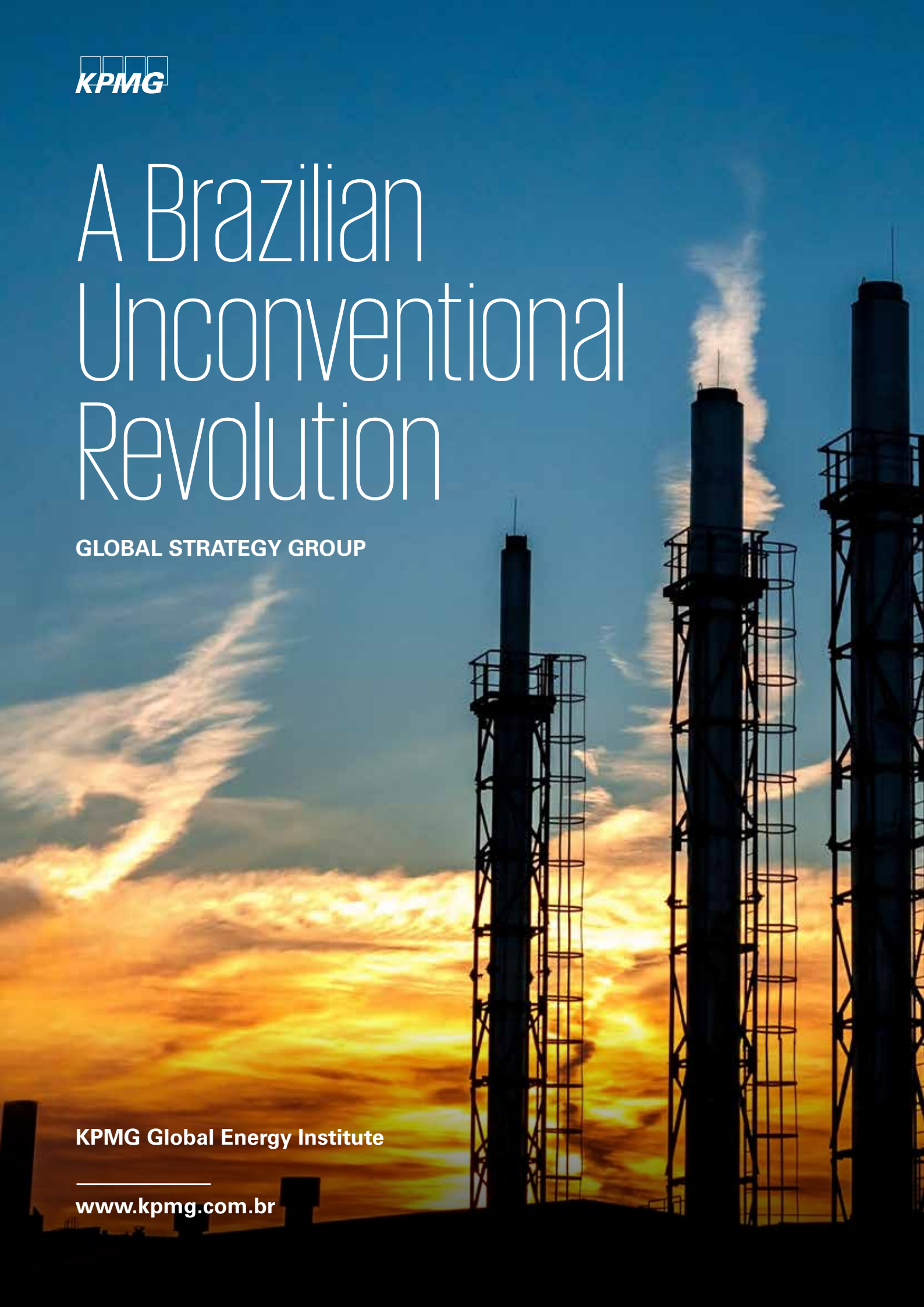
KPMG

A Brazilian Unconventional Revolution

GLOBAL STRATEGY GROUP



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Prologue

In a near future, onshore shale gas exploration could become a strategic priority for the Brazilian Oil & Gas sector. To that end, the ability to develop business should be encouraged, simplifying public concession structures and environmental regulations in order to boost the industry.

Disregarding the inherent economic return of the activity, the onshore shale gas production drives research and technology development in the country, and represents an opportunity to promote less developed regions in Brazil. Shale gas also allows for flexible and localized energy production, pushing Brazil to explore new energy alternatives as part of the coming energy matrix transition.

The nature of onshore shale gas production represents an opportunity for smaller investors and operators, as well as other players such as petro chemical and independent energy producers, supporting the development of a strong local supply chain and a more distributed economic opportunity across the country.

As we go deeper in understanding the deterrent factors for the onshore shale gas opportunity in Brazil, we identify that the main actions to be taken in order to propel this industry will include:

- simplification of the regulatory framework;
- clear definition of the environmental licensing process and its requirements;
- development of industry-related tax incentives;
- simplification of administrative processes, including regional energy concessionaires;
- development of alternative monetization mechanisms such as "Gas to X".

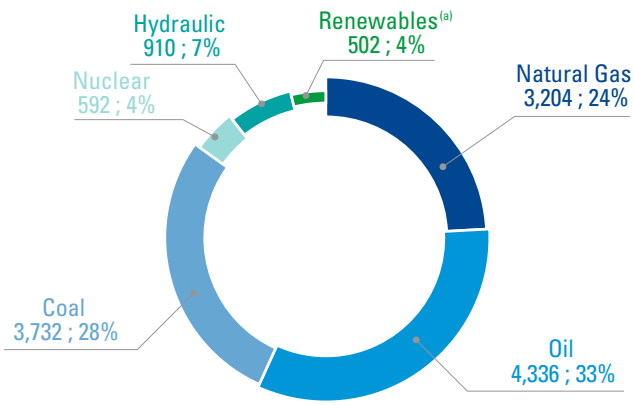
Additionally, we believe that the use of the offshore R&D Incentive Clause could support the development of the onshore shale gas industry, as a way to incentivize the participation of international and local investors in the development of this interesting industry in Brazil.

It's not about onshore or offshore or Shale options, but onshore and offshore and shale simultaneously.

A collaboration of: Armando Cavanha

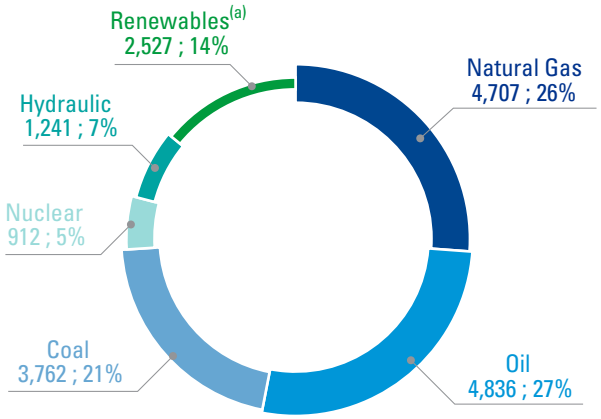
A world in transition

Energy matrix, 2016 - btoe



Note: (a) Includes biofuels
Source: BP Energy Outlook, 2018

Energy matrix, 2040 - btoe



GLOBAL FORECASTS

Looking to the future, energy demand is expected to be 30% bigger in 2040[1], as global GDP should rise 3.5% per year, following a growth in population, pushed mainly by China and India[2].

The world will need more energy, however more than ever, environmental concerns and technological advances are disrupting the energy sector.

In this context, in 2015, the Paris Agreement celebrated the commitment of 195 countries to keep the rise of global temperature below 2°C. Since then, government institutions have incentivized the transition to cleaner fuel sources and more efficient use of energy, mainly through policies and fiscal benefits.

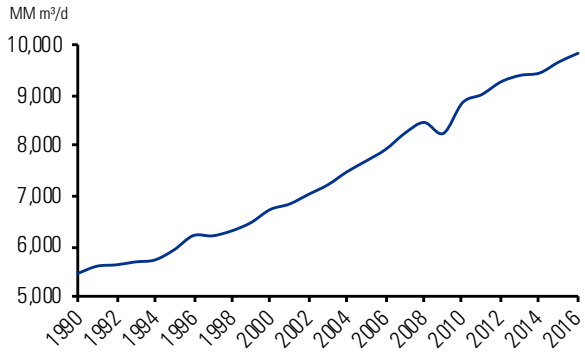
As a result, renewables and natural gas are expected to grow at a fast pace until 2040 (1.6% and 7%, respectively), supporting a transition to a cleaner energy matrix[1].

45% is the growth expected for natural gas consumption in the next 25 years(1).

Since 2010, solar energy consumption is growing at rates above 30%, this represents a continuous **exponential growth.**

NATURAL GAS: THE BRIDGE FOR THE FUTURE

Natural gas consumption has grown over the years, first used as alternative for coal and then for oil, mainly in the power generation and industrial sectors:



Source: BP Statistical Review of World Energy, BP, 2017

As solar panel, wind turbine and battery technology reduces its costs, renewables consumption will grow worldwide above the growth of fossil fuels. But, especially in less mature markets traditionally dependent on coal, like China and India, natural gas is expected to work as a "bridge", allowing a faster transition to a decarbonized energy matrix(1).

Due the intermittent nature of renewable generation, natural gas can provide capacity during peeks of consumption or lack of production due natural events, like low solar intensity or low wind speeds. Trade is enabled by the fast expansion of NGL, which ensure access of non-producer countries.

Source: (1) World Energy Outlook, IEA 2017; (2) World Oil Outlook, OPEC, 2017 ; (3) BP Energy Outlook, 2018

What is new with unconventional resources

What are they?

Despite the lack of consensus about the definition of "what the unconventional resources are"[1], we will consider those to be resources onshore located in low permeability formations, which need stimulation techniques, such as hydraulic fracturing, in order to be produced/extracted.

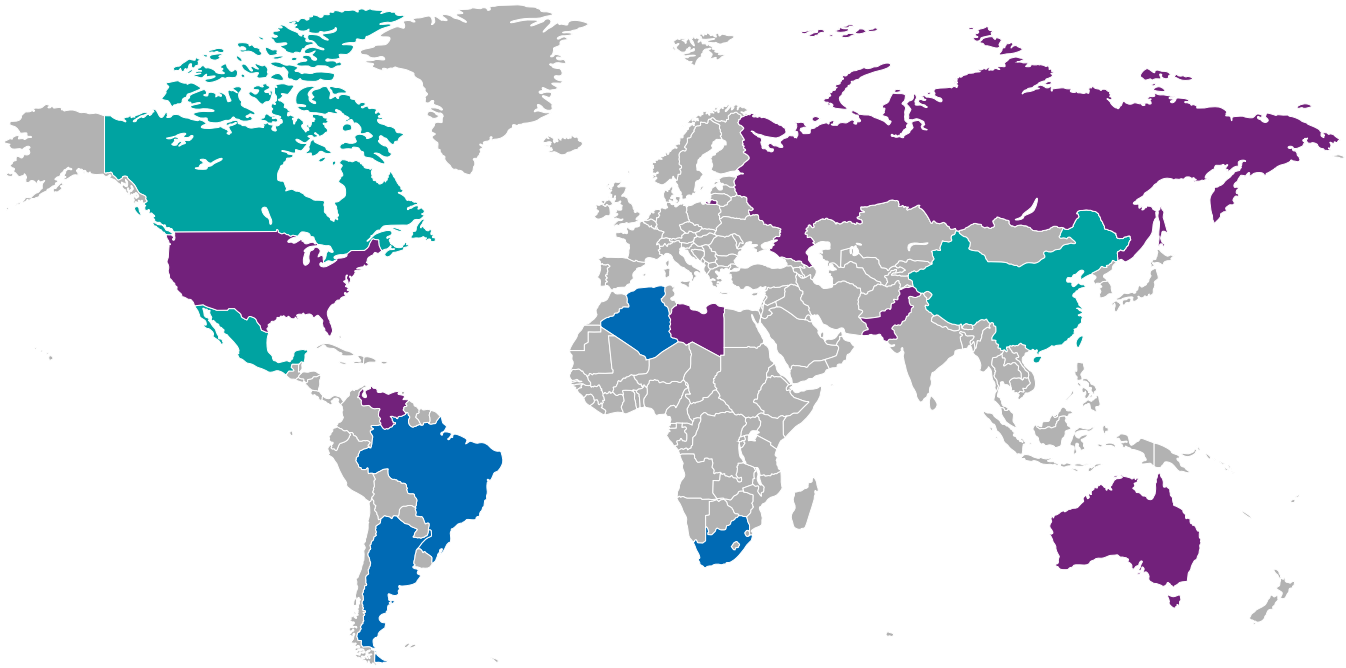
Hydraulic fracturing is a technique of pumping large quantities of fluids at high pressure down a wellbore and into the target rock, seeking to create fissures in order to allow infiltration of fluids within the well. Fluids commonly consists a mixture of water, chemical additives and proppant (incompressible particles like sand and ceramic pellets)[2][3].

Between the 1980s and 1990s, Mitchell Energy experimented fracturing the Barnett Shale, and by 2000 it was possible to produce commercial volumes of shale gas[4].

Tight gas, coalbed methane, gas hydrates, shale gas, and tight oil are all considered unconventional resources.

Where are they located?

Currently, technically recoverable shale oil and shale gas resources have been identified in 41 countries, ranked by different levels of potential[5]:



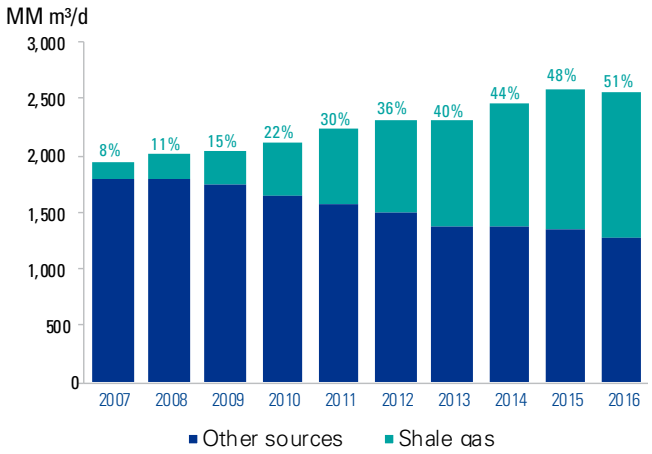
Top country in tight oil, resource | Top country in shale gas resource | Top country in both resources

(1) What Are Unconventional Resources? A Simple Definition Using Viscosity and Permeability, Harris Cander, 2012; (2) Resolution 21, ANP, 2014; (3) The Process of Unconventional Natural Gas Production, EPA, 2018; (4) Where our natural gas comes from, EIA, 2017; (5) Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States; EIA, 2013

The beginning of a Revolution

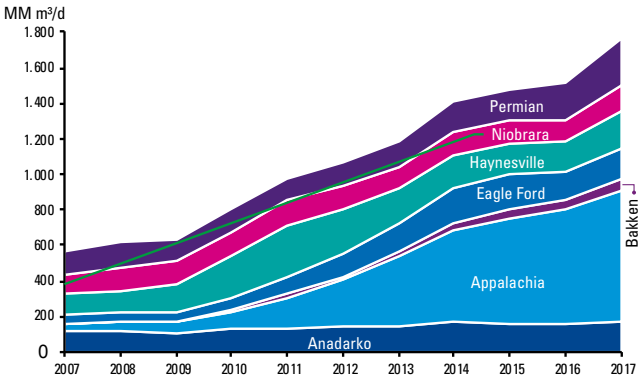
Recent developments in horizontal drilling and well stimulation have made possible the current surge in unconventional oil and gas commercial production in United States, beginning in 2007. The big volumes of oil and gas pumped to market combined with the increase on OPEP production pushed the oil barrel to USD 26 in January, 2016. Despite the crisis, the need for leaner operations in pursuit of reduced operational breakeven consolidated the unconventional role in global production.

US Market Dynamics



Source: Natural Gas Summary, EIA, 2017

Due to its natural low permeability reservoirs, production is limited and the decline period tends to starts early, which could lead to lower profitability in conventional prediction. However, the ability to better position within the market dynamics, plus the focus on leaner operations, allowed for profitable operations in US overtime.

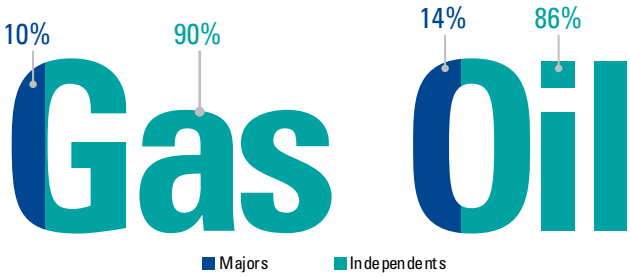


Source: Drilling Productivity Report, EIA, 2017

Who is the common player?

Flexibility of production and short pay back times allow small companies to thrive in the unconventional business. Contrary to the large IOCs, that are interested in higher risk and long-term returns; independent companies do not have an integrated operation and look to smaller projects with faster returns than can accommodate market dynamics:

US Companies profile



Argentinian market dynamics

Argentina is the second country in the world in terms of recoverable shale gas resources. Since 2010 unconventional production has increased, reaching 39% of gas and 28% of oil domestic production in 2016[1].

With development of concentrated reserves in the Neuquén and Austral basins, Argentina reverted the decline in mature fields, and represents today a successful case of commercial production outside US. State-owned company YPF – together with Chevron and Tecpetrol – accounted for 62% of oil production in 2016. Gas production is lead by Total Austral, followed by YPF and Petrobras, respectively[2].

50% of Argentinian natural gas production will come from unconventional sources by 2025[3].

Source: (1) Boletín Estadístico nº 182, Dirección Provincial de Estadística y Censos, 2017; (2) Pronósticos de Petróleo y Gas, MEyM, 2017; (3) Escenarios Energéticos 2025, MEyM, 2016

How the main markets are structured

			
Mineral resources ownership	Landowner	States	Federal Government
E&P activities regulator	State Authority and BLM on federal proprieties	Energy Ministry among provincial supervision	Energy Ministry and ANP
Environmental permits	State Agencies, Mining Authorities and NEPA-CEQ on federal lands	Environment Ministry and Secretariat of Environment	Ibama (offshore) and State authorities (onshore)
Conventional and unconventional resources distinction	Yes	Yes (Law 27.007/2014)	Yes (ANP Resolution 21/2014)
Main resources on unconventional formation	Tight oil and shale gas	Shale oil and tight gas	Shale gas and tight oil
Reserves distribution	Distributed	Concentrated	Distributed
Transmission	Regional concessions / Private capital	Regional concessions / Private capital	Regional concessions / Petrobras informal monopoly (in transition)
Transportation infrastructure	Well distributed	Well distributed	Coastal
Distribution	Regional concessions / Mixed capital	Regional concessions / Mixed capital	Regional concessions / Mixed capital
Consumption	Power generation Industrial Residential	Power generation Residential Industrial	Power generation Industrial Oil Refining

But is it environmentally friendly? What are the main concerns?

Hydraulic fracturing technique has raised big concerns around water source contamination, toxic/ mutagenic or bioaccumulative additives effect, volume of water used, micro-earthquakes, flowback water treatment, among others.

Here we present some of these issues and the best practices adopted by industry to avoid or mitigate social-environmental impacts of unconventional exploration:

Well integrity

This risk is usually related in most cases to cement and casing failures. Gas migration could lead to water contamination or even blowouts, in extreme cases[1].

Good industry practices include logging after each casing phase, equipment and pipe integrity tests, pressure monitoring, use of microseismic, geomechanical modelling.

Land use and earthquakes

In percentage terms, surface equipment and installations correspond to 1.4% of the subsurface area explored. Despite this, preservation areas, vegetation displacement and soil deterioration have to be taken into account. There are some incidents of micro-earthquakes provoked by unconventional activity, the most pronounced one registering 3.8 on Richter scale, in the Horn River basin. Although activities such as mining and geothermic operations had lead to stronger cases, monitoring of injection rates and pressures, seismic sensors and geological studies close to fractures figure in the best practices of industry.

Water use and fluid disposal

The fluid pumped into rocks is mostly composed of water. A study of 500 wells in Marcellus (US) estimated that 4-30 thousands of cubic meters of water is used per well, and 76% corresponds to hydraulic fracturing fluid. According to this study, 89-95% of the fluid injected that returns to surface is reused, but as additives are mixed with water to get proprieties like viscosity, density, friction factor, etc.[2].

Good practices such as disclosure of fluid composition, establishment of concentration limits of substances for disposal and installing of level alarms in tanks are recommended.

Spills and water sources contamination

Surface spills are more critical in unconventional exploration due the large volumes of fluid used, and transport, storage and treatment are some activities that deserve attention. Maybe the most concerning issue in terms of unconventional exploration, is when water source contamination occurs with the producing lay connected to aquifers due to casing and cementing failures, induced fractures or geologically.

Definition of buffer zones (establishing the minimum distance between drilling and water layers), hydraulic studies (including permeability, matrix, pressure regimes, fractures propagation), waterproofing areas and use of tracers in monitoring wells are extensively recommended[3].

Source: (1) Environmental Impacts during Marcellus shale gas drilling: causes, impacts, and remedies, SRSI, 2012; (2) Process Based Life-Cycle Assessment of Natural Gas from the Marcellus Shale, Jiang et. al, 2013; (3) Aproveitamento de hidrocarbonetos em reservatórios não convencionais no Brasil, CTMA/PROMINP, 2016

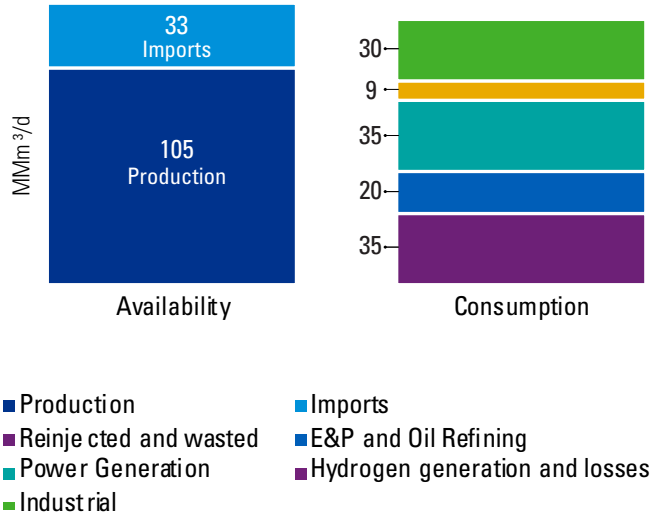
How does Brazil position against that context?

Brazilian Gas Market

Natural gas is mainly consumed in the power generation and industrial sectors in Brazil.

Brazil produces a large amount of natural gas, a trend that is expected to grow, as pre-salt fields have a higher gas/oil ratio. However Brazil imports 26% of its consumed gas, a large proportion of it is actually reinjected of flared as part of the production operations[1]:

Natural gas in Brazil



Source: Resenha Energética Brasileira, MME, 2017

The majority of Brazilian gas imports come from Bolivia, which had seen its R/P ratio fall sharply along the years. The R/P ratio measures how much time a country has of production of a resource, considering the level of discovered reserves and production at time. The biggest contract of supplying with Petrobras (18MM m³/d) expires in 2019[2], remaining the question about how much of this will be renewed and whether Petrobras would be the contractor, again?

Bolivian R/P ratio[3]		
	116	2000
	14	2016

Gas to Grow

Aware of the preponderance of natural gas in the future energy scenario and the changes expected with Petrobras disinvestment in infrastructure gas assets, the Brazilian government proposed a legal initiative seeking to boost market dynamics and give flexibility of the use of essential facilities.

The program, called "Gas to Grow" proposes an integration between the Electrical and Gas sectors, restrictions on nominations of distribution company board members by producers, effectiveness of free consumers, among others initiatives.
In this context, the substitute of Law 11.909/2009 is awaiting approval in Brazilian Congress, proposing:

Coordinate Plan of Transport System Development, presented by transportation companies to ANP, suggesting optimization and expansion initiatives

Authorization Regime, including construction, expansion, operation and maintenance of facilities

Veto of board designation power, members of board or directors of producing companies could no longer indicate decision makers at distributing companies

ANP metrics, of periodic and extraordinary reviews of prices, capacity cession of pipelines, buyers guarantees, among other issues

Access to essential facilities, such as pipes and terminals, in respect to the proprietary priority, **and commercialization by** producers, free-market consumers and distributing companies

Source: (1) Resenha Energética Brasileira, MME, 2017; (2) Novo contrato da TBG será no regime de entrada e saída, ABEGÁS, 2017; (3) Statistical Review of World Energy 2017 – underpinning data, BP, 2017

Natural gas will soon be a global commodity

As gas becomes a more relevant energy source, markets will gain flexibility and breed the base of suppliers, consumers and investors. Global trade is a reality for natural gas, proved by LNG terminals around the world. China is expected to be the largest LNG importer, (surpassing Japan) by 2030[1]. As in Brazil, the movement to adapt to flexibility that energy consumption requires more than ever is seen in China, where a domestic reform gains strength as LNG supplies increase.

The reform seeks to boost third-party access to gas terminals, liberalize domestic gas pricing and promote a Chinese trading hub. Due the increase of gas demand and lack of import pipelines in highly populated coastal regions, spot purchases will soon take an important place.

Looking for short-duration deals and transparent pricing mechanisms, a shift of risk from buyers to sellers will come, as the oil-linked LNG pricing deals becomes shorter, while gas becomes a global commodity.

Source: (1) Opportunities and challenges of China's LNG expansion, S&P Global Platts, 2018

How attractive is the Brazilian market for onshore production?

Brazilian oil and gas conversation is usually about offshore investments and technology, especially after pre-salt discovery. But onshore basins have a wide potential, still not explored as it deserves. We present some factors about the context in which onshore investments are inserted in Brazil, although they are not extensive.

CONSTRAINTS

Brazil had a gap of blocks offer between 2008 and 2013, when the production sharing model for pre-salt areas was formulated and no Bid Round occurred. This generated a lack of investments for subsequent years and impaired operations of a lot of companies that depended on the oil value chain;

Since most of Brazilian reserves are located offshore, institutions, regulatory authorities and companies had traditionally focused on this activity, and onshore investments, typically made by small companies have been "left aside";

The unsuccessful events after the 11th and 12th Bid Rounds evolving environmental licensing generated legal uncertainty for investors;

Disappointment in results of the last onshore rounds, as there were no offers for the 21 blocks in the 15th Bid Round could be in part explained by Petrobras divestment, Topazio Project, which offers 104 onshore fields;

Bureaucracy and a complex tax framework is a barrier for small companies, typically interested in onshore projects;

As onshore basins were not extensively studied, the data available is scarce, taking into account the size of the basins.

INCENTIVES

In the beginning of 2017, the Energy and Mines Ministry launched an initiative known as REATE, a program for revitalization of onshore oil and gas exploration and production activity. At the same time, ANP created a department focused on onshore areas. This initiative generated goals like:

Raise onshore Brazilian production by three times, from 140 to 500 thousand bbl/d by 2030[1];

Definition of criteria for unconventional Bid Rounds and end of the restriction for unconventional production[2];

Regulation of Signature Bonus restitution in case of obstruction of contracts by legal determination[2];

Permanent offer of areas, which is being implemented by ANP[3];

As part of oil discovery in Brazilian territory, there are some wells drilled in onshore basins which found source rock resources, then abandoned. Those regions (and some of them regions of mature fields) already have an infrastructure installed, and could be used for pilot projects;

Onshore technologies and infrastructure generally require less investment, and hydraulic fracturing techniques could be considered consolidated on the market;
Initiatives such as REATE, Gas to Grow and stratigraphic wells drilled by ANP had been showing government efforts to go forward with onshore exploration, which is essential to push unconventional exploration progress.

Source:(1) Metas do Programa REATE buscam triplicar produção onshore no país até 2030, Energy Way, 2017; (2) Grupo de Trabalho do Programa de Revitalização das Atividades de Exploração e Produção de Petróleo e Gás Natural em áreas terrestres, MME, 2017; (3) Tudo que sabemos sobre a oferta permanente, E&P Brasil, 2018

How attractive is the Brazilian market for onshore production?

Considering the high GOR (gas-oil ratio) of pre-salt fields plus the Bolivian gas supply, the question is raised as to whether it is feasible to have shale exploration in Brazil.

Gas produced in offshore fields requires a strong outflow infrastructure, i.e. hundreds of kilometers of pipelines going onshore. Despite Rota 1, 2 and 3 (the last one under construction), much of the gas produced today is then reinjected or the gas going onshore alternatively is processed and distributed along a coastal way.

There are 4 main reasons that explain why unconventional gas exploration could be a successful activity in Brazil:

Unconventional resources are therefore placed in onshore basins, and gas outflows to distributing and processing hubs demand low investments.

There is an infrastructure installed in mature basins, and governmental institutions are used to oil industry activities.

Flow rates are not limited to a secondary fluid, since the main fluid is natural gas.

During unfavorable price scenarios, the fields could be easily switched off, working as a market thermometer: switch on/switch off, depending.

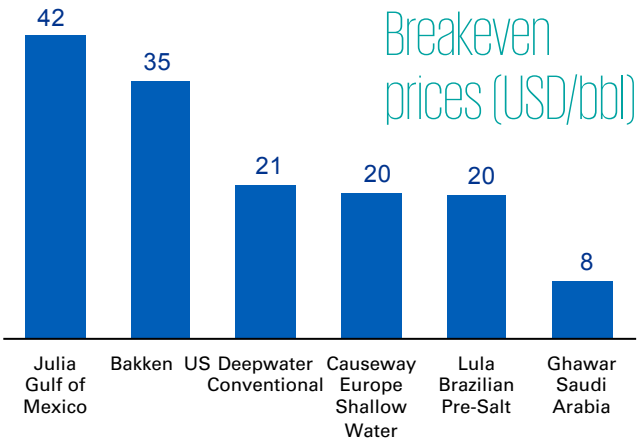
Flexibility as a driver in unconventional production

Unconventional gas projects need lower investments, compared to offshore projects, which require larger investments to capitalize. These unconventional investments also have a lower payback time, hence the quick returns enable a faster cash flow cycle that enable investments in yet newer projects. This characteristic turns shale gas investments attractive for investors that do not want long term exposure, and that require higher returns in exchange of higher asset risk profile. These assets also have a higher level of flexibility to operate, benefiting from favorable market prices. On the other hand, these assets allow more balanced risk profiles as the investor can diversify the investment upon a larger amount of smaller projects.

Pay back time (years, 2016 basis)

Intern Return Rate (%, 2016 basis)

Breakeven prices (USD/bbl)



Source: IHS Markit Vantage, 2018

Unconventional projects showed resilience in front of low prices scenario, hitting a breakeven at $35/bbl in the Bakken play, for example, with the consolidation of the technology combined with a leaner operating model.

When considering the reality of Brazil, the fact of not having an adequate logistic infrastructure and the current transition to a more balanced energy matrix are clear drivers for unconventionals in the market. On the other hand, the lack of adequate environmental regulations and operational certifications are two different factors against that same business model.

"My name is Mica"

We developed a "virtual" field, named Mica, in order to establish how the different cost events in an unconventional asset could influence Mica's cost base. Mica is an unconventional shale gas field with insignificant oil production located in the Northeast of Brazil.

The Mica field story

Unconventional gas field
Lower GOR
Parnaíba Basin
Area: 400 km²
Horizontal wells
TVD ~ 2.000 m
Time to drill a well: 30 days
Start of production: 2018
End of production: 2040
Frac stages: 21
Gas composition: CH4: 92%; C2H6: 5%; H2S: 0%
Currency: USD
Inflation Index: 2%
Discount rate: 10%
Royalties: 7,5%
Special Participation : 0%
Signature Bonus: USD 0
Commodity prices: IHS Markit forecasts
Percent CAPEX capitalized: 30%
CAPEX for first year: USD 50 million
CAPEX change factor: 1.0

What would be the cost of developing a Brazilian shale asset?

Our study considered 34 producing assets in US and Argentina as benchmarks to costs and established qualitative criteria, based on Brazilian maturity to the related cost[1]:

Newcomer
Cost is 30% above the sample mean

Comparable
Cost is 10% above the sample mean

Elder
Cost is the sample mean

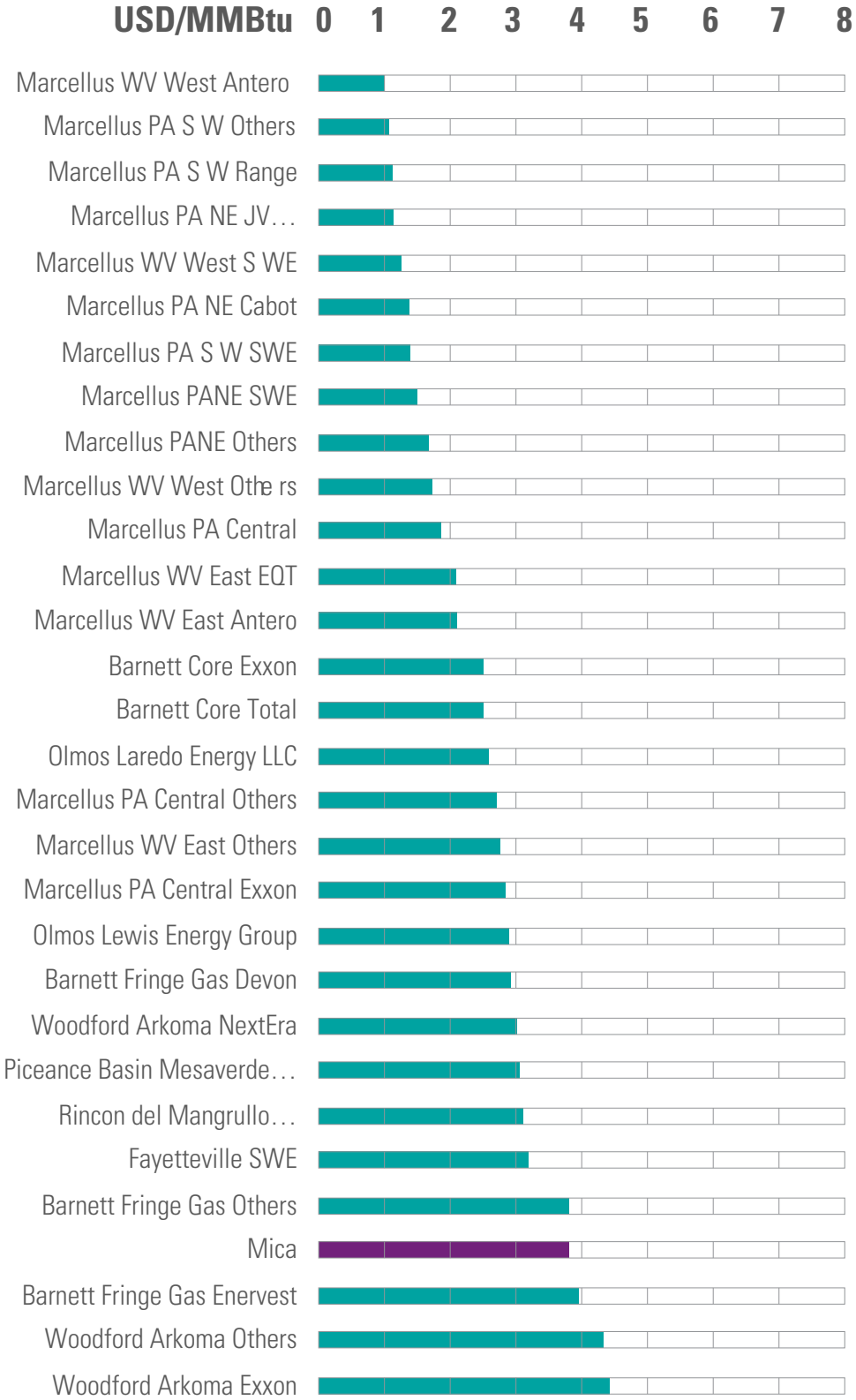
The costs analyzed and the fraction of CAPEX are[1]:

	Costs	Criteria	% CAPEX	Assessment
Drilling Costs	**Permit, Survey, Clean Up and Construction**		4.4%	There is a high uncertainty around environmental licensing, since no concession from 12º Bid Round had permit to starts to operate
	Rig, bits, casing, drilling fluid, logging, others		23.3%	Due the strong offshore activity, these equipment and services already have a consolidated market
	Cementing		2.9%	Cementation job is expected to vary only on formation specificities and length
Completion Costs	**Trucking and Hot Shots**		0.2%	The access to areas where a commercial activity doesn't exists is in general poor
	Proppant (sand, ceramic, resin coated)		3.2%	Brazil does not have a commercial proppant production in scale that a unconventional asset demands, there is no supply chain developed.
	Completion logistics		2.0%	The access to areas where a commercial activity doesn't exists is in general poor, specially in Brazil that relies on highways.
	Fracturing consumables		4.0%	Due the strong offshore activity, these materials, often used in drilling fluids have a mature market
	Frac Water gathering, storage and transfer		6.1%	Knowledge about water sources in this areas are still incipient and initial investments will must be done for connection and transport to wells. Besides, legislation for wells distancing, water gathering and storage is still underdeveloped.
	Flowback services and water disposal		4.5%	
	Completion Rig		0.7%	Initial costs could be higher at an initial moment, due the atypical demand for onshore rigs, but supply industry is consolidated on country.
	Perforation services, packers, coiled tubing, pipes, logging and others		11.3%	Due the strong offshore activity, these equipment and services already have a consolidated market
Facilities Costs	**Wellhead, artificial lift, facilities construction**		11.6%	Initial costs could be higher at an initial moment, due the atypical demand for such equipments, but supply industry is consolidated on country.
	Flowlines		0.1%	Due the strong offshore activity, these equipment already have a consolidated market
General Costs	**Workforce**		6.9%	Labor legislation is more restrictive and occurs in more costs in Brazil
	Fuel and Contingency		9.6%	Fuel prices tends to follow international references and contingency costs usually are based on best practices of industry
	Equipment leasing		8.9%	Due the strong offshore activity, these equipment already have a consolidated market

Source: (1) O desenvolvimento de recursos de gás de folhelho no Brasil: Aspectos econômicos, regulatórios e ambientais, 2018

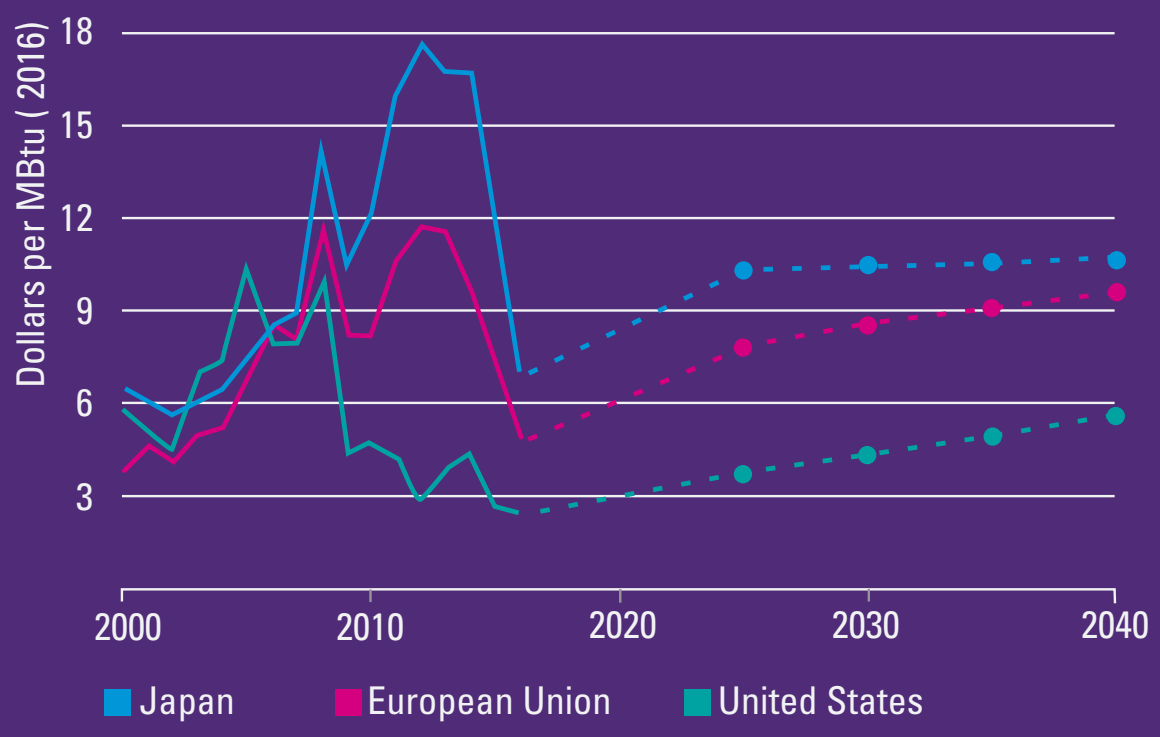
Is it sustainable?

The field earnings and costs were calculated through a financial model and a breakeven price of USD 4.4/MMBtu was obtained, i.e., the price where net present value is equal to zero:



Natural Gas prices forecast

It is worth forth to mention that model's breakeven is a favorable result considering current projections for natural gas prices, specially for Japanese and European markets, all of them above USD 4.4/ MMBtu[1][2].



Source: (1) World Energy Outlook, IEA 2017; (2) O desenvolvimento de recursos de gás de folhelho no Brasil: Aspectos econômicos, regulatórios e ambientais, 2018

A powerful breakeven

The breakeven price of Mica field is a theoretical number, based on assumptions adopted considering regulatory, logistic and fiscal scenario's.

However, this number can easily be reduced if some efforts in critical issues are taken:

REGULATION

ANP showed a connected performance with market dynamics in the last 2 years, materialized by initiatives like permanent onshore offer. A step forward unconventional exploration regulation is deeply needed, connected with environmental organizations as Ibama, providing insurance for society and companies

TAXES

The high taxation raises costs for investors, which makes hard to invest and maintain the business when commodity prices are down. Initiatives like REPETRO already showed its potential, and maybe onshore specific incentives could enable more attractive costs

LOGISTICS

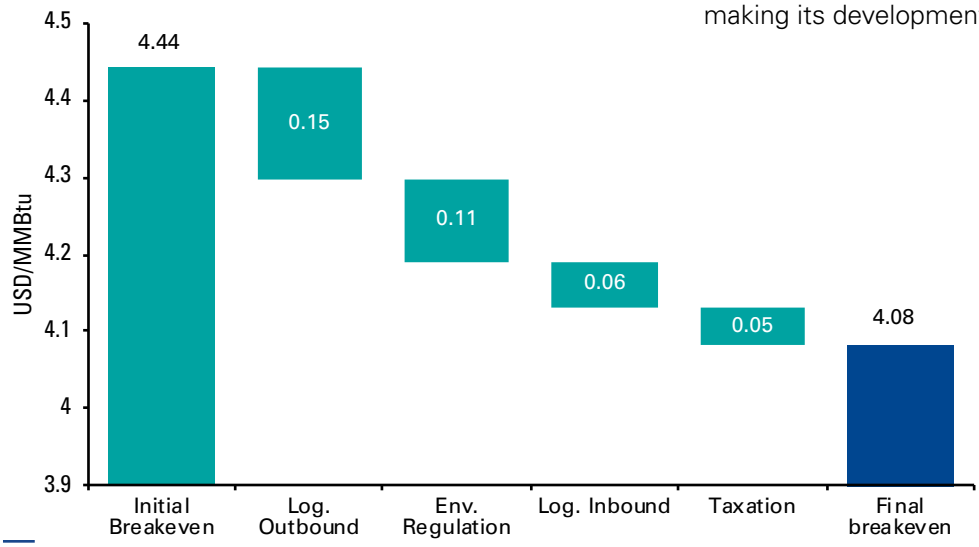
Infrastructure for gas outflow is critical in cost terms, but also inbound logistics gaps for feed operations are bottlenecks. Infrastructure investments and "Gas to Grow" approval could be very positive for cost reducing

GAS MONETIZING INITIATIVES

Alternatives on "Gas to X" model could enable incredible business models, adding value to natural gas consumption. Imagine for example use gas to feed turbines and then power clusters that make weather forecasts?!

Breakeven reduction

We simulated how adjustments on these critical concerns could contribute to reduce Mica's breakeven, making its development more competitive:



"Gas to X"

THE "GAS TO X" BUSINESS MODEL

The concept behind "Gas to X" is the possibility of having business models based on the "in-site" and "just in time" utilization of the fluid at the well head, allowing the localization of production without requiring large investments in distribution infrastructure.

Here are examples of promising business models in Brazil:

X = Petrochemicals

Petrochemicals production near the well head would reduce costs on gas transmission and distribution, also impacting low costs of final products, such as plastics, pipes, clothes, candles, bags, frames, etc.

X = Fertilizers

Fertilizers and other agricultural supplies have natural gas as main feedstock. The regions near unconventional basins are also larger producers of grains, such as Paraná, Maranhão and Mato Grosso. Local production could reduce logistic costs and ensure availability.

X = Wire

Reservoir to wire is already a success in the Parnaiba basin and could be expanded to additional regions. The thermoelectric model has great potential, since eolic and solar sources have intermittent production issues.

Epilogue

As the world undergoes an energy matrix transformation, from traditional fossil fuels into renewable energy sources, gas will become a more relevant commodity, as it can act as a bridging technology between the past and the future.

In this context, global gas consumption is expected to grow in the coming years, which will be enabled by the spread of non-conventional gas production technologies such as hydrocracking.

In the case of the Brazilian market, although the market trends show a growing gas consumption trend, leveraged by initiatives such as Gas to Grow, there is still a concern about whether the capacity to produce that gas exists on current and upcoming offshore assets, or whether that demand will require more reliance on foreign imports.

Although there are substantial gas reserves in Brazil, it may be necessary to deploy unconventional production technologies in order to accelerate the rate of extraction and to cope with demand increases.

Looking at those technologies, they offer several characteristics that may be quite relevant to the reality of Brazil:

I. ability to deploy production locally, not requiring outbound infrastructure or pipelines, and therefore providing gas for specific purposes, such as gas to wire or gas to fertilizers in agricultural areas;

II. lower investment requirements, allowing small independent players to make discrete investments in the country, reducing the level of country exposure and providing faster return on capex;

III. ability to act as a last unit provider on the market, counter balancing the market dynamics and adopting a switch-on and switch-off commercial strategy to avoid gas price exposure.

All in all, the unconventional gas sector in Brazil will represent an opportunity to revolutionize a mature sector, allowing the development of a value chain that will profit areas that are traditionally non-gas producers such as the interior of the country, and reducing Brazil´s dependence on imported gas sources.

In order to achieve that, Brazil will be urged to rethink some factors negatively impacting the profitability and sustainability of this upcoming industry, including:

I. the need for a specific and transparent sector regulation and environmental licensing process, in order to attract local and external investors on the basis of clear rules for the game;

II. the need to develop a sustainable value chain for the required technology, simplifying the tax burden for technology imports

III. the need to develop an efficient transportation infrastructure for all the inbound logistics associated with unconventional production;

IV. the need to establish clear and transparent regulations related to the monetization mechanisms behind the unconventional production, such as the Gas to X initiatives.

Contact us

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