The role of Clean Development Mechanism in Promoting Alternative Sources of Energy in Mexico

Jose Juan Gonzalez
Universidad Autonoma Metropolitana
Mexico

Content

- **The importance of the oil industry for the Mexican economy**
- **CDM implications for the future of renewal sources of energy**
- **The role of legislation: does it promote or constrain renewals?**
- **Conclusions and proposals**

I. The importance of hydro-carbons in Mexico

Good news

1. **Mexico ranks 9th in proven reserves of crude oil, 21st in natural gas, 7th in crude oil production, and 8th in natural gas production.**

2. **It has a wide range of alternative energy resources such as hydro, wind, solar, geothermic, and biomass, among others.**

.

3. Oil industry is:

1. The main source of energy: almost 75% of the energy that Mexico consumes is generated from fossil fuel

2. The main source of public revenue: For the fiscal year of 2008, oil sector will provide about 35% of the government's revenues.

3. An important generator of welfare:
   - PEMEX and CFE have a total of 247 000 employees;
   - Veracruz, Tabasco and Campeche, which together generate 7.9 percent of the GDP because oil industry presence.

Bad News:

1. Mexican economy is so dependent on the oil sector that it is completely vulnerable to variations in oil prices in the international markets.

2. Since 1970s each international energetic crisis has caused an internal economic crisis in Mexico.

3. The environmental impacts of fossil fuel production, distribution and consumption are so acute that their cost is enormous for the Mexican government:

- Even for Mexico that is responsible for no more than 1.5 percent of the world's total fossil fuel-based carbon emissions, air pollution represents one of the most complex environmental problems, especially for mega cites such as Mexico City, Guadalajara and Monterrey.

- Environmental impacts of the oil industry in regions where activities of exploration and exploitation are conducted are also significant.

- Oil industry has caused the most catastrophic accidents in Mexico such as the Ixtoc 1, San Juanico, and Guadalajara explosions occurred in 1978, 1984, and 1992 respectively.

4. In spite of its significant fossil fuel reserves, Mexico is far from being self-sufficient in energy.

1. Over the last years Mexico has gone from being an exporter to being an importer of gas, gasoline, and other oil products.

2. Mexico's consumption of fossil fuels increased from 40,000 thousand metric tons of oil equivalent in 1970 to 130,612,000 in 1999, including coal and coal products (6,489), crude oil and natural gas liquids (84,928), and natural gas (30,952).

3. Mexico's consumption almost equals the quantity consumed by all Central American and Caribbean countries .

5. Being a public monopoly, revenue from oil exports has been used to fund the public deficit instead of investing it in improving oil industry facilities, making this sector an old and inefficient one.

According to Mexican Tax Laws, PEMEX is obliged to pay:

- The ordinary hydrocarbons duty
- Duty on crude oil extraction
- Extraordinary duty on crude oil exports
- Duty on hydrocarbons for the stabilization fund
- Duty on hydrocarbons for the fund for scientific and technological research on energy
- Duty on hydrocarbons for fiscal monitoring of oil activities
- Excess gains duty

6. Whereas internationasl prices of oil has got their historical maximum the reserves of the most important Mexican oilfield –Canatrell– are rapidly declining.

7. Even if global oil demand continue increasing during the following years and despite the international prices maintain its high level, Mexico would confront an economic and energetic crisis due to the decreasing tendency of oil extraction and the increasing tendency in internal demand of oil products.

8. International demand of fossil fuels looks like declining in the following years. (Kyoto and national strategies effects).

- To avoid this scenario Mexico has to start a gradual process of substituting fossil fuel consumption with renewable energies.

- If that, most of the national oil production may be addressed to international markets with the consequent positive effect on public finances.

- At the same time, local reduction of fossil fuels consumption could positively impact environmental performance of Mexico.

- CDM projects could provide and opportunity to encourages such process. Specially in case of electricity generation, cars and industries which are the main generators of CO_2 and other greenhouse gases.

II. The future of renewal sources of energy and the role of CDM

- How much energy can renewable sources can supply?
- How much revenue they can generate?

Contribution of renewables

- Mexico ranks 3rd in capacity of generation of geothermal energy with 870 MW installed in the fields of Cerro Prieto (720 MW), Los Azufres (100 MW), Tres Virgenes (10 MW), and Los Humeros (40 MW).
- among the Latin American countries, Mexico is one of the most promising countries for wind energy development. Its abundant wind resources have an estimated energy potential of 30,000 MW located in the region of the Isthmus of Tehuantepec, State of Oaxaca.
- Biofuels may be important as well. Until December 2002 there were two permits issued by the Energy Regulatory Commission to generate electricity based on the use of biogas produced by anaerobic fermentation of organic materials at two water treatment plants. Both projects located in municipalities adjacent to Monterrey City are currently in operation with an installed capacity of 10.8 MW. Additionally, there are 32 permits to generate electricity in hybrid systems (combustoleo- sugar cane waste). The biggest generation plant is "NACO NOGALES" located in Agua Prieta, Sonora, has a proved capacity of 258 MW.

- Currently there are two hybrid generation plants in process of building. The first in the State of Nuevo Leon with a capacity of 146.000 MW and the second in Durango with a capacity of 596.500 MW.

Notwithstanding that:

- Until now, the contribution of renewable sources has been marginal and has been use mainly for heating or electricity generation purposes
- The only mature renewable sources of energy are hydroelectricity and geothermal.
- Together, they just represent 25 percent of the total capacity of the National Electric System of Mexico and contribute with 15.1 percent of national electricity generation

Renewables as a source of income

- A recent study shows that:

  "Worldwide, nations must cut emissions in half over the next fifty years. To reach that goal, the United States will have to cut emissions by 80 percent." Fred Krupp and Miriam Horn. Earth: the sequel.

- An author holds that the European Union (just considering 15 members) needs to make a reduction of 405 million tons of carbon dioxide equivalent yearly and asserts that if the cost of reduction is calculated at the price of € 22 would then amount to over € 9.9 billion; but if the price is assumed of € 30 the amount would be almost to € 12.1 billion. M. Peeters. "European Climate Change: Critical Issues and Challenges for the future" in Ale Kustian Fauchald and Jacob Werkman (editors in chief), *Year book of International Environmental Law.* (United Kingdom Oxford University Press 2005) 185-186.

- Mexico as non Annex I county has not assumed any CO_2 emissions reduction commitments under Kyoto but it is able by this international agreement to get additional resources by implementing Kyoto mechanism projects in its territory.

- CDM projects could provide extra support for dealing with climate change and also generate additional economic resources to both support environmental policy objectives and to provide an additional source of income for the people.

- However, the main question is if CDM projects can generate enough resources so as to compensate the reduction of economic resources generated by the oil industry.

- Annex I Countries are expected to spend millions of dollars in CDM projects during the following years. For instance, according to current projections, Japan is spending €105.60145 million of Euros; the Netherlands € 44 million of Euros; France €44 million of Euros; Canada € 695.11 million of Euros; Italy € 59.704 million of Euros; Spain €200 million Euros; Austria € 96 million of Euros; Rusia € 60 million of Euros; Irán € 53 million of Euros; Germany € 50 million of Euros; China, Arabia Saudita, India, Indonesia y Egipto, have invested € 14 million of Euros in CDM projects.

- In fact, CDM projects have already started to produce benefits for non Annex I countries. For example, Brazil was one of the first countries in the world to take advantage of carbon creditsand and Peru is receiving 40 million dollars annually in founding to implement CDM projects.

- Currently, Mexico has 189 approved CDM projects that mean a reduction of 11,592 Ktons of CO_2.

- At the price of 22 euros for ton, it could generate € 255. 024, 000 Euros of annually revenue.
- Mexican government has hold the DCM will generate in the future $ 500 million dollars of revenue.
- Oil industry generated in 2007 $30, 752.68 million dollars.

III. The role of legislation in promoting renewable sources of energy

- Kyoto countries, especially those included in Annex B, are in the process of adapting their legislations in order to meet their reduction targets. These processes have involved a number of elements, including taxes, regulations, and trading.

- In Mexico, environmental laws does not establish any obligation or incentive to reduce CO_2 emissions.

- Evolution of energy law in the last decades has moved on the direction of allowing private investment in energy sector instead promoting sustition of fossil fuesl for renewable source of energy.

- The implementation of CDM projects is not really dealt with by Mexican legislation. (prevent CC and compensate the damage it causes)

Conclusions

1. Despite the enormous possibilities that Mexico has to introduce more environmentally friendly sources of energy it still depends mainly on the oil industry. Because of that, the Mexican economy is very vulnerable to any changes in the international fossil fuel market. At the same time, Mexican demand for energy continues to increase.

2. Mexico needs to establish a comprehensive energy policy not only to satisfy the local demand for energy but also to reduce its dependence on oil exports. Besides, the Mexican government needs to deal with the environmental impacts caused by the production, transportation and consumption of fossil fuels.

3. Until now, a number of plans, programs, laws, regulations and standards have been enacted by Mexico in the field of environmental protection and energy exploitation. Although such documents refer indirectly to the problems analyzed in my presentation, in fact, they do not reflect the existence of a real policy regarding renewable energies..

4. That can be explained by the fact that planning in Mexico is based on methodologies that only evaluate short-term economic cost of energy generation. The lack of assessment regarding the benefits of renewable energies for the national economy, such as long term price stability, and risk reduction in energy supply together with the fact that Mexico has important fossil energy resources, explain why national energy policies and scenarios are and have based on fossil fuels.

5. The entry into force of the Kyoto Protocol in 2005 represents a great opportunity for Mexico to rebuild its energy policy on more environmental friendly basis.

6. The Kyoto Protocol also offers the possibility of accessing additional economic resources and opening new areas of business in the economy with the potential to reduce Mexico's dependence on the oil industry.

Propossals

Mexico needs to establish a legislative agenda so as to lay out a new legal framework that enables the process of complementing traditional sources of energy with renewable sources. Such agenda have to be built taking into account the following questions:

- Whether or not privatization of energy sector is a real condition to guaranty energy security in Mexico.
- Can Mexico still depending on traditional oil industry?
- Which will be the economic, social and environmental role of CDM projects in Mexico?
- Has renewables a real capacity to generate additional economic resources for Mexican government?
- What would happened if Mexico oil reserves continue decreasing?
- What have been the real effects of taxation on PEMEX economy?