

Growing Potential for U.S.-Mexico Energy Cooperation

By Duncan Wood

Key Recommendations

- There is a pressing need for infrastructure investment in the transportation of oil and, most importantly, gas. The creation of a truly regional gas market requires large scale construction of gas pipelines, both within Mexico and across the border.
- Regulatory cooperation between the energy and environmental agencies of both countries is urgently needed. As transboundary oil and gas reserves are exploited, the two nations should harmonize their standards and regulations for hydrocarbons exploration and production.
- The question of cross border electricity transmission has been a feature of bilateral talks since 2010 but little has yet been achieved. It is vital that the bilateral mechanism is given a sense of urgency and importance from both governments
- The development of a Smart Grid for electricity transmission and distribution in Mexico is an issue that would benefit from further bilateral cooperation. U.S. funding for initial research into the building of a smart grid should now be followed by increased technical cooperation.
- The huge advances in energy efficiency in the United States in recent years presents a model that Mexico would do well to study. Some work has already been done in Mexico to put in place an energy efficiency strategy, and collaboration with U.S. agencies would be of great benefit.
- Long term discussions should begin between Mexico, the United States and Canada over the questions of carbon emissions, carbon pricing and a carbon tax. Although the possibility of a national carbon tax or cap and trade system in the U.S. appears distant, it is important that all three of the NAFTA partners understand the others' approach to this issue and monitor future policy developments closely.

Looking ahead to the next six years of interaction between governments of Mexico and the United States, there is the potential for an enormously fruitful relationship in energy affairs. Much of this depends on two key factors, political will and the internal changes that are underway in Mexico's energy sector. In the past, political sensitivities concerning U.S. involvement in the Mexican hydrocarbons industry have limited the extent of collaboration in the oil and gas sectors. This continues to be a cause for concern in any U.S.-based discussion (from either the public or private sectors) of Mexican energy policy and the potential for collaboration, but in recent years there has been a relaxation of sensitivity in this area. Partly in response to the perceived need for international assistance in resolving Mexico's multiple energy challenges, and partly as a result of a productive bilateral institutional relationship between federal energy agencies, there is now a greater potential for engagement than at any time in recent memory.

We can identify three main areas in which bilateral energy cooperation holds great promise in the short- to medium-term. First, given the importance of the theme for both countries, there is great potential in the oil and gas industries. This lies in the prospects for investment, infrastructure and technical collaboration. Second, we can point to the electricity sector, where the creation of a more complete cross-border transmission network and working towards the creation of a market for electric power at the regional level should be priorities for the two countries. Third, in the area of climate change policy, existing cooperation on renewable energies and the need for a strategic dialogue on the question of carbon-emissions policy are two issues can bring benefits for both partners.

Underlying all three of these areas are broader concerns about regional economic competitiveness and the consolidation of economic development in Mexico. The first of these concerns derives from the hugely important comparative advantage that the North American economic region has derived in recent years from low-cost energy, driven by the shale revolution. In order to maintain this comparative advantage, and to ensure that the integrated manufacturing production platform in all three countries benefits from the low-cost energy, the gains of recent years must be consolidated by fully developing Mexico's energy resources. With regards to the second concern, economic development, a number of commentators, analysts and political figures in Mexico have identified energy reform as a potential source for driving long-term economic growth and job creation, and the potential opportunities for foreign firms are considerable. While the United States cannot play an active role in driving the reform process, the implementation of any future reform will benefit from technical cooperation with the U.S. in areas such as pricing, regulation and industry best practices.

The Evolving Energy Context

The past 5 years have seen a revolution in the energy sector globally, with the advent of shale gas and tight oil production dramatically altering the supply outlook. In the case of gas, the success of American firms in drilling for gas in shale formations across the continental United States has meant a flood of new supplies that have caused a major decline in gas prices. From a Henry Hub spot price of over \$13 per million British Thermal Units (mmBTUs), the price has fallen to just over \$2 per mmBTU by the end of 2012. This, in turn, has greatly reduced the cost of generating electricity in the United States and has encouraged utilities to switch to gas from other fuel sources. The United States has also increased its domestic oil production by more than 800,000 barrels per day (bpd) through the exploitation of tight oil reserves in places such as North Dakota, applying latest drilling and hydraulic fracturing (fracking)

technologies. Although we have seen this jump in supply in the U.S., oil prices have remained high due to global demand pressures and the international, rather than regional nature of oil pricing.

At the same time as U.S. production has risen, Mexican oil has experienced a precipitous decline. From a level of 3.4 million bpd in 2004, Mexico's oil production has fallen to only 2.55 million bpd. The stagnation of the national oil company, the prohibition on foreign or private investment and participation in the sector, and the end of easy oil in Mexico has meant that a change in thinking is desperately needed in Mexican hydrocarbons policy.

Oil and gas

As noted above, the history of cooperation between the United States and Mexico on oil issues has been limited by the historical sensitivity of Mexico's government and people to any hint of interference from the U.S. in what has traditionally been seen as a central element in the nation's sovereignty. Nonetheless, recent years have shown a softening on this sensitivity, in part due to generational change, in part due to political change, and in part due to the success of negotiating a Transboundary Hydrocarbons Agreement in 2012. That agreement laid out a framework for determining the management and exploitation of cross-border oil reserves, and was hailed as a positive development. It was quickly ratified in the Mexican Senate, but it has yet to be ratified in the United States, and so has not yet come into force. Before moving on to discuss new areas of cooperation, it is important that this existing agreement is ratified.

It is widely expected that the government of Enrique Peña Nieto will present an energy reform initiative to the Mexican Congress early in 2013. While it is still unknown how ambitious that reform proposal will be, it is thought that the government will present an initiative that will be aimed at opening the sector to greater levels of private participation in refining, petrochemicals and even in exploration and production. Such an opening will of course offer significant possibilities for foreign as well as Mexican firms, and will also open the door to new areas of technical and regulatory collaboration between the two countries.

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Mexico's energy establishment, and increasingly it seems, the government, hope that private investment will occur in unconventional hydrocarbons sector. For Mexico the most interesting plays in the future will be found in the deep waters of the Gulf of Mexico, in the as yet untapped shale reserves that are found throughout the east of the country, and in the geologically-complex fields of Chicontepec, where Pemex has been consistently failing to meet production targets over the past four years. The application of cutting-edge technologies and techniques from U.S. firms would likely be important in all three of these areas, and the experience of American firms in shale plays would provide them with an advantage in the event of an opening in that area.

Of particular interest in this regard is the experience of U.S. firms in the hydraulic fracturing (fracking) business. The ability to extract **shale oil and gas** in areas that suffer from water shortages (such as Texas) will be crucial to developing shale resources in Mexico, particularly in the north of the country. In fact existing knowledge of the geological characteristics of the Eagle Ford formation will also be crucial in exploiting its oil and gas reserves in Coahuila, where the formation extends. One Mexican company, Alfa, has already worked extensively with U.S. partners in the shale industry north of the border, and we can expect higher levels of private sector collaboration to develop.

Beyond exploration and production, the pressing need for **infrastructure** stands out as an area with high potential for bilateral collaboration. First, it is vital that large scale construction of gas pipelines occurs, both within Mexico and across the border. Within Mexico, the Calderon administration identified the need for multi-billion dollar investments in the creation of a truly national gas pipeline network: at the present time the majority of western portion of the country lacks access to natural gas. Secondly, as was made painfully clear to a number of private sector industrial consumers during 2012, during times of short supply, the country lacks the capacity to import extra supplies of gas from the United States due to the limitations of the cross-border pipeline network. In 2012 this led to complaints from companies that they were unable to secure stable and sufficient supplies of gas for their manufacturing processes.

The second deficit in energy infrastructure can be found in the **refining** sector. The much-publicized efforts of the Calderon administration, announced in January 2009, to build a new refinery at Tula in the state of Hidalgo that was designed to process up to 300,000 barrels a day of Mexican heavy crude have thus far come to nothing. The project has been repeatedly delayed, first due to problems in securing the land, then due to bureaucratic problems and political wrangling. At the same time, Mexico's dependence on imported gasoline has increased in line with rising demand. Mexico therefore needs to find a solution to this issue in the near future, and one option that presents itself is the example of the Deer Park refinery complex in Texas where since 1993 Pemex and Shell have worked together in a joint venture to refine 340,000 barrels a day of crude oil. Part of the production of the refinery heads back to Mexico and has become an important source of income for Pemex as well as helping to satisfy the country's need for refined products.

Lastly, Mexico's **petrochemical** sector is in urgent need of investment. For many years now the industry has languished due to a lack of funds and a lack of direction from the government. Despite encouraging signs of new investment interest in recent months, the major Mexican petrochemicals project of the last few years, Ethylene XXI, has suffered repeated delays. When completed in 2015, the project will be a private petrochemical complex for the production of polyethylene, producing up to one million tons of polyethylene, and replace up to \$2 billion worth of imports resulting in the creation of thousands of jobs. But the prospect of huge supplies of cheap gas from Mexico and the U.S. shale gas industry offers the tantalizing prospect of turning Mexico into a production and export base for these products, and there will be a major opportunity for joint ventures with foreign firms.

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The last major area for hydrocarbons cooperation between the U.S. and Mexico concerns **regulation**. As Mexico contemplates the opening of its oil and gas industries, an issue of considerable concern is that of strengthening the regulatory agency, the Comisión Nacional de Hidrocarburos (CNH) and of designing national regulations that will provide a level playing field between public and private sector actors, and will ensure the efficient and safe functioning of the industry. Of particular concern, given the experience of recent years, is to guarantee environmental protection and operational safety, especially in deep water exploration and production (E&P). Institutional ties between the CNH and U.S. regulatory agencies have been slowly developing since the creation of the Comisión in 2009, and were particularly important in the context of the Transboundary Hydrocarbons Agreement. It is imperative that this cooperation is consolidated and strengthened into the future, and offers a low cost opportunity in one of the least sensitive areas of the Mexican oil and gas sector.

Electricity

Mexico's electricity sector has gone through significant changes over the past twenty years since the passing of the 1992 Ley de Servicio Publico de Energia Electrica, in which private electricity generation was permitted under certain circumstances. During that time the private sector has become responsible for around 30% of installed capacity in the country, although the Comisión Federal de Electricidad (CFE) remains the dominant player in the market through its monopoly over transmission and distribution. Electricity prices remain high in the country, particularly for commercial customers, and this is widely seen as a limiting factor on Mexican business competitiveness. At the same time, although 97% of the Mexican population is connected to the national grid, this means that almost 5 million Mexicans still do not have reliable access to electricity.

At the present time Mexico is a net exporter of electricity to the United States, with around 600 gigawatt hours (GWh) of power exported from Baja California to California in 2010 and around 150 GWh of power exported from Texas. However, Demand for electricity in Mexico is growing fast: according to SENER, demand grew from 157,204 GWh in 2001 to 200,946 GWh in 2011. Much of that growth in demand has come from the residential sector, but it is big business that has led the way as demand is tied directly to economic growth. This suggests that, as Mexico's economy continues to grow at a rate higher than its NAFTA partners, we should expect the country's electricity demand to increase at a similar rate. This projected growth means that Mexico will either have to add further generating capacity or increase its electricity imports. Both scenarios present opportunities for the U.S. In the first, new installed capacity

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will likely be in the form of combined cycle natural gas plants, to take advantage of the historically low price of natural gas due to the shale revolution. As pointed out above, Mexico is already looking to import more gas from the United States, and new electricity generating capacity will increase that even further. The second scenario would directly benefit the electricity producers, most likely in Texas, which has seen and rapid growth in capacity in recent years.

In order to get electricity from Texas to Mexico, however, some major investments must take place in the area of **transmission**. At the present time the cross-border transmission infrastructure is highly limited and talks between the two countries aimed at facilitating new cross-border projects have achieved little real progress since 2010. Nine cross-border interconnections exist at the time of writing, with new

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transmission capacity last added in 2007, with the opening of the Sharyland McAllen-Reynosa 150MW connection. Of course transmission not only affects the prospects for electricity imports into Mexico from Texas, but also exports from Baja California to California, particularly of electricity from renewable sources such as wind (see below).

Mexico and the United States will need to deepen their cooperation in the area of transmission if these projects are to be brought to fruition. As noted above, to date the cross-border transmission discussions between the two countries have not yielded very much of substance, and it should be a priority of both governments to try to inject the process with more vigor and enthusiasm. In part the slow movement of the talks so far is a result of the fact that neither side has attached much importance to them; on another level, however, the differences between the two countries' systems has run into cultural barriers. Because the CFE is run as a federal government agency, rather than as a business, it has been noted that the organization thinks not in terms of business opportunities, but rather of fulfilling its mission of providing electricity as a public service. This cultural obstacle to progress must be overcome, however, if the true potential for electricity trade is to be realized.

One final issue on which the two countries can and should cooperate in the years to come is that of upgrading Mexico's national electricity grid and making it a truly "Smart grid". As Mexico's economy and electricity market mature, and as a more market-oriented pricing structure emerges, the use of smart grid technologies will become of increasing importance to manage supply issues, and to allow for flexible responses to unexpected jumps in demand. One issue that the government hopes to solve through smart grid technology is that of electricity distribution losses, which run as high as 17% at the national level. At the present time the CFE is only just beginning to install a small number of smart meters in the selected areas of the country, but in August of 2012 the Comisión Reguladora de Energía (CRE) announced that it has begun developing a smart grid plan for the country. Early research for the plan was financed in part by a US\$405,000 grant from the US Trade and Development Agency, and the two countries should continue to cooperate on the development of the grid, creating significant opportunities for private firms from both sides of the border.

Climate change and renewables

The Calderon administration was notable for its emphasis on questions of climate change and renewable energy. Calderon was personally committed to the question of finding a post-Kyoto bargain at the international level, and at the domestic level succeeded in passing ambitious carbon-emissions legislation in 2012. During his tenure Mexico also saw the rapid expansion of renewable energy sourced electricity

generation with the large scale wind power developments in Oaxaca, and the beginnings of other developments in Baja California, Tamaulipas and Nuevo Leon. Presidents Obama and Calderon signed a Bilateral Framework for Clean Energy and Climate Change agreement during President Obama's April 2009 visit to Mexico City.

Thus far it does not appear that climate change or renewable energies are a high priority for the Pena Nieto government, but the potential for meaningful collaboration should not be underestimated. Given the continuing shift in the U.S. towards cleaner energy and energy efficiency (much of which has been driven by the shale revolution), it is now not unthinkable that the U.S. will be able to meet Kyoto-style emissions targets within the next few years. At the level of the states, with California at the cutting edge, we are seeing the development of not only renewable portfolio standards for electricity generation, but also the emergence of cap and trade schemes. If other states adopt similar measures, there are a number of implications for Mexico.

The first is simply an extension of discussions that already exist about Mexico sourcing **renewable energy** projects for U.S. consumption. The potential for wind power in the states of Baja California and Tamaulipas is both huge and economically competitive, although it is currently held back by the cross-border transmission challenges discussed above. Ample investment opportunities exist for U.S. firms in

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both wind power generation and in supplying the equipment for wind farms. What's more, an integrated production structure for turbines that sees equipment being produced in both countries makes eminent sense.

The second issue concerns questions of **energy efficiency**. The United States has taken great strides in this regard in recent years and Mexico has begun to implement energy efficiency measure in residential applications and for transportation. Close technical collaboration, and the harmonization of standards would be of enormous benefit for the North American market. Already Mexico has benefitted from stricter U.S. energy efficiency standards in automobiles, as car firms have invested heavily in new smaller vehicle production in the country.

Third, long-term discussions should be undertaken to prepare a harmonized approach to **carbon emissions policy**. As the United States moves towards a low-carbon future, and the potential for national cap and trade or carbon-tax systems becomes a reality, it is vital that Mexico is prepared for such a contingency. It would be a disaster if U.S. or Mexican goods were not able to cross the border freely because the two countries have divergent carbon emissions approaches. If a carbon tax is feasible in the long term, it would make sense for the two countries to coordinate their approaches, with each other and with Canada, to ensure that all three NAFTA partners move in the same direction.

Closing thoughts

The potential for effective collaboration between the two countries on questions on energy and climate change is huge. As a region, North America currently offers the most positive outlook in the world in terms of cheap, clean energy, largely thanks to the shale revolution that has taken place in recent years. Moreover, also thanks to shale, the United States, Canada and Mexico all have the chance to become energy independent and become net energy exporters to the world. The governments of the U.S. and Mexico should therefore undertake intensive discussions early in the new administrations to identify priority areas in the short- and medium-terms and should create institutional mechanisms through which these priorities can be pursued. In many cases these discussions will be bilateral, but on some long-term issues, such as climate change, for example, it makes sense to adopt a more regional approach, incorporating Canada into the process.

As Mexico undertakes a new energy reform process, the landscape for hydrocarbons and electricity will be subject to significant change. Mexico's new government has decided that the existing state-led approach to oil and gas exploitation is no longer valid, and no longer serves the interests of the nation. This change will offer new opportunities for U.S. firms and potential competitiveness gains for the American economy. The establishment of a clear agenda for talks on bilateral cooperation is therefore a priority that should not be underestimated.