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Mexico's Oil and Gas Sector: Background, Reform Efforts, and Implications for the United States

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Summary

The future of oil and natural gas production in Mexico is of importance for both Mexico's economic growth, as well as for U.S. energy security, a key congressional interest. Mexico is a top trade partner and crude oil supplier to the United States. Mexico's state oil company, *Petroleos Mexicanos* (Pemex) remains an important source of government revenue even as it is struggling to counter declining oil production and reserves. Due to an inability to meet rising demand, Mexico has also significantly increased natural gas imports from the United States. Still, gas shortages have hindered the country's economic performance, including in manufacturing sectors that are highly integrated with U.S. industries.

On December 20, 2013, Mexican President Enrique Peña Nieto signed historic constitutional reforms related to Mexico's energy sector aimed at reversing oil and gas production declines. On August 11, 2014, secondary laws to implement those reforms officially opened Mexico's oil, natural gas, and power sectors to private investment. As a result, Pemex can now partner with international companies that have the experience and capital required for exploring Mexico's vast deep water and shale resources. Leftist parties and others remain opposed to the reforms, however, maintaining that the reforms cede control over Mexico's natural resources without ensuring that those resources are developed in a sustainable way that benefits the Mexican people. Opponents hope to convene a popular referendum on the reforms during the 2015 mid-term elections, but Mexico's Supreme Court may not allow it to take place.

The energy reforms transform Pemex into a "productive state enterprise" with more autonomy and a lower tax burden than before, but make it subject to competition with private investors. They create different types of contracts for private companies interested in investing in Mexico, including production-sharing and licensing; allow companies to post reserves for accounting purposes; establish a sovereign wealth fund; and create new regulators. In August, Mexico's Secretariat of Energy announced the results of "Round Zero," which defines the exploratory and production areas that Pemex can retain. Pemex is likely to partner with private companies to exploit many of those areas. The first round of public bidding is expected in 2015.

The U.S. Congress has legislative and oversight interests in examining the potential implications of Mexico's oil and natural gas reforms on U.S. hydrocarbons imports and exports, bilateral trade and investment, and economic conditions in Mexico. Congress approved the U.S.-Mexico Transboundary Hydrocarbons Agreement in December 2013 (P.L. 113-67, the Bipartisan Budget Act of 2013). That agreement is intended to facilitate joint development of oil and natural gas in part of the Gulf of Mexico. In June 2014 and again in September 2014, the House approved measures (H.R. 3301/H.R. 2) with provisions to ensure the continued development of infrastructure to export natural gas to Mexico.

The opening of Mexico's oil and natural gas sector could expand U.S.-Mexico energy trade and provide opportunities for U.S. companies involved in the hydrocarbons sector, as well as infrastructure and other oil field services. If these reforms accelerate growth and investment in Mexico (as the government has stated) they could also benefit North American competitiveness. Industry analysts maintain that the reforms are generally well-designed, but that the way they are implemented will likely determine whether they prove to be as transformative as the Mexican government expects.

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Introduction

The United States has a strong economic interest in ensuring energy security, bolstering exports, and reducing barriers to U.S. trade and investment. The United States also has a national security and an economic interest in ensuring that Mexico, a key ally and top trade partner with which the United States shares a nearly 2,000 mile border, is economically vibrant and politically stable.[1] U.S.-Mexico energy trade and cooperation plays an important role in achieving those goals.

U.S. policy makers are closely monitoring the implementation of the December 2013 constitutional reforms and August 2014 implementing laws that allow Mexico's *Petroleos Mexicanos* (Pemex), to partner with international companies to boost production. Hailed by many analysts as the most significant economic reform undertaken by Mexico since its entrance into the North American Free Trade Agreement (NAFTA) in 1994, the energy reforms are expected to boost investment, growth, and eventually oil and gas production in the country. The reforms also opened Mexico's electricity sector to private generators, although not addressed in this report.[2] If power sector reforms can help reduce Mexico's high electricity costs, then Mexico's manufacturing sector—a dynamic sector that is highly integrated with U.S. industry—should become more competitive.[3] There is a danger, however, that the Mexican government may have oversold the benefits of the reforms to a populace that remains divided about whether or not they will be good for the country.[4]

Congress has enacted legislation and convened a number of hearings on Latin American energy issues and, more specifically, U.S.-Mexico energy issues. During the first session of the 113th Congress, lawmakers focused on examining legislation to implement a U.S.-Mexico Transboundary Hydrocarbons Agreement that would create a bilateral framework for joint development of oil and natural gas resources in part of the Gulf of Mexico.[5] (H.J.Res. 59/P.L. 113-67), the Bipartisan Budget Act of 2013, approved the Agreement. While joint development in the transboundary area is a step forward for energy cooperation, Congress arguably has a greater legislative and oversight interest in increasing U.S. trade and investment in Mexico's broader hydrocarbons sector and U.S. natural gas and refined petroleum products exports to Mexico. On June 24, 2014, the House approved legislation (H.R. 3301), which seeks to ensure the continued development of natural gas infrastructure and exports to Mexico. Those provisions were integrated into H.R. 2, which the House passed on September 18, 2014.

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[1] For background, see: CRS Report R42917, *Mexico: Background and U.S. Relations*, by Clare Ribando Seelke, and CRS Report RL32934, *U.S.-Mexico Economic Relations: Trends, Issues, and Implications*, by M. Angeles Villarreal.

[2] Lisa Viscidi and Paul Shortell, A Brighter Future for Mexico: The Promise and Challenge of Electricity Reform, Inter-American Dialogue, June 2014, http://www.thedialogue.org/uploads/IAD9603_MexicanEnergyFINAL.pdf.

[3] David H. Petraeus, Robert B. Zoellick, and Shannon K. O'Neil, *North America: Time for a new Focus*, Council on Foreign Relations, Independent Task Force Report No. 71, October 2014, available at: http://www.cfr.org/north-america/north-america/p33536. Hereinafter CFR, October 2014.

[4] In an August 2014 survey conducted by *Parametría y Asociados*, some 46% of participants predicted that the reforms would have a negative effect on the country. Although the Supreme Court may not allow the popular referendum proposals on the energy reforms to move forward, the government could continue to face opposition to the reforms. Rodrigo Carriedo, "Mexico Update: A Proposed Referendum on Energy Reform," *Americas Society/Council of the Americas*, September 18, 2014.

[5] For background, see: CRS Report R43606, *U.S.-Mexico Transboundary Hydrocarbons Agreement: Background and Issues for Congress*, by Curry L. Hagerty.

This report provides an overview of Pemex and the content and prospects for Mexico's energy reforms, before discussing specific issues facing Mexico's oil and gas industry. It then examines the U.S.-Mexico energy relationship through the lenses of trade and energy cooperation. It concludes by suggesting several oversight issues for Congress related to what the enactment of energy reform might portend for Mexico's economic development, the U.S. energy matrix, and bilateral or North American energy cooperation.

Pemex: A Brief History and Pre-Reform Status Report

Foreign investment in Mexico's oil industry has had a tumultuous history. [6] After oil was discovered in Mexico at the turn of the 20th century, foreign investors—primarily from Britain and the United States—played a significant role in helping the country become the world's second largest oil producer by the early 1920s. However, political unrest during and after Mexico's bloody revolution (1910-1920) and the country's 1917 constitution, which established national ownership of all hydrocarbons resources, caused investment in Mexico's oil and natural gas sectors to gradually decline. By the 1930s, reduced foreign investment had resulted in dramatic declines in production levels, and fraught relations between U.S. oil companies and successive post-revolutionary presidents had damaged U.S.-Mexican relations. Tensions culminated in President Lázaro Cárdenas' historic 1938 decision to abandon efforts to mediate a bitter labor dispute between Mexican oil workers and foreign companies and instead follow through on his threat to expropriate all U.S. and other foreign oil assets in Mexico.

Upon its creation in 1938, Pemex became a symbol of national pride and a rallying point around which Cárdenas and what became the Institutional Revolutionary Party (PRI)—the party of President Enrique Peña Nieto—united a disparate Mexican society against foreign intervention. Oil remains deeply tied to Mexican nationalism. Nevertheless, Pemex continued to pursue service contracts with some U.S. oil companies until the practice was definitively outlawed by a 1958 regulatory law implementing Article 27 of the constitution.[7] From then on, Pemex retained a monopoly over Mexico's oil and natural gas sector and the Mexican Finance Ministry kept tight control over the companies' finances and management.

In 2013, seventy-five years after its founding, Pemex found itself facing significant challenges. Pemex had its heyday in the late 1970s following the discovery of the huge shallow water Cantarell oil field, but the company's long-term performance had been hindered by a number of factors. For years, Pemex sustained itself on the revenue produced from its relatively easy-to-exploit shallow water fields without investing the capital necessary to replace those reserves with new fields or even maintain its infrastructure. Pemex had a high percentage of losses, low worker productivity, and facilities that are in significant need of repair; 37 people were killed in January 2013 after an explosion occurred at one of the company's offices in Mexico City.[8] In part because

[6] For an overview of Mexico's oil industry from 1901 through the 1970s, see: George Grayson, *The Politics of Mexican Oil* (Pittsburgh, PA: University of Pittsburgh Press, 1980).

[7] Article 27 of Mexico's 1917 constitution gives the Mexican government exclusive legal authority to exploit, distribute, and process hydrocarbons in the country and states that the government may not, per the regulatory law, grant private concessions for their exploitation. Article 28 establishes petroleum and other hydrocarbons as strategic sectors over which the government (public sector) exerts total control.

[8] Adam Thompson, "Rusty Wheels of Pemex Require Much Oiling," *Financial Times*, April 3, 2013.

of the Mexican government's heavy tax demands, Pemex had operated at a loss since 1998 and significantly increased its debt burden. Until recently, the government had also prevented the company from reinvesting its profits into maintenance and new exploration.[9] Pemex's pension liabilities, negotiated by the company's powerful and, for some observers, corrupt workers union, had become an unsustainable drain on its finances.[10] Each year, Pemex had been losing hundreds of millions of dollars due to criminal groups illegally tapping into its pipelines.[11] Pemex's inability to partner with other companies arguably inhibited it from benefitting from new expertise and techniques, particularly in deep water drilling and hydraulic fracturing (fracking).

The Path to Pemex Reform

Proposals for Energy Reform

President Enrique Peña Nieto of the nationalistic PRI assumed the Mexican presidency on December 1, 2012 after 12 years of rule by the conservative National Action Party (PAN). Even though Peña Nieto hailed from the PRI, the party that had nationalized the oil industry and watered down previous PAN-led reform efforts, he campaigned on an economic platform that prioritized allowing Pemex to form joint ventures with private companies. At his inauguration, President Peña Nieto announced a reformist agenda aimed at bolstering Mexico's competitiveness that included energy sector reform.

In order to implement his agenda, President Peña Nieto and leaders of the PRI concluded a "Pact for Mexico" agreement with the PAN and the leftist Party of the Democratic Revolution (PRD) that facilitated the passage of financial, education, telecommunications, and fiscal reforms.[12] Many of those reforms required constitutional changes. As with the other constitutional reforms enacted in 2013, the energy reforms that Peña Nieto proposed in August of that year required a two-thirds vote in the Mexican Congress and approval by a majority of the country's 32 state legislatures. As discussed below, a PRI-PAN alliance enabled the December 2013 approval of constitutional reforms on energy, but led the PRD to leave the Pact for Mexico.

The Peña Nieto Administration's August 2013 energy reform proposal would have removed hydrocarbons from the list of strategic sectors that can only be developed by the government and allowed Pemex to form "profit-sharing"[13] partnerships with international companies in exploration and production. The reform would also have allowed Pemex to sign agreements with private companies for transporting oil and gas, refining, and producing petrochemicals. In secondary legislation, the President pledged to introduce reforms to give the company budget autonomy, improve its transparency, and change its fiscal structure, among other measures.

[9] Reforms passed in 2006 allowed Pemex to fund a portion of its capital investments with earnings rather than through the issuance of new debt. Ognen Stojanovski, "Handcuffed: an Assessment of Pemex's Performance and Strategy," in *Oil and Governance: State-owned Enterprises and the World Energy Supply*, ed. David G. Victor, David R. Hults, and Mark C. Thurber (Cambridge University Press, Cambridge: UK, 2012).

[10] Thompson, op. cit.

[11] Patrick Corcoran, "Oil Theft is Big Business for Mexican Gangs," *InSight Organized Crime in the Americas*, March 20, 2012.

[12] For information on the reforms in English, see: http://reformas.gob.mx/en/reforms.

[13] Under this scenario, private companies receive a percentage of the remaining revenue earned once exploration and production costs have been recovered, but would not own a share of production.

The PAN put forward deeper reforms than the PRI that would permit private concessions in upstream and downstream[14] operations and production-sharing agreements between Pemex and private companies. Former PAN President Felipe Calderón tried to enact far-reaching energy reforms in 2008, but his proposal was watered down by the PRI-led Congress.[15] The PAN also sought to establish a strong regulatory body and a sovereign wealth fund to support social needs. Some PAN legislators reportedly conditioned their support for energy reforms on the PRI backing political reforms, which were also approved in December 2013.[16]

The PRD vigorously opposed allowing private involvement in Pemex. Instead the PRD proposal focused on reforming the company while simultaneously granting it greater budget autonomy and a less onerous tax burden. Past and present PRD party leaders joined forces to oppose the PRI and PAN versions of energy reform.

Key Provisions of the December 2013 Constitutional Reforms[17]

In the end, the reforms approved by the Mexican Congress[18] and a majority of state legislatures and then signed into law by President Peña Nieto on December 20, 2013, bore most in common with the PAN proposal, but contain elements of all three parties' energy reform propositions.

Key elements of the reforms include:

- Maintaining state ownership of subsoil hydrocarbons resources, but allowing companies to take ownership of those resources once they are extracted and to book reserves for accounting purposes;
- Creating four types of contracts for exploration and production: service contracts (companies are paid for activities done on behalf of the state), profit-sharing contracts, production sharing contracts, and licenses (enabling a company to obtain ownership of the oil or gas at the wellhead after it has paid taxes);
- Opening refining, transport, storage, natural gas processing, and petrochemicals sectors to private investment;

[14] Upstream refers to the exploration, development, and production phases of oil and natural gas production. Midstream refers to the transportation of the resource, and downstream refers to the refining and marketing of the resource. Natural gas does not need to be refined, so downstream in that sector relates to the marketing of natural gas.

[15] President Calderón originally proposed measures that would have allowed Pemex to enter into joint ventures with foreign companies in exploration and production, and permitted private companies to build and operate refineries, pipelines, and storage facilities in Mexico. Calderón's proposal prompted strong resistance from the PRD and was significantly watered down by the PRI in the Mexican Congress. Nevertheless, the final legislation brought private sector experts into Pemex's management structure, created an independent National Hydrocarbons Commission (CNH) to advise the company, and added greater flexibility to its procurement and investment processes. Most significantly, the 2008 reforms permit Pemex to create incentive-based service contracts with private companies.

[16] Those reforms provide for the re-election of federal deputies for up to four terms beginning in 2015 and of senators for up to two terms beginning in 2018, the reelection of mayors and local legislatures, the replacement of the Attorney General's Office with an independent General Prosecutor's Office, the creation of a new national electoral institute, and the annulment of an election if there is evidence of "systematic" violations of campaign finance restrictions.

[17] David L. Goldwyn, *Mexico Rising: Comprehensive Energy Reform at Last?* Atlantic Council, December 2013, http://www.atlanticcouncil.org/images/publications/Mexico_Rising.pdf.

[18] The reforms were approved by the Mexican Senate on December 11, 2013, (95-28) and the Chamber of Deputies on December 12, 2013, (354-134).

- Transforming Pemex into a productive state enterprise with an autonomous budget and a board of directors that does not include union representatives;
- Strengthening four federal entities with regulatory roles in the hydrocarbons industry (the Ministries of Energy and Finance, the National Hydrocarbons Commission or CNH, and the Energy Regulatory Commission) and creating a National Agency for Industrial Safe and Environmental Protection; and,
- Establishing a sovereign wealth fund, the Mexican Petroleum Fund for Stabilization and Development, to be managed by the Central Bank.

Secondary Laws Approved in August 2014[19]

While the constitutional reforms outlined the broad contours of Mexico's oil and gas reform, many details were left to be defined in secondary laws needed to implement those reforms. Those laws had to pass Congress by a simple majority and technically had to be enacted within 120 days of the signing of the energy reforms (December 20, 2013). However, due to a variety of factors, including the PAN's internal elections held in May 2014, the Mexican Congress did not consider the energy laws until a special section was convened in July. The Senate and Chamber of Deputies debated and made minor modifications to the Peña Nieto Administration's original proposals that were then approved with broad support from the PRI, PAN, and smaller parties. Key provisions dealing with the hydrocarbons sector not mentioned above include:

- Pemex: is more independent of the state, but must adopt internal reforms; is to pay a tax rate of roughly 65% (rather than 79% now); and is permitted to keep some of its existing fields through a "Round Zero" process as deemed appropriate by the Secretariat of Energy;
- Pemex's monopoly on retail gasoline and diesel sales ends in 2016;
- Companies will pay royalties and taxes varying with the price of oil;
- Companies must respect national content requirements of 25% in 2015, rising to 35% in 2025 (excluding deep water activities);
- Companies may not expropriate land from communities for exploration and development, but rather temporarily occupy land and compensate its owners; and,
- The National Hydrocarbons Commission (CNH) is strengthened and established as a constitutionally coordinated entity to gather and manage information on the energy sector; issue regulations and monitor compliance; and manage the bidding rounds, award contracts, and supervise those contracts.

Round Zero

On August 13, 2014, the Mexican government announced the results of Round Zero a month earlier than had been required by the legislation. The Secretariat of Energy awarded Pemex 83%

[19] This section draws from: David L. Goldwyn et al., *Mexico's Energy Reform: Ready to Launch*, Atlantic Council, August 2014, available at: http://www.atlanticcouncil.org/publications/reports/mexico-s-energy-reform-ready-to-launch.

of Mexico's probable reserves and 21% of its prospective reserves. Pemex had requested to retain 31% of the country's prospective reserves, but its limited capacity to explore and produce in deep water and unconventional areas may be why it was not awarded that large a share.

Even though Round Zero did not open up new fields for private companies to bid on, it did increase the opportunities for private involvement in exploration and production in Mexico. According to industry experts, Pemex is likely to change the 24 service contracts it has with oil companies (as allowed under the 2008 reforms) into profit-sharing contracts and to seek new partners to help it develop some of the other probable and prospective fields. They also predict that new companies interested in investing in Mexico's energy industry may first seek to partner with Pemex before submitting independent bids.

Next Steps

During the next several months, Pemex will be undergoing significant restructuring; all of the regulatory agencies empowered or created by the energy reforms will be staffed and training programs for those interested in working in the industry will begin; regulations will be released; the priorities for the Mexican Petroleum Fund will be defined; and the areas that will be part of the first round of public bidding will likely be announced.[20] Although international oil companies reacted favorably to the constitutional and secondary reforms, they are reportedly somewhat concerned that Mexico may be rushing through the implementation process. U.S. companies are closely watching the degree to which Mexico establishes sound environmental and safety standards, recruits talented and independent individuals to staff regulatory agencies, fosters transparency, and conducts fair and transparent bidding processes.[21]

Mexico's Energy Resources

Oil: Attracting a lot of Interest

Mexico is the world's 10th largest producer of oil and holds approximately11.1 billion barrels of oil reserves—the 18th largest in the world.[22] Mexico may also have the 8th largest tight oil[23] resources globally, about another 13 billion barrels.[24] With these reserves, Mexico has the potential to halt its decade-long decline in oil production.

[20] Ibid. Pedro Valenzuela and Duncan Wood, *Mexico's Energy Reform: Entering the Final Phase - The Expert Take*, Woodrow Wilson Center's Mexico Institute, August 13, 2014.

[21] CRS phone interview with State Department officials, August 28, 2014.

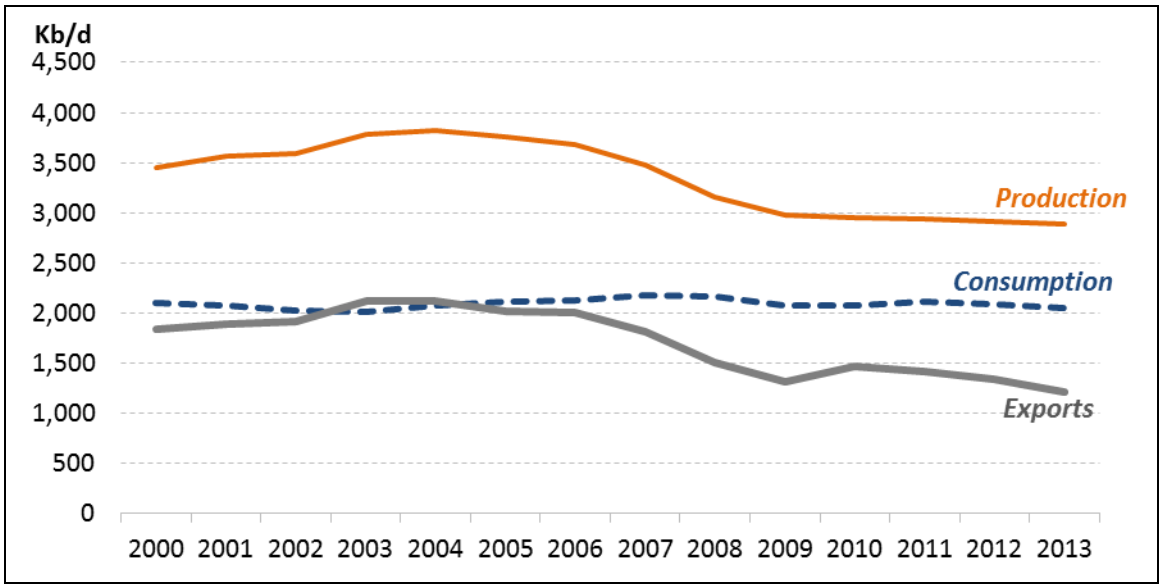
[22] *BP Statistical Review of World Energy*, June 2014, http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy.html.

[23] Tight oil refers to oil that is trapped in impermeable formations, such as shale or sedimentary rocks, and requires artificial fractures to allow the hydrocarbons to flow.

[24] U.S. Energy Information Administration (EIA), *Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States*, Washington, DC, June 10, 2013, p. 10, http://www.eia.gov/analysis/studies/worldshalegas/. Hereinafter: EIA, June 2013.

Figure 1. Mexican Oil Production, Consumption, and Exports

2002 - 2013



Source: BP Statistical Review of World Energy 2013, June 2013.

Notes: Units = thousand barrel per day (kb/d).

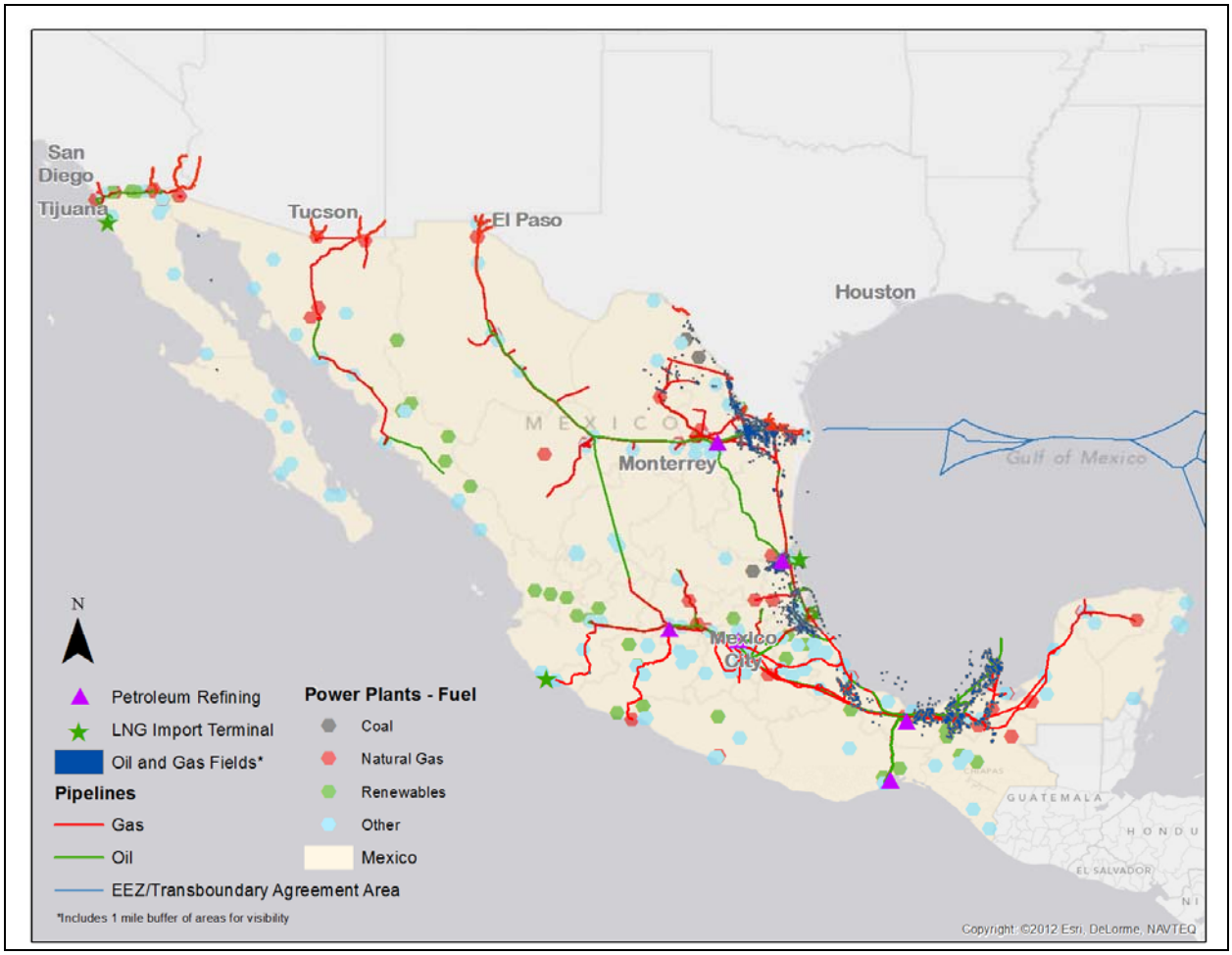
Mexico's oil production declined by some 20% from 2005 through 2009; production has fallen by roughly 1% per year since that time (see **Figure 1**) due, in part, to aging and inefficient infrastructure (see **Figure 2**).[25] Nevertheless, Mexico lags only behind Russia, the United States, China, and Canada as an important non-OPEC oil producer. Most of Mexico's production (75%) is found offshore in the shallow waters of the Bay of Campeche, which is part of the Gulf of Mexico, and concentrated in two fields—Ku-Maloob-Zaap (KMZ) and Cantarell. KMZ production has been on the rise since 2006, reaching almost 864,000 barrels per day (b/d) at the end of 2013, and has replaced part of Cantarell's decline. Cantarell was once one of the largest producing fields in the world, but started having pressure problems in the mid-1990s. Efforts to reverse the decreasing production were successful for a while and the field reached its peak in 2004 at 2.1 million b/d (63% of Mexico's production). By 2013, Cantarell produced only about 440,000 b/d (17% of Mexico's production).

The U.S. Energy Information Administration (EIA) has estimated that the recently-enacted energy reforms could boost Mexico's long-term oil production potential to 3.7 million b/d by 2040 from the 2.9 million b/d produced in 2013. That estimate is 75% higher than the EIA's 2013 forecast for Mexico's long-term oil production that was issued prior to the enactment of energy reforms.[26]

[25] This paragraph draws from: EIA, *Country Analysis: Mexico*, April 24, 2014, available at: http://www.eia.gov/countries/cab.cfm?fips=MX. EIA.

[26] EIA, "Energy Reform Could Increase Mexico's Long-term Oil Production by 75%," press release, August 25, 2014.

Figure 2. Mexico Energy Infrastructure

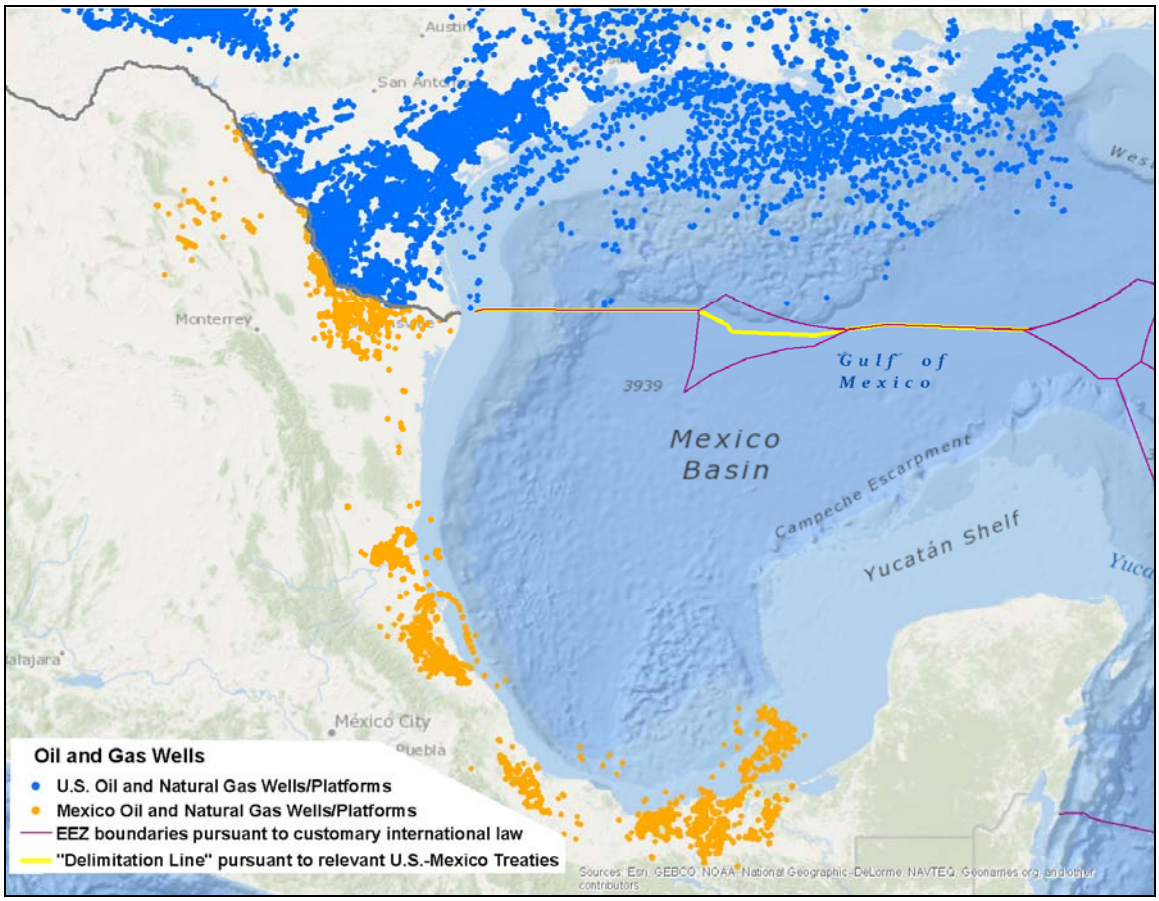


Source: Compiled by CRS using data from IHS, Platts, and Esri. Date: September 2013.

There may also be significant deep water resources in the Gulf of Mexico yet to be discovered. As can be seen below in **Figure 3**, Mexico has undertaken very little activity in its portion of the Gulf of Mexico, particularly compared to the United States, in part because Mexico does not yet have the technical capacity to effectively explore or produce its deep water areas. This is one of the reasons that international companies, particularly those with deep water expertise, are excited about the reforms in Mexico. Additionally, the U.S.-Mexico Transboundary Agreement (see below) may play an important role in raising Mexico's standards of operation in deep water.

Figure 3. U.S./Mexico Oil and Natural Gas Activity Around the Gulf of Mexico

Active Wells and Platforms



Source: Compiled by CRS using data from HSIP Gold 2012 (Platts), IHS 2012 Wells, and Esri.

Note: This map may or may not offer information related to the submerged land tenure systems of the United States or Mexico.

Natural Gas: More Needed

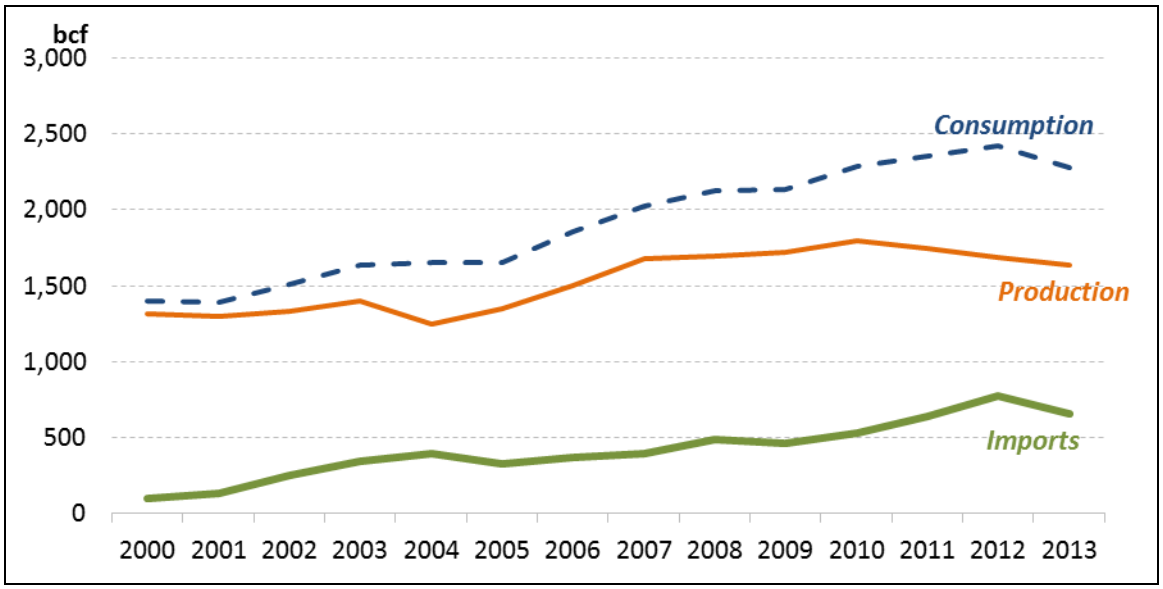
Mexico's natural gas production capacity is higher than in 2000, but has not been able to keep up with demand (see **Figure 4**), which increased about 80% between 2000 and 2012. Most of Mexico's natural gas consumption supports its oil operations and national electricity generation. Mexico's proven gas reserves are on the decline due to underinvestment in exploration. Production has also begun to decline in recent years as price differentials have made it more profitable for Pemex to produce oil than gas. And, although Mexico may have significant unconventional natural gas resources, it is further behind in developing these resources than other countries, such as Canada. Mexico's energy reforms seek to attract private investment in exploration and production of both conventional and unconventional natural gas resources, but also to accelerate investment in much-needed infrastructure for storage, transportation, and distribution.

As a consequence of demand rising faster than production, Mexico's imports of natural gas have also been increasing, accounting for about 27% of consumption today compared to less than 10%

in 2000. In 2000, Mexico imported 30% of U.S. natural gas exports which accounted for 100% of Mexico's natural gas imports. In 2006, Mexico started importing liquefied natural gas (LNG) at very high costs from Qatar, Nigeria, and Peru to help meet its growing demand for gas. Mexico has three LNG import terminals, two on the Pacific side and one on the Atlantic.

Figure 4. Mexican Natural Gas Production, Consumption, and Imports

2002 - 2013



Source: *BP Statistical Review of World Energy 2013*, June 2013.

Notes: Units = billion cubic feet (bcf).

As a free trade partner, exports of U.S. natural gas to Mexico are assumed in the public interest by U.S. statute and permitted without delay, which has spurred U.S. natural gas exports to Mexico. In 2012, U.S. natural gas exports accounted for approximately 80% of Mexico natural gas imports, and 21% of its natural gas consumption. Between 2008 and 2013, U.S. pipelines to Mexico doubled their capacity. Current U.S. export capacity to Mexico is 4.7 billion cubic feet (bcf) per day. By the end of 2015, that capacity should reach7 bcf/d.[27] It would appear that for the immediate future Mexico will likely remain dependent on U.S. supplies of natural gas to meet its growing demand.

Unconventional Oil and Natural Gas Opportunities

One of the areas gathering interest with the possible opening of Mexico's oil and natural gas industry is shale development. The EIA has assessed Mexico's shale gas resources to be significant (the 6th highest globally).[28] The proximity of some formations in northern Mexico to U.S. developments makes them attractive to some U.S. companies. As an example, the Eagle Ford basin in Texas, one of the fastest growing shale producing areas in the United States, may extend down into Mexico.

[27] Electronic correspondence with U.S. Federal Energy Regulatory Commission (FERC), October 3, 2014.

[28] EIA, June 2013.

Mexico, through Pemex, has already started exploring some of its unconventional formations. A limited number of test wells have been drilled, but Pemex has ambitious plans for scaling up development and production over the next 10 years. However, Mexico will need to implement reforms to attract outside investment to strengthen regulatory and environmental protection measures; expand pipelines, roads, and other infrastructure; address water management issues; and deal with security concerns. Some of the states in northeastern Mexico where shale formations are located have experienced significant violence in recent years, possibly deterring additional business opportunities.[29] Potential disputes with individuals and communities over access to land could for exploration and development also deter would-be investors. The United States has already been working with Mexico in some of the more technical areas such as resource assessment, environmental protection, and regulatory policies.

Refining: Limited Capacity and in Need of Modernization

Although Mexico is a large exporter of crude oil, it is a net importer of refined petroleum products, such as gasoline and diesel fuel. Mexico does not have enough refining capacity of its own to meet its domestic demand for refined products, nor has it made the investment to process heavy crudes like its Maya crude. Mexico has six refineries with a total capacity of 1.54 million barrels per day, but in recent years has operated below capacity because of operating mishaps.[30]As in many other countries throughout Latin America, Mexico's refineries are in need of major repairs and upgrades and often operate at below their stated capacity.[31] Mishaps and other losses are expected to result in a $7.7 billion loss for the company in 2013.[32]

Mexico and the United States already have a close relationship in the refining sector. Much of the U.S. Gulf Coast refining capacity is designed to process heavy crudes, which require more sophisticated and expensive technologies than Mexican refineries currently possess. Mexico exports its heavy crude to U.S. refineries on the Gulf Coast, which then sends some of the refined products back to Mexico. Pemex, which operates all of the refineries in Mexico, also owns 50% of a refinery in Texas. The refining relationship between Mexico and the United States could potentially be expanded even further as the reforms fully open up Mexico's downstream (marketing and refining) hydrocarbons market to international companies.

Energy: a Central Component of U.S.-Mexico Trade

The bilateral economic relationship with Mexico is of key interest to the United States because of Mexico's proximity, the high volume of trade with Mexico, and the strong economic ties between the two countries. The United States is, by far, Mexico's leading partner in merchandise trade, while Mexico is the United States' third largest trade partner in total trade after China and Canada. Mexico is the United States' second largest export market after Canada and ranks third as a supplier of U.S. imports. Since NAFTA took effect in 1994, the United States and Mexico have become more economically integrated with strong trade and supply chain linkages. Between 1993

[29] "Mexican Cartels Steal Billions From Oil Industry," *Associate Press*, September 25, 2014.

[30] EIA, April 2014.

[31] Justin Jacobs, "Refining Woes in Latin America," *Petroleum Economist*, October 2013.

[32] "Mexico's Pemex to Incur $7.7 Billion Refining Loss in 2013," *Fox News Latino*, October 23, 2013.

and 2013, total U.S. trade with Mexico increased by 506%.[33] In most sectors, NAFTA removed significant trade and investment barriers, ensured basic protections for NAFTA investors, and provided a mechanism for the settlement of disputes between investors and a NAFTA country. The agreement, however, included explicit country-specific exceptions and reservations. Under Chapter 6 of NAFTA, the Mexican government reserved to itself strategic activities, including investment and provisions in such activities, related to the exploration and exploitation of crude oil and natural gas.[34] Despite these exclusions from NAFTA, energy remains a central component of U.S.-Mexico trade, as discussed below.

Mexico Still a Top U.S. Oil Supplier

Mexico has been trading oil and natural gas with the United States since the turn of the last century. It is typically among the top three exporters of oil to the United States. In 2013, the United States imported 850,000 b/d of crude oil from Mexico, behind Canada and Saudi Arabia.[35] Mexico's crude oil exports to the United States increased steadily in the 1980s and the 1990s, reaching a peak in 2004 and 1.6 million b/d. Since 2006, U.S. crude oil imports from Mexico have generally declined, reflecting Mexico's drop in production and rising internal demand.

Mexico is the third leading supplier of U.S. crude oil imports. As shown in **Table 1**, Canada accounted for 28% of the dollar value of U.S. crude oil imports in 2013, followed by Saudi Arabia (18% of the total), and Mexico (12% of the total).

Table 1. U.S. Crude Petroleum Oil Imports in 2013

Total in Billions of U.S. Dollars

Country	Value	% of Total
Canada	76.7	28%
Saudi Arabia	50.3	18%
Mexico	31.9	12%
Venezuela	27.8	10%
Colombia	14.0	5%
Other Countries	73.2	27%
Total	273.8	--

Source: Compiled by CRS using USITC Interactive Tariff and Trade DataWeb: HTS number 2709 for crude petroleum oil.

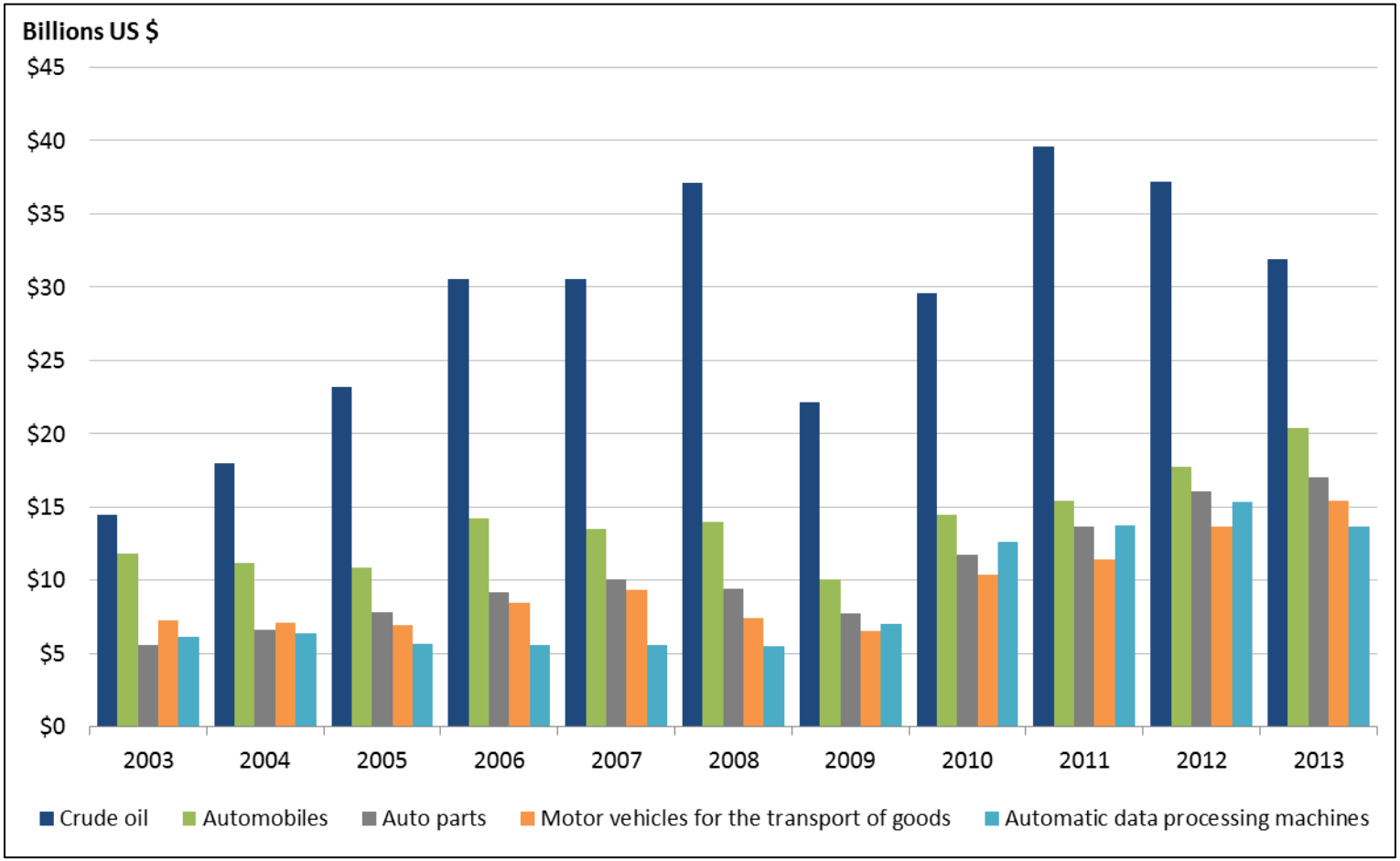
[33] Based on data from the U.S. International Trade Commission (USITC) Interactive Tariff and Trade DataWeb using Harmonized Tariff Schedule (HTS) at the 4-digit level. For more information on NAFTA and its effects on trade, see CRS Report R42965, *NAFTA at 20: Overview and Trade Effects*, by M. Angeles Villarreal and Ian F. Fergusson.

[34] Chapter 6 of NAFTA applies to energy and basic petrochemicals. It reserves most activities in Mexico's energy sector to the Mexican state.

[35] EIA, *Mexico Country Report*, April 24, 2014.

Figure 5. Top 5 Imports from Mexico

2003 - 2013



Source: Compiled by CRS using USITC Interactive Tariff and Trade DataWeb at http://dataweb.usitc.gov; HTS4-digit level.

The United States is the destination for approximately 71% of Mexico's oil exports, which arrive via tanker. Although Mexico has an extensive pipeline network that connects major production centers with domestic refineries and export terminals, it does not have any international oil pipeline connections. Exports leave the country via tanker from three Gulf Coast export terminals.[36]

The majority of Mexico's crude oil exports are of the heavy Maya blend (approximately 82% of exports), while the lighter crude oil produced offshore is mostly retained for domestic consumption. Most of Mexico's crude oil exports will likely continue to be exported to the United States because of its close proximity and also because the U.S. Gulf Coast possesses the sophisticated refineries necessary to process the heavier Maya crude oil.

The leading U.S. import item from Mexico is crude petroleum oil.[37] The value of crude oil imports from Mexico in 2013 totaled $31.9 billion, over 50% higher than the value of automobile imports, the second leading import item. As shown in **Figure 5**, crude petroleum oil imports from Mexico are considerably higher than other top imports from Mexico.

Although Mexico is one of the world's largest crude oil exporters, it is a net importer of refined petroleum products. In 2012, Mexico's imports of refined petroleum products from all countries totaled $29.6 billion.[38] Mexico was the destination for 44% of U.S. exports of motor gasoline in 2013, although imports from the United States have declined since 2011.[39]

Trade in Natural Gas

The United States has been Mexico's largest supplier of natural gas and Mexico continues to be a growing market for additional U.S. natural gas exports. As previously mentioned, Mexico's natural gas production has failed to keep pace with rising domestic demand making U.S. gas exports an important source of energy. The value of Mexico's natural gas imports increased from $995.7 million in 2007 to $2.5 billion in 2013.[40]

Mexico imported a total of 779 billion cubic feet (Bcf) of natural gas in 2012, out of which 620 Bcf came from the United States. The United States imports a very small amount of natural gas from Mexico. The surplus in natural gas trade with Mexico is expected to widen as recent supply and demand trends in both countries are expected to continue.[41] U.S.-Mexico trade in natural gas is done exclusively via pipeline.

[36] EIA, April 24, 2014.

[37] USITC Trade DataWeb, using HTS code 2709 for crude petroleum oil.

[38] Secretaría de Energía de México, Energy Information System, available at http://www.sener.gob.mx.

[39] EIA, April 2014.

[40] Secretaría de Energía de México, http://www.sener.gob.mx.

[41] EIA, April 2014.

Areas of U.S.-Mexico Energy Cooperation

In addition to the burgeoning energy trade between the United States and Mexico, energy cooperation has gradually risen to the top of the U.S.-Mexican political agenda as well. The United States and Mexico have been working on geothermal energy projects since the 1970s, but the possibility of expanding joint efforts to produce renewable energy sources, as well as conventional and unconventional hydrocarbons resources, has also entered the bilateral agenda.

Bilateral Framework on Clean Energy and Climate Change

On April 16, 2009, President Obama and then-Mexican President Calderón announced the Bilateral Framework on Clean Energy and Climate Change to jointly develop clean energy sources and encourage investment in climate-friendly technologies. Among others, its goals include enhancing renewable energy, combating climate change, and strengthening the reliability of cross-border electricity grids. Four bilateral meetings have thus far been held to advance the Framework. Since Mexico remains a top U.S. crude oil supplier and many of its untapped resources lie in deep waters in the Gulf of Mexico and in shale formations abutting the U.S. border, the countries want to ensure that Pemex (or other companies) develop those resources in an environmentally responsible way.

The U.S. and Mexican governments share a mutual interest in developing renewable energy sources, particularly those capable of serving rapidly growing population centers along the U.S.-Mexico border. As part of that effort, since 2011 the North American Development Bank has provided loans worth at least $677 million for projects related to wind and solar energy. The U.S. Agency for International Development (USAID) and Mexico have also expanded cooperation on environmental issues with the *Mexico Global Climate Change (GCC) Program*, a five-year, approximately $70 million program. The program seeks to help Mexico reduce emissions from deforestation, implement a low emissions development plan, and create a system for monitoring greenhouse gas emissions.

Although Mexico is trying to diversify its energy sources, it, like the United States, is likely to continue relying on oil and natural gas from traditional and unconventional (i.e., shale) sources. In the wake of the 2010 Deepwater Horizon spill in the Gulf of Mexico and amid concerns about the impact of hydraulic fracturing of shale oil in the United States, both governments have an interest in ensuring that hydrocarbons resources are developed in an environmentally responsible way. For example, as Pemex begins to partner with U.S. companies in the Gulf, it could benefit from participation in the Marine Well Containment Company that was created by U.S. companies to deal with spills. Should Pemex pursue contracts with U.S. companies who have years of expertise in hydraulic fracturing, they could complement the environmental and regulatory advice that Mexico is already receiving from the U.S. Departments of State and the Interior.

United States-Mexico Trans-Boundary Hydrocarbons Agreement[42]

In 2012, the United States and Mexico signed an agreement known as the U.S.-Mexico Transboundary Hydrocarbons Agreement (the Agreement). The Agreement could mark the start of an energy partnership in an area of the Gulf of Mexico that the U.S. Department of the Interior estimates to contain as much as 172 million barrels of oil and 304 billion cubic feet of natural gas. Although it concerns relatively little oil and natural gas, a main purpose of the partnership is to lift a moratorium on development in that region that had been in effect since 2000. In addition, the Agreement gives Pemex and U.S. companies options for jointly developing oil and gas reservoirs, referred to as "transboundary resources," that exist in areas straddling the marine border of both countries.

Prior to the expected expiration date for the moratorium, the Mexican and U.S. Congresses reviewed and accepted the Agreement.[43] Congress enacted legislation approving the Agreement on December 18, 2013, (H.J.Res. 59).[44] Now that the United States and Mexico have approved the Agreement, the moratorium is considered moot. The Department of the Interior's Bureau of Ocean Energy Management awarded the first leases subject to the Agreement in May 2014.[45]

Issues for Congress

Mexico's Economic Development

Most experts agree that boosting oil and natural gas production and tapping into Mexico's vast hydrocarbons reserves would likely boost economic growth in Mexico. The Peña Nieto government maintains that the recently-enacted energy reforms will result in lower energy prices (for electricity and natural gas), create 500,000 new jobs, and boost GDP growth by 1% by the end of his term in 2018. JP Morgan has estimated that the reforms may increase annual growth rates in Mexico by up to 0.8% and foreign investment in Mexico by $20 billion per year by 2016 or 2017.[46] Higher tax revenues resulting from increased energy production could also result in more funds available for social programs and other key priorities that are established by the Mexican Petroleum Fund for Stabilization and Development. The reform also intends to boost

[42] For background, see: CRS Report R43606, *U.S.-Mexico Transboundary Hydrocarbons Agreement: Background and Issues for Congress*, by Curry L. Hagerty.

[43] The Mexican Senate reviewed and accepted the agreement in April 2012. On June 27, 2013, the U.S. House of Representatives passed H.R. 1613, the Outer Continental Shelf Transboundary Hydrocarbon Agreements Authorization Act (H.Rept. 113-101). House activity featured signs of a persistent policy divide between "pro-drilling" arguments to accelerate energy production and "anti-drilling" arguments to maintain the moratorium in order to provide time for fiscal, safety, and environmental issues to be addressed. On October 12, 2013, the Senate passed S. 812, to allow the Secretary of the Interior to implement the Agreement.

[44] Title III of the Bipartisan Budget Act of 2013 (H.J.Res. 59) gives congressional approval of the Agreement and requires implementation planning by the Secretary of the Interior. For details about implementation plans to date, see http://www.bsee.gov/uploadedFiles/BSEE/Newsroom/Publications_Library/BOEM-BSEE%20MOU%20and%20Attachment%20A%20re%20Impementation%20of%20US-Mexico%20TBA%20(FINAL%20signed%207-17-2014).pdf.

[45] "BOEM awards leases in US-Mexico transboundary area to ExxonMobil," *Oil & Gas Journal*, May 30, 2014.

[46] J. P. Morgan, "Mexico: Positive Surprises in Mexico Energy Reform and Implications for Fixed Income Markets," December 16, 2013.

backward linkages to Mexico's domestic industries through its inclusion of national content requirements favoring domestic firms that feed into the oil supply chain.

Although it is difficult to predict how increasing private participation in Mexico's oil and gas sectors would affect the country's economic development, skeptics see reason to doubt the government's positive predictions. Some argue that multinational companies and large Mexican conglomerates that can serve their needs (for infrastructure or other services) stand more to gain from the energy reform than the Mexican people.[47] Many wonder where the government's job forecasts come from given that most analysts maintain that Pemex is a bloated company with too many employees that would likely shed workers as a result of reform. Others are concerned about increased oil revenue being mishandled by corrupt Pemex or Mexican government officials rather than invested in strategic ways that will benefit the country as a whole.[48]

Impact on the U.S. Oil and Natural Gas Sectors and the Bilateral Energy Trade

The opening of Mexico's oil and natural gas sector to foreign investors poses significant changes in the U.S.-Mexico energy relationship that may have advantages and disadvantages for both sides. Reversing Mexico's production decline would add more oil to the global market and enhance U.S. energy security. Having a neighbor who is a growing oil producer to the south, as the United States has to the north with Canada, could provide a reliable supplier for the long term and it would also contribute to North American energy independence. Some predict that the region could produce surpluses of oil and gas in the coming decades, as well as expanded renewable energy: wind, solar, biofuels, and hydro-power.[49]

U.S. companies that are able to enter the Mexican upstream sector are likely to benefit from the opening of Mexican resources to foreign investment, depending upon the terms of the contracts that are offered. Significant opportunities for infrastructure development, oil services companies, and downstream industries are also likely to open up. This would be true for both the oil and natural gas sectors, but U.S. natural gas producers who export to Mexico might, over the long term, potentially lose some of their market.

An expansion of Mexico's refining industry would benefit U.S. companies involved, but may shrink Mexico as an importer of U.S. refined products. Depending upon the type of refineries Mexico builds and the characteristics of additional oil found, U.S. refiners may lose supplies and market share. On the other hand, should the U.S. Department of Commerce approve of the proposal, U.S. companies might be able to swap light sweet crude that comes from shale for heavy Mexican crude, which is well-suited to U.S. refineries.[50]

[47] "Richard Fausset, "Tons of Thousands Protest Mexican Oil Reforms," *Los Angeles Times*, September 8, 2013.

[48] Enrique Krauze, "Mexico's Theology of Oil," *New York Times*, November 1, 2013.

[49] CFR, 2014.

[50] Jim Snyder, "Mexico's Interest in U.S. Oil Seen Opening Export Door," *Bloomberg*, September 16, 2014.

Opportunities for Bilateral Energy Cooperation

As energy moves to the forefront of U.S.-Mexican relations, opportunities may exist for greater bilateral or trilateral (with Canada) energy cooperation. Those advocating a trilateral approach generally highlight the need for regulatory harmonization, regional planning, reduced investment and export restrictions, and strategic investments in new infrastructure.[51] Within the U.S.-Mexico context, analysts have urged the United States to offer more technical assistance to Mexico if it is requested, to ensure that new cross-pipelines are approved as quickly as possible, and to consider creating rule for oil and gas swaps.[52] Another area that could be expanded involves efforts to ensure that hydrocarbons resources are developed without unduly damaging the environment, possibly through collaboration between Mexican entities and U.S. federal or state regulatory entities. In terms of capacity-building, the University of Texas system has recently expanded educational exchanges and training opportunities for Mexicans working in the petroleum sector. Other U.S. universities could also follow suit, potentially with support from the Obama Administration's "100,000 Strong in the Americas" effort to boost educational exchanges.[53] Many others have also urged the United States and Mexico to work together to provide oil and natural gas resources to help reduce expensive energy costs in Central America as well.

TPP Negotiations

While the North American Free Trade Agreement (NAFTA) removed significant investment barriers and ensured basic protections for U.S., Canadian, and Mexican investors in other NAFTA countries, it did not open the Mexican energy sector to foreign investment.[54] The recent opening of Mexico's energy sector to foreign investors may have implications for the ongoing trade negotiations for a Trans-Pacific Partnership agreement (TPP).[55] The United States, Mexico and Canada are all participating in the talks and, while, a TPP is not likely to change NAFTA, an agreement may change the rules governing North American investment and trade. During an October 2014 visit to Washington, DC, Mexico's Economic Secretary Ildefonso Guajardo suggested that the TPP talks should reflect the opening of Mexico's energy sector to private investors and include updates in the investment provisions of NAFTA to deter trade and investment disputes among North American investors.[56]

[51] CFR, 2014.

[52] Goldwyn, August 2014.

[53] For information, see: http://www.100kstrongamericas.org/about.

[54] For more information on NAFTA, see CRS Report R42965, *NAFTA at 20: Overview and Trade Effects*, by M. Angeles Villarreal and Ian F. Fergusson.

[55] For more information on the TPP, see CRS Report R42694, *The Trans-Pacific Partnership (TPP) Negotiations and Issues for Congress*, coordinated by Ian F. Fergusson. The twelve countries involved in the Trans-Pacific Partnership (TPP) negotiations include the United States, Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam.

[56] "Trade Talks Must Reflect Mexico's Energy Reforms, Guajardo Says," Bloomberg Bureau of National Affairs, October 23, 2014.

Outlook

Since taking office, President Peña Nieto has shepherded a number of significant constitutional reforms through the fractious Mexican Congress that had eluded the past two PAN Administrations. The most important of those reforms may be the energy reforms promulgated on December 20, 2013 and implemented by secondary laws signed on August 11, 2014 that allow for private participation in Mexico's oil and gas sector in ways not possible since the sector was nationalized in 1938. The recently-enacted energy reforms have the potential to boost energy production and improve economic competitiveness in Mexico, but implementing them in a meaningful way may prove difficult.

The next six months could prove critical for the success or failure of Mexico's energy reforms. Amidst strong opposition from the political left, the Mexican government will have to manage popular expectations about the benefits of the reforms, many of which may not be felt immediately. Pemex will need to restructure its workforce and investment priorities as it seeks to become a productive state enterprise that can compete with other companies. The National Hydrocarbons Commission (CNH) will need to conduct the first round of public bidding in an efficient and transparent fashion and to offer contracts with terms that are attractive to international companies. At the same time, the executive will need to create strong regulators to oversee the hydrocarbons sector.

This report will be updated periodically to inform the U.S. Congress on the implementation of oil and gas reforms in Mexico and to analyze how the reforms may impact Mexico's economic performance, the U.S. oil and natural gas sector, and bilateral energy relations.

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