Precedents, Actuality and Perspectives of Ethanol Production in Mexico

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Summary

In this work some reflections are exhibit about the possible employment of ethanol fuel in the Mexican context. It breaks of a development of ethanol production in the country, his fortitude and weaknesses, as well as of the ownes consumptions of gasoline to demonstrate the potential advantages of a possible program of ethanol fuel production from sugar-cane in the economic and social order as well as and in the preservation of the environment.

Introduction

This work tries to analyze, first of all, the incidence of the sugar and alcohol production, as well as the industry diversification processes of cane in the Latin-American contemporary and Mexican society in particular, to knowing that this activity involves processes and factors, cultural, economic and political, that influence on the contemporary society, remarked by the world globalization.

The XXIst century in which we live it is characterized by three fundamental conflicts on which the sugar agribusiness is directly connected: the energy, the feeding and the environment protection.

In the energy order it turns out to be clear that the future, for many countries of the world, without saying for all, there is in the replacement of the fuel so called “black gold”, which constitutes not renewable resource, which sooner or later will

disappear; for that is important to find a new energy sources not dependent on limited resources that are compatible with the preservation of the environment.

In the food context it is important to emphasize that sugar constitutes yet the energy excellently for many peoples of the world, in particular for the development countries and poor communities, which is demonstrated in the fact that the growth of his world production along the history keeps a direct proportionality with the population growth.

Today Brazil continues being the leader of the technological development in this field in Latin America with an extensive use of alcohol like substitute of gasoline for automobiles. Nowadays, any Brazilian consumer can buy a Volkswagen, Peugeot or Renault model that uses the technology “Whole Flex”, whose advantage is to use gasoline, alcohol or a combination of both. The service stations distribute equally alcohol or gasoline, which allows the drivers to use the cheapest fuel.

The history of this one technology is not new. From 70's, the Brazilian automobile industry looked for an alternative to face the high prices of the gasoline that stemmed from the energy crisis of that period. During 80's the automobiles that only used alcohol went so far as to present 90 per cent of the total selling’s of the industry. Nevertheless, a deficit in the alcohol production at the beginning of 90's it did comeback to gasoline automobiles. Today this problem does not exist already, because with the new technology the dilemma is eliminated on the type of fuel that moves the vehicle. In this year, more than the half of the new automobiles that are selling on the Brazilian market are a “Whole Flex ” and a positive expectation of selling exists.

The alcohol use as fuel possesses additional advantages. The first one of them is the reduction of pollutants emission to the environment, especially of carbon monoxide after a more finished combustion is achieved. Another important effect is the impact on the agribusiness sugar plantation. Thanks to the increase in the

alcohol demand, complete regions that devote themselves to the production of sugar, can diversify and improve utilities for the farmers and industrial workpeople. That is to say, there exist big social and private benefits derived from a major demand for alcohol of cane, since a major production needs a major number of agricultural workpeople hired by the sugar refineries.

In Argentina, the company Repsol announced an investment of 30 million dollars to develop technology of biofuels and to install a plant with capacity of 120 million liters per year that will work from 2007.

In Chile, the company Lansa, who monopolizes the production of sugar, announced recently an alliance with Enap, the State Oil Company, to produce ethanol.

In El Salvador the giant American Cargill is provided with installations to dehydrate 60 million tons of Brazilian ethanol, which is equivalent to five days of American consumption.

On the other hand, in Colombia the Law on September 693, 2001 forces the use of bioethanol in the gasoline of the principal cities of the country. The rules of the Law came into force in September 2005 for the Bogota gasoline's, Cali, Medellin and Barranquilla, where fuel gasoline with alcohol up to 10 % in volume is served.

In Venezuela, petroleum country as Mexico, a wide program promises to be for the construction of up to 15 new distilleries with a view to replacing the tetraetilo of lead and the MTBE in his gasoline. In short, Latin America demonstrates a strong movement in favor of the employment of ethanol as oxigenante and partial substitute of gasoline.

These advantages would justify the adoption of this technology in Mexico. On the one hand, there would allow the pollutant's reduction in the urban zones of the

country, included the city of Mexico, Guadalajara and Monterrey. On the other hand, it would diversify the cane-Mexican industry, which faces serious problems for decades.

The adoption of this technology also would benefit PEMEX, for all that the addition of 8-10 % of ethanol in the gasoline would represent a similar volume that it was possible to liberate for the exportation or to extend the duration of reserves. This politics does not enter contradiction with the article 28 of the Constitution where it is established that the State has in exclusive form the control on the oil and other hydrocarbons, only that would allow the agroindustrial sugar sector, to contribute to support the energy national program.

The promulgation of a law for the employment of ethanol in the gasoline would generate incentives so that the Mexican farmers invest in the production of alcohol and a big impulse would happen to an industry on which thousands of Mexican families depend. It would open the way towards an energy rational politics, with perspectives in a long term and compatibly with the environment.

Nevertheless, to obtain major clarity on the possibility of implementing a ethanol production fuel in Mexico it is suitable to reflect on the development that this production has had in the country, his actual situation, as well as his fortitude and weaknesses.

History of the Alcohol Production in Mexico

The sucro-alcohol Mexican industry has a long history, which has been narrowly related to his use in the industry of drinks and liquors, as well as his employment in the pharmaceutical industry, for that it has gone so far as to be constituted as one of the most important agribusinesses of the country. At the moment there are cultivated approximately 650 thousand hectares of sugar-cane, which could promote the energy and industrial development of the ethanol. Nevertheless, this

important farming has had an exclusive destination towards the sugar production in limited qualities and the conversion of the final molasses in ethanol for the previous described uses.

Product of that, the alcohol Mexican industry has been characterized by installations of low capacity, non-development technology and high indexes of molasses (fig. 1) and fuel consumption.

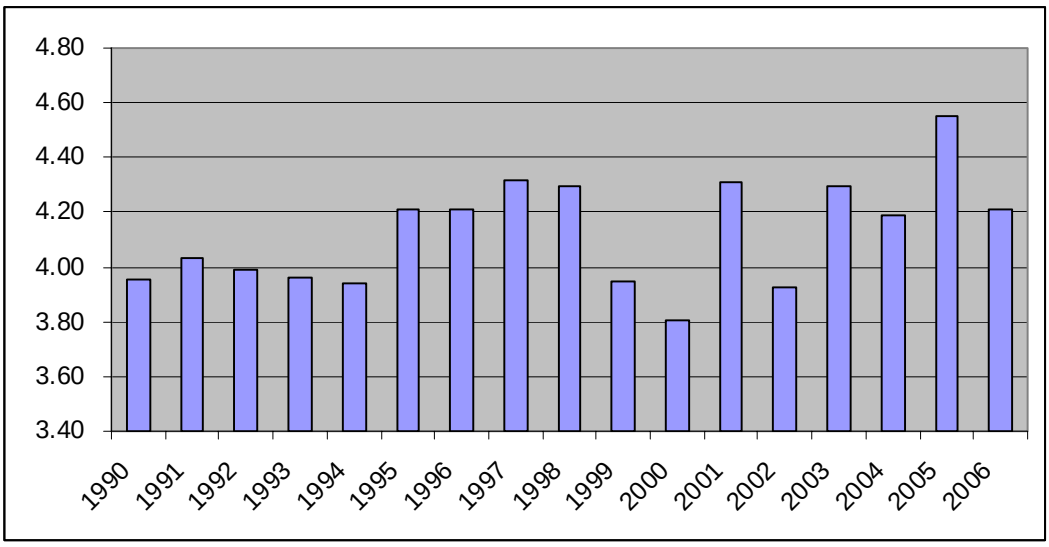

Fig. 1: Molasses Consumption for the ethanol production in Mexico (kg)

Also, it is important to emphasize that the alcohol production has faced recently diverse restrictions, inside which we can emphasize the following ones:

- A high tax load.
- Sudden fluctuations in the molasses prices for both the national and exportation markets.
- Environmental Contamination by vinazas disposal.
- Imports of ethyl alcohol with low taxes.
- The employment of old fermentation technologies.

In spite of during the last years several programs have been arranged to promote the expansion of the sucro-alcoholera industry, this one has been influenced, in addition to the economic recession, for other factors such as the high raw materials cost with the contraction consistent of the current offer of ethyl alcohol.

The actual recession of the sugar Mexican industry has conducted that during the sugar harvest 2004/2005 were producing practically less than the half of the distilleries that were operating at the end of the 80's; actually work only 11 distilleries with a production of 59,326,646 lts. The sugar refineries that at present are provided with distilleries in operation are the following ones: Calipan, Carmen, Aarón Sáenz, El Mante, Tamazula, Pujiltic, La Gloria, San Nicolás, La Joya, La Providencia and San Pedro.

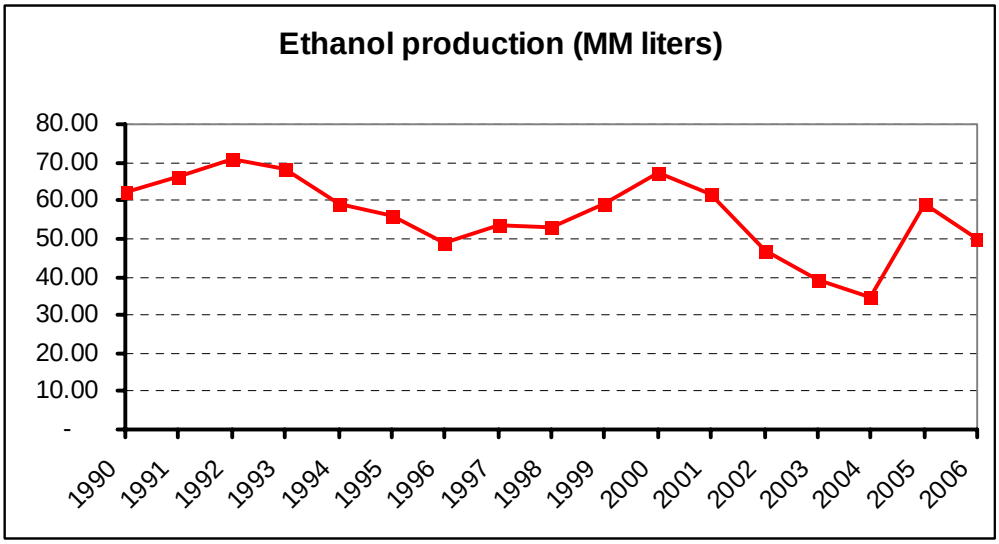

Fig. 2 Ethanol Production in Mexico during the last 17 years.

The alcohol production from cane in the period 1990-2006 showed a big change, with fluctuations ranged from 0 and 70 % between one year and other (Figure 2).

In the above mentioned period the biggest fall appeared in the year 2004 when the production registered a fall up to 34.5 MM of liters, whereas the biggest increase was observed in 1992 with a production of almost 71 MM of liters.

In 1990, 62.36 million liters were producing to themselves, later, in 1992, the alcohol production rose up to 70.99 million liters, the decade biggest production, date from which the production started declining, until 1996 when it went down to 49.83 million liters. Later, a process of changes began where the production reached 61.62 million liters in 2001, but there still do not exceed themselves the levels observed to the beginning of the above mentioned decade of 90, although in the last sugar harvest a certain tendency is demonstrated towards a possible recovery.

Another element that demonstrates the regression of alcohol Mexican Industry it is constitutes by the reduction of the number of distilleries in operation (Figure 3), where there has taken place a stopped of 63% of the existing distilleries before 1990.

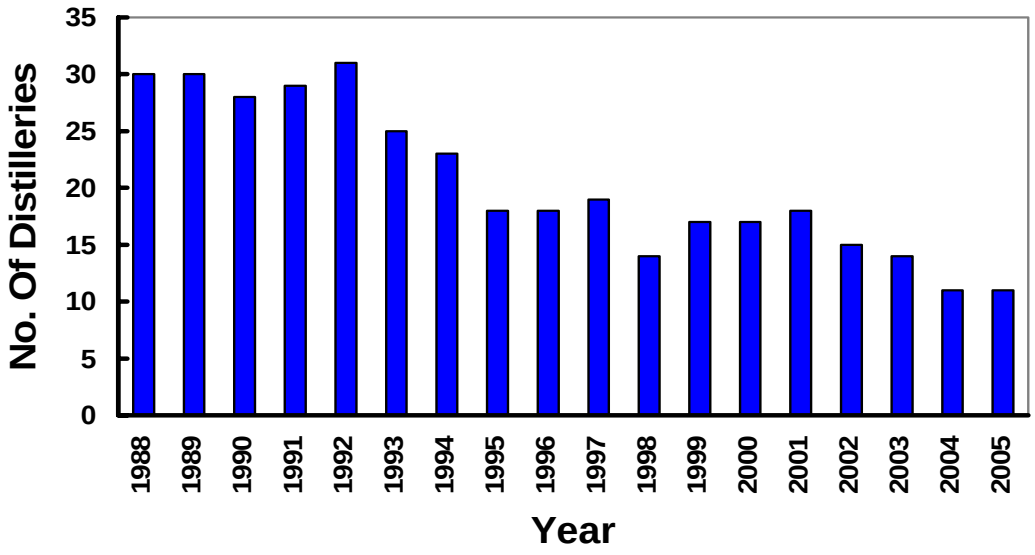

Fig. 3: Distilleries in operation during the last 15 years.

Source: www.sagarpa.gob.mx, February, 2006

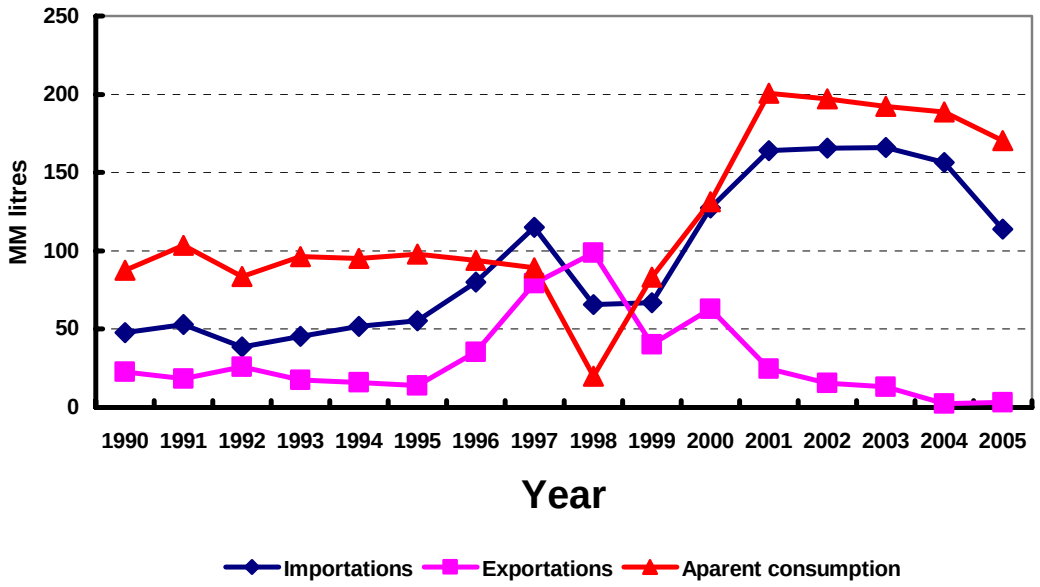

Fig. 4: The apparent consumption during the last 15 years.

The apparent consumption (production + imports – exports) in the period 1990-2001 (Figure 4) presented an average annual growth of 23.12%. In this period the biggest fall happened in the year 1998 when the pointer registered an annual reduction of 69.75%, whereas the biggest increase was observed in 1999 with an annual growth of 204.55 %. The biggest apparent consumption in absolute terms appeared in 2001, when it amounted to 200.7 million liters. Nevertheless, in the last years is demonstrated a big tendency to the increase in the consumption, which has been satisfied by an increase in the imports and not by a production growth, as it should be waited. It, of course, finds explanation in the high costs of production of sugar-cane in Mexico, if it is compared with other countries of the region.

Mexico is provided in these moments with 58 sugar refineries in operation distributed the length and breadth of his territory, being the State of Veracruz the one that possesses the biggest number (22), as well as distilleries (5). At present only 11 of them are operating on his distilleries, with a production of 59,326,646 lts. The sugar refinery, that for his characteristics obtained the best and lowest

consumption of fuel oil for liter of alcohol, with only 0.20 lts. of fuel oil for liter of alcohol was La Gloria, with a production of 20,138,528 lts. On the other hand we have that the sugar refinery that consumed less molasses for liter of alcohol was San Pedro with a consumption of 4.125 kg for liter of alcohol, and one emphasizes that the above mentioned sugar refineries are located in the state of Veracruz.

Production and Consumption of gasoline in Mexico and its possible relation with the Ethanol Production.

Although the discovery of the oil and the creation of the internal combustion engine printed an exceptional acceleration on the humanity development, the indiscriminate exploitation of this source of not renewable fuel has encouraged the fears and worries of the man opposite to his irremediable future depletion and the pressing need to find new sources of energy that give responses to the increasing needs of the society. In this sense, in the last years the investigations about the employment of varied sources of energy for dissimilar ends has been fastened; nevertheless, in the field of energy alternative for cars use only the ethanol and more recently the fuel cells, they turn out to be promissory.

Today it can be said that the employment of cells fuel for the generation of electricity that should propitiate the self-propelled functioning of vehicles, still constitutes a solution of the future and although technically viable, it have not an economic response yet. Nevertheless, the employment of the ethanol as entire or partial substitute of the gasoline already to been widely tested in innumerable countries led by Brazil and the United States and it constitutes, undoubtedly, the energy solution of this sector for the next 50 years. It is important to point out that such politics not only finds foundation from the energy point of view, but also from the environmental point, since it propitiates a better combustion in the engines with a reduction of the emission of carbon monoxide.

It is enough to indicate that, according to ***F.O. Lichts***, ***2005***, the ethanol fuel production in 2010 will overcome 60,000 million liters and in 2020 120,000 millions. Nowadays the world production reaches 45,990 million liters, where only Brazil and the USA produce the 70% of the world production.

Nevertheless, it is necessary to ask: which have been the factors that have affected a country as Mexico, with serious problems of environmental contamination and rigorous requirements in the regulation of gas pollutant's emission and/or of greenhouse effect it has not initiated a program to promote the employment of the ethanol in the mixtures with fuels?

Undoubtedly, the condition of Mexico as producing country and refiner of oil has propitiated that the solution to the addition of oxygenants to the gasoline with a view to improving the combustion in vehicles has gone towards the production and consumption of oxygenants derivatives of the oil, such as MTBE (metil terbutil ether) and TAME (teramil metil ether).

According to ***Bueno, J. 2005*** in Mexico there take place the become oxygenated gasoline Magna PEMEX and Premium PEMEX by means of the employment of MTBE and TAME. In the country there exist production capacities of 9.5 MBD (Thousands of barrels per day) of MTBE and 6.1 MBD of TAME. Nevertheless, this productive capacity is insufficient for the levels of consumption of become oxygenated existing gasoline, therefore they have been imported between 6.3 and 9.0 MBD of MTBE during the last 5 years.

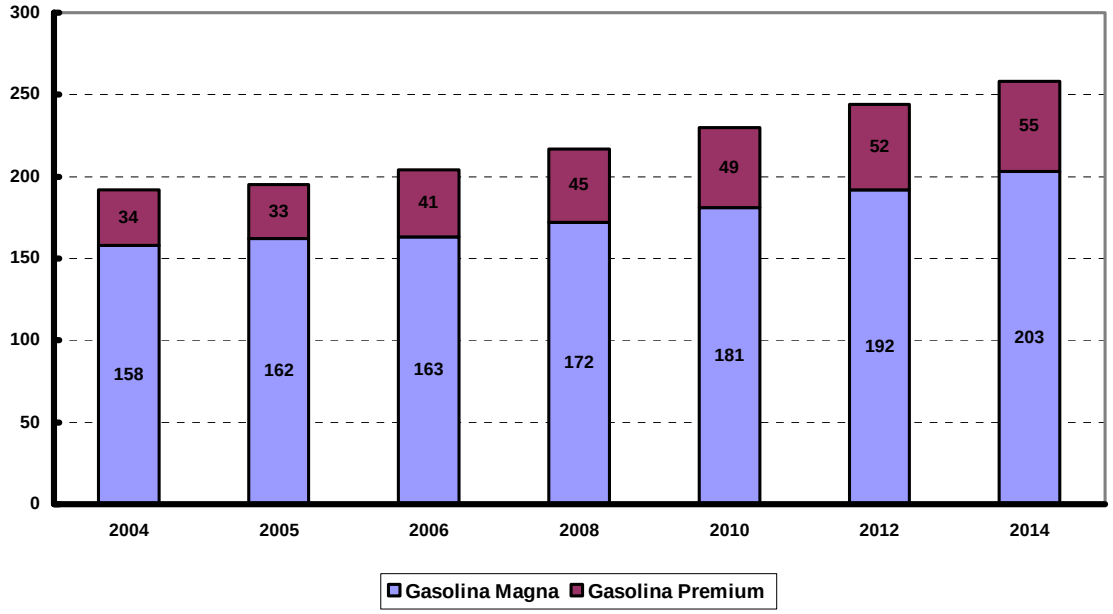

Fig. 5 Current consumptions and perspectives of gasoline in Mexico

The figure 5 shows the gasoline demand from 2004 to October 2005, which entire magnitude was 195 MBD and it is predicted that in 2014 the demand of oxygenated gasoline will be 258 MBD, which represents a demand of oxygenants of 21.4 MBD. If it is considered that the prognoses as for reserves of crude oil Mexican indicate that alone this one will reach for approximately 15 years, it is clear that it is necessary to begin to think about a renewable fuel as the ethanol. The employment of ethanol in the mixtures with gasoline at levels of between 10-15 % can mean, not only a solution to the problem of the employment of oxygenants nowadays strongly sanctioned as the MTBE, but also a dilation in the depletion of the oil available reserves.

Figure 6 illustrates the current demand and perspective of oxygenants (MTBE and/or TAME) estimated for ***Bueno, J., 2005***, as well as the quantity of ethanol that is needed for the entire replacement of the same ones.

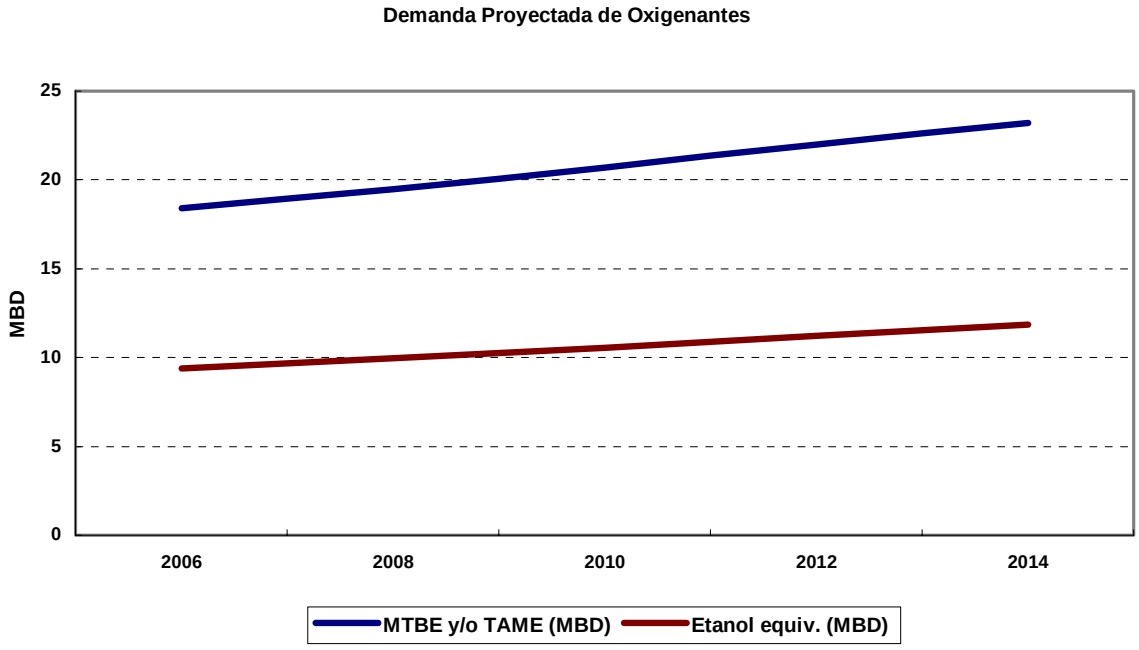

Fig. 6 Perspective demand of oxygenants in Mexico

It means that in 2014 up to 687 MM liters per year of ethanol would need, only as oxygenant. This demand could be satisfied between 7-8 autonomous distilleries of 500 MLPD working during 180 days of sugar harvest, which from the investment point of view it does not constitute an unattainable goal.

Of course, the vision of PEMEX does not focus the solution of the problem in the replacement of the current oxygenants by ethanol, but in the replacement of the methanol used in the production of MTBE for the ethanol, in order to produce ETBE (etil terbutil ether), with a view to being able to keep on using the productive existing installations with a minimal transformation.

The production of ethanol needed in 2014 can be satisfied by 10.3 million tons of cane, which to yields of 72 t/ha means to cultivate 142860 new hectares. If it is considered that at the moment Mexico possesses a surplus of sugar production near to the million tons it turns out to be clear that most of this cane is available and alone it would be necessary to cultivate approximately 1.6 million tons of

additional cane, without considering the alcohol that can be produced from the transformation of the final molasses.

Conclusions

Of everything up exposed it turns out to be clear that Mexico has possibilities of implementing a program for ethanol fuel production, as in other Latin-American countries as Brazil and Colombia, with a view to reducing his consumptions of fossil fuel and minimizing his environmental conflicts, since he has the agricultural potential for the implementation of the same one. Therefore, the first steps must go towards the formulation of a national politics that propitiates the regulative frame adapted for this intention and encourages to the state and private sector to joining to this important production.

On the other hand, the above mentioned program would constitute a leakage door for the farmers in the clash to the current crisis of the sector, tinted by important surpluses of sugar and honey production.

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