Title
Pemex: Problems and Policy Options

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Publication Date
2006-02-01

POLICY PAPERS

Center for Latin American Studies
University of California, Berkeley

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February 2006
Paper No. 4

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DSFLGKFDLG;KDF;LGK

INTRODUCTION

The “peak oil” theory, which asserts that world oil production has reached the peak of the Hubbert Curve and must inevitably decline in future years, is not shared by many industry experts, including oil majors. However, the theory does seem to have played out pretty accurately in the United States, where oil production has been declining since the 1970s despite that nation’s wide-ranging access to investment and leading technologies.

In the case of Mexico, over twenty years of constant decline and depletion of proven oil reserves seems likely to take its toll in the short term. For well over a decade, Cantarell, a supergiant oilfield in Campeche Bay in southeastern Mexico, has been the mainstay of Mexico’s oil output, providing 60 percent or more of total production. Now, technical studies made by the state-run oil company, Petroleos Mexicanos (Pemex), confirm that the collapse in output levels at Cantarell is imminent. This has not been acknowledged publicly by the company, and it is not clear to what extent Mexico’s presidential candidates are aware of the problem. It is, however, common knowledge among Pemex and industry specialists.

PEMEX: A TROUBLED COMPANY

Pemex is a world-class oil company according to several indicators, particularly oil production and revenues. In terms of oil output, it is the third biggest oil company in the world, after the state-run oil giants of Saudi Arabia and Iran. However, Pemex is a troubled company in many senses and most of its problems are becoming more critical, making its future a less sustainable one. Most of its oil fields are at a mature stage of production. Its reserves have been depleted. Its finances have weakened under a growing debt burden. It continues to have a key function as an instrument of fiscal policy based on the export of a non-renewable resource. It is not a model oil company either in terms of technology or of the business standards of today’s world. Some of the major issues facing Pemex are discussed in this paper.

OVERVIEW OF RESERVES SITUATION AND OF EXPLORATION AND PRODUCTION

Mexico's proven hydrocarbon reserves stood at 17,650 million barrels on Jan. 1, 2005. Of that amount, 14,803 million barrels were of crude oil. This means the official figure of proven reserves fell by 45.8 percent during the first four years of the Fox administration, though this was partly due to a change in the method of calculation. Were it not for that change, the fall in reserves would be 25.6 percent. Pemex often quotes larger reserves figures, corresponding to 3P estimates (proven + probable + possible). In the early 1980s, the Mexican government speculatively spoke of up to 72 billion barrels of reserves, which were then assumed to be proven.

Under the current administration, Pemex has been spending roughly US$9 billion annually on exploration and production (E&P), up from US$5 billion during the Zedillo administration. However, about US$8 billion of that amount has been spent each year on production and only US$1 billion on exploration. Results in crude oil production have been significant. Output rose from 3,012,000 barrels per day (b/d) in 2000 to a historic record of 3,383,000 b/d in 2004, before slipping back to 3,333,000 b/d in 2005. However, output has fallen far short of the 4,000,000 b/d promised by the Fox government in 2006. In recent years, Cantarell has accounted for roughly 2,000,000 b/d, or 64 percent, of Mexico's crude oil production.

Exploration results, meanwhile, have been poor. No major new discoveries have been made, largely because Pemex's budget is insufficient for exploring new regions. Pemex has been replacing only about 10 percent of its production with newly-discovered proven reserves. Most major oil companies achieve close to a 100 percent replacement rate. Government officials often speak of a 57 percent replacement rate, with the possibility of achieving 100 percent by 2010, but this refers to 3P reserves, not to proven reserves.

A large part of Mexico's territory remains unexplored. The country, including its continental shelf and deepwater, has a total area of 2,753,766 square kilometers (km2), of which 1,054,568 km2 may have oil-bearing potential. About 20 percent (probably the best 20 percent) has been explored, with major reserves having been found in shallow water. Pemex officials, and even executives at international oil majors, have said it is reasonable to assume there may be up to 54 billion barrels of undiscovered resources in the unexplored areas, half of which might be in deepwater. This potential, however, remains highly speculative.

SHARP DECLINE FORESEEN IN CANTARELL

For several years now, Pemex officials have acknowledged that there will be a major decline in output from Cantarell at some point, but have not yet admitted that decline is both imminent and likely to be sharp. A new technical study carried out by Pemex's E&P division was completed in November 2005 and shows that crude oil output from Cantarell will likely decline much more sharply than previously expected, with that decline becoming clearly apparent from the second half of 2006.

The study shows that oil in Cantarell is being rapidly depleted. It specifically mentions a scenario—considered probable by the Pemex specialists—under which Cantarell output for 2006 is foreseen to average 1,748,000 b/d, even though Pemex's operating program has set a goal of producing 2,004,000 b/d from Cantarell this year. Meanwhile, Pemex has publicly stated that output from Cantarell is expected to be 1,905,000 b/d, down 6 percent from 2005 levels.
The 1,748,000 b/d figure is based on a 30 percent recovery factor, while the 1,905,000 b/d figure is based on a 52 percent recovery factor. The study admits that there is a large degree of uncertainty about how the field will behave and where output will stand over the next few years, but points to the 30 percent recovery scenario as most likely.

This more pessimistic scenario would come about as a result of the number of wells being invaded by gas going well beyond the field's ability to replace lost production through repairs to wells or new drilling, the report says. Production becomes more complex and oil becomes more viscous as exploitation advances.

The 30 percent scenario would have output from Cantarell starting 2006 at 1,913,000 b/d and falling to 1,540,000 b/d by January 1, 2007. Thereafter, output would drop to 875,000 b/d by Jan. 1, 2008, and to 520,000 b/d on Jan. 1, 2009. The study makes recommendations to the E&P division to cancel the installation of two new platforms scheduled for Cantarell and make changes in its drilling program.

Publicly, Pemex has said output from Cantarell will average 1,683,000 b/d in 2007 and 1,430,000 b/d in 2008 "subject to getting the amounts of investment required." This prediction is based on a 52 percent recovery factor and thus might be considered unlikely. Moreover, the investment caveat is illogical. If more money were invested more quickly in production at Cantarell, the reserves would be depleted more quickly.

Pemex has said publicly that an increase in output from other projects, particularly heavy crude from the Ku-Maloob-Zaap complex and light crude from the Tabasco Littoral fields, will offset a decrease in output from Cantarell. This appears to be false given the proven reserves levels in these fields, which are insufficient to maintain significant production over a long period of time.

The Ku-Zaap-Maloob and Tabasco Littoral fields could, at best, add up to 600,000 b/d (though 400,000 b/d seems more realistic) of new output by 2009, before declining sharply. This might be enough to largely offset the decline from Cantarell for two or three years under the 52 percent scenario, but certainly it would not be the case under the 30 percent scenario. Pemex has no other new projects to boast of. All of the above imply that a major decline in Mexican oil output is inevitable over the next decade or so, as it would take eight to ten years to find major new deposits in shallow water regions or in deepwater.

IMPACT OF DECLINE ON FUTURE CRUDE OIL EXPORTS

Decline in Cantarell output could severely hit Mexico's future crude oil export volumes as well as revenues from them. Crude oil exports for 2005 stood at 1,805,000 b/d, down 3 percent from 1,870,000 b/d in 2004. However, revenues from crude oil exports provided Mexico with US$28.2 billion in revenues in 2005, up 33 percent year on year due to much higher international oil prices.

If Cantarell were to decline by 1,400,000 b/d over the next three years and if that decline were to be offset by an increase of 400,000 b/d at other projects—namely Ku-Zaap-Maloob and Tabasco Littoral—Mexico's oil revenues would fall by close to US$15 billion annually from year 2008 on, at current global oil prices. That amount is similar to Mexico's total income from remittances and greater than its income from tourism. Mexico's public finances would thus be severely affected—revenues from Pemex (including domestic fuel sales) accounted for 37.6 percent of government revenues in 2005, against just 30 percent at the beginning of the decade—as would Mexico's trade balance in energy, given that the country has become a major importer of fuels.

The Mexican government has said it is committed to efforts to stabilize the global oil market and will maximize its oil output "to the degree that its technical and budgetary possibilities allow for that." These "possibilities," are however, now extremely limited, while the Mexican economy has now become more vulnerable to major fluctuations in oil prices.

OUTLOOK FOR REFORM IN ENERGY AND OIL POLICY

Mexico has made no substantial progress towards any major kind of energy reform or oil industry reform during the Fox administration. Energy reform, as proposed by the administration, has been promoted half-heartedly as a superficial concept, roughly equated to the idea of opening up the energy industry as much as possible to private investors without privatizing the state-run energy industries. There has been little depth or detail to the proposals. Indeed, the Fox administration did not make any hint of a desire to make major changes to the oil industry until late 2004, that is, after four years in office.

Major reform proposals, such as those relating to deepwater development in the Gulf of Mexico, have been shelved and are unlikely to be discussed or reviewed in the current election year. In Mexico's Congress, political will has also been lacking to make reforms that would allow direct private investment into the oil industry or any other areas of the energy industry. Congress has been divided, and President Fox has been unable to achieve basic consensus on almost any issue related to energy.

Mexico's Constitution (Article 27) says that only "the nation" can exploit hydrocarbons. The enabling law delegates that responsibility exclusively to Pemex. This is the key obstacle to direct private investment (including foreign investment) in the oil industry today. However, the law allows for all kinds of service contracts and public works to be done by private companies. It also allows for 100 percent private participation in petrochemicals, though few companies have become involved because of prices and lack of long-term government guarantees in the supply of petrochemical feedstocks.

Mexican law continues to prohibit the awarding of concessions to private operators or any kind of joint ventures between state-run Pemex and international majors that might imply sharing investments, reserves, output or profits. Reform proposals are not likely to be taken up again until 2007, when a new government will be in power, though the winning presidential candidate may be able to impose some of his agenda in late 2006. Until then, Pemex will be in a "business as usual" mode, facing the challenge of maintaining crude oil output around current levels in the face of incipient decline of its supergiant Cantarell oilfield.

Until now, the presidential candidates have not given a very clear vision of how they will deal with energy policy if elected into power. Candidates Andrés Manuel López Obrador (PRD) and Roberto Madrazo (PRI) have expressed a more statist vision, while Felipe Calderón has given support to a wide-ranging opening to private investment. Their initial statements and working papers, however, are not necessarily an indication of how they will act, if they are elected into office. Moreover, the next president is again likely to face a divided Congress that will deny him a majority. This situation could most likely thwart his efforts at major energy reform.

It might be noted that Fox administration officials have made several oil-industry reform proposals—again in a superficial, half-hearted manner—in late 2005 and early 2006. These include putting Pemex assets on the stock exchange, having Pemex invest in Central America, creating a new oil industry regulator, placing prominent citizens on the company board, promoting new refining and petrochemical plans, as well as a number of openings to private investors. However, none of these proposals seem politically viable at this time, apart, perhaps, from a minor degree of administrative and financial autonomy for Pemex or some kind of realignment of Pemex's business units. These may be discussed in Congress this spring.

There are case studies, relevant to Mexico, of how international companies have evolved positively through reforms to their state-run industries in recent decades. These case studies include Britain's BP, Spain's Repsol, Norway's Statoil, Brazil's Petrobras and, more recently, France's Gaz de France and China's Sinopec. In refining, much could be learned from companies like the Valero Corporation, Petróleos de Venezuela and ENI. Analysis of these case studies goes beyond the scope of this paper.

PEMEX FINANCES

Excessive taxation has been the main reason that Pemex has made insufficient investments. Pemex is subject to a basic hydrocarbon tax which siphons off 60.8 percent of its income. However, after that payment, other taxes kick in, which mean that Pemex pays all of its income to the government as revenue. As a result, the company usually reports a net loss, despite recording giant revenues. It also has to resort to massive indebtedness to pay for its investments.

At the end of September 2005, Pemex had total liabilities of US$95.6 billion, as against total assets of US$96.8 billion. Equity thus stands at US$1.2 billion. In late 2005, Congress approved a tax relief bill for Pemex that, in practice, is not much better than the national oil company's existing tax deal. The bill proposes providing Pemex with an additional US$2 billion in 2006. This paltry sum, as compared to US$28 billion in oil export revenues in 2005, might, at best, keep the company out of the red. In recent times, Pemex's financial statements have regularly recorded an after-tax loss, which has been weighing on the company's credit rating. Some lawmakers have expressed concern that the benefits of the new tax deal to Pemex may be offset by other taxes in the 2006 federal budget.

Guillermo Ortiz, governor of Mexico's central bank, has complained publicly that 90 percent of Mexico's oil revenues in recent years has gone to short-term expenditures and paying bureaucrats' salaries and therefore does not contribute to the nation's economic growth. "There has been over US$30 billion of windfall income from oil exports during the present government. Where has it gone? Where are the highways that should have been built with it?" Ortiz complained during a hearing before Congress.

LABOR RELATIONS

Staffing at Pemex has risen significantly during the Fox government. At the beginning of 2005, Pemex reported total staff of 142,145 active workers, of which roughly 99,000 are unionized. This reflects an increase of about 12,000 workers during the Fox government. White-collar, non-unionized workers are believed to account for a large part of that increase.

Pemex reached a record 178,766 workers in 1987, before whittling the total down to 106,393 at the end of 1993. Since then, the payroll has been increasing. Pemex has a bigger labor force than any other oil company in the world, with the exception of the state-run bureaucracies of China and Russia.

The company's ills are currently magnified, however, by the fact that it pays pensions to about 70,000 former workers, of which 56,000 are paid through the union. Pemex owes its workers a total of US$31.8 billion in retirement payments, pensions and seniority premiums, which are part of the company's previously mentioned total debt. That works out to US$223,000 for each active worker.

The Pemex oil workers' union is potentially very powerful, though in recent years it has tried to be low profile. Nevertheless, the leaders of the union were at the heart of an illicit election financing scandal, known as Pemexgate, during the 2000 presidential elections. Attempts at legal action by the Fox government against the union leaders have failed.

OTHER E&P ISSUES

(1) Natural Gas

The Fox administration failed to follow through on its commitment to raising Mexico's natural gas output from 4.7 billion ft3/day at the outset of the administration (year 2000) to at least 7 billion ft3/day. Recent output has been close to 5 billion ft3/day. The unsatisfactory results may well be due, in part, to the limited success of Pemex's multiple services contracts (MSCs) program, which has been the subject of political and legal controversy.

Pemex has argued that it needs to tender aggressive E&P contracts to meet fast-rising demand for gas. This obliges the company to improve on traditional forms of service contracting. The idea of MSCs has been to bundle together thirty or forty contracts, which used to be tendered separately, into one single large-scale contract. Over the past three years, Pemex has tendered eight MSCs, which are the closest thing to concessions that have yet been awarded to private companies under Mexico's tight legal restrictions on private investment in E&P.

However, international oil majors—with the exception of Repsol YPF and Petrobras, who took the first two MSCs tendered—have stayed away, because MSCs have not allowed companies to book reserves nor to get an attractive return based on risk and reward.

Political and legal uncertainties have also kept companies away. For instance, the federal auditing office, a congressional oversight agency, advised Pemex against awarding more MSCs that imply any kind of work that could be interpreted as "exploration and production" of oil or gas, activities which are constitutionally reserved to the state. MSCs apparently require contractors to operate the wells they drill and produce the gas, even though the wording of the contracts only refers to "maintenance" and "development" activities, not "production."

Pemex's poor performance on gas production has led Mexico to be a major importer of natural gas from the United States and has also promoted liquefied natural gas (LNG) projects. The Fox government has promoted and tendered two LNG regasification terminals, one at Altamira on the Gulf coast and one at Ensenada, on the Pacific coast. A third terminal, at Manzanillo on the Pacific coast, is to be tendered soon.

(2) DEEPWATER E&P

In September 2004, President Vicente Fox confirmed statements by Pemex officials regarding oil potential in the Perdido Fold Belt in the deepwater Gulf of Mexico, on the Mexican side of the U.S.–Mexico maritime boundary. Pemex had spoken of "detecting and mapping" oil-bearing zones which could potentially hold 54 billion barrels of oil.

Pemex later made clear in a statement to the Mexican Bolsa that the figure refers to a "prospective resource" based on seismic studies and that no hydrocarbon reserves have been discovered, as no exploratory wells have yet been drilled in the Mexican part of the Perdido Fold Belt. Prospective resources in no way represent proven reserves nor do they influence reserves figures Pemex has reported.

Pemex has said that the promising geology is in the deepest part of the Gulf and that Pemex cannot go it alone in developing the reserves, as the potential oil fields would cross the U.S.–Mexico maritime boundary. The support of international majors, who would provide investment and technology, would be indispensable, and this would require some new legislation in Mexico, in Pemex's view.

Since then, Pemex has spoken to global oil majors with a viewing to studying deepwater options, though no real progress is known to have been made. Suggestions have been made in some forums that the United States could finance a joint binational strategy in order to develop these crossborder fields optimally. Mexico's deepwater strategy, however, is a matter that remains pending for the next government.

REFINING AND PETROCHEMICALS

Pemex's investments in refining and petrochemicals have been well below minimally desirable levels. In the case of refining, the government has cut new budgetary investments to a minimum and private companies are prohibited from investing by law. In petrochemicals, high feedstock prices have discouraged private investment. Nevertheless, Pemex has begun a major refinery upgrade at Minatitlán, Veracruz.

Faced with a skyrocketing gasoline import bill, Pemex has said that it will tender the basic engineering for three refinery upgrades this year and begin work on planning for a new refinery. The upgrades themselves will be tendered by the next government.

Pemex's plans are to build coking plants at four of its refineries so that it can process mainly heavy crude at all of its six refineries. Currently, Pemex's refineries process 60 percent light crude and 40 percent heavy crude—a legacy from the days when Mexico's oil output was mainly light oil. Today, close to 75 percent of Mexico's output is heavy crude.

In order for Pemex to make greater investments in refining, it would probably have to reinvest a much larger share of its oil export income in the industry itself, put some of its assets onto the stock exchange or open the industry up to direct private investment. Any one of these three options would imply major fiscal reforms or major oil industry reforms, which seem unlikely in the short term, particularly during the current election year.

CENTRAL AMERICA POLICY INITIATIVE

Mexican President Vicente Fox has floated a project for building energy infrastructure in Central America, which could involve public and private investments of up to US$7 billion. The showpiece investment would be a $2.5 billion oil refinery to process Mexican Mayan crude oil. Panama, Costa Rica, Guatemala or southern Mexico have been mentioned as possible sites for the refinery. Other energy investments would include an LNG regasification plant to provide a source of natural gas in the region—though, again, no details of siting have been given—and a major gas-fired, combined-cycle power plant.

Fox spoke of a possible investment of $400 million by Pemex in the oil refinery, as well as participation by unspecified Mexican private investors. The objective would be to provide Central America with sufficient infrastructure to supply energy at competitive prices to all countries in the region, thus mitigating the impact of volatile prices of oil and oil products. The projects would be an extension of a regional infrastructure plan, announced and promoted by Fox in 2001, known as the Puebla-to-Panama project.

To Mexican industry observers, it is not clear that there is any logic at all to the refinery plan, other than for Mexico to be a geopolitical counterweight to Venezuela's regional energy expansion plans. A refinery in Central America could take the economic logic away from refinery upgrades in Mexico, as well as taking jobs and profit away from Mexico. Also, it is not clear that Mexico will have enough crude oil in the future to supply a new refinery in Central America or even in Mexico.

FUEL POLICY AND DIVERSIFICATION

Mexico is highly dependent on fossil fuels. Oil, gas and coal account for roughly 90 percent of the nation's energy use and 90 percent of power generation. Major decisions must be made in fuel policy, especially regarding options for power generation. Currently, natural gas and fuel oil account for most generation, with gas having been the preferred fuel for almost all new projects in recent years. Decisions must be made on whether coal, nuclear power, hydropower and renewable energy, as well as petcoke and residuals from Pemex refineries, should take on a greater role in the generation of electricity. This is a complex discussion that goes beyond the scope of this paper.

INVESTMENT NEEDS

Pemex's current investment budget in recent years has been about US$10 billion annually, with US$8 billion going to oil production, US$1 billion to and US$1 billion to the refining, gas processing and petrochemicals divisions.

However, it seems clear that Mexico's oil industry requires future investments of over US$20 billion annually, if it is to replace reserves, offset foreseeable short-term declines in production and have a growth-oriented future. One multinational oil executive said publicly that the "case is compelling" for Mexico to invest $50 billion in exploration and $200 billion in field development over the next ten years.

Indeed, it is likely that in the future at least US$5 billion will be required annually for exploration and about US$15 billion for oil and gas production. These levels of investment would allow for development of new, potentially oil-bearing regions, including deepwater. Ideally, there would be another US$3 billion to US$4 billion annually for refining and related activities (fuel distribution and commercialization), US$2 billion for petrochemicals and US$3 billion for maintenance of increasingly obsolete facilities and pipelines.

It seems well-nigh impossible for Pemex to meet such needs with more debt or through the company's budget. There are several other homegrown investment alternatives, including the possibility of a major fiscal reform that would allow Pemex to record a profit and reinvest a significant share of that profit in the industry itself. Other alternatives are: using the nation's currency reserves (currently close to US$70 billion) to finance oil industry projects, allowing major investments in Pemex by Mexican pension funds or issuing Pemex stock on the Mexican Bolsa. A different, and perhaps more feasible, long-term alternative could be to open up the industry to direct private investment, both Mexican and foreign.

THREE REFORM OPTIONS FOR THE NEXT PRESIDENT

The Mexican oil industry needs to achieve an optimal model in which the nation's institutions and its state-run industry can coexist with private companies in ways that provide the greatest benefits for society as a whole. Outright privatization—the sale of the company's assets—can be ruled out for many reasons, most of which are political in nature. There are three basic models which can be put forward, although there can be variations to each of the models.

MODEL No 1. This would be an improved status quo, without constitutional amendments, in which the fiscal goals of the Mexican government would remain unchanged, while giving greater financial and administrative autonomy to Pemex, presumably with more responsive and renewed corporate governance applying business (rather than political) criteria to its administration and operation. Private-sector companies, both domestic and foreign, would continue to take part in the industry only through services contracts. A variation on this model could be to put Pemex equity on the stock market, making it a "public interest company."

MODEL No. 2. Pemex could continue to be a fully state-run company, but with a full-blown opening to private investors through constitutional and legal changes that would allow Pemex to award concessions, risk contracts, profits-sharing or production-sharing contracts. Through these new contracts, direct private investment in the oil industry would be allowed for the first time, both in E&P and in other areas of the oil industry.

MODEL No. 3. Pemex could become a limited company with majority state participation or alternatively, remain under state control but with a majority of private capital. The composition of capital could be either 100 percent Mexican, public and private or 50 percent or more of its capital could be private, either Mexican or foreign. In any case, the Mexican state would conserve majority voting rights (50 percent of votes plus one) on the board, as a way of ensuring that the company would respond to national interests. This "Pemex S.A." could be financed on capital markets and would compete in a deregulated market in which other companies would be active and compete in all areas of the oil industry, whether it be through permits, concessions or contracts awarded by the Energy authorities. Private companies could also associate with Pemex or amongst themselves.

FINAL COMMENT

It might be said that the first of these models will probably be the most politically viable, especially in the absence of political consensus on alternative reforms, yet it implies maintaining a virtual state monopoly, and it may be unable to provide solutions to problems such as the depletion of oil fields, the company's precarious financial situation, its large investment needs, excessive bureaucracy, corruption and the need for greater innovation and technological and trading skills.

The third model would seem to be the best of the three options, but possibly the hardest to achieve politically. It would largely break the bond that subordinates Pemex to the government (particularly, to the President and to the Finance Ministry) and would help provide Pemex with investment options, particularly if the federal government were prepared to take on some of Pemex's debt as sovereign debt. The third model would require strong, efficient regulation, which does not currently exist. It might be said that many other major oil companies such as BP, Repsol, Statoil, Petrobras and Sinopec have achieved greater success by putting assets on stock exchanges and moving towards deregulation.

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