."Mayo de 2002.*
[150] Idem.
[151] Idem.
[152] Chapter 6. Costs of transaction, risks and financing of projects -CDM. www.cambioclimatico.gob.mx
[153] Article 3405 of the Civil Code for the State of Coahuila, Mexico
[154] Article 2742 of the Civil Code for the State of Guerrero, Mexico
[155] Article 2518 of the Civil Code for the State of Jalisco, Mexico
[156] Article 2891 of the Civil Code for the State of Puebla, Mexico
[157] Article 3074 of the Civil Code for the State of Quintana Roo, Mexico
[158] Article 87-B of the General Law for Ancillary Credit Organizations and Activities. A SOFOM is corporation similar to a "non-bank bank", authorized to engage in several financing activities without being subject to the normal regulatory burdens of financial institutions.
[159] Article 87-G of the General Law for Ancillary Credit Organizations and Activities
[160] Legal delivery occurs when the pledgee and pledgor agree that the possession of the pledged goods will remain with the pledgor and the pledgee will receive a document evidencing the ownership rights of the assets (i.e., the invoice).
[161] Articles 381 and 395 of the General Law of Negotiable Instruments and Credit Transactions
[162] Fifth Civil Collegiate Court of the First Circuit. Direct Amparo 2865/95. Unanimity of votes. Justice: Efrain Ochoa Ochoa. Secretary: Eduardo Francisco Nuñez Gaytan. Instance: Collegiate Circuit Courts. Source: Weekly Federal Judicial Gazette. Era: Ninth Era. Tome II August 1995. Thesis: I.5o.C.10 C Page 475. Individual Thesis
[163] Article 2811 of the Civil Code for the Federal District and Article 3 of the Federal Law of Bonding Institutions
[164] The International Chamber of Commerce is an international, non-governmental organization comprised of thousand of companies, business associations and financial institutions from most nations. One of its main goals

consists in the harmonization of international trade practices, which is sought through the work carried out by its many commissions (www.iccwbo.org).

[165] Banks may elect to issue a stand-by letter of credit subject to the rules of either the ISP98 or the UCP, since none of these instruments is a law, and the parties may contractually choose to incorporate their provisions as they deem appropriate.

[166] www.worldbank.org.

[167] On October of 2006, the World Bank's Board of Executive Directors authorized the financing of a US$49.35 MM project to reduce GHG emissions from anthropogenic sources through the installation of an Integrated Solar Combined Cycle System (ISCCS) using solar parabolic trough technology. The project, known as Agua Prieta II, will be located at the State of Sonora, within the world's solar belt, where there is high potential for replication. The Agua Prieta II project will be the first of its kind, penetrating the electricity market in Mexico and Latin America. Also, The World bank is providing a subsidy to lower the generations costs of a US$120 MM wind energy project known as La Venta III, located in Oaxaca, Mexico, which is being financed by the private sector through commercial sources.

[168] REEEP is created in the Johannesburg Convention, with the purpose to generate an alliance between non profit organizations, public and private sectors.

[169] Gazette IMP. "*Se incorpora México a la Asociación para la Energía Renovable y la Eficiencia Energética*". 2007.

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