James A. Baker III Institute for Public Policy
Rice University

Mexico's Energy Reform -- Powering the Future

A Report on a Conference Held at Rice University's Baker Institute

November 26, 2013

Introduction[1]

Mexico's government appears on track to make constitutional changes and pass important legislation that will clear the way for opening Mexico's energy sector to private investment. The constitutional changes may be approved by the end of 2013 and the legislation by mid-2014. Implementation is expected to begin by early 2015 at the latest. The extent and depth of the reforms remain unclear, but they have the potential to tap into Mexico's vast shale and deep-water resources. The development of shale formations, in particular, will provide employment opportunities in regions of the country that have been economically marginalized and vulnerable to organized crime.

This report summarizes the key issues raised by speakers at the conference "Mexico's Energy Reform: Powering the Future," held at Rice University's Baker Institute October 31, 2013. The conference included a keynote address and three moderated panel discussions, which also fielded questions from the audience. The report highlights the key issues raised by the speakers in order to provide stakeholders and the general public with insights into the Mexican energy policies that led to the anticipated reforms and explore the likely challenges along the way.

The conference was co-sponsored by the Baker Institute's Mexico Center and Center for Energy Studies, and Haynes and Boone, LLP.

Pemex: Current Situation and Challenges

Froylán Gracia Galicia, executive chief of staff to the director general of Petróleos Mexicanos (Pemex), delivered the keynote address at the conference. He underscored the "energy revolution in North America" and asserted that Mexico must find ways to become part of the energy revolution already taking place in the United States and Canada. While he predicted that energy reform would pass in Mexico by the end of 2013, Gracia made it clear that Pemex would not be

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privatized. The proposed changes to the energy sector would instead open the Mexican energy market to national and international competition.

Gracia mentioned that Pemex provides the Mexican treasury with one-third of its annual revenue; as a result, the company is primarily concerned with annual profits to fund the government and largely ignores longer-term investment strategies and business opportunities. Pemex recognizes it needs to invest more in exploration to increase proven reserves, especially of non-conventional oil and gas, and eventually increase production. This is urgent in light of the fact that Mexico's oil industry is poised to make Mexico a net importer of energy in the coming years. In 1993, Mexico exported US$5 of energy (oil, natural gas, and hydrocarbons) for every dollar it imported. In 2011, Mexico exported only US$1.60 of energy for every dollar it imported. In addition, oil production has been falling since 2004, primarily due to a fall in pressure in the wells of Mexico's supergiant Cantarell oil field.

Gracia also stated that since 2002, the government has been investing heavily in exploration in order to keep the rate of reserves above 100 percent (i.e., thanks to exploration, Pemex has been increasing its reserves faster than it depletes those reserves); between 10-18 percent of what Pemex invests to produce a barrel of oil goes toward exploration. While Pemex's output has stabilized around 2.5-2.6 million barrels per day since 2009, the U.S. Energy Information Administration (EIA) projects a downward trend; however, Pemex's business plan anticipates a gradual increase in production. According to Gracia, Pemex's production costs remain among the lowest of the world's oil companies. This is likely because the company focuses on onshore and shallow water fields with low lifting costs, which increase profitability and provide sufficient revenue to the Mexican government.

Gracia also mentioned the important role of competition in the development of U.S. shale and deep-water plays. In contrast to the United States, which drilled 9,100 shale wells and 137 deep-water oil wells in 2012, Mexico drilled only three shale wells and six deep-water wells. The market price of natural gas is too low and production costs are too high to warrant Pemex's investment in shale, and without advances in technology and expertise, deep-water exploration and production also remain expensive.

Energy reform would bring new players into the market and allow Pemex to become more competitive by acquiring greater autonomy over its investment decisions. Currently, 90 percent of Pemex's revenues go to the federal government. "If Mexico had a fiscal regime more similar to that of Brazil or Angola—more in line with international practices—that will, in itself, allow Pemex an extra US$10 billion to invest annually," Gracia said. This is how the Party of the Democratic Revolution (PRD) wants to address energy reform, but US$10 billion is not enough to sufficiently boost Mexico's oil production. Increased investment is needed to tap into P1, P2, and P3 reserves faster and bring more oil into the market. While the development of Mexico's natural gas reserves is not financially viable, Mexico is constructing gas pipelines to import gas from the United States.

Gracia emphasized that changes to Pemex's fiscal regime that decrease the government's dependence on oil revenues must occur before Mexico's energy sector is opened to competition and Pemex is allowed to spend more revenues on exploration and production. With more fiscal autonomy, Pemex will be in a better position to attract private sector investment and compete with other companies; however, Garcia said, "every barrel that is produced will have to go to a state entity that will be trading the oil." Additionally, in order to be successful when energy reform occurs, Gracia said Pemex's pension scheme must be reformed to increase the company's competitiveness; subsidies for gasoline and other hydrocarbons must be more transparent; and plans to share risk, boost investment, and attract technology must be developed while the state maintains ownership of the country's oil reserves.

Among other topics, conference panelists discussed the future of energy reforms in Mexico, the challenges and opportunities for shale gas, and deep-water oil prospects in the Gulf of Mexico.

The Future Shape of Energy Reform in Mexico

Before delving into what energy reform in Mexico means for the development of specific resources, particularly shale gas and deep-water oil, the first panel discussion took a step back to look at the political landscape in Mexico in light of the pending reforms. What is behind the government's intent to attract new investment and technology? What will be the extent and depth of reforms given the interests and negotiations among Mexico's political parties?

George Baker, publisher of *Mexico Energy Intelligence*, said that the future of Pemex and Mexico's energy sector is clear, but the present is confusing. A "Pemex 2.0" operating as a mixed-capital company is inevitable, Baker said. This is a global trend among national oil companies (NOCs) and, as an agency of the federal government, Pemex cannot currently operate outside Mexico—not even in cross-border oil fields. Additionally, a Pemex 2.0 is necessary for assuring that Pemex, as a government entity, will not claim sovereign immunity to shirk responsibility in the wake of a disaster such as an oil spill.

In the meantime, however, the present is murky. What does the government want from energy reform and why is it proposing constitutional changes? Baker suggests the government wants to remove the oil regime from the constitution, thus treating oil like any other mineral resource in Mexico. "[The government] wants article 27 [of the constitution] to be limited to talking about oil *in situ*." The government wants the flexibility, however, to have better control over the mechanisms and conditions that exploit the oil *in situ* in order to optimize accrued wealth from oil resources in the context of a dynamic, technologically advanced international market, he said.

Baker emphasized an important point: The energy reform debate must not be derailed by a debate on the future of Pemex. Energy reform is less about the future of the company and more about the future of Mexico's energy sector. In that respect, the conversation should be built around energy as a whole and only secondarily about Pemex.

Xavier Antonio de la Garza, an attorney in the international department of Pemex's legal division, outlined the Peña Nieto administration's proposal for energy reform. He stated that SENER (the country's department of energy) will play a larger role in the energy sector. The responsibility for all energy contracts is, in fact, likely to shift from Pemex to SENER. The goal of the current energy reform proposal is to allow private investors to participate in the entire production chain, that is, in all upstream and downstream operations in oil and gas as well as electricity. This would also mean that venture participants would have a place in deep-water and ultra-deep water activities, areas where Pemex lacks the capital and the technology to explore. The mechanism is likely to be profit-sharing arrangements that enable state ownership of all hydrocarbons but incentivize private investment and technological leaps in the entire production chain. The law must provide the certainty investors are looking for by making these arrangements clear and enforceable. Pemex will remain a full participant in these joint ventures.

Another important goal of energy reform is to update and modernize Pemex's infrastructure, especially infrastructure related to refining, storage, and distribution. The ultimate goal is to increase Pemex's production and refining capabilities as well its profitability in the long term by improving its skills and expertise—and its ability to create new jobs—as it moves into new areas of exploration and energy production where the company cannot currently invest. The new scheme would help feed Mexico's increasing demand for energy. The law would also improve the company's corporate governance, bringing it up to par with international best practices.

"The challenges of the reform involve moving from one of the most restrictive oil and gas frameworks to a more competitive and flexible scheme," said de la Garza. "Pemex should not exhaust its resources investing in new projects if they can be funded by private capital." The secondary laws, or regulatory framework, will be crucial to meaningful reform. Changes to Pemex's fiscal regime must also be approved for Mexico's energy sector to be successful as private investment is introduced. A change in the hydrocarbons revenue law would lower Pemex's tax burden to the government and free capital for more investment in exploration and production.

Alberto de la Peña, partner at Haynes and Boone, LLP, highlighted that energy reform represents the most important change to Mexico's legal structure since the North American Free Trade Agreement. He pointed out that there is still a lot of discussion regarding production sharing versus profit sharing and whether private companies will be able to book the reserves. De la Peña highlighted two contradictory articles of the Mexican constitution—27 and 28—which, respectively, mandate state control of the country's oil resources and ban monopolies. In order to reform the energy sector, the Peña Nieto administration wants to remove language from article 27 that reserves oil, hydrocarbons, petrochemicals, and electricity as the property of the state.

The Peña proposal would not provide concessions or licenses for private companies to exploit these resources, but would allow the state to sign contracts with the private sector to boost investment. Opposition parties—the PRD and the National Action Party (PAN)—have put forth proposals, too. The PRD would limit energy reform to a change in Pemex's tax regime (which opponents say is not sufficient to significantly increase the country's competitiveness); the PAN promotes the use of concessions, giving international corporations the legal right to exploit the oil reserves while compensating the government.

Following their initial remarks, Tony Payan, director of the Baker Institute Mexico Center and panel moderator, asked the discussants to focus on the important concept of sovereign immunity. Baker emphasized that Pemex 2.0 must operate at arm's length from the government in order to credibly demonstrate that the company would, in fact, take responsibility for potential disasters. Corporate governance is also a key issue. While Pemex's oil workers union appoints four members of the company's board of directors, the PAN and the PRD have suggested revoking the power from the union to improve the quality of the company's leadership.

A potential timeline for the reforms includes necessary constitutional changes by the end of 2013, a regulatory framework ready for congressional approval by spring 2014, and private investments beginning in late 2014 or early 2015.

Challenges and Opportunities for Shale Gas

Luis Miguel Labardini, partner at the energy consulting firm Marcos y Asociados, addressed the future of shale gas in Mexico. Labardini said that North America is the most important region worldwide for shale gas, with Canada, the United States, and Mexico each possessing 150 trillion cubic feet (TCF) of technically recoverable shale gas reserves. The United States is experiencing an economic renaissance in regions where shale gas is being developed. A shale boom has yet to be achieved in Mexico, although the country's technically recoverable shale gas reserves are between the fourth and sixth largest in the world. Pemex has shown minimal interest in shale gas investment, with only five drilled wells compared to the roughly 10,000 wells in the United States. By this measure, Pemex will likely not invest in shale gas and will instead focus on other investments with higher internal rates of return, including several shallow water projects throughout Mexico.

Labardini advocated investment in shale gas as part of Mexico's energy reform and hopes the U.S.–Mexico border will become open enough to sustain a shared economic renaissance in shale gas for both countries. Shale gas basins will be developed if more operators from the United States are brought to Mexico, he said. Although Labardini maintained a contracting infrastructure of sorts existed between the energy economies of the United States and Mexico, he believes an open border would increase the efficiency of the market by allowing the cluster of shale gas operations to move more naturally down to Mexico.

Another of Labardini's concerns regards the transportation infrastructure that moves imported gas from the United States to Mexico. As it stands, Mexico is a net importer of natural gas yet faces the challenge of high transportation costs. A goal of the energy reform is to facilitate the transportation of natural gas from the United States to Mexico.

Additionally, Pemex is looking to profit-sharing agreements as part of energy reforms. Labardini said that a license scheme may be more appropriate for shale gas, considering operators would be scattered throughout the country and profit-sharing agreements would be difficult to manage.

Kenneth B. Medlock, senior director of the Center for Energy Studies at the Baker Institute, underscored Mexico's need to first address issues of worker safety and energy infrastructure in order to attract foreign investment. He called attention to the lack of worker safety reports in studies of the Mexican energy industry. He said there are tremendous safety concerns south of the U.S.–Mexico border and emphasized the need to create working environments more attractive for foreign capital in the region. Specifically, he mentioned that many companies are active in the Eagle Ford Shale in Texas—a play that also extends well south of the border into Mexico. Regardless of the enormous potential of the play, most companies north of the border do not want to send their employees south out of concern for their safety. Medlock recommended that Mexico improve security around the border to promote the development of the shale industry and economic growth.

Another issue related to tapping into Mexican shale is the lack of strong infrastructure, Medlock said. It is necessary to drill several wells in order to assess and fully characterize the natural resources and capitalize on sweet spots of the gas. While this has already occurred in the United States, massive drilling still needs to happen in Mexico. Medlock explained the difference between a resource and a reserve. He clarified that a resource is something that is conceptually understood to be in place, whereas a reserve has been physically "touched" or assessed through drilling. He explained that while characterizing the resource would require substantial amounts of money, equipment, and manpower, it would determine shale plays for development and establish service-oriented activities that do not yet exist in Mexico.

Energy reform is the first step to fully characterizing resource plays and increasing the flow of foreign capital to Mexico's oil sector, Medlock said. He reminded the audience that the United States saw dramatic growth in its oil and gas sector in recent years due to low regulatory demands, which enabled companies to easily drill many wells to characterize and extract shale resources via hydraulic fracturing.

Medlock said that efficiency could be brought about by increased competition. Pemex is currently thought to have low firm efficiency, he added. Some companies, he said, were forced to move into international capital markets in order to compete with peers. Increased competition in Mexico would increase the likelihood of Pemex operating in shale plays domestically and abroad. Medlock suggested a similar move could be beneficial for the Mexican sector in the wake of energy reforms.

Ariel Ramos, partner at the Mexico City office of Haynes and Boone, LLP, pointed out that Mexico is already late with energy reforms and has no time to lose—especially because it is competing with other countries that offer better conditions and opportunities for exploration and production. He mentioned that current Mexican oil and gas production is incredibly low compared to the country's reserves. Therefore, the biggest risk facing Mexico is not whether the country will run out of oil or gas, but that the country will not be able to take it out of the ground. He noted that most of the shale oil and gas reserves are located in violent regions of Mexico; it will be a challenge to provide for the safety of companies in areas known for drug trafficking. He also said that energy reform and development of shale reserves would create jobs for low-income people in regions that, as of now, have few employment prospects beyond the drug trade.

Ramos noted that many of Mexico's reserves are undeveloped, and Pemex was able to increase its replacement ratio of reserves in the last several years—formerly a major issue—because Mexico decided to increase production in existing plays and increase revenue. Ramos also said that most of Mexico's oil reserves are in heavy oil, which requires more resources and sophisticated technology to refine. He stated that Mexico is a major consumer of natural gas, and in order to reach shale reserves it must look to the U.S. producers that have the know-how and capital to develop the shale resources, which are expensive considering the low price of natural gas in North America. However, he said, Pemex believes Mexico's shale reserves hold a significant amount of oil, which could help lower the net cost of shale development.

Antonio Franck, partner at the Mexico City office of Haynes and Boone, LLP, moderated questions for the panelists. "What would be the impact of the development of the Mexican shale reserves for Mexico versus the importation of gas from the United States?" he asked.

Labardini said that shale play operators in the United States are not inclined to drill in Mexico because it is easier to produce the gas in the United States and transport it to Mexico. This is partly because Mexico lacks the oil and gas field services infrastructure, which should be addressed by energy reform and changes to the fiscal regime in the country's energy sector. Current plans for fiscal reform in Mexico will have a 1 percent royalty on wet gas and 0 percent on dry gas, with a surcharge when the price of gas goes above $5.5 over million BTU, but the plans will have to be tested in the market in order to define the exact boundaries. Labardini stated that Mexico should work to attract investors to produce natural gas, especially in the Mexican parts of the Eagle Ford Shale, because they would provide alternative economic opportunities in depressed regions that are dominated by organized crime.

Medlock stated that work has been done on the potential development of Mexico's shale resources, and that reforms would need to be dramatic to achieve even slow progress. However, appropriate policy changes to increase supply would also increase demand; as gas prices decreased, industrial use of natural gas would increase and allow for full-fledged conversion to natural gas in the Mexican power sector to meet environmental objectives. Shale development would also bring foreign capital to shale-rich areas of Mexico and contribute to local economic growth, but the question remains: how should such an investment be triggered?

Ramos said that the government has held several discussions on why Mexico should develop reserves when the country can instead import gas from the United States. He asserted that these discussions have shown a lack of perspective because they do not view the energy opportunities in the context of the North American energy market. He proposed that Mexico become a gas producer to best benefit from the North American energy boom, and he critiqued Mexico's reliance on cheap gas imports because—although U.S. gas is being produced at a loss right now—the industry intends to reconfigure its liquid facilities and start exporting gas at higher prices. Also, noting that Mexico is a big hydrocarbon consumer and should be concerned about the domestic market, Ramos proposed enhanced infrastructure for gas transportation and more investment in shale.

Medlock also highlighted that there is a long-term industrial challenge of creating demand syncs for gas in Mexico and developing the infrastructure to transport energy. Mexico would also be competing with U.S. gas producers, which have a major first-mover advantage in getting their gas to market. Medlock predicted that even with energy reform in the coming months, Mexico's gas sector will not be competitive for at least the next decade.

Ramos pointed out that, due to safety concerns in the North, much of Mexico's industry has developed in the country's central region away from shale resources. Mexico's Federal Electricity Commission (CFE) is the country's largest natural gas consumer, but it lacks the infrastructure to transport shale energy to fast-growing cities like Querétaro, Guadalajara, and Guanajuato, which currently have high electricity prices. According to Ramos, Pemex Gas comprises less than 5 percent of the company's budget thus cannot maintain gas infrastructure. CFE, however, has invested in a pipeline to import gas from the United States.

Challenges and Opportunities in the Gulf of Mexico

The panel's moderator, Ricardo García-Moreno, partner at Haynes and Boone, LLP, cited the United States' success with deep-water drilling in the Gulf of Mexico and said there is much potential on Mexico's side of the maritime border.

While discussing deep-water exploration and production in Mexico, Labardini mentioned that Pemex's official deep-water success rate is 60-70 percent, but company insiders have said Pemex has had to "twist the figures" to demonstrate that exploratory efforts have led to results. He also said that while the United States has drilled around 140 deep-water wells in the Gulf of Mexico, Mexico has drilled only three or four. This is significant because, statistically, it is easier to demonstrate the success of such efforts when more wells are drilled. In order to rectify this situation, Mexico's planned energy reforms call for opportunities for private investment in deep-water resources, which could yield approximately 50 billion barrels of oil. However, Labardini explained that reforms may be limited to profit-sharing contracts instead of more common production sharing contracts because the government feels that sharing production is too similar ideologically to sharing the actual oil. International oil company (IOC) lobbyists are in Mexico discussing the issue with government officials. Some IOCs want a production-sharing contract, but others would accept a profit-sharing contract. According to Labardini, profit-sharing contracts will "distort the efficiency of the whole oil production process in deep-water." This is due to several reasons. The first is that proposed reforms only allow one marketing entity to gather all of the oil and gas produced by private operators. "This monopoly—I think it's sort of a Soviet-style monopoly—is going to gather all this oil, sell it on the market," he said. This is problematic because it will be the only entity defining the rules by which Mexican oil is sold. "Then, they are going to distribute the profit to the operators. I think this breaks the continuity that is required in a process of production and marketing of crude oil or natural gas." Labardini also hopes that, for the sake of transparency, the reforms call for the National Hydrocarbons Commission to organize block auctions for deep-water resources and then negotiate and administrate the contracts independent of the Ministry of Energy and the Ministry of Finance. Lastly, he recommended that Mexican deep-water wells along the U.S. border be integrated into U.S. infrastructure to increase efficiency.

Ricardo Colmenter, regional general counsel for the Western Hemisphere at Weatherford International, speaking under the condition that his opinions were his own and not those of Weatherford International, discussed the failures of Mexico's 2008 energy reforms and recognized its important role as a stepping stone to the pending 2013/2014 reforms. The 2008 reforms relied on incentive contracts, which are similar to service contracts in Colombia and Ecuador. These sorts of contracts have proven useful in mature fields in order to increase recovery rates. Major operators and service companies, however, were not very familiar with these contracts and did not enter negotiations for them. This created space for smaller companies to take advantage of opportunities with Pemex and create a framework by which private companies could operate successfully in Mexico. Colmenter underscored that this framework provided the basis for discussing further private sector investment in the 2013/2014 reforms, but the strategy of incentive contracts would not be effective in deep-water.

The reforms proposed by the Peña Nieto administration this year are similar to those that President Felipe Calderón presented in 2008 but was unable to move through Congress. Although the politics behind the reforms are messy, it is good news that both the PRI and the PAN have now demonstrated interest in opening Mexico's energy sector. In order for the reform to be successful, it needs to increase investment, rule enforcement, transparency, and security, Colmenter said. In addition, each type of contract works under distinct circumstances, and the reforms should allow for different types of contracts to accommodate the business interests of the Mexican government and private companies.

William "Hunt" Buckley, partner at Haynes and Boone, LLP, mentioned the importance of a 2012 agreement between the United States and Mexico regarding transboundary reservoirs along the maritime border in the Gulf of Mexico. A 2000 treaty placed a moratorium on drilling 1.4 nautical miles on either side of a line through the Western Gap. Under the 2012 agreement, the two governments agreed to find a mutually acceptable way to consult with each other and share information in order to begin joint development plans in the Western Gap. Mexico is not drilling many deep-water wells, but since the United States is—and since Mexico thinks the United States has been rapacious—the Mexican government negotiated an agreement that it continues the moratorium indirectly. That is, despite the information sharing and development planning, U.S. and Mexican government officials must ultimately approve the plan, and one of the countries can unilaterally default to the 2000 treaty.

García-Moreno asked panelists how energy reform would affect service companies operating in the Gulf of Mexico. Labardini said that shallow water development will not be affected by reforms and that Pemex will continue to dominate operations of these fields. There is, however, opportunity for service companies to become involved in deep-water projects. International service companies have been in Mexico for a long time, and it will be natural for them to take advantage of new opportunities. Other companies that have not been operating in Mexico will have a tougher time tapping into the Mexican energy sector and forging relations with Pemex, which holds a monopsony as the sole operator contracting out service work. However, other companies will ultimately be able to do so, especially since planned reforms allow private operators to engage in the Mexico's energy sector as a complement to Pemex. Colmenter pointed out that service companies that have been operating in Mexico will be significant allies to the new operators in Mexico because the service companies know how to do business with Pemex. Buckley underscored the importance of not only changing the types of contracts available to service companies, but also modifying how Pemex puts bids out for services. With respect to partnering for deep-water projects, Buckley said that even outside Mexico, such projects are usually consortium-driven due to their size.

With the opening of Mexico's energy sector, service providers will be more inclined to do business with operators are low-risk. This could force Pemex to adopt the same standards that international operators use when contracting with service companies. In the meantime, as Colmenter pointed out, IOCs are concerned that Pemex is going to take all the oil, create a new entity, sell the oil, put the money in a trust fund, and then pay the companies. There is a risk of excessive complication in the new scheme of potential energy reforms.

Conclusion

Given the political sensitivity of energy reform in Mexico, the panelists' candid participation in the conference was appreciated. We recognize that many stakeholders are not free to speak publicly about their perceptions of events in Mexico and must choose their words carefully. Despite these constraints, we are able to draw the following conclusions from the conference:

1) Mexico's considerable shale resources are not likely to be developed unless the government provides an attractive investment regime and until the level of security for service and operating companies greatly improves.

2) The eventual development of shale and deep-water resources would bring new business opportunities for operators and service companies in Mexico and around the world. Shale development would also contribute to the economies of depressed regions by creating employment opportunities.

3) The eventual completion of the Transboundary Hydrocarbon Agreement will allow for the integration of U.S. and Mexican production infrastructure, even without the discovery of a cross-border reservoir.

4) Pemex's ability to enter into joint ventures with IOCs and operate outside of Mexico will eventually require the creation of a "Pemex 2.0."

5) Mexico's government is correct in seeking a commercial oil regime that is not restricted by artificial constitutional limitations, but the government's initial proposal for using "profit-sharing" contracts with IOCs looks problematic at best.

6) A new oil regime that brings in many new operators and service companies will sharply limit Pemex's ability to influence markets and prices as a monopsony.