Summary: Mexico might have missed the first wave of
the shale revolution, but the country is aggressively
catching up to make sure it rides the next wave of
energy innovation, restructuring its electricity markets
to benefit from record low U.S. natural gas prices.

Over the past 10 years, Mexico has missed out
on an energy revolution that rivals the oil boom in
Pennsylvania that began in 1859. By contrast in the U.S.
and Canada, a combination of advanced oil recovery
techniques such as fracking, massive drops in the cost
of producing renewable energy, and the profusion of
smart grid technologies has led to an explosion in oil
and natural gas supplies, resulting in sharply lower
wholesale power and natural gas prices.

U.S. imports of crude oil have also plummeted, helping
to transform the country into a net exporter of natural
gas and natural gas liquids. Mexico, on the other hand,
has seen its oil production slump from 3.4 million
barrels per day (bpd) to 2.2 million bpd in just over 10
years, with industrial electricity prices at least 25%
higher than in the U.S. despite government subsidies.

In December 2013, Mexican leaders took the bold
step of reversing energy nationalization policies from
1938, and set out to join the North American energy
revolution with the aim of bringing the benefits to its
citizens. No other major energy-producing nation has
attempted to open up nationalized natural gas, power,
and oil markets in one fell swoop. While the impact
of the proposed reform of state-owned oil company,
Pemex, is not to be underestimated, the speed of
change within the natural gas and power sectors has
been particularly pronounced. There are plans to
expand the pipeline network by 75% in the next two
years. State-owned utility CFE (Comision Federal de
Electricidad) has already requested bids on 12 gas
projects worth $8.7 billion, and project value will almost
double to $15 billion by the end of 2016.
With so much natural gas expected to be generated in Mexico, it is no surprise that its electricity generators have high hopes for power to cost much less in the future. On top of this, the creation of the National Center for Energy Control (CENACE) as Mexico’s ISO/RTO – which match power generation with demand -- and the accompanying regulations allowing industrial companies to purchase electricity from a wholesale power marketplace has raised hopes of independent power producers (IPPs) – who will finally have their chance to service the Mexican market.

The speed at which investment ramps up in Mexico’s natural gas sector will depend to a large extent on gas prices. In the United States, natural gas prices have been declining the past eight years, and investment in the sector in North America has cratered (Figures 2 and 3). In the near term, this bodes poorly for increased investment in Mexican shale, but for U.S. gas exporters, the liberalization of Mexico has opened up a large market for pipeline gas in an era of global gas oversupply, further increasing scrutiny on the Mexican market reforms.

In the short-term, natural gas supply and demand are famously inelastic; small changes in demand and supply can produce significant moves in price. There are several reasons to think that natural gas prices risk going higher over the next few years:

- Natural gas dominates new additions to power generation in the United States as coal plants are retired, driving U.S. gas demand.
- U.S. natural gas supplies are no longer growing and, in fact, began to contract over a year ago.
- The collapse of investment in the sector is likely to keep natural gas production under downward pressure. Year-on-year U.S. natural gas production barely grew in Q1 2016.
- The possibility of a La Niña this winter could increase natural gas demand.

There is one major factor which may limit the rise in natural gas prices: inventories. Storage levels remain near seasonally-adjusted record highs and this could prevent near-term price rises. Weather can be a risk in both directions. An usually hot summer or colder-than-normal winter can put upward pressure on prices. A cooler-than-normal summer or warmer-than-normal winter can depress prices.

Higher natural gas prices could spark increased investment in gas production in Mexico, as well as ignite a rebound in investment in the United States later this year and in 2017.

The scale of the liberalization effort by the Mexican government is unprecedented among both developed and developing economies. However, in their implementation, the draft proposed regulations for each industry demonstrate an incremental approach designed to ensure that incumbent players in oil and in gas, Pemex and CFE have ample time to adjust to the new normal, and that they still comprise the bulk of generation and distribution. In the short-run, this approach, coupled with a weak commodity price environment, may make it challenging for independent producers to realize immediate, significant economic benefit from the reforms. Even if natural gas prices do move higher, Mexico will continue to import gas from the U.S. as it would be difficult to significantly increase domestic gas production in the short term, and LNG remains prohibitively more expensive than U.S. pipeline gas.
Ultimately, it is the design and implementation of the rules, coupled with the market’s confidence that the rules will not be changed, that will either drive investment in private power generation or set the stage for the status quo, blocking or otherwise making it non-viable for IPPs to service qualified users.

Market Considerations: From Design to Implementation

Policymakers have embarked on an ambitious agenda to liberalize these sectors in a short period of time. What was accomplished over decades in the United States and elsewhere, they aim to complete in less than 5 years. While the ambition and vision is admirable, the foundation of any functioning market is credibility. By rapidly rolling out programs with only a nominal period for consultation and trial with potential market participants, Mexico risks losing credibility with international energy participants and limiting participation from private sector players. By only partially deregulating entities or incrementally opening markets as rule-making emerges, Mexico risks making only a modest dent in the inefficiencies inherent in a state-owned-and-operated industry, limiting the upside for private investors and ultimately creating only the appearance of privatization while retaining cross-subsidies and governance issues that linger in such a system.

Thus, as energy markets liberalize, it is critical that Mexico takes adequate care and consideration of the following points:

- **Equal and open access to transmission and distribution with competitive rate setting to ensure opportunity for new power generators.** The ability of independent players to access the market on what is perceived to be a fair basis, with competitive rate setting applicable to all is crucial. This principle is central to attracting new players to service Mexican customers. As new investment bring more efficient electricity generation projects, real (unsubsidized) electricity rates for industrial, commercial, and residential customers will reduce, mitigating the need for costly subsidies in the future.

- **Transparency in purchasing decisions, reflecting a diverse universe of suppliers and technologies.** Players need to feel that power-purchasing decisions are based on a market-based model of investment with full transparency on terms and conditions consistent with other energy markets. Results of the renewable electricity auction in March revealed the benefits of open competition across technologies, with over 69 firms participating. The average supply price was $48/MWh, with some bids as low as $35.50, well below the CFE price of $70. However, given the size and scale of the winners of the auction, regulators must be cautious that the “lowest-bid-wins” strategy does not drive out all but the largest players from participating and lead to premature consolidation this early in the liberalization process.

- **Demand-driven investment with effective transmission system to balance system load.** While it may take some time to allocate capacity to new players, care should be taken to ensure that investment occurs where load exists, with strong, extensive transmission links to keep a single generator from exercising power in times of high demand. There is limited value to Mexico if generation is built where it is not adequately connected to the load centers.

- **Robust systems to manage price discovery, reporting, distribution, and trading.** For gas and power markets, in particular, it is important to ensure that the technology is in place to encourage the development of a competitive marketplace. For gas, this technology becomes important to encourage transparent price negotiation and accelerate the development of reference prices for more active gas points. For power, technology assists regulators as more independent producers supply the system, enabling CENACE to track generation firms and their prices to adequately capture the marginal costs of electricity.
The next 5 years will be pivotal for Mexico’s energy future. The changes to the country’s constitution are remarkable, but the work has just begun. Market rules need to be implemented in order for Mexico to join its neighbors to the north in benefitting from this century’s rapid advancements in energy. It will be difficult to manage the competing interests, but it is essential that Mexico keeps a clear, consistent vision for a competitive marketplace with market designs that are targeted at driving investment in Mexico’s energy infrastructure, while enabling CFE and Pemex to transition from state-owned monopolies to successful competitive enterprises. With unrelenting focus on the long-term goal, Mexico’s infrastructure can catch up and bring the benefits of increased domestic production, improved supply, cleaner fuels, increased system reliability, and lower costs of energy to the country.

**Figure 2:**

*Henry Hub Natural Gas Futures Prices*

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price ($/MMBtu)</td>
<td>0</td>
<td>7</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

Sources: Bloomberg Professional (NGV6 and NGV7)

Outlook: Mexico’s constitutional changes open the possibility for a great deal of additional investment in the future. Even if Mexico takes additional measures to attract outside investment, at current prices investment might be quite modest. That said, production and demand trends suggest the possibility of a much higher prices ahead and a boost in natural gas prices could bring in a flood of investment.

**Figure 3:**

*U.S. Oil and Gas Rig Counts*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Operating Rigs</td>
<td>0</td>
<td>500</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td>2500</td>
<td>0</td>
<td>500</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td>2500</td>
<td>0</td>
<td>500</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td>2500</td>
<td>0</td>
<td>500</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td>2500</td>
<td>0</td>
<td>500</td>
<td>1000</td>
</tr>
</tbody>
</table>

Sources: Bloomberg Professional, Baker Hughes (BAKEOIL and BAKEGAS)

To read more economic research reports like this one or subscribe to the mailing list, visit cmegroup.com/research.