Promotion of Natural Gas Exploration and Non-conventional Gas Development

"Analysis of two cases in the Argentine experience"

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PURPOSE

The purpose of this paper is to outline the regulatory and legal background of the gas industry in the Argentine Republic, as well as its changes and the effects those changes have had. It is also intended to identify the opportunities and challenges for the development of non-conventional gas given that Argentina has a very significant supply of these resources as revealed by surveys recently conducted by renowned international institutes.

BACKGROUND

Natural gas, at present, with a participation of 52% in Argentina's energy mix, supplies approximately 7.6 million households, is the main fuel for energy generation, is used by 1.46 million vehicles and has a very strong penetration as primary fuel in the industry segment.

Within a context of strong economic growth concentrated over the past 8 years, natural gas demand has been encouraged by prices well below those of substitute fuels and this is how average consumption increased from 105 million cubic meters per day (MMm^3/day) in 1999 to 145 in 2009. In turn, those prices, on average, do not cover the development and replacement costs of resources available in the country. As a result, the available gas supply dropped significantly. This decrease combined with the sustained increase in demand brought about, as of 2004 to date, a deficit in natural gas domestic supply to serve local demand mainly from the Northern and Neuquén Basins which have historically supplied gas for the peaks in residential consumption during winter periods.

Energy sector authorities opted first to restrict gas exports and then to increase gas imports from Bolivia as well as Liquefied Natural Gas imports. However, no definitive solution was given to the underlying causes that gave rise to this unsatisfied demand.

Over the past five years Argentina changed from being a net exporter of natural gas to being a net importer of this fuel. In only ten years, its proved reserves dropped from 28 trillion cubic feet (Tcf) in 1999 to 14 in 2009.

Contemporaneously with this particular situation in Argentina, non-conventional gas (mainly tight gas and shale gas) exploded in the United States and Canada with the accelerated development of new technologies of horizontal drilling and massive frac stimulation and also with the introduction of strong incentives to this type of investment. According to estimates of the United States Energy Information Administration, Argentina ranks third worldwide in technically recoverable non-conventional resources amounting to 774Tcf (EIA – "World Shale Gas Resources: An initial Assessment of 14 Regions Outside the United States" released on April 5, 2011), after the US (862Tcf) and China (1.275Tcf).

The release of reports of this type and the reliable geological data gathered during the country's long hydrocarbon history prompted the Argentine Federal Energy Secretariat to implement the so-called "Gas Plus" Program in March 2008 through Energy Secretariat Resolution Nbr. 24/08 geared at promoting investments in natural gas exploration and development, which includes tight gas in particular.

It was after the launching of this program that some exploration and production companies engaged in conducting surveys and in producing natural gas from new non-conventional sources of gas and made significant exploratory efforts that resulted in findings of considerable magnitude for the country.

It is relevant to mention that Argentina currently has in excess of 1 million square kilometers (247 million acres) of under-explored sedimentary basins where there are high prospects of obtaining successful results not only in respect of the development of non-conventional resources but also with regard to the discovery of conventional resources.

This paper presents the first results of the Gas Plus Program gathered by the Federal Energy Secretariat and proposes certain challenges to meet the objectives sought by this Program with a view to reverting the present deficit in domestic supply through the development of non-conventional resources.

It will also present the experiences of Apache Energia Argentina and Pan American Energy in their successful exploration projects, as well as production experiences in tight gas and shale gas reservoirs over recent years.

ARGENTINE GAS MARKET AND ITS INFRASTRUCTURE AS OF 2011 (1):

- Energy Mix:

  Natural Gas (52%), Oil (32%), Hydroelectric Power (12%), Nuclear Power (2%), Coal (1%), Renewable Energies (1%).

- Total Natural Gas Demand: 146.2 MMm^3/day

  (Volumes stated on daily average/year)

Residential:	32.8 MMm^3/day	(22) %
CNG:	7.5 MMm^3/day	(5) %
Industries:	34.3 MMm^3/day	(23) %
Thermal Power Generation	35.3 MMm^3/day	(25) %
Off-system Consumption[2]:	28.1 MMm^3/day	(19) %
Fuel Gas:	8.2 MMm^3/day	(6) %

- Total domestic supply: 124.9 MMm^3/day

- Domestic market prices (Argentina):

Residential[3]:	$0.57/MMBtu
CNG[3]:	$0.97/MMBtu
Thermal Power Generation:	$2.60/MMBtu
Industries:	$3.00/MMBtu

- Imported gas from Bolivia: 7.4MMm^3/day

  Price 1Q2012: $10.6/MMBtu

- Re-gasified LNG: 13.9 MMm^3/day

  Price 3Q2011: $13.6/MMBtu

- Transmission Services:

  Since its privatization in 1992 (Law Nbr. 24,076), the Argentine gas transmission system is an open access system and tariffs are regulated by Ente Nacional Regulador del Gas (ENARGAS) (the Gas Regulatory Authority).

[1] Reference: "MMm^3/d" stands for million cubic meters day
"$", refers to US Dollars.
[2] Corresponds to productive volumes consumed in fields and thermal power plants or in processing plants at gas pipeline head stations.
[3] Corresponds to prices in local currency converted to US Dollars at the December 2011 exchange rate

In that same year (1992), the country was divided into two geographical areas, the northern area licensed to Transportadora de Gas del Norte ("TGN") and the southern area licensed to Transportadora de Gas del Sur ("TGS"). The two companies combined have a firm transportation capacity of 137 MMm^3 per day (as of 2010).

A distinctive feature of the Argentine gas transmission system is that none of the transmission companies are authorized to buy or sell gas except for purely operating purposes.

- Network Distribution Services:

The same as in the case of gas transmission companies, in 1992 Law Nbr. 24,076 divided the country into 9 regions where zonal gas network distribution monopolies were set up ("distributors").

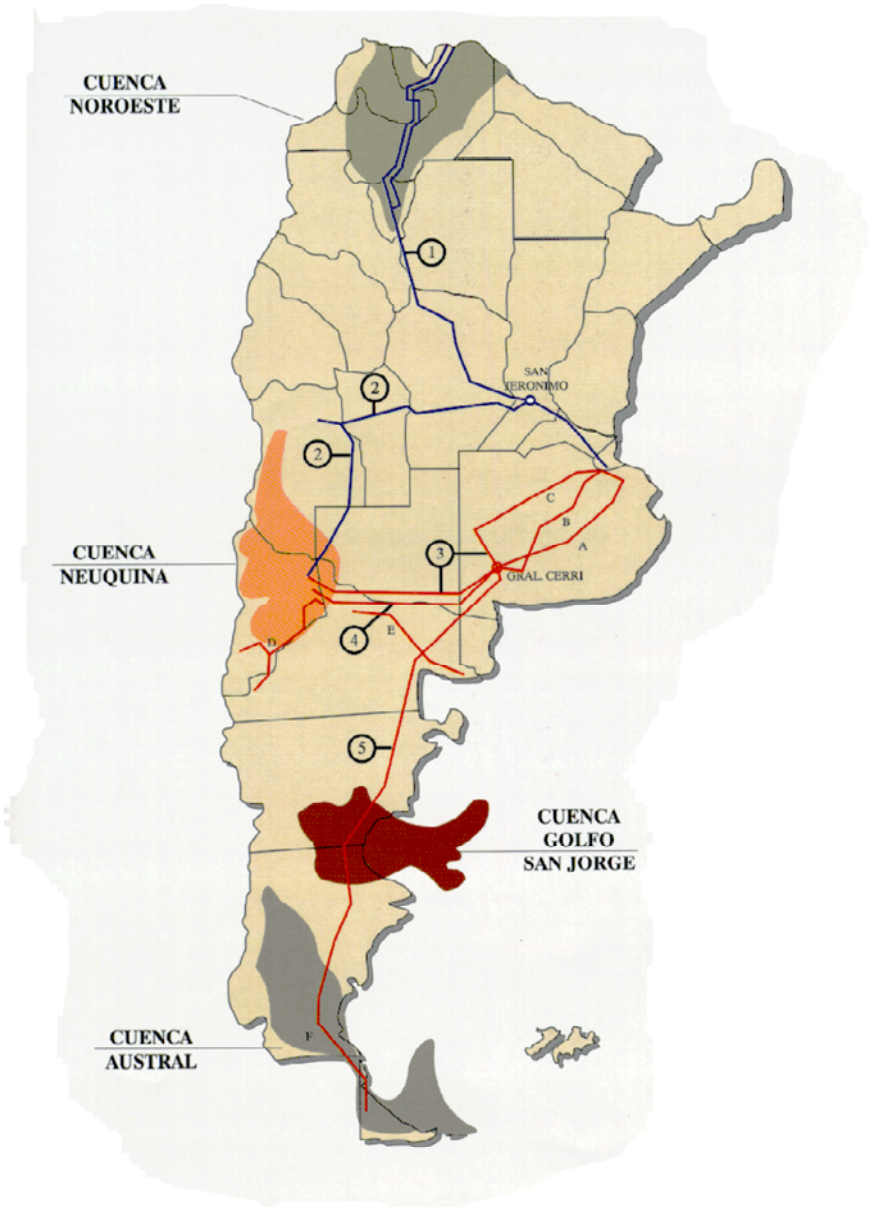
These 9 distributors supply gas in aggregate to approximately 7.6 million residential consumers.

Since its privatization in 1992 (Law Nbr. 24,076) and the same as in the case of the transmission sector, the gas network distribution system is regulated by Ente Nacional Regulador del Gas (ENARGAS).

- Gas Re-gasification Facilities:

At present, there are two LNG re-gasification vessels in Argentina that re-gasify the LNG imported from various parts of the world.

One of these vessels which has a re-gasification capacity of 17.5 MMm^3 per day is in Escobar, 60 kilometers north of the City of Buenos Aires. The other re-gasification vessel is anchored in the port of Bahía Blanca, 680 km. south of the City of Buenos Aires, and has a re-gasification capacity of 12.5 MMm^3 per day.



REGULATORY FRAMEWORK

The legal and regulatory bases that govern the marketing, transmission and distribution of natural gas in the Argentine Republic were established in June 1992 when the Federal Congress passed Law Nbr. 24,076 (known as the "Gas Law").

The Gas Law created ENARGAS, the regulatory agency that oversees the downstream of the Argentine gas industry (transmission companies, distribution companies, sub-distribution companies, marketers, among other).

While transmission and distribution tariffs are fixed and adjusted by ENARGAS, the Gas Law established that the wellhead gas price would be freely negotiated between buyers and sellers of the sector, basically the gas distribution companies, large industrial consumers and thermal power generation plants. The gas wellhead price, which remained fixed during the

first year and a half of the effective term of the Gas Law, was deregulated as of January 1, 1994.

As established by said Law, although ENARGAS approves transmission and distribution tariffs but has no participation in the establishment of gas wellhead prices, it can refuse to allow a distributor to transfer to its customers (passthrough) all or a portion of the increase in the cost of the gas bought. This would be the case if ENARGAS determined that the price paid by distributors exceeds the price paid by other distributors under equivalent conditions and for similar volumes, indirectly limiting in this way the capacity of producers to freely negotiate gas prices directly with distributors.

CHANGES IN THE LAWS AND THEIR EFFECTS

As of 2002, within the framework of the Economic Emergency Law (Law Nbr. 25,561), the Argentine Government "pesified" the contracts denominated in foreign currency (including gas supply contracts) for the purpose of reducing the inflationary pressure generated by the strong devaluation of the Argentine Peso.

Since that time, the Argentine Government increased the level of regulations applicable to the gas sector. Thus, as of February 2004, Decree Nbr. 180/2004 was published establishing the creation of a Gas Electronic Market owned and operated by the Buenos Aires Stock Exchange whose main purpose was to create a free, transparent and competitive market for buying and selling natural gas in the spot and secondary (transmission and distribution) markets. The Decree also established the creation of a specific trust fund to finance the expansion of the country's gas transmission system. According to the Decree said trust fund would be set up mainly through Specific Charges created to such end and paid: a) by consumers through transmission tariffs; b) with funds obtained from credits granted by certain national and/or international institutions; and c) with certain contributions made by the main beneficiaries of said trust fund. Finally, this Decree also established a supply cut-off mechanism with inverse priorities in respect of tariffs in such a way that users who paid higher transmission tariffs were the last to suffer gas supply restrictions.

Also in 2004, the Argentine Government issued Decree Nbr. 181/2004, dated as of February 13, 2004, where it ordered the Federal Energy Secretariat to implement a procedure to normalize natural gas prices at the metering point of the transmission system through agreements executed directly with natural gas consumers and producers. The purpose of this Decree was to preclude large users (such as industries) from buying gas from distributors encouraging them, in turn, to buy gas directly from producers at market prices, thus establishing a price differentiation among the various demand segments.

The so-called segmentation process ended in September 2006 having all medium and small industrial gas users, thermal power generation plants and retail CNG service stations contracted directly with gas producers (or marketers) the purchase natural gas at the wellhead. As of that date, local distributors can only render the complete service of gas transmission, distribution and supply to end residential consumers and small retail stores and

sell only the transmission and distribution service to segmented users that contract the gas directly with producers or marketers at the wellhead.

In April 2004, the Federal Planning, Public Investment and Services Ministry promoted an agreement with natural gas producers allocating market quotas by producer in order to guarantee the supply of domestic demand. This agreement guaranteed the supply of minimum daily volumes by gas producers to distributors and thermal power plants and established differential prices for the different demand segments. In addition, prices per basin were set as netback prices with the Northwestern Basin established as the reference. Prices in the different segments moved at different speeds until they reached the "target" prices established in the agreement and they applied to all market segments with the exception of the residential market.

In 2007 the Argentine Government executed a new agreement with gas producers ("Gas Producers Agreement") to guarantee the supply of natural gas domestic demand during a five-year term and thus normalize the economic conditions for its supply. The Gas Producers Agreement (approved by Federal Energy Secretariat Resolution Nbr. 599/07) established certain minimum gas volumes which each producer was required to supply to the domestic market, as well as a volume reduction mechanism in case a producer did not have sufficient gas to supply all the volumes of the categories it had been assigned. The segments to be supplied by producers were as follows: Residential, CNG, Thermal Power Generation and Industrial. An interesting aspect of the agreement was that it established a mechanism to guarantee the supply to the Residential segment in case production was insufficient with respect to demand, redirecting gas (when necessary) from the Industrial, Thermal Power Generation and CNG segments to the Residential segment.

Within this framework, prices paid by gas distributors to supply residential consumptions remain regulated and in local currency (Argentine Peso), as well as prices for the CNG segment, whereas prices for the Thermal Power Generation segment, which still remain regulated, were adjusted and "dollarized". At present, prices related to the Industrial segment are freely negotiated between buyers and sellers.

ADDITIONAL ACTIONS IN RESPONSE TO THE INCREASE IN DEMAND

As a result of the country's extraordinary economic growth over the last decade and because of the regulated energy prices, the demand of all sectors increased to levels well above the available natural gas domestic supply. For this reason, in 2006 the Argentine Government, through state-owned company ENARSA, executed an agreement with Yacimientos Petroliferos Bolivianos (YPFB) of the Republic of Bolivia to import volumes equivalent to approximately 5 MMm^3 per day as of the start of the effective term of the agreement, with a temporary scheme of volume increases in the long term. For 2012 the agreement contemplates the supply of approximately 13.5 MMm^3 per day to Argentina, a volume which would apparently increase to 27.7 as of 2021.

Likewise, during 2007, the Argentine Government launched a program to substitute gaseous fuels for liquid fuels aimed at those users that had the capacity to switch between these two types of fuels. Those who adhered to the program received the liquid fuel subsidized by the State at the price of the natural gas that was "released" for use by other customers that did not have the capacity to switch to liquid fuels.

Finally, as of 2008, the Argentine Government contracted LNG regasification vessels. One of the vessels is stationed in Bahía Blanca (550km south of the City of Buenos Aires) and the other vessel in Escobar (60km north of the City of Buenos Aires). Both terminals combined re-gasify approximately 30 MMm^3 per day and there are plans to expand the regasification capacity. Even though at present the average price at which state-owned company ENARSA acquires the LNG vessels is approximately $15/MMBtu (without considering re-gasification costs), the end user of re-gasified gas is strongly subsidized by the State through a trust fund set up to such end.

IMPACT ON NATURAL GAS RESERVES AND PRODUCTION

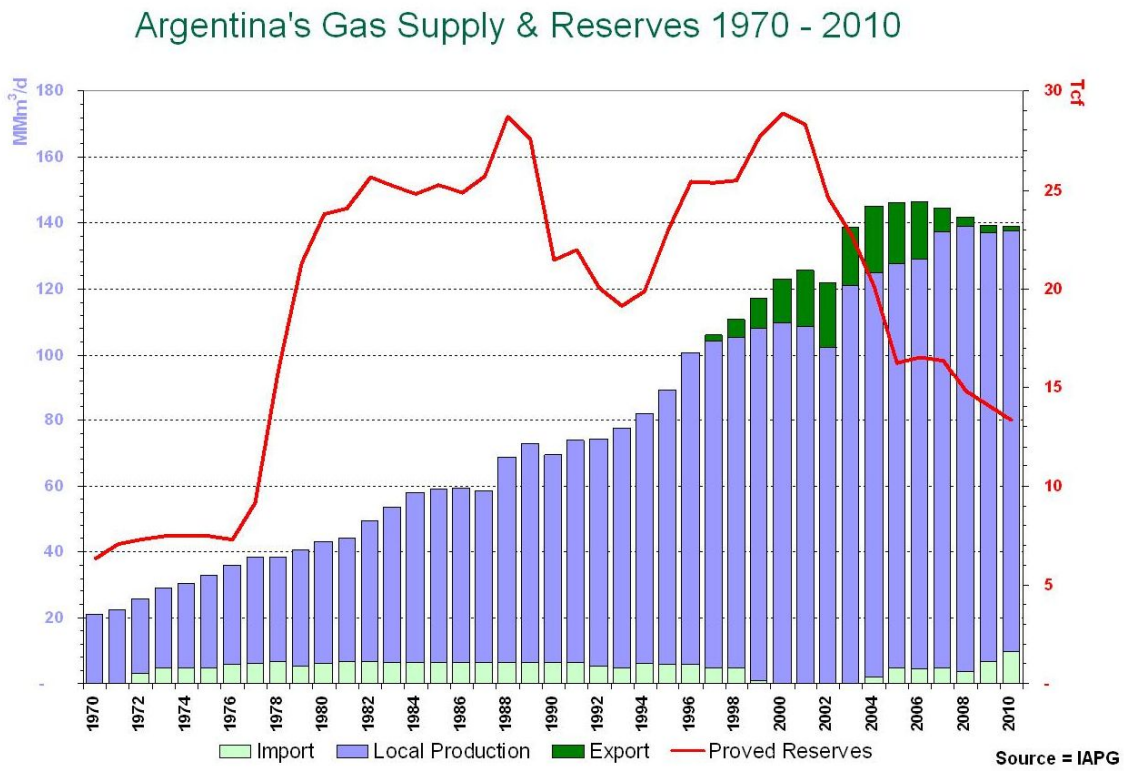
As illustrated in the graph below, local production in Argentina increased steadily since 1970. Also, in spite of having had very substantial reserves with respect to consumption it can be observed that since 1998 these reserves have dropped almost uninterruptedly.

Since 2002, the combination of:

(1) the reduction of prices collected by gas producers in US Dollar terms,
(2) the increase in demand caused by the depressed price (compared to substitute fuels); and
(3) the sustained increase in the economic activity

created a level of demand that grew at a pace well above the level of demand which domestic supply had the capacity to serve.

As of 2004, volumes produced locally have been insufficient to supply the country's demand especially the winter consumption peaks that were usually supplied with production from the Neuquén basin. This demand excess was corrected by the Government with (partial or total) seasonal restrictions on gas consumption; restrictions on segments that had the capacity to use substitute fuels; gas exports (partial or total); imports of gas and electricity and, lastly, the deployment of LNG regasification vessels near the big consumption centers, turning Argentina from a net exporting country to a net importer.



"GAS PLUS" PROGRAM

On March 3, 2008 the Energy Secretariat issued Resolution Nbr. 24/2008 (subsequently amended by Resolution Nbr. 1031/2008 and by Resolution Nbr. 695/2009), which established the "Gas Plus" Program.

The main purpose of the "Gas Plus" Program was to provide incentives for the development of incremental gas in order to increase (conventional or non-conventional) natural gas in Argentina. To such end it guaranteed gas producers who qualified under the program the approval of a price that would guarantee the recovery of costs plus a "regulated" rate of return over the investment. It also guaranteed that volumes produced and marketed under the Program would be the last volumes to be re-directed in case of additional supply needs from the Priority Demand (residential, commercial and small industries) which is uninterruptible (and has a lower market price).

For the purpose of qualifying under the "Gas Plus" Program gas producers were required to meet certain requirements that included the following: (a) they had to be a party to and had to comply with the terms and conditions of the Gas Producers Agreement (Energy Secretariat Resolution Nbr. 599/07) referred to hereinbefore; and (b) they had to submit a project to make investments in new gas areas requiring intensive investments and/or in areas having complex geological characteristics (tight sands or low-permeability sands) and/or in areas which had not been exploited since 2004.

Notwithstanding the above, Energy Secretariat Resolution Nbr. 695/09 relaxed the conditions to qualify for the Gas Plus Program and, under certain conditions, even allowed to include in the Program companies that were not signatories to the Gas Producers Agreement.

First results:

According to official data of the Federal Energy Secretariat the first results of the Gas Plus Program are as follows:

Three years after the launching of the Program, 140 new wells started to produce that supply around 9 MMm^3 per day, a volume which would increase to 15 by mid 2012.

To date, the Energy Secretariat has approved 56 projects that are being developed or which will be developed in the future across the country with investments committed for $4.2 billion (one fourth of which has already been invested as of the end of 2011). Resources to be explored are estimated in approximately 3.2Tcf (90.515 billion m^3).

According to data available, prices approved by the Energy Secretariat for the projects would range between 4.10 and $7.00/MMBtu.

The breakdown of resources and investments submitted through the Program is as follows:

- Non-conventional Gas: 1.36Tcf (38.384 billion m^3) of resources and associated investments worth $2.390 billion.
- Exploration: 0.87Tcf (24.660 billion m^3) of resources and associated investments worth $1.451 billion.
- Reactivation of Exploitation: 0.97Tcf (27.473 billion m^3) of resources and associated investments worth $359 million.

At year-end 2011 the status of the Program was as follows:

- 260 new exploratory wells.
- 85% of wells drilled and worked-over were productive.
- Addition of 2.7 Tcf (76.200 billion m^3) in reserves.
- Maximum depth reached: 5,826 meters (Northwestern Basin)

REPORT ISSUED BY EIA (U.S. ENERGY INFORMATION ADMINISTRATION)

Within the framework described above, the shale gas revolution occurred driven by shale oil. Through a combination of technological innovation, fiscal incentives and appropriate price signals this revolution reverted the declining gas production trend in the US. In addition, hand in hand with the lessons learnt in the use of new technologies for horizontal drilling and massive hydraulic multi-fractures it was possible to significantly decrease development costs over time.

In Argentina, the report issued by EIA (EIA – "World Shale gas Resources: An Initial Assessment of 14 Regions Outside the United States" released on April 5, 2011) identified technically recoverable non-conventional resources amounting to 774Tcf concentrated mainly in the Neuquén Basin and in Golfo San Jorge Basin, and ranked the country third in the ranking of countries having greater shale gas resources worldwide, behind China and the US.

Data related to Argentina seem to have a very high predictive capacity because they apparently result from comparisons with geological basins having similar characteristics in the United Sates where non-conventional gas has been successfully developed. These comparisons could be performed because the country has abundant prior geological data as these basins have a long producing history of more than one hundred years.

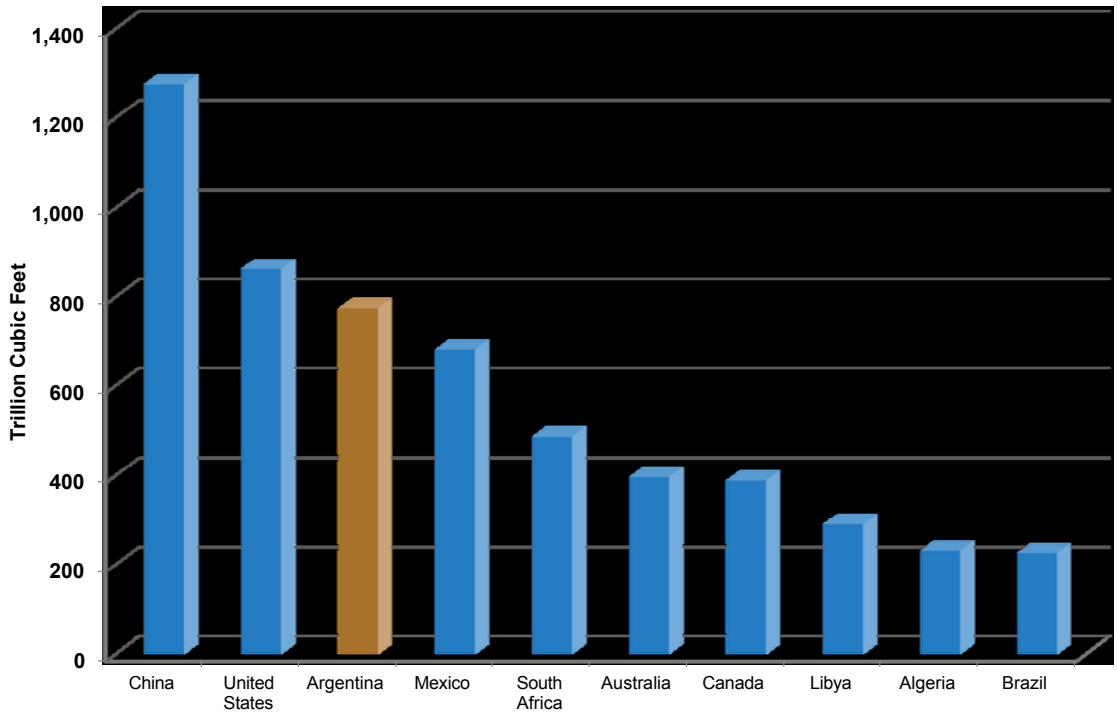
In particular, it is estimated that the Neuquén Basin in view of its extension, reservoir thickness, organic matter content, porosity, permeability, maturity and susceptibility to hydraulic fracturing, would apparently concentrate 407Tcf, exclusively taking into account the technically recoverable resources in its more important formations.

On its part, the Golfo San Jorge Basin would apparently have another 95Tcf of technically recoverable resources in its D-129 and Aguada Bandera formations.

If we consider that consumption in Argentina is equivalent to approximately 1.5Tcf per year, the magnitude of the incorporation of these resources having immense proportions and a tremendous impact, undoubtedly has the capacity to change the supply and the location of energy in Argentina as well as the present structure to supply a consolidated natural gas demand.

Estimated Shale Gas Technically Recoverable Resources

World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States - EIA



EXPERIENCES OF APACHE AND PAN AMERICAN ENERGY IN ARGENTINA

- Experience of Apache Energía Argentina:

Apache has been one of the leaders in the development of the Gas Plus Program in the country since its very inception and, as of December 2011, it is the main producer having produced 38% of total volumes produced under the Program at country level. So far it has pursued its work in the Neuquén Basin having drilled 87 wells in tight sands with a production of approximately 3.45 MMm^3 per day. For Apa che, the development of Gas Plus means having reached 66% of its production available today in the Neuquén Basin and 47% of its total production in Argentina.

Well depths vary according to the location of reservoirs in each field ranging between 1,600 and 4,200 meters.

As an example of the activities pursued by Apache to date in connection with the Gas Plus Program, the development of 5 fields in particular can be mentioned: Estación Fernandez Oro, Anticlinal Campamento, RanquilCo, Guanaco, and Loma Negra NI.

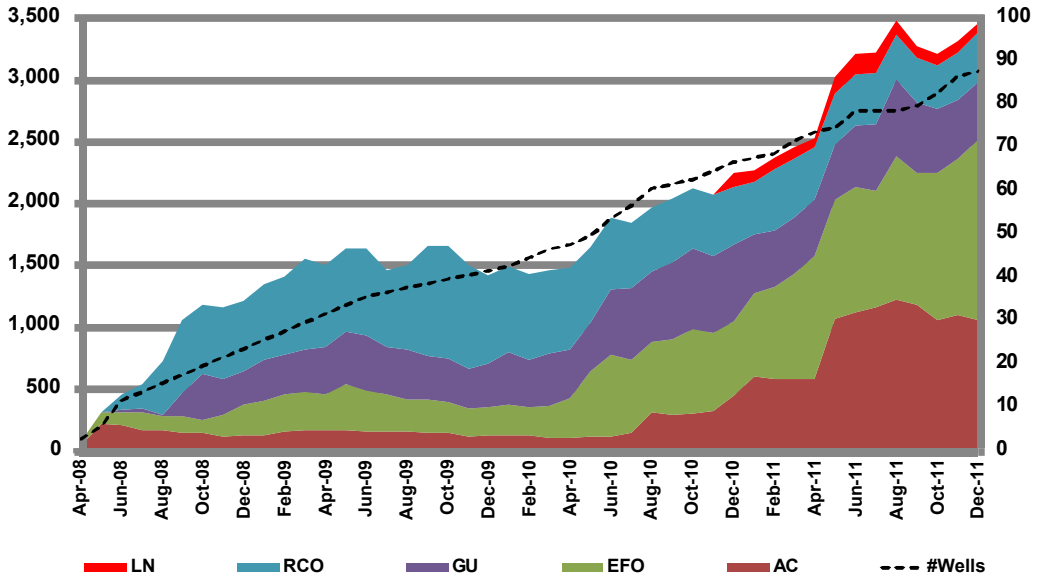
Out of the 87 wells drilled, Apache has used state-of-the-art technology in 2 horizontal wells in Anticlinal Campamento field and, in this same sense, it is drilling an additional horizontal well in Guanaco Field at present.

An example of a horizontal well drilled into the Precuyo Formation (tight gas) in Anticlinal Campamento Field, Neuquén Basin, is Well ACS-15h drilled in 2011. The final vertical depth of the well was 3,990 meters. As the reservoir is characterized as tight gas and for the purpose of obtaining adequate production levels, 4 multiple fracs were made with 6.8Tn of sand and 680 m^3 of fluid in each frac. In addition, micro-seismic technology was used to detect micro events. Frac lengths ranged between 120 and 400 meters and the well produced 250,000 m^3 per day of gas at 1.460 psi on a 12 mm orifice in initial production tests.

On the other hand and as an activity in addition to the Gas Plus Program, in 2011 Apache drilled and started to produce in the Neuquén Basin the first horizontal multi-frac well into a shale gas formation in Latin America (ACOx-2001p). The vertical depth of the well was 3,600 meters with a 900 meter horizontal section into Los Molles formation. To complete the well 10 multiple fracs were made using 32,000HP (16 trucks) at a pressure of 12,000 psi. Never before had this power and a similar pressure been used in Argentina to perform this kind of work. To supplement drilling, different core samples were obtained to study the reservoirs and their shale gas resource potential.

Production and wells drilled - Apache's Gas Plus in Neuquen Basin

(Total Gas Plus prod.= 3.44MMm^3/d @ Dec 2011- (87 wells)



- Experience of Pan American Energy ("PAE"):

Since 2008, Pan American Energy has been another leader in the Gas Plus Program having presented in respect of both its operated and non-operated areas a total of 17 projects within the framework of the program of which 12 have already been approved by the Federal Energy Secretariat.

Out of the total number of projects already approved, 2 were non-productive and 5 are already producing. With a total of 15 producing wells in Golfo San Jorge Basin and 45 wells in the Neuquén Basin, gas production of Pan American under this Program is equivalent to 2.2 MMm^3 per day. This volume represents at present almost 12% of the total production of the company.

As an example of the work conducted so far by PAE below is a brief description of "Trahuil Project". This is a deep exploratory prospect that qualifies as "New Field" under the Gas Plus Program.

"Trahuil Project" is in "Anticlinal Grande – Cerro Dragón" block, Golfo San Jorge Basin. The project started in October 2008 with one deep exploratory well drilled to a depth of 3,250 meters (PAE.Ch.Tr.xp-1), the only precedent being the 3D seismic recorded in the area.

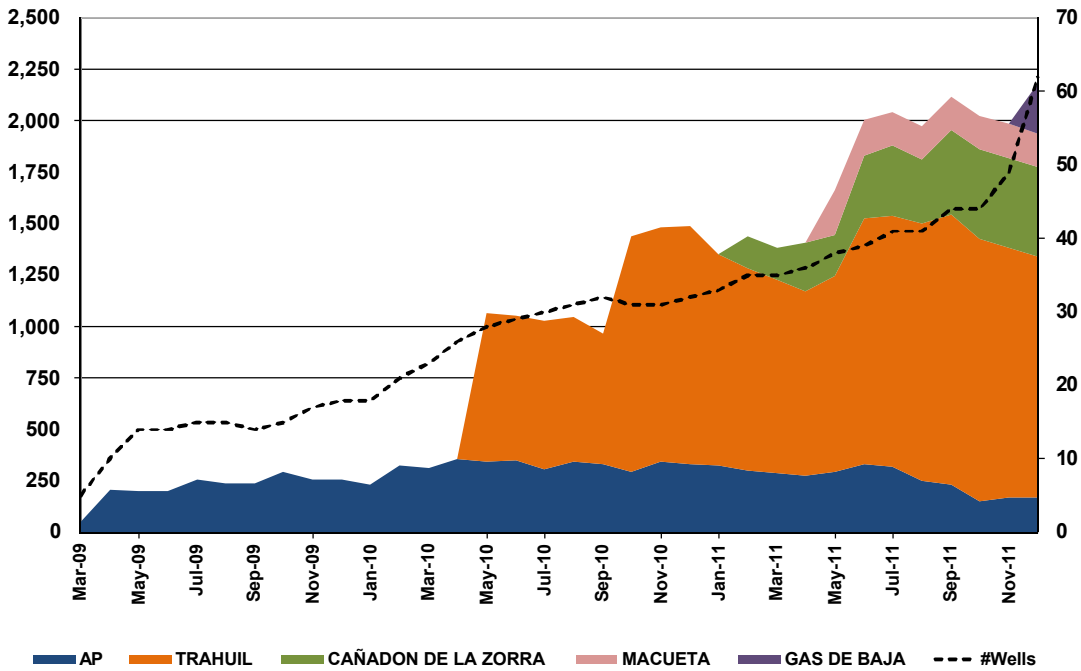
The well targeted gas in D-129 Formation located in layers below producing horizons both in this field and in nearby fields.

At present there are 3 producing wells at "Trahuil" and the exploitation program contemplates drilling four additional wells.

To conclude, Trahuil is producing at present 1.2 MMm^3 per day.

Production and wells drilled – PAE´s Gas Plus in NQN, GSJ & ACA

(Total Gas Plus prod. = 2,19 MMm^3/d @ Dec 2011 – (62 wells)



OPPORTUNITIES

Argentina has an immense supply of non-conventional resources and thanks to the technological changes that have occurred over recent years the necessary tools to develop these resources are now at hand.

With its more than 100 years of production history, Argentina has a consolidated domestic demand (52% of the energy mix) and would be able to export surplus volumes in the future through existing gas pipelines dedicated to the main regional markets.

It currently has significant surplus infrastructure for gas transmission and conditioning as well as for gas processing to strip liquids.

Likewise, basins where non-conventional resources are located have facilities for storing and transporting liquids. This would allow to take advantage of the mixed fields where there is shale oil and through them obtain economic leverage for developing natural gas.

Argentina has highly qualified human resources and a concession structure of private companies capable of making investments without requiring additional expenditures from the public sector.

As explained before, an increasing percentage of Argentina's demand is currently supplied with LNG and with gas imported from Bolivia. In the first case through short-term purchases and in the second through a long-term agreement that expires in 2027.

While average prices paid to local producers remain very depressed with respect to the regional prices of natural gas and substitute energies, the demand of gas imported from Bolivia and re-gasified LNG is subsidized and prices do not constitute an appropriate indicator of the relative scarcity of that commodity.

The development of non-conventional gas resources can supply the domestic market and a significant portion of regional markets.

Considering the current prices of imported gas, the development of very significant volumes of non-conventional resources could be undertaken at prices lower than the export parity in addition to developing regional economies, contributing resources to the Provinces through hydrocarbon royalties and to the Federal Government through federal taxes, creating jobs locally and adopting the best technologies available in the world.

THE INCENTIVE OF NEED

In spite of the substantial economic growth of recent years, Argentina has suffered a permanent reduction in the production of oil (since 1998) and natural gas (since 2004). For this reason it ceased to be a net exporter of energy to become a net importer increasingly depending on imports that grow in both volume and price.

One of the main pillars of Argentina's growth model over recent years has been that it has maintained "twin" surpluses, that is, it has had a positive balance both in fiscal and in foreign trade accounts.

However, these positive balances gradually decreased to the extent the 2009 crisis affected the international demand of products having greater relevance in Argentine exports.

Also, among the main causes of the deterioration of the commercial surplus is the deficit in the Energy area where volume and prices maintained their growth trend.

It is estimated that the energy deficit in 2011 was close to $3 billion and that the deficit projected for 2012 would double to $6 billion. The threat of the energy deficit on public accounts is an important incentive to adopt measures geared to reducing it.

The domestic demand that steadily increases and the domestic prices that remain frozen as a result of the intervention by the government converge directly or indirectly to the increase in subsidies that can become unsustainable for public finances in the short or medium terms.

There is no doubt that Argentina, at present, cannot do away with natural gas imports neither from the point of view of its production system nor from the point of view of public accounts since any interruption in gas supply to the industrial sector that manufactures exportable goods would bring about the double effect of reducing the activity level and at the same time the reduction of production of a locally manufactured product which would entail the consequent need of increasing imports to substitute it.

Aside from the need to import that exists at this specific moment, the introduction of imported energy supplies at increasing international prices seems to challenge the economic sustainability of the growth model undertaken. If conditions were created to promote non-conventional gas and oil at prices lower than import parities and the byproducts associated to those non-conventional resources which are beneficial for the country in fiscal terms, in terms of employment and optimization of resources and in terms of the state-of-the-art technology that is employed, the country and its economic model would benefit since Argentina would regain its past energy self-sufficiency.

CHALLENGES

The transformation of this immense opportunity into a sustainable reality requires much more than an attainable demand and prices that make development viable. It demands a specific legal and regulatory framework for the activity which should adjust itself to the development of non-conventional gas and this represents a very significant institutional effort for all stakeholders in the hydrocarbon industry. The following aspects should be taken into account among many other: incentives related to very substantial high-risk investments; logistics, management and handling of the necessary water resources; treatment and processing infrastructure; pipeline expansion; human resources; relations with landowners and stable

master agreements between federal authorities (that regulate the natural gas market) and provincial authorities since the property of the subsoil belongs to provincial states.

Social consensus is also required with regard to the environmental guidelines that will regulate the activity since they entail much more than just technical reasons and should meet standards that are socially acceptable for the communities in which those activities will be conducted.

In addition, it is necessary to guarantee that there will be low levels of labor conflicts and also to agree how the economy will receive an immense quantity of resources primarily channeled to one activity with the social consequences that are likely to follow. In this sense, the following should also be underscored: cost control (costs are increasing excessively at present) and the conflicts which need to be addressed within Provincial states and between Provincial states with different resource availability.

These guidelines must be solved within the sphere of public policy as a condition precedent so that the efforts of companies, the Provincial states and the Federal Government can articulate to transform this opportunity into successful and sustainable long-term results.

Finally, we should underscore the challenge posed by the cultural change required to move from the present exploitation business model where big companies exploit vast concessions to a model where small companies intensively exploit smaller fields with highly specialized technologies.

CONCLUSIONS

According to the report issued by the US Energy Information Administration which was mentioned in this paper, Argentina has an enormous potential of non-conventional resources. If the development of these resources is successfully managed, natural gas supply would significantly increase and would allow to supply local demand. This would bring about an increase in economic activity in general and would enable to sustain local labor over time. Benefits would have a positive impact on companies that invest in exploration and production and also a direct impact on the entire value chain, that is, from producers to end consumers, guaranteeing that no supply restrictions will exist.

Argentina currently imports significant volumes of natural gas to supply approximately 20% of its gas consumption. It is therefore possible to revert this situation by substituting gas imports paid at international prices which affect the trade balance and do not generate work or economic activity for the country.

The increase in non-conventional gas production would also bring about an increase in royalty and tax collections by Provincial states and the Federal Government.

Thus the possibility exists to attract genuine exploration and production investments which would drive regional economies as well as vast sectors of the society.

Argentina would benefit from the contribution to the country's technological development through the techniques used in the exploration and production of non-conventional resources. In addition, the need of materials would bring about an increase in the local supply of specific equipment and services for this type of applications.

Finally, the increase in production and reserves would strategically revert the country's present dependence on energy imports.