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Promising prospects: a Pemex rig in the bay of Campeche. Liberalisation will give the state company added scope to invest in exploiting the country's considerable offshore oil reserves – Susana González/Bloomberg

Rapid returns required from the reform

The measure of the success of liberalisation will be how much manufacturing increases and social inequality declines, writes *Jude Webber*

There is a simple way to measure the success of Mexico's energy reform to date: just look at the number of private companies considering investments of $1bn.

To name just three: Canada-based Pacific Rubiales says it has $1bn to spend in Mexico; new kid on the block Sierra Oil & Gas started up with $525m but has options to double that; and Alfa, a Mexican company with experience in shale in Texas, is hoping to issue stock this year to raise $1bn for energy projects at home.

Sami Iskander, BG Group's chief operating officer, used to be a sceptic about the prospect of Mexico pulling off the long talked-about reform to an energy sector shackled to the state since nationalisation in 1938. Now he is a convert.

"It will be bumpy for sure. But it will be absolutely fantastic," he told the Financial Times at a recent energy conference where enthusiasm about the liberalisation among executives from around the world was palpable.

It is clear that Mexico, the third-largest oil producer in the Americas and home to the world's sixth-biggest technically recoverable shale gas resources, could not have limped along much longer without the game-changing reform promulgated by President Enrique Peña Nieto in August this year.

Petróleos Mexicanos, or Pemex, the bloated state group that is losing its 76-year monopoly as the sector is opened to private investment and competition, was bowed by the weight of 1.2tn pesos ($88bn) in pension liabilities and its production was in inexorable decline.

Assets such as the giant shallow-water Cantarell field, which changed Mexico's oil fortunes when it was discovered in 1976, are depleting and the impact is becoming starker: despite increasing investment in recent years, Mexico's oil output, which has plunged by more than 1m barrels a day since its peak a decade ago, fell 4.3 per cent in the third quarter, compared with a year earlier.

To put it bluntly, the old model, Mr Peña Nieto says, was "worn out".

Mexico has so much to offer: deepwater riches, huge shale potential and abundant onshore and shallow-water prospects, all ripe for the application of new technology. But that was beyond the state company's means.

Unlocking that potential is critical to Pemex's profitability, but crucially it is also vital to putting Mexico at the heart of a future integrated North American energy market with the US and Canada.

The reform's success will be the extent to which it boosts the competitiveness of Mexico's export-orientated manufacturing sector by slashing electricity prices that are 84 per cent higher for industrial clients than in the US.

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Inside

State leviathan rises to the challenge of reinventing itself

Pemex Less bureaucracy and a simplified structure form basis of plans for growth, writes *Jude Webber*

Facing new competition: Pemex platforms in the Gulf of Mexico — Susana Gonzalez/Bloomberg

There are two things you can't mess with, Mexicans like to joke. One is the Virgin of Guadalupe, the country's patron saint. The other is Pemex.

But the state petroleum company – such a national icon that the stereotypical sombrero-wearing Mexican was once its logo – is untouchable no longer.

As Mexico opens its energy sector to private investment, the 76-year-old institution is suddenly having to shape up, as it lurches from a cosy era of entitlement to a new age of competition.

The pressure on Pemex not to stumble is huge. Although new entrants are expected to pour tens of billions of dollars into Mexico's energy sector in coming years – the government forecasts $50bn will flow in by 2018, but private estimates reckon it could be more than triple that by the end of the decade – Pemex will remain a significant presence and will still be, in many cases, an essential partner.

"We need to get this step right," Mario Beauregard, Pemex's chief financial officer, acknowledged before a packed hall of potential investors recently, as the company moves into the implementation phase of Mexico's centrepiece reform.

Pemex has a long way to go – the bonanza Cantarell shallow-water oilfield, discovered in 1976, is on the wane and Pemex's oil output has been in stubborn decline for a decade.

Meanwhile, production costs rose 15.6 per cent in 2013 compared with 2012, meaning that maintaining the status quo is not a viable option since the company cannot turn production around, say, by exploiting the promising – but cash-guzzling – deepwater fields in the Gulf of Mexico.

But Pemex is off to a good start. It has a slimmed-down portfolio, a new board and an ambitious mandate to be run, by the end of 2015 as much like a private enterprise as it is possible for a huge state oil company to be.

That means adopting industry best practice to achieve efficiencies and maximise revenues for the state, while being relieved of having to hand over quite as much of its earnings to the government as it has until now.

Revenue from Pemex provides a third of the national budget, but the government expects the company's tax burden to shrink from 79 per cent to below 65 per cent within a decade, freeing cash for it to invest in what will yield results.

Under this year's Round Zero, when the government decided which prospects Pemex should keep and which would earn more for Mexico by being put out to tender, the company was guaranteed sufficient reserves to pump 2.5m barrels a day of oil equivalent for more than 20 years as well as 83 per cent of so-called 2P reserves, which have a 50 per cent probability of success, and 21 per cent of Mexico's prospective resources.

Emilio Lozoya, Pemex chief executive, whose previous experience as a turnround specialist is being put to the test, is pushing ahead with plans to simplify the structure by reshaping the company into two divisions: upstream and downstream. Some $1bn has already been saved by streamlining internal bureaucracy.

Arturo Henríquez, Pemex's head of procurement, was parachuted in by Mr Lozoya from the private sector in Houston, where he had run a start-up. He discovered there were 120-plus buying offices. "I was horrified," he says.

> 'We see this reform as a tool that will help us go forward in years to come'

Mr Lozoya welcomes the fact that Pemex will no longer be obliged to plough millions into unprofitable areas, such as refineries. Parts of the Chicontepec basin, whose promise has been thwarted by complex geology, despite Pemex having poured $13bn into it since 2002, are also being offered to private investors.

But Pemex will not be driven out of business by the arrival of oil majors such as Exxon, Shell and Chevron. No other companies can match it in terms of knowledge of Mexico's geology and prospects, and it will retain a nationwide presence. "It is foolish for any of us coming in not to try to partner with Pemex," says Sami Iskander, chief operating officer at BG Group.

He speaks from experience: his company has made the successful transition from offshoot of a nationalised utility to international major. Pemex faces the same reinvention challenge, with the added burden of reforming a pension system that has racked up debts equivalent to 9 points of Mexico's GDP. But Mr Henríquez says that applying international standards, best business practices and "a lot of common sense" is already making a difference.

"I wouldn't say bureaucracy [at Pemex] is dead," says Mr Henríquez. "But this is a great opportunity to make positive change – and we are seeing it."

The acid test will, of course, come with competition. But Pemex's cadre of managers is sure of one thing: there was no way the status quo could have continued.

"For Pemex, this reform is our salvation," Mr Beauregard told a recent business summit in Querétaro. "Instead of seeing the reform as a threat, we see it as a tool that will help us move forward in the years to come."

But it is a seismic cultural shift. "We have to change the chip in all of us working at Pemex, generating incentives so all our activities are orientated to generating value," he said.

Gone is the rigid monopoly. "We have to learn to act as a business and as businessmen," he says.

Foreign majors eye rich returns from deepwater

Gulf of Mexico oil

Opening-up of market will bring investment to tap world's largest unexplored reserves, reports *Anjli Raval*

Wajih Effendi has been based in Houston for the past two years, slowly developing the Mexico business of BG Group, an energy company. Now, with the country about to open its energy industry to private involvement, Mr Effendi is moving to the other side of the border.

BG Group is among those companies looking to cash in on landmark energy reforms that aim to modernise and develop Mexico's oil, gas and power industries. For nearly 80 years, state monopolies, onerous legislation and a shortfall of capital have hamstrung the sector through underinvestment and huge inefficiencies.

Mr Effendi is one of only two people at BG who has been focused solely on the group's Mexico play, but the company is increasing the number of staff dedicated to the country into double digits . It is taking extra office space in Mexico City, underlining its longer-term hopes for the region.

BG Group – like Royal Dutch Shell, Chevron and other international oil companies – is eyeing deepwater drilling opportunities in the Gulf of Mexico, which is one of the world's largest unexplored reserves of oil and gas.

"[Deepwater] is the big prize," says Mr Effendi. "Look at the amount that has been explored on the US side of the Gulf of Mexico, versus the Mexican side." Some 1,600 wells have been drilled in US waters, compared with 50 or so on the Mexican side, industry watchers say.

Until now, the vast deepwater reserves have been untouched by Mexican state oil company Pemex because of the technical challenges and the money required to develop them. At the same time, shallow-water fields in the Gulf, where Pemex has expertise, have matured and stocks are on the decline.

The numbers give a clear sense of the urgency. Production, peaked at 3.4m barrels a day in 2004, but has since fallen 24 per cent to 2.5m b/d this year, say the authors of a Boston Consulting Group (BCG) report on Mexico's energy reforms.

"Nearly one-quarter of Mexico's oil production comes from fields in which 50-75 per cent of reserves have been depleted," they add. "An additional 46 per cent comes from fields in which more than 75 per cent of reserves have been tapped."

But prospective resources are estimated at a staggering 115bn barrels of oil equivalent and Mexico has been described as "a sweet shop" by energy executives looking to invest. While shallow-water, shale and onshore opportunities are all available, deepwater resources – believed to be the most lucrative investments – stand at close to 30bn boe, BCG data show.

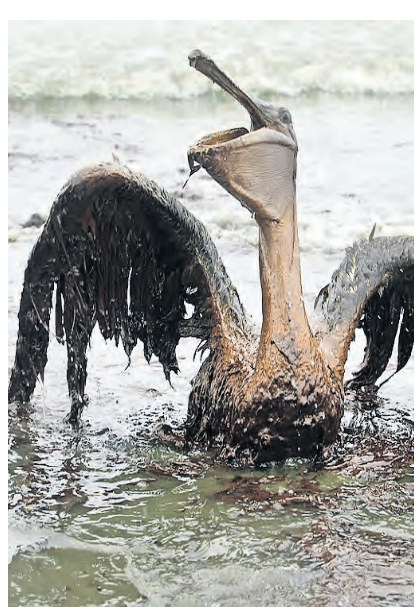
International oil conglomerates, such as Royal Dutch Shell, BP, ExxonMobil, Chevron, Total and Repsol – many of which already have a presence in Mexico, have the expertise to search for oil in harder-to-access areas and the balance sheets to fund their operations, say analysts. Nobel Group and Tullow Oil are among other interested parties.

While the break-even point for developing conventional oil is less than $40 a barrel, it is $40-$80 a barrel for deepwater oil, according to BCG. To develop all its prospective reserves, Pemex, which has reported losses of $30bn over the past six years, will require some $830bn in capital expenditures.

> Mexico has been described as a 'sweet shop' by energy executives looking to invest

"For international oil companies with the balance sheet and the technical expertise, this offers great potential. If they get in early, the hope is they will be able to build up their acreage over the years to come," says Mr Effendi. "Everyone is making a long-term strategic decision."

A new hydrocarbons law, which is the cornerstone of the Mexican reforms, outlines a fresh contract framework offering companies a licensing agreement, a cut of the profits, a proportion of the production or a share of the servicing revenues.



Dangers: the Deepwater Horizon spill

Parts of the prized Perdido Fold Belt, some offshore heavy oilfields and parts of the technically challenging Chicontepec formation will be on the block. While Pemex is expected to stay a partner in some of the more lucrative opportunities initially up for grabs, analysts say, others may be developed exclusively by a foreign energy company.

But commercial terms of the deepwater oilfields will not be known until the finance ministry details them when blocks are put up for the first public tender round in 2015.

Elisabeth Eljuri, who is head of Latin America for law firm Norton Rose Fulbright and a leader in the oil and gas practice, says there are still many grey areas that foreign companies looking to invest are trying to navigate.

Intricacies of the bid process have yet to be revealed and the exact geology of each of the blocks is still unknown. Certain fiscal and contract terms are also unclear, Ms Eljuri says, including details of how much of the proceeds of each project will have to go to the government, grounds for termination and approvals processes.

Environmental considerations are also key, after disasters such as BP's Deepwater Horizon oil spill in 2010.

"There are lots of details that have yet to be clarified," says Ms Eljuri. "But the terms are expected to be favourable. I don't think the Mexican government is going to reinvent the wheel.

"It will try to keep to international standards as it knows this is a big opportunity to generate foreign investment. But it needs to get it right. "

Organised crime could undermine benefits of the reform programme

Security

Companies warned not to underestimate the cost of protecting installations and cargoes, writes *Jude Webber*

How much of a risk are Mexican drug lords and the country's volatile security situation for the landmark energy reform? The head of one company that has a services contract with Mexican state giant Pemex smiles ruefully.

At its worst point – some three to four years ago – a full 40 per cent of the acreage the company is working on was a no-go area, and that was despite some of the processes being automated, says the executive, who asked not to be named.

Things have improved somewhat, but it is all relative: the proportion of the area his company is working on that can only be visited with the army, in helicopters, has shrunk to 20 per cent.

"Security will be a problem," says the executive, highlighting the elephant in the room when it comes to the industry's otherwise rapturous reception of Mexico's energy reform.

Officials used not to mention the s-word too much: big companies – the ones eyeing the country's deepwater riches – were used to operating in challenging environments, they would euphemistically say.

Why would Mexico, even with brutal outfits like the Zetas and the powerful Sinaloa cartel, be any different?

But lately, the government has started to allude to the problem. Lourdes Melgar, the hydrocarbons undersecretary, told a recent conference of potential investors that "we have to admit it" – some areas initially earmarked for tender to the private sector in the first bidding round posed "serious challenges regarding security and organised crime".

She added: "As we assess how things get better, we will be able to put those areas into the following rounds."

To get an idea of the scale of the problem, take the extent to which Pemex itself has been hit. "The number of reported taps [pipeline tappings] has virtually doubled every two years since 2008," says Dwight Dyer, a senior analyst at Control Risks, a consultancy.

In 2000, there were only 155 recorded instances of tappings. By last year that figure had ballooned to 3,052, from 1,744 in 2012. According to Pemex's latest data, the number of illicit taps hit 2,662 in the first nine months of this year – a cost of more than $1bn in 2014 alone that the company can ill-afford.

Last year, the volume of liquids stolen was an estimated 9.3m barrels, compared with 8.2m in 2012. As a result, Pemex is pouring $282m into beefing up its pipeline security controls and is confident that the problem has stabilised – even though it is far from under control.

Cargo theft – the hold-up of trucks carrying oil – is another concern, and that is even before foreign companies begin to think about what Mexico terms "high-impact crimes": murder, kidnapping and extortion.

"Security is a key issue. Nobody talks about it, but it is key," says one chief executive with experience in Mexico and who knows the areas in the grip of organised crime first-hand. Indeed, it has proved harder to work there than in Iraq as its oil sector was opening up, he says.

"No foreign company will put its people at risk," he adds.

Most companies, as a result, are factoring the issue firmly into their business plans – covering everything from private security guards for fields where they would be working to ensuring the safety of workers in transit.

How much that will cost depends entirely on the kind of resource involved: offshore drilling is unlikely to be touched by organised crime, but those companies' onshore installations may be.

On the other hand, shale areas in the north of the country are in areas far more likely to encroach on cartel turf and the risk there will be higher.

That, clearly, will be more onerous for midsized companies of the kind typically involved in shale development in the US than for majors used to seeing security planning simply as an essential part of their investment strategy.

"No one will refuse to work in Mexico because of the security situation," says Emil de Carvalho, managing director for Latin America of Salamanca Group, a consultancy that advises clients on security strategies.

"The risks in Mexico are manageable. If you have a robust operational risk programme in place, you can operate with a reasonable residual level of risk."

The cost of factoring in security is, however, "probably more expensive than people realise", says Control Risks' Mr Dyer.

With Pemex being state-owned, it falls to the armed forces to provide security, but it is not yet clear how that will work once Pemex starts entering into partnerships or private players start developing resources alone.

In any case, there are not enough federal troops to deploy to energy installations, especially with flashpoint security crises as in the western state of Guerrero, where 43 students disappeared after clashes with police on September 26, or in Michoacán or Tamaulipas, where federal forces were mobilised earlier this year.

Nor are there enough reformed – and therefore reliable – local police forces to help protect them.

Crime can come closer to home as well, in the form of a reputation for ingrained corruption that Pemex is now seeking to weed out.

Front line: flashpoint crises stretch the armed forces

The key, says Gustavo Mohar, a former interior ministry undersecretary, is to spread the benefits of staying on the right side of the law.

"When local criminals know, for example, that a pipeline is going to be built, the best way for a company to protect itself is to include the community," he says.

Domestic contractors are out to seize their chances

Potential winners
The reforms should benefit companies with local knowledge or experience in services, reports *Amy Stillman*

From cheese to polyester and engine parts, there is little Alfa does not make. The industrial conglomerate got its start in 1974 making steel in the northeastern Mexican state of Nuevo León. But over the years it has developed a keen appetite for diversification, devouring new businesses.

It should be no surprise, then, that Alfa plans to participate when Mexico holds its first oil and gas auction next year under the energy reforms approved in August. It provides oil services to Pemex, the state oil company, and has expanded its oil footprint in Texas, where it is drilling for shale oil with partners.

According to Raúl Millares, Alfa's energy director, the company hopes to win contracts in shallow-water and mature fields in farm-out deals with Pemex and could bid on shale blocks in upcoming oil auctions, using its experience in Texas.

"We are making a big effort to expand our activities in the oil business," says Mr Millares. "In time, it could become an important part of Alfa's portfolio."

The liberalisation of the energy sector this year promises to boost the nascent private oil industry, where development has been stunted by three-quarters of a century of oil nationalism.

Mexican companies Diavaz, Grupo R and Constructora y Perforadora Latina are among a handful of local players potentially well-placed to take advantage of the opening having gained skills in the oil services industry by providing services to Pemex such as gas injection in oil reservoirs. Following limited reforms in 2008, they have also been able to win incentive-based service contracts, which allow Pemex to subcontract drilling at a set, per barrel fee.

Alfa, for instance, has helped Pemex double production at the mature San Andrés and Tierra Blanca fields in Veracruz state to 5,000 barrels of oil equivalent a day since winning service contracts in June 2012.

Diavaz has accumulated more than a decade of experience in the gas-rich Burgos Basin, where it has participated in service agreements through a consortium with Brazil's Petrobras and Japan's Teikoku. It is also the operator in two blocks in the Tampico-Misantla basin.

Under the reforms, these companies will also benefit from the restructuring of their contracts into licences or profit-sharing or production-sharing agreements, giving them at least part of the oil output.

Moreover, some Mexican groups could partner with more experienced international oil companies. This year, Alfa has increased its stake to 19 per cent in Pacific Rubiales, a Toronto and Bogotá-listed oil company, a move widely seen as paving the way for it to acquire the seasoned heavy-oil driller.

David Neuhauser, a money manager at Illinois-based hedge fund Livermore Partners, says: "Alfa's exposure to oil is relatively small, so buying Pacific Rubiales would give it a large footprint right off the bat with substantial cash flows."

Alfa plans to sell 400m new shares amounting to $1.3bn to fund new oil activities. It will also raise cash from initial public offerings for its subsidiaries, Sigma, a food processing company, and Nemak, an automotive parts maker.

Drilling down: Local companies want more of the action – Susana Gonzalez/Bloomberg

Diavaz, meanwhile, has been approached by ExxonMobil of the US to explore deepwater fields in Mexico, according to chairman Luis Vázquez Senties, who says it could raise about $1bn to fund new operations.

But it is also considering opportunities with Petrobras, which has extensive experience exploring ultra-deepwater fields off Rio de Janeiro.

Other local companies with relatively little oil experience, such as Fermaca, a pipeline company, or Grupo México, a mining conglomerate, also do not see this as a limitation. Many are skilled at managing local regulations, which could make them attractive partners for international companies.

"This is where we local partners can add a lot of value," says Raúl Monteforte, development officer at Fermaca, which is seeking international partners to bid on oil assets in Mexico.

The company's debut in the Mexican pipeline sector may give some indication of its resourcefulness. It purchased its first pipeline project from Royal Dutch Shell in 2001 after the major was unable to resolve right of way and permitting problems. According to Mr Monteforte, Fermaca had the gas flowing in double quick time.

Up for the fight: Emilio Lozoya must sweep away corruption – Tomas Bravo/Reuters

Profile Emilio Lozoya, head of Pemex

Emilio Lozoya is in a hurry, *writes Jude Webber*. The fresh-faced Pemex chief has a new board of directors and a focused strategy, and wants to get on with raising production – fast.

His mission is to transform Pemex from the hulking state oil company that had to be all things to all people into a nimble corporate operator with a clear game plan. He has to deliver results and reverse declining output.

Freed from the need to invest in unprofitable activities, Mr Lozoya plans to start with what Pemex knows best – shallow-water fields – and then move into deepwater exploration.

He holds separate economics and law degrees, a masters from Harvard, and has corporate turnround and investment fund expertise, so Mr Lozoya, who turns 40 in December, is unlikely to be out of his depth.

Tall and dapper, with a penchant for Patek Philippe watches, the Pemex chief is the son of a former energy minister but was new to public service when Enrique Peña Nieto, the reformist president, put him in the job almost two years ago.

Like Luis Videgaray, the finance minister, Mr Lozoya was not only a student and protégé of Pedro Aspe, a private equity specialist and former finance minister, but also a key member of the president's transition team.

"He is a force of nature," says David Goldwyn, a former US state department energy affairs official, of Mr Lozoya.

Would-be investors are charmed and impressed by Mr Lozoya's vision and drive – and he is well aware that when it comes to transforming Pemex the buck stops with him.

It is a formidable task.

The state oil company was set up in 1938, after Mexico kicked out foreign oil majors and nationalised the energy sector. It has been at the heart of the state ever since, funding a third of the national budget via taxes and employing about 150,000 people.

But Pemex has also become known for towering corruption and a fossilised bureaucracy that Mr Lozoya must now sweep away.

The chief executive, who was awarded the petroleum executive of the year title by global industry executives, is already installing a culture of meritocracy. A former McKinsey consultant works in operations. A former International Monetary Fund official is in the finance department.

Mr Lozoya sits in the driving seat of the president's campaign to modernise Mexico, but it may not be an easy ride: when the government invites bids for former Pemex assets next year, it will thrust the group into unprecedented competition on its home turf.

Mr Lozoya is preparing to meet the challenges head-on and has even talked of spinning off some assets and floating them – a move that is bound to ruffle feathers.

But he appears to admire mould-breakers: his art collection includes works by Picasso and Dalí. And his hobby is boxing. Expect him to pull no punches.

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Economic and practical obstacles limit ambitions

Shale A glut in the US, poor infrastructure and crime dim prospects, writes *Amy Stillman*

Prickly problem: arid areas raise infrastructure challenges

Vladimir Sosa, the 32-year-old first energy undersecretary of the Mexican state Nuevo León, is no oilman.

But his appointment perhaps says as much about the changes afoot under Mexico's reformist government as it does about Nuevo León's desire to be at the forefront of them.

Investors have applauded the speed at which Enrique Peña Nieto, Mexico's president, has set about restructuring the economy, the centrepiece of which has been opening the oil sector to private investment after almost eight decades of state control.

But perhaps one of the biggest cheerleaders is Nuevo León, whose access to vast shale resources in the Burgos basin, an extension of Texas' Eagle Ford formation, has fired it with ambitions of becoming a Houston-style oil hub.

"We believe the reforms will help shale activity grow – the potential is huge," says Mr Sosa, who was involved in the oil ministry's framing of the energy laws passed in August this year.

Mexico plans to hold its first competitive oil auction in early 2015. About 40 per cent of the 169 blocks being put out to tender are in so-called unconventional areas that mirror shale formations in the US, where drillers are using new technologies to get at previously inaccessible hydrocarbons.

But while states such as Nuevo León expect the reforms to create benefits in their backyard, there are concerns that the government, in its exuberance to exploit these reserves, has overlooked some important obstacles to development.

Although Mexico's shale resources are among the world's 10 largest, according to US Energy Information Administration estimates, it is increasingly difficult to see the advantage of developing this while the US is experiencing a glut next door. The EIA estimates that spot prices at Henry Hub, the US natural gas pricing benchmark, will average $4.58 per million British thermal units this year, which is about four times less than Mexico has paid for liquefied natural gas from Asia and Latin America.

"At today's [Henry Hub] price, there is very little incentive to develop Mexican shale gas," says Luis de la Calle, a former Mexican trade official. "You would rather pipe it in from Texas."

Mexico, in fact, plans to do just that. New gas pipelines that equal 46% of Mexico's existing pipe network are to be built over the next three to four years, suggesting cheap US imports will answer much of the country's gas needs quicker than its shale developments will.

Moreover, the glut has also meant that a number of independent drillers across the border are reluctant to start new projects in Mexico.

"Given the remarkable well economics that we have in our backyard under a known regulatory regime and risk profile, it is going to be very hard to put a dollar anywhere else," one driller in Texas told the Financial Times.

Infrastructure issues are another problem in Mexico's arid northern region. In order to access shale in the Burgos basin, which is believed to contain more than half of Mexico's shale resource, pipelines would first have to be developed to carry billions of gallons of water to be used for fracking. The infrastructure to simply get the gas to market is also lacking.

Further south, where Burgos opens into the shale-rich Tampico-Misantla basin, security is another concern. The government has been trying to attract investors to the region, but there has been a growing prevalence of drug cartels, leading to a rise in murders, extortion of businesses and oil theft from Pemex, the national oil company.

"The government and Pemex have not been able to counteract organised crime groups as you would expect," says Dwight Dyer, a Mexico City-based analyst at Control Risks, a security consultancy. "It will take a lot of effort to turn this back."

Over time, Mexico could follow the example of Argentina, where shale resources from its huge Vaca Muerta formation in the Neuquén basin are being developed to help offset domestic gas shortages.

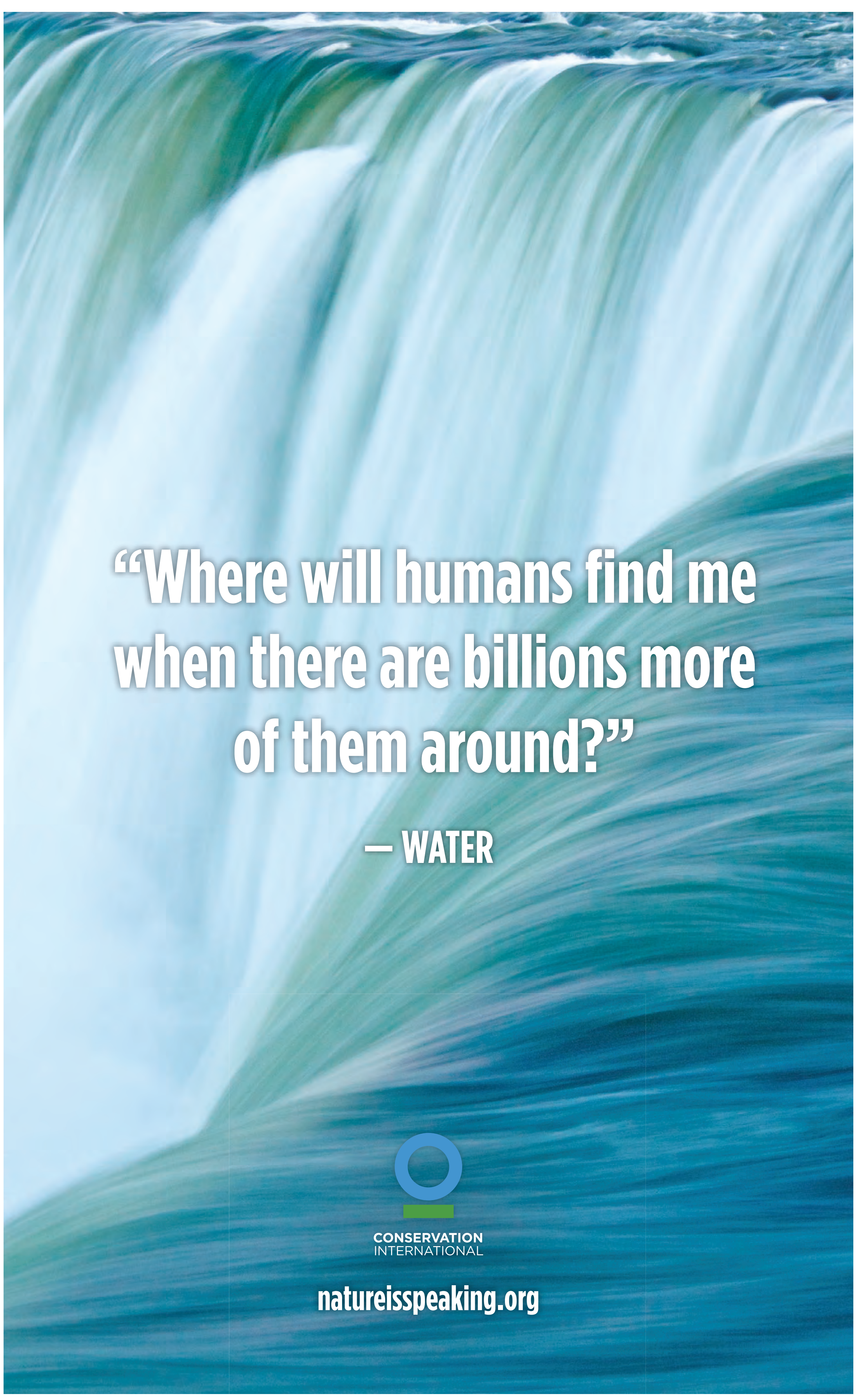
The discovery of natural gas liquid-rich shales could provide another feedstock source needed for petrochemicals and products derived from petrochemicals such as plastics and textiles. They are running a trade deficit in Mexico of almost $11bn in the first eight months of 2014, says the Bank of Mexico.

> 'At today's [Henry Hub] price there is very little incentive to develop Mexican shale gas'

But Mexico's reserves are considered trickier to get at than those in Vaca Muerta, where the shale is thicker than most formations, making it possible to extract more from a single drilling site. Moreover, YPF, the Argentine state-owned oil company, has years of experience exploiting Vaca Muerta with foreign partners, and the infrastructure and supply chain in the Neuquén basin are well developed.

Mexico is less advanced. While more than 200 unconventional wells have been drilled in Argentina, Pemex has drilled 20, according to a June 2014 report by Accenture, the consultancy.

"Mexican shale development is in its infancy at best," says Ivan Cima of Wood MacKenzie, the global energy consultancy . From the shape of things, it could be for some time to come.



Rapid returns required from the reform

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Despite its own reserves, Mexico has had to rely on cheap US gas imports. And, because pipelines are inadequate, it has to generate a fifth of its electricity with costly and polluting fuel oil. The reform's first results will come, ironically, not from more abundant Mexican gas, but from increased imports from the US, once infrastructure is improved.

But one thing is clear: the government has staked its bets on energy reform to power Mexico out of a three-decades-long rut of low economic growth.

The ultimate reward, in a country where 53m people, or just under half the population, live in poverty, will be greater wealth to narrow gulfs between haves and have-nots.

The country has set up a sovereign wealth fund, administered by the central bank, to manage the influx of oil riches: part will go to education, infrastructure and pensions; the rest will be stashed away for a rainy day.

The reform has sparked most excitement in the oil and gas sector, but electricity reforms promise to deliver faster results to ordinary Mexicans. Power generation will be liberalised, leading – the government has promised – to lower bills within a couple of years. Customers also face the prospect of a new world of choice at the petrol pump.

All eyes are now on the government, as it completes the fine print of the new energy framework and the tenders that will begin next year, starting with shallow-water fields, then extra-heavy oil, unconventional assets, onshore and finally offshore prospects.

Even with falling international oil prices, there is expected to be a rush to the starting line.

Rodrigo Medina, governor of the northern state of Nuevo León, says he has had "serious conversations" with more than 110 companies keen to set up shop in Monterrey, Mexico's business capital. "We are going to be the Houston of Mexico," he smiles.

Pemex and the state electricity company CFE have new boards of directors and clear new mandates to ditch their old bureaucratic ways and be run with the goal of maximising value as "state productive enterprises".

The National Hydrocarbons Commission (CNH), meanwhile, has been expanding its staff, as it prepares for the challenge of running the bidding rounds. It is aware of the monumental task it faces. "You can take it for granted that our main purpose is to boost competition," Juan Carlos Zepeda, its president, reassures investors.

Mexico has won praise from the industry for learning from other countries – including not imposing an overly strict national content regime, as Brazil did.

The CNH wants clarity, a level playing field and, above all, predictability, so as to foster confidence among investors. "We're not running Google," says Mr Zepeda. "We are not pushing our people to be creative."

In all, Mexico aims to tender 169 blocks in the first round of auctions next year, though some may be offered as package deals. It is a colossal challenge for the regulators and the government, which must swiftly set up data rooms to make all Pemex's seismic and geological data available to potential bidders.

Alfredo Marti, managing director of Riverstone, one of the largest energy-focused private equity funds, has praised the government's meticulousness – indeed, his fund has invested in Sierra Oil & Gas. However, he cautions: "There might be bottlenecks in the regulatory and permitting process . . . There's always the risk of unintended imperfections that need to be fine-tuned over time. First and second licensing rounds are never perfect."

84%	53m
Extra that Mexican manufacturers pay for electricity compared with US	Number of people in Mexico estimated to be living in poverty

Companies themselves are also starting to crunch the numbers. Mexico has made it clear its awards – for the new-style licences, production-sharing or profit-sharing contracts – will be based on who submits the best offer.

But even as Mark Albers, ExxonMobil senior vice-president, highlights, the chance of striking oil in the deep waters of the Gulf of Mexico is only one in three, meaning companies that pitch their offers too high may be out of pocket if their wells are among the two-thirds that typically come up dry.

In addition, if oil price falls continue, Mexico's shale prospects may look unattractive. Melissa Stark, global managing director of the new energy business at Accenture, the consultancy, reckons companies will need prices above $80 to make Mexican shale profitable in the first instance.

"If shale is going to get developed, you're going to need a conscious effort by the Mexican government and specific incentives," she says.

But even aside from costly deepwater drilling or challenging shale development, many avenues are open to Mexico. Enhanced oil recovery techniques can squeeze more from declining fields. Horizontal drilling, which is little used in Mexico, can also be used to get more out of conventional fields.

The country also abounds in oil installations that were sealed up decades ago when oil prices were $20 or less, according to one lawyer who advises a Mexican energy company. In one instance, he says, "the pipes had been cut off and when the caps were unscrewed, oil came gushing out – and Pemex engineers say the country is full of these".

Private companies will be allowed to form joint ventures with Pemex or they can invest alone or with other national or international partners. Mexican conglomerates, such as telecoms tycoon Carlos Slim's Grupo Carso and Grupo México, a miner, are keen to enter and several banks have announced energy funds.

One of the biggest hurdles will be finding the right talent. "Just like in the US, Mexico does not create enough petroleum engineering graduates to meet demand," says Bruce Peterson, Houston office managing director at headhunter Korn Ferry.

Pedro Joaquín Coldwell, Mexico's energy minister, sees a "before and after the energy reform" in terms of the country's fortunes.

Things are off to a flying start, but the billion-dollar question remains: how fast will the reforms deliver? "We need to get on with it," urges Mr Iskander. "Mexico requires speed."

Investment influx promises cheaper and greener power

Electricity Plant upgrades and renewables will be focal points of spending, reports *Jude Webber*

Winds of change: high targets have been set for renewables
Jamie Carstairs/Alamy

Enrique Ochoa, the head of Mexico's state electricity company, CFE, is a busy man. "My diary is full of meetings with national and international companies that want to come and open up here – I have at least 10 a week," he says. "I'm seeing huge appetite, from Europeans, Americans, Asians and many Mexican companies."

The prospect of Mexico's oil reform turning North America into a new Middle East has galvanised public attention, but it is the quieter, but no less far-reaching, reform of the electricity system that could bring faster change in the form of cheaper tariffs and better, more sustainable supply.

For the past two decades, Mexico has given private companies the limited opportunity to generate power – allowing groups such as Cemex, the cement producer, or Walmex, the Mexican arm of US supermarket group Walmart, to generate power, including wind or solar, for their own needs. Now, they will be allowed to sell that power to third parties, as will electricity companies that are already in, or about to enter, the newly liberalised market.

"Mexico is going to be one of our main investment destinations in the next few years, with up to $5bn through to 2018 in new combined-cycle gas turbine plants and wind farms," says Ignacio Galán, chairman and chief executive of Spain's Iberdrola, the largest private generator in Mexico.

"As a result, we will be producing more energy in Mexico than in any other country where we have operations," Mr Galán says. Iberdrola says it already illuminates one in seven of the country's lightbulbs.

Cheaper electricity is vital to boosting Mexico's industrial competitiveness, but there is one big problem: because Mexico is not producing enough gas to meet its own needs, and the existing network to import gas from the US is full to capacity, CFE has had to turn to costlier and less environmentally-friendly fuels.

A fifth of the country's power is generated using fuel oil, which is four times more expensive than natural gas and 68 times more polluting.

That has led to electricity bills that are, on average, 25 per cent higher than in the US, although Mr Ochoa says when subsidies are stripped out, the average tariff is 75 per cent higher. Industrial users pay 84 per cent more for their power and commercial users considerably more than double than in the US.

It has also sent CFE's profits plunging. Despite record sales in 2013, the company racked up a 37.6bn peso ($2.8bn) loss last year.

That left it ill-equipped to tackle another pressing problem: Mexico loses some 15 per cent of its electricity because of creaking infrastructure and theft, in particular the practice of illegal electricity connections known as *diablitos* (little devils). That is more than double the OECD average of 6 per cent and five times higher than in South Korea.

Under the reform, the state retains control of transmission and distribution, but there will be an independent operator for the whole grid, known as Cenace.

The reform has already opened the door to $7.7bn of investment in a range of infrastructure projects, including gas pipelines that will boost the size of Mexico's network by 34 per cent. Texas, which is a third of the size of Mexico, has a gas pipeline network that is nine times larger, according to Mr Ochoa.

Seven power-generating plants are being upgraded, at a cost of $200m, to run on natural gas rather than fuel oil. That promises big savings: it costs 2,000 pesos per megawatt hour to generate with fuel oil, compared with 780 pesos at converted plants and 478 pesos at the next generation of state-of-the-art combined-cycle plants, Mr Ochoa says.

"This is a reform in favour of competitiveness, sustainable supply and sustainable prices," he stresses.

The changes also offer a big opportunity for Pemex, the state oil company, which wants to switch from being Mexico's biggest customer of electricity to its second-largest producer. Emilio Lozoya, Pemex's chief executive, wants to harness the heat and vapour from its operations to fuel a new business line, in which it expects to generate about 10 per cent of the nation's supply.

Mexico has already set ambitious targets for renewable energy, stipulating that green power must make up 35 per cent of the country's generation by 2026.

> Mexico has stipulated green power must make up 35 per cent of the country's generation by 2026

"There are thousands and thousands of megawatts of wind and solar projects that at some point in time will be able to be constructed," says Michael Till, co-head of energy at Actis, a private equity firm that has set up the Zuma Energy platform in Mexico.

Zuma has bought a wind farm in the southern state of Oaxaca that will be operated by Spain's Acciona, the biggest renewables producer in Mexico.

Miguel Angel Alonso, the head of Acciona in Mexico, has praised the government for its thoroughness and willingness to engage with the private sector. "It is generating more documentation than we can digest and comment on," he laughs.

Acciona, which generates about a quarter of Mexico's wind power, sees the reform as a great opportunity. "We are very keen to grow . . . We think growth of 30 per cent is feasible for us," Mr Alonso says.

A way opens to accelerated growth and modernisation

VIEWPOINT

Diana Villiers Negroponte

In the pipeline: small businesses will have a bigger role in the energy sector

Mexico's opening of its energy sector to private participation will probably lead to a rapid acceleration in growth of manufacturing and services.

Until this year, there has been little space for private initiative because of the dominance of Pemex, the state-owned oil company, of oil, gas and petrochemicals and the monopoly by CFE, the federal electricity commission, over power generation and transmission. The reforms allow private companies to bid competitively on contracts for a wide range of energy-related products and services.

Mexican companies that foresee profitable markets in these sectors are creating joint ventures and seeking access to local and international capital. Bank of America expects an increase of $20bn in foreign direct investment in 2015 alone.

Such joint ventures are having a broad impact on the Mexican economy. Braskem of Brazil and Mexico's Idesa petrochemicals group have teamed up to build the Etileno XXI plant in Coatzacoalcos, in the eastern state of Veracruz. The facility will produce ethane and polyethylene, used to make carpets, paint and nappies.

It will help reduce petrochemical imports (the country imports 66 per cent of its needs) and create 14,000 jobs during construction. Etileno XXI will employ 3,000 people when it is in operation. It will be fed by natural gas, which private companies can distribute.

Foreign and Mexican investors have begun the construction of the Los Ramones I and II pipelines that connect US suppliers of natural gas to Mexican markets. The reforms create a secondary market in pipeline capacity and, by cutting red tape, allow gas pipelines and electricity transmission lines to be built faster.

Cheaper natural gas and improved electricity supply mean expanded manufacturing opportunities. The Tula refinery in Hidalgo is among key areas of the energy industry using Emerson wireless devices as heat sensors. General Electric's plants in Nuevo León manufacture electrical turbines, transformers and valves for the oil industry. Siemens of Germany is looking to extend its plants in Guadalajara. Philips, from the Netherlands, intends to expand its operations in Monterrey and Tijuana.

These companies foresee the end of the days when Pemex would close what its critics saw as sweetheart deals for all manner of supplies, from pipes to wrenches and security services. New practices supervised by neutral regulators mean subcontractors can compete for such contracts.

The reform requires a 25 per cent national component, rising to 35 per cent by 2025. The government will publish a catalogue of national opportunities and expect main contractors to increase national content by 1 percentage point a year up to the 35 per cent ceiling.

> One can surely expect an explosion of fresh ideas and entrepreneurial initiatives

This provides an opportunity for smaller Mexican SMEs to participate in the energy opening and boost productivity. As subcontractors, they will have to bring themselves up to international standards and hire qualified personnel.

Mexican SMEs flourished in the auto-parts industry under the North American Free Trade Agreement; energy reform gives many opportunities to SMEs to participate in manufacturing supply chains.

It will not all be plain sailing. Critical for SME success will be their access to credit, hopefully via rules passed in 2013 that require more Mexican bank lending to SMEs.

To address Mexico's shortage of engineers and skilled labour, many city and state governments are investing more in education. León in Guanajuato is building a campus for the national polytechnic institute; Querétaro state has created a university to train technicians for the local aerospace industry, in which Canada's Bombardier is a leader; General Electric trains advanced engineers in Querétaro. Pemex is building engineer training facilities at its Burgos gas processing plant in Reynosa, Tamaulipas. Monterrey's technology and higher education institute is helping Pemex develop its own university.

All hopes and expectations must be balanced against Mexico's security and corruption problems. Important in the fight will be transparent bidding rounds for contractual services, a level playing field for private and other operators in dealings with Pemex and, most important of all, the continued strengthening of the rule of law.

The opportunities for Mexico are significant. Among the consequences of the reform, one can surely expect an explosion of fresh ideas and entrepreneurial initiatives and growing demands for qualified engineers.

My bet is that Mexico's younger entrepreneurs will seize their opportunities, compete to participate and, in so doing, help modernise their country.

Diana Villiers Negroponte is a non-resident senior fellow at the Brookings Institution, Washington

Opening of the market will attract newcomers


Into the mix: a Halliburton lab in Houston. The company expects a revival in fortunes in Mexico — Aaron M Sprecher/Bloomberg

Service providers

Companies want a piece of the action, but the oil price will limit their options, says *Anjli Raval*

Halliburton, the US oilfield services group, reported a tough year in Latin America in its latest quarterly earnings call. Profit margins and activity levels were weaker than expected, largely as a result of operational issues in Mexico. But it is not all looking so downbeat.

"We're . . . excited about the pace of Mexico energy reform and expect to see strong opportunities in shale, mature fields, and deepwater markets in the coming years," says Dave Lesar, chief executive.

Reforms to overhaul Mexico's energy sector, to allow foreign companies and private homegrown ones to participate in the country's oil, gas and power sectors are not just a boon for the world's biggest operators such as Royal Dutch Shell or Chevron.

For oilfield services companies that have been present in Mexico for years, such as Halliburton and Schlumberger the reforms are set to propel activity, as greater levels of exploration and production (E&P) take place in untouched deepwater areas and in the unconventional oil sector.

Halliburton has expertise in North American shale gas extraction and pressure pumping technologies, at the same time as there is increased Mexican focus on unconventional projects.

Baker-Hughes and Weatherford International, too, could bring the technology needed for hydraulic fracturing and horizontal drilling.

Schlumberger's deepwater and subsea technologies push could stand it in good stead as more servicing capabilities are required in the Mexican portion of the Gulf of Mexico.

Deepwater services are the most lucrative, as they are highly intensive, usually have contract lives of more than eight years and allow companies to provide integrated services. As this is the most costly sector to service, margins tend to be healthy and there are only a handful of companies with the technical expertise to do the job well.

Although industry watchers have said some oilfield services providers may look to enter the exploration and production sphere – given their existing relationships with Pemex and knowledge of the region – others have said it is unlikely, as they may not want to compete with their growing customer base.

Despite the opportunity, a shift in strategy for these companies operating in Mexico would mean a change in business model that would entail more risk and greater upfront costs.

Esteban Levin, a managing director of global banking at HSBC Mexico and former chief financial officer at Pemex, says: "These oilfield services providers will likely stick to what they know best, such as drilling or well testing for example. They only stand to gain from Mexico's energy sector opening up.

"There is enough going on. They could just expand their activity base across deepwater, shale, shallow water plays by drawing on existing relationships they have with E&P companies," he says. "If anything, they will likely face more competition from smaller services companies looking to enter the space."

Those companies that may have been deterred by servicing contracts linked with Pemex, or with larger exploration and production companies already working in Mexico, may now enter the fray amid a greater number of midsized E&P companies flocking to the region.

Energy analysts such as Chad Mabry, at MLV & Co, have said companies are already forging relationships and learning about the country's market in preparation for when it does open up.

"Up until now, the US has been Mexico's biggest customer. But because of the shale revolution, these barrels are not headed to the US any more," said Mr Mabry.

"Pemex is protecting its long-term interests by drawing in foreign investment. It hopes to see the same kind of renaissance of its domestic industry that the US has had. Services companies, like E&P companies both big and small want a piece of it."

But one risk remains. If oil prices continue to be weak, it could reduce E&P activity as oil operators are reluctant to undertake capital expenditure on upstream projects, analysts say.

The oilfield services industry is feeling the effect of cost-control pressures from operators that have pulled back on some big projects around the world.

The developing situation is keenly watched by analysts, but some wonder about how the repercussions may affect companies' earnings prospects.

Production set for upturn with end of state monopolies

Petrochemicals

Industry should benefit from restructuring of Pemex's downstream business and cheaper electricity prices, reports *Amy Stillman*

When a long-mooted joint venture between Mexichem and Pemex to develop a vinyl chloride monomer (VCM) plant in eastern Mexico finally got the green light last year, Antonio Carillo knew something had changed.

The chief executive of Mexichem, the Tlalnepantla-based chemicals maker, had been trying to push the deal through with Mexico's slow-moving state oil company for the best part of a decade. He had all but given up when, unexpectedly, it was unanimously passed by the Pemex board of directors – shortly after the new government came to power.

"It has been a big step forward," says Mr Carillo, who attributes the revitalisation of the project, now in a ramp-up phase, to the changes stirring in the country's energy sector. The liberalisation of the sector includes overturning a law that prevented chemical manufacturers from buying from feedstock suppliers other than Pemex.

The reforms could help Mexico reverse a long malaise in its energy value chain as state monopolies have presided over decline. Mexico's chemicals industry association ANIQ estimates that $25bn will be invested in petrochemicals over the next decade, contributing to 3.8% of the gross domestic product, up from 1.4% of the GDP today.

Until now growth has been stunted because Pemex has prioritised its more lucrative upstream business over investing in pipelines, refineries, petrochemicals and natural gas. Pemex supplies only enough raw materials to meet its current contract obligations with chemicals companies such as Mexichem and Braskem-Idesa, a joint venture between Brazil's Braskem and Idesa in Mexico, making it difficult for them to increase production.

The dominance of state utility CFE in the electricity market has also limited competition in power generation that could help serve energy-hungry plants.

According to Mr Carillo, Mexichem's petrochemicals plants in Mexico have been operating on a restricted amount of natural gas for the past three years.

Rising imports of costlier liquefied natural gas (LNG) to compensate for domestic shortages have also raised electricity costs. "In the past 25 years we've lost a lot of petrochemicals to Asia because of high gas prices," says Luis de la Calle, a former Mexican trade official.

Turning round declining natural gas production could take time. Mexico will need to attract private investment in its gas resources. Although the country is rich in shale reserves – and has some of the world's biggest, according to the US Energy Information Administration (EIA) – falling gas prices in North America make it a less attractive development prospect. Mexico also lacks the infrastructure both to extract the gas and bring it to market.

A more immediate change could see higher volumes of cheap US gas being piped into Mexico, helping replace LNG imports and offset shortages. Mexico's pipeline network is almost one-ninth the size of pipeline capacity in Texas, at 11,342km in 2013. But five new gas pipeline projects being auctioned by the CFE to be built by March 2017 will add 1,367km linking Mexico to the US. Pemex's Los Ramones pipeline project from central Mexico to Texas will also bring an additional 1,000km of pipeline to the existing network.

"As soon as the pipelines are built, we foresee a large number of projects mushrooming everywhere in Mexico," says Luis Farías, vice-president of energy at Cemex, the Monterrey-based cement maker. "It is like a huge gasification plan for the country."

Electricity reform is a related improvement, says Mr Farías, who estimates competition from private generators could help reduce industrial electricity prices by 15-25 per cent by 2017.

The planned restructuring of Pemex's downstream and midstream business also promises to open the doors to greater private sector involvement in pipelines and petrochemicals. "Pemex cannot invest in everything; it needs to decide if it wants to be a minority or majority shareholder," says Mr Carillo.

The Mexichem chief reckons the VCM joint venture with Pemex in Veracruz state could be a model for future partnerships.

In January 2013, Mexichem bought a 56 per cent stake in the project for $200m and has since reversed declining output, now on track to reach full capacity by 2016, with annual production of 400,000 tonnes of VCM, the raw material used in plastic pipes.

"Petrochemicals is not something easily carved out from Pemex," says Mr Carillo. "But once it joins with private companies, it has a significant ability to move faster."

'Once Pemex joins with private companies, it has a significant ability to move faster'


Antonio Carillo: doors are open to private sector involvement