

Mexican Energy Sector Modernization Tasks, 2006-2012

By Ernesto Marcos Giacomani*

Presentation

Energy is a strategic sector for Mexico. It is the foundation of our economy, an important factor in our relations with the globalized world, and has the capability of performing a priority function in driving our future development.

It is so significant for Mexico, that the energy sector cannot be treated in isolation from the rest of the economy. In fact, in large measure the development of the sector explains the behavior of our basic economic variables.

In the last 5 years, Mexico has experienced the most favorable international economic situation recorded in the modern history of the country.

Because of high oil prices, oil export revenues during the Fox Administration (2001- 2006) amount to more than \$135 billion U.S. dollars. More than twice that enjoyed by President Zedillo’s government. This means \$70 billion U.S. dollars of additional foreign currency generated directly by the energy sector during the last six-years.

Based on this oil bonanza, the Federal government has promoted Pemex’s use of the off-balance sheet mechanism known as Pidiregas in order to finance practically all of the productive investment that Congress authorized for Pemex during recent years (Pidiregas debt is now at over U.S. \$50 billion). If we also take into account the unprecedented increase in remittances from Mexicans working abroad (U.S. \$60 billion); the substantial savings on the service of the public debt for having enjoyed the lowest interest rates that have prevailed in the last 48 years (U.S. \$35 billion); and the effect on our trade balance as a result of the robust, sustained expansion our main trade partners have recorded (U.S. \$100 billion), we are talking about extraordinary funds, in foreign currency, of more than \$300 billion U.S. dollars in the same period.

These elements largely explain the macroeconomic equilibrium attained. All three derive from external factors over which we have no direct influence. These truly extraordinary amounts were not available in previous administrations. The question we must ask ourselves is: What did the Fox administration do with this extraordinary flow of foreign currency that Mexico received during this six-year period?

Table I clearly shows that a production maximization policy is evident. Pemex has spent over \$50 billion dollars in the last six years, mostly borrowed, to maximize production of oil and gas. Also shown is the natural decline of Cantarell. In 2005, it still represented 60% of national production. Further the best case scenario for Cantarell is 1.4 MMBD for 2008 compared to 2.2 MMBD in 2004. And finally, it will be extremely difficult to compensate for this reduction with production from other fields.

Oil Production and Exports: Production-Reserves Ratio

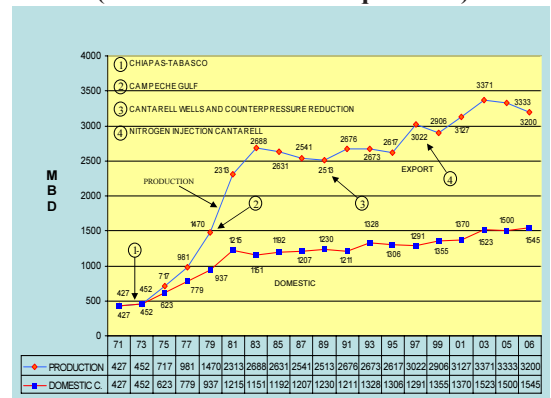
If we analyze the impact of the strategy of maximum petroleum exploitation adopted in recent years, we must conclude that the outcome has been the exhaustion of proven reserves to critical levels. They have fallen more than 50% in the last 6 years, which means that they are only enough for a little over 9 years at current production rates, when in year 2000 the reserves to production ratio was 23 years. The reserves replenishment rate with respect to extraction was 28% on average in the last six years.

Production of the super-giant Cantarell field has begun to decline irreversibly. We must remember that in 2005 this field represented 60% of national production with 2.2 million barrels per day. In the best of cases, Cantarell’s production will drop by 800 thousand barrels per day from its peak, by 2008. In such a short term, it is extremely difficult to have additional production available from other fields in order to compensate for this announced fall in the Cantarell production.

Crude volumes for export also reached their maximum level three years ago, in 2004. And if we analyze the oil products trade balance, including gasoline, diesel and fuel oil, we conclude that net exports of liquid hydrocarbons have been declining since 2003. This trend seems to be irreversible.

We urgently need to design and begin applying a national strategy

Table I
Production and Domestic Consumption of Oil
(million barrels of oil equivalent)



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Table II
Reserves and Production of Hydrocarbons *
(millions barrels of oil equivalent)

Reserves	Reserves	New Discoveries		Develop. And Delimitation		Revisions	Production	Reserves
	31/12/2000	Volume	%	Volume	%			31/12/2006
Proven	32,614.4	+785.6	8.6	+1,931.4	20.8	-10,348.3	-9,646.0	15,514.2
Probable	12,196.2	+1,292.5	12.8	-1,150.0	-13.0	+ 2,965.5	-	15,257.4
2P	44,810.6	+2,078.1	21.4	+781.4	7.6	- 7,382.5	- 9,646.0	30,771.6
Possible	11,343.4	+ 3,065.6	30.7	-917.3	-9.9	+ 1,096.9	-	14,604.7
3P (Totals)	56,154.0	+ 5,143.7	52.0	-135.9	-2.4	- 6,285.6	- 9,646.0	45,376.3

Source: Informe de la Reserva de Hidrocarburos PEMEX

* Some figures do not add up due to rounding

- Total proven hydrocarbon reserves dropped 52% in the period 2000-2006, from 32.6 to 15.5 BBOE. Revisions and reclassifications represent 50% of this reduction.
- R/P for proven reserves (1P) declined from 22.2 to 10.3 years. R/P for crude oil only is less than 10 years.
- Probable reserves registered a 26% increase, from 12.1 to 15.3 BBOE, derived from reclassification of proven reserves. But 2P reserves had a decrease of over 30%.
- Even more critical: reserve replacement ratio was only 28% on average for the last 6 years.

for hydrocarbon reserves, directed not just to the discovery of new fields, but also to the use of more efficient methods of utilization that make it possible to recover a larger proportion of the hydrocarbons stored in the subsoil, and from other deposits that can be attractive at current crude prices, converting fields with reserves currently classified as probable, into proven reserves.

No matter what the scenario, great effort and substantial resources are urgent in order to reactivate mature fields, increase the production of marginal fields and develop new ones to compensate for the decline at Cantarell. In this context, it is of the utmost importance to assess the oil potential of the geological structures located in deep waters of the Gulf of Mexico. We recommend the elaboration of an integral strategic plan to confirm the real existence of oil deposits in the Gulf, and to do so seriously, with the greatest technical meticulousness. The oil future of our country depends on this great project.

First Task: State Energy Policy

We recommend establishing a National Council for Planning and Governance of the Energy Sector that should be participative, transparent and open. This council would be responsible for formulating a new public policy on energy, not Government, but State policy, with the contribution of experts from all areas of energy. The objective should be

to avoid the industry continuing to be a “fiscal deposit”. This council would establish the crude oil production and reserves replacement goals through realistic investment projects, with funds guaranteed for several years. It should conceive of the energy sector as a whole, so that we do not commit nonexistent volumes of gas for electrical generation without at the same time promoting natural gas development projects that ensure the supply Mexico requires.

Second Task: Strategic Associations

The promotion of strategic associations with international companies, both public and private, will allow Pemex to comply fully with oil production goals and turn the energy industry into the indispensable driving force to accelerate the development of the country. The cases of STATOIL in Norway and PETROBRAS of Brazil are examples of successful state companies that develop appropriate technologies and meet aggressive exploration and production goals through international alliances.

To achieve this, agreement between the executive and legislative branches is indispensable.

Energy Security: The Case of Natural Gas

The topic of natural gas production and importation must be approached from a prospective of supply security for the country.

Because Mexico is a net exporter of oil, we have not been concerned with the topic of energy security. We are used to thinking that this is a focus for traditional importers. The growing dependence on foreign sources of supply to meet our needs for natural gas, however, can endanger its availability for strategic uses, where in many cases practically speaking, it cannot be substituted, such as combined-cycle power generation.

The country’s vulnerability in terms of natural gas supply will remain at least for the rest of this decade: around one-third of the gas sold domestically is imported through pipelines from the United States.

In the mid-nineties, the Mexican government began a process of gradually opening up the natural gas market for the purpose of introducing healthy competition into the pipeline transportation, storage and distribution phases of the gas industry. This new regulatory context is the one that has allowed the CFE to contract for the long-term importation of LNG (liquefied natural gas) for later processing through private re-gasification plants in Altamira and Ensenada. We must remember that CFE is already the largest gas-consumer company in the entire North American market – including the United States and

Canada.

It is important to advance in the design of a new framework of rules and regulations for natural gas with the purpose of establishing the terms and conditions of gradual, orderly participation by private and social groups investment in exploration and production of dry non-associated natural gas.

The investment and production goals Pemex has announced for basins that produce non-associated dry gas surpass \$5 billion U.S. dollars, just for the first 3 years of the new administration. Notwithstanding, the expected production increase resulting from this investment effort is barely one billion cubic feet per day, maintaining the deficit of supply. This figure will have to be at least doubled in order to strengthen the country's sovereignty in relation to gas supply security.

Third Task: Natural Gas.

We recommend establishing an interdisciplinary group of professionals related to the natural gas industry, assigned to design new forms of participation of social and private investment – exclusively Mexican in a first stage – in the exploration and production of non-associated gas. There must be a secure supply of natural gas in order to cover the estimated gap in domestic production and guarantee the supply of this strategic input for Mexico's development.

Restructuring of the Electric Sector

Electric power is the most important, generalized input of the Mexican economy. Its price, quality and supply reliability determine our economy's level of competitiveness like no other factor. Looking to the long term, thinking about the country we would like to have around the year 2030, we have to design the structure of a strong, competitive electric industry capable of driving the rest of the economy toward the most advanced markets.

If we want lower electric power rates, we need to generate our own electric power at lower costs, transmit it throughout the national grid efficiently, and distribute it to the smallest user competitively. Quality and security of supply are also critical for competitiveness.

It is absolutely necessary to provide legal security for investments made by independent power producers, and to attract bigger investments that make it possible to create a competitive, efficient electric power generation market. Every opportunity to generate cheaper, high quality electric power must be encouraged. Control of the electric industry in the hands of the State is guaranteed by the centralized ownership and operation of the national transmission system.

Fourth Task: Electric Sector

We recommend a restructuring of the electric sector based on three main components:

- 1) Creating a competitive electric generation market that ensures ever lower costs and permits participation by all sectors through distributed energy systems;
- 2) Maintaining state control of the national transmission network, favoring access to the most efficient producers; and
- 3) Promoting regulated competition in the distribution and commercialization phases, thinking always of the benefit to the end consumer.

We recommend placing the design of the strategies for operating these facilities in the hands of local governments, where the power generation and distribution assets are located, for the benefit of the producer regions. This policy would drive development of the south-southeast part of the country: Tabasco, Chiapas, Veracruz, but also Guerrero, Colima and other states that are big energy resource producers and that until now have not participated in the direct benefits they generate for the rest of the country.

Reinforcement of State-owned Energy Sector Companies

The challenges our country will have to face in relation to energy require strong, competitive, government-owned companies. We are convinced that, under current conditions, only the Mexican State can guarantee their operation and soundness for the benefit of the country. That is why radically reinforcing and modernizing these companies is indispensable.

It is necessary to turn these Government-owned Energy Agencies into real public companies: with autonomous operation, without interference by other interests; with independent, professional corporate government bodies; transparent management of funds and a rendering of accounts to the entire population. Congress has already received bills to make structural changes in the organization and operation of the sector's government-owned companies, to direct them toward these objectives.

Fifth Task: Government-Owned Companies

Two directions are required for reinforcing the government-owned energy companies: one fiscal and the other autonomous operation.

We recommend finalizing and approving the proposal of a new tax regime for Pemex and for CFE. The bill recently approved by Congress, of a new tax formula for Pemex, represents an advance, but does not yet allow the company to put its finances in order again. We need to move decisively in the direction of effectively capturing the “economic rent” derived from the exploitation of hydrocarbons because they are nonrenewable resources, and tax the other productive activities of Pemex and CFE like any other industrial activity by means of a system equivalent to that of the Income Tax.

We also recommend converting the sector’s government agencies into real publicly-owned energy companies; enacting a new organic law for these state-controlled companies designed to allow them to compete in international markets, permitting them to explore and produce not just in Mexico, but beyond our borders as well, with autonomous operation, professional, independent boards of directors that respond to the mandate to maximize Mexico’s energy wealth.

It is important to consider the advisability of distributing shares representing the capital of the state-owned energy companies to all Mexicans, because they are the real owners of Mexico’s oil wealth, as the most effective public scrutiny mechanism to make sure that the mandate to manage the sector to the benefit of the entire population is performed punctually.

Reinforcement of Institutions for the Governance of the Energy Sector

The indispensable complement of this bill for the overhaul of government-owned companies consists in the design of a legal framework and a new institutional architecture that are compatible with the new energy policy; that guarantees the governance of the oil industry and of the electric industry, and directs them to the proposed objectives. The rule of the State over energy resources must also be modernized.

Substantial changes to the regulatory framework of the sector are also required, as well as the creation and strengthening of independent regulatory entities. The presence of new participants in the sector demands that the Energy Regulatory Commission (CRE) be reinforced for sound management of the country’s oil and gas resources.

Sixth Task: Regulatory Context

The sixth task refers to the establishment of a new legal context for the sector that effectively applies the state’s energy policy, oversees our renovated public companies in their compliance with performance agreements to increase productivity, and provides for the equitable distribution of benefits derived from this strategic activity.

The presence of new participants in the sector demands that the Energy Regulatory Commission be reinforced and/or that a new National Oil and Gas Office be created for sound management of our non-renewable resources. As important as the organizational structure that is adopted, will be having the appropriate institutions and regulations in place.

Productivity of the Energy Sector’s Government-owned Companies

The number of people employed by the government-owned companies has increased significantly in recent years, particularly in the case of Pemex. Furthermore, operating expenses as well as administrative expenses have grown at a pace faster than inflation and faster than the companies’ level of activity.

Labor liabilities of the sector’s three companies also show high growth rates. And in no case have they been properly funded to insure the payment of pensions in the future. These trends must be reversed in the interest of increasing productivity, and austerity measures must be adopted that make it possible to lower the current expense, thereby releasing additional funds for productive investment.

Seventh Task: Productivity Increase

We recommend applying an extensive austerity program on the expenditures of Pemex, the Federal Commission of Electricity and Compañía de Luz y Fuerza del Centro, as well as undertaking a variety of initiatives to increase productivity. Do more with what we already have. Using the available resources with flexibility, to mobilize them toward the most productive projects.

The austerity policy must encompass all the significant items of the entities current expenses and include the goods and services procurement contracts used for operating and maintaining facilities, as well as the costs of the investments the government-owned companies make and set in motion. New

contract models have to be adopted for public works and for provision of the specialized services the sector's companies require, with the aim of achieving a commitment by the contractors and specialized suppliers to attain productivity goals that will make us more competitive.

The savings obtained would be channeled into productive investment of the same entities that generate them.

Links Between the Energy Sector and the Domestic Industry

The growing imports of oil products and petrochemical precursors for industry are the result of the oil industry's chronic under-investment in refining activities and petrochemistry. This deficiency prevents adding value to our production of hydrocarbons, with the multiplying effect of this on employment, industrial production and the generation of taxes that would derive from such greater production.

Mexico's refining capacity has not grown for two decades. Because of this, we import more than a quarter of the country's needs of products, which resulted in a trade deficit of these products of almost \$5 billion dollars last year. During that same year, Pemex Refinación channeled subsidies into the sale of gasoline and diesel equivalent to the investment cost of new refining capacity that would have substituted for these imports permanently. The current administration's explanation is that the refining and petrochemical projects cannot cover the international reference (opportunity cost) prices of their oil input. The evolution of the international markets during the last years was a unique opportunity to adjust the current price formulas, align domestic prices to those that really prevail abroad and correct this situation. But as in so many other areas of public policy, the opportunity was allowed to go by.

For similar reasons, the domestic chemical industry that has the fundamental elements necessary to be one of the country's most competitive sectors, also reports a trade balance deficit of more than \$9 billion dollars and has experienced the disintegration and breakdown of its production chains.

Eighth Task: Stimulation of the Production Chains

It is imperative, through direct assignment of budget funds and the arrangement of strategic alliances in the sector, to promote the construction of at least 3 new, high-conversion, refining modules, with capacity of 150 thousand barrels per day each, until attaining self-sufficiency in high quality refined products. The investment required to achieve this goal is on the order of \$10 billion U.S. dollars.

A similar amount is what is required to reconfigure and modernize the existing refineries in order to produce gasolines and diesel that are ultra low in sulfur, to rehabilitate pipelines and storage and distribution terminals, as well as to stimulate new investments in infrastructure necessary to operate the new refineries.

In the petrochemical sector, the value chains of our chemical industry must be encouraged to integrate, guaranteeing long-term supply at competitive benchmark prices of basic input and raw materials produced by Pemex.

Energy Prices as the Basis of our Economy's Competitiveness

In relation to prices of fuels, raw materials for industry and electricity rates, there is a clear misalignment of domestic in relation to international prices. In good measure, this situation is a result of the uncompetitive tax system Pemex and CFE are subject to. It is not valid to propose a reduction in energy prices without establishing the specific mechanism to attain that goal. Prices can be subsidized artificially for a time, but this would send us back very quickly to the black hole of inflationary public finances.

It will not be possible to lower energy prices permanently without far-reaching reform. Lastly, it is the unit costs of the gas, oil and electricity, and how the benefits derived from their production are distributed, that must determine energy prices in Mexico.

Ninth Task: Competitive Prices

In a first stage, on the basis of the prevailing administered prices mechanism, we recommend adopting a price policy for our energy products that, under the principle of their opportunity-cost for the country, insures competitive costs for the industry, aligns consumer prices with international prices – making explicit the taxes that prevail on these products- and encourages the integration of the production chains inside Mexico, and not abroad.

In a second stage, the sector would be able to establish more dynamic mechanisms regulated by the competition of different supply sources so that prices stay competitive in the long term.

Energy and the Environment

The challenge of maintaining the sector's facilities and pipelines, as well as of reducing adverse effects on the environment, require permanent, not crisis, solutions. The energy infrastructure has to be

kept in good condition to avoid a future repetition of the natural and social disasters that their deterioration has caused.

Climate change is a phenomenon with serious consequences for our country. In the coastal states we are at risk of experiencing devastating climate events, and even lose part of our coasts due to the rise in sea level. International comparative studies attribute to Mexico, 3% of the total effects of greenhouse gas emissions worldwide, and classify us as the biggest source of emissions in all of Latin America.

Therefore, we have to work with the international community to stop global warming, drastically reducing the volume of polluting emissions that we generate. And it is the energy sector that directly or indirectly contributes almost all the greenhouse effect emissions. It is crucial to tackle the problem so that the products and processes of our energy industry are compatible with proper care of the environment.

At the same time, Mexico is rich in potential renewable energy sources. We have the highest solar index in North America; regions with great wind power potential like La Ventosa; geothermal fields, rivers and coasts, biomass and idle thermal capacity. The capacity of our countryside to produce ethanol from sugar cane and other farm products is outstanding. Sustainable development of the energy sector must have renewable energy sources as its backbone; an indispensable strategy for ensuring a clean, reliable, secure energy supply for the Mexico of tomorrow.

Tenth Task: Environmental Safety and Protection

We must be inflexible in overseeing and supervising safety in all public and private energy sector facilities and plants. To do this, the necessary budget must be allocated in Pemex for proper infrastructure maintenance, thereby reinforcing the environmental safety of the industry.

Along this line, putting into motion all the viable options for electric generation from renewable sources is absolutely essential. As soon as possible, we must diversify the country's primary sources of energy. For this purpose, we recommend expanding the geothermal fields; using the biogas generated by garbage and the biomass, such as cane bagasse; expanding generation by mini-hydraulics as well as the large hydroelectric plants; building large eolian energy fields in Oaxaca, Zacatecas, Hidalgo and Baja California, and investing in technological R&D to take advantage of the tidal energy potential on our coasts, solar energy, and any clean form of micro-generation that allows users to generate electric power for their own consumption and place their surpluses into the domestic transmission network.

It is likewise necessary to bolster the energy saving and efficiency programs, by assisting industries with financial support to lower their energy consumption, as well as the energy performance of home appliances, machinery and transportation vehicles to reduce their polluting emissions, and by issuing Mexican official standards that improve energy efficiency, without increasing costs. We recommend stimulating joint generation in industries that have usable thermal capacity and improving the quality of our fuels for transportation and industry.

Conclusion

To sum up, what our energy sector needs is a policy of reinforcement of state-owned companies that should be pragmatic, global and unbiased, with mechanisms that ensure effective distribution of the profit and benefits of the sector to the advantage of all Mexicans.

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