Digging deep: geopolitics of shale resources

Owing to recent political events in Ukraine, and indirectly those in the Middle East, concerns have mounted in relation to oil and gas delivery to Europe, with some analysts suggesting that North American shale resources may need to be called upon. However, due to basic economic factors, a more realistic solution would be for the EU and Ukraine to develop their own shale resources but, so far, with the exception of the UK, and to a lesser extent Poland and Spain, no large-scale efforts are being undertaken, finds *Vasili Nicoletopoulos.**

For many, the move towards shale oil and gas recovery in the EU seems obvious since in the US, a boom in this market (*Fig.1*) has transformed the country's annual energy outlook, ending a long decline in oil production, cutting natural gas prices by two thirds from their 2008 peak and encouraging hopes of a sustained recovery in US manufacturing based on cheap energy.

Furthermore, the shift in power generation away from traditional sources like coal has cut greenhouse gas emissions and other associated pollutants. The US can now speculate about a future of self-reliance in energy, something that might have once seemed an impossible feat.

"The country is producing over 10% of the world's crude oil supply. This landmark is testament to how responsible shale development is changing not only the US energy landscape, but the global outlook as well. The US and Canada are the only major producers of tight oil in the world," the US Energy Information Administration (EIA) has reported.

The US shale revolution has been a story of technological progress. As in any such period of rapid advancement, it makes a big difference whether or not you have the right technology as well as market position, including the right access to resources through lease agreements.

However, the standard-bearers of the revolution are not always the ones that benefit the most. By creating additional supply, the US shale boom knocked away the support under North American natural gas prices; hurting the profitability of companies that made most of their income from selling gas. On the other hand, companies that moved more quickly into oil have done much better.

The recent rapid growth in the production of unconventional oil and gas (shale gas and tight oil) in the US has also had global implications, in particular a significant divergence of natural gas prices between the US and major economic trading partners, such as the EU, Japan and China.

Furthermore, the unconventional oil and gas revolution has had an uneven impact on US consumer prices. Gas prices for residential consumers have fallen from a peak pre-2008, while industrial and power sector gas prices fell by about 50% from 2008 highs. Residential electricity prices have continued to rise, while industrial electricity prices have risen at a lower rate. For households, the effects of the unconventional oil and gas revolution have been largely outweighed by continued increases in electricity prices, and in particular, gasoline prices.

The dramatic decline of US natural gas prices does not appear sustainable in the longer term, however. Prices fell to their lowest point of $1.95/MMbtu at the beginning of 2012, before climbing to $4.69/MMbtu in January 2014 and falling to around $4/MMbtu at the time of writing.

This price collapse was due to a number of short-term factors including limits on export capacities; limited elasticity of natural gas consumption in the residential, industry and electricity sectors; and the production of highly valuable liquid fuels associated with natural gas production. Longer-term expectations of production costs for shale are situated closer to $6-10/MMbtu.

Important news from the last few months (*Table 2*) illustrates the national as well as international importance of US shale development, but also public acceptance concerns.

Foreign investment attracted by US shale

One of the most spectacular repercussions of US shale development has been the attraction of foreign investment in the country as investors seek to take advantage of this relatively cheap energy source.

Figure 1: US shale gas plays, lower 48 states

Source: API

On 10 April 2013, SABIC of Saudi Arabia announced plans to exploit the US shale boom and capitalise on cheap US feedstock prices by developing at least one new cracker in the country, with a view to investing in one or more projects utilising ethane derived from shale gas as a feedstock.

The move is a reflection of international attention garnered by US shale resources, even from market players based in oil-rich regions such as Saudi Arabia, where feedstock costs are relatively low compared to regions such as Asia and Europe. SABIC simultaneously announced the signing of a research agreement with MIT on new processes for production from unconventional feedstocks, such as shale gas.

One year later, Royal Dutch Shell and the China National Petroleum Corp. (CNPC) signed a deal to boost cooperation in sectors like deep sea exploration as well as liquefied natural gas (LNG) and unconventional gas sources, like shale.

Shell hoped to benefit from the operational and technological experience gained during the development of shale gas in North America, while CNPC holds the country's premium oil and gas acreage.

Later, in May 2014, Mitsubishi Corp., Mitsui & Co., Itochu Corp. and other Japanese trading houses said they would push on with investments in North American shale oil and gas fields, despite more than $600m in write-downs in the sector owing to low gas prices and reduced reserve estimates over the last two years. The comments from the Japanese executives are a vote of confidence in the long-term outlook for unconventional drilling in the US and Canada.

Are US exports likely?

Europe buys almost 30% of its natural gas from Russia. In light of the recent and on-going political events in Ukraine, the question of whether the US should export shale oil and gas to Europe becomes critical, even though nobody should underestimate the added costs of transport and, in the case of gas, pressurising at the loading terminal and de-pressurising at unloading. In any case, US natural gas exports cannot automatically replace Russian gas owing to the time it would take for US export terminals to be built.

"Instead, American gas will flow mainly to Asia (…) The most useful thing that Europe could import is not American gas itself but the open economic model that has enabled the US natural gas industry to thrive," suggested a recent article in the *Financial Times*.

On 18 July this year, oilfield service provider Schlumberger Ltd, which drills with Rosneft, Russia's largest oil producer, on the island of Sakhalin, said there was no "real impact" on its business in Russia, two days after the US slapped sanctions on Rosneft and Novatek, the country's second-largest gas producer, over Moscow's role in the Ukraine crisis. Schlumberger had signed an agreement with Russia and Gazprom Neft earlier in 2014 to collaborate on technology for the planned Bazhenov shale development project in the Priobskoe oilfield in Western Siberia.

A few days later, US President, Barack Obama immediately followed a European action by announcing a new round of US measures that he said will affect "key sectors of the Russian economy."

President Obama also expanded the list of US-sanctioned banks and defence companies. The US and Europe banned exports of technology for use in Russian deepwater, Arctic and shale oil exploration. Later on, it was specified that actions will be directed against Russian oil, not gas.

Meanwhile, the Louisiana Cameron Parish terminal obtained a permit to export natural gas. More significantly, the Commerce Department opened the door to more US oil exports as long as the crude is lightly processed (in so-called condensate splitters that turn a super-light oil called condensate into products such as naphtha, used as a petrochemical feedstock), tempering the impact of a law that has banned most overseas petroleum shipments for the past four decades. The department widened its definition of what had traditionally been considered a refined product, eligible for shipping to customers abroad. That means more of the oil being pumped from US shale formations may be eligible for export after being run through small-scale processing units.

Canada

It was said earlier in this report that the US and Canada are the only major producers of tight oil in the world. Shale gas development in Canada is more recent and has been proceeding more slowly than it has in the US. Until now, development has been concentrated in British Columbia and, to a lesser extent, Alberta. Shale gas resources are also known to exist in Quebec, New Brunswick, and Nova Scotia, and are likely to be found in other regions.

In July 2014, Northern Rockies Regional Council in British Columbia sent a letter to federal and provincial governments regarding hydraulic fracturing (fracking), where it said that, "hydraulic fracturing is currently the only viable method of accessing shale gas, which is essential for the economic prosperity and energy security of our community and all of British Columbia."

Mexico

The Ministry of Energy in Mexico has estimated that a $100bn investment is needed over the next 10 years to develop Mexican shale resources. Some sources have mentioned figures closer to $250bn.

Smaller companies will probably dominate the development of Mexico's shale gas deposits as Petroleos Mexicanos (Pemex) focuses on shallow water and onshore projects, according to the independent director of one of the state-owned company's units. While Pemex has only invested approximately $250m in Mexico shale gas exploration and production, foreign companies will not drill new wells or bring the required investment until clarity from the Mexico energy reform process takes place later this year, or during the first quarter of 2015.

Even once the Mexican government clarifies how foreign investment will be allowed to take ownership of shale gas assets in the country, the exploration process will not be easy.

News headlines May-August 2014

Headline	Date published (2014)
Exxon and Chevron losing out in US shale boom, while small companies win	8 May
EPA eyes new disclosure rules for fracking chemicals	9 May
US steel imports surge nearly 26 pct in Q1 '14 on shale boom	13 May
U.S. crude imports drop to 17-year low as shale bolsters output	21 May
Santa Cruz becomes first California county to ban fracking	21 May
California Senate rejects for the second year in a row a bill to halt fracking	29 May
Construction commences on Marcellus shale power plant	3 June
Texas oil production set to overtake Iraq	2 July
Cuomo ponders NY drilling as fracking bans reach top court	3 June
New York Court rules that towns can prohibit fracking	1 July
Baker Hughes rig count shows fracking activity, oil and gas exploration up	9 July
Chevron acknowledges just how much water is needed for oil shale development	11 July
Chevron acknowledges just how much water is needed for oil shale development	11 July
North Carolina lifts fracking moratorium	14 July
U.S. June crude oil exports highest since 1957, passing Ecuador	6 August

Infrastructure is needed for the oil and gas industry to flourish in the northern part of Mexico.

A package of nine initiatives, including eight new laws and modifications to 12 others on fossil fuels, water, electricity and oil funds, came before the senate in the last week of June, after being debated by the Energy Commission.

The new legal framework for Mexico's oil industry has not placed controls on the use of harmful chemicals in the extraction of unconventional fossil fuels, and environmentalists and experts fear their consumption will increase in an industry that is opening up to private capital.

The energy reform, "will exacerbate the use of chemicals. The new laws do not address this problem. We need to know what is used, because otherwise we cannot know the consequences. That's why we want a ban on hydraulic fracturing," activist Claudia Campero, of Canada's Blue Planet Project, told *IPS*.

In July 2014, it was announced that shale gas development in Mexico will involve the Japanese government, with plans to begin importing cheap natural gas into Japan in the mid-2020s. Japan's Prime Minister, Shinzō Abe, and Mexico's President, Enrique Peña Nieto, were expected to reach an agreement to strengthen bilateral energy cooperation.

Mexico is home to the world's sixth largest shale gas reserves and the 18th largest petroleum reserves.

Historically, state-owned companies have held a monopoly on oil and natural gas businesses in Mexico, however, in the wake of a drop in production due to financial difficulties, the country revisited its constitution at the end of last year to allow overseas companies to participate in energy development. Prime Minister Abe reportedly hopes to take on the role of Japan's top salesperson in order to seize that opportunity and make Japan the first foreign country to join Mexico's shale gas development project. In addition, the Japan Oil, Gas and Metals National Corp. and Pemex are to sign a memorandum on cooperation on technical development in gas businesses and human resource development, according to sources.

Beyond North America

"The unconventional supply revolution that has redrawn the global oil map will likely expand beyond North America before the end of the decade," the International Energy Agency (IEA) reported in its annual five-year oil market outlook, released in June 2014.

The Medium-Term Oil Market Report 2014 also sees global oil demand growth slowing, stating: "OPEC capacity growth is facing headwinds, and growing regional imbalances in gasoline and diesel markets (…) and that while no single country outside the US offers the unique mix of above-and-below-ground attributes that made the shale and light, tight oil (LTO) boom possible, several countries will seek to replicate the US success story."

The report projects that by 2019, tight oil supply outside the US could reach 650,000 barrels per day (bpd), including 390,000 bpd from Canada, 100,000 bpd from Russia and 90,000 bpd from Argentina. US LTO output is forecast to roughly double from 2013 levels to 5m bpd by 2019.

Ageing fields are an issue for almost all OPEC producers, but above-ground woes have escalated; security concerns are a growing issue for several producers and investment risks have deterred some international oil companies.

Mark Zdunczyk

As hydraulic fracturing activities ramp up around the globe, the demand for oilfield minerals, like frac sand, is set to rise.

The IEA's report notes that as much as three-fifths of OPEC's expected growth in capacity by 2019 is set to come from Iraq. The projected addition of 1.28m bpd to Iraqi production by 2019, a conservative forecast made before the launch at the beginning of an August military campaign by insurgents that subsequently claimed several key cities in northern and central Iraq, faces a considerable downside risk.

The annual report sees global demand rising by 1.3% pa to 99.1m bpd in 2019. Yet the report also expects the market to hit an inflexion point, after which demand growth may start to decelerate due to high oil prices, environmental concerns and cheaper fuel alternatives. This will lead to fuel-switching away from oil, as well as overall fuel savings. In short, while peak demand for oil, other than in mature economies, may still be years away, and while there are regional differences, peak oil demand growth for the market as a whole is already in sight.

Given planned refinery construction and the growth in supply that bypasses the refining sector, such as natural gas liquids (NGLs) and biofuels, the refining industry faces a new cycle of weak margins and a glut of light distillates like gasoline and naphtha as a by-product of needed diesel and jet fuel.

Geopolitics

Russia is known to have vast supplies of natural gas. In 2006 and 2009, Gazprom, the world's largest natural gas extractor, cut off supplies to Ukraine, for the second time, and this created shortages in Europe. In 2010, it reduced supplies to Belarus, and last autumn Russia threatened Moldovans with the same if they did not abandon plans to sign a free-trade accord with the EU.

After the crises of 2006 and 2009, Europe increased imports from Norway and Qatar. It built new facilities for receiving LNG and upgraded storage capacity so that supplies could be stockpiled in case of a cut-off, as well as importing more coal. Pipeline connections within the EU were improved, making shortages easier to alleviate. The Crimea crisis will give new impetus to these efforts.

In April 2014, Russia filed a dispute with World Trade Organization (WTO) against the EU, which could further sour that relationship, risk the security of Europe's supplies of gas and oilfield minerals from Russia and curtail Russia's own imports of these materials.

According to Russia, the EU's Third Energy Package is inconsistent with obligations it signed up to in the General Agreement on Trade in Services (GATS), which is a treaty to remove trade barriers among WTO members.

As **IM** has pointed out, as well as being a major supplier of gas to Europe, Russia is also

an important source of oilfield minerals such as bauxite-based ceramic proppants for fracking from companies like JSC Borovichi Refractories, supplies of which are crucial to the development of Europe's shale gas industry.

Heightened tensions could also affect the distribution of Russian-produced bentonite, a clay used for conventional drilling muds in oil and gas drilling.

Crimean hydrocarbons

In taking Crimea, Russia gained a sea of fuel reserves by extending its maritime boundaries, quietly giving it dominion over vast oil and gas reserves while dealing a blow to Ukraine's hopes for energy independence. Russia did so under an international accord that gives nations sovereignty over areas up to 230 miles from their shorelines. It had tried, unsuccessfully, to gain access to energy resources in the same territory in a pact with Ukraine less than two years earlier.

In Moscow, a spokesman for President Vladimir Putin said there was "no connection" between the annexation and energy resources, adding that Russia did not even care about oil and gas.

"Compared to all the potential Russia has got, there was no interest there," the spokesman, Dmitry Peskov, said.

Exxon Mobil, Royal Dutch Shell and other major oil companies have already explored the Black Sea, and some petroleum analysts say its potential may rival that of the North Sea. William B. F. Ryan, a marine geologist at the Lamont-Doherty Earth Observatory of Columbia University, said that Russia's Black Sea acquisition gave it what are potentially "the best" of that body's deep oil reserves.

In April 2014, France's Total obtained rights to explore three hard-to-recover Russian shale oil areas, joining other majors, ExxonMobil, Statoil and Royal Dutch Shell, to develop the energy source, which is a key driver in Moscow's efforts to at least maintain its oil output at approximately 10m bpd.

Interestingly, a month later, Russia's Lukoil announced plans to drill for tight gas in Saudi Arabia in early 2015 after a decade-long hunt for conventional deposits that had proved futile. The world's top oil exporting nation invited international oil companies (IOCs), such as Lukoil, Royal Dutch Shell and Sinopec, to find and pump gas in its southeast Empty Quarter, known as Rub al Khali, more than 10 years ago. Natural gas would help Saudi Arabia cover subsidised domestic power demand so it can save oil for more lucrative exports.

On 25 May this year, BP confirmed its commitment to Russia after signing a shale oil deal with state-owned oil company Rosneft, despite US government-led sanctions against Moscow and the company's CEO. The contract was signed at the St Petersburg International Economic Forum by Rosneft boss, Igor Sechin, as President Putin looked on.

In June, BP's CEO said in Moscow that, "Sanctions have had no impact on working in Russia yet." Russia faces a dilemma to maintain output from Soviet-era oil fields and develop Arctic and shale reserves; it still needs Exxon Mobil, Halliburton and BP to provide modern drilling and production gear, as well as techniques such as fracking.

A revealing interview by Konstantin Simonov, general director of the Russian National Security Fund in the Greek newspaper *Kathimerini* on 27 July 2014 summarises Moscow's point of view:

"This winter there is the possibility of disruption of the flow of natural gas due to Ukraine – and again it is Russia that will be blamed (…) I do not support that Russian policies are entirely correct – we could have been more flexible with prices and given even higher rebates, especially to SE European countries as this is where Brussels think we are acting monopolistically (…) However, the EU has set the strategic goal of reducing the role of Russia and is obstructing the South Stream pipeline that would bypass the Ukraine. Furthermore, the EU had hopes of developing shale gas in Europe but later on it decided this was impossible. Instead of recognising their mistake, EU bureaucrats now base their hopes on shale gas imports from the US, again with the aim of blocking Russia – i.e. with political but uneconomic objectives."

Ukraine

Ukraine has possibly the biggest shale potential on European soil, as shown in *Fig.2*. According to Robert Bensh, an energy and energy security expert who has worked in Ukraine for over 13 years, "With Crimea, Ukraine loses some prospective offshore oil and gas territory in the Black Sea, but it does not lose any shale. All the shale is in Ukraine's east and west."

In June 2014, Royal Dutch Shell announced it has halted drilling for shale gas in eastern Ukraine to protect its personnel from clashes between pro-Russian separatists and the Ukrainian army. "Shell is taking a 'time-out' on exploration work after drilling two wells since the Hague-based explorer signed a production-sharing agreement last year," the company's chief financial officer, Simon Henry, said.

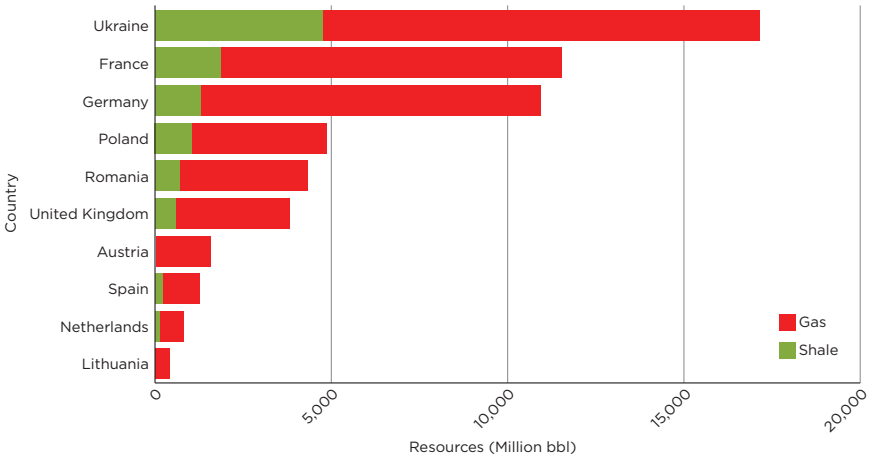
Both Shell and Chevron signed production-sharing agreements with the previous Ukrainian government, headed by ex-President Viktor Yanukovych, promising to spend hundreds of millions of dollars on shale and tight-gas exploration.

European shale potential

Even though direct extraction of oil and gas from the source rock is currently only actively developed in America [US, Canada and Argentina], European nations have the geological capabilities to develop shale resources too. Rystad Energy has identified more than 40 prospective shale formations within 20+ basins in Europe, which fulfil the early geologic requirements for shale development.

Some shale development efforts have already been reported in Poland, with limited results. Meanwhile, exploration plans have been reported in the UK and Ukraine. Rystad Energy has identified 40+ prospective shale formations in Europe that satisfy early geologic requirements for shale development. *Fig.2* shows economically recoverable shale resources

Figure 2: 10 most promising shale holder countries in Europe. Economically recoverable shale resources, by gas and liquids



Source: Rystad Energy

for the 10 most promising shale holder countries in Europe, split by gas and liquids (including light oil and NGL).

The EU has delegated public policy decisions regarding fracking to member-states. There is a moratorium in France and Bulgaria and parts of Spain, as well as considerable difficulties in Germany. The German Federal Environment Ministry and the Federal Ministry of Economics have agreed on common core principles for the regulation of fracking, the position of the ministries being that fracking for shale and coalbed methane will not be allowed for economic purposes in the foreseeable future.

The UK

The UK government has announced it is to shorten permitting times for shale gas drilling sites from 13 to two weeks, effective later this year. The move is the latest in a number of steps recently taken by UK authorities to promote domestic shale gas exploration.

"The [UK] government is committed to exploring the potential of shale gas to create growth, jobs and energy security," a Department of Energy and Climate Change spokesperson told **IM**.

More importantly, in a speech setting out the government's legislative plans for the next year, Queen Elizabeth II said a bill would be proposed to "enhance the UK's energy independence and security by opening up access to shale and geothermal sites."

Today, companies planning to drill onshore need to obtain consent from every landowner whose property a well may pass under. The government said the new law will remove the need for this permission. Drilling for shale often involves horizontal wells that run for hundreds of meters and can pass under several different properties.

Lastly, on 28 July, the British government published details of the bidding processes for onshore oil and gas licences, referring to shale gas as a central instrument for its energy strategy.

"Unlocking shale gas in Britain has the potential to provide us with greater energy security, jobs and growth. We must act carefully, minimising risks, to explore how much of our large resource can be recovered to give the UK a new home-grown source of energy. As one of the cleanest fossil fuels, shale gas can be a key part of the UK's answer to climate change and a bridge to a much greener future," Business and Energy Minister, Matthew Hancock, commented.

The government has also published online planning guidance, a regulatory roadmap and an illustration of onshore licences. More than half of the country will be open for bids. In the words of the *Guardian*: "Fracking push gets go-ahead across UK as ministers tighten safeguards. Drilling will be allowed in national parks in 'exceptional circumstances' but ministers retain power to veto plans."

Poland

On 11 June 2014, the lower House of Parliament in Poland passed the hydrocarbons bill, facilitating exploration and extraction of unconventional resources by introducing a single exploration and extraction permit.

"A single permit for exploration and extraction will replace three separate permits required presently," the government's press office said when the bill was approved by the cabinet in March 2014.

As a rule, permits will be granted for the period of 10-30 years. Other solutions include facilitating the procedure of granting environmental permits and limiting documentation requirements.

In the words of legal firm Baker McKenzie, "Both Poland's infrastructure and public opinion largely support the country's development of its shale resources. However, its shale industry is still at an exploratory, pre-commercial phase with shale gas operations slowing following the discontinuance of some international oil companies' shale explorations in Poland. Possible investors in Poland's shale resources are carefully watching the government's draft law on shale gas exploration and extraction."

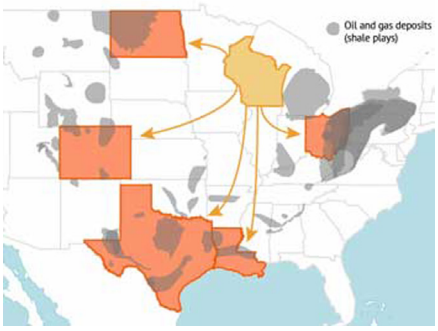
As for individual companies, in the spring of this year, Chevron Polska and Poland's PGNiG signed an agreement to explore shale gas together in the south-east of the country. On the contrary, a few days later, France's Total had not renewed its only shale gas exploration licence in the country, highlighting the problems Warsaw faces in reducing its reliance on Russian energy. The company said that despite the presence of gas, it had concluded the area it was exploring in eastern Poland near the Ukrainian border was not economically viable. In a potential turnaround, energy firm San Leon hailed the first successful shale test in Poland in January and said the use of ceramic proppants was vital to achieving it.

Spain

Spain is Europe's fifth-largest energy consumer and has practically no production of liquid fuels and natural gas. This explains why Spain has silently crept up alongside Poland and the UK as one of the EU Member States open to shale gas exploration.

The central government, led by Prime Minister Mariano Rajoy, has repeatedly stressed its support for shale gas development as a way to spur growth and job creation in a challenging economic environment. According to the Spanish Oil & Gas Association, ACIEP, there are currently about 70 exploration permits (for different types of hydrocarbons) in force and a further 75 awaiting authorisation. The number of permits requested and granted has gone up by 80% in the last five years.

Figure 3: Wisconsin frac sand destinations



Source: Rice Lake Online

In March 2013, Gessal Consultants undertook a comprehensive preliminary evaluation of prospective conventional and unconventional hydrocarbons; 2bn barrels of oil and 2.5bn cubic metres of natural gas of which 80% could be found in shale rock. Most shale gas reserves are located in the Basque-Cantabrian basin in the north of Spain, namely the provinces of Alava in the Basque Country, Burgos in Castilla y Leon and the autonomous community of Cantabria.

A year later, Deloitte published the results of another study, this time on the economic impact of hydrocarbons in Spain. The research, commissioned by ACIEP, and based on the estimates outlined by Gessal, assesses the impact of the exploration and development of conventional and unconventional hydrocarbons, including shale gas, on gross domestic product, job creation and imports and exports. Among other findings, the report highlights that, under the baseline scenario, the exploitation of natural gas could allow Spain to become completely independent of gas imports by 2030 and an exporter of natural gas until 2050.

The findings of both reports need to be verified on the ground through exploratory drilling; no exploratory operations have started as yet.

Responding to criticism from autonomous communities – such as Cantabria or La Rioja, which have adopted laws to ban the use of fracking in their territories – a new environmental law entered into force in December 2013, which included a mandatory environmental impact assessments for all shale gas projects, including exploration.

A note on proppants

On the back of shale advancements, proppants are becoming a growing business, especially in

North America. Frac sand remains the most widely used proppant by volume with resin-coated and ceramic proppants making up for rest of the market.

Frac sand

Some major US frac sand producers are developing new mines, while others are facing problems. Noise pollution, health and environmental concerns have delayed US frac sand developments in recent years as operations ramp up in line with a growing fracking industry:

- US Silica Holdings, Inc. has received approval to begin development of a new 3m tpa frac sand mine and plant in Fairchild, Wisconsin, to be served by the Union Pacific Railroad. It is anticipated that it will become operational by the fourth quarter of 2015.
- Eagle Materials gained final approvals for its frac sand mine in Utica, Illinois, after having faced opposition to the mine in 2011 owing to a lack of information regarding increased truck traffic. The company is hoping to make the first frac sand shipment to its 1.5m tonne processing facility in Corpus Christi, Texas, no later than its fiscal third quarter, which ends in March 2015.
- Superior Silica has faced difficulties at its Minnesota frac sand facility owing to concerns over truck traffic. This has now led to project cancellation.
- The Winona City Council may hear a city committee's set of recommendations on frac sand air monitoring after all, despite the plan getting hung up earlier in a different committee. The Citizen Environmental Quality Committee made a list of recommendations for air monitoring that has bounced back and forth between the committee and the city's planning commission for some time, because the commission declined to recommend sending it along to the council. A group opposed to frac sand mining, Citizens Against Silica Mining, approached the environmental committee to request recommendations be sent straight to the council, arguing that a citizen group can call on council members to address an issue without planning commission input.

Frac sand prices

Frac sand prices in the US have been increasing in recent months. For example, US Silica saw oil and gas revenue climb 92% on increased frac sand prices, which the company announced in Q1 this year on the back of high demand coming from oil and gas producers using more proppants per well.

"Prices are expected to continue to rise by 'double digits'," US Silica's CEO, Bryan Shinn, said, adding, "We raised prices in late Q1 and then again in Q2 (...) we are in the double digit range for the rest of the year when we look at the price increases. The prices were buoyed by an increase of demand for 100 mesh frac sand, above other grades."

Shinn also said that there was a possibility that 100 mesh could have been slightly depressed, but the demand for the grade has been high in any case.

Houston-based frac sand producer, Hi-Crush Partners LP, saw second quarter earnings increase to $83m, up from $38m in Q2 2013, as the company sold higher volumes of frac sand due to a lower cost of production. Revenue for Q2 2014 increased by 120% year-on-year (y-o-y) to $83m owing to sales of over 1m tonnes frac sand; a 67% increase y-o-y and a 14% increase quarter-on-quarter (q-o-q). Jim Whipkey, co-CEO, emphasised that since the start of 2014, the company has announced eight new contracts or contract amendments, five of which were in the second quarter.

Frac sand logistics

Wisconsin's boom in the production of sand used for fracking has fuelled a large increase in rail traffic, moving the commodity to other states, causing conflicts and raising safety concerns. While the number of Wisconsin car-train accidents has remained relatively steady in recent years (derailments are actually down) some residents who live near train tracks used for transporting sand, primarily in western and north-western communities, complain about noise and traffic delays in addition to safety worries.

Rail transportation of frac sand is fuelling another increase in train traffic in Wisconsin. The *Associated Press* and the *La Crosse Tribune*, citing newly released figures, reported that 36 trains loaded with flammable crude oil extracted by fracking now rumble through the state every week.

Ceramic proppants

Global minerals giant Imerys saw profits rise as new ceramic proppant production came on stream, with results underlining the profitability of the company's energy business, which includes the US proppant PyraMax plant acquisition. Imerys announced it had acquired the plant through the purchase of PyraMax Ceramics LLC, an industrial complex for manufacturing ceramic proppants, built in Wrens, Georgia, US, with two production lines to be gradually ramped up in the course of 2014 for a total annual capacity of approximately 225,000 tonnes. Investment will total $235m, to be potentially increased by the end of 2014 with additional amounts not to exceed $100m.

Meanwhile, Carbo Ceramics Inc., a leading proppants producer, has reported increased y-o-y revenue for Q2 2014, reflecting continued growth in the US fracking market. Quarterly revenues hit $176.6m, up from $153.7m in Q2 2013. Revenue was also up q-o-q from the $148.6m recorded in Q1 this year, a period that was affected by adverse weather conditions. The 15% revenue growth in Q2 can be attributed to an increase in proppant sales volumes, aided by Millen Line 1, which commenced production during Q1 and is currently ramping up to full capacity, which is expected to be reached by the end of Q3. Once full capacity is realised, Carbo Ceramics will have a total annual capacity of 2bn lbs (907,184 tonnes).

Poland's Baltic Ceramics Investments (BC) is issuing shares to help fund the construction of a factory that will produce ceramic proppants as part of a developing supply chain for Eastern Europe's shale gas sector.

"We will have the first such factory in the EU," Dariusz Janus, head of IndygoTech Minerals, the holding company controlling BC, told *Reuters*.

BC wants to have the factory up and running during the second half of 2015. It has made successful tests of its product in the US and is ordering equipment for the factory. The company has received $11m from the EU's structural funds, a further $4m from Poland's public funds for boosting innovation and is currently issuing $3.4m in shares to complete financing for the project.

BC aims to produce 135,000 tpa of proppants, which is approximately 5% of global demand. It says it owns deposits of enough raw materials to cover up to 80 years of production.

"We have already received inquiries about our product from firms looking for shale gas in Poland, Romania, Ukraine and Britain," Janus said, adding that BC's key advantage is its location in Poland, which will allow it to provide operators in Europe with ceramic proppants significantly faster and cheaper than firms such as Carbo Ceramics or Imerys, which produce proppants in the US.

A large worldwide supplier of bauxite proppant is Mineracao Curimbaba, Ltda. in Pocos de Caldas, Minas Gerais, Brazil. Its SinterBall Bauxite was originally introduced in the industry in 1988 and through the years it has undergone several developmental generations.

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