



OIL & NATURAL GAS CONFERENCE

ARPEL2017

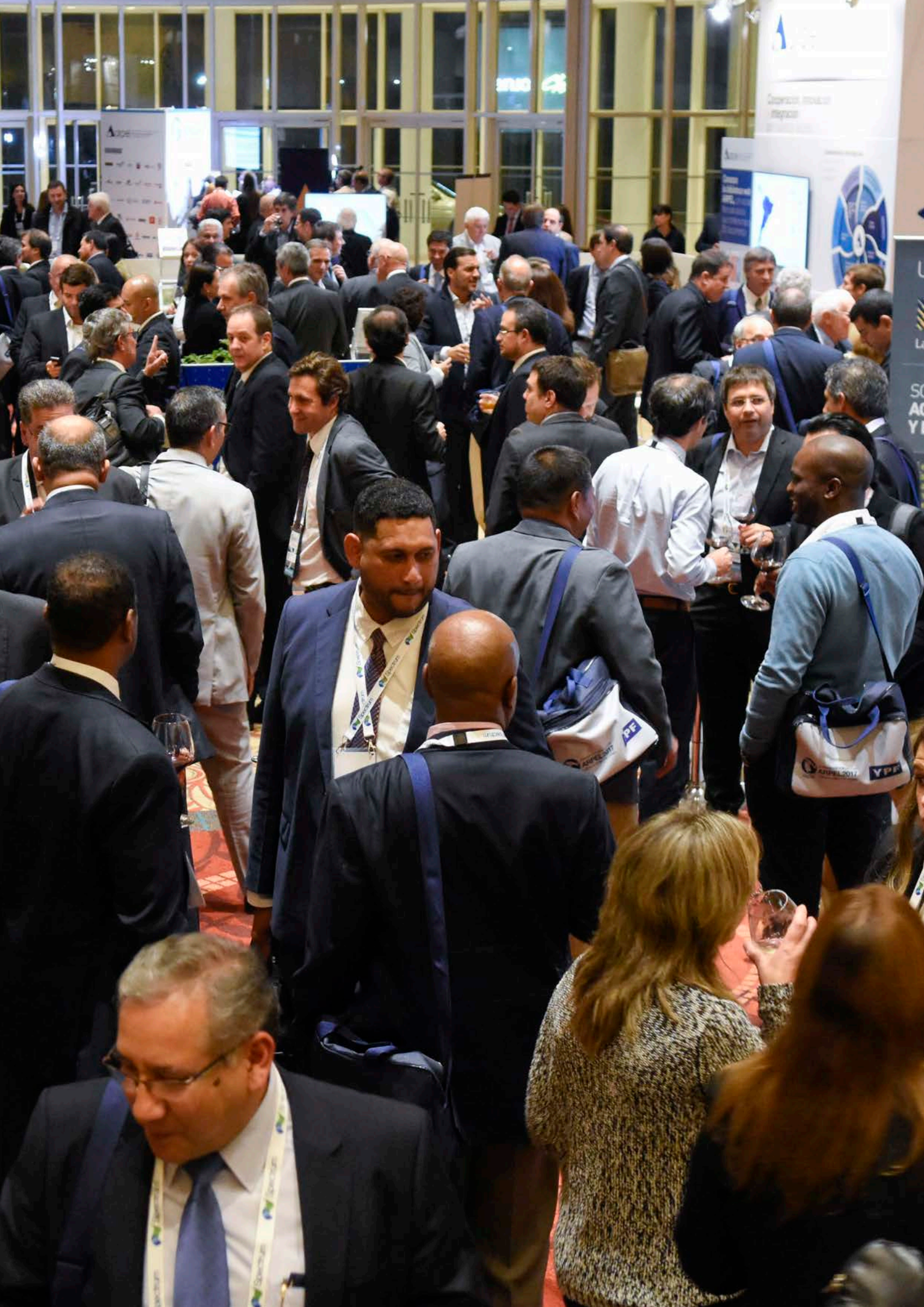
LATIN AMERICA AND THE CARIBBEAN

NEW ENERGY REALITY.
CHALLENGES AND OPPORTUNITIES

April 25 - 27, 2017. Punta del Este, Uruguay

Report of the Oil and Gas Conference ARPEL 2017

Summary and Main Conclusions





Introduction

New economic, political, social and technological paradigms are beginning to set up a different global scenario. The world is changing rapidly and is going through a period of adaptation to a new reality that also affects energy.


The geopolitical chess game, the breakthrough of digital technology, climate change or the new habits of the global village in which we live have a direct impact on an industry that is a pillar of the development of the planet. What are the challenges and opportunities of these times?

Once again, the Oil and Gas Conference ARPEL 2017, which took place April 25-27 in Punta del Este, Uruguay, was the platform for a sectoral analysis. It provided a space to explore possible responses and define certainties in a time of profound adjustments and enormous challenges.

The biennial event brought together more than 300 senior representatives of the regional energy sector from 134 companies, national and international institutions in the sector, and government agencies from 24 countries.

Three days of generous dialogue, analysis and discussion contained in a Forum of Hydrocarbon Agencies, eight plenary sessions, six keynote addresses and four concurrent workshops enabled the leaders of the industry to focus on the region and shed light on what is to come for the sector.

From the upstream sector through the geopolitical perspective, climate change, transparency and combating corruption, or cyber threats, the diversity of approaches allowed a substantial and comprehensive approach.



On balance, Latin America and the Caribbean have today a historic opportunity to consolidate their potential and, in turn, project themselves with greater prominence at the global level as a serious and reliable energy supplier.

At the same time, investments are reactivating and seeking opportunities that combine efficiency, legal security and environmental care, and, therefore, the challenge of strengthening and projecting the upstream sector as the basis of energy production must be a shared task between States and private players.

Finally, the specific weight gain of natural gas as the hydrocarbon of the future and as a source of transition toward a more renewable global energy matrix shows a horizon where the sector has a major role and is always at the forefront of the supply of energy.

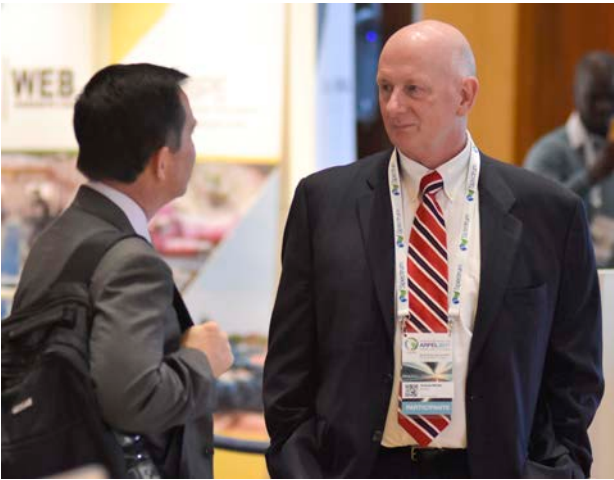
Present at the opening ceremony were Ms. Carolina Cosse, Minister of Industry, Energy and Mining of Uruguay, Ms. Marta Jara, President of ANCAP, and Mr. Carlos Colo, Chairman of the Board of Directors of ARPEL.

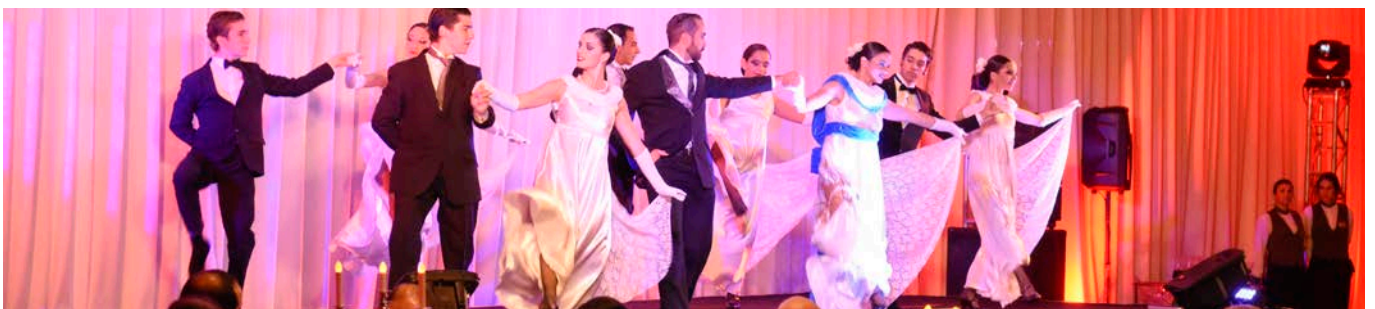
Mr. Colo said that the world has entered a new economic cycle where commodities, including energy, will be structurally low and where the region as a whole will compete in production, distribution and sales with other regions. “In view of this scenario, concepts such as efficiency, costs, productivity and technology will be significant, to which ARPEL, from its role of promoting mutual cooperation and regional integration, will be strongly committed,” he said.

The present report presents the subjects addressed during the Oil and Gas Conference ARPEL 2017.













01 //
Investment Opportunities in the Region

The exploration potential of Latin America continues to be important for new discoveries of oil and gas, and offers opportunities to build varied portfolios. However, aspects such as the country risk profile, the stability of the tax regimes and the facilities for the development of business will be decisive in attracting capital and the implementation of projects.

The starting point of the Oil and Gas Conference ARPEL 2017 “New Energy Reality, Challenges and Opportunities” was the Forum of Hydrocarbon Agencies.

Two sessions and the presence of senior state representatives from ten countries in Latin America and the Caribbean outlined a scenario in which the region confirmed its productive vocation in a period when the international oil price per barrel has stabilized in the USD 40 and USD 50 range, and which, according to the experts, will be the new reality in which the industry should move during the

following years.

The Deputy Secretary of Energy, Mining and Hydrocarbons of Neuquén, **José Gabriel López**, was the first speaker to take the floor. He stated that after eight years of work in the framework of Plan Nuevos Horizontes, the Argentine province which he represents is now addressing the Fifth Bidding Round. This will give further impetus to the development of exploration projects on the Vaca Muerta Formation, considered by the United States Department of Energy as the second most important reservoir of unconventional resources in the world, with an estimated potential of 583 Tcf.

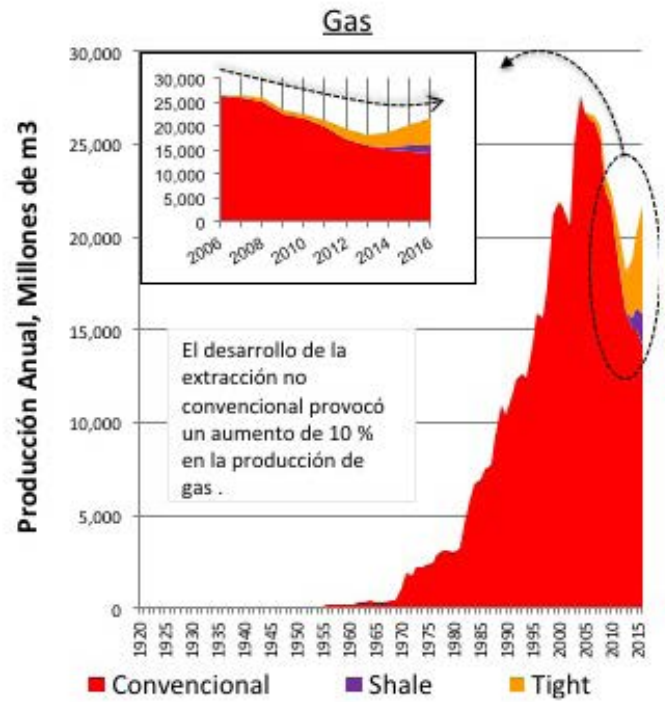
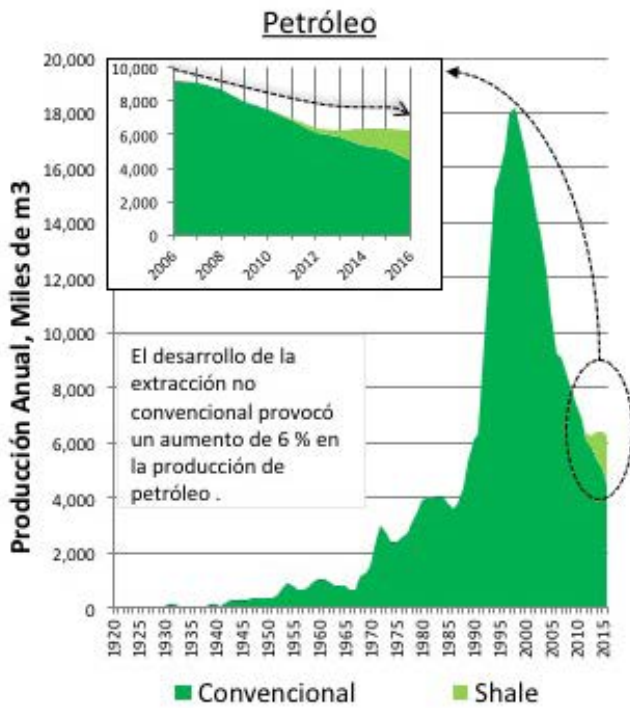
The Fifth Bidding Round also represents the beginning of the Plan Exploratorio Neuquén (Exploratory Plan of Neuquén), which will consist of six areas under international competitive bidding and other 50 blocks under the modality of quarterly open biddings. “The type of contract will be flexible, as a service contract. This will allow companies to assess the merchantability of each block and, eventually, together with Gas y Petróleo del Neuquén S.A. (GyP), carry out the development with a concession title,” López said. In recent years, the development of unconventional extraction in Neuquén resulted in an increase of 6 % in the production of oil and 10 % in the production of gas in Argentina.

In turn, the Manager of Operations of the Bolivian



José Gabriel López
Deputy Secretary of Energy, Mining and Hydrocarbons of Neuquén

Evolución de la producción de hidrocarburos en Neuquén



MINISTERIO DE ENERGÍA,
SERVICIOS PÚBLICOS Y
RECURSOS NATURALES

NEUQUÉN
PROVINCIA

JUNTOS
PODEMOS
MÁS

Evolution of the hydrocarbon production in Neuquén.
José Gabriel López, Deputy Secretary of Energy, Mining and Hydrocarbons of Neuquén

company YPFB, **Luis Carlos Sánchez**, said that his country is progressing in activities that allow increasing the technical information related to the exploration areas. “There is a very significant exploration potential since almost 50 % of the Bolivian territory is an area of interest in hydrocarbons,” he said.

The executive also stressed that environmental regulations in force allow exploration activities in protected areas, adding legal stability that would make exploration of potential reserves estimated at 35.1 Tcf of natural gas and 516.4 million barrels of crude oil and condensate viable. On the other hand, the geographical location of the country would be a key factor in the supply of the Southern Cone markets, an aspect that already has a history with existing contracts for export to Brazil and Argentina.

In a joint presentation, the Director of Hydrocarbons of Paraguay, **Julio Albertini**, and the Acting Head of the Exploration and



Luis Carlos Sánchez
 Manager of Operations of the Bolivian company YPFB

Exploitation Unit of Petropar, **Andrés Peralta**, said that their country aims to be an axis of energy integration based on the economic stability and sustainable growth experienced in recent years. This is added to the fact that “Paraguay has the most competitive tax regime and tax benefits in the region,” Albertini stated. Paraguay is working on a new register of hydrocarbons that will be presented at the end of 2017. At present, the country has passed eight laws of concession, approved seven prospecting permits and there are

eight blocks pending approval. Fifty-two wells have been drilled, in 60 % of which the presence of oil and natural gas was determined. Since 2014, Petropar has resumed exploration activities; in the past, this was only carried out by private companies.

The President of Perupetro, **Rafael Zoeger**, explained that there were regulatory changes to make his country more attractive for oil investments. Peru has 18 basins, in four of which exploration and exploitation works are well advanced.

According to Zoeger, the country has today a hydrocarbon potential of 10 billion barrels of oil equivalent, including deepwater resources. Based on this, Peru could produce up to one million barrels of oil per day. “The only way to develop the potential of Peru is attracting investments



Julio Albertini
Director of Hydrocarbons of Paraguay



Andrés Peralta
Acting Head of the Exploration and Exploitation Unit of Petropar



Rafael Zoeger
President of Perupetro

through oil companies with technical and economic capacity,” Zoeger stated.

With this purpose, Perupetro has focused on a reform that involves a new regulatory framework, which includes contracting, direct negotiation and bidding systems. In addition, the reform emphasizes the strengthening of Perupetro as regulatory body, and a national exploration and production plan. “The central purpose of the reform is to make Peru an attractive market for oil investment through appropriate contractual conditions, return commensurate with the risk and streamline deadlines for paperwork and permits,” said the executive.

Concluding the first meeting of the Forum of Hydrocarbon Agencies, the General Manager of ANCAP, **Ignacio Horvath**, said, “The activity of this last decade represents a quantitative and qualitative leap in the Uruguayan platform,” since after two bidding rounds for deepwater exploration in 2009 and 2012, respectively, Uruguay is directing its efforts to the development of a third round, which aims to offer 17 areas in the basins of Punta del Este, Pelotas and Oriental del Plata, which will require drilling ranging from 50 meters to more than 3,500 meters deep.

Uruguay Round 3 will be officially launched in Houston, United States, in September 2017 and it is expected



Ignacio Horvath
General Manager of ANCAP

that the submissions of bids will be in April 2018. “Uruguay offers clear rules, political, economic and social stability, which results in an optimal environment for business investment,” Horvath said. He also valued that his country has a proven record of operational success in challenging deepwater environments.

The Director President of Petrobras Mexico, **João Araújo Figueira**, who acted as chairman of the Forum, concluded the first session by saying that, in view of the above, legal security is a fundamental parameter to attract investment to the region. He also stressed the willingness of the state companies and hydrocarbon agencies to move forward along this

line, which will help “the industry develop without the fear that the rules of the game change during the course of their business,” he said.

On the other hand, he stated that it is clear that there is a range of important energy opportunities in the region, even in areas in which biddings were declared void in the past. “This is the life of hydrocarbon exploration. It can never be said that an area is doomed and not worth anything. It is about studying and identifying the petroleum systems and that creates very interesting dynamics that move the industry,” he added.

In this regard, Araújo recalled that it is of crucial importance for the region to obtain higher hydrocarbon reserves. It is also important to provide cutting-edge technology and appropriate management mechanisms to produce



“This is a two-way path between countries and companies, and, in turn, a win-win relationship.”

Joao Araújo Figueira
Director President of Petrobras Mexico



Orlando Velandía
President of the National Hydrocarbon Agency of Colombia

“It is in our hands to react to find the balance and promote investment to maintain the supply of energy in our region.”

Javier La Rosa
President of Chevron Brazil

oil and gas in a competitive manner, giving priority to environmental management and social responsibility. Finally, he added that it is key to consolidate transparent and long-term relations. “This is a two-way path between countries and companies, and, in turn, a win-win relationship,” he emphasized.

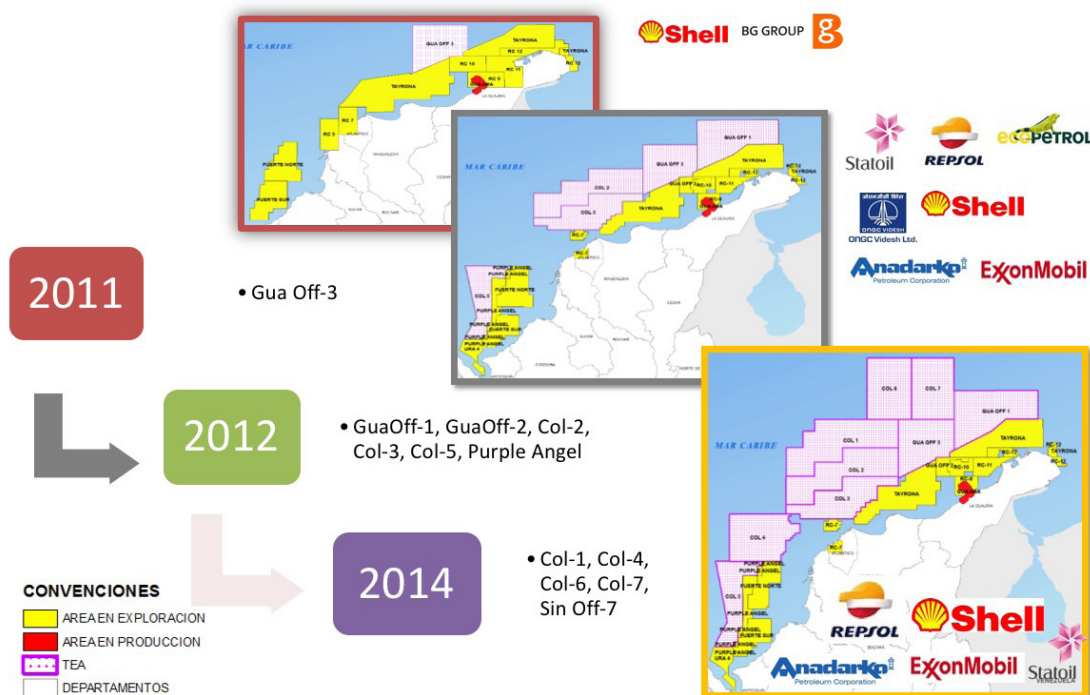
The second session of the Forum of Hydrocarbon Agencies was chaired by the President of Chevron Brazil, **Javier La Rosa**, who began by highlighting the abundance of resources in the region, the potential of the existing market and the need to attract investment to the continent. “It is in our hands to react to find the balance and promote investment to boost the supply of energy in our region,” he highlighted.

Colombia was the country to open

the second session. The President of the National Hydrocarbon Agency of Colombia, **Orlando Velandía**, explained that with the fall of prices his country began to adopt the necessary measures that would keep the majority of the companies operating in its territory, assuming that it was not enough to have the resources, if new incentives and mechanisms were not included to make the country more attractive in contractual matters. “Actions were taken to secure contracts, the permanence of companies and, above all, to maintain a reasonable level of investment in exploration and production,” he said. The measures taken allow extending exploration periods, transferring operations in case of problems of prospectiveness, or of social or environmental nature, and making

Evolución Offshore Colombiano

Historia – Suscripción de Contratos



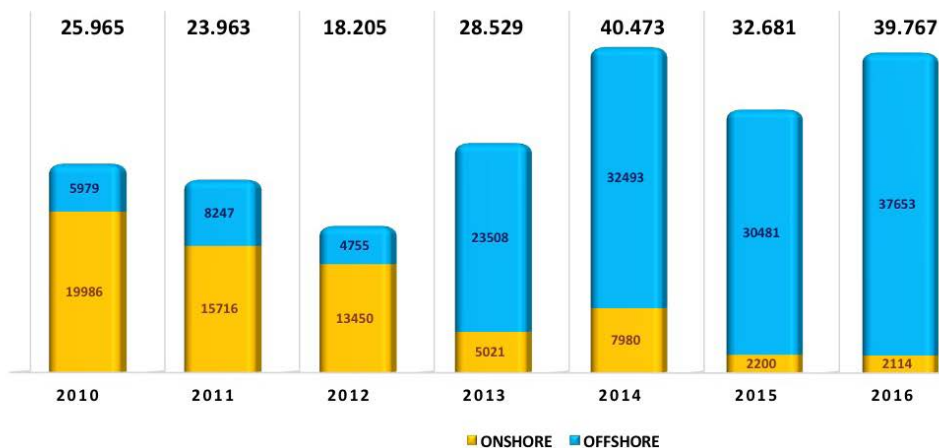
Colombian offshore evolution

Orlando Velandía, President of the National Hydrocarbon Agency of Colombia

ACTIVIDAD EXPLORATORIA

Adquisición Sísmica 2010 - 2017

AÑO	Sísmica OFFSHORE Km 2D Equivalente	Inversión Pactada USD \$ (Millones)	Sísmica ONSHORE Km 2D Equivalente	Inversión Pactada USD \$ (Millones)
2010	5.979	45,3	19.986	302,6
2011	8.247	40,3	15.716	231,9
2012	4.755	15	13.450	269,9
2013	23.508	49,4	5.021	64,2
2014	32.493	72	7.980	181
2015	30.481	88	2.200	30,8
2016	37.653	136	2.114	52,2
2017	0	0	0	0
TOTAL	143.116	397	66.467	1.133



Exploratory activity

Orlando Velandía, President of the National Hydrocarbon Agency of Colombia



Luis Ayala
 Director General of Hydrocarbons of Guatemala

guarantees more flexible to improve the cash flow of companies. In addition, adjustments are being made in the scheme of oil contracts, in addition to bidding rounds, to address permanent assignment processes on the basis of the update of the information and delimitation of the areas.

At the same time, a tax reform created mechanisms such as tax refunds to encourage exploration, and the establishment of three free zones for offshore areas, which reduces the tax burden in almost 19 percentage points.

As a result, the executive said that twenty-one exploratory wells were drilled in 2016, and more than fifty are scheduled for 2017. He also said, “There is no frontier basin in the world that, in times of low prices, has received so much investment in exploration as the basin of the Colombian Caribbean Sea. More than 100,000 kilometers of seismic data. This year alone we will develop five exploratory wells. Today, Colombia offers numerous opportunities,” he concluded.

“Due to its natural resource potential, and based on the oil policy, Guatemala is positioned as a strategic country for domestic and foreign investment,” the Director General of Hydrocarbons of Guatemala, **Luis Ayala**, stated.

The Central American country has three basins: Petén Norte y Sur, Amatique, and Pacífico, which contain primarily oil and gas records. At present Guatemala has ten exploration and exploitation contracts under the modality of Production Sharing Contract and is preparing for the 2018 Guatemala Round for the exploration of 13 onshore areas. These proposed areas have seismic survey information and records of previously drilled wells.

The Managing Director of PCJ of Jamaica, **Winston Watson**, said that after more than six decades of history in hydrocarbons, his country is at a stage where there is evidence of hydrocarbons and also has up-to-date information. Watson explained that more than 3,700 km have been covered with 2D seismic surveys between 2016 and 2017, and that a complete field work and prospective analysis is being developed.



Winston Watson
 Managing Director of PCJ of Jamaica



Alberto Reyes
Vice Minister of Hydrocarbons of the Dominican Republic



Marny Daal-Vogelland
Manager of Petroleum Contracts of Staatsolie

In his regard, the prospects of the island, with still 14 blocks available, range from shallow to ultra-deep, with an estimated potential of 300 million barrels of oil equivalent in shallow water; 1 billion barrels of oil equivalent in deep water; and billions in ultra-deep waters.

The Vice Minister of Hydrocarbons of the Dominican Republic, **Alberto Reyes**, explained that a National Database of Hydrocarbons has been developed in his country, which contains 90 % of the historical, seismic and wells data of the state. The online database is freely accessible.

In the field of prospecting, Reyes said that there will be some 10,000 additional kilometers of high-resolution 2D seismic data in 2017 to be added to the 20,000 kilometers of existing seismic data.

On the other hand, in relation to contracts, and the tax regime, he said that a model of progressive production

sharing contracts based on an internal rate of return is nearing completion. In addition, the Dominican Republic is ready to organize bidding rounds for exploration and production rights. Closing the Forum, Suriname was represented by the Manager of Petroleum Contracts of Staatsolie, **Marny Daal-Vogelland**. The executive said that a round is planned to find partners and thus develop two blocks near the coast. "Now it is the time to focus again on our core business, which is to explore and produce oil," she said.

The round will be for blocks B and C, both of 3,000 square kilometers, with depths of up to 30 meters, she added. The reserve potential is 300 million to 915 million barrels of oil in Block B and 100 million to 350 million barrels in the Block C. The company would aim to sign the exploitation agreement in the first quarter of 2018 and begin operations during the third quarter of 2018.

Government Strategies to Attract Investment

The sharp fall in crude oil prices had a direct impact on capital investment for the upstream sector. According to the President of Product Line and Global Marketing of Weatherford, **Kyle Chapman**, such investments fell in two-digit values in the last two years. In spite of this, the forecast for 2017 shows a change in the trend with a modest increase that will still be 40 % below the levels recorded in 2014. “This means that, in general, there is less capital available for investment and, therefore, in the search made by governments to attract investments in exploration and production, it will be essential that they can provide a stable and secure environment to ensure the

flow of capital to their countries,” said Chapman at the start of the Plenary Session “Governmental Strategies to Attract Investment.”

“The good news is that upstream investors are coming out of hibernation, for which reason they look for opportunities to invest and that will generate a fierce competition to attract such investments. We saw an example this morning (during the Forum of Hydrocarbon Agencies) and that shows just how competitive this market place is, the Vice President of Global Tax Research of Wood Mackenzie, **Graham Kellas**, said. According to Wood Mackenzie, there are currently more than 60 bidding



“In the search made by governments to attract investments in exploration and production, it will be essential that they can provide a stable and secure environment to ensure the flow of capital to their countries.”

Kyle Chapman

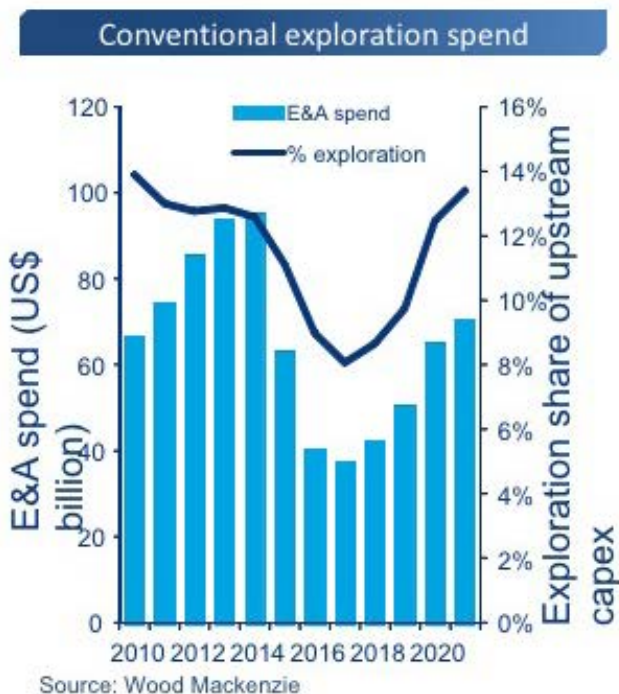
President of Product Line and Global Marketing of Weatherford

rounds already launched or in the preparation phase at the global level, which shows a positive reaction after two difficult years for the sector. However, regarding competition to attract investment, the diagnosis also considers the areas that are still a matter of concern to investors. The Director of Upstream Research and Consulting of IHS Markit, **Ricardo Bedregal**, said that the current environment shows that there is still pressure on the returns of upstream companies. The profitability



Graham Kellas
Vice President of Global Tax Research of Wood Mackenzie

Upstream investors are coming out of hibernation..
..but competition for that investment is fierce..



Trusted commercial intelligence
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Upstream investors are coming out of hibernation...
Graham Kellas, Vice President of Global Tax Research of Wood Mackenzie



“The fiscal terms have a direct impact on the competitiveness of countries.”

Ricardo Bedregal

Director of Upstream Research and Consulting - IHS Markit

in exploration and production companies was negative in 2015, but is expected to improve as some mega-projects begin.

Similarly, production is kept under extreme economic and fiscal pressure, an element that has forced a change of approach in policies for the sector. “The fiscal terms have a direct impact on the competitiveness of countries,” stated Bedregal.

In this regard, Kellas said that countries are currently taking two types of measures to attract investment in the upstream sector.

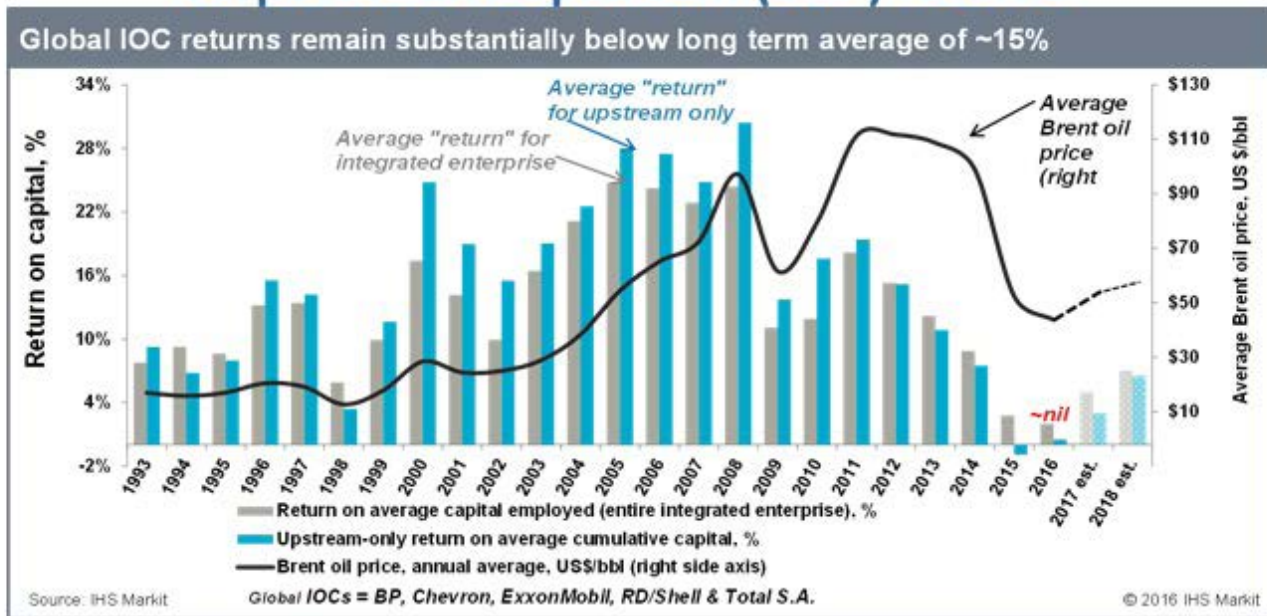
The first measure is fiscal disruption, which has an immediate impact on the production and flow of the companies, and the second measure adopted by others is fiscal development, which has an impact on licenses and concessions in new exploration areas. The executive of Wood Mackenzie was clear to indicate that, even with

these measures, investors have become more selective and compare the attractive tax environment with the prospects of each country. They also express constant concern about fiscal stability. “During the cycle of high prices there was a high level of fiscal disruption measures that increased the participation of states in the sector throughout the region, so now investors take the fiscal risk into account.

The question is that while countries promote their fiscal terms, what guarantees can be given to investors that things will remain as they are, even when the situation (prices) will improve in the future,” he stressed.

Bedregal added that most of the countries focus on encouraging new projects, and only in extreme cases, existing projects. All this is due to the fact that there are factors that determine the adoption of changes in fiscal policies, among them, the

Current environment: continued pressure on corporate and upstream (E&P) returns



- E&P returns for Global IOCs were negative in 2015. Returns are expected to improve as mega-projects start-up in 2016-17, but meager oil price gains will dampen rebound

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Current environment: continued pressure on corporate and upstream (E&P) returns
Ricardo Bedregal, Director of Upstream Research and Consulting - IHS Markit

high dependence of the states on the income from oil and gas.

“Within this framework, the ability of state companies to carry out investment is important for the long-term perspective, because if there is a combination of governments with weak finances and also weak state-owned companies, the result would be a threat for future capacity expansion,” Bedregal added.

This being so, the overall balance

made by IHS Markit highlights the fact that Latin America has led the way to making positive changes in fiscal terms. Some countries, such as Mexico, Colombia, Bolivia and Argentina have advanced in a series of reforms for the upstream sector to continue attracting investments. Added to this is the fact that after ten years, Brazil also reopened the upstream sector to private investors to explore the presalt layer.

Challenges of the Upstream Sector

The first challenge of the upstream sector is how to operate with a low oil price, as this puts pressure on the profitability of operations, in a scenario where local prices tend to converge with international prices. This was the first vision presented in the lecture given by the Executive Vice President of Exploration and Production of YPF, **Santiago Martínez Tanoira**. “From now on, our projects are being evaluated at international prices, and we have to move with this horizon of prices,” the executive said.

The second challenge, according to Martínez, is the need to work very strongly on the reduction of costs, both OPEX and CAPEX, because the unit costs of each one have increased significantly in recent years. A third challenge - shown from the perspective of Argentina - is that production comes from mature fields, low permeability fields or unconventional fields, so neither oil nor gas are easy to find in this country. With the conventional resources of Argentina, this country has a horizon of 15 years of exploitation of oil at the current rate of production. Regarding gas, the horizon is 12 years, with the difference being that there are 32 Tcf of conventional and more than 800 Tcf of unconventional gas. “In Argentina, we had the geological luck of having unconventional resources, the second most important gas resources in the world and the fourth most important oil resources,” he added.

This represents a huge challenge, because these resources must be transformed into reserves. To do



“We believe that Vaca Muerta, more than a project, is increasingly becoming a reality.”

Santiago Martínez Tanoira

Executive Vice President of Exploration and Production - YPF

this, the first step of YPF was to reach scale through the acquisition of acres, performing pilot projects both for exploration and development, and fostering a service industry. The second step was to generate competitiveness, which tangibly reduced the cost of development in horizontal exploratory wells by 50 % in one year.

The third step has been to accelerate growth with the support of new partners, agreements with trade unions and a close relationship with stakeholders. “We believe that Vaca Muerta, more than a project, is increasingly becoming a reality,” he stated.

The Upstream Executive Director at Repsol North America, **John Rossall**, provided an overview of what is happening in that continent. According to the experience presented, one of the main challenges is the reduction of costs in the sector, with a crude oil price that will not exceed USD 50 in the near future. “We are not talking about economy, but about balancing our revenue with our expenses over a year,” he said.

To achieve a balance in prices, there are many ways to reduce service costs or input costs, i.e., we should seek to do business differently. Other strategies used are standardization, optimizing maintenance, improving the efficiency of labor, saving and smooth collaboration throughout the supply chain, that is to say, partnering with some suppliers to be more efficient. According to Rossall, in 2015 Repsol initiated a very effective program on cost efficiency, with an emphasis on three aspects: the portfolio, financial issues and operational resilience.

Then he placed emphasis on the commercial side and demand. “These tools have helped us a lot, they have allowed us to save from 10 % to 15 % of the costs,” the executive said. Large reductions have also taken place in offshore in the past two years, both regarding cost and efficiency. “In many places of the world we feel that we have achieved costs that have allowed us to really reach a breakeven point, which is great,” stated Rossall.

With regard to mature fields, the experience of Repsol in the Chovin field, in Canada, was very valuable. According to John Rossall, the company sought not only to reduce costs but to create a safe environment. For example, advanced



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John Rossall

Upstream Executive Director - Repsol North America

technology was used to monitor remotely 800 wells and automate a variety of processes.

Regarding onshore unconventional resources, the implementation of economy of scale, the increase in efficiency and continuous improvement were very important. “What is important is the productivity for every dollar invested. In recent years we have increased to 100 barrels per day for each million dollars invested in capital. A couple of years ago, these were only 50 barrels per day per million, so the capital efficiency increased during the last few years,” he said.

Regaining Credibility

The Petrobras case deserved special emphasis by the Director President of Petrobras Mexico, **João Araújo Figueira**, who said that facing low prices, with the series of events that occurred in the company, implies a double challenge. The Brazilian company revised its strategy to focus its attention on two fundamental metrics: security and deleveraging. About the first aspect, Araújo noted that there must be a labor force working under appropriate conditions, in order to prevent injuries or fatalities. Work was done on the reduction of the indicator known as Total Recordable Injury Rate, which in 2015 was 2.2. The current goal is to reach 1.4 as the maximum limit in 2018. “To achieve this, we need dedication, a lot of training, work and planning with our people to change the mentality, because we are convinced that every accident can be avoided,” he said. With regard to the reduction of leverage, there was a proper management of costs and expenses. The main engine for this was the efficiency in CAPEX, taking advantage of the intensive learning curve of the presalt fields. “It is one of the windows

of opportunity for Petrobras to generate value, that is, to reduce the time of drilling and boost productivity, as well as improve the use of resources,” Araújo said.

Another engine is the efficiency of OPEX, i.e., reducing costs by increasing production. “Associations in disinvestment was another of the actions that we had to take. A few years ago it was impossible to consider the sale of assets, but we had to resort to disinvestment for the company to reduce its leverage,” he said.

The disinvestment program of Petrobras in the period 2015-2016 amounted to USD 13 billion and, for the period 2017-2018, they are considering USD 21 billion. The step-by-step reduction of costs was from USD 14.6 per barrel in 2014 to USD 10 per barrel in 2016. “We expect costs to be reduced even more in the period 2017-2021, reaching USD 9.6 per barrel,” he said.

The development of technology has also been a key factor to optimize costs in Petrobras. In 2015, the company won an international award for the successful implementation of solutions for ultra deepwater in the presalt layer.





02 //

The Global Context and its Impact
on the Energy Sector

The oil and gas industry faces great challenges for producing countries, as well as for national companies (NOCs) and international companies (IOCs). There are many obstacles along this way, among which are the volatility of oil prices, political instability in many countries and high social and environmental costs.

For **John Martin**, Senior Vice President of the World Petroleum Council (WPC), there are growing uncertainties and challenges in this context. This is because, according to Martin, no other industry works in such wide horizons as the hydrocarbon industry.

One of the main challenges is to supply energy to a rapidly growing world population, in addition to help millions of people to get out of the poverty threshold. According to the population models of the United Nations - quoted by Martin- the world population could rise to more than 16 billion people at the end of this century, and China and India will continue to be the two largest

economies of the world, representing 30 % of the projected population.

“Despite international efforts to halt climate change, oil along with other fossil fuels will continue to maintain a position of leadership by 2050,” stated the executive of the WPC, and added that another area of uncertainty concerns future investments.

In that regard, he considered that investments in clean technologies must be increased so that the world may advance to climate stabilization. “Governments must not only maintain but also increase their commitment to achieve energy security and climate targets in collaboration with the oil and gas industry,” he stressed.

“In this scenario,” he added, “the prospects for the industry would seem to be quite safe.” The reality is, nevertheless, quite different. “The oil and gas industry is going through and managing complex risks, and we have been doing this for the past 100 years. However, in the new global context, the scope and impact of



“Governments must not only maintain but also increase their commitment to achieve energy security and climate targets in collaboration with the oil and gas industry.”

John Martin
Senior Vice President of the World Petroleum Council

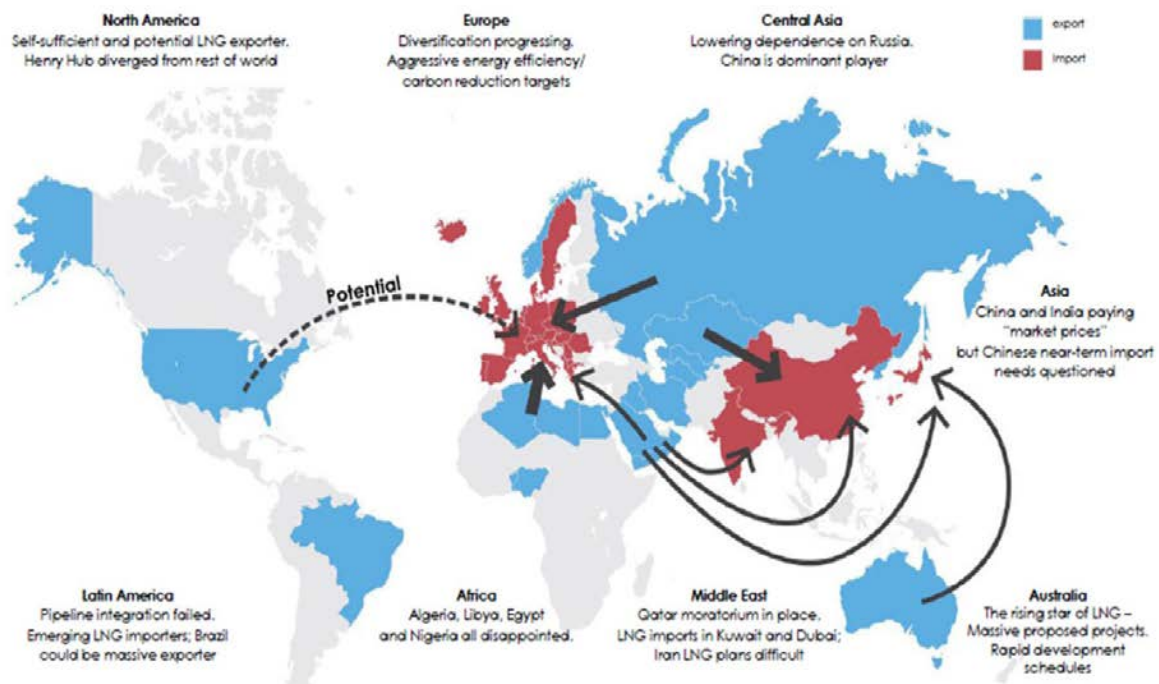
these uncertainties are bringing risk management to a very high level,” he pointed out.

He explained that these uncertainties include geopolitical risks in many regions of the world, also associated with highly volatile oil and gas prices. He cited as an example countries like Libya and Iraq, which have increased their crude oil production, but political instability prevents them from reaching the levels achieved in previous years. In the case of Europe, the aim is to reduce the dependence on Russian gas, and in the Arctic, the

development of projects has a strong opposition of environmental groups. As regards natural gas, Martin emphasized that its demand increased significantly in the last 20 years, as many countries migrated from sources such as coal and oil. Also, during this period, gas prices in many parts of the world correlated with oil prices, both reflecting the regional supply and demand.

“However, gas price trends in the last five years showed differences depending on the region. The security of long-term supply has come to Asia

2015 – Global Gas Market Forecast Changes



2015 Global gas market

John Martin, Senior Vice President of the World Petroleum Council

and Europe, which transformed the global map of buyers and sellers, where the United States has entered as a very important global player,” he added. Martin expressed his satisfaction with the new roles of the industry in terms of sustainability and social and economic impacts, participating with investments in the development

of renewable energy sources. He concluded by highlighting the leadership of the industry in the development of high-level professionals who are needed in the new global context. The WPC has a foundation that trains young people in developing countries to maximize skills and abilities.

Geopolitics and Economy

The Partner and Managing Director of Boston Consulting Group, **Gustavo Nieponice**, made a complete description of the global and regional geopolitical and economic vision, and its impact on the energy sector. He said that hydrocarbon production in the next 20 years shows a growth of 1 % in the case of oil and 2 % in

the case of gas. This growth will be underpinned mainly by emerging economies.

The expert also highlighted the penetration of renewable energy in the global energy mix. According to the projections for 2040, 30 % of energy production can come from such sources. In fact, two-thirds of the new installed



“We live in a world dependent on factors that go beyond politics and generate fragility in the energy system.”

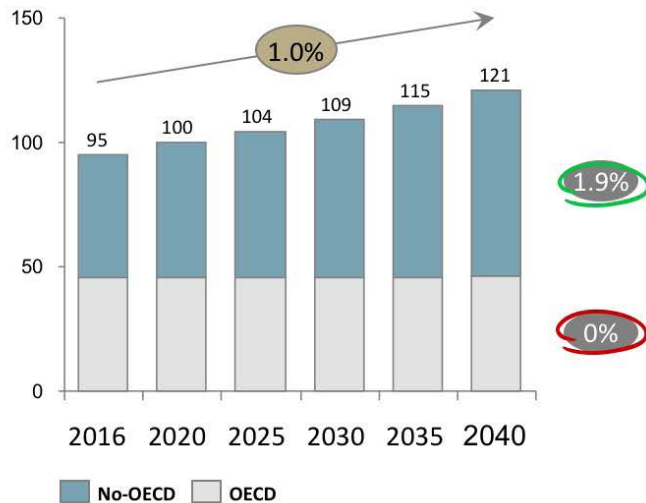
Gustavo Nieponice
Partner and Managing Director of Boston Consulting Group

La demanda global de petróleo y gas crecerá impulsada principalmente por los mercados emergentes

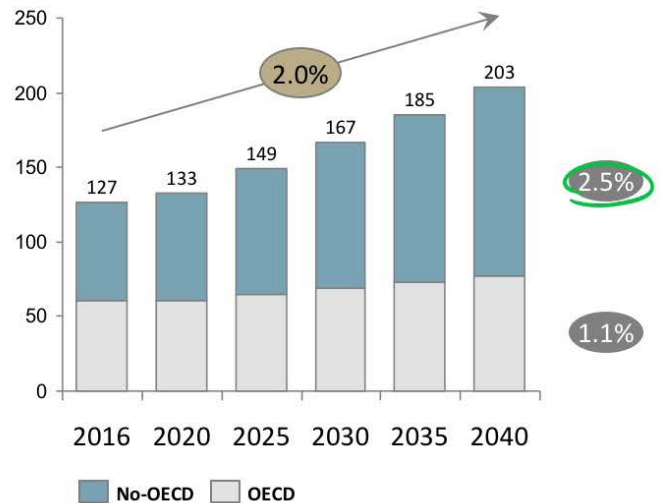
Demanda global de petróleo:
1% anual

Demanda global de gas natural:
2% anual

Demanda de petróleo (Mbpd¹)



Demanda de gas natural (Tcf²)



1. Mbpd: million barrels per day 2. Tfc: Tera cubic feet
Fuente: IEA WEO 2016 – Análisis BCG

The global oil and gas demand will grow mainly driven by emerging markets.
Gustavo Nieponice, Partner and Managing Director of Boston Consulting Group

power generation capacity in the next five years will be based on renewable energy, he said. In that context, he said that electric vehicles and new lighting technologies are elements that will increase energy efficiency.

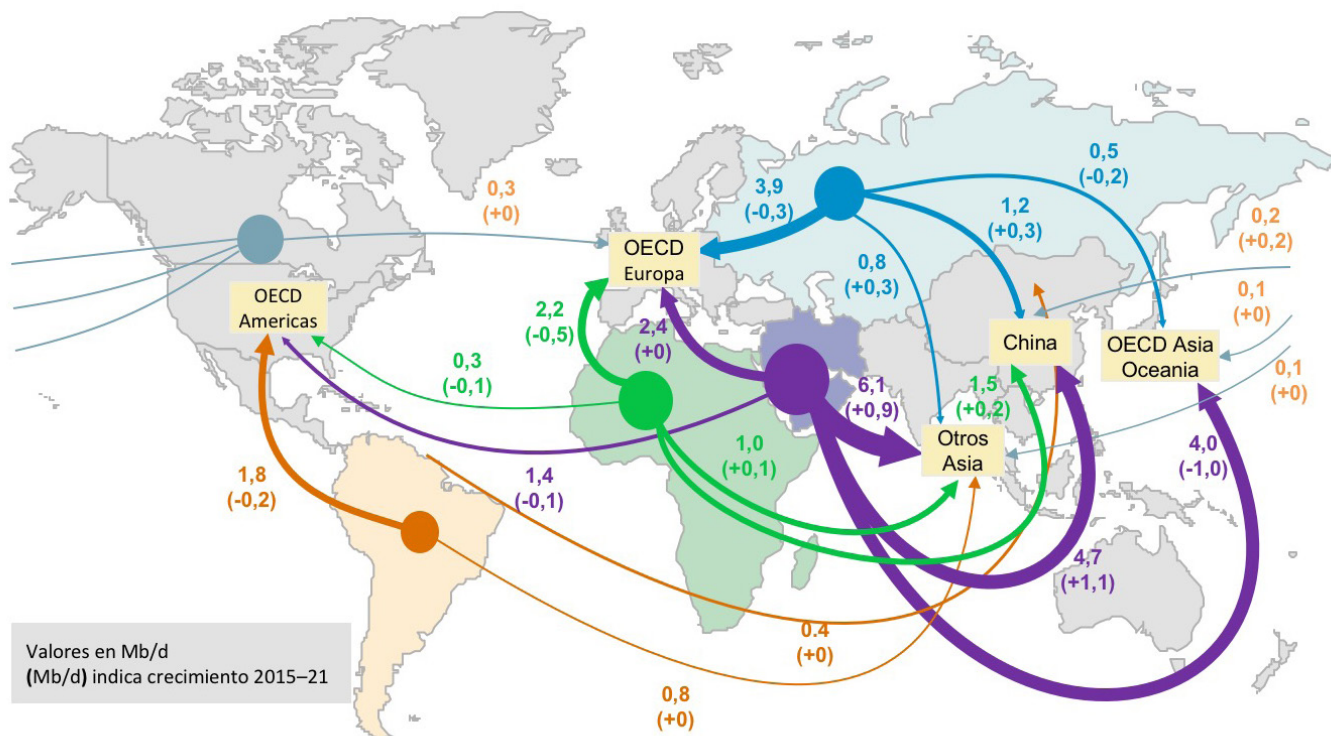
In the case of unconventional hydrocarbons, Nieponice noted that in the next 20 years shale, tight, offshore and deepwater hydrocarbons will play

an increasingly important role as a proportion of the oil production. They currently represent around 40 % of production, and in 2035 they will reach nearly 55 %.

In the geopolitical scenario, Nieponice pointed out that one must first think about the presidential elections in some countries, then natural disasters and social conflicts as the Arab Spring

Acompañando la demanda de mercados emergentes, las exportaciones de crudo continuarán moviéndose al este

Exportaciones de crudo en 2021 y crecimiento en 2015-21 para rutas comerciales clave



Fuente: IEA Medium Term Oil Market Report 2016

Accompanying the demand for emerging markets, exports of crude oil will continue to move to the east.

Gustavo Nieponice, Partner and Managing Director of Boston Consulting Group

or the crisis in Ukraine. “We live in a world dependent on factors that go beyond politics and generate fragility in the energy system,” he said. In this regard, the geopolitical scenario put forth by the expert shows many ramifications. In the first place, he mentioned the volatility that may be caused by the victory of Emmanuel Macron in France, the Brexit in Great Britain and the election of Donald

Trump as president of the United States. “We are at a stage where it is very difficult to foresee what the political trends will be,” he said. Secondly, he mentioned the weakness of institutions regarding the phenomenon of social networks and, finally, the polarization of the political systems when reducing immigration, restricting trade and isolating countries.

How Will This Context Affect Supply and Demand?

“All this can lead to disruptions in international trade that affect the growth of the economy and, therefore, the oil and gas demand,” he replied, and recommended paying attention to Asian economies which can bring additional elements to the rates of growth.

At the regional level and from the viewpoint of supply, in Latin America, he pointed to Venezuela as a factor of reduced production if the social crisis that the country is going through is further aggravated, while the opposite could happen in the United States if the platform of environmental deregulation is changed.

“Obviously, the Middle East continues to be the main producer. He believes that the development of the relations between Iran and the United States should be monitored, and placed emphasis on the “latent conflict” of a war in Syria. With respect to other players, Nieponice said that Iraq, in spite of increasing production, maintains internal conflicts and Saudi Arabia - the most stable country - has the challenge of transforming its economy by 2030. In this context, he concluded that Latin America is a region that does not have a level of conflict as the Middle East, but neither the stability of developed countries. Finally, the executive of Boston Consulting Group pointed to five

factors that need to be improved in the region to stimulate the upstream sector: access to surface, coordination between national and local governments, resources, competitiveness and, finally, fiscal terms and regulations. “We have to continue to work so that our economies are stable, with low inflation, with free flow of capital and monetary stability that favor projects with low interest rates,” he concluded.

16.000

Billion people

The number of inhabitants of the planet at the end of the century, according to the United Nations.

1/3

will come from
China and India.





03 //
New Energy Reality
Challenges and Opportunities

An open and dynamic dialogue for interaction of senior government representatives of the energy sector in Brazil, Colombia, Paraguay and Uruguay took place during the first Plenary Meeting of the Oil and Gas Conference ARPEL 2017. Four issues were brought into consideration to be addressed from the experience of the countries with a regional focus: energy matrix, strategies and investment opportunities, continental competitiveness and challenges posed by climate change. All this is part of the challenges and opportunities that arise from a new energy reality.

On balance, Latin America and the Caribbean show a friendly attitude toward the environment. “We are the greenest region in the planet with the highest share of renewable energy,” said the Executive Secretary of the Latin American Energy Organization (OLADE), **Alfonso Blanco**. However, the region has a number of tasks ahead, such as governance over natural resources, the appropriate use of its potential in hydrocarbons and the need for a genuine regional integration to generate a greater specific weight in the global energy context.



“We are the greenest region in the planet with the highest share of renewable energy”.

Alfonso Blanco
Executive Secretary of OLADE

Energy Matrix

“The rapid development of new technologies, an unstoppable digital revolution, global environmental challenges and a change in the demographic and growth patterns are factors that explain the great transition that is going on in the world with the potential to change the way we produce and consume energy,” said the consultant and member of the Brazilian Committee of the World Energy Council (WEC), **Izeusse Braga**, who chaired the session.

According to Braga, intense pressure is expected in each of the dimensions of the so-called “energy trilemma” as countries seek to improve energy security, expand energy equity and reduce carbon emissions. “Taking into account these issues, how do you see the future development of the energy matrix of your country?” he asked the group of speakers.

The Minister of Industry, Energy and Mining of Uruguay, **Carolina Cosse**, was the first to answer the question to show the progress that her country has achieved in recent years. With 2015 data of the WEC, Uruguay is located in the top 20 in sustainability (number 14), as well as in energy security (number 18), while in energy equity it holds position 44.

Carolina Cosse
Minister of Industry, Energy and
Mining of Uruguay



“The energy sector will face great challenges to transform itself and be able to fulfill the COP 21 commitments. Renewable energy, energy storage, the innovative design of markets and energy efficiency will be key to guide this transformation.”

Izeusse Braga

Consultant and member of the Brazilian Committee of the World Energy Council (WEC)



In addition, Cosse indicated that the Uruguayan energy matrix is based on a 63 % on renewable energy, which is even higher when evaluating specifically the electricity matrix, where renewables reach 97 %. “The enormous challenge we have in Uruguay is to find a synergy between an energy policy that has been carried forward from 2005 and an industrial policy. This means that the change in the energy matrix may be turned into a change in the industrial matrix,” she stated.

The Minister of Oil, Natural Gas and Biofuels of Brazil, **Márcio Félix Carvalho**, stated that wind energy accounts for 10 % of the energy matrix of his country, and the development of biofuels, such as ethanol and biodiesel, has helped Brazil to move to an economy with lower levels of carbon, also fostered by the use of natural gas.

“Paraguay has a very peculiar energy matrix,” said the Deputy Minister



Márcio Félix Carvalho
Minister of Oil, Natural Gas and Biofuels of Brazil

of Mines and Energy of that country, **Mauricio Bejarano Martí**. Although Paraguay is the largest exporter of electrical energy per capita in the world, at the domestic level the electrical energy only represents 18 % of the total energy, while biomass accounts for 43 % and hydrocarbons for 39 %.

“We are working to increase the use of the electrical energy that we produce, because we have a great potential.



Mauricio Bejarano Martí
Deputy Minister of Mines and Energy of Paraguay



Orlando Velandía
President of ANH

Ninety-nine point six percent of our electric power is clean energy from hydroenergy,” he said.

Colombia is another country located in the top 20 of the global ranking promoted by WEC, with one of the most environmentally sustainable electrical systems. “This could make us be relaxed,” said the President of ANH, **Orlando Velandía**. “However, when breaking down the energy matrix we find enormous challenges.”

Velandía referred to the fact that the Colombian energy matrix depends on a 70 % of hydroelectric generation, and this leads to a high dependence which, in addition, becomes a problem when droughts hit as a result of climate change. “Putting all the eggs

in one basket is not a good strategy in any sector,” he added.

In addition to hydropower, the energy matrix of Colombia comprises 11 % of gas, 10 % of liquid fuels, 8 % of coal and only 1 % of renewables. To change this situation, in 2014 the Government enacted Law No. 1715 that promotes generation through renewable energies. According to Velandía, such law had allowed the presentation of 50 new projects by 2015.

“It is not enough to develop sustainable systems if we do not think of citizenship through tariff systems and better energy access conditions. That is the challenge that we have in Colombia,” he concluded.

Strategies and Investment Opportunities

Starting the second round of presentations, **Izeusse Braga** pointed out that the fall in oil and raw material prices deeply affected exports and national budgets of several countries in the region. In that context, most of the countries have had to cut spending significantly, and experienced low economic growth, rising inflation and unemployment, and strong effects on exchange rates. “What strategies is your country adopting for the development of the energy sector, in particular oil and gas? And what measures are being taken to promote investment opportunities?” Braga asked.

The National Director of Energy of Uruguay, **Olga Otegui**, replied that her country is working on two lines. The first one relates to the transformation of the energy matrix and its diversification through renewable sources. We decided that natural gas should be the backup fuel for the use of renewables, because we believe that this source could be more efficient and more adaptable to different uses,” she said. We also encourage greater oil prospecting and exploration, both offshore and onshore. In this context, there have been two bidding rounds to date, which have enabled Uruguay to position itself in the regional oil map. The third round is expected to be launched in September of this year. In the case of Brazil, **Márcio Félix Carvalho** spoke about the program “Gas to grow,” which reflects the interest of the country in increasing the use of this resource. “Brazil can be considered a success in the industry,

but this success may be summarized in just a few words: Petrobras, deepwater, oil and presalt,” he said.

For this reason, the government prepares a new policy for exploration and production to be presented next June that would include a schedule which takes into account bidding rounds to promote exploration and production offshore in the presalt and onshore for discovery of natural gas. “Our onshore production is three times lower than that of Ecuador and Argentina and seven times lower than that of Colombia. We believe our onshore production will bring surprises, especially regarding gas,” he added.

Mauricio Bejarano Martí said that Paraguay is working on a fundamental axis to have its own hydrocarbons. “Our current production of natural gas is very low, still insignificant,” he said. A change in regulations to grant permits and concessions in a less cumbersome and agile fashion, added to the tax competitiveness of the country - due to its lower tax rates - are part of the actions. They also include a greater prominence of the state company Petropar, which can now form consortia with other companies in order to develop the upstream activities more aggressively and dynamically.

“We have significant oil reserves but we are not an oil country,” **Orlando Velandía** said. The President of ANH Colombia was self-critical when affirming that in times of high prices, his country increased and accelerated oil production to reach an average of one million barrels per day, almost exhausting its reserves.

As a result, Colombia has seen the need to deal with aggressive tax incentives for investments in exploration, because “we have to go back to the previous levels of reserves and production,” he added. Thanks to these efforts, Colombia is now considered attractive for investment, but should work on other fronts to regain the level of oil exploration and production. “We are

targeting on the Caribbean Sea. I believe that our future offshore and gas production will be there,” Velandía said. In this regard, he stated that his country has to face three challenges: improving its level of conflict, raising the recovery of its reserves and evaluating its unconventional potential. “Our country needs to take quick action due to its high dependence on hydrocarbon resources,” he said.

Integration and Competitiveness

The third round of presentations focused on the energy performance of the continent. In his introduction, Braga highlighted the richness and diversity of energy resources of Latin America, in particular renewable energy sources. “Although the complementarity of these resources throughout the region has been widely studied, the lack of regional integration has given rise to an enormous untapped potential. Considering that there are other regions seeking to attract investments to develop their energy sectors, “what incentives do you believe should be given to make the region more competitive in relation to the rest of the world?” he asked.

Orlando Velandía replied with another question: “How integrated are we capable of becoming?” and added: “Starting at least with binational integration and seeking to improve infrastructure, especially in pipelines and similar projects, would be a challenge to undertake. Like Colombia, we would also like to learn a lot more from Uruguay on the subject of renewables, or learn from the experience of Brazil in offshore. Having this capability is a challenge. We could lose great opportunities merely due to our lack of integration.” **Márcio Félix Carvalho** and **Mauricio Bejarano Martí** agreed with Velandía that binational projects are a good opportunity for integration. Both

speakers highlighted the achievements of Brazil and Paraguay, by way of example, with joint projects such as the Itaipu hydroelectric plant.

Alfonso Blanco spoke about energy complementarity as a preliminary step to integration. The Executive Secretary of OLADE said that, in pragmatic terms, an integration that covers the entire region is not achievable due to certain aspects, such as geopolitics. “However, complementarity through the efficient use of the energy surplus of some countries and the unmet demand of others, is a preliminary step. Perhaps stronger integration

processes are achieved later,” he said. Blanco added that the continental potentialities and capacities should be used to promote Latin America at the global level and attract more investments in the sector. “We are working very strong at OLADE to harmonize our information system with the International Energy Agency. This is a key issue,” he said.

Olga Otegui concluded that in order for the continent to improve investment levels, stability and long-term policies are essential., “We need to show signs of our interest to attract investments in the long term,” she said.

Climate Change

In the final round of speeches, **Izeusse Braga** spoke about the challenges of meeting the environmental agenda established at COP 21 in Paris, which, as agreed, requires the world to accelerate the decarbonization of the global GDP at a rate of 6 %. “The energy sector will face great challenges to transform itself and be able to fulfill these commitments. Renewable energy, energy storage, the innovative design of markets and energy efficiency will be key to guide this transformation,” he said. Under this premise, and taking into account the contribution of the region to sustainable energy development, Braga asked the last question to the speakers: What are the challenges that appear to

promote the implementation of the commitments to combat climate change?

Bejarano Martí expressed that this should be pursued at the regional level within the framework of generation from renewable sources. **Otegui** added that we should focus on how to reduce the consumption of fossil fuels in the transportation sector and in the industrial sector. “Every country has its own reality and solutions, so each country must have sovereignty to decide instead of importing solutions,” **Carvalho** reflected. **Velandía** stated that his country is making huge efforts to lower the levels of CO2 emissions. “I think that we have to work on another front, i.e., improving our capacity of absorption by mitigating aggressive deforestation programs,” he stressed. Finally, **Blanco** highlighted that it is necessary to incorporate renewable sources to the energy matrix through market mechanisms in order to avoid distortions in energy prices. “The issue of subsidies is delicate and requires a quite serious approach,” he said.



Dialogue of Presidents and CEOs of the Region

The same scenario with different actors. As in the first panel, Plenary Session 2 addressed the new energy reality, challenges and opportunities. This time the issues were considered from the perspectives of the Presidents and CEOs of major companies operating in the continent. In his introduction, the Senior Vice President of IHS Markit, **Carlos Pascual**, who chaired the meeting, said that the industry is currently operating with an oil barrel price between USD 50 and USD 60, due to the efforts of the OPEC and Russia to resume control of the supply at the global level. “The questions are: Where do we go from here? How fast will prices increase? The answers have major implications for the region,” he remarked when opening the discussion.



“Due to low prices, no investments have been made in exploration and production, so that at some point we are going to have an impact on the supply of crude oil in the market.”

Carlos Pascual

Senior Vice President of IHS Markit

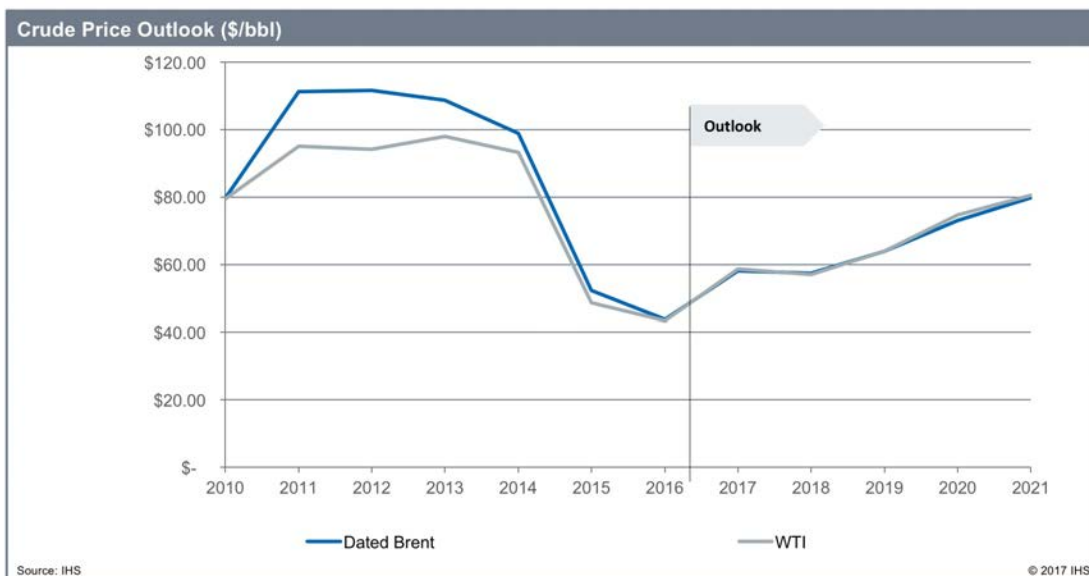
USD 58

The projection for the oil price in the period 2017-2018 made by IHS Markit.

6%

The rate at which the world must accelerate the decarbonization of the global GDP to achieve the goals of the Paris Agreement.

Oil market outlook: return to stability?

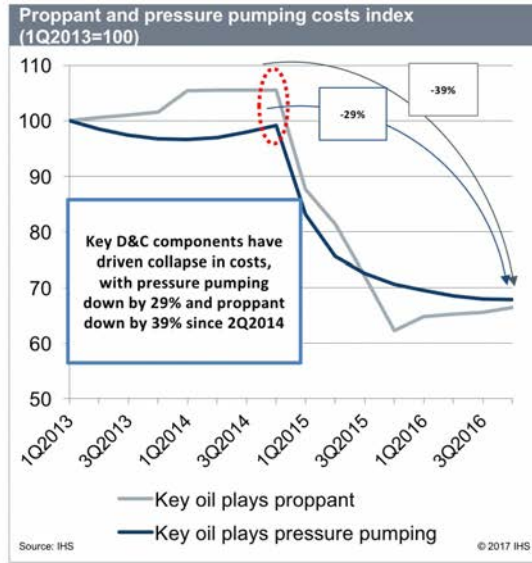
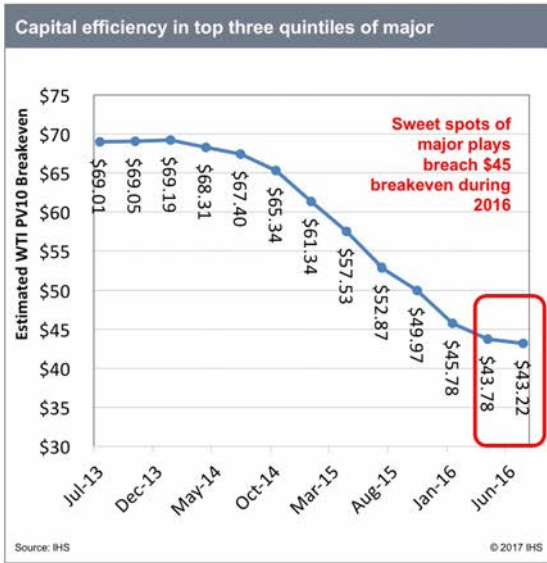


Benchmark crude price outlook (dollars per barrel)												
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dated Brent	\$79.51	\$111.21	\$111.68	\$108.68	\$98.94	\$52.37	\$43.70	\$58.08	\$57.36	\$63.91	\$73.00	\$79.84
WTI	\$79.48	\$95.04	\$94.12	\$98.03	\$93.28	\$48.71	\$43.31	\$58.73	\$56.99	\$63.94	\$74.68	\$80.46

Oil market return to stability

Carlos Pascual

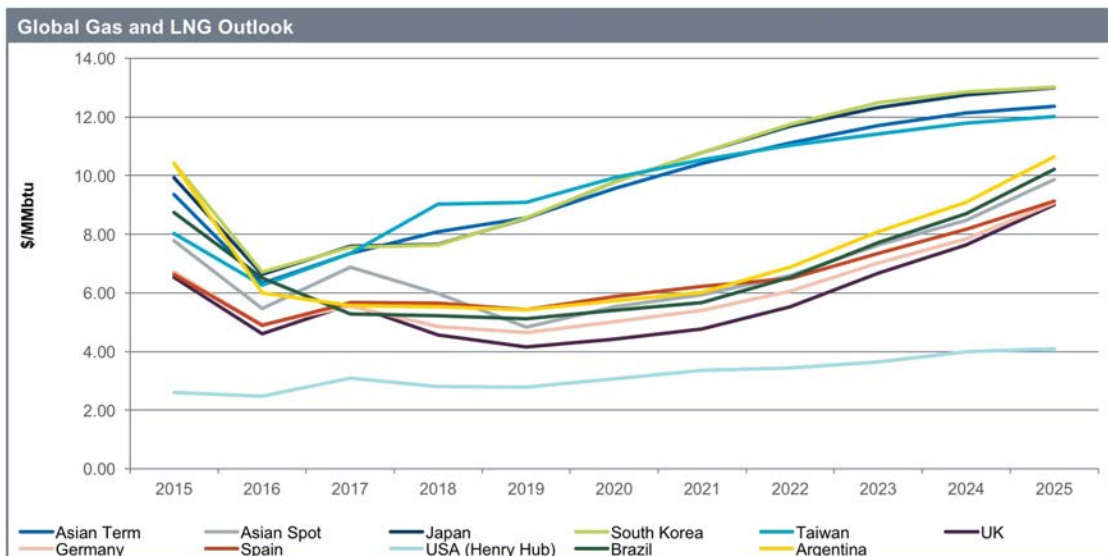
US shale has dramatically improved competitiveness through small compounding gains



The rebound in US production beginning now comes as the system has achieved amazing gains in capital efficiency from the compounding of well selectivity, design changes, and collapsing costs. Peak capital efficiency has likely passed, and the unwinding is already beginning.

US shale has dramatically improved competitiveness through small compounding gains
Carlos Pascual

International gas supplies sustain low price environment through 2020



International gas supplies sustain low Price environment
Carlos Pascual

The Price Variable

The President of Petrotrin of Trinidad & Tobago, **Fitzroy Harewood**, stated in his first speech that the balance between global supply and demand has not been achieved yet, and will not be achieved for at least three to four years. “This imbalance will continue and the price will tend to rise very little, so we must take a cautious approach,” he said. For the General Manager of the Chilean ENAP, **Marcelo Tokman**, the agreement reached between OPEC and Russia remains important, so the Executive Board considers that it would be key that the commitment be renewed. “As long as the agreement is in force, there should be a sharp decline in the inventory as of this year, and in 2018, prices should be closer to USD 60, in a situation of market balance,” he said.

The Commercial Vice President of Schlumberger Latin America, **Carlos Sarmiento**, stated that the actual effect of the agreement is yet to be seen, because in the last months of 2016 OPEC had a production record that caused an impact that remained over the first quarter of 2017. In addition to this, the United States has had a reactivation of unconventional that is affecting prices in the opposite direction. Once again, **Carlos Pascual** put into



Fitzroy Harewood
President of Petrotrin of Trinidad & Tobago



Carlos Sarmiento
Commercial Vice President of Schlumberger Latin America



“Vaca Muerta is a world class resource. The conditions for its development are yet to be adjusted. This project must be able to develop at market prices.”

Carlos Ormachea
President of Tecpetrol

consideration another element of analysis. “Due to low prices, no investments have been made in exploration and production, so that at some point we are going to have an impact on the supply of crude oil in the market. When will it take place? In 2018, 2019 or 2020?,” he wondered. On that point, Tokman stated that in his opinion the effect on supply will be seen by the end of 2018. **Sarmiento** stated that it is clear for him that, with the exception of Russia, the Middle East and the United States, the world has had a decrease in investments in the upstream sector equivalent to half of the investments made in 2014. “The impact that this is having on the reservoirs has to do with the rate of decline, which in some places is up to 25 % and 30 %,” the Schlumberger executive stated. Sarmiento, on the other hand, said that the sustained levels of production are generating a feeling of false resilience in many locations. Why? “Because it is said that production is maintained despite the fact that we do not invest so much, and what is happening is that, in the end, this is affecting the

reservoir and causing greater depletion. This will have an impact and will affect the supply in a probably dramatic way,” he said. Taking these elements into account, the speaker was also inclined to consider, like Tokman, that the impact on the price should show a positive trend in the coming years. Going deeper in the analysis, the President of Tecpetrol, **Carlos Ormachea**, expressed a more conservative approach, since the dynamics and the production cycle are changing with the progress of unconvensionals, which in the medium term - the next five years- could put “some kind of roof to a price increase beyond USD 60. We are currently working in a horizon in the range of the USD 50 to USD 60, and with this horizon we plan investments,” he said. Ormachea referred to the performance of unconvensionals in the region, particularly in Argentina, indicating that the conditions are proper to invest in the development of gas projects, although at current prices, the projects in Vaca Muerta remain quite tight. “Obviously, in a perspective of better prices, and when we have been able to achieve a substantial decrease in costs, there will be a very important potential for the region,” he said. Already at the end of the analysis, Pascual referred to projections developed by IHS Markit, which state that the value of the barrel could be between USD 57 and USD 58 for the period 2017-2018, due to the existing agreement to cut production between OPEC and Russia and to the increase in production, mainly in the United States. In the same line, IHS Markit believes that the impact on the production of hydrocarbons, resulting from the lack of investment in the upstream sector, may occur in 2020.

The Impact on Costs

Given the drop in prices, in the United States all upstream companies faced the challenge of cutting costs to become viable. In the segment of un conventionals, for example, the average of the cut was from USD 70 per barrel (in July 2013) to USD 43 (in June 2016). With this experience, **Carlos Pascual** asked the speakers: “What have we learned from this process? What was achieved in term of efficiency? What can be maintained for the future?”

Carlos Sarmiento said that the most appropriate way to generate improvements in costs and efficiencies in a more sustainable manner is integrating efforts, so that both operators and service companies understand their objectives and focus on a reduction of the total cost. “This is definitely more sustainable,” he said.

Marcelo Tokman agreed with the Schlumberger executive that we must look forward together with suppliers, and added that one must not lose sight of the discipline, which was weakening in the sector when international prices were above the USD 120 per barrel, generating an increase in costs. As a result, according to Tokman, the industry is currently in a period of deflation of costs that has direct impact on the prices of services.

“Forty percent of the reduction is due to this decrease in the cost of services, but two other elements are most important, from the point of view of

sustainability: an increased selectivity of projects to be carried out and the search for technology, innovation and improvement of processes to move faster in the learning curve,” the Manager of ENAP added.

Fitzroy Harewood also valued the concept of sustainability, and said that it is important to generate a robust and cost-cutting scheme that is sustainable in the long term, even more if the item goes through a state oil company, as Petrotrin, which must also respond to the interests and expectations of higher income and employment generation of an entire country. “This is a huge challenge. We must talk with suppliers and service companies to solve difficulties together, because this ensures the sustainability of the business,” he agreed.

Addressing the analysis from the point of view of un conventionals, **Carlos Ormachea** said that the reduction of costs, as a necessary condition to develop Vaca Muerta, must be significant. According to the President of Tecpetrol, one of the elements that should contribute to this reduction is engineering.

He said that to the extent that progress is made in the learning curve and the operators involved in the area are successful in the development of projects, a critical mass of business will be created that will allow increased investment in technology, which will lower the cost throughout the value chain.

Ormachea also added to his analysis the impact of the fiscal terms on unconventional projects in his country. “In Argentina we have a significant fiscal burden, and it is likely that we must follow a gradual process to adjust this,” he said. The executive explained that the effective tax rate exceeds 35 %. “When you have rates higher than these thresholds, investment projects are severely penalized,” he added.

Beyond fiscal issues, the executive considers that, to the extent that progress is made, mechanisms and solutions will be found to help to gradually improve efficiency and results, because Vaca Muerta is a world class resource. The conditions for its development are yet to be adjusted. This project must be able to develop at market prices,” he emphasized.

As a conclusion, **Carlos Pascual** said that it was clear that companies must reduce costs through the use of technology and the development of innovative mechanisms that contribute to efficiency. In this way they will be competitive and viable. On the other hand, he remarked that there is also an incentive for countries, which in order to attract investment must take into account the fiscal terms they impose on the projects. “If they are addressing the development of resources only from the perspective of income for the country, they will lose these revenues,” he said.



“Environmental sustainability is an issue from which there is no escape.”

Marcelo Tokman
General Manager of ENAP

Natural Gas

The rapid increase in the production of natural gas and its impact on the global market, especially with the revolution of shales in the United States, was the third topic under discussion. **Pascual** said that as a result of this development, the prospect of 2020 prices for natural gas is quite low, which is good news for consumer countries, but a challenge for producers.

Because of its potential, countries such as Argentina with unconventional and Brazil with the presalt, aim to be producers of gas and enter in a larger market competition. The question raised by the Vice President of IHS Markit was if natural gas could be competitive in Latin America under this context. “We definitely believe that the answer is yes,” replied **Carlos Ormachea**, based on the high quality of the resources of the region. Anyway, he agreed that in the next four to five years, there will be an oversupply of gas in the world. “The challenge is to achieve efficiency in productivity and cost reduction, which would open up a market demand for the gas that we produce in the region and that would

lead to its industrialization,” he said.

Marcelo Tokman, in turn, referred to the energy interconnection between Chile and Argentina based on gas.

The Manager of ENAP said that there is absolute coincidence between the benefits of greater integration and the political decision to move forward in that line. “We must find ways to move forward by taking advantage of the multiple pipelines linking both countries,” he said. In addition, Tokman said that a different aspect from the past is the existence of LNG regasification terminals, which now allow a country to become no longer dependent on a single supplier.

“In any market, diversification is a way of managing risk. What is interesting is that today this can be done in this market in ways that ten years ago were almost impossible,” Pascual stated.

Fitzroy Harewood addressed the theme of gas in relation to its competitiveness with diesel, on the understanding that liquid fuels are commonly used for electricity generation in many Caribbean islands. According to the executive of Petrotrin, there is a strong will in the region to gradually change this

situation and to use more gas for the generation of electricity. In the specific case of Trinidad & Tobago, the goal set by Harewood is to ensure that 100 % of electricity is generated by gas, so that liquid fuels are for other industrial uses.

However, a key issue for the development of gas in the continent has to do with infrastructure. “The infrastructure is not yet at the level it would make us as competitive as desired,” said **Carlos Sarmiento**. With countries such as Brazil and Argentina with ambitious plans to develop their gas reserves, the challenge to obtain this production and transport it is latent. “In Argentina, about 10 % of the gas transportation infrastructure system corresponds to idle capacity, as a result of the decline in production shown in the last ten years,” **Carlos Ormachea** added. As a result, this would enable the transportation of the first new and additional production generated by the development of unconventional in Neuquén, between 14 and 15 million cubic meters per day. In the same way, Argentina would have a certain treatment capacity that was built

by the operators to process a high volume of gas over a decade ago. A second element to consider is that gas carriers, which are regulated in Argentina, now, due to rule changes, are now recovering their earning capacity, so they might become investment vehicles that could meet the new demand for gas transportation. “That is to say that not all the required investment in infrastructure has to come from the public sector. I think that in this new scenario, a good part of these opportunities will be open to the private investors. There is still a lot to be done,” added Ormachea. On this point, and closing the third part of the session, **Carlos Pascual** considered that the role of governments has changed fundamentally in infrastructure management. “I believe that there are few governments in any part of the world that have the resources to do all the necessary investments. The role of governments refers more to how to develop the strategy and the plan, and how to maintain incentives for private investment to develop infrastructure,” he concluded.

Environmental Sustainability

After the COP 21, the energy industry has begun to reflect on the implications that the Paris Agreement will have on the companies in the sector. **Carlos Pascual** recalled that 15 years ago the issue was about the peak supply and the fear was that at some point oil would run out completely, while now the issue is the peak demand. “Today there are aspects such as “How many electric vehicles will there be? How will the market change? What impact will it have on hydrocarbon production? This is a crucial issue for the sustainability of the planet,” he said.

With this introduction, the question addressed to **Marcelo Tokman** was: “Do companies take the issue of sustainability seriously? What else should be done?”

In response, Tokman said that environmental sustainability is an issue “from which there is no escape,” and added that in the case of Chile, the country took a commitment to reduce the intensity of carbon (emissions of carbon dioxide per gross domestic product) by 30 % with respect to the level of 2007.

On the other hand, measures were taken that have a direct impact on the sector, such as the rules that limit emissions from thermal power plants, as well as green taxes at a cost of USD 5 per tonne of CO₂. “That certainly implies an effort to introduce cleaner technologies within our production processes,” the executive said.

In relation to whether the industry is threatened if there is a peak demand for hydrocarbons, Tokman envisioned

a growing demand for natural gas, which would help to balance the future scenario between hydrocarbons and renewable energies. But, in addition, the executive said that ENAP is starting to explore clean technologies such as wind. “It is the way to keep ourselves open and see what is going on with different technologies that will be increasingly important in the energy matrix,” he said.

Regarding the peak demand, **Carlos Sarmiento** considered that “there are hydrocarbons for quite a long time and that is a reality”. However, he said that a change of mentality was necessary, which implies a new approach on the use of technologies in the oil industry, leaving aside the financial stress of focusing on the contribution of those technologies to the decarbonization of the environment. “There are issues such as the effect of remote operations, or the effect involved in the use of technologies that affect less physical space, or the effect of making the decision not to drill additional wells and, instead, to improve the recovery factor in the already existing ones. These are aspects that can help a lot to decarbonization,” he said.

To the question: “How do you see integration of natural gas with renewables and how can that contribute to fulfill the objective of decarbonization?” **Carlos Ormachea** replied, “It was a necessary marriage,” because natural gas is the natural partner of projects that have limitations in the continued provision of supply. “However, there will be space for both things for a long time,” he said.

In conclusion

Carlos Pascual, Senior Vice President of IHS Markit

The industry is working in a very dynamic market, in which the cycles have been made even shorter, especially with the changes in the type of production and the income from unconventional.

In addition, the low prices have forced a reduction of costs and the search for greater efficiency, which will also force an increased competitiveness. And in order to survive, competitiveness cannot be ignored and must be respected not only by companies but also by countries, because the fiscal terms will be fundamental in this process.

On the other hand, the production of natural gas offers a huge global opportunity to use a fuel with a lower CO2 content. However, to get to this, attention should be paid to the issues of the infrastructure required to develop it, in addition to a partnership between governments and companies.

Finally, in order to survive we have to maintain a planet that is sustainable and we all have to do our part. In the future, there will be a demand for hydrocarbons, but consistent with this demand we need to understand how to integrate with technologies and innovation to lower the levels of carbon dioxide emitted in the production systems.

Transparency and fight against corruption

The Minister of Transparency, Supervision and Control of Brazil, **Torquato Jardim**, participated in the Conference and delivered a lecture entitled “Transparency and Fight against Corruption.”

Before his lecture, the Consultant and member of the Brazilian Committee of the World Energy Council, **Izeusse Braga**, by way of introduction, recalled that, in 2004, during a summit held in New York, the inclusion of a tenth principle to the Global Compact promoted by the United Nations was approved. It explicitly states: “Businesses must act against all forms of corruption, including extortion and bribery.” “The first intention was



Torquato Jardim
Minister of Transparency, Supervision and Control of Brazil

to challenge companies and bring governments, UN agencies and civil society to create a more transparent, free of corruption global economy,” said Braga, who was present at this historic moment.

Today, that the Lava Jato case has impacted Brazil severely, in particular the oil industry, Braga appreciated the work carried out by Jardim from the Ministry under his responsibility to regain the reputational values of the sector. “Mainly in relation to more than 99.9 % of professionals in our industry who have nothing to do with the enormous problems caused by so few,” he said.

In turn, Jardim said that Lava Jato is an underway investigation and that it may continue for several more years. According to Minister Jardim, the case has revealed the high concentration of power, that is even institutionalized, and that is expressed, for example, at the tax level, with two-thirds of the tax collection going directly to the federal coffers, and at the administrative level, with a strong concentration of power in the President of the republic, state governors and mayors of towns.

Jardim said that today in Brazil there is a necessary creative “deconstruction of the entire working apparatus of the Brazilian Government,” with the purpose of creating a new correlation of forces in society.

The aim is to make public administration more transparent so that the civil society and the private stakeholders that deal with public entities clearly know the decision-making process. The purpose is to restore confidence and reputation between the State and civil society, the

labor market and investors.

“The State must learn, in a transparent manner, to be accountable to civil society. In addition, we must have a new electoral system with greater representativeness that clearly defines the system of financing electoral campaigns,” he said.

On the other hand, the Minister said that in the future the great constitutional, business and social debate for Brazil will focus on the role of the government as entrepreneur and whether it is the best model for the role of the State in the economy. Given the nationalist vision of the country together with the perception that, in Brazil, everything can be done by Brazilian themselves, this creates “a great confrontation between what is national and international. This is once again the great debate,” he added.

One of the concrete results of Lava Jato has to do with the creation of Pro Ética, a program carried out by the Ministry of Transparency, defined as a cooperative effort between the public and private sectors to promote a more integrated, ethical and transparent corporate environment.

With the program, companies conduct, in coordination with officials of the federal government, audits on tax and labor obligations, and internal programs of integrity. In this way, 195 companies went through this process in 2016, while in 2017 there are close to 500 companies.





04 //

Natural Gas and its Increasingly Prominent Role

In the next twenty years, the composition of the global energy matrix will not experience significant changes. Hydrocarbons will continue to lead consumption by approximately 80 %, while renewables will remain at 20 %. The reason for this is the large growth that global consumption of natural gas will record. Latin America has significant potential energy reserves, so the question is relevant. What are the prospects for the development of gas reserves in the region? How to monetize these reserves?

The Executive Director for Latin America and the Caribbean of Repsol, **Evandro Correa**, presented a comprehensive overview on the subject, focusing his analysis on the opportunities and challenges that countries such as Trinidad and Tobago, Venezuela,

Colombia, Peru, Bolivia, Chile, Brazil and Argentina have ahead of them. With data from the BP Statistical Review of World Energy, in 2015, Latin America accounted for 4.1 % of reserves, 5 % of production and 5 % of global consumption of natural gas. In that context, Correa emphasized that the behavior of the region has been constant, although the distribution in terms of reserves, production and consumption is very uneven. “The main gas demand in Latin America is concentrated in Mexico, Argentina and Brazil, which consume 80 % of the total,” he explained. In addition to this, consumption within the continental energy matrix is divided basically between two sectors: electricity generation and industry, while residential and vehicle consumption is far behind.



“The main gas demand in Latin America is concentrated in Mexico, Argentina and Brazil, which consume 80 % of the total.”

Evandro Correa
Executive Director for Latin America and the Caribbean of Repsol

6.599
TCF

Global reserves of natural gas at the end of 2015, according to the BP Statistical Review of World Energy 2016. This volume would be enough to supply the planet for 52.8 years

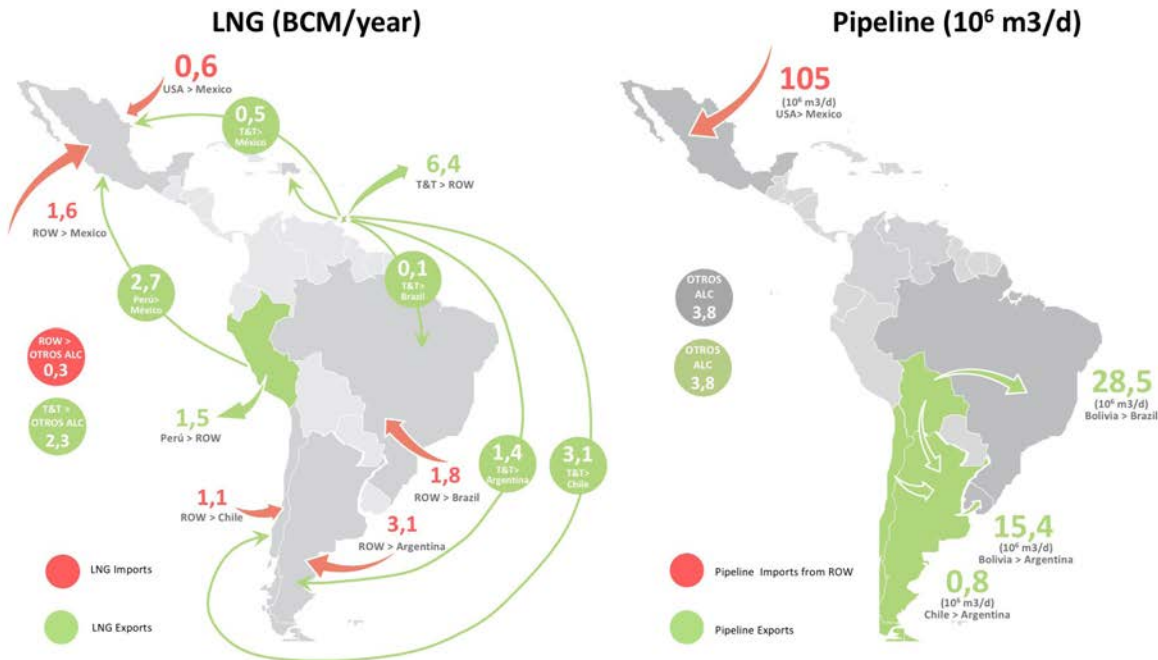
LNG Terminals



Source: ARPEL - Trends of the Natural Gas Sector in Latin America and the Caribbean – April 2016

LNG terminals
Evandro Correa

Natural Gas Trade 2016



Source: ARPEL

Natural gas trade 2016
Evandro Correa

Country by Country

Trinidad y Tobago

According to Correa, Trinidad and Tobago is one of the major producers and exporters of gas in the region, with reserves of 11.5 Tcf, production of 3.3 billion cubic feet per day (Bcfd) and consumption of 4.2 Bcfd. At present, it is negotiating with Venezuela the possibility of importing gas from the Dragón field, as well as the joint development of two fields: Manatee-Loran and Manakin-Cocuina. According to the executive of Repsol, currently, the greatest challenges of the island are the sharp decline in its production, which leads to a deficit for the supply to the domestic market and exports, as well as the need to encourage exploration further.

Venezuela

With 198.4 Tcf, it is one of the most important countries in the world in terms of gas reserves and resources; in fact, it has the largest gas reserves in the region. “It has all possible opportunities in terms of underground resources,” Correa said. “But its challenges are proportional to the amount of its reserves,” he added. Correa referred to the complex political crisis in that country and the economic risks that directly affect foreign investment. “Today, the main challenge of Venezuela is to attract investment in order to develop its resources,” he said.

Colombia

It is a market that demands a lot of gas and which requires investments in this sector, as it only has reserves of 4.8 Tcf, and consumption and production of 1.05 Bcfd, respectively. Correa said that its political stability and its open economy friendly to foreign investment allows anticipating opportunities for the placement of capitals in the upstream sector. However, expediting of environmental licenses and permits regarding communities is pending. Among other challenges, Colombians should improve their infrastructure for gas transportation and increase the LNG capacity with a second regasification terminal.

Peru

“It is one of the countries with more potential resources,” Correa says. It currently has almost 15 Tcf of gas, and its great opportunity is to develop the great potential in the Ucayali basin. Among its major challenges are to increase its transportation capacity, for which it has advanced on the South Peruvian Gas Pipeline project, and, like Colombia, to eliminate the obstacles to the granting of environmental licenses. An important aspect in the Peruvian case has to do with the need to renegotiate the contract to export LNG to Mexico, which is based on the Henry Hub and, therefore, has a very low value. “This makes the Peruvian government collect low royalties, while the upstream sector charges an extremely low price for gas and Perú LNG cannot cover its costs,” Correa said. The Peruvian option would be to divert shipments to be traded in markets such as Asia or Europe.

Chile

Although its gas production is small (0.1 Bcfd) and its consumption is moderate (0.4 Bcfd), Chile has the opportunity to import LNG and re-export it to the Argentine market. The experience of the last year has opened this possibility. Its challenge is to increase production and optimize its electricity matrix. An agreement with its neighbors, Peru and Bolivia, that have excess gas, would allow the country to have cheaper gas.

Bolivia

Bolivia is a net exporter with large reserves (10 Tfc) of gas and a good production (2.2 Bcfd). At the domestic level, its consumption is low and most of the production is exported to Brazil and Argentina. According to Correa, the country has the opportunity to increase exports to the Argentine market because the price of its gas is very competitive as compared to LNG.

In the case of Bolivia, the challenges are related to the renegotiation of the gas contract with Brazil, which expires in 2019, and the need to assess the possible scenario in which both Brazil and Argentina achieve self-sufficiency in gas and stop being its customers. "If that is the case, Bolivia will have problems to export its gas," the executive of Repsol pointed out.

Brazil

The country is on its way to greatly increase its gas reserves, but also increase its demand. At present, its reserves amount to 15 TCFs, its production is 2.2 Bcfd and consumption is 4 Bcfd. In addition to ongoing exploration activities, the development of important projects in the presalt is underway.

Its main challenge is to develop the large number of projects and discoveries made in recent years, which will require billions in investment, as well as achieving the balance between growing demand, local production and imports.

Argentina

Argentina has a good production (3.5 Bcfd) and is a large consumer of gas (4.6 Bcfd). Its biggest problem is the seasonal demand, which forces it to increase imports in winter. Correa believes that a solution to this situation would be to install regasification plants and then use them when there are seasonal peaks of demand.

Undoubtedly, the great challenge and, in turn, opportunity of Argentina is the development of Vaca Muerta. Correa considers that there are many resources that will demand a very high investment to become reserves. "If the incentives continue in force, it is possible to move forward in its development, but drilling costs should be lower and the price of gas should be increased," he concluded.

Monetization of Gas and Integration Options

In its publication World Energy Outlook 2015, the International Energy Agency announced that the “Golden Age” of natural gas had arrived. The growing consumption of natural gas and its role of energy of transition between fossil fuels and renewable energy positioned gas with a high profile in the coming years. “Natural gas is an energy that will facilitate decarbonization. In addition to being an energy of transition, we see that it is also on the other side of this bridge of transition,” the Secretary General of the International Gas Union (IGU), **Luis Bertran**, stated. The speaker, who chaired the keynote address on Monetization of Gas in Latin America and the Caribbean,

added that a second great wave of growth of gas through LNG is anticipated for this year. In the specific case of Latin America, Bertran said the region has a competitive advantage regarding price, since, on average, the values are at an intermediate level as compared to other continents such as Asia and Europe that have, in addition, a high demand for gas. In turn, the Partner of Bain & Company Brazil, **José de Sá**, explained that the Latin American gas potential is undeniable, particularly when anticipating the development of the presalt in Brazil and Vaca Muerta in Argentina. “And when we look at what



“Natural gas is an energy that will facilitate decarbonization. In addition to being an energy of transition, we see that it is also on the other side of this bridge of transition.”

Luis Bertran
Secretary General of the International Gas Union-IGU



“If we look at our position as a region, we realize that much progress needs yet to be made. Contracts are a first step, but it is still necessary to achieve a balance between supply and demand,”

José de Sá

Partner of Bain & Company Brazil

the region has in terms of reserves, and we compare it with countries that supply gas in abundance, the situation is good for consuming regions,” he said.

However, José de Sá believes that the image of the region is not exactly that of a block that is a large supplier of gas to other continents. Even internally, the expert says that it is not the same to speak of gas contracts, such as that existing between Bolivia and Brazil, as to speak of true energy integration. “If we look at our position as a region, we realize that much progress needs yet to be made. Contracts are a first step, but it is still necessary to achieve a balance between supply and demand,” he explained.

In this regard, the consultant argues that

achieving such a balance would imply that natural gas should have a heavier share in the continental energy matrix and contribute to the consolidation of a robust, homogeneous and connected market. “Much progress needs yet to be made, but that would be true integration,” he said.

In line with the remarks of the executive of Bain & Company Brazil, Luis Bertran added that it is necessary for the continent to integrate its own markets by developing infrastructure.

In terms of opportunities, he said that the region can reduce production costs through the use of unconventional gas and reach premium markets, such as Asia or Europe, exporting LNG.





05 //
The Future of Refining

The Manager of Planning and Technical Development of YPF, **Mauricio Martin**, stated that for 2030, gas and oil will keep their majority share in the global energy matrix, with a balanced share between both (28 % and 30%, respectively).

In this regard, the global demand for fuels, and particularly of middle distillates, will be driven by the transport sector. For example, Mexico is a traditional importer of gasoline and is expected to continue being so by 2020.

In South America, Brazil, Argentina and Chile are the main importers of diesel. According to the projection of analysts, by the end of 2020 production will reach approximately 2 million barrels per day and there will be a refining capacity of 5 to 6 million barrels per day.

In terms of installed capacity, Latin America has a primary installed capacity of 296 million tons, 7 % of the global refining capacity. In South America, national companies or companies with a majority share of the state own 94 % of the refining plants.



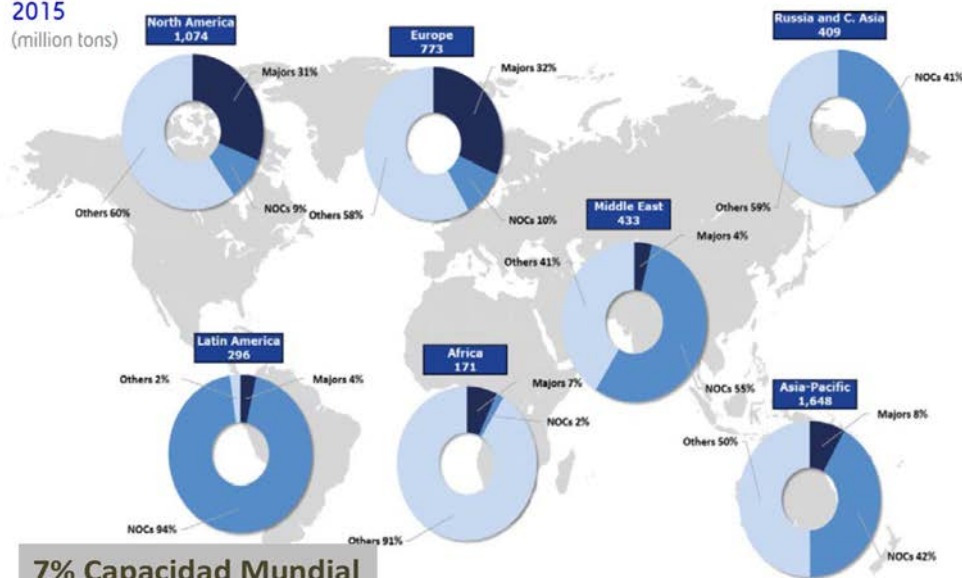
Mauricio Martin
Manager of Planning and Technical Development of YPF

CAPACIDAD PRIMARIA DE REFINACIÓN EN EL MUNDO

Fuerte presencia de NOCs en Latinoamérica

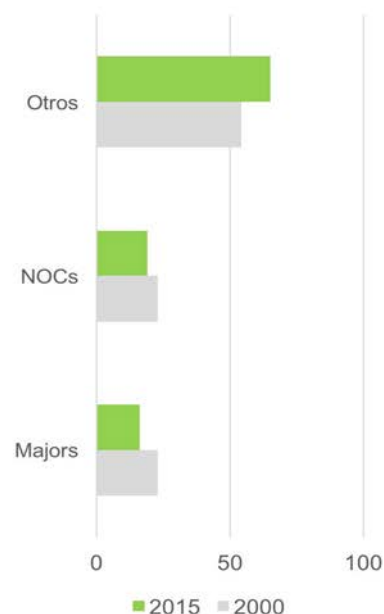
2015

(million tons)



7% Capacidad Mundial

PARTICIPACIÓN % EN LA CAPACIDAD PRIMARIA



⁽¹⁾ Majors: ExxonMobil, BP, Shell, Chevron, Total, Eni, Repsol NOCs: CNOOC, Gazprom, Indian Oil Corporation, KNOC, Kuwait Petroleum Corp, Lukoil, Mitsui, NIORDC, ONGC, PDVSA, Pemex, Pertamina, Petrobras, PetroChina, Petronas, PTT, Reliance, Rosneft, Saudi Aramco, Sinopec, Statoil

Fuente: ENI World Oil & Gas Review 2016

Primary refining capacity in the world

Mauricio Martin

Less Sulfur

The YPF executive highlighted that Chile leads desulfurization advances in refining plants, thanks to its regulations and legislation. Current regulations have lowered the sulfur content to less than 15 parts per million of sulfur in fuels and, in order to reach that, Latin America must make investments of around USD 18 billion.

“From 2020, all the maritime transportation at the global level has to lower the sulfur content of fuel to 0.5 %. This adds extra pressure on all the fuel oil exporting countries, and fundamentally Brazil and Venezuela, that will have to adapt their refining operations and make investments in conversion in order to be able to incorporate gas oil into marine fuel in the next few years,” stated Martin. In summary, growth in distillation capacity, conversion and desulfurization are requirements by 2030. “The truth is that increasing the distillation capacity in Latin America is complex. The Latin American refining system comprises 75 refineries, more than 50 % of which have a capacity of less than 50 thousand barrels per day. This does not generate economies of scale,” Martin said.

The Value of the Petrochemical Industry

The President of the Latin American Petrochemical Association (APLA), **Marcos Sabelli**, highlighted the role of the petrochemical industry in modern life and energy saving. According to the American Chemical Society, 96 % of all manufactured products are, in some way, related to the chemical and petrochemical industries.

The executive of APLA emphasized the role of the petrochemical industry in sustainability related to food production, which contributes to the health of the soil and crops through the production of fertilizers.

According to Sabelli, efficiency in the petrochemical industry is essential because it contributes to thermal insulation in houses and buildings, as



“We have to monetize gas liquids in Latin America, otherwise, we will remain waiting for everything to come to us, which is the same as continue importing.”

Marcos Sabelli

President of the Latin American Petrochemical Association

well as the production of heat-reflecting paints. “This leads to a decrease in energy consumption. More people will be living in our world, but we are not going to necessarily require more energy to heat those homes, we can make homes much more efficient from the thermal point of view,” he said. Regarding technology, the expert highlighted the emergence of “disruptive technologies,” as dehydrogenation of propane to produce propylene. “We used to depend on products that came from the refineries as raw material. Now, we produce synthesis gas, we have many technologies available,” he added. In this context, the Latin American petrochemical industry is large and is also an importer. It imports around USD 100 billion in commodities, products

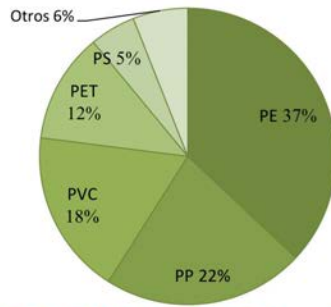
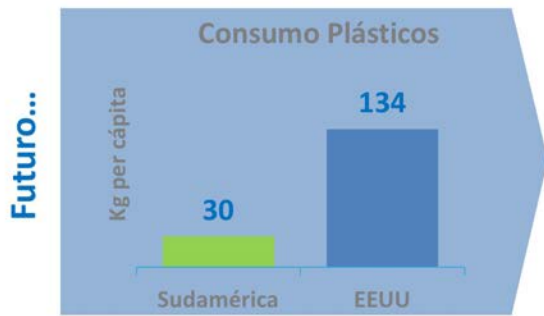
and finished products, and exports USD 35 billion, so in the trade balance, the region becomes an importer. “It is a business of approximately 300 billion tons which becomes a significant digit in the GDP of Latin American countries,” he said. And where is the opportunity? “In unconventional resources,” Sabelli said, and referred to the great capacity of Vaca Muerta in terms of resources., “The two digits in the total production of the Neuquén basin involve only 1 % of the surface of Vaca Muerta, that is to say, only 1 % of the surface is developed, so the potential is huge. My message is that we have to monetize gas liquids in Latin America, otherwise, we will remain waiting for everything to come to us, which is the same as continue importing,” he concluded.

¿Qué ha sucedido en nuestra industria en los últimos 10 años?



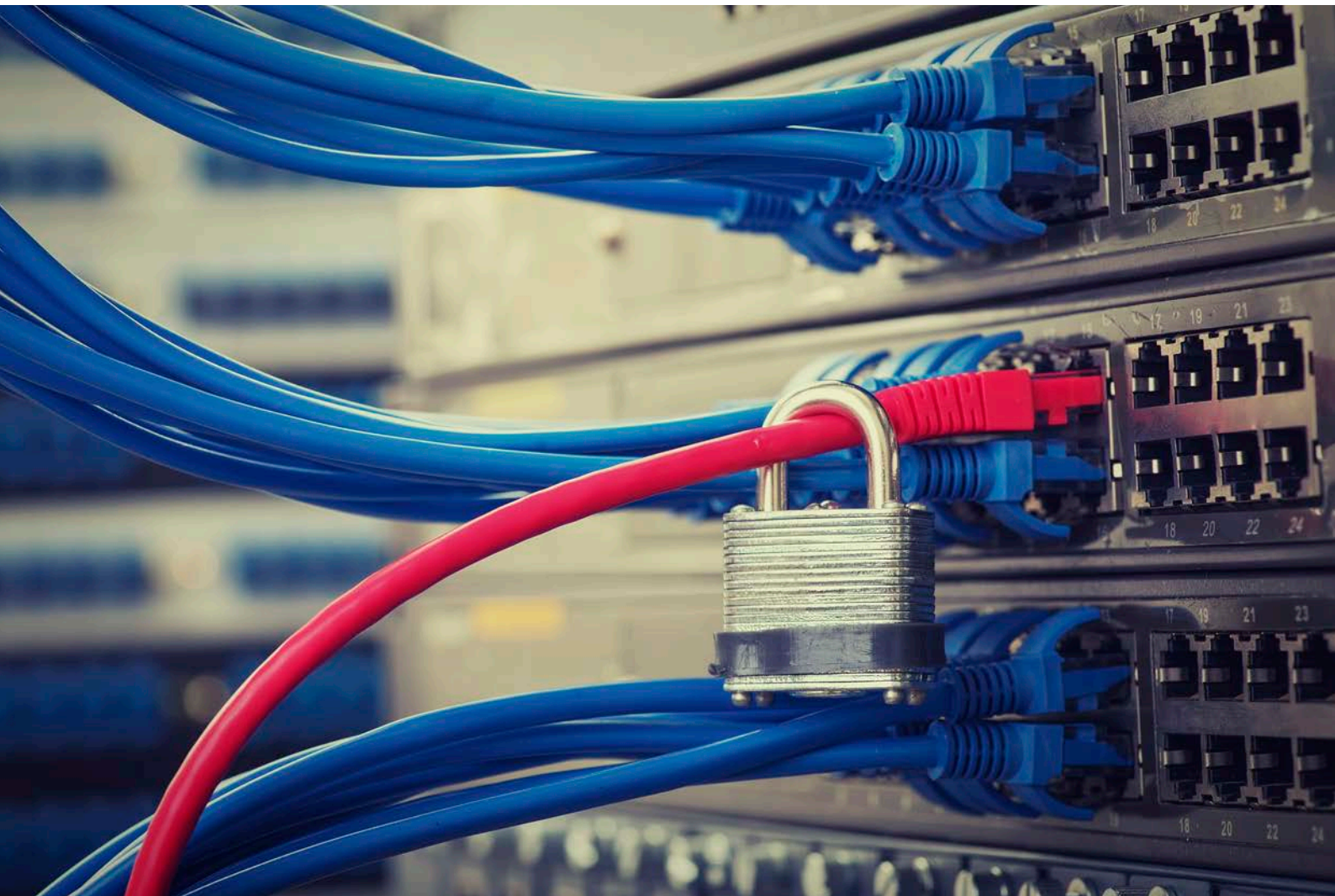
What has happened in our industry in the last 10 years?
Marcos Sabelli

Industria Petroquímica Latinoamericana



AAGR (2017-2021) ≈ 2,4%

Latin American Petrochemical Industry
Marcos Sabelli





06 //
Contract Management and
Industrial Cybersecurity

Contract Management and Its Impact on Business

“In 2016, Oliver Hart and Bengt Holmström won the Nobel prize in economics for the “Contract Theory,” the Advisor to the Board of Director of ANCAP, **Benito Piñeiro**, recalled at the start of the keynote address based on this theory and its applications in the oil and gas industry.

The Chief Economist of Fundación de Investigaciones Económicas Latinoamericanas (FIEL - Latin American Economic Research Foundation), **Fernando Navajas**, developed the subject by explaining that the introductory note to the Nobel prize 2016 establishes that “the contract theory provides a general understanding of the contractual design, but it does not provide unique or definitive answers, because the best contract will depend on the specific situation and context.”

According to a survey mentioned by Navajas, which was conducted by Fulbright-Norton-Rose in 2015 under the label of “Trends in Litigation,” contracts are placed as one of the main concerns for the future of the companies in the sector (45 %), even above the average of the survey (34 %). In this regard, among the main benefits that the contract theory applied to the sector could generate, the economist considers that, in the first instance, it enables the case study. Similarly, it would allow optimizing the considerable resources that the industry allocates to contract management and litigation, as well as helping to limit transaction costs thanks to a perfectible contractual design.

“ARPEL could be the appropriate space to dimension and classify these transaction costs and how they can be limited in the region through better contracts,” he concluded.



Benito Piñeiro
Advisor to the Board of Director of ANCAP



Fernando Navajas
Chief Economist of Fundación de Investigaciones Económicas Latinoamericanas (FIEL - Latin American Economic Research Foundation)

The Time of Industrial Cybersecurity

Today, concepts such as cyberattacks or cyberthreats begin to be frequently used at both the corporate and the industrial level. In fact, the World Economic Forum lists cyberrisks as one of the most significant risks at present. In this line, Alliance Group places them in the top 10 of the current major risks at present and their increase seems inevitable: Position 13 in 2013 and position 3 in 2017.

In view of this scenario, the Oil and Gas Conference ARPEL 2017 organized a plenary session that addressed the “strategic importance of having an effective industrial cybersecurity program.” The Information Security Manager of YPF, **Brian O’Durnin**, chaired the panel, while the Director of Critical Infrastructure Protection and Business Development of Kaspersky Lab, **Andrey Suvorov**, and the Managing Director of WisePlant, **Maximilian Kon**, made presentations on the subject.

In the introduction, O’Durnin said it was clear that robotics is advancing significantly within the processes of the oil and gas industry, for which reason the challenge is the incorporation of the issue of industrial cybersecurity in the agenda of the senior management of companies. “Today, the digital reservoir and so many other industrial projects that are benefiting from technology are a reality. Cyberthreats become an important factor in the business risk matrix,” he said.

For Suvorov, a common mistake is to think that a perimeter of security and an antivirus software are sufficient to protect the systems. “We must understand what cyberthreats mean in this business. Each new technology



“Today, the digital reservoir and so many other industrial projects that are benefiting from technology are a reality. Cyberthreats become an important factor in the business risk matrix.”

Brian O’Durnin
Information Security Manager of YPF



“The reality is that the responsibility for security is not the responsibility of the procurement unit, but of the upper management.”

Maximilian Kon
Managing Director of WisePlant

means greater integration,” he said, while Kon stated that cybersecurity is not just a matter of critical infrastructures, it is also a matter of costs, as it may cost millions of dollars in losses if not taken into account. Specifically, Kon pointed to more than 15 consequences that may result from technological incidents within critical information technology infrastructures or in critical industrial infrastructures. Among the main consequences is the loss of production, of control of the equipment, of staff time, environmental damage or loss of human life, in addition to the loss of confidentiality and data. On this point, Suvorov remarked that human factor should be taken into account, which can also involve significant economic losses for a company. Kon described the effects of the human factor on the basis of a study carried out by Homeland Security in 2015. It states that more than 95

% of cyberincidents that occur within critical infrastructures of companies are internal, 30 % of which are attributable to the company’s own staff that in 50 % of the cases took unintentional actions which finally had an impact on the systems.



“We must understand what cyberthreats mean in this business. Each new technology means greater integration.”

Andrey Suvorov

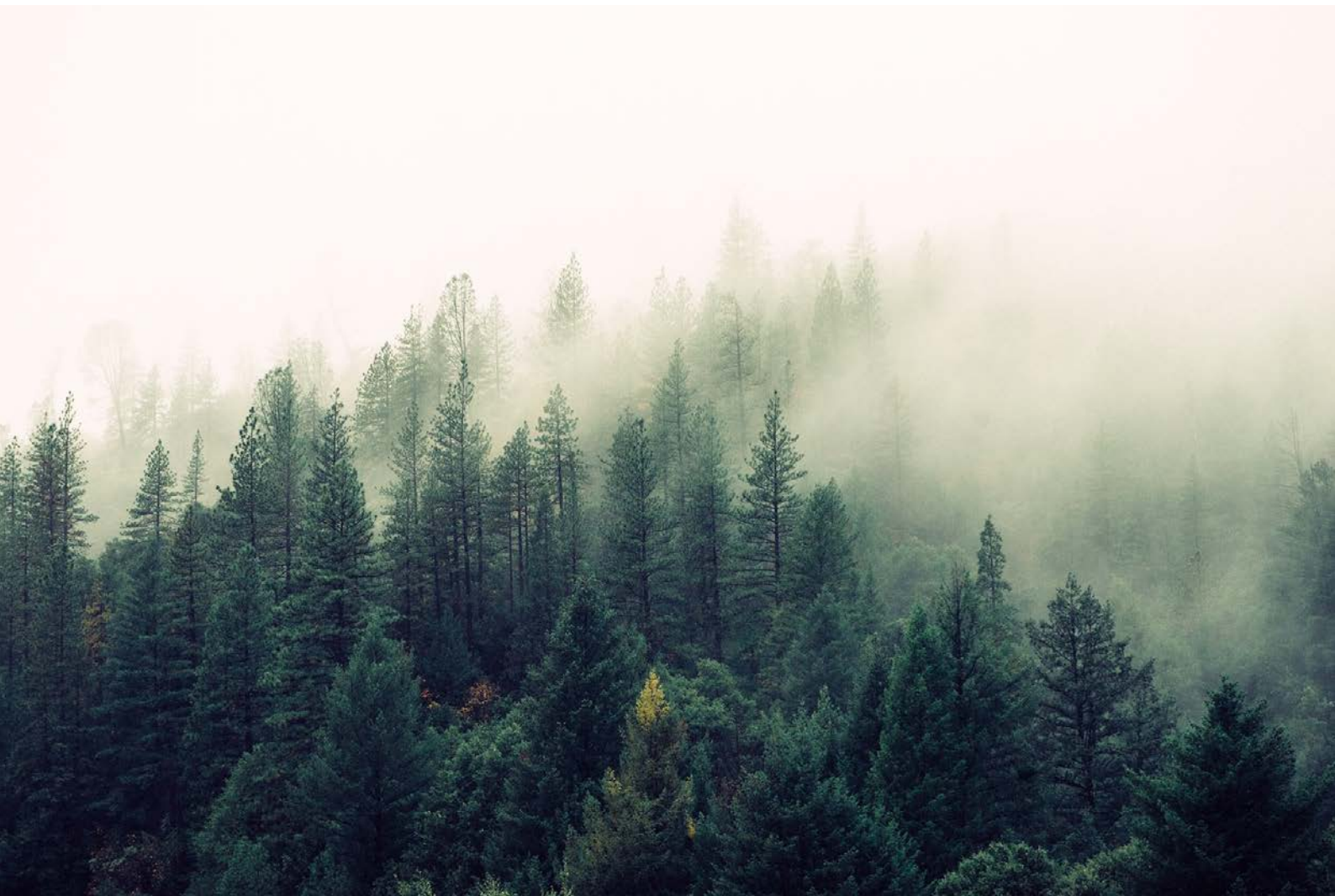
Director of Critical Infrastructure Protection and Business Development of Kaspersky Lab

What Can Be Done?

In terms of risk management, Suvorov spoke of a scheme in which the acceptance, the transfer and the mitigation of the situation come into play. The expert stated that many companies only consider the first and the second aspect and, in general, transfer the risk to an insurance company. However, he recommended that the companies of the sector should review contracts with insurance companies, which today are not willing to cover damage caused by cyberincidents if there is not an adequate cybersecurity program in place.

In addition, Suvorov recommended that the relevant staff should be trained, an awareness program developed, an emergency response team in the event of cyberattacks created, the infrastructure and systems regularly monitored, and, most importantly, the issue of security should be a matter of the board of directors of the company.

“Many people think that technology solves most problems. The reality is that the responsibility for security is not the responsibility of the procurement unit, but of the upper management,” Maximilian Kon said, and closed by saying, “Good security is good business.”





07 //
Energy Efficiency and Environment

The world, and particularly the region, is facing a process of change in the form of understanding production and consumption, which introduces the notion of a restriction to the emissions of greenhouse gases. This reality must be taken into account in the long-term decisions in the industry. “The transition toward a carbon-constrained world has already started, and this is evidencing in multiple and diverse areas, from science to international politics, investors’ decisions, international trade and the energy sector itself,” the researcher of the Torcuato Di Tella Foundation, **Verónica Gutman**, stated. The speaker described the strong trends that are defining a new world for the energy industry: Radically new technologies, changes in the economic and geopolitical balance, greater environmental demands, and even reforms in the financial system aimed at reducing long-term risks.

In the case of emissions of greenhouse gases, energy production accounts for around 35 % of global emissions, to which 14 % derived from transportation, 21 % from the industry and over 6% from the residential sector are added. The emissions from production and use of fossil fuels accounts for more than 75 % of global emissions, with China being the main global emitter, above the United States. In Latin America and the Caribbean, Brazil and Mexico are already within the top 10 emitting countries, while Argentina is within the top 20.

According to the expert, this poses new challenges, such as leading the transition toward decarbonized systems, but maintaining the current ability of global energy systems, which implies new policies, strategies, practices and investments, in addition to a cultural change at the level of the organizations and the sector itself.

For the Director of Downstream of ARPEL, **Irene Alfaro**, climate change has become one of the major themes



“The transition toward a carbon-constrained world has already started, and this is evidencing in multiple and diverse areas.”

Verónica Gutman

Researcher of the Torcuato Di Tella Foundation

of the global political agenda in recent years. In this context, the region has three characteristics that will be decisive at the time of defining the path that will lead to the fulfillment of the commitments made in the framework of the Paris Agreement.

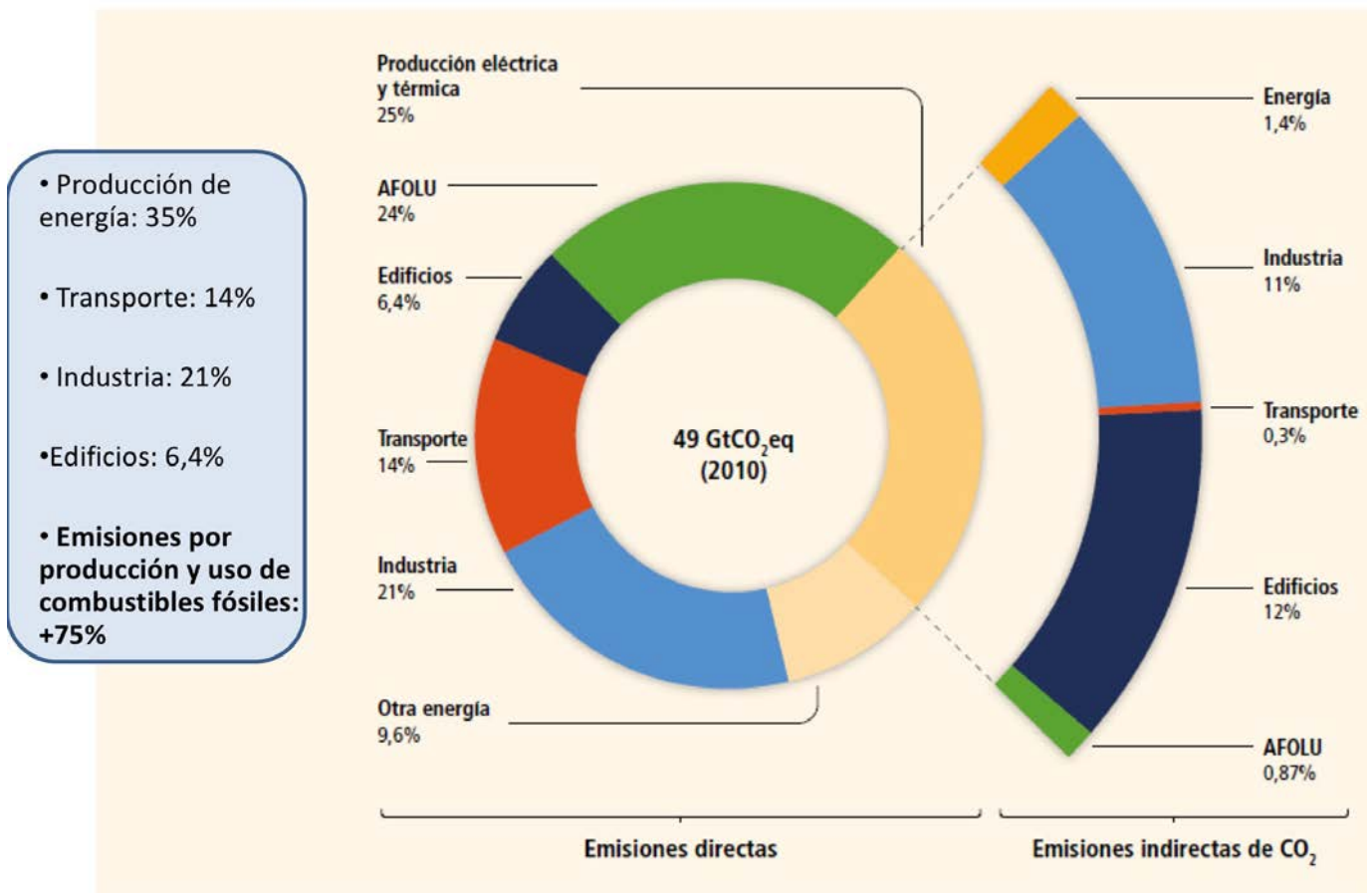
The first one is that the Latin American energy matrix has a higher preponderance of renewables than the global average. “We emit only 7 % of



“In Latin America we emit only 7 % of the global greenhouse gases, and our emissions of energy-related carbon dioxide are much lower than the world average per capita.”

Irene Alfaro
Downstream Director de ARPEL

Emisiones de gases de efecto invernadero por sectores económicos

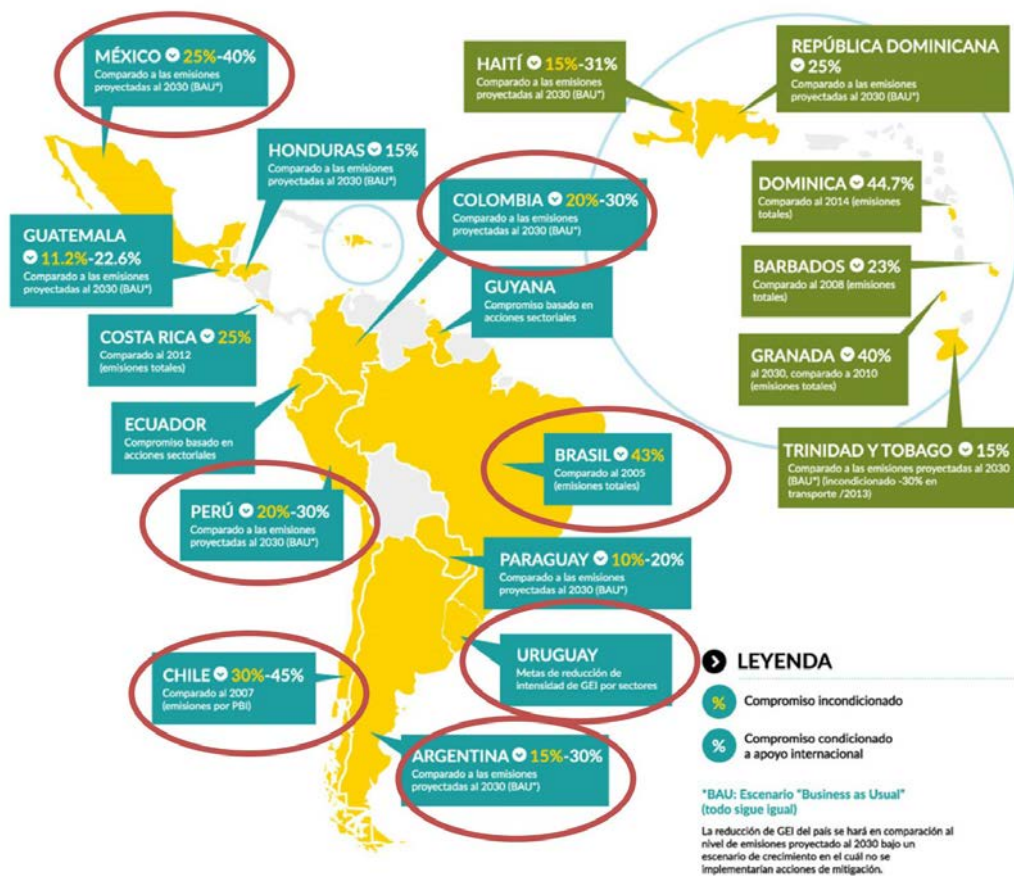


Fuente: IPCC (2014)



Greenhouse gas emissions by economic sector
Verónica Gutman

COMPROMISOS DE REDUCCIÓN DE EMISIONES DE GEI AL 2030



Incluye las INDCs presentadas hasta el 1ero de octubre del 2015 (fecha límite oficial)

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GHG emission reduction commitments by 2030 Verónica Gutman

the total world greenhouse gases and our emissions of energy-related carbon dioxide are much lower than the world average per capita and per unit of economic production,” said Alfaro. The second aspect is that the region has energy needs still unmet, and a long way to go in terms of economic and social development. The third and last characteristic is that ecosystems

are particularly vulnerable to climate change, with high costs associated with its impacts.

In short, the perspective of the regional industry in the medium term, as a supplier of energy in a carbon-constrained scenario and aligned with the objectives of the Paris Agreement, imply important challenges that arise as opportunities for companies.

Smart Cities and Mobility

Currently, the majority of the inhabitants of Latin America are concentrated in the cities, which generates a problem related to the quality of life and urban mobility. In this regard, the Executive Director of CIER, **Juan José Carrasco**, pointed out that in the region there is a need to design urban intelligent transport systems which are in line with the reduction of CO2 emissions and make progress on energy efficiency.

Alain Grimard, Senior Officer at UN-Habitat, said that a smart city is sustainable and that the ideal is to have a 30 % of the urban space dedicated to streets and a 15 % to green spaces, which requires the involvement of local authorities in collaboration with the national authorities and the private sector. As the expansion of the cities is inevitable, Grimard considers that proper planning is required to maximize its benefits and minimize the effects of poor development. According to the approach of UN Habitat, the strategy of smart sustainable cities is based on principles that support three key elements: compact, integrated and connected city.

The Vehicle Regulation Manager of Toyota Brazil, **Edson Oriakasa**, noted that by 2020 the fourth part of all vehicles will be connected and that the motor technology will allow drivers to get to their offices more efficiently, avoiding traffic congestion and accidents, allowing the flow to be cleaner and safer.



Juan José Carrasco
Executive Director of CIER



Alain Grimard
Senior Officer at UN-Habitat

According to Orikassa, by working with hybrid technology, Toyota vehicles encourage the performance of all systems of energy, thereby reducing the use of fossil fuels and, therefore, of CO2 emissions. In this regard, the main challenge of Toyota is to reduce emissions by 90 % by 2050.

“The first great challenge in Latin America is to transform collective transport into electric transport... and if we analyze how much that number of cars represents in electrical

energy, by 2040 this will account for 5 % of the electrical energy of the whole world,” said **Gonzalo Casaravilla**, President of the National Administration of Power Plants and Electrical Transmissions of Uruguay (UTE). Therefore, due to the growth in electricity demand, the countries in the region will have to choose self-sufficiency, seeking alternatives to develop their supply matrixes with a strong component of renewable energy.



Edson Orikassa
Vehicle Regulation Manager of Toyota Brazil



“The first great challenge in Latin America is to transform collective transport into electric transport... and if we analyze how much that number of cars represents in electrical energy, by 2040 this will account for 5 % of the electrical energy of the whole world”.

Gonzalo Casaravilla
President of the National Administration of Power Plants and Electrical Transmissions of Uruguay - UTE





08 //
Cutting-Edge View on Human Talent
Management

A leader surfer is the most cutting-edge and attractive concept of current management. It refers to the people who understand that the new context will not change, and they do not get angry nor confront this; instead, they run to get a board, and when the wave comes, they try to make it the best wave of their lives, stated the Director of AHÁ!, **Gastón Morales**.

The expert on human resources management referred to how dangerous it can be for a leader to take his/her business in cruising speed, that is to say, repeating old formulas when the Generation Z is entering the competition.

“When companies unsaddle in the forest until dawn, there are other companies that at the same time are riding at full speed. When they wake up, they will have to follow in the footsteps of another company that became the leader, leaving the other one as a follower,” said Morales, to highlight that we live in times where audacity is the true prudence.

GE, the company created by Thomas Edison, understands this very well, with a history of constant change in terms of innovation and added value.

It now faces the challenge of digital transformation under a model that has been called “Adaptive Organization,” the Human Resources Manager of GE, **Christian Cetera** stated.

In this context, Focused or Adaptive Teams are formed and work in an interconnected manner with the customer to offer a solution through co-creation, where the role of the leader is totally different from the traditional vertical model.

Cetera explained that GE’s Adaptive Teams are based on identity for a purpose where the intelligence that stands out is not the intelligence of a person, but the collective intelligence of a self-regulated team with social identity, while the role of the leader is to be the organizer of context, to control and to awaken in individuals the capacities that the team and the customer need.

According to Morales, in order for the organizations to move to a next level and increase their capacity for effective action, it is necessary for them to learn new ways of doing things, go from a comfort zone to a quite heavy discomfort zone. “Today we know that learning is based on the memory



“When companies unsaddle in the forest until dawn, there are other companies that at the same time are riding at full speed”.

Gastón Morales
Director of AHÁ!



Christian Cetera
Human Resources Manager of GE

system and its cornerstone is the initial stage of the attention,” explained the expert to point out that it is on the attention where more work should be done in teams.

He compared the attention with a flashlight, because when attention focuses on something, everything around it becomes dark. According to neuroscience, a person captures cognitively only 1 % of the stimuli that his/her body receives.

For Cetera, a company promotes its system of connection with people based on five new concepts. The first is to understand that customers are the ones who determine the success of the company; therefore, long-term relationships should be sought. The second is to learn to let go of whatever is necessary in terms of tradition, of ego or of any aspect that does not allow the company to adapt quickly. The third is to build an organization of continuous and constant learning; otherwise, the company will not be able to survive. The fourth is to learn that there are no longer safe areas or mature markets; opportunities will

appear with challenges in various fields, and finally, the most important, that the connection of leadership comes through the empowerment and inspiration of others.

What kind of inspiration? The challenging image of the future, what Morales calls the magnet. In this regard, working very focused would be the only thing that would generate an impact and a change. “A leader has to understand that he/she should establish a mutually beneficial relationship with collaborators,” he added.

Finally, the expert questioned the fact that in many cases there is an enormous distance between the mission and vision of the companies and the mission and vision of each person in the boat called organization. In that sense, the leader must be close to his/her collaborators and provide tools for them to be closer to his/her magnet, to their vital development, “maybe the girl or the boy does not want a salary increase at the end of the year, but prefers to leave one day at 5.00 in the afternoon to take a drama class,” he concluded.

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