



ENERGY SECURITY IN ARGENTINA: VACA MUERTA & BEYOND

Argentina's energy sector is headed towards an important juncture. After what can only be described as a rocky decade for the Argentine economy and energy industry, the nation's significant unconventional resource potential has revived attention and hope. Argentina must now continue with the onerous task of restoring investor confidence damaged by years of political and institutional instability.

Still, there should be no doubt that optimism is swelling in Argentina as the country seeks a way to turn its vast shale resource potential into bankable reserves. The government has recognized many of these challenges and its efforts to appease international creditors and encourage foreign investors should be welcomed. Many are hopeful that a change in government after the presidential elections in October this year will further engender progress.

While Argentina's market fundamentals are relatively strong, some serious financial obstacles must be cleared before the nation can re-emerge as a major regional energy player. Chief among these are the issues of subsidies and a massive energy deficit, which is adding further pressure to an already strained fiscal outlook. These concerns will no doubt be at the forefront of this year's general elections and dominate the new president's first term.

A World Class Shale Resource

The reversal of Argentina's fortunes is rooted in the US Energy Information Administration's analysis of its vast unconventional oil and gas potential. Argentina's shale formations contain the world's second largest shale gas resources and fourth largest shale oil. This translates to 802 trillion cubic feet (tcf) of technically recoverable shale gas and 27 billion barrels of technically recoverable shale oil. Much of this is contained in the Neuquén basin in west-central Argentina, and in particular the shale formation known as Vaca Muerta.

Yet Argentina is careful to distinguish between what the energy industry calls a resource and what is considered a reserve: Reserves are by definition economic or bankable while resources stem from a more optimistic and less tangible assessment.

Argentina's national oil company, YPF, has set forth a strategy focused on reversing the country's trend of declining oil production, with shale at the center of its efforts. Production in Vaca Muerta has reached 41,000 barrels per day of oil equivalent from 320 active wells. This represents an important milestone for Argentina and also marks the first unconventional resource production in Latin America. Indeed, Argentina is one of just four nations to produce commercial quantities of shale oil or gas, along with the US, Canada, and China.

Technology and Innovation

While many countries endowed with shale resource wealth have coveted the United States' success, it has become clear in recent years that all shale is local. With that in mind, Argentina is attempting to adapt the technology and innovative techniques developed in the US to local conditions, both above ground and below.

Figure 1: Argentina's Shale Basins

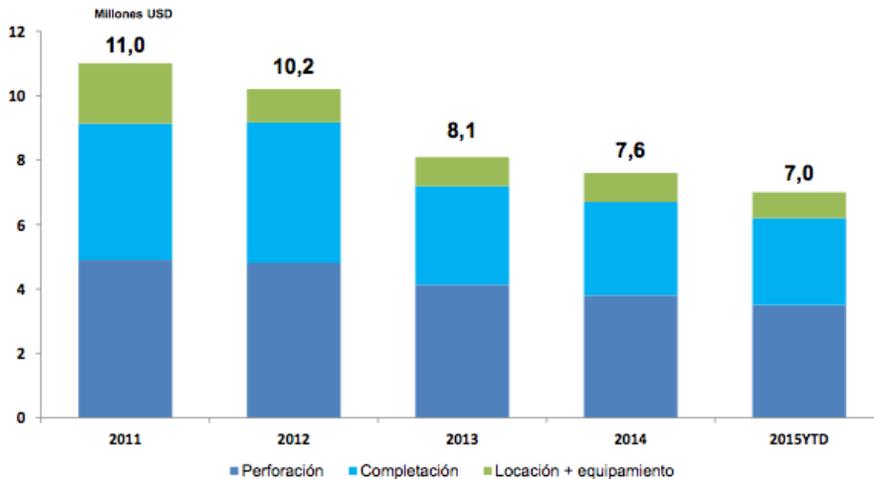


Source: Advanced Resources International



For many years, the high cost of unconventional production in Argentina has cast a dubious shadow over its resource potential. As recently as 2011, the cost per well was around \$11 million. YPF aims to almost halve that figure to \$7 million by the end of this year. Reducing these costs by enhancing local knowledge, as well as efforts such as developing a local sand source for use in drilling are a huge challenge that must be overcome to seize the opportunity that Vaca Muerta and the rest of the nation's unconventional resource potential holds.

Figure 2: Construction Cost per Well



Source: YPF

At the core of YPF's efforts to recover production for the country and create a sustainable development framework are two pillars: increased productivity of resource extraction and reduced well costs.

Managing the complexity of Argentina's unconventional resources by adapting techniques to local conditions enhances efficiency and productivity. YPF aims to eventually achieve 'factory drilling' scale in its vertical wells. The goal is to reach a level at which some 10,000 wells are drilled per year, with a corresponding \$10 billion in investment flows into the shale industry. Such an accomplishment would bring Argentina's production in line with the most prolific shale plays in the United States.

Tackling Above Ground Hurdles

As Argentina seeks to develop its unconventional resource wealth, both the public and private sector must tackle the above ground hurdles that have held back production until now. Investors cite myriad reasons Argentina presents a risky choice, not least of which is a complex and sometimes unfriendly business environment. Primarily, however, the greatest problem is a lack of clarity, certainty, and stability at both political and institutional levels. Increasing fiscal and legal transparency, as well as ensuring that rules and regulations are clear and not subject to unexpected change would go a long way to boosting investor confidence.

Argentina's new hydrocarbons law, approved in 2014, takes aim at some of the factors that have discouraged potential investors. Under the revised framework, royalties are capped at 12 percent, and longer concession terms have been introduced for unconventional resources (35 years) and offshore areas (30 years). Perhaps most importantly, new projects with investment greater than \$250 million have the right to export 20 percent of the oil and gas produced, exempt from export taxes. This figure rises to 60 percent for offshore production.

There are signs these changes are bearing fruit. Chevron was the first oil major to sign a deal with YPF, worth a potential \$15 billion. Dow Chemical has also signed a commitment for a potential \$188 million and Petronas for a reported \$9 billion, all in Vaca Muerta. YPF has signed preliminary deals with Wintershall and Sinopec as well.

The ongoing development of clear and consistent rules and a reliable judicial and institutional framework should further entice investors to Argentina's shale opportunities.



Energy and the Economy

Energy is hardly the only factor contributing to Argentina’s economic problems yet a revitalization of the sector would make a considerable contribution to the nation’s economic health. Energy contributes around 5 percent of Argentina’s GDP, 6 percent of its export revenue, and 17 percent of its imports.

Once a major energy exporter and pioneer in the development of natural gas, fuel imports alone are now costing Argentina over \$10.5 billion per year (Figure 3). These include natural gas by pipeline from Bolivia, liquefied natural gas (LNG) tankers at spot market prices, and oil.

Argentina’s energy deficit, as well as pervasive energy subsidies are the result of thorny policy choices made over the last several years by the national government in the wake of a major economic crisis. In 2015, energy subsidies are estimated to reach \$165 billion or 3 percent of GDP.

While Argentina’s price caps have long warded off potential investors, a price of \$77.50 per barrel of oil and \$7.50 per million British thermal units (MMBtu) of natural gas will actually shield producers selling on the domestic market. Of course, the deal offers no such protection for exporters, with several provinces feeling squeezed by low global oil prices. Nor are subsidies a sustainable solution in the long run. As long as domestic prices remain above international levels, consumers are essentially subsidizing oil production.

One noted economist has likened the nation’s complex fiscal web of tariffs, deficits, debts, restrictions, stagflation and exchange traps to the game of “Jenga,” in which a tower of blocks easily collapses if one removes the wrong piece.

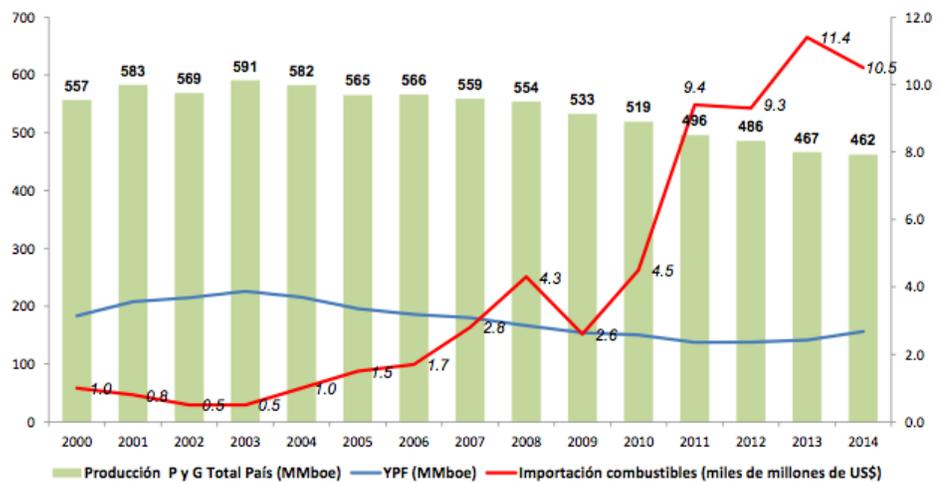
The untangling of Argentina’s fiscal morass will no doubt fall to the next administration.

Regional Integration

Opportunities for reviving regional integration efforts provide a final piece of good news for Argentina. Significant interconnection infrastructure investments made in the 1990s, coupled with a massive increase in LNG export and import infrastructure have established a solid base for regional natural gas integration across South America, but particularly within the Southern Cone. While some assets have fallen into disuse, existing infrastructure provides a base from which to optimize the integration of natural gas markets. Regional agreements already in place provide the political basis for cooperation. Argentina could be at the vanguard of this exciting new phase.

There are several means by which Argentina could better take advantage of existing natural gas and transmission infrastructure connecting the nation to its neighbors. Natural gas landed at Chile’s LNG terminals could be used to generate electricity in Argentina or sent onwards to Brazil. Natural gas could also be transported from Chile to Argentina via pipeline to generate electricity in the north and center of the country. Natural gas swaps between

Figure 3: Argentina’s Energy Deficit



Source: YPF



Chile and Argentina as well as Uruguay are also an option. Uruguay's new LNG terminal should further be considered a potential supplier to both Argentina and Chile.

However, these scenarios rely on significant political will and a reversal of long-held views on energy trade, which in many cases result from past missteps. The potential benefits for Uruguay, Brazil, and Chile, as well as Argentina, are considerable. Ultimately, the future of a new regional integration paradigm will depend less on national choices about energy sources and more on whether each nation sets a path with clear and consistent rules that provide confidence and stability.

Conclusion

The anticipation surrounding Argentina's energy sector is plainly warranted. The government has taken positive steps towards improving its image as a place to do business and foreign investors are taking note. If these moves continue to prove successful, it could pave the way for an energy resurgence and a renewal of its status as a regional energy leader.

There are, however, several above and below ground risks to address. Argentina's approach to finding local solutions and adaptations of technology developed elsewhere is bearing fruit. Still further productivity and efficiency is required before Argentina is able to meet not only domestic needs but reverse its energy trade imbalance.

With many investors looking forward to and beyond the presidential elections later this year, Argentina's success has much riding on the outlook and strategy of the incoming administration.

This report is based on discussions during the Argentina Energy Roundtable, held on March 19 in Buenos Aires.

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