Will Latin America join petroleum's new world order?

Lucian Pugliaresi

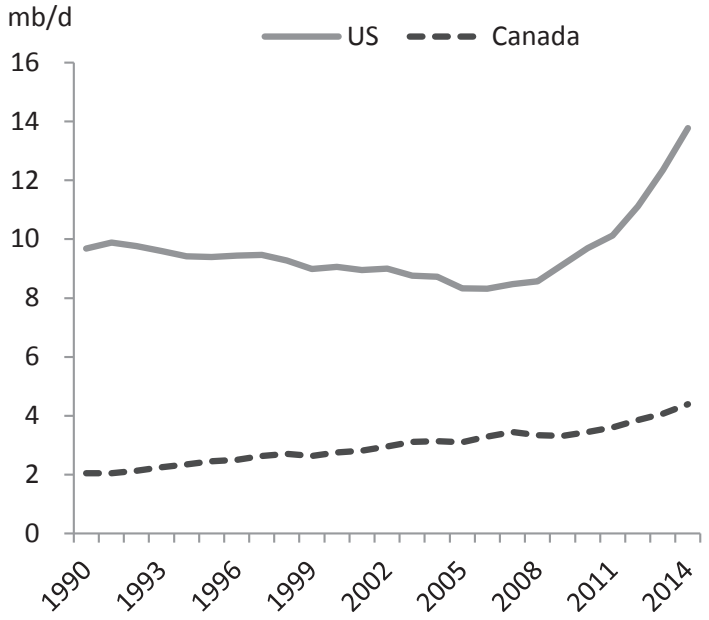
Introduction

The surge in crude oil and natural gas liquids production from the USA and Canada, totalling over 6 million barrels/day (mb/d) since 2006–7 (see graph on right), is a remarkable achievement of technological innovation and risk taking. This liquids growth arrived on the heels of large-scale and low-cost development of natural gas supplies from so-called tight or unconventional formations. US production growth has been driven by long-term improvements in the application of both the art and science of horizontal drilling and hydraulic fracturing.

In the years just prior to the emergence of the US petroleum renaissance, Canada achieved substantial improvements in both mining and steam-assisted gravity drainage (SAGD) extraction techniques from the McMurray Formation in the Western Canada Sedimentary Basin. These North American (sans Mexico) unconventional petroleum developments are altering flows in world crude oil trade, shifting long-term price expectations, and challenging long-held conventional wisdom on US energy policy promulgated in an era of scarcity.

Lessons from the US and Canadian production surge

An important feature of the rapid expansion in US production is that it



US and Canadian crude and natural gas liquids production, million barrels per day (mb/d)

Sources: Canadian Association of Petroleum Producers, EIA

occurred entirely on private land outside the jurisdiction of the federal government; this permitted development to take place quickly and largely unimpeded. Oil and gas production from federal land has become highly contentious and subject to cumbersome and often cavalier regulatory oversight, court delays, and intractable political gridlock. As the recent surge in US oil and gas output took place on private land, the permits and environmental regulations were handled largely by local authorities, without the typical long delays and financial risks prevalent in projects developed under the jurisdiction of the federal government. In a stunning turnaround, the USA is now the world's number one oil and gas producer – having previously been written off as a petroleum province undergoing permanent decline.

Both the US and Canadian experiences offer substantially different risk profiles for petroleum investment. The all-in per barrel cost of shale resource development is costly by world standards (US$50/barrel or more), but financial and project risks are low as total costs are modest and revenue begins to flow within months. Most shale developments do not require risking large capital outlays over long time periods before first production.

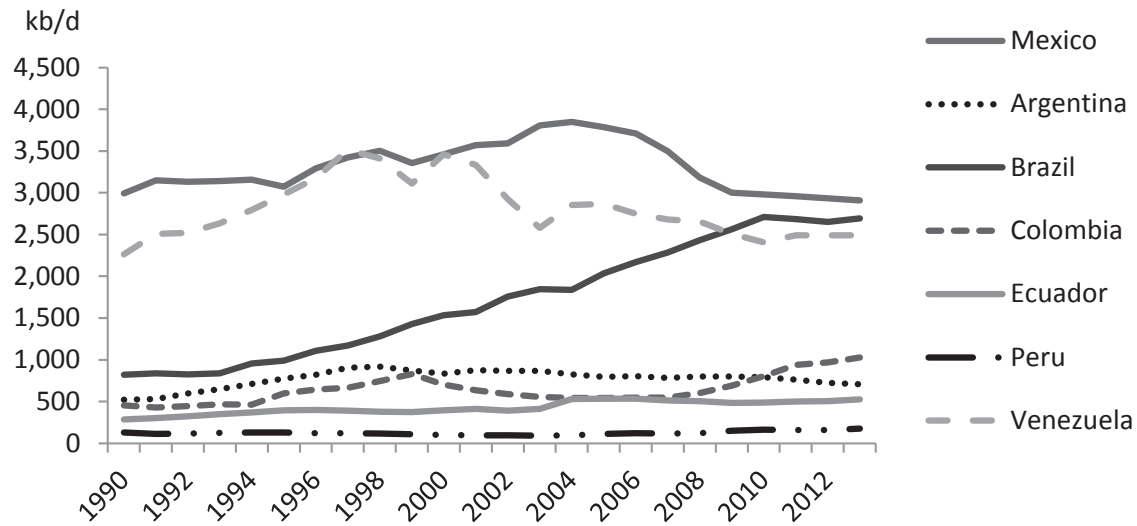
'MOST SHALE DEVELOPMENTS DO NOT REQUIRE RISKING LARGE CAPITAL OUTLAYS OVER LONG TIME PERIODS BEFORE FIRST PRODUCTION.'

In contrast to the US experience, the Canadian production surge is almost entirely from 'Crown' properties. However, sustained reform of Canadian leasing procedures – administered by the National Energy Board (NEB) of Alberta and the Alberta Energy Regulator – has fostered a predictable and long-term programme to bring in investment from both IOCs and NOCs. (The commercialization of the oil sands benefitted from a royalty relief regime wherein projects paid 1 per cent royalty until initial capital costs were recovered, before moving to the prevailing royalty rate.) Canadian oil sands development is capital intensive and is characterized by a substantial delay before first production, but investors remain confident that they can manage regulatory and political risk in Canada.

What about the rest of the Western Hemisphere?

The US and Canadian experiences have demonstrated that very different development models can deliver high volumes of oil and gas production if the appropriate technology and reserves are available and above-the-ground risks can be contained. Recent production trends show less impressive results from Latin America (see graph below).

The most significant production growth has come from Brazil, which successfully attracted the participation of international oil companies (IOCs) in the development of its offshore pre-salt reserves. Sustained and well-managed economic reforms in Colombia have delivered an investment-friendly development programme for several years now. Notwithstanding these improvements, production losses from Venezuela, Mexico, and Argentina have contributed to stagnant performance for the region as a whole. Latin American crude oil production in 2012 came in at 10.3 mb/d, roughly



Latin American crude oil production, thousand barrels per day (kb/d)

Source: EIA

the same volume as the region produced in 2002.

The production performance in Latin America cannot be blamed on inadequate reserves. According to the US Energy Information Administration (EIA) Latin America has proven hydrocarbon reserves only second to those of the Middle East. Even if we ignore pending evaluations for deep water and shale reserves Latin America, with 20 per cent of the world's total, has the largest proven hydrocarbon reserves outside the Middle East, which has 48 per cent. (Although it is too early to make any firm conclusions on the ultimate performance of shale resources in Latin America, a report by the EIA and Advanced Resources International (ARI), released in June 2013, identified liquids-rich prospective shale formations in the Americas, such as Vaca Muerta in Argentina, Eagle Ford in Mexico, Ponta Grossa in Brazil, and La Luna/Capachu shared by Colombia and Venezuela.)

'THE PRODUCTION PERFORMANCE IN LATIN AMERICA CANNOT BE BLAMED ON INADEQUATE RESERVES.'

Oil reserves in the region are distributed unevenly. Venezuela dominates the region with 297 billion barrels of proved reserves. The country's large reserve endowment is mostly extra-heavy, with characteristics not unlike those of the Canadian oil sands. Venezuela more than tripled its official reserves in the last five years due to a combination of high oil prices, technological advances, and actual experience with extra-heavy oil extraction and marketing. Its reserves are the world's second largest after Saudi Arabia.

Crude oil reserves are subject to continuous revision as exploration proceeds. For example, Brazil's reserves have recently been raised from 7.5 to over 13 billion barrels (*Oil & Gas Journal*, 2 December 2013) and higher estimates have been published. Pre-salt, deep, offshore reserves in Brazil could potentially quadruple the figures from current official estimates.

According to Dr Edgar Rangel-German (*The New Role of the Mexican Upstream Regulator*, XXIII La Jolla Energy Conference, May 2014) CNH, the Mexican independent energy regulator, is now reporting that the nation's 2P crude reserves exceed 26 billion barrels, a substantial increase over earlier estimates. (A common definition of 2P reserves is: those reserves which analysis of geologic and engineering data suggests are more likely than not to be recoverable under reasonable economic, technical, and operating conditions.)

Looking ahead

Much of the poor production performance seen throughout Latin America can be tied to the failure to follow through with the reform programmes implemented in the 1990s. Soon after the 1990 reforms, upstream oil and gas investment began to flow to the region, only to see a return to resource nationalism in the 2000s, this time with a particularly virulent strain. This retrenchment in reform followed the run-up in world oil prices – an often-positive environment for resource nationalism. The subsequent policy shifts were highly visible in Argentina, Ecuador, and Venezuela and in the gas sector in Bolivia. The surge in resource nationalism took several forms, ranging from outright expropriation to implementation of new requirements that discouraged foreign investment and participation in the petroleum sector.

There are now some positive signs that genuine reform is back on the table and we cannot discount the catalyst of lower oil prices and declining government fiscal outlooks as an instrument which is sustaining reform efforts. None of the new reform programmes come with guarantees, but Brazil (even with some recent setbacks) and Colombia have shown that genuine benefits can be achieved. The Mexican initiative is wide-ranging and serious. Venezuela will likely require a regime change before major reforms can be implemented, but given conditions in the Bolivar Republic this may occur sooner rather than later.

'THERE ARE NOW SOME POSITIVE SIGNS THAT GENUINE REFORM IS BACK ON THE TABLE …'

So what might a sustained petroleum reform programme yield throughout Latin America in terms of rising oil production? Recent experiences with production growth in the USA and Canada can at least provide a technical guidepost on the potential pace of development, in circumstances in which capital is deployed in a timely manner. Of course, whether such reforms are likely, and can be sustained for long enough to make a difference in sustained production growth, is an entirely different question.

Mexico

The historical setting that created Petróleos Mexicanos (PEMEX) cannot be ignored in any assessment of the Mexican initiative to proceed with massive reform of its energy complex. The Great Depression, low oil prices leading to declining payments to the Mexican government, and the view that foreigners were taking advantage of Mexican workers led to strikes and political turmoil. On 18 March 1938 the Mexican Supreme Court approved an expropriation of all subsoil assets.

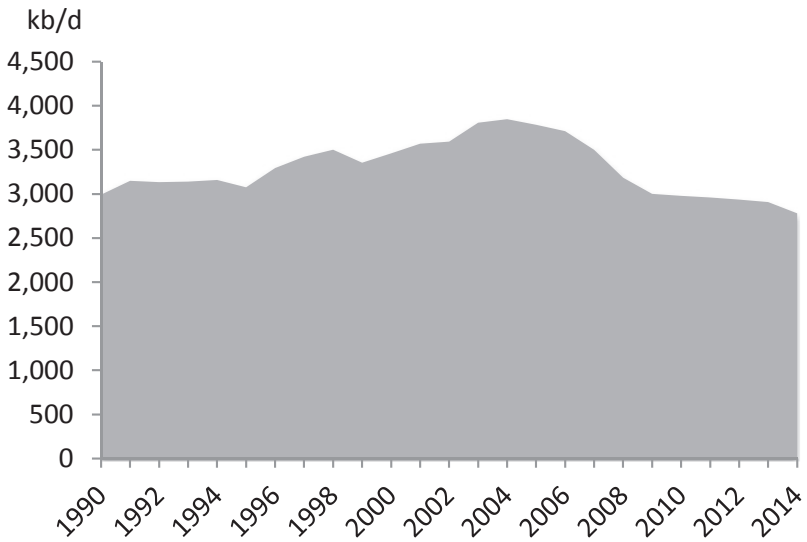
PEMEX is the oldest of the major national oil companies (NOCs); for many years it has been the largest

supplier of crude oil to the USA, an instrument of pride for the Mexican people and a major revenue source for the government. However, the North American petroleum renaissance has not only provided a demonstration that mature petroleum provinces can be rehabilitated, but that Mexico was entering a more competitive environment and US interest in PEMEX crude was fading quickly in light of rising US and Canadian production. Indeed, one of the positive forces for reform was that Mexican crude was no longer 'required' in the USA. The implementation of constitutional changes and of novel legislation used to open up the Mexican petroleum sector were politically difficult tasks. Opposition to the reforms took many shapes, with some political opponents complaining that increased Mexican oil production 'would only end up being exported to the Americans'. Presumably the opponents of reform were not impressed by the fact that the crude exports would receive world oil prices.

After an era of declining crude production (see graph below), particularly in contrast to the US experience, a political consensus came together that the single operator, PEMEX, could no longer efficiently manage such a wide variety of challenges. So for the first time in Mexican history, a wide range of foreign participation is now possible in the petroleum sector.

Anyone who has experienced a presentation by Dr Edgar Rangel-German, head of the Mexican energy regulator (CNH), cannot help but be impressed by the comprehensive nature of the reforms. CNH will undertake management of the bidding process, sign, manage and oversee contracts and drilling programmes, provide expert opinion on exploration and development plans, and authorize seismic studies, in addition to carrying out other important functions. Participation can take the form of joint ventures, to outright bid and development of a play acquired through a competitive auction by a foreign company. Data rooms will be opened up for the new prospects and extensive efforts will be implemented to encourage foreign participation.

Even with the implementation of reforms, PEMEX will continue to have an important role, and considerable resources remain under its control. PEMEX has ended up with 83 per cent of current 2P reserves, but will only receive around 20 per cent of prospective reserves and less than 10 per cent of unconventional reserves. Permitting a strong role for PEMEX is critical for the success of the reform programme, while at the same time an explicit admission that there are plenty of reserves available for participation by foreign or private Mexican companies – for which PEMEX may lack the resources and/or technical capacity to undertake at this time.



Mexican oil production, thousand barrels per day (kb/d)

Source: EIA

Argentina

The US EIA has reported that, other than the USA, Argentina is likely to have the biggest potential to develop shale oil in the western hemisphere. The EIA has reported technically recoverable shale reserves at 27 billion barrels and this estimate is likely to be revised upward once additional exploration takes place. To date, most exploration has taken place in the Los Molles and Vaca Muerta formations, where 50 wells have been tested with largely positive results. Initial production rates have been from 180 to 600 b/d, not substantially out of line with the experience in many of the US shale formations.

Long-standing investment risks, such as price controls and export taxes, are the biggest constraint to sustained petroleum growth in Argentina. In addition, the ongoing legal battles in US courts from the default finding on official debt are contributing to reluctance for full-scale investment.

Venezuela

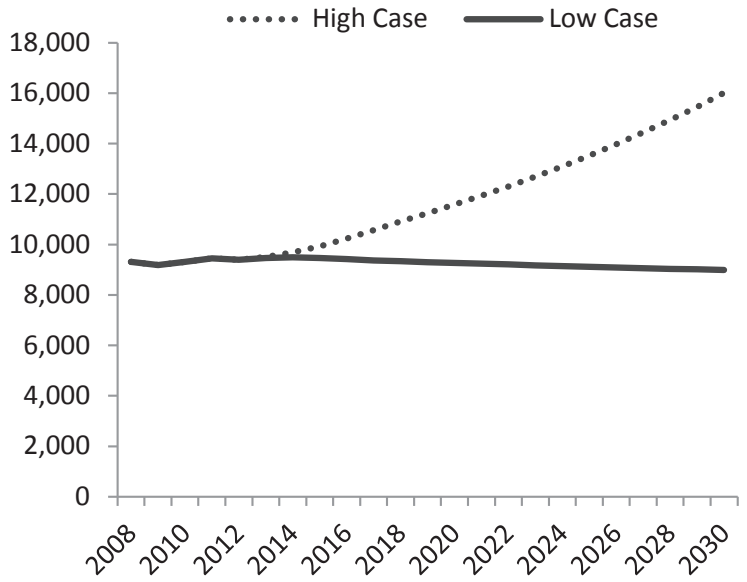
In the 1970s, Venezuela nationalized its petroleum industry and created a state company, Petróleos de Venezuela S.A. (PDVSA). Although PDVSA had many of the problems common to

state-run companies, it was considered a highly professional and competent organization until 2002, when half the employees walked off the job in reaction to policies implemented by then-President Chávez. Most of the liberalization programmes put into place in the 1990s were discontinued, and there were substantial increases in tax and royalty rates.

The large-scale nationalization of foreign investor holdings in 2006 was especially damaging, as the government mandated the renegotiation of a 60 per cent minimum PDVSA share in project operations. Sixteen firms, including Chevron, ExxonMobil, and Royal Dutch Shell, complied with new agreements, while Total and Eni were forcibly taken over. After Chávez's death in 2013, President Maduro continued Chávez's policies. Venezuela is also increasing pressure on the foreign operators that remain in the country to increase investment to offset recent production declines. Court battles continue over compensation from the nationalization programme and Venezuela is facing about 20 cases at the World Bank tribunal; these are likely to see resolution sometime before the end of 2014.

Latin America's production uncertainty

From a strictly technical view, Latin America's major petroleum producing provinces could substantially raise production over current levels.



Latin America uncertainty range, thousand barrels per day (kb/d)

Sources: Historical figures, EIA. Forecast range estimated from EPRINC calculations on the pace of petroleum development under alternative reform scenarios. EPRINC combined totals are for Argentina, Brazil, Colombia, Mexico, and Venezuela.

Experience in the USA and Canada demonstrates that improved extraction techniques, sound application of new production technologies, and sustained investment coupled with stable contract terms and contained political risk would probably yield continued production growth, given the existing and likely growing reserve base in Latin America. The uncertainty will remain largely above the ground.

'… LATIN AMERICA'S MAJOR PETROLEUM PRODUCING PROVINCES COULD SUBSTANTIALLY RAISE PRODUCTION OVER CURRENT LEVELS.'

The range of uncertainty in Latin American production is shown in the graph above. Approximately half of the uncertainty comes from Brazil, given the large potential for the pre-salt and its requirement for large-scale investment. Most of the remainder will come from Mexico and Argentina. Venezuela offers considerable potential, but this potential cannot be realized through modest reforms and will likely require regime change.

Special thanks to Desmond Dahlberg of EPRINC for valuable comments and reviews, and Ivan Sandrea from Sierra Oil & Gas S. de R.L. de C.V. in Mexico.