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Mexico's Energy Reform

Introduction

In 2013, the Mexican government embarked on a series of institutional reforms, ending a decade-long political gridlock to enhance economic growth and competitiveness. The government targeted the energy sector, among others, and set out a process of making it more competitive, lower cost and environmentally sustainable. The government amended Mexico's constitution to allow private investment in both the electric and petroleum sectors. These amendments, plus a series of laws enacted in 2014 would end the 75-year-old monopolies held by two state-owned behemoths – Pemex and CFE. Henceforth, Mexico intended to attract domestic and foreign investment into the energy sector. Moreover, it initiated policies to harness its substantial resource potential, such as solar, wind and geothermal power, and deep-water oil, which had long been underdeveloped. And it would build a modern energy infrastructure, utilizing inexpensive natural-gas imports from the USA.¹

Yet shortly after the reforms were announced, oil and gas prices began to fall. "The reform was important under high oil prices," observed Mexico's Finance Minister Jose Meade, "but became crucial with low oil prices."² This situation induced decreases in investment and energy efficiency. While the Mexican government had just adopted international best practices, the transformation of Pemex and CFE would prove to be difficult. Both institutions had decreasing productivity and increasing debts, and the government's plan to make them profitable enterprises had not yet come to fruition. With oil prices in the \$40s during much of 2016, some wondered whether the reforms would attract suitable investors and yield the goals of (1) lower prices, (2) cleaner energy, and (3) shared benefits. Could the Mexican government and its new investors balance both bold and prudent actions in a manner that deployed intensive regulation, rather than privatization, to facilitate efficiency and growth?³ Could they "make national champions into competitive firms," asked Miguel Messmacher, Undersecretary of Finance, while "generating market incentives and increasing corporate governance?"⁴

Energy in Mexico

Commercial oil production began in Mexico in 1901, although the amounts produced were too small for companies to export until 1911. The prospect of producing oil drew entrepreneurs and oil workers from the US and Britain to the region, and US investment grew from 38.5% of total investment in 1911 to 61% by 1921 as the reserves proved bountiful.⁵ Mexico was the second largest producer of oil in the world by the early 1920s, with production peaking in 1921.⁶ The Mexican Revolution (1910-

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1920) took place during this expansion in oil activity, though since the sector was dominated by very profitable foreign firms (helping to finance the revolution), the industry kept growing. By the 1930s foreign companies such as the Mexican Eagle Company (a subsidiary of the Royal Dutch Shell) and the Standard Oil Company of California (now Chevron) dominated the industry.⁷

During the revolution, Mexico's Congress approved the Constitution of 1917, which was meant to uphold the principles of the revolution while declaring government ownership of all subsoil resources. While the government allowed foreign companies to operate after the Constitution was implemented, growing disputes between Mexican labor and the foreign oil companies concerning unfair treatment of Mexican workers led to then-president Cardenas' expropriation of oil in 1938. Cardenas created *Petróleos Mexicanos* (Pemex), the state-owned Mexican oil firm that would monopolize the industry. Pemex became an important symbol of independence to many Mexicans, and state-ownership of oil was described as being of "quasi-religious significance" to the Mexican people.⁸

Electricity in Mexico was initially provided by regional private firms, which only serviced the areas they found profitable. In 1937, the government created the *Comisión Federal de Electricidad* (CFE), a state-owned electricity firm, to regulate the private monopolies and to service the areas that they neglected, as demand for electricity was rapidly growing.⁹ Following CFE's creation, hundreds of regional electricity monopolies were consolidated, and CFE's market share gradually increased. CFE grew to cover almost the entire country, except for the area surrounding Mexico City, which was serviced by the local state-owned firm *Luz y Fuerza del Centro* (LFC) after the 1960 nationalization of the electricity industry.¹⁰ Nationalization was justified by the concept that the electricity industry was a natural monopoly, a prevalent idea at the time.

Mexico's government taxed Pemex heavily; by the 1980s the company was taxed at 69% of its total income, which provided approximately one-third of government revenue.¹¹ This heavy tax burden limited Pemex's resources for increasing exploration and downstream investment opportunities. It also enabled the government's acceptance of the company's growing inefficiency. Pemex's production increased in the 1970s after extensive oil discoveries, but growth in productivity was stunted as it became increasingly controlled by the oil workers' labor union. Overstaffing, inefficiency and corruption prompted the government, under President Carlos Salinas, to require Pemex to account for its internal finances, leading to a massive layoff of workers. Between 1989 and 1995 Pemex cut its staff nearly in half, though it still had more employees than firms such as Exxon, which generated 5 times Pemex's revenue.¹² In 1992, Pemex was split into 4 subsidiaries, each with its own board of directors, in the areas of exploration, refining, gas and chemicals. In that same year the government allowed independent power producers (IPPs) to participate in power generation and natural gas (although they had to sell their production to CFE through power purchase agreements) and also allowed for self-supply and cogeneration schemes.¹³ And in 1997 Pemex's secondary petrochemical plants were privatized, though this was met with many angry protests staged by oil workers.¹⁴

Most Mexican oil workers were represented by the *Sindicato de Trabajadores Petroleros de la República Mexicana* (STPRM), the oil union that had historically wielded much power in Pemex. Union members typically commanded high salaries, medical care, and other benefits that earned them the reputation of an "aristocracy of labor" by the rest of Mexico's society.¹⁵ However, the union's reputation was tarnished in 1989 when its leader was arrested on charges of murder and illegal arms possession. It was further tainted in 2001 when the union was found to have illegally funneled funds to the PRI's presidential candidate, a scandal known as "Pemexgate."

Additional changes unfolded during the leadership of President Calderon, who in 2008 pushed through reforms to allow the appointment of independent directors, thereby lowering political and labor union influence (though there were still 5 union members on the board). This also provided

Pemex more discretion in investment decisions.¹⁶ Privatization was not accomplished, but incentives to foreign firms working with Pemex were provided. Calderon's reform created the *Comisión Nacional de Hidrocarburos* (CNH), which acted as a regulator that reported to the Ministry of Energy (SENER). Calderon also eliminated the inefficient LFC, merging their operations with CFE's, which made CFE the main provider of electricity throughout the country. While these reforms were a diluted version of what Calderon initially desired, they were a step towards a more autonomous industry.

As of 2015, Mexico reported 13 billion barrels of proven oil reserves, a 21% decline from 2014,¹⁷ and 112 billion barrels of potential reserves.¹⁸ Some actually thought Mexico contained oil and gas reserves comparable to Saudi Arabia's, and, according to the US Energy Information Administration, Mexico's shale gas and oil reserves were the 6th and 8th largest in the world, respectively.¹⁹ Nonetheless, output from Mexico's largest oil field, Cantarell, had fallen 80% since 2004.²⁰ Oil production had begun a decade-long decline, falling by almost 1 million barrels per day by 2015; natural gas production too had been declining since 2010, resulting in increased imports from the United States (see **Exhibits 1, 2**). Only the discovery of four shallow-water reserves in 2015 and some improvements in production efficiency that increased non-Cantarell production by 58%, assuaged a negative outlook caused by the depletion of known sources, lack of new exploration, Pemex's high debt levels and low oil prices (see **Exhibit 3**). One observer described Pemex's tendency to focus on extraction rather than exploration as "running faster just to stay in place."²¹

Pemex was traditionally viewed as a revenue maximizer for the state, striving to increase volume, rather than profitability. Pemex's lack of investment resulted in deteriorating infrastructure and poor maintenance, which itself resulted in yearly accidents throughout Mexico.²² While Pemex still controlled the hydrocarbons sector in upstream, midstream and downstream operations, it only produced 16 barrels of crude oil per worker per day, compared with 25 barrels at British Petroleum and 33 barrels at Brazil's Petrobras.²³

CFE was the highly indebted SOE still in charge of providing electricity to the country, though in 2014 its prices for industrial, commercial and high-consumption residential establishments were 85%, 135% and 149% higher than in the US, respectively, even *with* government subsidies.²⁴ Between 2000 and 2013 electricity demand in Mexico increased by 3.3% annually.²⁵ CFE had increased electricity generation by 2.7% between 2014 and 2015, and independent power producers were contracted to build many of the new generation projects in order to meet the increased demand.²⁶ IPPs already generated about 40% of Mexico's electric power. Yet transmission expansions were reliant on CFE's strained budget, which, combined with high oil and gas prices in the 2000s, resulted in price increases for industry and residents (see **Exhibit 10** for Pemex and CFE's income statements).²⁷ CFE forecast that demand would increase by 3.7% per year in the next decade.²⁸

Mexico's transmission and distribution network, controlled by CFE, consisted of 550,000 miles of lines; nearly half of them were 20 years old or more (see **Exhibit 6**).²⁹ The networks were afflicted by significant distributional losses: in 2012 CFE reported that nearly 16% of transported energy had been lost in distribution (a percentage nearly three times that of the OECD average).³⁰ Significant portions of the losses were non-technical (i.e. due to theft).

Corruption plagued both Pemex and CFE, further hindering their productivity and efficiency. In 2010 the Ministry of Public Service deemed Pemex the "most corrupt entity" of the Mexican government.³¹ Not to be outdone, CFE allegedly surpassed Pemex in corrupt practices in 2011, when it topped the list of government agencies with financial irregularities after a series of bribery scandals.³² Additionally, in 2015 Pemex and CFE were both listed among the world's top ten money losers by Fortune, with Pemex coming in at number one (it lost \$10 billion more than its nearest competitor).³³

Mexico's economy depended on the hydrocarbons and utilities sectors – 4.7% and 1.8% of Mexico's GDP, respectively - in 2015 (see **Exhibits 8, 9** for budget information).³⁴ In order to maintain, or even increase their contribution to GDP, it was apparent that changes were badly needed. Though long-lived, the energy industry monopolies were clearly suffering from lack of investment, productivity and efficient management, deficiencies that seemed unlikely to correct themselves in the near future.

The Reform

Enrique Peña Nieto was elected president of Mexico in 2012, reinstating the Institutional Revolutionary Party (PRI) as the dominant party in Mexico. The PRI had controlled Mexico for 70 years, until a rival, right-wing party (PAN) won in 2000 and 2006. The PRI's reputation was generally marred by authoritarianism, corruption and patronage. Peña Nieto strove to distance himself from his party's reputation, promising to break with the past in favor of a more democratic and transparent government.³⁵ The day after Peña Nieto was sworn into office the three main political parties signed the *Pacto Por Mexico* (Pact for Mexico), a wide-sweeping initiative with the goal of ending the inertia that had afflicted Mexico's economy for years. Mexico's GDP had grown at just 2.4% annually from 1980-2010, low relative to other middle income countries and to its own pre-1980 growth rate.³⁶ Peña Nieto's administration attributed slow growth rates to oligopolistic market distortions, low productivity, corruption and financial exclusion.³⁷ The Pacto set forth reforms meant to address these issues in the areas of fiscal policy, education, social security, finance, politics, telecommunications and energy. It even set goals and deadlines for each.

The energy reform intended to transform the sector into an open market, with increased competition from private players and accessibility to foreign companies for the first time since 1938. Its goals were to lower electricity and fuel prices by increasing efficiency, improve the balance of payments, share the benefits with society and increase the amount of clean energy, all in a transparent manner. CFE and Pemex were to become "productive state enterprises," equipped with new boards of directors and corporate structures while being subjected to performance evaluations.³⁸ They were re-designed to have more technical, management and budgetary autonomy, and their corporate information would be made publicly available to increase transparency.³⁹ "Both transparency and competition would help to reduce corruption," said Francisco Salazar, the head of *Comisión Reguladora de Energía* (CRE) until 2015, "but it will take time."⁴⁰ The reform aimed to add 500,000 jobs by 2018 and 2 million by 2025, and to add 1% to GDP growth by 2018 and 2% by 2025.⁴¹ The government presented a goal of generating 35% of total energy from clean sources by 2024, rising to 50% by 2050.⁴² To attain these objectives by the set deadlines, the Mexican government quickly began drafting the legislation needed for their implementation.

To facilitate this reform agenda, Mexico's Congress ratified amendments to the constitution in December of 2013. Secondary legislation was drafted and introduced to Mexico's Congress in April 2014, and was signed into law just 4 months later. The constitutional amendments pertained to Articles 25, 27 and 28 of Mexico's constitution and allowed for private participation under contract or permit in most areas of the oil, gas and electricity sectors, though sub-soil resources remained the property of the state.⁴³ The secondary legislation consisted of 9 new laws and 12 modifications of existent laws that updated the regulation of hydrocarbons and electricity, specified the roles for different agencies, revised the taxation of the sector and regulated the environmental and social issues surrounding the industry.⁴⁴ The government drew upon global best practices, such as the US' Department of the Interior's work on bidding and Norway's management of its oil fund.⁴⁵

Government and regulatory agencies, such as SENER, the Ministry of Finance, the CNH and the CRE, were restructured to increase transparency and independence and to facilitate competition (see

Exhibit 16 for the new regulatory structure). According to the former head of the CRE, they needed to be strengthened to convince new players that the rules would not be taken on political grounds and would be even for all players.⁴⁶ SENER dictated Mexico's energy policy and was placed in charge of choosing the upstream areas for auctions, the bidding schedule, applying specific models to each contract and devising details for non-financial contracts.⁴⁷ SENER was also responsible for the planning and expansion of the national grid and setting the requirements for clean energy certificates. The Ministry of Finance was meant to create the financial section of each upstream project's contract and to participate in auditing. The CNH was put in charge of conducting national bids and awarding oil and gas contracts while regulating extraction-related activities. It no longer had to report to SENER, though it was expected to provide technical advice to SENER when needed, and it was given its own budget. Finally, the CRE was tasked with regulating and granting permits for storing, transporting, and distributing oil and gas products.⁴⁸ Both the CNH and the CRE were structured as independent government regulatory agencies. The bidding process, results and contracts for exploration and extraction were to be released as public information, as were the sessions and agreements that the CNH and the CRE were involved with.

Two new independent systems operators were created as part of the reform process: The National Center for Natural Gas Control (CENAGAS) and the National Center for Energy Control (CENACE). CENAGAS was formed to administer and coordinate the natural gas pipeline grid and the management of natural gas, and began operations in 2015.⁴⁹ CENACE, under the purview of SENER, was meant to control, monitor, and ensure fair competition in the wholesale electricity market and the power grid.⁵⁰ It had previously been a subunit of CFE. Each market participant (categorized as either a power generator, a qualified user with demand of at least 1 MW, a supplier or a non-supplying trader) will have to enter into an agreement with CENACE before conducting transactions.⁵¹

Additionally, the National Agency for Industrial Safety and Environmental Protection of the Hydrocarbons Sector was created to regulate industrial and operational safety and the environment in Mexico's hydrocarbons industry. A further aspect of the reform required companies to share benefits with the Mexican state and with their host communities and to undergo social impact assessments in addition to the already-mandatory consultations with indigenous communities that SENER was responsible for.⁵² These social impact assessments would be submitted to SENER.⁵³

The Mexican Oil Fund, created as a trust within the Bank of Mexico, was established to manage the non-tax income earned on assignments to Pemex and contracts made on the nation's hydrocarbons. It would be responsible for allocating payments to the contractors. Prior to the reform, oil funds had been used solely for budgetary purposes. Beginning in 2015, after the fund reached 4.7% of GDP (which would go towards the government's budget) and after that a further 3% of GDP (which would go towards national savings), up to 60% of the industry's surplus would be put towards research and development (10%), oil and gas projects and infrastructure (30%), scholarships, regional development, etc. (10%), and a universal pension fund (10%).⁵⁴ The fund was designed to operate in a transparent manner by publishing the origin and destination of the oil money it directed.

Finally, the government created a new financing vehicle to draw investment into the energy sector and to ease the monetization of Pemex's and CFE's assets. The instruments, known as Fibra E, were energy investment trusts that would be publicly traded to allow outside investment in energy companies' assets and would receive favorable fiscal treatment. Companies would be able to issue Fibra Es to investors and monetize their assets by placing their holdings in operating infrastructure and energy projects in a trust.⁵⁵ The trust would issue investment units that would be publicly offered on the Mexican stock exchange. Their design drew from the US's master-limited partnerships, which financed the shale boom. While Fibra Es could be used for power sector assets, use of them was not

allowed for upstream investment.⁵⁶ Private energy firms were able to use the instruments to raise capital as well, though the mechanism favored mature assets such as pipelines and transmission lines which were more stable sources of revenue for the bondholders.⁵⁷ The Mexican Securities Industry Association estimated that Fibra Es could generate \$70 billion of additional investments by 2020, however by 2016 there was still no usage of them.

Hydrocarbon Sector Reforms - Pemex

Reforms pertaining to hydrocarbons focused on increasing the productivity of Pemex while attracting foreign investment to the industry. As part of its transformation into a productive state enterprise, Pemex's subsidiaries were reduced from four, which were viewed as too cumbersome, to two. The two subsidiaries were in the areas of exploration and production, responsible for upstream activities, and industrial transformation, which was responsible for gas processing, NGL fractionation, crude oil refining, and petrochemical production. They were expected to share services, and some claimed that this measure could save Pemex \$10 billion.⁵⁸ Additionally, the government created 5 new subsidiaries in the areas of drilling, logistics, cogeneration and services, fertilizers and ethanol.⁵⁹ Pemex also planned to centralize activities such as human resources, legal, and financial, as well as others, to further streamline the company.

Long criticized for organized labor's control over the company and inflexible relations with workers, the reform removed the 5 members of the oil labor union from Pemex's board, added five public members (including two businessmen, an editorial writer and a finance professional) and lowered the number of government representatives to five (Secretaries of Energy, Finance, Economy and Environment, and the Undersecretary of Hydrocarbons).⁶⁰ Pemex's CEO was not on the board, though he would still be present at board meetings. The total number of board members was reduced to 10 from 15, with the energy secretary as the board president.

With regard to the high debt levels (\$87 billion in 2016) that hindered the company's performance, the reform included an overhaul of Pemex's pension system and sought more flexibility in labor relations. To increase Pemex's profitability, the government proposed that it assume a portion, equal to half of the savings the company and the union could agree upon, of Pemex's \$90 billion of unfunded pension liabilities.⁶¹ 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 spouse. These high pension obligations could impede Pemex's ability to compete with private companies, and one of the goals of these changes was to allow Pemex to compete on equal footing with new entrants, particularly in an environment of low oil prices.

The government stipulated that, before it adopted this portion of Pemex's pension liability, Pemex had to negotiate with the oil workers union to increase the retirement age to 65 and to transition to more transparent practices.⁶² Pemex entered into talks with the oil union in 2015, and by 2016 the union had agreed to an increase in the retirement age to 60 for employees with less than 15 years of service and the introduction of a defined contribution plan for new employees, as well as other changes.⁶³ In 2016 the government provided a \$4.2 billion bailout to the company, and the company cut its budget by \$5.5 billion in the face of falling oil prices and a depreciated peso against the US dollar (see **Exhibit 11**). Shortly afterwards Pemex agreed to a one-year 3.17% pay increase for its unionized workers, although 30% of high-level executives were let go (a total of 15,000 workers were laid off).⁶⁴ Emilio Lozoya Austin, Pemex's former CEO, resigned after three years of losses, and Peña Nieto replaced him with José Antonio González Anaya. Pemex planned to lower investment in unprofitable production and to defer long-term projects, among other goals (see **Exhibit 12**).

José Antonio González Anaya, Pemex's CEO since February 2016, had met inefficiency and corruption head-on. For instance, around 81% of contracts for procurement were directly assigned when he arrived. On his first day, the administrative head reported that they were buying 50,000 desktop computers; Anaya asked why they weren't leased? After discovering that they were overpriced by 100%, Anaya cancelled the purchase – saving 3 billion pesos on day one. Over the next 9 months, they cut 100 billion pesos more in costs – 20% of budget and 50% of investment.⁶⁵ Pemex's strategy for 2016-2021 included concentrating on profitable exploration and production opportunities, entering into partnerships with other companies, increasing operational and budgetary discipline and increasing cost efficiency.⁶⁶

The government also underwent a fiscal reform, which resulted in reduced tax rates for Pemex and higher income and consumption tax rates for the rest of the economy. Before the reform, Pemex was responsible for paying income tax as well as 10 additional taxes. The reform lowered this to only 3 taxes, in addition to the income tax; Pemex was expected to pay 36% less in taxes and royalties each year.⁶⁷ Pemex's tax restructuring was implemented in 2015, a year in which Pemex reported a net loss of \$30.3 billion after paying \$22.9 billion in taxes and duties.⁶⁸ This reform aimed to increase Pemex's investment in sophisticated technology and exploration, which could help it increase productivity and competitiveness. The government gave Pemex the choice of the pre-reform cost cap of \$6.5 USD per barrel or a percentage that depended on the price of oil, whichever resulted in higher revenues. The percentage approach would allow Pemex to pay lower taxes when oil prices are low, but higher ones when prices are high.⁶⁹ Still, "Pemex is the largest tax contributor," said Anaya, "about 15%. If Pemex's taxes deviate, I get a call..."⁷⁰

To make up for the lower oil and gas taxes the government expected more funds to come from taxation on new private companies and from the higher tax rate enacted on the non-oil economy. And progress was being made: after oil prices fell, government take from Pemex decreased by 4.3%, but this loss was more than made up by the fiscal reform.⁷¹ However, the Ministry of Finance retained the right to adjust tax rates in the future so that the government could sustain public expenditures.⁷²

Hydrocarbon Sector Reforms - Competition

Private companies were now to participate in the exploration and extraction of hydrocarbons under four types of contracts chosen by the government. The new options were production-sharing agreements, profit-sharing agreements and licenses, and the previous option of service contracts was still available. The government also allowed a combination of the four options. Production-sharing agreements allowed the contractor to keep in-kind production that covered costs and their share of operating profit and then to deliver the remaining production to a marketing firm hired by CNH.⁷³ Profit-sharing contracts required the private company to deliver all of its production to CNH's marketing firm, with the Petroleum Fund paying it its share of profits. Licenses would be granted through a bidding process conducted by CNH, allowing the contractor to have a right to the minerals it extracted after paying a variety of fees to the Mexican government. Service contracts were agreements whereby a private company would sell the hydrocarbons it extracted to the Mexican government at a price stipulated in the contract (see **Exhibit 13** for oil and gas market framework).⁷⁴ The Mexican Petroleum Fund would be responsible for delivering payments. All upstream projects, excluding deep water activities, had to be composed of at least 25% national content^a by 2015 and 35% by 2025. Deep water exploration and extraction must use 8% of national content by 2025.⁷⁵

^a National content refers to local (in this case Mexican) suppliers, workers, and inputs.

SENER and the CRE were allowed to issue permits enabling private firms to participate in refining, gas processing, transportation, storage, distribution and petroleum marketing activities. Pemex had dominated the petroleum product market in Mexico, as all of the gas stations were its franchises, though it was vastly inefficient and imported about half of the gasoline that Mexico consumed. With demand for petroleum products growing in Mexico, an influx of new providers was warranted, though stimulating competition in an area with an all-encompassing incumbent firm would be complicated. Additionally, the number of gas stations in Mexico was controlled by the government, but the growth in the number of stations did not match that of demand.

Private firms were able to import gasoline beginning in April 2016, provided they had the necessary permit from CRE. 123 permits for the import of gasoline and 174 for the import of diesel had been approved by September 2016.⁷⁶ Gulf Oil International received a retail permit in 2016 and planned to open 100 gas stations in Mexico within the first year.⁷⁷ They would have to use Pemex's infrastructure to import product into Mexico, as Pemex controlled the distribution networks (which were regulated by CRE). Prices were also to be opened to competition: After nationalizing hydrocarbons, the government set a maximum price at which fuel could be sold, with all retailers selling at that price, but it began to liberalize fuel prices in 2017.⁷⁸ On January 1, 2017, gas prices increased 20% in some parts of Mexico, prompting panic buying and protests.

The newly created CENAGAS was given control over the approximately 5,500 mile national natural gas pipeline system and was to focus on supporting a competitive natural gas transportation and storage market. Pemex, which previously had controlled most of the pipeline system, would provide operations and maintenance services.⁷⁹ Private companies that owned gas pipelines were able to integrate into the grid and would be subject to open-access discipline.⁸⁰ The CRE provided permits for the transport and distribution of crude oil, but the law gave little guidance as to how private companies could participate, leading some to believe that the government was experiencing difficulty in dealing with the natural monopolies.⁸¹ Additionally, 2 US private equity firms announced their involvement with 2 new gas pipelines that would link central Mexico with shale gas from Texas.⁸²

Investor optimism about Mexico's hydrocarbon sector increased after the reform was signed into law. The US EIA increased its prediction for crude production in 2014 to rise from 2.1 million bbls/d to 3.7 million bbls/d by 2040.⁸³ And Pemex sold \$4 billion in bonds to fund its debt and to finance capital expenditures, prompted by an upgrade of the company's rating by Standard and Poor's and the increase in potential for foreign investment in the industry.⁸⁴ Still, Pemex's rating, due to low oil prices, low productivity and high taxes, was downgraded by Moody's in 2016 to its lowest investment rank with a negative outlook, which could dampen investor's optimism about the sector.⁸⁵ The Mexican government planned to hold 5 auction "rounds" to tender the contracts for upstream investments and stimulate investment in the sector.

Auction Results

The 5 "rounds" of licensing would occur between 2015 and 2019, the first of which awarded Pemex acreage while the following four would be open to private companies and for partnerships with Pemex. The criteria for the bidding companies varied for each round, but the government would favor those with more experience and capital. Pemex would retain areas in which it already produced, and it was awarded 83% of proven and probable reserves in the first round, "Round Zero." Pemex was given 21% of prospective reserves, 67% of what it had requested. However, if Pemex failed to commercially develop an area within 5 years, the area would be returned to the state. The majority of reserves granted to Pemex were in shallow-water, for, as Anaya stated, "we don't have the resources, and we don't have the technology" concerning deep-water oil production without partners.⁸⁶

Round One commenced in December of 2014 and was composed of five separate tenders for exploration and production rights of shallow-water reserves. The first tender presented 14 blocks of offshore shallow water reserves in the Southern Gulf for auction; it received just 2 successful bids. The global context of low oil prices and the terms that the Mexican government required for the bids had dampened interest, and the small number of successful bids was below expectations (the president of the CNH stated that the round would be successful if 4-7 bids were successful).⁸⁷ A joint venture between Sierra Oil & Gas (Mexico's first independent oil and gas company), Premier Oil PLC (London), and Talos Energy LLC (US) won both bids, though they had offered to pay the government 10% more than the minimum requirement.⁸⁸ The blocks they won were off the coasts of the states Veracruz and Tabasco, holding around 600 million barrels of oil equivalent (boe). Due to the disappointing results, SENER loosened some of the auction requirements, such as announcing the minimum bid and allowing companies to submit bids both independently and in consortia with others.⁸⁹

The second tender of Round One in September 2015 was more successful, with 3 out of 5 shallow-water blocks granted to 3 different companies or consortiums via production-sharing contracts. The Italian company Eni SPA entered Mexico's energy market by winning the first block, the Argentine Pan American Energy LLC and E&P Hidrocarburos y Servicios SA de CV won the second block, and the American Fieldwood Energy LLC and Mexican Petrobal SAPI de CV won the fourth block.⁹⁰ The premiums paid in this tender were unexpectedly high. The third and fifth blocks received no bids. And the third phase of Round One awarded all 25 licenses for smaller onshore fields throughout Mexico in December 2015, with 22 companies entering the sector.⁹¹ Mexican entities won 18 of the contracts.

Round One's fourth auction, considered the most lucrative one, offered tenders for 10 deep-water reserves off the coast of Mexico in December 2016. Additionally, in 2016 financially-strained Pemex approved of a plan to work with a partner obtained through a bidding process in developing deep water reserves in the Trion block. SENER granted Pemex permission to do this and would stipulate the terms of the contract, as it would for future farm-outs. BHP Billiton Ltd. won the Trion block after bidding \$1.92 billion. The results of the fourth auction, where 8 of the 10 blocks received bids, were announced the same day. Large players such as Total SA, Exxon, CNOOC and BP won blocks either independently or in consortia, and Pemex, in a partnership with Chevron and Inpex Corp., also won a block. Mexico's Sierra Oil & Gas pledged the highest royalties and won 2 bids.⁹² The royalty bids ranged from 5% to 27% above the minimum required royalty.⁹³ A fifth phase, the auction of blocks of unconventional (shale) fields, was to occur in 2017.

The first phase of Round Two offered 15 blocks up for bid. The government would provide 30-year production-sharing contracts with the possibility of a 10 year extension. To qualify for the Round Two auctions, firms or consortia had to document technical capability from at least 3 exploration and production projects between 2011 and 2015, or total investments of at least \$1 billion on such developments.⁹⁴ They must also be experienced operating or being a financial partner in shallow or deep-water projects and meet minimum capital requirements of \$1 billion or have assets worth at least \$10 billion. The second phase of Round Two would offer license contracts for 12 onshore blocks. Round Two's auctions were scheduled for June 2017. However, some worried that the initiation of the second round before the completion of the first were signs of government haste amidst further decline in current productivity and reserves.⁹⁵

Electricity Sector Reform

Simultaneous to the changes upstream, the government reformed the electricity sector with the goal of lowering energy costs and increasing capacity. Mexico's energy minister referred to the reform of the power sector as the "economic competitiveness reform," and some observers believed the

electricity reform would be implemented faster and with more opportunities than the hydrocarbon reform.⁹⁶ Electricity demand was increasing, and in 2015 the government projected that an additional 60 GW of generation capacity would be needed by 2030.⁹⁷ To attain this, the government opened the sector to private and foreign companies and reduced barriers to entry to facilitate competition and increase generation. Still, the state had exclusive rights to develop and operate nuclear plants. Approved market entrants would be able to sell directly to their customers.

The state would maintain its monopoly in transmission and distribution (T&D), but CFE and other state entities would be allowed to enter into contracts with private companies to build new T&D infrastructure (see **Exhibit 15** for the new power sector structure). The Mexican national transmission system covered most of the country with its 57,000 km of lines, though as previously noted many lines were moribund and distribution losses were extensive. It was hoped that the contribution of private and international firms would modernize the T&D networks and lower costs and losses.⁹⁸ Private companies could participate in T&D development by entering into either a public private partnership or a turn-key or long term contracting scheme with a state entity.⁹⁹ The transmission grid would operate under an open-access paradigm, with well-defined interconnection criteria and procedures making it possible for any generator to connect and deliver power to the grid.¹⁰⁰ The government planned for the gradual installation of smart grids (which utilize remote-based control and automation) in all the distribution divisions to modernize the system and to curtail electricity theft.¹⁰¹

To terminate CFE's monopoly in generation, SENER mandated a division of the vertically-integrated CFE into at least ten separate enterprises: six energy generating companies, one transmission company, one distribution company, a regulated retail firm and a large customer-oriented retail firm.¹⁰² After the reform, CFE created two additional firms – CFEnnergia and CFE International – to buy natural gas and contract for the construction of gas pipelines. Each company would have its own CEO and its own board of directors. Although there would be Chinese walls between them to prevent conflict of interest and to stimulate competition, the chairman of each board was the chairman of CFE. All twelve companies would remain under state ownership for the time being, but as for-profit productive enterprises. Like Pemex, CFE appointed a new board of directors as part of the reform. In 2014 CFE's board was altered to be more balanced, with its 10 members now being 4 independent board members, 3 members of the government and a member appointed by CFE's union.

CFE, again like Pemex, was burdened by a substantial pension liability of \$34 billion in 2015. The government agreed to partially absorb a portion of CFE's liability on the condition that CFE meet with the electricity union and enact an austerity program.¹⁰³ CFE did meet with its union, and they agreed to cut CFE's labor liability by 50%, with the Ministry of Finance taking on a significant amount of the remaining debt.¹⁰⁴ This absorption would help CFE's competitiveness as new companies entered the market, for the government wanted to create a level playing field rather than disfavoring CFE. The government also amended CFE's budget, reducing it by around \$600 million in 2015. However, some noted that increased private participation could ease the capital investment requirements of CFE.¹⁰⁵ In the first semester of 2016, due to the one-time reduction in labor obligations, CFE recorded a net profit of \$5.7 billion, its first profit since 2010.¹⁰⁶ In future years, however, it would still have annual losses approaching \$5 billion.¹⁰⁷

SENER introduced the National Electric System Development Program (PRODESEN for its Spanish acronym) in 2015, which replaced the Program of Works and Investments of the Electric Sector. PRODESEN elaborated plans for installing new generation units and developing transmission and distribution line infrastructure, and it was meant to be more equitable than its predecessor, as it would be developed by CENACE instead of CFE. It anticipated that companies other than CFE might provide

up to two-thirds of new generating capacity by 2029.¹⁰⁸ It also mandated the linkage of the Baja California Peninsula and the national grid and improved connections with the US and Central America.

The fuel for these new power plants was to come from natural gas – provided by CFenergia and other fuel marketers. Given the glut of shale gas available in the United States at less than \$4/mmbtu, CFenergia was planning to build a huge network of gas pipelines from Sasabe, San Elizario, Waha, Webb and Brownsville, Texas. At these locations, they could connect with multiple gas suppliers and then distribute gas to combined cycle gas turbines throughout Mexico (See **Exhibit 14**). Over 7,000 km of new lines were already under construction, with more undergoing tendering. And Transparency International accompanied CFenergia in its contract negotiations. According to Guillermo Turrent of CFenergia, while the cost would be \$23 billion, the savings potential (the NPV of a 20-year gas contract), over burning fuel oil or diesel, would be huge – in dollars, pesos and cleaner air.¹⁰⁹

Launching a Wholesale Electricity Market

The reform provided for the creation of a wholesale electricity market in Mexico, which would allow private companies to produce and sell electricity and compete with CFE and each other. CENACE, the new independent body, was tasked with operating the wholesale electricity market in Mexico. It was responsible for dispatching electricity and monitoring operations. CENACE would coordinate operations by using information relating to generation costs, dispatch, inflow and outflow nodes, energy imports and exports and demand-side management activities.¹¹⁰ It would also enable private firms to access the transmission network, fostering further competition with CFE. The CRE would regulate the market and provide permits for the generation of electricity (see **Exhibit 16**).¹¹¹

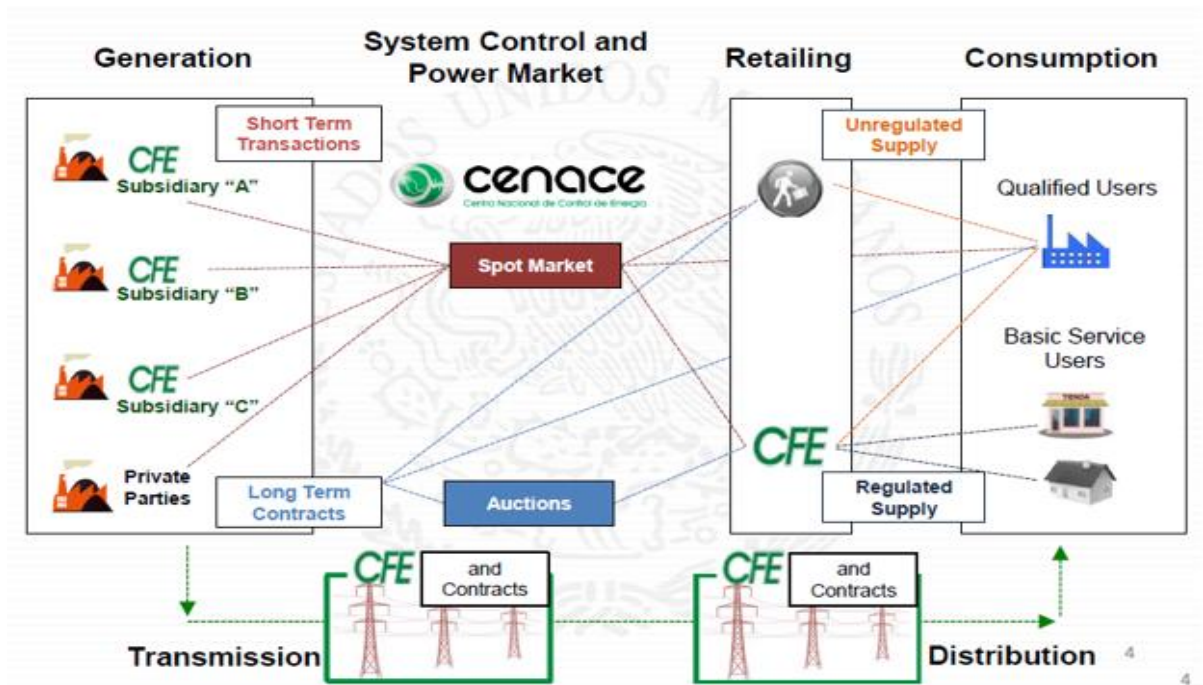
In 2015 SENER published the *Bases del Mercado Eléctrico*, which laid out the electricity market's design and operating principles. Market transactions included products and services related to electricity, ancillary services, power capacity, financial transmission rights (to reduce exposure to grid congestion) and clean energy certificates (CECs). The government created CECs to develop a market for and promote the usage of clean energy. Electricity retailers and large users would purchase the certificates from clean generators depending on their power consumption, and the CECs would be bought and sold at prices based on supply and demand.¹¹² Firms that generated clean energy would earn CECs, while those that represented final users would buy them from producers. One CEC would be issued for every MWh of clean energy generated. The minimum requirement for energy retailers and large users would be to purchase CECs valued at 5% of the total electricity consumption they served.¹¹³ Entrants could participate in the market as either a power generator, qualified user, supplier or non-supplying trader. Short-term transactions would include day-ahead and real-time electricity and ancillary services, the capacity market and the CEC market. Concerning short-term transactions, power generators would bid to sell energy to the market while retailers and qualified users would submit offers to buy from the market.¹¹⁴ CENACE would then dispatch electricity from the generators into the grid and clear the market at the marginal bid which determined the price. Medium- and long-term contracts for electricity and capacity would be assigned in auctions for terms of 3- or 15-years, and 20 years in the case of CECs. CENACE would also auction financial transmission rights.¹¹⁵

In 2015 CRE awarded the first permit for qualified electricity retail to Mexican firm Energía Buenavista, which would sell electricity to qualified users as an intermediary between the market and end users.¹¹⁶ Qualified users (typically industrial users with demand of at least 1 MW) would register with the CRE and obtain energy directly through the market and bilateral agreements with generators, or through integrated service contracts with qualified electricity retailers. Basic users would attain energy through basic service retailers under a regulated tariff (see **Figure 1** for the new industry structure). Initially the only retailer was CFE, though this was expected to change in the future as

qualified retailers entered the market and were able to serve qualified users. (CFE was expected to remain the only retailer to regulated customers, for private companies that offered basic service would be obligated to offer service to all customers).

The wholesale market began operating in early 2016, with the implementation of short-term, day-ahead and real-time operations. The second phase of the short-term market, adding an hour-ahead market and an auction of financial transmission rights [financial instruments used to facilitate bilateral contracting and competitive open transmission access] to the day-ahead and spot market operations,

Figure 1 Mexico's New Energy Industry Structure¹⁷



would begin between 2017 and 2018. The auction of financial transmission rights had been pushed back to assure that a large number of participants would be able to enter, enabling liquidity and competitive prices. An initial auction for long-term contracts was adjudicated in March 2016, a second such auction was adjudicated in September, 2016, and a third long-term power auction would be initiated in April 2017. A capacity balancing market would commence in 2017, and the market for CECs was to be initiated in 2018. Mexico also planned to diversify the fuel used for generation to lower costs and increase the amount of clean energy used. However, while historically high electricity prices were appealing to energy generation investors, electricity prices had begun to fall. By 2015 the price of electricity in the industrial sector had fallen by approximately 30%.¹¹⁸ As a result, by early 2017 few industrial customers wanted to move from the regulated basic retail service to qualified retail under the more competitive wholesale market, where some input costs were not yet defined, especially given that the basic retail service rates were yet to be recalibrated for the restructured power sector. Jeff Pavlovic, a designer of the electric market reforms, predicted that more participants would enter the wholesale market after the basic retail service rate was reformulated and published.¹¹⁹

Renewables

As a country rich with sunlight, wind, geothermal and water resources, Mexico had significant potential for the development of renewable energy. While traditionally dependent on hydrocarbons for both energy and government funds, Mexico had already begun bringing renewable energy sources into the mix to meet energy demand and to decrease environmental impact. In 2008 Mexico passed a law establishing clean energy generation targets of 35% by 2024 and 50% by 2050.¹²⁰ Mexico became the second country to enact a legal framework regarding climate control when it passed the General Climate Change Law in 2012.¹²¹ The reform furthered these initiatives by publishing the *Programa Nacional para el Aprovechamiento Sustentable de la Energía 2014-2018* (PRONASE) - a roadmap describing best practices, policy guidelines and indicators to evaluate progress in the use of renewable energy.¹²² Also in 2014 the government implemented a carbon tax on the emissions of fossil fuels, excluding natural gas. The tax generated \$540 million USD in revenue in its first year.¹²³ The government enacted the Energy Transition Law in 2015, which reiterated the goal of 35% of clean energy generation by 2024 but also set forth shorter-term goals. The Law affirmed the CEC mechanism, which had converted the country's overall clean energy goals into binding requirements on specific market participants.

The reform upheld the accelerated depreciation benefits for specific renewable energy assets and terminated previous mechanisms such as the energy bank (for intermittent renewable energy projects) and fixed transmission charges.¹²⁴ CECs and financial transmission rights were created in part to replace both mechanisms, though certain projects that had submitted applications to the government prior to the reform could be grandfathered and continue to act under the previous law.¹²⁵

Investment in renewable energy sources grew at a slower pace than that of conventional sources, and clean energy as a percentage of installed capacity fell from 29% in 1999 to 25% in 2014.¹²⁶ In 2014, 22% of electricity came from non-fossil fuels.¹²⁷ Energy generated from clean sources decreased by a further 3.7% in 2015, largely due to lower hydroelectric output.¹²⁸ However, wind installation increased from 85 MW in 2006 to over 2,000 MW in 2014, and there were growing numbers of grid-connected solar projects in the works.¹²⁹ Mexico had reached grid parity in solar energy, and had nearly reached it in wind. This was facilitated by the high price of electricity and falling costs of solar and wind installation projects.¹³⁰ In 2015, approximately 50% of Mexico's energy was generated through combined-cycle, followed by 13% from conventional thermal, 11% from coal and oil, and 10% from hydroelectric.¹³¹ Around 20% (inclusive of hydroelectric) was generated from clean sources in total (see **Exhibit 5**).

A short-term goal of the Mexican government was to produce 9.5 GW of clean energy by 2018. The government's definition of clean included efficient cogeneration, nuclear power, hydroelectric power and even the efficient use of fossil fuels (if carbon capture and storage were utilized), as well as that generated from renewable sources.¹³² To meet this target, clean energy production must be increased by 5% by 2018, which would require a very supportive environment. If attained, this target would match Canada's 23-year cumulative installed wind-farm capacity in only 3 years.¹³³

The reform created a new legal framework for geothermal energy in particular. SENER conducted a geothermal round zero in 2015 to determine the prospective sites that would be developed by CFE and those that would be established by public and private investors in future rounds. The government awarded CFE 52% of its requested sites and projects, leaving 12.5 GW of geothermal prospects unclaimed.¹³⁴ The first private company to enter the geothermal market under the new law was Mexico's Grupo Dragon, and the government was processing 10-15 exploration permit requests in 2016. However, due to the high up-front costs, private investment in geothermal energy was expected to take longer to develop than other energy sources.¹³⁵ To alleviate the risks associated with the high initial costs, the Mexican government offered an insurance program to cover the geothermal exploration stage, which would help the participating companies secure financing.¹³⁶

CFE, having already launched a large investment program in natural gas, left much room open for private participation in the renewables sector.¹³⁷ It announced that it would install 15 new renewable energy projects to create 2.8 GW of energy, far short of PRODESEN's goal of 32.5 GW of clean energy additions by 2029.¹³⁸ Clean energy generation plants under CFE that were operating before the reform but had implemented expansion projects and clean-energy plants whose capacity was not included in an interconnection agreement under previous laws would also have to participate in the CEC market.¹³⁹ CRE would be responsible for verifying compliance and administering consequences for non-compliance, though the legal consequences were not clearly defined.

In March 2016 CENACE held the first long-term auction, offering 15-year electricity contracts and 20-year CECs. The participation of 69 bidders exceeded the government's expectations, as only 10 companies were estimated to partake.¹⁴⁰ CFE was the sole purchaser of energy from the auction winners, and awarded 85% of the CECs and MW of energy that were offered. The government awarded contracts to 11 companies with a total of 18 proposals. The winning companies, largely renewable energy firms, included the US' SunPower, Italy's Enel and China's Jinko Solar for solar energy proposals and Energía Renovables del Istmo II and Aldesa Energías Renovables, both based in Spain, and the Mexican Energía Renovable de la Península for wind proposals.¹⁴¹ Despite glitches relating to technical difficulties and invalid offers, causing CENACE to repeat the tendering process, the auction was considered a success in terms of lowering expected prices and promoting renewable energy.¹⁴²

Solar dominated the first electricity auction, with 12 projects totaling 1,691 MW at an average price of \$45 USD per MWh.¹⁴³ Wind came in second, with 6 projects providing 394 MW at an average price of \$55 USD.¹⁴⁴ Many were surprised at the auction's resulting low prices, attributing them to a drop in the cost of PV and turbine installation as well as Mexico's rich solar and wind resources. CFE was the sole buyer of electricity, and the winning companies were expected to begin supplying power by 2018. Additionally, clean energy projects sold more than 5 million CECs per year to CFE.¹⁴⁵ The auction was largely viewed as a success, with the CEO of the auction's largest bidder noting that "The reforms are demonstrating results in attracting massive investment ... Mexico is taking advantage of its natural resources to create a competitive and sustainable energy future."¹⁴⁶

Mexico's second electricity auction was also dominated by solar and wind, with solar winning 54% of energy and 53% of CECs and wind's share increasing to 43% of energy and 41% of CECs. The auction awarded contracts to 23 bidders out of 57 participants. Winning bidders represented firms from 11 countries and included Spain's Acciona Energia, France's Engie, and Mexico's IEnova.¹⁴⁷ This auction ensured that power would be purchased in areas the grid needed most by considering the differences in electricity generation costs in different regions of the country.¹⁴⁸ In total, 3,916 MW and 9.3 million CECs per year were awarded across solar, wind, geothermal and hydroelectricity for a total of \$4 billion USD invested in new renewable projects.¹⁴⁹ The winning companies received long-term contracts to supply capacity, energy and/or CECs to CFE, and were to begin delivering electricity in 2019. SENER announced that the resulting clean energy prices (averaging \$33.47/MWh USD) from this auction were "among the lowest prices reached at the international level."¹⁵⁰

Looking Ahead

The ambitious energy sector reform and its rapid implementation gave rise to increased private and foreign investment in the industry, though some uncertainty remained. The politically controversial attempts to reform the energy sector prior to Peña Nieto led some to believe that a future change in government might impact the legislation pertaining to the reform, or undo it completely. Though this would be difficult given that the reform was now enshrined in the constitution. Public perception of Peña Nieto had been falling due to corruption allegations and issues with other reforms

he implemented, such as his education reform. And public support of Manuel Lopez Obrador, the former mayor of Mexico City who had run for the presidency twice before, was increasing. One of Obrador's top goals was to undo the energy reform. Transparency measures would have to be diligently implemented to help prevent further corruption and strengthen investors' confidence.

Lourdes Melgar, an architect of the energy reform, noted that it had been designed under the assumptions of \$100 oil prices, GDP growth of around 4%, and economic growth in other countries, all of which were below expectations as the reform was implemented.¹⁵¹ The low price of commodities in the sector during the reform may have prevented further investment. Some companies were waiting to see what the results would be of the initial auctions and the wholesale electricity market to determine if they wanted to enter the industry. CFE would have to adjust to lower electricity prices, and Pemex to lower demand for fuel oil. With both companies suffering huge losses, the government struggled to keep both afloat and help prevent further accumulation of debt.¹⁵²

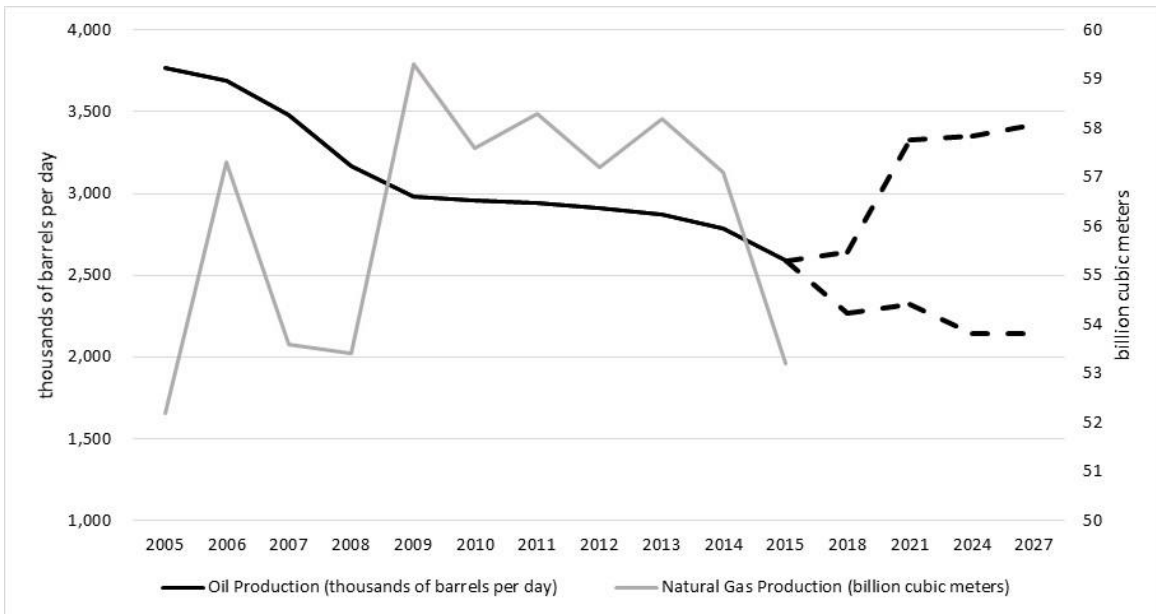
Shortly after Donald Trump was elected US president the peso began depreciating, falling to 21 pesos per dollar in December 2016. The majority of CFE's input costs (such as fuel prices and capital) were dollar-based and therefore would increase as the peso devalued. This complicated the question of how the promised reduction in electricity costs would be achieved. Additionally, Mexico was already getting cheap investment, so attempts to lower electricity prices could be limited to curtailing distributional losses and T&D investments.

Previous reforms had not provided enough incentives to attract independent oil companies into Mexico, yet the current regime had exhibited flexibility in altering qualifications in response to low interest (such as after the first oil auction). Even with successful offshore bids, it would take years to develop domestic flows of crude oil. Companies or consortia that won the bids also needed to successfully implement their projects to achieve the production goals set forth by the auctions. Mexico's financing frameworks were not as developed as those of other countries, which could hinder investment; domestic credit to private firms amounted to 31% of GDP in 2016, as compared to 195% in the U.S., 157% for OECD countries on average, 69% in Brazil and 51% in India.¹⁵³ With demand growing at 2.5%, it was not at all clear that supply could ever catch up.

Additionally, tension within the restructured CFE and Pemex might arise as they adjust to a competitive environment, and tension between them might emerge as the country ramped up production of more cost-effective natural gas in a "dash for gas," lowering demand for Pemex's oil.¹⁵⁴ To replace inefficient state monopolies with heavily regulated, state-owned "for-profit" companies raised many issues for efficiency and "competition."

Jed Bailey, managing director of Energy Narrative in Cambridge, worried about the declining peso's effects on achieving competitive energy prices. He also saw a conflict between multiple CFE pieces that were still backed and financed within the framework of a CFE monopoly. "How independent would they really be?"¹⁵⁵ Jeff Pavlovic worried about the need to align electric prices with costs. CFE and Pemex were both generating huge losses, and thus mounting debts. For CFE, "raising rates to a level that would cover present-day costs would be politically impossible, cutting costs will be a gradual process and, in the absence of the aforementioned, CFE's net losses could lead to negative net equity."¹⁵⁶ Unless the gap between rates and costs could be covered by subsidies, CFE may need to seek private investment, perhaps in their generation companies.¹⁵⁷ César Hernández Ochoa, the Under Secretary of Electricity, worried about the hand off of power from the Energy Ministry to CRE...in 2017.¹⁵⁸ Jose Anaya, CEO of Pemex, worried about low oil prices and the conditions of his refineries. And everyone – without exception – worried about the new American President, Donald Trump.

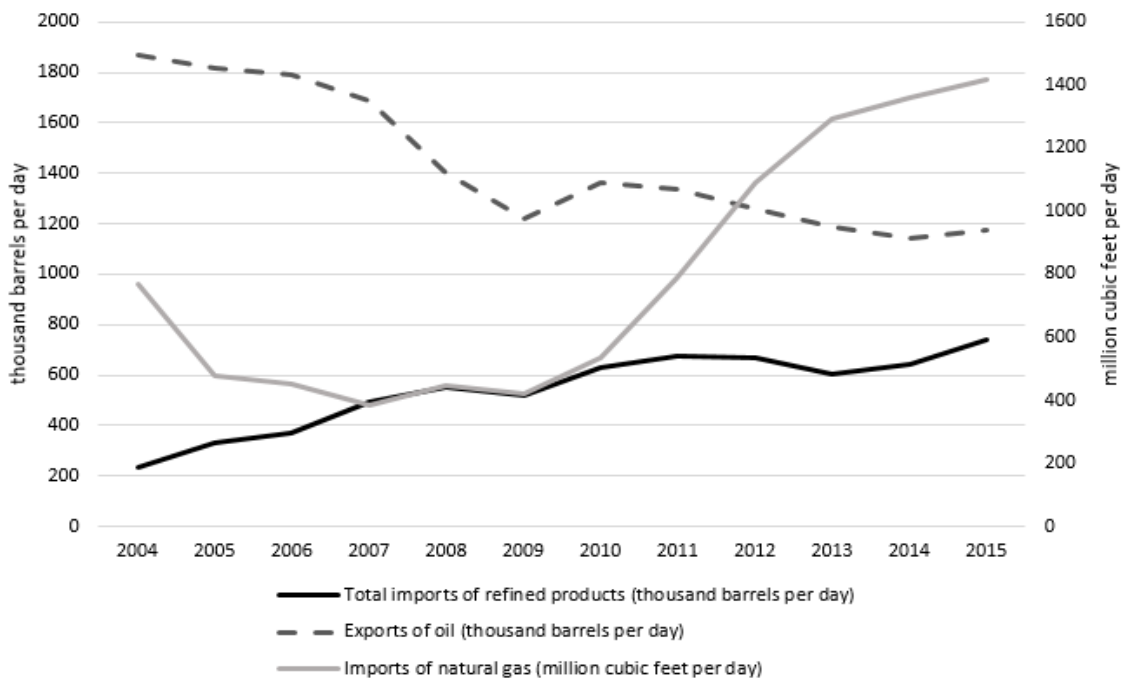
Exhibit 1 Oil and Natural Gas production in Mexico



Note: Figures for oil production after 2015 are projections for positive and negative scenarios.

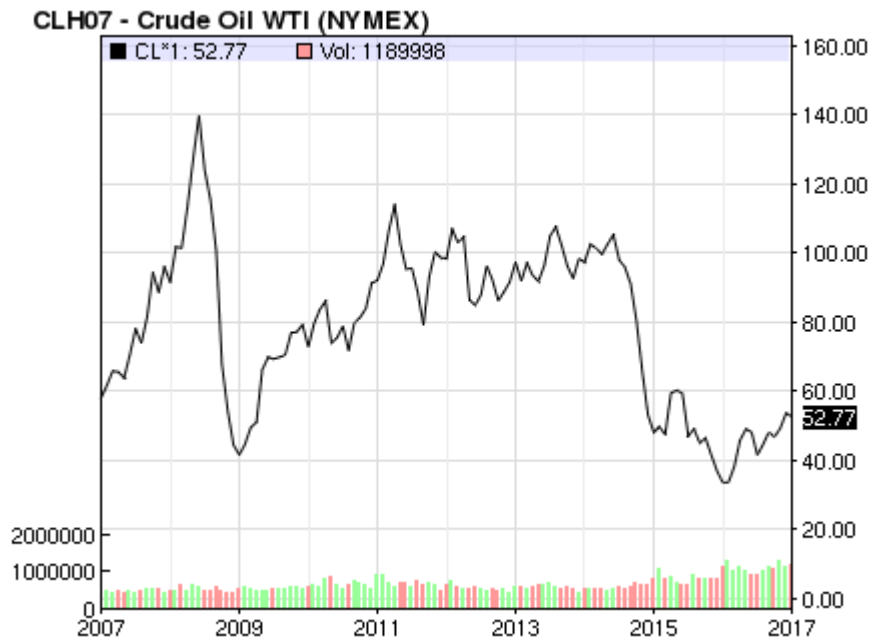
Source: Created by casewriter using data from the BP Statistical Review of World Energy June 2016 report. Projections are from Pedro Valenzuela, "Mexico's Reforms and the Prospects for Growth," The Wilson Center, May 2016.

Exhibit 2 Mexican Imports of Refined Product and Natural Gas and Exports of Oil



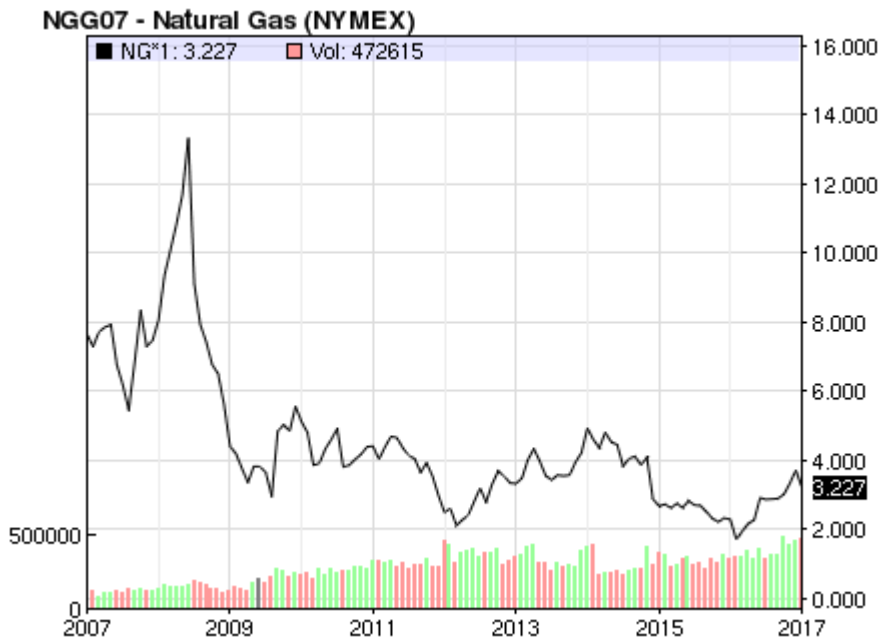
Source: Created by casewriter using data from Pemex's Statistical Yearbook 2014 and Pemex's monthly petroleum statistics publication.

Exhibit 3 Crude Oil Prices



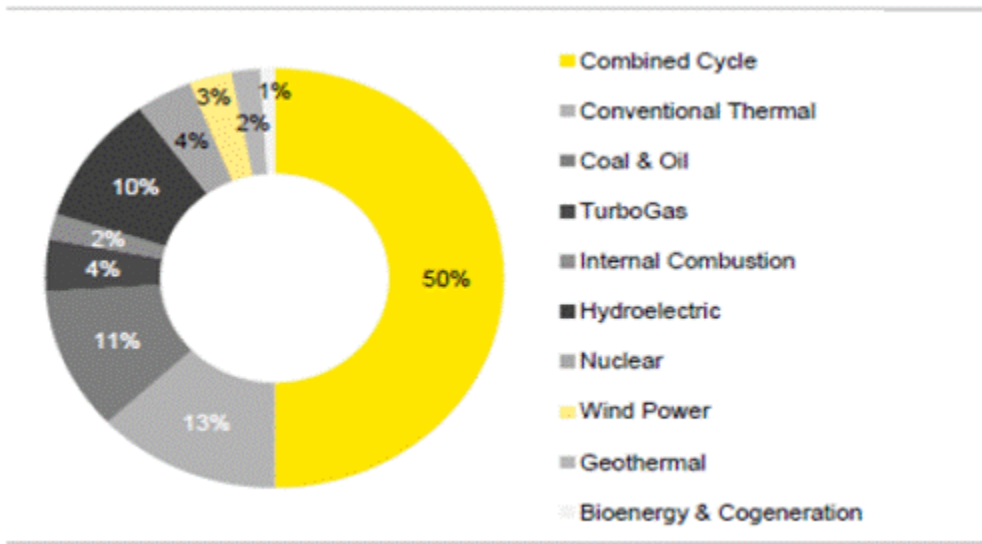
Source: Crude Oil Prices, Nasdaq, accessed 01/23/2017.

Exhibit 4 Natural Gas Prices



Source: Natural Gas Prices, Nasdaq, accessed 01/23/2017.

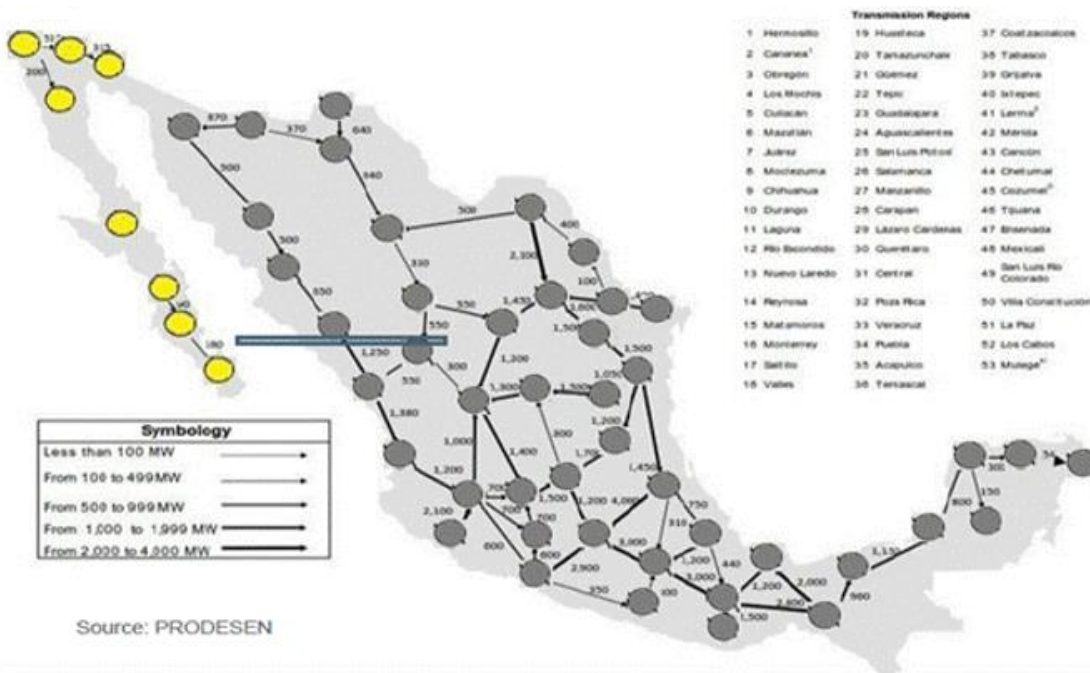
Exhibit 5 Mexico's Energy Mix 2015



Source: PRODESEN, Ernest & Young

Source: Energy Alert - National Electric System Development Program (PRODESEN) 2016 -2030, Ernst and Young, June, 2016.

Exhibit 6 Mexico's Electric Transmission Map



Source: PRODESEN

Source: Energy Alert - National Electric System Development Program (PRODESEN) 2016 -2030, Ernst and Young.

Exhibit 7 Mexico's Balance of Payments (millions USD)

	1995	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Current Account Balance	-1,576	-9,052	-7,475	-14,499	-20,262	-8,536	-5,208	-13,370	-16,698	-30,409	-24,665	-31,725
<i>Trade Balance</i>	2,164	-7,663	-6,312	-10,311	-17,615	-4,926	-2,943	-1,205	291	-909	-2,573	-14,375
Exports of goods	48,438	214,633	250,319	272,293	291,886	229,975	298,860	350,004	371,442	380,729	397,866	381,198
<i>Oil</i>	8,638	28,329	34,707	37,937	43,341	25,694	35,907	49,381	46,788	42,712	35,855	18,779
Imports of goods	46,274	222,295	256,631	282,604	309,501	234,901	301,803	351,209	371,151	381,638	400,440	395,573
<i>Refined products^a</i>	1,206	7,257	9,453	13,886	20,942	11,727	18,270	27,872	27,230	25,330	24,353	19,974
<i>Net Services</i>	4,989	-7,068	-7,733	-7,661	-7,976	-10,218	-10,557	-14,793	-14,005	-10,983	-12,451	-9,448
Exports of services	14,704	15,736	15,908	17,244	17,673	14,824	15,235	15,582	16,146	20,194	21,086	22,609
Imports of services	9,715	22,804	23,641	24,904	25,649	25,043	25,792	30,375	30,150	31,177	33,537	32,057
<i>Primary Income</i>	-12,689	-16,444	-19,364	-22,918	-20,126	-14,971	-13,231	-20,333	-25,544	-40,170	-32,556	-32,209
Credit	3,713	4,818	5,578	7,664	8,530	6,797	10,812	10,569	13,154	11,320	11,319	8,168
Debit	16,402	21,262	24,942	30,582	28,655	21,769	24,043	30,901	38,698	51,490	43,875	40,377
<i>Secondary Income (transfers)</i>	3,960	22,122	25,934	26,391	25,455	21,579	21,523	22,960	22,559	21,653	22,915	24,307
Credit	3,995	22,179	26,022	26,498	25,583	21,639	21,609	23,139	22,768	22,649	24,026	25,213
Debit	35	57	88	108	128	60	86	178	209	995	1,111	905
Capital Account Balance	na	na	na	na	na	na	na	na	na	na	na	na
Financial Account Balance	10,487	-15,105	-10,058	-24,584	-34,032	-16,698	-48,333	-52,681	-55,036	-67,896	-58,835	-31,521
<i>Net Direct Investment</i>	na	-19,497	-15,351	-24,151	-27,921	-8,296	-11,382	-11,013	2,033	-32,716	-18,213	-18,158
Assets	na	6,474	5,758	8,256	1,157	9,604	15,050	12,636	22,470	13,138	7,463	12,126
Liabilities	9,526	25,971	21,110	32,407	29,078	17,900	26,431	23,649	20,437	45,855	25,675	30,285
<i>Net Portfolio Investment</i>	10,377	13,487	1,607	1,474	-18,760	19,253	-32,703	-48,561	-73,231	-49,502	-47,016	-21,966
Assets	662	20,548	1,729	14,739	-14,183	34,540	5,357	-6,049	8,611	1,617	63	-1,589
Liabilities	-9,715	7,060	122	13,265	4,577	15,288	38,060	42,512	81,842	51,119	47,079	20,377
<i>Financial derivatives (net)</i>	na	na	na	na	1,522	-4,271	546	725	-117	470	671	-6,007
<i>Other capital flows (net)</i>	9,637	-9,095	3,687	-1,907	11,128	-23,383	-4,795	6,168	16,279	13,853	5,723	14,610
Assets	6,694	-5,825	4,110	18,809	18,705	-20,977	27,005	3,674	6,274	27,279	20,910	12,853
Liabilities	-2,942	3,270	423	20,715	7,577	2,406	31,800	-2,494	-10,005	13,426	15,187	-1,758
Reserve assets (net)	-16,312	9,996	2,147	10,803	8,083	4,472	20,698	28,222	17,516	17,778	16,722	-15,417
Errors and Omissions	-4,248	3,943	-437	718	-5,686	-3,689	-22,427	-11,089	-20,822	-19,708	-17,447	-15,212

Source: Created by casewriter using data from the International Monetary Fund, the Economist Intelligence Unit Country database, Pemex's Statistical Yearbooks, accessed October 2016, and the World Integrated Trade Solution trade statistics, the World Bank, accessed January 3, 2017.

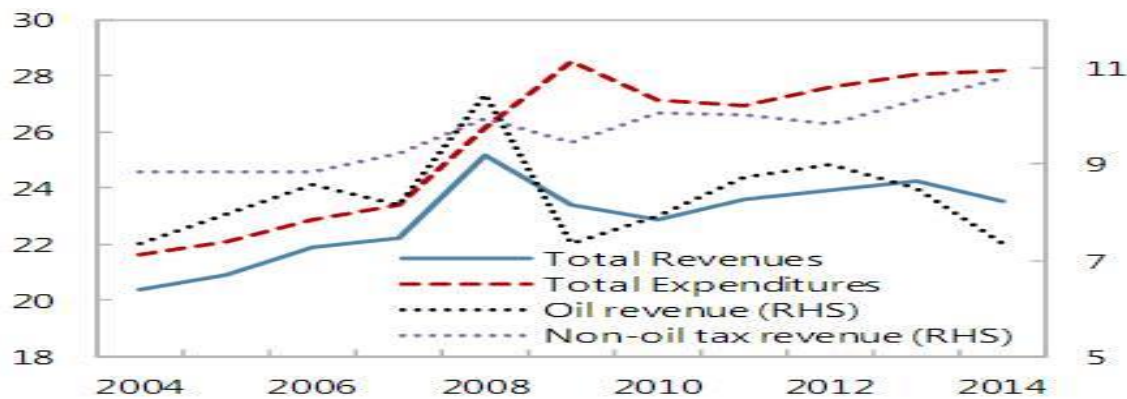
^a this includes natural gas and petrochemicals.

Exhibit 8 Mexico's Government Budget (% GDP)

	2011	2012	2013	2014	2015	Staff Projections					
						2016	2017	2018	2019	2020	2021
Budgetary revenue, by type	22.5	22.5	23.6	23.1	23.5	22.6	21.1	21.4	21.6	21.6	21.5
Oil revenue	8.6	8.9	8.3	7.1	4.7	3.1	3.3	3.5	3.7	3.7	3.6
Non-oil tax revenue	8.9	8.4	9.7	10.5	13.0	13.1	13.0	13.1	13.1	13.1	13.0
Non-oil non-tax revenue 2/	5.0	5.2	5.5	5.5	5.8	6.4	4.8	4.8	4.8	4.8	4.8
Budgetary revenue, by entity	22.5	22.5	23.6	23.1	23.5	22.6	21.1	21.4	21.6	21.6	21.5
Federal government revenue	15.9	15.7	16.8	16.7	17.5	17.5	16.1	16.3	16.4	16.3	16.3
Tax revenue, of which:	8.9	8.4	9.7	10.5	13.0	13.1	13.0	13.1	13.1	13.1	13.0
Excises (including fuel)	-0.5	-0.8	0.0	0.6	2.0	2.4	2.4	2.3	2.3	2.2	2.2
Nontax revenue	7.1	7.3	7.1	6.3	4.5	4.4	3.1	3.2	3.3	3.3	3.3
Public enterprises	6.5	6.8	6.8	6.3	6.0	5.1	5.0	5.1	5.3	5.2	5.2
PEMEX	2.7	3.0	3.0	2.6	2.4	1.8	1.6	1.8	1.9	1.9	1.8
Other	3.8	3.8	3.8	3.8	3.6	3.4	3.4	3.4	3.4	3.4	3.4
Budgetary expenditure	25.0	25.1	25.9	26.3	27.0	24.8	23.3	23.1	23.3	23.2	23.1
Primary	23.1	23.1	24.0	24.3	24.7	22.1	20.7	20.3	20.3	20.2	20.2
Programmable	19.7	19.9	20.6	20.7	21.1	18.5	17.1	16.7	16.6	16.6	16.6
Current	14.8	15.1	15.1	15.5	15.9	14.7	13.9	13.4	13.4	13.4	13.3
Wages	5.9	5.9	6.0	5.9	5.9	5.9	5.8	5.8	5.7	5.6	5.5
Pensions 3/	2.7	2.7	2.9	3.0	3.2	3.2	3.3	3.4	3.5	3.6	3.7
Subsidies and transfers	3.0	3.1	3.3	3.6	3.7	3.3	2.9	2.6	2.5	2.5	2.5
Other	3.2	3.3	3.0	3.0	3.0	2.2	1.8	1.6	1.6	1.6	1.6
Capital	4.8	4.7	5.4	5.2	5.2	3.9	3.3	3.3	3.3	3.3	3.3
Physical capital	4.5	4.4	4.6	4.8	4.3	3.3	3.2	3.2	3.2	3.2	3.2
Of which: Pemex	1.8	2.0	2.0	2.1	1.7	1.3	1.1	1.1	1.1	1.1	1.1
Financial capital 4/	0.4	0.4	0.9	0.4	0.9	0.5	0.1	0.1	0.1	0.1	0.1
Nonprogrammable	3.4	3.3	3.4	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Of which: revenue sharing	3.3	3.2	3.3	3.4	3.5	3.3	3.4	3.4	3.5	3.5	3.5
Interest payments	1.9	2.0	2.0	2.0	2.3	2.5	2.6	2.7	2.9	2.9	3.0
Traditional balance	-2.5	-2.6	-2.3	-3.2	-3.5	-2.2	-2.2	-1.7	-1.7	-1.7	-1.7
Adjustments to the traditional balance	1.0	1.2	1.4	1.4	0.6	0.5	0.8	0.8	0.8	0.8	0.8
Public sector borrowing requirements (PSBR)	-3.4	-3.8	-3.8	-4.6	-4.1	-2.6	-3.0	-2.5	-2.5	-2.5	-2.5
Memorandum items											
Crude oil production (million barrels per day)	2.6	2.5	2.5	2.4	2.3	2.1	2.0	2.2	2.3	2.4	2.4
Crude oil export price, Mexican mix (US\$/bbl)	101	102	99	88	44	29	34	37	39	41	41
Gross public sector debt	43.2	43.2	46.4	49.5	54.0	54.4	54.6	54.4	53.9	53.3	52.5
Net public sector debt	37.5	37.7	40.4	43.2	47.6	48.0	48.3	48.0	47.6	46.9	46.2
Nominal GDP (billions of Mexican pesos)	14,550	15,627	16,116	17,252	18,136	19,351	20,435	21,564	22,843	24,317	25,939
Sources: Mexican authorities and IMF staff estimates.											
1/ Data exclude state and local governments and include state-owned enterprises and public development banks.											
2/ Includes revenues from the oil-price hedge for 107.5 billion pesos in 2015 and 78 billion pesos in 2016. It includes also Bank of Mexico's operating surplus transferred to the federal government for 31 billion pesos in 2015 and 239 billion pesos in 2016.											
3/ Includes social assistance benefits.											
4/ Due to lack of disaggregated data this item includes both financing and capital transfers.											

Source: Arrangement under the flexible credit line and cancellation of current arrangement – press release and staff report, International Monetary Fund, May 2016.

Note: Adjustments to the traditional balance includes Pidiregas, IPAB, budgetary adjustments, net inflows of stabilization funds, FARAC/FONADIN, debtor support, change in capital of development banks and nonrecurring revenue.

Exhibit 9 Mexico's Public Sector Revenues and Expenditure (% GDP)

Source: International Monetary Fund, Article IV Mexico 2015, page 37.

Exhibit 10 Pemex's and CFE's Income Statements

Pemex's Income Statement (billions pesos)								
	2008	2009	2010	2011	2012	2013	2014	2015
Total sales	1,329	1,090	1,282	1,558	1,647	1,608	1,587	1,166
Cost of sales	654	561	631	779	832	840	865	1,031
Gross income	675	527	651	780	814	769	721	135
Operating income	571	428	546	672	905	727	615	98
Comprehensive financing cost	-108	-15	-12	-93	-5	-33	-135	n.a.
Income before taxes and duties	660	452	607	768	905	695	481	-128
<i>Of which are hydrocarbon extraction duties</i>	772	547	654	875	903	865	746	393
Net income	-112	-95	-47	-107	3	-170	-266	-521
CFE's Income Statement (billions pesos)								
Total sales	270	220	254	292	388	404	333	307
Cost of operation	287	260	292	319	235	244	234	220
Gross profit	-17	-40	-38	-27	153	161	99	86
Operating income	-18	-40	-37	-27	-10	-19	-5	-35
Financial cost	-22	-1	-3	-19	-11	-22	-44	-59
Write-off of rate insufficiency	21	43	34	27	32	40	27	n.a.
Income before taxes	n.a.	n.a.	n.a.	n.a.	-18	-36	-44	-93
Net income ^a	-41	-42	-51	-87	-51	-78	-74	-94
Peso/USD exchange rate (end of year)	13.5	13.1	12.4	14.0	13.0	13.1	14.7	17.2

^a Net income includes the write-off of rate sufficiency for all years except 2015, where it is inapplicable.

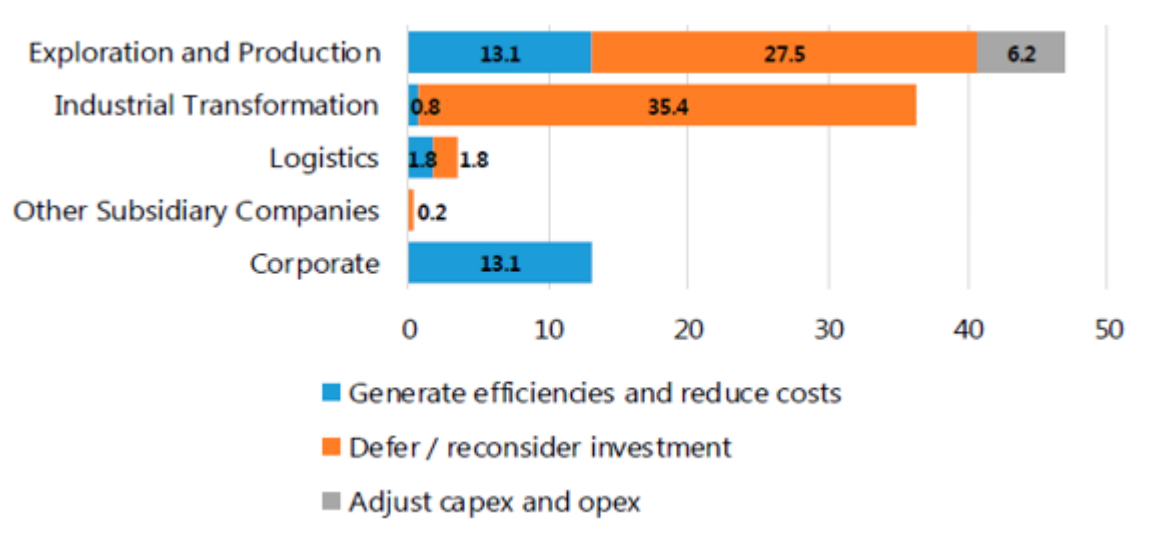
Source: Created by casewriter using data from Pemex's statistical yearbook 2014, Pemex's petroleum statistics publication, CFE's financial statements, and data from the Economist Intelligence Unit, accessed November 2016.

Exhibit 11 Mexico/US Foreign Exchange Rate



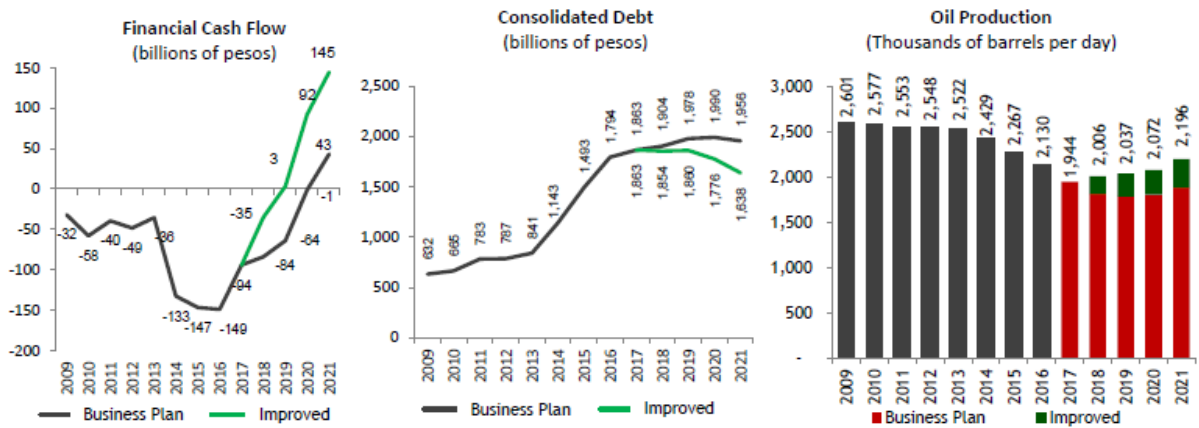
Source: Federal Reserve of St. Louis Economic Research, accessed 01/23/2017.

Exhibit 12 Pemex's 2016 budget adjustment (billions of pesos)



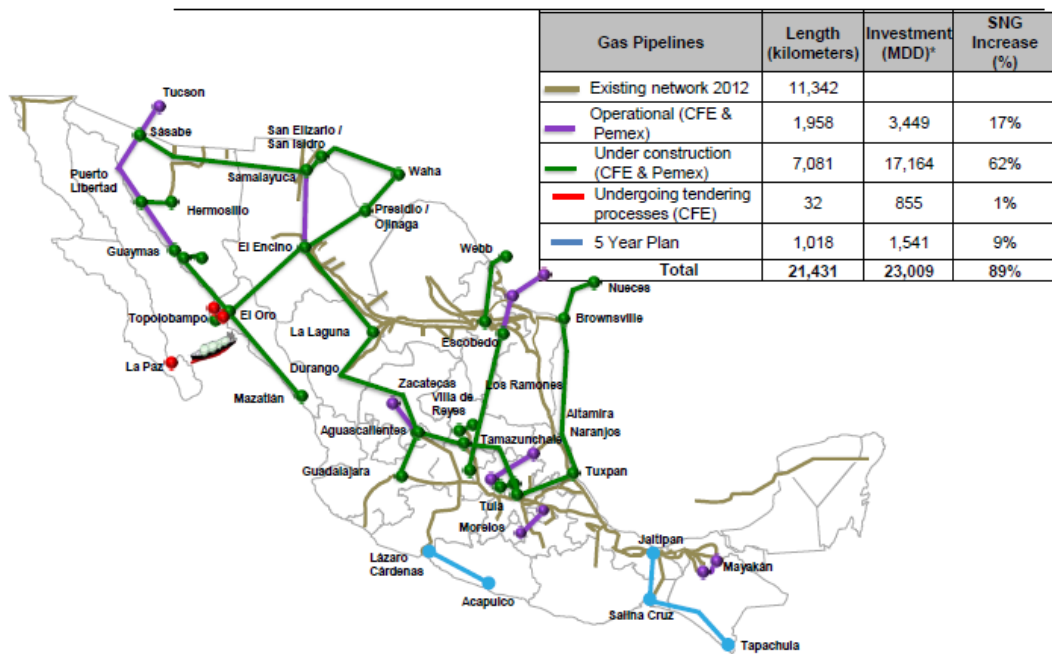
Source: "Mexico: 2016 Article IV Consultation," IMF, November 2016.

Exhibit 13 Pemex's 2016 budget adjustment (billions of pesos)



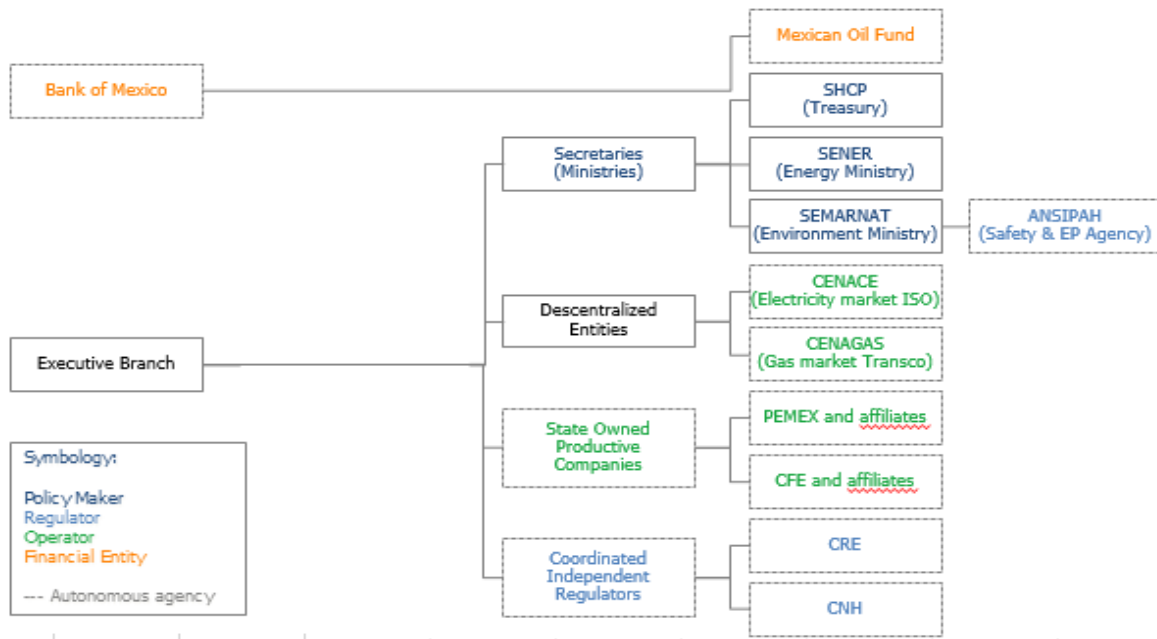
Source: Pemex's Business Plan 2016-2021.

Exhibit 14 Mexico's pipeline expansion plan



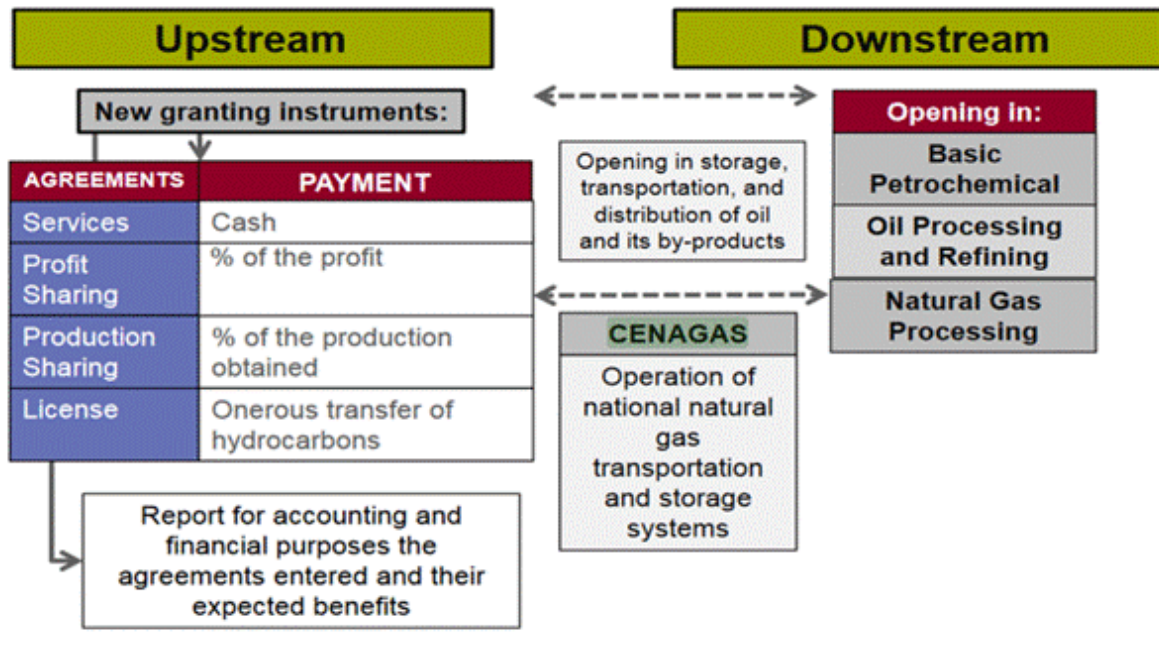
Source: "2013 Energy Reform; Investment opportunities through the entire value chain: upstream, midstream and downstream," CFE.

Exhibit 15 Industry Regulators and State Productive Enterprises



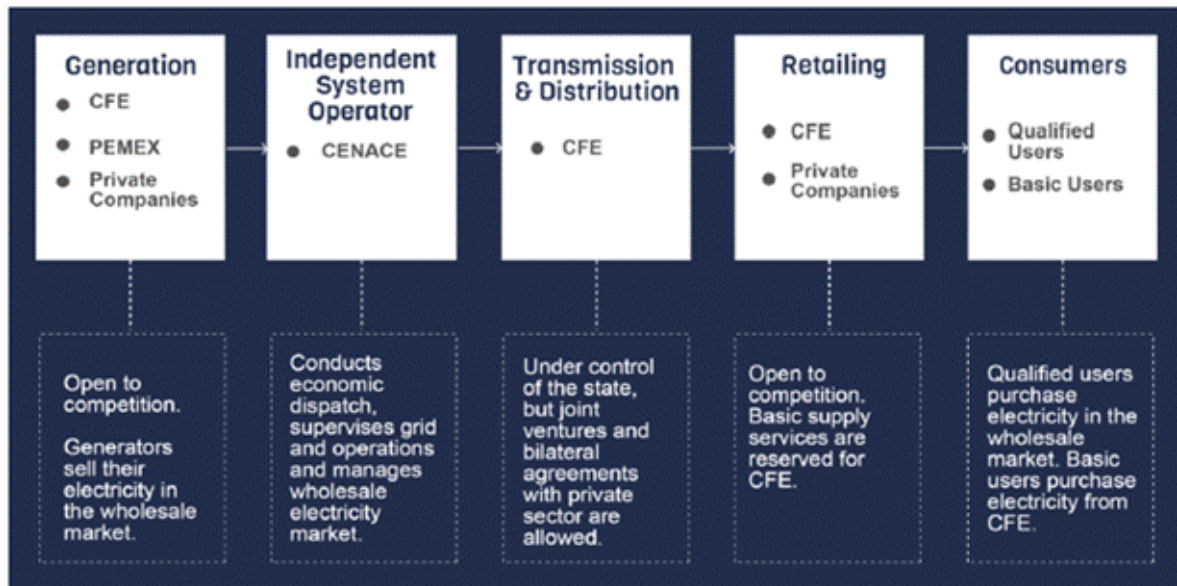
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Exhibit 16 Mexico's New Oil and Gas Market Framework



Source: Benjamin Torres-Barron, "Mexico's Energy Sector: Trends and opportunities," Baker & McKenzie, April 8, 2016.

Exhibit 17 Mexico's New Power Sector Structure



Source: Alejandro Chanona Robles, "Tracking the Progress of Mexico's Power Sector Reform", The Wilson Center, April 2016.

Exhibit 18 Basic Structure of Mexico's Wholesale Electricity Market

Major Players	Products & Services (Sub-Markets)	Transaction Classification
<ol style="list-style-type: none"> 1. CRE (Regulation) 2. CENACE (Operation) 3. Market Participants <ol style="list-style-type: none"> a) Power Generator b) Qualified User (Demand Equal or Greater than 2 MW) c) Supplier <ul style="list-style-type: none"> ● Basic ● Qualified ● Last Resort d) Non-Supplying Trader 	<ol style="list-style-type: none"> 1. Electricity 2. Ancillary Services 3. Capacity 4. Clean Energy Certificates (CELS) 5. Financial Transmission Rights 	<ol style="list-style-type: none"> 1. Short-Term Transactions <ol style="list-style-type: none"> a. Day-Ahead Electricity & Ancillary Services b. Real-Time Electricity & Ancillary Services c. Capacity Market (Annual) d. Clean Energy Certificate (CELS) Market 2. Medium & Long-Term Contracts: <ol style="list-style-type: none"> a. Medium-Term Electricity & Capacity Auctions (3-year contracts) b. Long-Term Capacity & Clean Energy Auctions (15-year contracts); CELs (20-year contracts) c. Financial Transmission Rights Auctions

Source: Alejandro Chanona Robles, "Tracking the Progress of Mexico's Power Sector Reform," The Wilson Center, April 2016.

Endnotes

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