



Price rebounds and productive efficiency set a new local scenario for 2019

Introduction

As per estimates made by the Office of Energy Planning of the Energy Division¹ of the Ministry of Economy (MINECO), 2018 was a pivotal year in the performance of the oil and gas industry (O&G). Recent exports of natural gas to Chile, after a lasting absence in international markets resulting from the ongoing production crisis affecting the sector (which started in 1998), jointly with recent increases in the extraction of unconventional hydrocarbons and the resulting growth in their contribution to total production, are two landmarks that will force a change in production, exports and local procurement trends in 2019. In 2019, prices of main energy commodities, particularly oil and gas, continue on the path towards recovery, a process that started in late 2016. Although this recovery takes place after an overwhelming fall of price levels, which as of 2016 may be estimated well above 60% of the maximum levels reached in 2012 and 2008, for oil and gas, respectively; over the last few years, both commodities have shown a rather stable recovery, reaching an accumulated growth higher than 60% and 50% for oil and gas, respectively, in 2016 and 2018. As a result, the price of these commodities went from USD/bbl 43 in 2016 (average price of the WTI, Dubai and Brent oil basket) and USD/MMBTU 3.5 (average price of the gas produced in the USA and the EU) to USD/bbl 70 and USD/MMBTU 5.3, respectively, in November 2018.

Such changing trend, which is evidenced in a recent study prepared by the World Bank projecting the prices of major commodities up to 2030^2 , has been the result of several factors such as: 1) the ongoing crude oil production cut that the Organization of the Petroleum Exporting Countries (OPEC) and other non-OPEC countries have been implementing as from 2016, to foster an upwards trend in crude oil prices; and ii) the constant increase in USA oil and gas production, which unlike the previous factor, mitigates increases and forces prices down. In addition, other two factors might be added in light of their recent significance in outlining the future expectations for the energy market: iii) the trade war engaged by USA and China in terms of tariffs; and iv) Venezuela's economic, political and social crisis, which adds a material level or uncertainty in terms of production due to the recent restrictions imposed by the USA and other countries to their crude oil supply.

It is to note that other oil producing countries such as Russia have adhered to the production cut implemented by the OPEC member countries (Saudi Arabia, Algeria, United Arab Emirates, Iran, Iraq, Kuwait, Libia, Nigeria, Ecuador and Venezuela). In January 2017, this block of countries, accounting for around 50% of the global supply of crude oil, decided to reduce its production by around 1.8 million daily barrels, with the clear purpose of supporting the price of this commodity and recovering the investments made years before, attracted by the longer cycle of price increases in energy commodities. This trend, which in 2018 had turned towards an increase in daily production as a result of rebounding crude oil prices, has reverted once again as OPEC countries and their partners have recently confirmed that production cuts will continue in 2019, in response to the new decline in mid oil price registered as from November 2018. Such decision might result in a drop of around 1.2 to 1.5 million daily barrels as from January 2019. Due to the resulting excess in

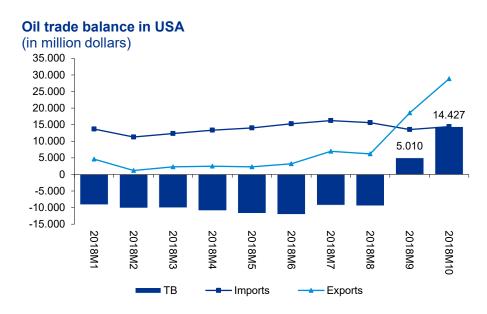
² "Commodity Markets Outlook. The changing of the guard: Shifts in commodity demand". World Bank, October 2018.



¹ "Argentina Energy Plan. Guidelines". Office of Energy Planning Office of Energy Governance, 2018.

demand, the average price of crude oil between 2017 and 2018 increased, from nearly USD 46 (June 2017) to USD 76 (October 2018). In November 2018, the price of barrel dropped again to USD 62 reviving the OPEC concerns and reactivating the production cuts in 2019. Meanwhile, during that same period (June 2017 - October 2018) WTI and Brent prices increased from USD/bbl 45 and USD/bbl 47 to USD/bbl 70 and USD/bbl 80, respectively. The Brent price is the most impacted by crude oil production and export cuts.

Figure No. 1
Oil trade balance in USA 2018



Source: prepared by us based on COMTRADE statistics

In addition, the USA continues advancing towards total self-supply in terms of hydrocarbons, as a result of the boom in the extraction and production of unconventional hydrocarbons that started in 2005, and which in 2018 had been indicated by analysts as a clear obstacle to the OPEC's purposes, always bearing in mind that such trend was tied to the American domestic consumption and its impact on international markets. Since 2015, unconventional hydrocarbons such as shale and tight have accounted for over 50% of the total crude oil supply, and for around 60% of the total gas supply of that country; thus positioning the USA as a key player in the international supply of hydrocarbons as well as in the determination of the final equilibrium price (particularly with respect to natural gas). The statistics of the International Trade Center (ITC), based on UN COMTRADE data, indicate that in 2018, the USA not only reached the first place in the world ranking of crude oil producers³, but it also registered a paradigmatic change in the historical deficit of the balance of trade of such energy resource (see figure N° 1), which as form September 2018 started to show positive balances (around USD 5 billion in September and USD 14 billion in October 2018). Such is an unprecedented scenario for this economy (a historic net importer of oil) that triggers a deep turn in the impact that major players may have on the international price of hydrocarbons. In fact, such changes, primarily fueled by the American shale, represent a significant barrier to the OPEC's intentions⁴, and explain why crude oil prices have been forecast at an average of USD/bbl 70 by 2030 (see section I).

⁴ "El imparable avance del shale oil de EE.UU. frena los planes de la OPEP" (The unstoppable advance of USA's shale oil put a halt to the OPEC's plans), El Cronista, December 19, 2018.



³ "Short-term energy outlook", U.S. Energy Information Administration (EIA), December 2018.

As indicated in previous reports (KPMG, 2016 and 2018)⁵, hydrocarbons price changes over the last decade were marked, during the upward trend period, by the super-cycle of price increases affecting major agricultural and energy commodities, the main determining factor of which was the growth of the so-called BRICS - Brazil, Russia, India, China and South Africa - and their pressure on the international demand for supplies and factors of production. This process, which spanned from 2003 to 2014, was followed by a period of decline resulting from the slowdown in the growth of emerging countries (mainly China) and the resulting surplus in the supply of commodities (mainly energy such as oil and other minerals). The oil production cut agreed by the OPEC attempted to remedy this situation, amid a scenario where unconventional hydrocarbon production might offset such effect. In this new scenario, where the decisions made by major hydrocarbon producers and exporters will forge the path to be followed by prices from now on, Argentina, whose growth usually depends on the foreign prices of raw materials (as they represent a significant portion of its GDP and exports), has adopted a set of measures aimed at offsetting the volatility of prices and their internal effects (subsidized local prices; adjustments to gas and electricity rates for industrial and household consumption; agreements to streamline activity, reduce costs and improve productivity, etc.). At the same time, it has encouraged investments in exploration and extraction of hydrocarbons so that the country may regain its status as a net hydrocarbon exporter.

In this scenario, it is essential to have a detailed description of the most relevant issues the Oil & Gas industry will have to deal with in 2019 to understand its immediate future. According to KPMG's prior reports, the growth and stagnation experienced by emerging countries, and the related impact on commodity prices were the two main issues the industry had to face over the last few years, along with insufficient local production and investment. This document, which attempts to highlight the items on the 2019 agenda, raises again the question of how investments, production and prices will behave in the sector, always bearing in mind the latest measures taken locally to change the direction of the industry, primarily in relation to unconventional production in the Neuquén basin (Vaca Muerta) and its importance and strategic influence in terms of finding a solution to issues of self-supply.

I. Recent changes in oil and gas prices

As highlighted in report "Relevant issues in the oil and gas industry for 2018" (KPMG 2018), changes in oil and gas prices over the last decade show the acceleration, drop and recovery cycle affecting the sector's performance during such period, all of which were fueled by the previously mentioned factors, i.e.: the growth of economies such as China, which have left behind their status of emerging countries to become global economic powers capable of generating changes in any market; the subsequent excess in global production resulting from the slowdown affecting such economies and the sharp decline in commodities prices; and finally, the scenario unfolded by the artificial measures implemented by the OPEC and its business partners, who are focused on continuing restricting the global output of crude oil so as to boost prices; and the continuous development of unconventional resources in countries such as Russia, China and Argentina, but particularly in the USA.

Over the last two years (see Figure No. 2), the average oil price (WTI, Brent and Dubai marked a stable path and rose from USD/bbl 43 in 2016 and USD/bbl 53 in 2017 to USD/bbl 70 in 2018 (while Brent, in turn, reached approximately USD/bbl 81 in October, WTI reached USD/bbl 70 in that same month). In light of the World Bank Projections for 2030, which were prepared based on statistics up to October 2018, it might be argued that the maximum average price of crude oil would reach USD/bbl 70, as according to such source, the price of this resource will remain stable in the mid and long term, mainly due to the struggle major crude oil producers have engaged in, and its

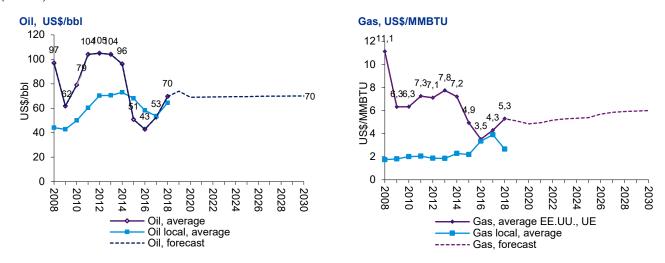
⁵ "Four relevant issues in the oil and gas industry for 2017" (KPMG Argentina, December 2016) and "Relevant issues in the oil and gas industry for 2018" (KPMG Argentina, April 2018).



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effect on prices in 2019; always bearing in mind that the USA will continue stimulating the extraction of unconventional hydrocarbons, and that such action might impact international markets, particularly after the unprecedented surplus in crude oil the country has registered during 2018. Natural gas shows a similar behavior, as during the same period, the price of this hydrocarbon, understood as the average price of the natural gas produced in the USA and the European Union (EU) per million BTU (MMBTU), went from USD 3.5 in 2016 to USD 5.3 in 2018. Unlike in the 2017 review⁶, the World Bank argues that such prices will keep rising and might get to USD/MMBTU 6 in 2030. The liquefied natural gas coming from Japan, in turn, might rise even higher, and is expected to reach USD/MMBTU 10 by that same year.

Figure No. 2
Changes in the average price of oil and gas in the last decade and projection for 2030 (In USD)



Note: i) the local price of crude oil and gas in 2018 only includes data up to June 2018 (last available figures); ii) local prices disclosed in the previous figure are stated in USD and, therefore, are affected by the devaluation of the Argentine peso that took place in 2018, year in which the ARS to USD exchange rate depreciated by over 100% as against 2017 average. **That is why the local price of gas shows a significant drop in 2018**, even though it increased by 60% in local currency (peso) between the average of 2017 and 2018 (up to June).

Source: Prepared by us based on data published by the World Bank (World Bank Commodity Price Data –Pink Sheets–

Changes in local prices are based on two core assumptions. On the one hand, and regardless of the artificial measures implemented to sustain them, the behavior of external prices is decisive to determine the future trend of oil and gas prices internally. On the other hand, as part of its constant efforts to resume hydrocarbon production at levels that allow it to stop depending on gas and electric power imports in recent years, balancing its energy trade accounts and gradually returning to self-supply, the country has designed policies to stimulate investment, even more so after the discovery of numerous unconventional hydrocarbon reserves⁷, primarily in the Vaca Muerta formation, in the province of Neuquén, which have gradually started to have a significant weight on the local offer of hydrocarbons.

In that sense, the government efforts to stimulate investments in the oil&gas industry are starting to pay-off, primarily in the upstream segment where most of the investments are needed; always bearing in mind the midstream and downstream segments (transportation, storage and distribution), which in the short to mid-term shall be sufficiently developed so as to provide energy to

and World Bank Commodities Price Forecast) and MINEM 2018

⁷ As per the Office of Energy Planning, and based on information obtained from the U.S. Energy Information Administration (EIA), Argentina is the second country with the higher potential to produce unconventional gas (after China), and fourth in terms of unconventional oil, behind Russia, the USA and China.



⁶ "World Bank Commodities Price Forecast", World Bank, October 2017.

the country⁸. As it is well known, as a result of the up-and-down cycle of international prices, global capitals started to be allocated to new projects of hydrocarbons extraction and production around the world. Such peak period was followed by excess in production and idle capacity during the downwards trend, which ended up putting in stand-by several of the already initiated projects, among them those being developed in Argentina, primarily those involving unconventional hydrocarbons in the Neuquén basin. That is why, as from 2015 the government decided to implement a set of measures aimed at subsidizing the domestic price of crude oil and gas⁹, so as to free local prices from the influence of international prices, and to strengthen investment incentives in the industry, taking advantage of the changing trend that was being experienced (in potential or expected production). Ever since then, and as noted in Figure No. 2, local mid prices have behaved different from their international peers. In 2017 they started to come closer to international prices as subsidies to crude oil production came to an end, restrictions to local fuel prices were lifted, and subsidies to unconventional natural gas production started to be gradually eliminated in a process that will be finally completed by 2021¹⁰.

II. Hydrocarbon production

Domestic hydrocarbon production has been showing a downward trend since the end of the 1990s, after the industry reached a historic record of around 50 millions cubic meters (MM³) in 1998 (a daily average production of approximately 850,000 barrels)¹¹. The sector output began to respond to the unfavorable conditions of the economic environment, a situation that was closely associated with the growth model chosen during the 2003-2015 period, and whose main characteristic was the implementation of policies aimed at disproportionately promoting demand over supply, thus generating a gradual but consistent decline in investment in almost all productive sectors. Since then, the reduction in hydrocarbon production combined with an increasing energy demand resulted in a supply crisis that had to be mitigated by a substantial increase in gas and electric power imports, which as of 2011, led to an important deficit in the energy account close to USD 7,000 million in 2013. Currently, the prospects in oil-gas exploitation areas, particularly with respect to unconventional resources, jointly with the country's natural and technical potential and the improvements that are being envisaged in the tax and business scenarios, lay down the necessary grounds so that investment and production levels may finally be stable in the industry, and so that the chronic deficit in the energy balance of trade may be solved in a relatively short period of time. In fact, in the last two years the average deficit in the trade balance of the fuel and

¹¹ The Argentine Oil and Gas Institute (IAPG) reports a record production of 49.2 MM³ in 1998, a figure that was converted to daily barrels by applying a factor of 6.2898 bbl/M³ prorated for 365 days.



⁸ For example, the 2019 Budget Law recently enacted by the National Congress is considering some committed investments to enlarge the infrastructure of the local power network by means of a PPP engagement.

⁹ The program of subsidized hydrocarbon prices has been mainly supported by a gas plan ("Plan Gas") and a program of subsidized prices for the production of unconventional gas (2018-2021 Program for Promoting the Production of Unconventional Gas, Resolution No. 46/2017 of the Argentine Ministry of Energy and Mining).

¹⁰ The Unconventional gas stimulus program, which is primarily applicable to the exploitation of Vaca Muerta, in pilot as well as in development projects, and which will also be applicable to the Austral basin, as provided for by resolution No. 447/2017 of the Argentine Ministry of Energy and Mining, will be in force until 2021. This program seeks to encourage investments in unconventional gas exploration/exploitation projects, by agreeing that the Government will pay a price higher than the international price, but that annual reductions will be applied: USD/MMBTU 0.5 until the end of the plan (2021); that is, USD/MMBTU 7.5 in 2018, USD/MMBTU 7 in 2019, USD/MMBTU 6.5 in 2020, and, finally, USD/MMBTU 6 in 2021 to converge at the market price as from 2022. Despite the program's provisions, the authorities have recently decided (February 2019) to reduce the amount of subsidies allocated to the sector, arguing that, pursuant to the original interpretation of such program, subsidies are tied to the original estimates of the production plan and not to the actual or effective production. To this date, the government and the affected companies are engaged in discussions on this matter, and the outcomes will have a significant impact on the level of investments announced by producers.

energy account remained at around USD 3 billion, a figure that accounts for a 55% improvement as against 2013 outcomes.

Argentina, in particular, is one of the four countries that currently produce unconventional hydrocarbons on a commercial scale, thanks to the important reservoirs located in the province of Neuquén, primarily at the Vaca Muerta basin, which is one of the main points of attraction for global investments in exploration and production. In fact, official statistics show that unconventional products such as shale and tight currently account for around 15% of the domestic supply of crude oil, and 37% of the gas supply, when no more than two years ago they accounted for 10% and 20%, respectively. Nevertheless, despite the important natural endowment of energy resources, some internal weaknesses might hinder the proper functioning and development of the energy sector in general and of the oil and gas industry in particular, in the medium term, such as: i) the current infrastructure deficit the government intends to address, by engaging in several investment projects involving works that have been included in the 2019 budget law, and that would be carried out under a public-private participation program (PPP) –now in stand-by and waiting for better internal and external conditions 12; and ii) the still high drilling costs in the upstream section (mainly in the exploitation of unconventional hydrocarbons), which, however, are starting to fall. In fact, while specialists asserted that a company like YPF could drill a horizontal unconventional well at the Vaca Muerta area in 41 days at a cost of USD 16 million in 2014, for 2015 such figures had dropped to 38 days and USD 15 million. Currently, YPF is able to drill a well in 25 days at a cost lower than USD 10 million thanks to this process of time and cost optimization. Even though the average drilling cost in the Vaca Muerta area may be higher than the cost of other wells taken as reference, such as the Eagle Ford in USA (USD 6 million per well in 2017), the last few years have shown that costs have swiftly started to pair up fueled by companies' need to reach higher efficiencies and to be more profitable in a somewhat volatile context for prices.

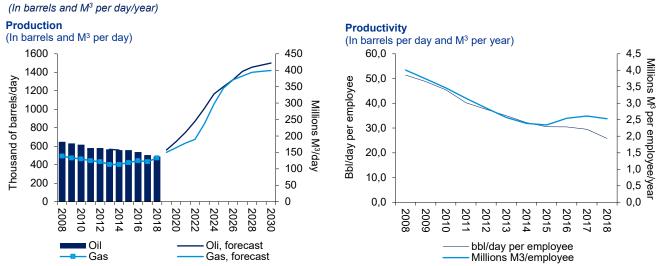
This process that seeks to streamline costs is important not only to successfully exploit unconventional hydrocarbons, but to the country's energy future. In a recent paper, the Office of Energy Planning of the MINECO¹³ estimates that the Vaca Muerta area will demand a significant number of wells to be fully developed. If it is considered that 884 wells are currently operating, the path towards total development of this area will demand a larger number of investments and new players, which will only arrive if the local conditions are fit to the purpose. In fact, part of this work is already underway, as the terms and conditions agreed upon in the concession agreements entered into for exploitation areas are quite moderate if compared to other plays. For instance, Loma Campana shows the highest cost (USD 10,000 - USD 15,000 per acre), which is well below the USD 20,000 required at Eagle Ford.

¹³ "Argentina Energy Plan. Guidelines". Office of Energy Planning Office of Energy Governance, 2018.



¹² In terms of internal conditions, it is important to achieve fiscal balance, to improve the financial markets' trust in the companies that were involved in cases of corruption in public works during the 2003-2015 period (for which they will have to incorporate risk and compliance programs, a condition already indicated in Resolution 27/2018 issued by the Anti-corruption Office) and, to reduce the reference interest rate, in such a way that local investments may be reactivated. With regard to external conditions, the risk-free external interest rate (EDF) is expected to remain stable or drop, and the country risk, which in December 2018 exceeded 700 basis points, is expected to decrease as well.

<u>Figure No. 3</u>
Changes in production and productivity in the Argentine Oil & Gas industry Projection for 2030



Note: i) the projection of production values for the 2019 - 2030 period was obtained from the publication "Argentina Energy Plan" of the Office of Energy Planning; ii) natural gas figures are those stated in said publication (in billion cubic feet per day, BCF7day) converted into M³ taking into account that 1000 cubic feet account for around 28 M³; iii) in order to obtain the estimated production of oil and gas, the production of these two resources was divided by the total private use registered in the industry.

<u>Source</u>: prepared by us based on data from the Office of Energy Planning of the MINECO, the Argentine Institute of Oil and Gas (IAPG), and the Ministry of Labor and Social Security (MTySS), 2018.

It is worth noting that items with the greatest impact on local drilling costs are labor, transportation, logistics and tax costs. As the government continues searching for new tools to improve the business and tax environments so as to attract a greater inflow of investments and new players, significant changes are being implemented, primarily in terms of taxes, labor and infrastructure issues. Amongst them, the addendum to the Collective Wage Bargaining Agreement entered into in 2017 by the government, the representatives of Oil and Gas workers (Oil and Gas Workers Union of Rio Negro, Neuquén and La Pampa, and Oil and Gas Executive and Professional Staff Union), and the companies exploiting the Vaca Muerta area, focused on addressing the particular issues inherent to the exploitation of unconventional hydrocarbons, improving incentives, reducing costs and increasing productivity (which has been recently confirmed by the "framework of sector understanding"); or the project included in the 2019 Public Budget Law to build a railroad to Vaca Muerta, which would extend for up to 850 km and would involve an investment of around USD 1.28 billion in 48 months. In fact, all such efforts seek to reduce the portion of production costs related to labor, transportation and logistics expenses, for the purpose of continuing improving costs efficiencies.

In terms of production, Figure No. 3 shows changes in this variable as well as in the productivity of the O&G industry over the last 10 years (2008-2018). A projection of such variable is offered up to 2030, based on the data obtained from the "Argentina Energy Plan" report issued by the Office of Energy Planning of the MINECO. As shown, oil production trends will start to change in 2019, after hitting rock bottom in 2018 with an estimated average daily production of 488,000 bbl/day. Official estimates suggest that crude oil production might reach an average of 560,000 bbl/day in 2019, to start growing at a mid-annual rate of around 16% up to 2024 and 4% up to 2030, reaching in that year a level of extraction that might well reach 1.5 million bbl/day. In other words, such projections estimate that crude oil production should increase by over 200% in around 12 years.



The natural gas behavior has been different. Although it has shown a low performance in the last decade, its output started to reverse such trend in 2015, going from an annual production of 113 million cubic meters per day (MM³/day) in 2014 to 119 MM³/day in 2015. This trend was maintained for the last two years, when 122 mm³/day were reached in 2017, and approximately 133 MM³/day in 2018. This behavior, dissimilar to that of crude oil, may be explained by the implementation of government programs (mainly, the so called Plan Gas, the Excess Natural Gas Injection Incentive Program and the Program for Promoting the Production of Unconventional gas) intended to boost investment in and production of natural gas within a context of self-supply crisis in connection with electricity and a substantial increase in the import of energy. By 2030, the trend of local natural gas production is also promising: it might account for 345 MM³/day in 2025 and around 400 MM³/day in 2030. Beyond these projections –which consider the changes and measures jointly adopted by the government and the sector–, the degree of success thereof, the new policies to be implemented in the future and the variations in the international price of crude oil barrel and gas MMBTU may move both estimates in either direction: upwards or downwards.

Regarding the productivity levels, a rate that measures the performance of the local industry in relation to the employment required (i.e. the quantity of product generated by a unit employed by day/year), Figure No. 3 shows that while crude oil has recently become steady around 30 barrels per employee per day, in the case of gas, the increase in 2018 might account for 2.5 MM³ per employee per year. Based on official projections and in light of the better performance of the O&G industry expected for 2019 and next years, labor productivity is likely to increase progressively and substantially, provided that measures for the promotion of the industry continue to be implemented and international prices continue generating profits that may later be reinvested, in a context of progressive cost efficiency.

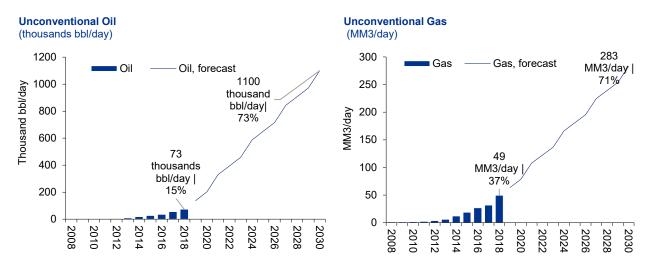
II.1 The importance of unconventional resources:

According to previous reports¹⁴ issued by EIA, Argentina is amongst the first four countries with the highest potential for the development of unconventional resources and, in fact, is currently exploiting this type of resources at a commercial scale. Based on such reports, in 2013, Argentine estimated technically recoverable reserves were around 27 billion barrels of oil and 802 billion cubic feet of natural gas, which is a key milestone for the energy future of the country. It is estimated that most of total recoverable reserves of shale oil (approximately, 16 billion barrels) and shale gas (approximately, 308 billion cubic feet) existing in Argentina are in Vaca Muerta formation. Additionally, the significant conventional oil and gas resources as well as the potential offshore exploration should not be disregarded. Actually, although unconventional resources are increasingly gaining ground, conventional ones currently contribute the largest share of the total local production of hydrocarbons and are the main supply for generating electricity in the country.

¹⁴ "World Shale Gas and Shale Oil Resources assessment: Energy Information Administration-Advanced Resources International". US Energy Information Administration, EIA, 2013.



Figure No. 4 Changes in the production of unconventional oil and gas. 2007-2017 Period (In barrels and cubic meters)



Note: i) the production levels shown in the figure consider the production of both shale and tight oil and gas. ii) Projections by 2030 were based on the data arising from the report "*Argentina Energy Plan*", issued by the Office of Energy Planning of the Ministry of Economy (MINECO).

<u>Source</u>: Prepared by KPMG based on data arising from the report "*Argentina Energy Plan*", issued by the Office of Energy Planning of the Ministry of Economy (MINECO), Universidad Austral and Hub Energía, 2018.

Over the last four years, the aggregate domestic production of unconventional hydrocarbons has jumped, mainly in the 2017-2018 period. Taking as a reference some of the years of the whole period with available data (see Figure No. 4), it may be noted that the production of unconventional oil went from 19,000 barrels a day in 2014 (i.e. 3% of the total supply of crude oil) to around 54,000 barrels a day in 2017 (11%). As regards 2018, although at the time of preparing this report no conclusive data was available, production might be around 73,000 barrels a day (15%). According to projections for 2030, the production of unconventional crude oil might reach 1.1 million barrels a day, which might represent approximately 73% of the local supply of this resource. Natural gas is showing a similar behavior. From 2014 to 2018, the production of unconventional gas went from 12 MM³ a day (i.e. 10% of the total annual production of natural gas) to 49 MM³ a day (37%). As in the case of crude oil, it is forecasted that, in the future, unconventional natural gas will account for 71% of the total domestic supply of this resource, which would represent an estimated production of 283 MM³ a day by 2030. As it is well known, the Neuquina basin is the most important source of unconventional resources on the Argentine soil. YPF concentrates most of the production of this basin, mainly in Vaca Muerta formation, and, at present, it is the company deriving the highest levels of production of unconventional resources. However, based on these significant projections. in a favorable environment, the share of other companies in ongoing projects involving unconventional resources, such as those being conducted in La Escalonada, San Roque, Bandurria, La Ribera, Aguada Federal, Bajo del Toro, Loma Campana and Loma Amarilla, Bajo del Choique, Salinas del Huitrin, Los Toldos, Cerro Arena and Estación Fernandez, among others, is expected to increase.

Although the recent increase in domestic production of unconventional resources can be explained by the rise in international prices and the local programs to boost gas production, the drop in costs resulting from economies of scale encouraged the production of these resources. As a result, profitability might no longer depend on international prices, at least to some extent. According to the Office of Energy Planning of the Ministry of Economy¹⁵, from 2015 to 2017, the cost of

¹⁵ "Argentina Energy Plan", Office of Energy Planning, MECON, 2018



production of unconventional crude oil in Argentina dropped by 50%, going from USD/boe ¹⁶ 27 to USD/boe 13, and by the third quarter of 2018, such cost dropped by an additional 28% (USD/boe 9.5). Similarly, the cost of production of gas dropped by almost 50% between 2015 and 2017 (from USD 2.3/MMBTU to USD 1.2/MMBTU), and by the third quarter of 2018, it dropped by an additional 41%, thus reaching USD 0.7/MMBTU.

These figures and the evident decrease in costs may be explained by four key issues: i) the improvement of the conditions in which the industry operates, ii) the leverage of companies operating in the Argentine market, mainly in Vaca Muerta formation, which accelerates the local learning curve by transferring all the knowledge and experience gained in the U.S. shale market to our country; iii) the multi-sector agreements that the Government has entered into with businesses and trade unions in the industry, which provides greater predictability to investors, especially regarding Vaca Muerta region (*Mesa Nacional de Vaca Muerta* [Argentine Roundtable for Vaca Muerta]), and iv) the Worldwide Bank projections for 2030, according to which the average international price would be USD/bbl 70. This, in turn, encourages companies to look for profitable alternatives by implementing new processes and technologies, while increasing efficiency and improving profit margins. It would be premature to speculate as to the future outcome thereof, given that the companies are still completing some pilot surveys in some areas and acquiring the necessary know-how to efficiently exploit the contents of the source rock within the upstream stage. However, prospects are highly promising and provide support to such projections.

Nevertheless, it is worth mentioning that the investments and costs involved in the extraction of unconventional resources are higher than those required for the production of conventional resources. Additionally, it should be understood that the decline in the production of unconventional resources is faster than in the case of conventional resources. In this regard, the development of policies designed to benefit the activity as well as the implementation of new agreements between the national and provincial governments and the O&G industry in order to improve the business environment and boost the investments to fight the price impact are still a priority. Although over the last years, a lot has been done, the main risks to the development of the unconventional sector in the short term are the political uncertainties, in light of the presidential elections to be held in 2019, the macroeconomic instability and the behavior of prices. For these reasons, the government shall endeavor to control key variables such as inflation and the USD exchange rate, since their current levels might discourage investments. Notwithstanding the foregoing, there are well-grounded expectations that variables will be controlled as a result of the initiatives undertaken by the government, such as the tax adjustment plan reflected in the recently approved government budget for 2019 (as a result of which the primary deficit by the end of 2018 was 2.8% of the GDP) or the set of measures that the Argentine Central Bank (BCRA) is implementing with the aim of controlling changes in domestic prices, mainly through tools such as the administration of exchange rates (floating regime) and the maintenance of high interest rates, even when they have been significantly reduced by BCRA during the first months of 2019. In the meantime, new political agreements should be encouraged to improve the legal and institutional frameworks, as all these factors affect costs and the profitability expected by oil companies, even more considering that the expenditures/investments required are quite significant, such as those involved in the exploration and exploitation of unconventional resources.

III. Investments in the O&G industry

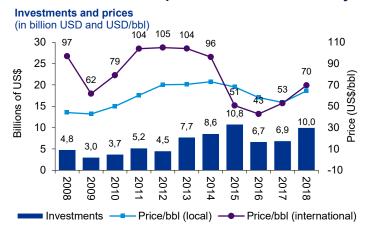
In line with the development of the sector, the investment component shows a significant recovery in 2017 and 2018, after the severe drop of around 38% in nominal terms experienced in 2015 and 2016. As noted in Figure No. 5 depicting the changes in this variable and in the local and international price of oil over the last ten years, both variables have shown the same course during

¹⁶ boe = barrel of oil equivalent



the period analyzed, which reflects the decisive effect of prices (mainly international ones) on the development of the sector. The political decision of placing the local price of oil and gas over international prices as from 2015 -through the implementation of programs for promoting hydrocarbon production (Plan Gas, the Excess Natural Gas Injection Incentive Program and the Program for Promoting the Production of Unconventional Gas, among others)- meant an effective protection intended to mitigate the fall in investments and the impact on the development of important extraction projects (mainly shale) as well as on the trade balance of energy (and the ensuing outflows of US dollars deriving from the import of energy). However, and despite some programs were discontinued during 2017 (particularly, Plan Gas that was discontinued in December 2017 and the new resolution of MINEM, whereby a floating domestic price scheme for fuel was adopted to reinstate a market based on international prices), investments would have reached USD 10 billion in 2018, i.e. a nominal increase of 45% compared to the amounts recorded in 2017. The Ministry of Economy estimated that, out of such total, around USD 4 billion were allocated to unconventional resources. Looking forward, it is expected that the number of projects involving unconventional resources will have a significant impact on investment levels, in line with production forecasts. Therefore, investments in this type of hydrocarbons are expected to exceed 60% (over a total of USD 29 billion per year) in 2025, and such levels will be maintained by 2030.

Figure No. 5 Investments and local prices in the O&G industry 2008-2018



<u>Source</u>: Prepared by KPMG based on data published by the Office of Energy Planning of the Ministry of Economy, the Argentine Ministry of Energy and Mining and the World Bank.

Additionally, the government continues seeking new ways of promoting investment in the O&G industry and has a package of new measures to support conventional, unconventional (onshore) and offshore production. These measures include, among others, a new regime for the import of pre-owned equipment for the hydrocarbon industry (Decree No. 629/2017), which eases the import process involving pre-owned assets that the local industry cannot supply; the aforementioned addendum to the collective bargaining agreement entered into between the government and the industry to reduce labor costs and improve efficiency; projects aimed at improving the infrastructure of the sector and the increase in incentives to the production of unconventional gas in Vaca Muerta formation for projects that are in the development stage (resolution 419E of MINEM). Today, other measures are being adopted: new bidding programs for offshore areas (several O&G companies widely experienced in this type of exploitation operate in the sector), the already mentioned project for the construction of a train to Vaca Muerta (covering around 850 km from Bahía Blanca to Añelo city), or the new gas pipeline aimed at increasing exports to Chile during the summer season. The purpose of these plans is to provide a sound basis for the current and future development of hydrocarbons, while strengthening credibility in order to attract investments.



Final Considerations

As noted in the 2018 report (KPMG, 2018)¹⁷, the behavior of prices is still affecting the production of national and international hydrocarbons by directing total investments to the regions, which in an uncertain scenario, may offer the best potential environment for the oil business. The restrictions on crude oil supply imposed by the OPEC producers and partners, together with the increase in U.S. production and the restrictions on the production of some countries, such as Venezuela and Iran, continue to make hydrocarbon prices variable. However, based on the most recent data obtained and the latest projections of the World Bank, prices might remain stable at around USD/bbl 70 by 2030.

At the local level, alternatives are still being sought to create the necessary conditions to foster investment, thus achieving a sustained increase in the production of hydrocarbons. In a somewhat volatile environment for oil prices, providing forecasts for the short term seems a complex task: in two years, the steep upward trend, boosted by the restrictions on production imposed by OPEC and its partners, was reversed, making way to a context of uncertainty in the last two months of 2018. This can be explained by the influence of the United States in the international market, coupled with the production and export issues currently faced by countries such as Iran and Venezuela. However, it is worth considering the projections made by the World Bank analysts, according to which the price of oil will stabilize at around USD/bbl 70, clearly reflecting the future average of oil prices. This does not mean that no deviations will occur, but such projections seem to provide a more or less reasonable basis to estimate the expected profitability of future investment projects. Unlike crude oil, the upward trend followed by the international price of gas appears to be clearer. In this regard, according to the World Bank's estimations, the average price of the gas produced by the United States and the European Union will be around USD/MMBTU 6 by 2030.

Furthermore, during the last years, the government has striven to participate in the cost reduction process undertaken by the sector by working out agreements with the main players (for example, the addendum to collective bargaining agreements aimed at reducing labor costs and improving productivity), by taking measures to remove the existing restrictions on the import of capital assets or by making additional investments in infrastructure with the aim of reducing logistics costs. In addition, it cannot be overlooked that, even when they might be seen as a regression, the government fiscal austerity program, coupled with the reinstatement of export duties and, more recently, the reduction of subsidies to the production of unconventional gas in Vaca Muerta (which might cause some inconveniences to the companies affected by such measures and a reduction or reassessment of committed investments), are regarded as necessary actions to be taken by the government to balance public accounts and eliminate the primary deficit in 2019. Moreover, these measures may also be required to build sound foundations for future investments. For the purposes of reaching the much desired energy self-supply, it must be noted that, at present, Argentina does not export significant amounts of hydrocarbons 18. Therefore, in the short-term, the imposition of duties or withholdings should not affect the development of the O&G industry, even considering the growth experienced in 2018, as described in this section (mainly due to the export of gas to Chile), and that expected for 2019. In addition to the foregoing, it must be considered that, although exports of these products are not significant today, the persistence of infrastructure-related issues might negatively affect them, thus triggering other inconveniences that could hinder the potential development of this sector.

Furthermore, as mentioned in other reports, it is important to devise a strategy for diversifying the energy production in order to create incentives and the necessary conditions to foster and distribute local investments among the different resources and sources of generation.

¹⁸ According to the Argentine Oil and Gas Institute (IAPG), Argentina exported around 1.6 MM³ of crude oil in 2017 (6% of total production) and around 13 MM³ of gas (0.03% of total production).



¹⁷ "Industria del P&G: Cuatro temas relevantes para 2018" ("Four relevant issues in the oil and gas industry for 2018"), KPMG in Argentina, 2018.

This can be explained by three factors. Firstly, the exploitation of unconventional resources has gained greater significance in the domestic supply of hydrocarbons; however, massive investments and more favorable conditions are called for, and those may only be attained in the future. Secondly, there are still important conventional hydrocarbons reserves to be exploited in our country, and such resources still represent the largest share of the domestic supply and are the most used resources for electric power generation. Finally, the production of renewable energy is a factor that, in addition to contributing to the diversification of the energy supply, is considerably more sustainable over time than other alternatives.

Actually, in 2019, the development of the global O&G industry in the short term will depend mostly on the efforts being made by large hydrocarbon producers and exporters and on the expectations generated by the market as to the consistency of trends over time, which is essential to determine the most sensitive variables of the business, such as investment, production and prices.

At the domestic level, current and future good development prospects as well as the announcements and measures aimed at continuously improving hydrocarbon exploitation should also be considered. This new trend, opposing to the recession experienced by Argentina during the first five years of the decade, is mainly reflected in unconventional resources. In fact, in the last two years, this type of resources has shown a significant growth: after representing a small share of local hydrocarbon production recently, it now accounts for over one third of gas production and 15% of oil production. Such figures are expected to continue to show an upward trend, provided that macroeconomic imbalances at the country level are corrected and that investments improve. Furthermore, it is worth noting that, in 2019, political aspects will be crucial not only for the oil industry, but for all production activities. This is so because the presidential election to be run this year triggers some uncertainty that, irrespective of the political party that may finally win, might entail a change in technical and political decisions that will have an impact on this and other sectors in the next years.

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