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**XXVIII** LA JOLLA  
**ENERGY** **2019**  
**C O N F E R E N C E**

**REPORT**

## Introduction

For almost 30 years, the Institute of the Americas has convened an annual energy summit at its home in La Jolla. With the Institute's reputation as an honest broker of dialogue, the La Jolla Conference allows a wide range of stakeholders to debate the key energy and sustainability trends in the Americas. Each May a distinguished group of thought leaders, investors and government officials convene with leading industry players in La Jolla for high-level investment dialogue and policy debate. This year's conference - an intense two days of panel discussions complemented by sidebar and after-hours debates - underscored the wide variety of challenges and opportunities facing the energy industry across the hemisphere and globe.

From regional elections to the ongoing global energy transformation, important energy market developments in Argentina, Brazil, Colombia and Mexico and the continuing crisis in Venezuela, this year's discussions also included the future of the hemisphere's energy sector. What follows are summaries compiled based upon the public panels and sessions held during the XXVIII La Jolla Energy Conference on May 22-23; our updated format, introduced last year, delivered several off-the-record breakout sessions related to topics - Venezuela's political outlook, cyber risk and cyber security, rule of law and corruption, renewable energy and natural gas - which are not detailed here in order to honor the nature of those sessions and discussions.

### **Opening Workshop - Safety Transformation as a Pathway to Operational Performance: The importance of safety in the industry**

Environmental Resources Management (ERM) co-chaired and led the presentation of this workshop. The session sought to share details from a comprehensive study and survey ERM conducted with the aim of helping to shape and inform the way companies develop new and safer ways to operate. Their study indicated that there is a need to re-imagine safety across sectors; companies have invested large amounts of money into this area without the corresponding results.

Phil LaDuke, a principal ERM consultant specializing in safety transformation, presented findings from the ERM Global Safety Survey. These were drawn from 144 senior leaders in safety across 22 countries, and 72% of those surveyed were global directors or VPs of their firms. According to the survey, stakeholder expectations are rising worldwide and companies are consequently increasing their investments in safety. However, there has not been sufficient reduction in companies' injury rates despite greater investment in training programs. Significant cultural and performance challenges remain. LaDuke concluded his survey analysis with a note that companies should not focus on spending large amounts of money on safety programs, but rather look to optimize what is spent. Integrated data systems and greater leadership engagement will be key in driving safety improvements.

Hector Garces, a Digital Services Lead at ERM and an expert on integrating technology and systems, explained how to leverage technology from Industry 4.0 in the safety realm. He presented a three-part model, Connected Safety: 1) eliminating the risk to send humans to high-risk situations, 2) providing real-time intelligence as a safeguard to the frontline worker, and 3) utilizing remote monitoring and smart devices to guide the worker while in hazardous conditions. This integrates people, processes, and safety to ensure the presence of safeguards rather than the absence of incidences. The challenge for companies, Garces stated, is ensuring that technology is contributing to safety and not hindering it.

In concluding, LaDuke shifted the focus to leadership, emphasizing that engagement is key, but leaders need to gain new skills. Though safety engagement is present from the top, it is not as prevalent among mid-level or frontline management. He pointed out that leaders are also not spending enough time on the frontline due to an abundance of paperwork and need to be given more training on hazard recognition.

The two workshop hosts closed by discussing next steps for improving participants' own organizations. Common issues were the clash of national and company cultures, a lack of monitoring, and decreased safety awareness caused by repetition of behavior. Overall, companies must put more effort into making safety an integrated company value, they posited.

### Opening Workshop - The Lithium Triangle in Latin America: Current and potential new developments



Emily Hersh, Managing Partner at DBDC Group in Argentina opened the workshop by stating that lithium is not a commodity. In 2018, lithium-ion batteries composed 59% of the lithium industry and is the fastest growing area of lithium products. The Lithium Carbonate Equivalent (LCE) system is a way of comparing lithium in different forms: metal, carbonate, hydroxide, and chloride. Within the LCE system, there are Tier 1, Tier 2, and Tier 3 batteries. An example of Tier 1 batteries are Tesla, Panasonic, and Samsung. Examples of Tier 2 and Tier 3 batteries include Chinese batteries. Hersh mentioned that in two to three years, many current Tier 2 companies will advance to Tier 1 level because of their current investments in lithium projects. South America's "lithium triangle" is rich in conventional brine. However, she argued that before turning to the lithium triangle, it is important to note the difference between deposits, resources, and reserves.

Deposits signify that you know there are minerals in the ground. Resources mean you know how much of the mineral is in the ground. Reserves mean you know how to extract the minerals. She addressed that while the lithium triangle consists of Chile, Argentina, and Bolivia, only Chile and Argentina have commercially produced lithium. Not only is it important to know where the minerals are, but it is important to know the other matter that the mineral is found in. For example, obtaining a mineral out of a liquid like water is easier than obtaining the mineral out of a denser liquid like clay.

Companies pursuing the lithium sector must first consider the social license to operate because there are communities and sensitive environments and ecosystems in the territories where they wish to extract the lithium. Therefore, when entering a territory, it is important to respect the community and surrounding cultural and environmental conditions by recognizing that it will exist long after the company moves on. According to Emily Hersh, it is important to recognize the environmental concerns in the company's actions and decide how to best mitigate these impacts. This is the case in all businesses and all actions, for example people demand energy for cell phones and laptops, and people demand transportation. Each of these demands are needed and each will have an environmental impact.

*But why is lithium important?*



Lithium is important because of the growth of electricity-based transportation and electric vehicles, which therefore leads to the need for reliable lithium supplies. Despite the growing need for lithium, the lithium industry is under-funded and could use as least \$12 billion to fully develop, according to conservative measures. Access to roads and energy is needed for lithium companies. For example, in Argentina, a lack of infrastructure is the number one barrier to the lithium industry,

and therefore, large amounts of investments are required to build proper roads and infrastructure to reach the resources and bring the product to market.

A central question that has been raised: is South America missing out on the lithium industry “boom?” The lithium industry requires money and technology, which will come from outside the region. South America is only a part of the global supply chain, so the desire for lithium will go on with or without South America. Currently, the opportunity is there, but without investors, South America will be left out of the lithium boom.

José Luis Manzano, Chairman of Integra Capital, pivoted the discussion to focus on Argentina. Manzano agrees that social license to operate is important; community approval is critical and they will be there long after the company leaves. From a company's perspective, Manzano highlighted the importance of engaging with the local communities at an early stage in order for the company to learn about the issues and opportunities in the area where a project will be developed. For example, drilling will require additional water, so understanding the availability and where to source water supplies for the project site is required. Manzano said that Argentina has less government interference than Chile and Bolivia and that a major hindrance to lithium projects in Argentina is the lack of infrastructure.

Panelists agreed that infrastructure is needed, it is a key part of the industry development, but it is also expensive. Creeping expenses is a community issue that can lead to bigger problems down the road. All communities have community issues and Manzano recommended talking to the community during the early stages of the project and upfront to determine what the community issues are to be sure to address them appropriately.



Juan Carlos Zuleta, a lithium economic analyst, focused the discussion on Bolivia and indicated that in December 2018, a mixed company (partially state-owned and partially German-owned) was created to extract residual brine to convert into lithium carbonate. While this company expected to produce high volumes, it was unable to produce at promised levels, and Zuleta indicated concern that Bolivia would be unable to produce lithium in the next few years. According to Zuleta, lithium in

the future is based on the rise of electric vehicles and Chinese regulations. The Chinese government introduced incentives, which reduced the price for lithium hydroxide and the 2019 incentives made these requirements even stricter to allow only lithium hydroxide, which will increase its value (lithium hydroxide). As a closing note, Zuleta addressed another concern regarding lithium in Argentina; the lithium in Argentina is located in many "salares" (salt lakes), requiring negotiations with many different communities, rather than in one main *salar* like in Chile and Bolivia.

Andrew Miller, Head of Price Assessments for Benchmark Mineral Intelligence (BMI), spoke about what is influencing the lithium market, began by highlighting that the lithium, cobalt, and graphite markets are small markets and these minerals require lots of refining. In 2018, there was a "battery arms race," in Nevada, which included Tesla making its own batteries. Over the next decade, companies predict that energy use will continue to increase dramatically. Lithium is being used mainly in the cathode market and it is this market that will determine the type of lithium that is needed in the future. For example, Tesla is using lithium at the higher end of the spectrum. Turning to the supply side, Miller pointed out that over the past three years, Australia has overtaken South America as it relates to raw material production.

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Finally, during the Q&A session, Hersh advised that for companies looking to invest in the lithium sector, companies should be aware that the market is small and new. Further, she noted, that buying *futures* is not an option, and suggests that companies should instead assess purchasing stock of companies in the lithium sector.

Hersh also discussed about the future of lithium. Lithium needs to be in solid state in order to produce a battery. There are expectations for the future in the battery-production market but it is important to note that lithium only comprises about one-third of the materials needed to develop a battery. Lithium changes from a liquid to a solid state and such transformation is expensive and time consuming.

## Investing in Latin America's Energy Sector

*Where is the money coming from?*

Panelists for this session included Lucas Aristizabal of Fitch Ratings, German Chullmir of Orel Energy and Read Taylor of Sierra Oil and Gas. Sharing their unique perspectives, they offered an important macro view of where investments in Latin American energy are coming from, with sources of investments varying depending on the segment of the energy sector. For example, while national oil companies (NOCs) still dominate investments in the oil and gas sectors, renewables see the majority of their investment coming from Europe. Altogether, roughly 65 percent of equity in investment of renewables in Latin America comes from Europe, with Spain being a major source in particular.

*Where are Investments going?*

Although the oil and gas sectors continue to take in the largest share of investments, the region's renewable energy sector has seen its share of investments grow each year. Regardless of which type of energy, the trend is for new investments to increasingly be focused on upstream and midstream projects. In terms of which countries are benefitting most from investment flows, panelists suggested that Brazil, Mexico, and Colombia seem to be the most attractive markets for new investments.

*Risk Profile*

Panelists agreed that, overall, the biggest risk in the short to medium term will be the country risk associated with the region's relatively unpredictable political situation. For example, while Mexico presents a huge opportunity for public-private partnerships in the country's energy sector, the uncertainty of the current administration signifies that investors must take into account the evolving outlook and risk profile that the Lopez Obrador government has created for the energy sector. That same concern applies to Argentina and Brazil, with Venezuela in a category of its own. However, the panelists were keen to highlight that while the country risk is the principal short to medium term risk for new investments and investors it simultaneously presents an opportunity. The aforementioned markets have huge energy potential, and while some investors may be hesitant because of the increased country risk, there is a vast opportunity for those who decide to take the risk. As one panelist noted, it is the old axiom: high risk, high reward.

## Tomorrow's Power Sector Today: Digitalization, Distributed Energy Resources, Energy Storage and the Rapidly Changing Electric Sector



Is energy storage something for today or something of the future? Rolando Gonzalez-Bunster, CEO of InterEnergy described a power storage project in the Dominican Republic to address the answer to this question.

In 1992, in the Dominican Republic, a business began with production of one megawatt. Today, that company has grown to produce 300 megawatts and is the main supplier of energy to the tourism industry, providing energy for 66% of hotel rooms in the

Dominican Republic. In the case of this project, it is occurring in an isolated system, not connected to the national grid. There are no subsidies and the system is entirely wireless. Soon, the project will expand to install 500 chargers to supply electric busses, taxis, and cars with electricity.

From the Argentina perspective, Andres Chambouleyron, Chairman of Argentina's Federal Electricity Regulatory Authority (ENRE) addressed the highly-regulated nature of laws regulating the use of residential solar panels where the user is responsible for installing the panels, self-consuming energy, and then selling the surplus to distributors at a regulated price set by law.

The law in most nations do not contemplate the system that is in place in the Dominican Republic. Rather, the law must permit distribution companies to install panels and sell to end users or be able to lease panels to the end user. In short, the law should not limit panels being sold to individual owners who must self-install and then sell back the excess to distributors.

In Argentina, the current law is a performance-based regulation, which means that it looks after the results. For instance, if consumption is higher than expected, the company is penalized regardless of how the energy is produced. Similarly, as well as if the company estimates too much consumption and does not use the estimated amount, the company can also be penalized. These systems look only to the quality and consistency of service, rather than on the

**The cost of upgrading storage and transmission will be shouldered by the consumer, but these are important questions that will impact the feasibility of new renewable projects**

means of production. Chambouleyron concluded by suggesting that the trend of separate generation, transportation, distribution is being challenged through the concept of vertically integrated companies, which take on more tasks and therefore are able to provide more economical options to the solar industry.

Finally, Chris Sladen of Reconnoitre Ltd. took a high-level view of the future of energy and particularly the role of large oil companies. Energy consumption will continue to rise he noted. Sladen estimates the increase to be about 1-2% per year. Most of the growth in demand will come first from natural gas, followed by renewables. Moreover, the world is demanding fewer emissions. However, there are many unknowns, for example, the ongoing trade war, changes in plastics, transportation, and reduction of poverty. Technology of the future is coming and, in fact, may already be here. For example, solar panels on people's homes and electric vehicles. Because the world lacks a carbon-pricing scheme, countries currently are able to shift emissions from one nation to another, and therefore the shift to renewables will be costly.

## Energy Transition: Debating Grid Flexibility and Resiliency and the Integration of Renewables



The panel was joined by Cesar Butron, Chairman of COES-SINAC in Peru, Silvia Martinez, Senior Specialist of the World Bank, Erwin Beckmann, Commercial Origination & Systems Intelligence of Zuma Energía, and Cecilia Aguillon, Director of the Energy Transition Initiative of the Institute of the Americas. The panel primarily focused on grid resiliency and flexibility and how vital these elements are to ensuring energy security in any country or region. By making grids more resilient, countries can

help insure that electricity can continue to flow to consumers even if there is a dip in output or even some type of natural disaster. However, achieving resiliency and flexibility is not easy, and there are several challenges in making sure a system's grid achieves resiliency.

One of the major challenges is the increased use of renewables. Renewables, while important for numerous reasons, introduce the major problem of intermittency. The sun is not always out; the wind is not always blowing, and so relying on these sources of energy means needing to be able to deal with periods of time during the day in which those sources are not actively producing electricity. There are, of course, solutions for these problems, but then the decision must be made as to who is supposed to cover the costs of these solutions. Is the government the responsible party to cover these costs? Should the new renewable technologies foot the bill since they are the disruptor? Ultimately, the cost of upgrading storage and transmission will be shouldered by the consumer, but these are important questions that will impact the feasibility of new renewable projects and, consequently, impact the degree of grid flexibility.

On the other hand, an argument can be made that the larger problem facing renewable energy is the fact that the source is often distant from consumers. This means that, in most cases, large transmission infrastructure is required to attain the benefits of renewables. And again, who should front the cost of that transmission infrastructure? Additionally, upgrading transmission becomes

even more difficult when taking into consideration the common delays in building. Transmission projects typically run two years behind schedule in Latin America, and this adds unnecessary cost and uncertainty to projects that are vital to increasing grid resiliency. Very few governments and companies have the bandwidth to focus on upgrading both transmission and generation at the same time, and so the next challenge becomes trying to determine which should be prioritized. Both are critical for realizing a truly flexible and resilient grid but knowing which to tackle first can be a serious challenge.

### *Improving grid flexibility and resiliency*

Like most other serious challenges, developing a solution for improving grid flexibility and resiliency will not be a one-size-fits-all solution. Problems plaguing grid resiliency in Africa are not the same as those in Latin America, and the problems in a place like Costa Rica are not the same as the problems faced by Chile. There are several organizations, both private and public, that are working on solutions. The World Bank, for example, is sponsoring a number of grid resiliency and flexibility projects. And while the majority of these projects are currently in Africa, there is no doubt that they are developing important expertise that could be applied to analyzing possible solutions in Latin America. Another important part of improving grid resiliency and flexibility is ensuring that this includes considerations of the increasing effects of climate change. Changing weather patterns including storms, flooding, droughts, and wildfires means that grids will face increasing disruptions at both the production and transmission levels, and it is imperative that planners keep this in mind when trying to make a grid more flexible and resilient.

## **Colombia's Oil & Gas Outlook and Market Development**

Luis Miguel Morelli, President of the National Hydrocarbons Agency of Colombia (ANH) shared that although Colombia had gone 5 years without signing any new contracts, it is now opening its doors to exploration. Five contracts have been signed, so far this year with companies such as Shell, Noble Energy, ExxonMobil, and Ecopetrol. Morelli stated that Colombia had started the year with zero contracts signed but aims to end the year with 25. He emphasized major structural changes underway: Colombia changed its way of assigning contracts in February; while this is usually done in rounds, the new process involves opening the whole country to investors.

**Morelli stated that Colombia had started the year with zero contracts signed, but aims to end the year with 25**

Colombia has 1,958 million barrels of oil reserves, enough for 6 years and 2 months of consumption, and suggested that a reactivation plan with unconventional and offshore should be necessary. Colombia also wants to reactivate small fields that are currently closed and plans to do so in late fall. This should lead to an extra production of about 1000 barrels per field each day, producing up to 50,000 barrels total per day. The country is planning to incorporate at least 2 billion barrels of reserves under President Duque. Colombia is starting to develop unconventional projects, and legislation for exploration is ready, where close to 8 billion barrels of reserves will be produced under these projects.

Jared Cutright, Manager of International Government & Political Risk at ConocoPhillips continued with a perspective from his company, where there is stiff internal competition for capital which is relevant for Colombia and markets across the region.

Cutright explained that a significant challenge in Colombia are delays in environmental licensing and permits. He further explained that his firm has been pending an environmental license for several months. At the same time, he underscored that ConocoPhillips is addressing community impact

through proper communication with those affected and, overall, was upbeat about the changes since the Duque administration took office.

Luis Miguel Morelli echoed these concerns, adding that the decision to pursue unconventional resources has in some ways had a delaying effect for the contracting process. To proceed with these contracts, environmental licenses need to be rectified by the end of the year. Social license to operate and corresponding communication with impacted communities are also areas of focus, and firms need to provide real education on the fracking process. This is a political issue rather than a technical one.



Cutright noted that Colombia had passed a national development plan that endorses fracking. The two panelists also highlighted the potential for natural gas in the Caribbean offshore and the expectation of two to three wells in the Caribbean. Morelli and Cutright both agreed that this will give Colombia the opportunity to be self-sufficient in gas, but transport systems need to be developed further.

The conversation shifted to the critical issue of the social license to operate. Cutright focused on the security side, assuring the audience that the Duque government has taken security seriously and is working to push back on pipeline attacks. Though there was previously pressure from the ELN against transport pipelines, security has improved and now this is not as much of an issue. Moving to a bigger picture of social impact, Morelli shared that there are four regional committees set up to involve all authorities and stakeholders in contract discussions. These committees review contracts individually and address any issues together, which particularly helps small companies with social licensing. The two panelists concluded the session by agreeing that the most critical element in Colombia's oil and gas outlook was the improvement of the permitting processes.

## Latin America's Upstream Outlook: How much oil and for how long?



The panel started with the panelists answering two questions: How much longer do we need oil? And how much longer do we have oil? According to Jose Antonio Cepeda, Adviser to the Minister of Energy and Non Renewable Natural Resources of Ecuador, oil will remain a big part of the mix until 2040. Currently, OPEC controls 80% of the oil in the world and it is expected that the energy used through 2040 must be a mix of oil, shale, and new sources.

Cepeda mentioned "20 years" of remaining oil in Ecuador: every year a former Ecuadorian Minister of Energy indicates that the country only has oil for another 20 years, but new discoveries and breakthroughs continue coming, and the "20 years" message continues.

According to Cepeda, oil must evolve to stay sustainable. Therefore, it is essential to work with other sources to have enough oil for the future. The future of the oil industry will remain for as long as it is needed and will be obtained through new discoveries and breakthroughs. Experts mentioned that oil must evolve to stay sustainable. Therefore, it is essential to work with other sources to have enough oil for the future.

Cepeda further stressed that Ecuador is mindful that oil development must evolve and include carbon capture and storage technology. In the same vein, Ecuador has approached the development within the Yasuni National Park with caution, concentrating its efforts on a small portion of the park to preserve biodiversity and indigenous areas. In addition to the environmental concerns, Cepeda elaborated on how Ecuador is pursuing increased stability with self-adjusting contracts and by prioritizing which fields should be targeted for E&P by Petroecuador and those for a tendering process.

According to Kevin Ramnarine, Former Minister of Energy of Trinidad and Tobago, the world will require oil, natural gas, and coal for some time to come and it is estimated that worst-case scenario, by 2040, 65% of world demand will be satisfied with hydrocarbons. The challenge comes with how to

replace hydrocarbons because, for example, most food consumed is traced back to hydrocarbons. World use of hydrocarbons is also not coordinated. For example, thanks to electric vehicles and increased fuel economy standards, the United States hit its peak of gasoline consumption 4-5 years ago whereas Asia has not, despite China's push for electric vehicles. Experts mentioned that coal is in decline, use of oil for power generation is in decline, and the demand for natural gas is increasing.



Ramnarine highlighted natural gas as the “star” of the energy transition and that Trinidad and Tobago is well positioned for the transition, housing one of the largest natural gas processing facilities in the Western Hemisphere. However, the development of shale gas poses a challenge, as their role as a provider of cheap, reliable gas faces competition.

Trinidad and Tobago produces 3.8 billion cubic feet (bcf) per day of natural gas compared to Argentina's 4.3 bcf per day. While Trinidad exports natural gas to Brazil, Argentina, and Chile, Trinidad's oil production is decreasing.

The panel shifted to the recent developments in Guyana: 13 discoveries in the last 4 years, including reserves of 5.5 billion in oil and growing. These discoveries could make Guyana one of the wealthiest per capita nations in the world. The production began with 120,000 barrels per day and is expected to increase to 700,000 barrels per day by 2025. A problem that Guyana will face is how to manage this massive discovery.

Ecuador for instance, through its new government, it is attempting to show foreign companies to have confidence that the

investments will remain in place in the long run. Ecuador further has a plan to explore the southern part of Ecuador. Part of Ecuador's plan for the future is bringing new partners into the country. The country also faces the importance of restricting development to preserve world heritage sites and the delicate balance that must be made between using natural resources and the need for an income for the people within the country.

Ramnarine emphasized that as an important part of the ongoing development of the sector in the world, it is imperative that countries such as Guyana establish sovereign wealth funds as they stress the importance of keeping this money from politics. The goal of these mechanisms is to safeguard oil revenue and insure that the funds can only be used and managed outside of one political or electoral cycle. Cepeda noted that Ecuador is a country that used to have a sovereign wealth fund that no longer exists. This experience from Ecuador can be replicated and it is a risk that other countries can experience in the future; therefore, in order to preserve a sovereign wealth fund, a state must invest in education for its citizens so that the country is aware of the financial need for a sovereign wealth fund well into the future.

Seferino Yesquen, Chairman of Perupetro addressed that *social license* has become a very important issue for energy companies. In Peru, according to Law, the country conducts Citizen Participation or Previous consultations from Native Communities in order to inform the population that lives near the area of the bidding blocks. Population shall be informed before negotiating a

contract or launching a bidding process as well as when the contract has been signed to introduce the company. Then companies also have to inform the communities in regards to Environmental Impact Assessment Studies.

Digital innovation is a key factor for the oil and gas industry to reduce costs, make operations faster, safer and make better decisions. Integration of data, analytics and connectivity is gaining a very important role in oil and gas industry. Experts believe that in the region it remains difficult to translate digital efficiency into better financial performance. In relation to Peru's data bank, Yesquen mentioned that his country is making great efforts to improve the quality of the information in order to diminish geological risk and make easier the decision taking to oil and gas investors.

Yesquen mentioned that Peru has learned from its experiences that it is important to have continuous and transparent communication with the population and communities in order to better inform them and provide an understanding that if managed properly and sustainably, the development of oil and gas resources will result in important benefits for communities and not only the companies. It is very important that governments assume this role with populations that live in remote areas that do not have basic services.\*

*\*Due to flight issues, Perupetro Chairman Seferino Yesquen was not able to join the panel, but shared these insights in writing.*

## Bolsonaro's Brazil Energy Outlook



The panel included experts Nelson Narciso, non-resident fellow at the Institute of the Americas and former director at Brazil's National Petroleum Agency (ANP), Lisa Viscidi, Director of Energy Climate and Extractive Industry Program at the Inter-American Dialogue and Timothy Stephure, Director of Latin America Gas and Power of IHS Markit.

Jair Bolsonaro took office on January 1, 2019. President Bolsonaro has been in office for only 5 months and panelists agreed it is a bit premature to render opinions about the new government. Nelson Narciso noted that Brazil is "not a jet ski," and thus the nation will not make quick, drastic changes. Rather, Brazil is like a "large ship", it will take time for Brazil to recognize any changes that need to be made, and then slowly the *ship* will turn.

The panelists started by referring to some general features of the Brazilian Energy industry, including the impressive decarbonization of its energy mix with its electricity matrix that nearly reaches 85% derived from clean sources. The panelists highlighted that despite the economic recession there is a lot of optimism for the energy sector with its robust auction model and many potential pro-market reforms.

Narciso emphasized that over 60% of Brazil's national production comes from the pre-salt. Since 2016, Brazil's regulatory framework has enabled a series of regular upstream auctions which gives investors certainty. Brazil is also attempting to break Petrobras's monopoly on distribution of gas through its tight hold on infrastructure.

In regards to the future of gas in Brazil, three years ago, there was a recession in the country, but now there is a lot of optimism. Brazil is currently talking about bringing down the price of gas and it is looking to privatize Petrobras. The first actions to show an intention of the privatization was through the sale of key infrastructure assets. However, the president's plans are not easy to accomplish because he must get through Congress. Power auctions are a success story in Brazil as solar and wind are some of the cheapest resources in the region. Northwest Brazil is the center of wind and onshore energy. This accounts for 45% of energy produced versus 10-11% found in other nations.

Brazil is a country that has a complicated law system to get its laws through Congress. There is a need for deeper reforms, for example, through more competition in the oil sector. Making these changes, however, will be a challenge because Bolsonaro has a limited number of seats in Congress and he has stated that he will not trade votes to have laws pass. Petrobras has a plan of divesting from 98% down to 50% of distribution, but this is uncertain because some people are against divesting.

### *Pension reform in Brazil*

The discussion turned to pension reform in Brazil and whether the issue is serving as a distraction to energy and other policy reforms. Pension reform is the most important part of the Bolsonaro policy, so by standing behind this goal, the Bolsonaro government is showing that he will not trade votes in Congress to pass policy. Currently, pension liabilities is Brazil's biggest debt: it was created in 1945 when life expectancy was 45, and now life expectancy is 75-80 and the policy remains the same.



Therefore, pension reforms could be a huge savings to the government. But as long as the pension reform does detract from other projects, the energy section likely has its own strength that it may pull through Congress separate from the pension reform.

Regarding onshore exploration, this is the time for investment in onshore production because levels of production could increase dramatically with only a small increase in investment, while taking care between production and reserves. Brazil went five years without bid rounds and this was very detrimental to the country, and having them back would be very beneficial for the country.

The panelists agreed that a key bottleneck for reform is the Brazilian Congress, which is increasingly at odds with Bolsonaro's energy agenda. Brazil has plans to diversify assets, but key divestments will require broader political support. They also stressed that if the current pension reform debate is left unresolved, reforms will become more unlikely, the panelists agreed.

The final question focused on whether Brazil will further privatize Petrobras. Panelists agreed that this will not likely occur despite the expected market friendly reforms. Conversely, when it came to

the question of whether Brazil will further privatize Eletrobras, there was unanimity that this will occur and that inertia for privatization of the electric sector is much stronger.

## Unconventionals and the Evolving Global Market: Debating Green Fracking, Technology and Natural Gas's Role for Combating Energy Poverty



How can firms in the industry bring a sustainable outlook to the table for unconventionals? Leigh Lyons, Global Development Manager of Unconventional Resources at Solar Turbines, explained that they build natural gas equipment and provide clients with energy storage solutions. He expressed that their equipment will become important in moving towards greener fracking; natural gas will produce cleaner fuel. The company is also in a good position to shift the industry towards more sustainable procedures since its operations touch all stages of the energy supply chain. Lyons stated that equipment providers are getting greener in accordance with customers' increasing demand and expressed a positive outlook for the development of greener fracking.

Ajay Kshatriya, CEO of Biota, pointed out that the current market need is centered on recovery rates. Currently, there is a renaissance of energy production, but only 5-7% of resources are recovered because it is difficult to optimize extraction in geological formations. Biota uses DNA sequencing technology to solve this problem. He explained that microbes live in each oil well; by using a DNA signature, we can understand with high precision where each sample of oil comes from. 10 basins and 30 companies are currently utilizing this revolutionary technology.

Peter Schriber, Vice President of Market Development of Xpansiv Data Systems expressed that there is a shift in customer priorities towards issues such as where energy comes from, that is the sources and impact on the community. Schriber explained that today's markets are insufficient in providing this information, but Xpansiv has created the first data-driven exchange using primary source data on how infrastructure is built. This allows for decision-making centered around procurement and externalities, increasing visibility in different parts of the production stream. Schriber finished by

stating that unconventional are here to stay, but there is certainly room to improve this area, particularly to address concerns and respond to more proactive consumers.

JC Thomas III, Director of External Affairs for Sempra North American Infrastructure, stated that Sempra is developing five key energy infrastructure projects in the realm of unconventional. They are located in the Gulf of Mexico, Port Arthur, Texas, and Baja California, Mexico. Thomas also posited that there is an energy revolution in North America, and it is poised to become the exporter of natural gas to the rest of the world. There is particular potential in liquefied natural gas (LNG), which is transportable and can be converted into other forms of products such as clothes, fertilizer, and electricity. Sempra wants to capitalize on this potential and build out its LNG prospects. Seizing on the unconventional production boom will greatly aid in the goal of reducing energy poverty across the globe while also providing a key piece of energy security for countries – insuring access to reliable and affordable energy supplies.

The panel moderated by Jeremy Martin, Vice President of Energy and Sustainability at the Institute of the Americas proceeded to discuss why fracking is so polarizing, pointing out that there is misinformation on both sides and no coordination within the industry. There are many independent producers with limited public relations skills or capabilities and thus cannot put out a clear fracking message. Though there are more important issues like flaring and community impact in the industry, these are not being discussed because the debate is still on fracking.

Finally, the panel addressed future natural gas markets and demand. There was consensus that Japan and South Korea would be the most likely markets since they have an increasing need for reliable gas. Parts of Europe, such as Poland, are also areas of great potential.

### Venezuela: Policies and Plans to shape its Energy Future



*Recovering oil production*

Venezuela, a founding member of OPEC, for years was one of the largest oil producers in the world. However, Venezuela's oil production today is only a small fraction of what it was less than even ten years ago.

David Voght, of IPD Latin America, explained that 2014 marked the year that Venezuelan oil production began to seriously decline, falling below 2 million bpd and has continued to decline since then. He noted that for many years PDVSA actually did a very good job at mitigating the severity of the decline in production. However, more recently oil production has slipped greatly and proceeded to take a major hit in March 2019 as a result of the massive blackout that occurred across the country.

The path to recovery for Venezuelan oil production is neither straight-forward nor will it be quick. Voght argued that in order for a future Venezuela to benefit from significant oil revenues again, the country will have to take several steps. First, it is important that consultations about Venezuelan oil production include voices from a wide range of backgrounds; it will be extremely important to gain insights from a wide variety of people. Second, it will be important to use established joint ventures to develop the existing projects rather than creating new ones. Finally, private investment will be crucial if Venezuelan oil production will ever recover. Currently, 65 percent of oil production in the country comes from new wells, and it will take a large amount of private capital to invest in building future wells in order to increase overall production.

### *Challenges beyond oil*

While Venezuela is considered a classic oil regime, it is too simplistic to assume that the situation of



the country would immediately improve if it is able to raise its production levels. Elizabeth Urbanas, the Deputy Assistant Secretary for Asia and the Americas for the United States Department of Energy, was clear that declining oil production is only one of many challenges that the country will need to address in the future. In addition to problems with things like transmission lines and electricity storage, one of the key challenges in addressing Venezuelan energy security is the fact that little is known about the

overall framework of Venezuela's energy and electricity systems.

As an example of how significant the challenges are for Venezuela's electricity grid, Voght noted that although Venezuela has roughly 30 GW of installed capacity throughout the country, they currently only produce about 8 GW. It is these types of problems that led Deputy Assistant Secretary Urbanas to conclude that it will take large-scale, risky investments that will take years if not decades to materialize in order to have a significant and positive impact on Venezuela's energy security in the future. Oil revenue will increase and start making its way back into the energy matrix and economy at some point, but that will not likely become a reality for a very long time.

## *Role of the Maduro Regime*

The United States, along with dozens of other countries, officially recognize Juan Guaido and his government as the legitimate administration of Venezuela, yet businesses in Venezuela's energy sector find themselves taking a slightly different approach. According to Raul Gallegos of Control Risks, businesses are increasingly choosing to accept the current political situation in Venezuela as the reality, and they are going to continue to operate and invest in Venezuela's energy sector regardless of the current political situation. The prize of Venezuelan resources is simply too big to hope and wait for a new, business-friendly regime to come to power. Even delayed contract payments from PDVSA do not discourage continued cooperation and investment because at the end of the day, it is better to have a stake in Venezuelan energy than it would be to wait and see. So long as companies are able to get exceptions (waivers from sanctions) from the US government to operate in Venezuela, they will continue to do so. To them, PDVSA's growing debt is a long-term problem that many are willing to take a risk on.

## **Argentina and Reigniting Regional Integration in the Southern Cone**



### *Vaca Muerta*

The discovery of Vaca Muerta and the development of its resources will fundamentally impact the chances for regional integration in the Southern Cone. Vaca Muerta's development is so significant that Chris Spaulding, the CFO for Pan American Energy, argued that it will be difficult to *overestimate* the impact that it will have for both Argentina and the region as a whole. And, Vaca

Muerta's impact will not stop at the regional level; Spaulding pointed out that as Argentina ramps up development and extraction of its resources, it will be just as eager to try and enter the global LNG market as it will be to further regional integration.

The development of Vaca Muerta's resources will be critical for the integration of the Southern Cone. Saverio Minervini, from Fitch Ratings, noted that while Argentina's decision to reverse some of its financial support (fiscal incentives) for new production and investment in projects in Vaca Muerta was not ideal, there are highly capable private companies that are continuing to invest in Vaca Muerta and develop its vast resources.

There was general consensus that Vaca Muerta's discovery and likely impact is unprecedented for the region and will likely act as a natural facilitator of regional integration in the Southern Cone regardless of which political party wins the next election in Argentina. Vaca Muerta's potential is bigger than political ideology; everyone, regardless of party, wants to develop Vaca Muerta, and this represents a significant opportunity for increased regional integration.

### *Groundwork for regional integration*

Regional Integration is not a new goal for the Southern Cone, and while integration faced serious challenges in the past, its long history means that there is a strong foundation for integration moving forward. Alvaro Rios Roca, a founding partner of Gas Energy Latin America, remains optimistic about regional integration due to the fact that the majority of infrastructure necessary for integration is already in place. Additionally, Alfonso Blanco, the Executive Secretary at OLADE, noted that the majority of integration initiatives in the past were derailed because of political, not economic, differences; however, those political challenges appear to be improving. Governments in the Southern Cone are increasingly trusting the private sector to settle challenges that governments were likely to try and handle in the past. Finally, while the threat of changing governments and constantly changing policies prevented sustained investment in energy in the past, this appears to be less of a reality moving forward.

### *Challenges facing regional integration*

The goal of regional integration in the Southern Cone represents a huge endeavor that will have innumerable benefits for all countries in the region; however, there are still serious challenges that will need to be addressed if regional integration will become a reality. Both Mauricio Roitman (Chairman of ENARGAS in Argentina) and Chris Spaulding agreed that one of the main challenges for Argentina in the coming years will be its ability to break into the global LNG market.

Argentina's development of Vaca Muerta would allow Argentina to enter the global LNG market as a major exporter of natural gas; however, that market is currently dominated by only a few main players and will consequently be very difficult for Argentina to enter. Roitman noted that an additional challenge facing regional integration in the Southern Cone is the varying degree of regulated electricity markets in the region. Deregulated electricity markets are key components for being able to take advantage of the low cost of natural gas; however, so long as some countries continue to rely on highly regulated electricity markets, the comparative advantages of natural gas will remain low, which will impede regional integration.

## **The Lopez Obrador Government and Mexico's Energy Self-Sufficiency Goals**



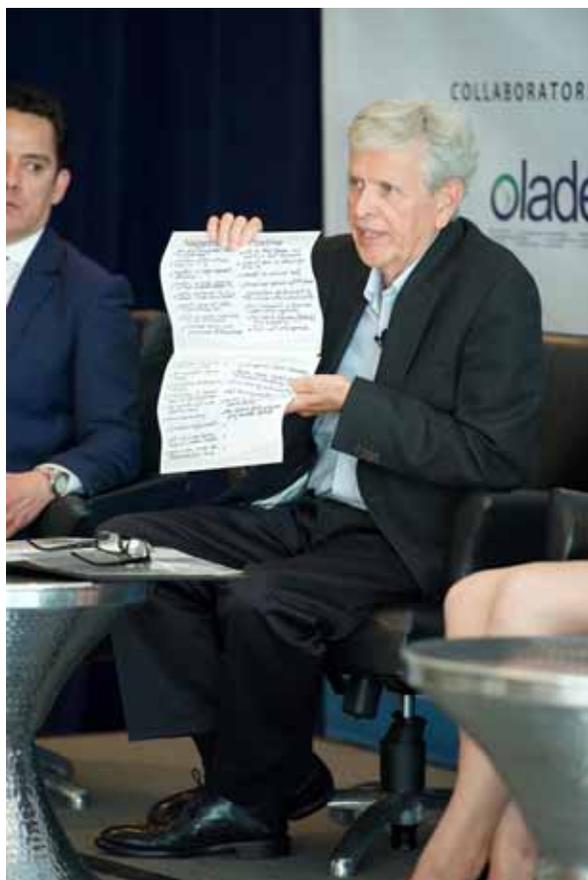
Energy policy and the outlook for the sector has figured prominently from the moment Andres Manuel Lopez Obrador was elected president last July. Translating the concept of the fourth transformation and what it portends for the country's energy sector is underway. The policy proposals and implementation strategies for achieving the goal of energy self-sufficiency outlined by the new administration provides ample room for debate and was the principal theme for the panel. Panelists included

Adamelia Burqueño, General Director for Statistics & Economic Evaluation, at Mexico's National Hydrocarbons Commission (CNH), Chris Sladen of Reconnoitre Ltd., Neil R. Brown, Director at the KKR Global Institute, and Duncan Wood, Director of the Mexico Institute at the Woodrow Wilson International Center for Scholars.

The electricity sector has undergone a dramatic transformation and rapidly evolved into a cost-competitive marketplace that each day is incorporating more megawatts of clean power, but with

auctions being postponed doubts are growing. Meanwhile, the new government is facing the critical challenge to recover Mexico's declining oil production. The Lopez Obrador administration has set a goal of 2.4 million barrels of oil production a day by the end of the *sexenio* in 2024. The demands placed on Pemex to deliver on this goal are significant. Furthermore, a stated desire to recover fuel self-sufficiency includes major investments in refining capabilities across the country, including the Dos Bocas refinery project that has become a highly polarizing topic.

The panel focused its attention on several topics that included self-sufficiency and the steps the government of Mexico is taking towards achieving that goal. One recurring comment was the fact that Lopez Obrador has been continuously evolving in terms of its energy policy developments and outlook. For example, the development path for the new Dos Bocas refiner. First, it was tendered for international bids that were subsequently rejected due to cost and timing, or as the government indicated for not complying with the rules of the bid. The president then announced that the government decided it will develop the refinery through its own resources with Pemex and SENER with a smaller budget and in a more expedited timeline. Panelists were doubtful that the project's new, and current, development plan will eventually allow the country to become self-sufficient and stop imports of refined products, such as gasoline to the country at higher prices.



The panelists agreed that the energy sector is a long-term business and therefore decisions made often take many years before showing actual results. Chris Sladen, Reconnoitre Ltd. Set forth that Mexico's falling oil production is related to decisions made in years in the past. Thus, it should be noted that while the energy reforms in Mexico have begun to bear fruit, the true extent of the decisions and implementation would not be seen for some years. Indeed, due to the reforms, the scale of investment that is now coming to Mexico is an effort to address these negative trends.

Sladen, in his comments, addressed the AMLO government's plan on self-sufficiency goals and constructing a refinery. Overall, he was doubtful about the new refinery but emphasized that the main challenge is accruing the needed investment for the oil and gas sector. He noted that development of the sector relies on four main factors: investment for oil extraction, capital required to find the resources, reserve replacement and production maintenance. After considering these factors, the total investment needed, he argued, would be approximately US\$41.5 billion per year.

There was general consensus that in order for Mexico to reach the oil production goal of 2.4 million of barrels per day by the end of AMLO's presidential period, it would need not only state investment but also private capital to make this promise a reality, otherwise, it will continue to be only a "promise."

In addition to the comments made regarding the investment needed for reaching the production goal, Duncan Wood agreed that upstream investment needs to be at least on the order of US\$35 billion per year. Wood also suggested that timing can be longer than the baseline as exploration and project developments typically require longer periods of time. When the government halted bidding

rounds in the oil sector, in large measure it prevented private companies from investing. The result of this policy decision has implications for attaining the stated oil production target particularly given budget constraints and Pemex's indebtedness and decreasing ability to secure financing.



Neil Brown mentioned that it is perhaps too easy to put superficial labels on President Lopez Obrador. He is indeed a very complex person with more leftist-populist tendencies, but he is also strongly pragmatic. We all have witnessed the evolution of his approach to rule of law assurances in the energy sector. He is a political disruptor, but also a professional politician who has been around for a long time and knows how the political arena works. In relation to federal spending, he has a lot of spending programs and spends like a liberal. However, he also saves like a conservative and his austerity is real and very important. Brown assured that all this creates a tremendous amount of ambiguity, and that he is humble enough to know that he cannot pretend to understand where President Lopez Obrador is going. However, from an investor's perspective, it does create a lot of uncertainty and investors do not like uncertainty, as it is very hard to price it.

On the specific topic of the panel, self-sufficiency, Brown suggested that it is easy to throw stones at the goals in Mexico and those driving the policy direction, but while sitting in the United States, it is important for us to have a bit of modesty, because for decades, there has been a bi-partisan drive for energy independence with limited success. In addition, Brown's own experience in working in politics suggests that Lopez Obrador can be a strong and useful political motivator.

Adamelia Burgueño indicated that from her perspective, she believes the government can reach the production goal of 2.4 million of barrels per day; however, she pointed out that it is imperative that the government considers the support from the private sector to achieve the goal.

The polling question for audience participation was in relation to whether Mexico will achieve the 2.4 million of barrels per day production goal by the end of Lopez Obrador's term. Some views were positive and stated that if the country allows private investment to develop the sector, Mexico will be able to reach the production goal; on the other hand, panelists were skeptical and said that given the

limitation of financial and time resources it will be impossible and Mexico will be “lucky” to reach 2.1 million of barrels per day.

## Conclusion

The conference this year again contemplated the transformation rippling across the global energy sector. Indeed, the pace of change and disruption governments and industry are facing cut across almost every panel and discussion. The discussions explored many of the angles, players, and implications associated with the global energy transition trends and developments, but also what is driving investment in the sector and where it is coming from. Several discussions included a view over the horizon for issues and developments that will shape the Latin American energy sector of tomorrow. This was particularly true with a lively opening workshop focused on lithium and the so-called Lithium Triangle in Argentina, Chile and Bolivia.

Specific panels and breakout sessions delved into myriad segments of the energy sector such as cyber security, transparency and corruption, natural gas and renewables, roof top vs. utility scale energy resources, grid flexibility, regional integration, among others. There was also ample time and robust discussion focused on key country-specific developments in the region including Colombia, Mexico, Argentina and Venezuela.

In terms of the investment outlook, it seems that across the board, there has been an increase in the level of private equity entering the energy sector in Latin America. This trend is growing thanks to the increase of high net-worth individuals who are looking to invest in the region’s energy boom as well as institutional investors. Some discussion focused on the role of Chinese investment; however, the consensus was that while the Chinese showed a great deal of interest in finding projects to invest in, very few of those investments actually took place. In some markets, after years of courting Chinese investment, there is now what may be called reticence with regards to those investments.

The oil and gas sector will continue to take in the largest share of investments; there is need to address the region’s renewable energy sector, as we will continue seeing its share of investments grow each year. It is expected that the trend for new investments will be increasingly oriented to upstream and midstream projects. Although energy transition has begun, fossil fuels are still the main energy source worldwide, and they will be at least during the next 30 years. A greater supply of oil and gas due to the production of non-conventional resources makes us realize, from one side, that the world still needs these fuels, and from the other side, that nature may provide them and will continue providing them as long as balance between satisfying the need of energy of the poorest in the world and the need of a better control of environmental impact is achieved.

Despite the outsized headlines and projections associated with EV’s and battery markets, the consensus was that the lithium market in Latin America will continue to develop and mature in terms of supply output only if sufficient financial resources and project development advances reach the region, not to mention overall infrastructure improvements. Panelists noted that companies looking to invest in the lithium sector should be aware that the market is small and in a nascent stage of development.

Natural gas continues to be a key element of the global and regional energy outlook. With the continued march of US unconventional production, the boom in LNG exports and the lessons learned from the US, countries such as Argentina and Brazil are eager to both seize the opportunity of important reserves and restructure the sector to be more competitive and insure that natural gas is more accessible for all uses across their respective economies.

Meanwhile, in Mexico, the fluidity of the policymaking approach of the new administration has presented challenges. There was disagreement over the impact of the policy choices made to date, as was there with regards to what the stated desire of energy self-sufficiency truly means and how they Lopez Obrador administration will achieve that goal, particularly in terms of oil production.

Indeed, Chris Sladen clearly illustrated the amount of investment and capital that is required to recover and boost oil production in Mexico; the current Pemex budget and spending plan pales in comparison to the needs of the sector.

Despite the fact that the region's contribution to world oil production has decreased from 9% to 7 %, upstream in the region is promising due to the development of important new plays and sources such as Brazil's Pre-Salt, Vaca Muerta in Argentina, and Guyana. Meanwhile, Mexico's geology remains important both in terms of offshore and shale possibilities. Moreover, despite the awful situation politically and economically facing Venezuela today, the country retains the world's largest oil and gas reserves and that is critical in the medium to long perspective for the region's upstream. Additionally, it is important to consider within this perspective the efforts of Colombia, Ecuador and Peru to intensify exploration in mature fields, offshore areas and unconventional. Striving to find solutions for social and environmental issues will foster increased and more sustainable exploitation of reserves located in those markets, particularly in environmentally sensitive areas.

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*The Institute of the Americas would like to thank and recognize the efforts made by our rapporteurs in preparing this report. From the University of San Diego: **Max Aviles** (Masters in International Relations Program), **Rebecca Heywood** (School of Law). From the UC San Diego Graduate School of Global Policy and Strategy (GPS): **Jerin Tan** and **Andres Prieto**.*