Mexico’s New Energy Model

A Crude Reform: Pemex in Mexico’s New Energy Landscape

A Working Paper

By Leticia A. Abad and Noel Maurer
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Mexico is coming out of one of the most dramatic reform periods since the creation of the North American Free Trade Agreement (NAFTA). Following the presidential election in July 2012, the new Peña Nieto administration shepherded through Congress a series of radical reforms—the most radical removed the national oil company Pemex (Petróleos de México) from its position as the monopoly supplier of all hydrocarbons in Mexico and guardian of the nation’s subsoil resources.

The reform did not privatize or radically change Pemex’s nature. What it did was expose Pemex to competition while at the same time remove some of the constraints that previously had held it back. By 2012, Pemex’s production had been in decline for eight years, and there was widespread agreement that something needed to be done, even if there was little agreement on what. Yet the compromised nature of the reforms meant that they failed to remove the constraints the company faced. Pemex gained some freedom and flexibility, but not enough, and it remains shackled by high taxes and high debt.

Starting with a historical overview of how Pemex gained its iconic status as the defender of Mexico’s national sovereignty against predatory foreign companies, this chapter explains the roots of Pemex’s production decline after 2004 and show how the Peña administration managed to overcome that iconic status and pass energy reform—but in process preserved many of the features that held the company back. It then shows how even though the energy reform was supposed to ease these constraints in theory, the reforms were incomplete in practice. Consequently, it takes a slightly more pessimistic view of the future of energy reform than the current conventional wisdom.
A History of Pemex

How did the Mexican oil industry come to be dominated by one giant state-owned producer and why did that company hold such iconic status in Mexico for so long? To understand this question, one must go back to the beginnings of the Mexican oil industry.

The Mexican Oil Industry before Pemex

In 1884, during the long dictatorship of Porfirio Díaz (1876–1910), the government gave the owner of the land legal right over any oil that was found underneath. The law overturned the Spanish colonial tradition that had granted the state ownership over subsoil resources. When the first oil companies began to explore for petroleum around 1900, they did so under this law. American and British firms controlled the majority of the known reserves. Díaz, it should be noted, had enacted his law in order to promote oil and mining production as a domestic revenue source, not as a giveaway to foreign capitalists. Once the industry’s tax exemptions began to expire in 1910, he responded to the oil companies’ successes by starting to raise taxes.

Unfortunately for the oil magnates, they soon faced far larger headaches than the small tax hikes levied by President Díaz: a full-blown revolution, Mexican style. One out of every 15 Mexicans would either die or flee to the United States, and full stability would not be restored until 1929. In 1917, while the fighting was still in full swing, some of the revolutionary factions convened a constitutional convention. Article 27 of the resulting constitution—which still governs Mexico 101 years and 227 constitutional amendments later—declared that all oil and gas reserves belonged to the nation. In the view of the revolutionaries, a small, unaccountable elite had used the 1884 law to surrender wealth to foreign companies in order to line their own pockets. In their view, the new constitution returned to the country’s historical tradition and took back for the people of Mexico what had always been theirs. (It is important to note, particularly for American readers, that this putatively radical change simply gave Mexico the same subsoil regime that prevails everywhere on Earth outside of 47 of the 50 United States, including such radical jurisdictions as Canada, Australia, and Alaska.)
The oil industry resisted the violence and institutional change. Oil taxes rose dramatically as every faction looked to the wells for income, and the oil zone was not free from violence. Nonetheless, Mexico’s output skyrocketed after 1917 despite the taxes, threats, and military mobilizations. Petroleum output then fell precipitously after 1921, but politics was not the reason. Rather, Mexico simply ran out of oil that could be produced competitively using existing technology. The companies kept looking for oil; they just stopped finding it. Some new discoveries (notably Poza Rica in 1937) prevented production from falling below 100,000 barrels per day (bpd), but the first golden age of Mexican oil was over.

*The Creation of Pemex*

If oil was no longer particularly important for the Mexican economy, how did it come to occupy such an important space in Mexico’s political mythology? The short answer is the dramatic expropriation of March 18, 1938. President Lázaro Cárdenas’ confrontation with the foreign companies became the stuff of political legend and a great nationalist triumph, a way of legitimating the Revolution and the dictatorial rule of the Institutional Revolutionary Party (Partido Revolucionario Institucional; PRI). This mythology concealed two great ironies: (1) President Cárdenas nationalized the companies in order to ensure that the industry kept producing in the face of labor strife, not to take back resources or seize (nearly nonexistent) profits; and (2) the Mexican government quietly acquiesced to American pressure and paid the oil companies more than the market value of their properties.

A wave of strikes started in 1934 and quickly escalated; that same year saw Mexico’s various company unions unite into the Oil Workers’ Syndicate of the Mexican Republic (Sindicato de Trabajadores Petroleros de la República Mexicana; STPRM). More strikes hit in 1935 and 1936. On November 3, 1936, the STPRM demanded an $8.3 million wage hike, 18 paid holidays, 20 to 60 days’ paid vacation, health insurance, 25 days of severance pay for each year of service in the case of voluntary separation and 90 days of severance in the case of involuntary separation, and—most seriously—control over all
hiring decisions save for 110 positions across the entire *industry.*\(^6\) The oil companies refused to meet union demands.\(^7\)

The Cárdenas administration attempted to mediate. Talks dragged on for years. Finally, on March 2, 1938, the Federal Labor Board announced that it would grant the unions a $7.3 million wage hike and increased control over personnel decisions. The Supreme Court upheld the decision the next day.

The result was chaos. Mexican Petroleum reacted by closing 23 wells, moving oil stored in the fields to the Tampico port (presumably for quick export), shutting down the Mata Redonda refinery and sending a letter to every employee stating that it would be unable to comply with the board’s order.\(^8\) The March 7 deadline fixed by the Federal Labor Board came and went. The board responded by suspending all labor contracts.\(^9\) With their pay contracts suspended and a strike deadline looming, workers began to seize loading terminals and shut down pipelines. President Cárdenas faced the imminent collapse of the oil industry.\(^10\) The problem was not that the industry loomed particularly large as a share of tax revenues or gross domestic product (GDP) in 1938, but rather that Mexico’s road transportation and a key part of its electrical capacity ran on domestic oil. Shut them down, and you shut down the economy.\(^11\)

On March 18, 1938, Cárdenas announced the nationalization in order to keep the goods moving and the lights on. The government moved quickly to seize the assets of the foreign companies operating in the country and created Pemex as a state-owned monopoly charged with the exploration, production, refining, and distribution of crude oil and petroleum products in Mexico. U.S. president Franklin D. Roosevelt had little enthusiasm for helping oil magnates, but lobbying by the companies convinced him to pressure Mexico for a settlement. In 1942, the U.S. government imposed a settlement, and Mexico paid market value for the U.S. oil companies’ operations (which in any case had been losing money for years). A separate agreement with the Mexican Eagle Oil Company, the largest in Mexico, gave its shareholders compensation in excess of *three* times the company’s 1936 market capitalization.\(^12\)
In short, the Mexican government seized a marginally profitable industry in order to keep the domestic oil flowing and wound up paying more than market value to its foreign owners. A nationalist triumph this was not. Nonetheless, Lázaro Cárdenas was an excellent politician. He turned the expropriation into a symbol of national sovereignty. Mexicans had control of not only their natural resources, but also the capacity to produce and process them without foreign assistance. For decades thereafter, Mexican children learned in public school history textbooks about the courage of President Lázaro Cárdenas in standing up to the powerful international oil companies. A national mythology arose surrounding the event. Many Mexican politicians felt a patriotic duty to preserve the legacy of President Cárdenas; others feared a nationalistic backlash if they made their views public.\footnote{13}

\textit{Organizing the Oil Industry}

Pemex’s monopoly did not spring forth fully formed in 1938. The Petroleum Affairs Enabling Act of 1938 gave Pemex the task of conducting all petroleum-related activities on behalf of the nation, but Article 6 of the Enabling Act authorized Pemex to contract third parties to perform services. This applied to all activities in the value chain: exploration, production, transport, storage, distribution, and wholesale commercialization of crude oil and refined products. In 1940, the government allowed Pemex to enter into production agreements with private companies, as long as they were domestically owned. A year later, in 1941, an amendment to the Enabling Act allowed partially foreign-owned companies into oil production, as long as Mexican nationals held the majority of the shares. In 1949, Mexico further loosened the restrictions on foreign participation, signing “risk agreements” with foreign companies, allowing them to explore and drill in particular areas. If oil was found, Pemex would take care of production, but it would pay back a percentage of oil revenues in exchange.\footnote{14}

New discoveries and Pemex’s ability to master new technology kept Mexico’s oil production from stagnating, but production rose only slowly after 1938. In 1956, increasing domestic demand meant that Mexico became a net oil importer.\footnote{15} As late as 1970, production averaged only 80 percent of its 1921 peak (see figure 5.1).
By the late 1960s, the Mexican government could take the symbolic act of banning foreign participation in the industry at little practical cost.¹⁶ Pemex did, however, continue to hire foreign service companies.¹⁷ One of these companies, Brown & Root, became the primary contractor in the development of the massive oil fields developed offshore in southeastern Mexico in the late 1970s.¹⁸ Later on, Pemex became the single largest client for another American oil services company, Schlumberger.

In 1992, the government divided Pemex into four subsidiaries: Exploration and Production, Refining, Gas and Basic Petrochemicals, and Petrochemicals. Additionally, Pemex owned a trading affiliate and a real estate company, and along with Schlumberger it co-owned an exploration company that operated inside Mexico. The different subsidiaries operated at arm’s length from each other, and each one had its own finance, human resources, and legal divisions. The goal of the breakup had been to increase internal control by forcing the newly separated units to conduct measurable transactions whenever a product crossed their border from another subsidiary. The problem, of course, was that the center lost direct control over the newly defined units.
The 1992 restructuring also sought to combat the high level of corruption in Pemex by eliminating its construction subdivision. Since the 1970s oil boom, Pemex had been tarnished by scandals involving large-scale theft at all levels of the company. The epicenter of corruption was the construction subdivision, since it controlled many of the procurement decisions. Yet, while highly wasteful, the subdivision also housed whatever little expertise Pemex had in the management of large engineering projects. Raúl Muñoz—Pemex’s chief executive officer (CEO) from 2000 to 2004 and previously CEO of DuPont Mexico—would later lament that no other branch of Pemex arose to close the gap in project management expertise.19

Mexican law sought to prevent collusion between Pemex managers and contractors by requiring that a large percentage of purchases and contracts be assigned to the lowest bidder in a public auction. The goal was to decrease rent-seeking opportunities. The regulations, however, had a negative impact on the company’s flexibility to respond to challenges on the ground. Pemex managers constantly complained that projects were delayed because minor procurement changes had to be approved by Mexico City.20 In addition, the staff feared prosecution on corruption charges, and thus refused to make even minor decisions without explicit authorization. International industry experts commented that Pemex managers constantly seemed to be occupied dealing with regulatory paperwork and audits, rather than on strategic and technical decision-making.21

The Rise and Decline of Cantarell

Unbeknownst to Pemex’s managers, by 1971 the company was on the verge of a great leap forward. Ten years earlier, in 1961, a fisherman named Rudesindo Cantarell had noticed that his shrimp nets kept on getting coated with sludge in Campeche Bay, off the Yucatán Peninsula. For seven years, Cantarell unsuccessfully tried to interest the authorities in his discovery, until, in his own words:

One day, I said to myself, “I’m a Mexican and I believe that there is wealth in the sea here that could benefit the country.” In 1968, I went to Veracruz to sell a load
of red snapper, and a friend who worked for the oil company suggested that I tell them directly about my discovery. So I went to Coatzacoalcos, to the La Ganadera Pemex office, and I told them about the floating oil stains and bubbles. They didn’t believe me at first, but they said that they’d send some people to investigate. Three years later, on March 12, 1971, they looked for me and we went down to where the oil stains were. A little bit later they discovered that this place was the biggest oilfield in the country. I didn’t believe them, but various people who worked for Pemex started looking for me, to give me some gifts, to tell me that I was a national hero.  

Other discoveries soon followed. Mexican oil production skyrocketed. Offshore Gulf production soon made up 80 percent of Mexico’s production. In the middle of the 1990s, when it seemed as if Cantarell was on the brink of decline, Pemex developed a plan to inject nitrogen into the reservoir to maintain pressure. Injections began in 2000, and Cantarell’s output leaped from 1.6 million bpd in 1999 to 2.1 million bpd by 2004. By that point, Cantarell produced 63 percent of Mexico’s oil.

Unfortunately, as Mexico had learned before in the 1920s, one can only fight geology for so long. Even the most productive oilfield has limits. Once the amount of oil in a given formation declines past a critical point, injecting more nitrogen serves only to fill the formation with gas and split the reservoir into smaller unrecoverable pockets. That meant that Pemex had to cut injections, but cutting injections dropped the reservoir pressure and caused production to resume its decline. Moreover, declining pressure meant that salt water began invading the reservoir, further reducing output. To give Pemex credit, by 2013 it had squeezed out more than 36 percent of the estimated total reserves in the field, whereas most oilfields around the world produced only 35 percent of their estimated reserves before exhaustion. Nonetheless, Cantarell went into rapid decline. By the eve of the energy reform, in 2013, output was down to 439,800 bpd and falling. Production at the neighboring offshore Ku-Maloob-Zaap (KMZ) fields (discovered in 1979, but not commercialized until 2002) made up some of the slack.
Pemex believed that new onshore fields around Chicontepec would replace Cantarell, a project known as the Aceite Terciario del Golfo. Unfortunately, Pemex proved incapable of developing Chicontepec. Pemex projected that the field would reach 550,000 to 700,000 bpd by 2017 and 1 million bpd by 2021. The development of Chicontepec, however, did not run smoothly. The rock was relatively low porosity and impermeable, the reservoir highly fractured, and the field’s internal pressure extraordinarily low. Drilling delays were pervasive. Pemex accused service companies of not meeting deadlines; services companies countered that Pemex did not provide drilling sites on time. In addition, the field sprawled over 1,500 densely populated square miles. The area lacked infrastructure and the prevalence of towns and farms increased the barriers to construction. By 2016, Chicontepec produced only 40,000 bpd and falling, where just a year before it had been hoped to produce 700,000. Pemex had spent more than $11 billion on the venture. To be fair to Pemex, the field was insanely complex and it was far from clear that any oil company could have made a go of it. That said, failure meant that by the time 2013 arrived, Pemex had no immediate replacement for Cantarell.

The Role of Labor in Pemex

Pemex’s unions wielded extensive power from the beginning. In fact, as related above, the company had been born in the wake of a paralyzing oil strike. The dictatorial PRI recognized the power of the union and sought to bring it under control. In return for loyalty, the PRI allowed oil labor leaders to run their unions as personal fiefdoms, utilizing workers’ dues for personal enrichment. Oil union members accepted corruption because their leaders delivered the goods. Over time, agreements granted increasingly favorable terms. Layoffs were near impossible. Moreover, union jobs became effectively hereditary; when a worker retired, one of his or her children gained first dibs on new jobs at the firm. Pemex avoided strikes, but the end result was a combination of high wages and severe overmanning.

Pemex had further difficulty optimizing its operations because the labor agreements effectively prevented the firm from relocating personnel. The union was divided into geographic sections, and the relative strength of each section leader was a function of
the number of employees he or she represented. The union therefore strongly resisted the transfer of workers from declining to booming areas.

Only once had Pemex managed to lay off a substantial number of unionized workers. In 1989, the government initiated an operation that led to the imprisonment of “La Quina”—the nickname of Joaquín Hernández, the powerful leader of the oil workers’ union—on murder charges. In the aftermath, Pemex slashed its workforce by approximately 25 percent. The number of employees, however, soon resumed its upward march. By 2013, the company employed a record 154,774 workers at an average annual wage of US$40,748, at a time when the average Mexican wage was only US$10,477. Payroll costs ate up 5.0 percent of the firm’s revenue at a time when its after-tax margin was negative 10.6 percent.

**The Politics of Pemex in the Early 21st Century**

By 2012, a presidential election year, it was obvious to all observers that the Mexican oil industry was in serious decline. In another country, the government might have been able to ignore the problem, but Mexico did not have that luxury. The Mexican federal government relied upon oil revenues to sustain government spending. Oil taxes provided 26 percent of federal revenues, amounting to 6 percent of Mexico’s GDP. Despite significant tax increases on the non-oil economy during the Calderón administration, Mexican politicians were unwilling to raise non-oil taxes enough to sustain the country’s low level of public spending, let alone increase it to the levels of countries like Argentina and Chile.

The fields in Cantarell and Chicontepec may have been declining, but Mexico did not lack for promising oil and gas resources. The problem was money. Pemex did not have the money needed to develop the country’s deepwater reserves or unconventional onshore plays. (It also lacked the expertise, but expertise can be gained with sufficient money.) The reason why Pemex did not have the money was that the federal government imposed a crushing tax burden on the company. The federal government could have eased up on
the tax burden, but then it would have had to find another way to finance Mexico’s already insufficient public spending.

In 2012, the PRI under Enrique Peña Nieto won the presidency but failed to win a congressional majority; it was expected that his administration would follow the previous two into reformist mediocrity. Instead, the PRI managed to pass a comprehensive series of radical changes, including the energy reform. How did that happen? The roots of the accomplishment were threefold. The first was that while the PRI did not hold a majority in Congress, it held a majority of the state legislatures. This was vital because a Mexican constitutional amendment requires a majority of state legislatures to approve. Mexican political parties, unlike American ones, are highly centralized—if party leadership approves of an amendment reported out of Congress, then the state legislatures controlled by that party will immediately vote “yes.”

The second was that the opposition National Action Party (Partido Acción Nacional; PAN) had no clear candidate for the 2018 election and thus no one with an incentive to hold up reforms for their own electoral advantage. Moreover, the PAN had long approved of opening the energy sector. The PRI could change its positions on a dime for political advantage; it was harder for the more ideological PAN to do the same. The PRI also agreed to give into PAN desires in a separate political reform. In addition, the PRI found it easy to buy votes from two smaller parties: the Greens and the New Alliance. The Greens, despite their name, were not particularly concerned about the environment. Rather, the party functioned as a family enterprise, winning seats in order to collect federal subsidies which it used to maintain its seats, parceling out votes to the highest bidder. The New Alliance began as a vehicle for the head of the powerful national teachers’ union and morphed into a vaguely center-right party. These highly centralized parties could be bought and would stay bought in what one prominent Mexican political scientist and commentator called “legalized corruption.”

The third was a split in the left. Andrés Manuel López Obrador—better known by his initials as AMLO—had abandoned the center-left Party of the Democratic Revolution
(Partido de la Revolución Democrática; PRD), frustrated with his second unsuccessful run at the presidency. The “New Left” faction took over the party and decided to distance itself from AMLO’s perceived radicalism. It therefore reached out to the PRI and PAN to negotiate a series of economic and political reforms that it hoped would reignite economic growth, positioning itself as the sensible left alternative in 2018.  

The resulting “Pacto de México” did not include the energy reform, but President Peña used the spirit of cooperation engendered by the agreement to speed the reform through Congress with PAN support (see table 5.1). A July 2013 poll showed that only 39 percent had a “good” or “very good” impression of Pemex, against 32 percent whose opinion was “bad” or “very bad.” Only 44 percent were “proud” or “very proud” of the company, against 54 percent who were “slightly” or “not at all” proud. Eighty-eight percent considered the company to be riddled with corruption. Fifty-nine percent supported allowing Pemex to act as if it were a private company. Strangely, of those who claimed to be familiar with the PRI’s proposed reforms, 55 percent supported the legislation but 54 percent also opposed private investment in the industry.

Table 5.1 Congressional Votes on Energy Reform by Party

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<th>Senate Against</th>
<th>House For</th>
<th>House Against</th>
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</tr>
<tr>
<td>TOTAL</td>
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Source: Barrientos del Monte and Añorve (2014).

The Peña administration also needed to overcome opposition from the oil workers’ union. After all, the PRI had no desire to provoke a crippling oil strike or mass demonstrations and it certainly had no desire to threaten its position in the 2015 midterms or 2018
presidential election. The oil unions had one center of gravity: the leadership of Carlos
Romero Deschamps. Deschamps also happened to be a sitting PRI senator and
“enjoyed” second place on the Forbes list of the 10 most corrupt Mexicans.36 On a monthly
salary of US$1,864, Deschamps managed to accumulate a $1.5 million “cottage” in
Cancún, a son who drives a $2 million Ferrari, and a daughter who likes to post Facebook
images of her jet-setting around the world with her three English bulldogs. In other words,
a serious corruption investigation would toss him and his children into jail. President Peña
made it clear to Deschamps that he had no choice but to go along with the reform in the
most obvious way: in February 2013, Peña took the powerful leader of the teachers’
union, Elba Esther Gordillo—number one on the Forbes corruption list and head of the
aforementioned New Alliance Party—and had her arrested on corruption charges.
Gordillo was fortunate enough to be over 70 years old and therefore eligible for house
arrest instead of prison—she owned a nice apartment in Polanco—but the message was
clear.37 Deschamps brought the union on board with the reform.

The reform went through the Senate in a little less than two months; in a last-minute
change, the Senate added a clause removing the oil workers’ union’s five seats on
Pemex’s board.38 The Chamber of Deputies approved the Senate version two days later.
In another country, requiring half the state legislators to ratify the amendments would
have slowed the process. In Mexico, however, state legislators were beholden to their
parties’ national leadership: the reform took only 83 hours after passage to garner a
majority of state legislatures.39

The energy reform was radical in the sense that it opened Mexico’s hydrocarbon industry
to foreign investment, but where Pemex was concerned it was remarkably conservative.
Pemex was given the right to retain a swathe of self-chosen hydrocarbon plays in what
the reform called “Round Zero.” The union lost its five board seats, replaced by outside
directors, but Pemex remained an organ of the federal government, its budget subject to
congressional and treasury review. The company now faced competition in the retail
sector, but it was not forced to divest any of its extensive network of service stations.
Pemex could invite foreign companies to participate in its plays (known as “farmouts”),
but only when advantageous to it and only with government approval. In other words, President Peña’s reforms did not strike at the heart of Pemex’s special position; rather, they skirted it, preserving enough of Pemex’s status to defuse the most intense opposition while still opening the hydrocarbon industry. That is not to say that the reforms did nothing to change Pemex, because they preserved as much of Pemex’s status as was possible given the goal of attracting enough foreign capital to reverse the output decline.

**Energy Reform in Theory**

How did the energy reform specifically affect Pemex? Pemex faced three interrelated constraints. The first was that the firm had no access to outside capital in order to finance new ventures or improve existing ones other than by issuing debt. It could neither issue equity nor engage in joint ventures. The second constraint was the massive tax burden imposed by the federal government. Taxes regularly drove the company into the red, leaving few resources for reinvestment or expansion. The third was management’s inability to squeeze out efficiencies. The labor union controlled a third of the seats on the board and the four-division split made decisionmaking cumbersome at best. In addition, the federal government micromanaged all budget decisions, since Pemex was considered an integral part of the federal bureaucracy. The reforms, therefore, intended to ease these three constraints.

To address the first constraint, the energy reform first allowed Pemex to choose which potential oil plays it wished to retain. Pemex would present a list of desired plays to the oil ministry—both existing fields and potential ones—which would make the final determination in “Round Zero.” Pemex could then choose to “farm out” some of these plays; that is, to attract foreign partners that eventually would receive a share in the play in return for physical investment and the use of their technology. To address the second constraint, the reform once again changed the tax system to lower the burden on the company if production went up but raise it if prices increased. Finally, to address the third constraint, the union lost its privileged position on Pemex’s board and was required to accept a change to the pension system. In addition, the reform reorganized Pemex from four divisions to two. These changes are worth examining in greater detail.
Easing Financial Constraints

In theory, the reforms were designed to ease the financing constraints Pemex faced. Round Zero allowed the company to choose which existing blocks it wished to keep. Pemex management did not make the decision independently. Rather, the Pemex board voted (by a bare majority) to outsource the selection to a committee of four government officials and one independent board member.40 The committee requested only 82 percent of all the “proven or provable” (also known as “2P”) reserves and 31 percent of all “possible” (3P) reserves in the country, amid suspicion that the government wanted to reserve promising blocks for the state to auction off in later rounds.41 Why this would benefit the state more than allowing a fully state-owned and highly taxed enterprise to develop them was left unexplained.

The energy minister approved all of Pemex’s 2P requests and 68 percent of its 3P requests.42 Pemex’s director-general reacted with indignation to the loss of a third of its 3P requests, but 3P reserves are by their nature speculative. The energy ministry likely believed that it would require the resources of major international oil companies to develop them. Pemex could still bid on those reserves in later auction rounds.

For the fields Pemex retained in Round Zero, the energy reform gave it the ability to “farm out” some of those blocks to private companies. In a standard farmout agreement, the owner of the lands (or “farmor”) brings in a partner (the “farmee”). The farmee agrees to invest a certain amount in the play. Once production starts, the farmee pays a fixed royalty on any production to the farmor. Any returns above the royalty pay back the farmee for their investment. Once the farmee has earned back their investment, they have the option to either continue making royalty payments or switch to a percentage interest in the proceeds from the play.

For a cash-strapped Pemex, a development model where the bulk of new investment comes from the farmee was obviously attractive. Most of the areas considered for farming out would be already discovered or producing fields, some of which might even have infrastructure in place.43 Pemex was quite optimistic about the model.
**Easing Fiscal Constraints**

The tax burden on Pemex regularly drove the company into the red. Before 2006, the federal government claimed 60.8 percent of Pemex’s gross revenues. The government feared that corruption within Pemex would allow its management to game a more complicated system. The problem was twofold. First, it took no account of oil prices. Second, it taxed marginal production at the same rate as existing fields. In 2006, the government attempted to address the problem. First, it raised taxes on the non-oil economy, including the first corporate income tax in Mexican history. Second, it replaced Pemex’s gross receipts tax with a complex set of new duties designed to increase the rate on existing fields while reducing taxes on newer operations. The reform reduced Pemex’s tax burden, but not enough to lift the company into the black.

The 2013 energy reform therefore took another bite at the apple, slashing the number of taxes Pemex had to pay on its crude oil and gas production while raising allowed deductions. In addition, the new system was made more sensitive to costs. Whereas before Pemex could deduct costs only at a fixed rate of 6.50 per barrel at most fields—well below the company’s average 2013 production cost of $7.91 per barrel—the company could now choose to deduct 10.6 percent of the value of production. It also was allowed to offset losses against its total tax bill. Finally, hydrocarbon tax rates were reformed to operate on a sliding scale, rising and falling with oil prices. Yet all legal formulas aside, Pemex remained under pressure to continue contributing roughly what it had before the reform. Former Pemex CEO José Antonio González Anaya acknowledged as much when he told a pair of Harvard investigators, “Pemex is the largest tax contributor, about 15 percent. If Pemex’s taxes deviate, I get a call.” That call could be serious, since the law granted the executive branch the authority to alter tax rates in the future.

**Easing Managerial and Labor Constraints**

If Pemex were to act as a “normal” oil company focused on production and revenue, it would have to increase efficiencies and stop behaving as an employment machine. The reform recognized this problem. First, it reorganized Pemex into two main divisions:
Exploration and Production (E&P) in the upstream and Industrial Transformation in the downstream. Second, it reorganized procurement, legal, and human resources. Third, it removed the union’s five seats on the Pemex board. The new board would consist of the energy and finance ministers, three other members appointed by the president of Mexico, and five outsiders appointed by the president and confirmed by the Senate.\textsuperscript{50}

The Peña administration also proposed that it would help Pemex with its current pension burden. The government said that if Pemex and the unions could agree to cut pensions, it would assume from Pemex a portion of the remaining burden equal to half the agreed-upon savings.\textsuperscript{51} Pemex’s employees were able to retire at 55 years of age, 10 years lower than other Mexican government employees, and they were guaranteed half of their salary, life insurance, and free medical coverage for themselves and their spouses. The administration told Pemex that it should persuade the union to raise the retirement age to 65 and agree to liberalize labor practices.\textsuperscript{52} The reform did not, however, alter Pemex’s legal status as a branch of the federal government. Despite the energy ministry’s seat on the board, Pemex was effectively independent from it. However, the treasury and Congress retained the right to review all its expenditure items line by line.

\textbf{Energy Reform in Practice}

With the reforms in place, it was hoped that Pemex’s would be able to acquire capital, enjoy a more relaxed taxation policy, and sort out its internal issues in order to become profitable. Yet in practice, the financial, fiscal, and management and labor constraints remained.

\textit{Easing Financial Constraints}

Pemex lacked both the cash and the technology to develop its resources. These facts made farmouts attractive, sweetened further by the fact that farmout production fell under the new, more lenient tax regime that the energy reform had established for private companies. Pemex’s biggest farmout to date (auctioned in December 2016) involved the Trión deepwater field. The project required $1.9 billion in capital expenditure from the Australian firm BHP Billiton and $600 million from Pemex before production; ultimately,
investment will total $7.4 billion.\textsuperscript{53} Comparatively, the other farmouts have been small change: in October, Pemex farmed out for Cárdenas-Mora, a $127 million expected investment in partnership with Cheiron Holdings Limited; and Ogarrio, a $95 million expected investment in partnership with Deutsche Erdöl AG.\textsuperscript{54} An attempt to auction the Ayín-Batsil play attracted no bidders. The company also planned to farm out the Nobilis-Maximino field in 2018, but investors expressed little interest and Pemex cancelled the tender. (See table 5.2.)

Table 5.2 Pemex Joint Ventures and Farmouts

<table>
<thead>
<tr>
<th>Block</th>
<th>Round</th>
<th>Partner(s)</th>
<th>Hydrocarbon</th>
<th>Expected peak production (bpd)</th>
<th>Investment (US$m)</th>
<th>Auction date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perdido Block 3</td>
<td>1.4</td>
<td>Chevron and Inpex</td>
<td>Light oil</td>
<td>$2,017</td>
<td>May 12, 2016</td>
<td></td>
</tr>
<tr>
<td>Trión farm-out</td>
<td></td>
<td>BHP Billiton</td>
<td>Light oil and gas</td>
<td>$8,839</td>
<td>Dec 5, 2016</td>
<td></td>
</tr>
<tr>
<td>Tampico-Misantla Block 2</td>
<td>2.1</td>
<td>Deustche Erdöl</td>
<td>Light oil and gas</td>
<td>$578</td>
<td>Jun 19, 2017</td>
<td></td>
</tr>
<tr>
<td>Southeastern Basins Block 8</td>
<td>2.1</td>
<td>Ecopetrol</td>
<td>Light oil</td>
<td>$804</td>
<td>Jun 19, 2017</td>
<td></td>
</tr>
<tr>
<td>Cárdenas-Mora farmout</td>
<td></td>
<td>Cheiron</td>
<td>Light oil</td>
<td>$192</td>
<td>Oct 4, 2017</td>
<td></td>
</tr>
<tr>
<td>Ogarrio farmout</td>
<td></td>
<td>Deustche Erdöl</td>
<td>Light oil</td>
<td>$162</td>
<td>Oct 4, 2017</td>
<td></td>
</tr>
<tr>
<td>Ek-Balam</td>
<td></td>
<td>none</td>
<td>Heavy oil</td>
<td>$6,600</td>
<td>May 2, 2017</td>
<td></td>
</tr>
<tr>
<td>Santuario and El Golpe</td>
<td></td>
<td>Petrofac</td>
<td>Light oil and gas</td>
<td>$1,590</td>
<td>Dec 18, 2017</td>
<td></td>
</tr>
<tr>
<td>Perdido Block 2</td>
<td>2.4</td>
<td>Shell</td>
<td>Light oil</td>
<td>$6,131</td>
<td>Jan 31, 2018</td>
<td></td>
</tr>
<tr>
<td>Perdido Block 5</td>
<td>2.4</td>
<td>none</td>
<td>Light oil</td>
<td>$6,131</td>
<td>Jan 31, 2018</td>
<td></td>
</tr>
<tr>
<td>Perdido Block 18</td>
<td>2.4</td>
<td>none</td>
<td>Dry and wet gas</td>
<td>$3,318</td>
<td>Jan 31, 2018</td>
<td></td>
</tr>
<tr>
<td>Perdido Block 22</td>
<td>2.4</td>
<td>Chevron and Inpex</td>
<td>Heavy oil</td>
<td>$4,747</td>
<td>Jan 31, 2018</td>
<td></td>
</tr>
<tr>
<td>Tampico-Misantla Block 16</td>
<td>3.1</td>
<td>Deustche Erdöl</td>
<td>Light oil and dry gas</td>
<td>$569</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cía. Esp. de Petróleos</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tampico-Misantla Block 17</td>
<td>3.1</td>
<td>Deustche Erdöl</td>
<td>Light oil</td>
<td>$569</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cía. Esp.de Petróleos</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tampico-Misantla Block 18</td>
<td>3.1</td>
<td>Cía. Esp. de Petróleos</td>
<td>Light oil</td>
<td>$569</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td>Cuencas del Sureste Block 29</td>
<td>3.1</td>
<td>none</td>
<td>Light oil</td>
<td>$541</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td>Cuencas del Sureste Block 32</td>
<td>3.1</td>
<td>Total</td>
<td>Heavy oil and dry gas</td>
<td>$474</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td>Cuencas del Sureste Block 33</td>
<td>3.1</td>
<td>Total</td>
<td>Light oil</td>
<td>$541</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td>Cuencas del Sureste Block 35</td>
<td>3.1</td>
<td>Shell</td>
<td>Heavy oil</td>
<td>$541</td>
<td>Mar 27, 2018</td>
<td></td>
</tr>
<tr>
<td>Ayín-Batsil farmout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nobilis-Maximino farmout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Clusters farmout (onshore)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL INVESTMENT</td>
<td></td>
<td></td>
<td></td>
<td>$49,563</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yet the farmout model had severe limits. Pemex expected them to raise its output from 1.9 million bpd in 2017 to 2.5 million by 2021. Even if that target was met, that would represent only modest growth and still be a long way from its 2004 peak of 3.4 million. Trión, for example, will not start production until 2022, with peak output not expected until 2025. The attempts to farm out Nobilis-Maximino and Ayín-Batsil failed, but even had they succeeded the fields would not have hit peak output until 2026. In theory, all the fields Pemex is considering farming out could produce 664,700 bpd—plus an additional 537 million cubic feet per day of natural gas—but not before 2026 even if everything goes perfectly. With the failure of Ayín-Batsil and Nobilis-Maximino, peak production from the remaining farmouts falls to 309,400 bpd in 2024. Worse still, since some of the fields are already producing, incremental production will be only 218,700 bpd.

Pemex has had more success at the auctions for new fields, particularly offshore auctions where it can offer partners access to its existing infrastructure. In theory, Pemex can attract roughly $21 billion of capital expenditure to replace its own plummeting expenditures and reduce its tax burden in the process. In practice, these are multidecade projects that will take a long time to execute. In addition, they expose Pemex to execution risk: the partners will take on much of that burden, but not all. In case of the farmouts, the glass is three-quarters empty and filling very slowly.

**Easing Fiscal Constraints**

Energy reform had a rapid and dramatic effect on Pemex. After oil prices sailed off a cliff from $98 per barrel in June 2014 to a nadir of $24 in January 2016, the company’s tax burden fell dramatically (figure 5.2). By 2017, the company paid only 48 percent of its revenue into federal coffers. That was still enough to drive Pemex into the red but the amount of red ink would have been incomparably higher under the old system.
The problem for Pemex is that its tax burden is still disproportionately high. Taxes per barrel in Mexico came to roughly $16.80 per barrel in 2016, down from $41 in 2014. Taxes are far lower for other Latin American state oil companies. Colombia’s Ecopetrol, for example, pays only $5.80 per barrel, Brazil’s Petrobras only $5.60, Argentina’s YPF only $1, and Ecuador’s Petroamazonas nothing.69 Admittedly, these figures ignore income taxes levied on the other Latin American companies—yet Pemex pays no income tax because it has no income after other taxes. The problem is worse for Pemex because its full-cycle cost, including finding and development expenses, runs around $36 per barrel.60 Unless the company can retain something around that amount, production will inevitably fall. The farmouts may allow Pemex to get around this particular obstacle; however, as mentioned, the farmouts have a long way to go before they can make a serious dent in Pemex’s constraints.

Could future administrations cut taxes further? The answer is almost certainly yes. Mexico’s two rounds of tax increases under the Calderón and Peña administrations have
been a success: public revenues have held up despite the meltdown in hydrocarbon revenues (figure 5.3). Mexico is still far from overtaxed even by Latin American standards. The government could increase rates and crack down on evasion. Moreover, rising oil and gas prices would raise revenues even under a more lenient tax regime. Whether the next administration will make such moves, however, remains to be seen. After all, neither the Calderón nor the Peña administration received much electoral benefit from their tax increases.

**Figure 5.3 Federal Taxes as Percentage of GDP, by Type, 2001-17**

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic hydrocarbon taxes</th>
<th>Hydrocarbon production taxes</th>
<th>Income taxes</th>
<th>VAT</th>
<th>Other taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2002</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2003</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2004</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2005</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2006</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2007</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2008</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2009</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2010</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2011</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2012</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2013</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2014</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2015</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2016</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>2017</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>

*Source:* SHCP. Note that “domestic hydrocarbon taxes” were negative between 2006 and 2014; that is to say, the Mexican government subsidized fuel consumption.

**Easing Managerial and Labor Constraints**

The energy reform did little directly to overcome Pemex's prime managerial constraint: namely, that it remained an organ of the federal government, subject to line item review by the treasury and Congress. Pemex had to justify, for example, all of its capital expenditure not only to its board but to the treasury in terms of meeting five-year
production targets. Management complained about the resulting inefficiencies and bottlenecks.

Pressures to keep the refining sector open meant that Pemex could do little about its biggest loss-producing center. Refined product output is down 37 percent since 2013 and Pemex refineries rarely use more than half their listed capacity. The twin natural disasters visited upon the Salina Cruz refinery—Hurricane Calvin in June 2017, followed by an earthquake in September—made matters worse. In 2015, the last year for which the earnings of the refining sector alone can be broken out, the sector lost $7.1 billion. The available data imply that things have improved from terrible to merely very bad in the years since: in 2015, the “industrial transformation” segment, of which refining is a part, collectively lost $5.5 billion. In 2017, losses had fallen to $2.9 billion. It was not clear that Pemex’s refining sector made any sense to be in Pemex’s hands; a private operator would certainly sell the plants and might even consider shutting them down. That said, Pemex’s management managed to institute a series of successful cost-cutting measures. It cut US$1.9 a year billion by renegotiating service contracts and saved an additional $300 million by shutting wells with lifting costs above $25 per barrel.

The reform, however, had two additional benefits: one direct and one indirect. The direct benefit was the pension reform. In 2015, the union agreed to increase the retirement age to 60 for employees with less than 15 years of service and migrate new employees to a defined contribution plan. In 2016, the government followed through on its end with a $4.2 billion bailout. The indirect benefit was that Pemex was able to get a start on reducing its overstaffing. The company shed almost 30,000 employees in a three-year period. What it is surprising is how easily Mexico’s strongest union—or what once had been its strongest union—folded into this plan. Layoffs hit unionized and nonunionized workers alike; in fact, the share of union workers declined slightly during the mass layoffs of 2015.

Alternative facts are not an American monopoly: in a startling 2014 declaration, union leader Carlos Deschamps declared that energy reform would bring no layoffs. Even
more startlingly, Deschamps denied that the mass firings were taking place once they had begun. According to him, only oil workers employed in private companies lost their jobs.\textsuperscript{68} Unfortunately, as figure 5.4 shows, the reality was otherwise.\textsuperscript{69}

![Figure 5.4 Pemex Employees and Union Share, 2002-17](image)

\textit{Source: SEC Form 20F, various years.}

Deschamps went along with the official line because he was corrupt and the Peña administration had him in their grasp. Why, however, was the union quiescent? Deschamps could have been voted out; even if not, a series of wildcat strikes could have erupted, in shades of the movement that brought down the private oil companies in 1938. The reason was twofold. First the layoffs disproportionately hit Tabasco, Campeche, and Veracruz. There workers did vocally demand the rollback of the energy reform, secret union elections, and the firing of their \textit{cacique}—that is, the political boss—Carlos Romero Deschamps.\textsuperscript{70} Some senators asked that Pemex produce a report on the causes of these massive layoffs and urged the secretary of labor to design policies to protect oil workers' rights.\textsuperscript{71} But regional disquiet could be contained. More important, the Pemex workers who managed to hold on to their jobs continued to see their real annual wages climb steadily in a country where average wages had been stagnant for more than two decades...
(figure 5.5). There was a round of Pemex wage hikes in 2015, after which wages barely outpaced inflation—but outpace inflation they did.\textsuperscript{72}

**Figure 5.5 Pemex Wages and Mexican Wages, 2002-17**

\textsuperscript{72} The problem for Pemex was that there was a long way to go before labor costs came under control. Payroll as a share of revenue increased when the layoffs began. It only began to fall in 2017, as rising oil prices took off some of the pressure. Nonetheless, payroll remained around 6 percent of revenue, similar to its pre-reform level (figure 5.6). Productivity similarly failed to improve, as Pemex’s upstream production continued to fall and its downstream refineries remained inefficient, money-losing wrecks. Considering Pemex’s high cost structure and the fact that it was still overstaffed compared to other Latin American national oil companies, more layoffs were a likely prospect—unless a future labor-friendly presidential administration, perhaps led by a native son of one of the badly hit states, headed them off.\textsuperscript{73}
Red Flags Ahead

Energy reform has been relatively good to Pemex. Round Zero gave the company the proven reserves that it wanted. Pension reform let it shed some, albeit not all, of its unfunded liabilities. A cowed union let it fire 20 percent of its labor force. The farmouts gave it access to outside equity capital. And taxes fell substantially. Despite all that, the enterprise remained troubled. Production declined, the refineries remained a money sink, and productivity did not improve. Pemex continued to lose money.

The result was a dramatic increase in debt: a 40 percent rise in total liabilities net of pensions since 2013. In basic accounting terms, Pemex was insolvent, with liabilities exceeding assets, US$184 billion to US$108 billion. In the real world, however, companies can recover from long periods of negative equity, even in the absence of a bankruptcy restructuring. Pemex continued to issue debt in international markets. The question was: how sustainable was the model? Did investors have confidence that the tanker would turn around?
Much of Pemex’s problems derived from low oil prices. Its overall debt sustainability indicators were not out of line compared to Latin America’s other big national oil companies. Financial fragility has plagued both YPF and Petrobras. Interest coverage—defined as earnings before interest and taxes (EBIT)/interest—has plunged for all three companies since 2014. Like Petrobras, Pemex managed to improve its debt maturity profile by swapping short for long term debt (table 5.3.) By 2017, short-term debt had fallen from 16 percent of the total portfolio in 2008 to only 8 percent. Nonetheless, Pemex does not have a robust liquidity position and will continue to have to borrow to meet upcoming obligations.

Table 5.3 Debt Indicators, 2017

<table>
<thead>
<tr>
<th></th>
<th>Pemex</th>
<th>Petrobras</th>
<th>YPF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest coverage</td>
<td>0.91</td>
<td>1.51</td>
<td>0.56</td>
</tr>
<tr>
<td>EBIT/Interest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short term debt</td>
<td>9%</td>
<td>6%</td>
<td>21%</td>
</tr>
<tr>
<td>share of total debt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spread over sovereign basis points</td>
<td>145</td>
<td>127</td>
<td>179</td>
</tr>
</tbody>
</table>

Source: Bloomberg

Markets appeared to have confidence that the supertanker could be turned around without hitting the shoals, although that confidence was not absolute. Pemex is linked to the Mexican federal government, which probably would intervene if the firm headed towards default. The key word is probably. That probability can be measured by the spread on Pemex bonds over Mexican federal bonds provides a measure of perceived risk; the bigger the spread, the riskier Pemex bonds are relative to Mexican federal bonds.

Pemex bond spreads took a rollercoaster ride after the reform. Little changed when reform passed, but spreads dropped almost 60 basis points in May 2014 (figure 5.7). Yields then spiked again in late 2015, as oil prices entered into an unexpected second round of decline. (The dashed yellow line shows the price of the Mexican export blend.) Analyzing every turn in market is a mug’s game, but the available data indicate that the
bond spreads of other large Latin American national oil companies followed a similar path (figure 5.8).

Figure 5.7 Spread on Five-Year Pemex Bonds over Mexican Federal Bonds

Source: Bloomberg
Yet one should not take too much comfort in the bond spread. As the saying has it, “Things which cannot go on forever, don’t.” Pemex’s current imbalances are unsustainable. To be clear, this does not mean that the firm is headed inevitably toward a restructuring. So far, the federal government has shown that it will support Pemex. It injected $1.5 billion in equity in 2014, $631 million in 2015, and $9.9 billion in 2016, in addition to the aforementioned $4.2 billion in return for negotiating the pension cuts. The federal government likely will continue to bail out Pemex in the future. More straightforwardly, it could cut Pemex’s taxes. But the risk of a market panic followed by a liquidity crunch and Pemex-induced financial crisis is very real.

**Conclusion**

The 2013 energy reform revolutionized the management of Mexico’s energy reserves. In that sense, it also revolutionized Pemex, because the company now had to compete for access to reserves. Pemex also lost its monopoly over the midstream—product pipelines, tank farms, and the like—and over retail fuel sales. It was much less revolutionary,
however, in its direct effect. In fact, by some metrics the reform was downright conservative as far as Mexico’s national oil company was concerned.

The reform aimed to make Pemex competitive by reducing the constraints on its performance. It attempted to give the company tools to access equity capital via the farmouts, reduce the tax burden, and increase operational flexibility by weakening union power both formally and informally. These reforms were partially successful. Pemex has farmed out operations that should increase its production by at least 200,000 bpd and possibly more than 600,000 bpd over the next six years, and has reduced its costs and improved its debt management. What Pemex has not been able to do, however, is move securely into the black. It is still overstaffed, facing rising labor costs while productivity continues to decline. The farmouts cannot raise output quickly, and its operational flexibility leaves much to be desired. The refining sector remains a millstone that the company can neither properly reform nor abandon. And it is telling that “research and development” is not even a line-item on the statement of operations on the company’s 20-F filing.

More reforms are possible. A future Congress could vote to make Pemex into a real limited liability company. It also could vote to cut the company’s taxes dramatically. Realistically, however, such reforms do not seem to be on the table. Rather, with AMLO’s rise in the polls, a rollback of the reforms seems like a much more realistic possibility.

Many observers have taken a false confidence in the fact that the energy reform was passed as a constitutional amendment. On paper, the Mexican constitution is hard to reform, but in practice it is much less difficult, having been amended an average of once every seven weeks over the past six years. Mexico’s parties are highly centralized and happy to logroll. As a practical legal matter, it would be difficult to repeal existing contracts without paying significant compensation—as Mexico discovered back in 1938—but it would not be hard to change the law going forward. In fact, it might not even take a legal change: Pemex has already been privately accused of slow-walking the opening of its midstream assets even though the company could make money doing so. Right now, the
energy ministry is pushing for openness. A political movement opposed to the reforms could stop auctioning off new blocks, allow Pemex to muscle the competition, and take credit for the increase in production already underway through existing farmouts and joint ventures.

AMLO is unlikely to retake existing concessions and give them back to Pemex. He is also unlikely to push through his quixotic desire to build a slew of new refineries. But he very well might throw sand into the gears of energy reform in a desire to protect Pemex and what Pemex used to represent in Mexican politics. Such a strategy would not protect Pemex as an enterprise and eventually it would come at a large fiscal cost. But as we have seen in many countries—not least Mexico’s northern neighbor—politicians often incur real future costs to satisfy today’s symbolic goals.

3 For a history of the Mexican Revolution, see Stephen Haber, Noel Maurer, and Armando Razo, *The Politics of Property Rights* (Cambridge, UK: Cambridge University Press, 2003), particularly chapter 3.
4 Ibid.
5 Exploratory wells increasingly came up dry, and the average initial capacity of a successful well dropped from a peak of 24,800 barrels per day (bpd) in 1920 to only 3,600 bpd by 1929. See Haber, Maurer, and Razo, “When the Law Does Not Matter.”
8 Ibid., 24.
12 All compensation figures are given in net present value terms at the time of the expropriation. See Noel Maurer, “The Empire Struck Back: Sanctions and Compensation in the Mexican Oil Expropriation of 1938,” *Journal of Economic History* 71, no. 3 (2011), 608.
Castaneda, April 6, 2007, “Political economy of the Pacto por Mexico,” World Energy Outlook—x burden on the company to 57
duties. The effect was to reduce the ta
Pemex's tax burden, as part of a general tax reform that imposed the first corporate income tax in Mexican
would allow its management to game a more complicated system. In 2006, the government reduce
increased the effective burden to roughly 63
nominal dollars using a 2013 exchange rate of 12.77 pesos per dollar.
Pemex employment and wages from Pemex,
Pemex employment and wages from Pemex, Anuario Estadístico 2016, 10, Table 1.3.Mexican average wages from the Organization for Economic Cooperation and Development (OECD). All figures are in nominal dollars using a 2013 exchange rate of 12.77 pesos per dollar.
Calculated from data in Pemex’s 2013 20-F filing.
Before 2006, the federal government claimed 60.8 percent of Pemex’s gross revenues. (Additional levies increased the effective burden to roughly 63 percent.) The government feared that corruption within Pemex would allow its management to game a more complicated system. In 2006, the government reduced Pemex’s tax burden, as part of a general tax reform that imposed the first corporate income tax in Mexican history at a flat rate of 19 percent. The law replaced Pemex’s gross receipts tax with a complex set of new duties. The effect was to reduce the tax burden on the company to 57 percent of income, but this was not enough to consistently lift the company out of the red.
Ibid., p. 27.

Mayer-Serra, “Reforma de la Constitución,” 34.


The SEC defines “proved” (1P) reserves as hydrocarbons with a 90 percent probability of being extracted at current prices. “Probable” reserves have a 50 to 90 percent probability of being extracted at current prices. “Possible” reserves have a less than 50 percent probability of being extracted. The higher the hydrocarbon price, the more resources the firm can profitability devote to extraction. Because the probability of extraction changes with the price of hydrocarbons, reserves rise with prices even if the firm conducts no exploration. Conversely, if prices fall, then the decline in reserves will exceed the amount of hydrocarbons actually extracted by the firm.


Adrian Lara, “The Evolving Role of Pemex and Its Future Position in the Upstream Sector,” Forum (June 2017), 17.

2013 production costs from Pemex’s 2015 20-F filing, p. 41.

For an example of how this offsetting worked, see page F-119 of the company’s 2017 20-F filing with the U.S. Securities and Exchange Commission (SEC).


Negroponte, “Mexico’s Energy Reforms Become Law.”

Data provided by SENER officials.

The verb in Mexican Spanish for “farm out” is farmoutear.


Including Ek-Balam.

Authors’ calculations.


Ibid., 7.

Pemex 2017 20-F filing, p. 58.

Ibid., 173.


Montes, “Pemex, Union Agree to Overhaul Pension Benefits.”


“Senado echa al sindicato del consejo de Pemex.”


Note that 20-Fs record number of employees but the Anuario Estadístico refers to the same number as “plazas.” Since SEC rules demand the reporting of actual human employees and not the number of official posts, this assessment goes with employees.


The annual salary increase fell from 4.75 percent per year in the 2011–13 contract to 3.12 percent for the 2017–19 period, but the latter contracts increased the “productivity bonus” that workers receive if they meet institutional goals and objectives from 26.99 percent to 29.5 percent. See the 2013 and 2017 “Contrato Colectivo de Trabajo celebrado entre Petróleos Mexicanos por sí y en representación de sus empresas productivas subsidiarias y el Sindicato de Trabajadores Petroleros de la República Mexicana” [Collective labor agreement concluded between Pemex itself and on behalf of its subsidiary production companies and the Oil Workers Union of the Mexican Republic].


In peso terms, the injections were 20 billion in 2014, 10 billion in 2015, and 184.2 billion in 2016. Moody’s Investors Service, “Petróleos Mexicanos: Update Following Ratings Stabilization,” Credit Opinion, April 13, 2018.

20-F filing, F-3.