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Oil & Gas in Brazil

A NEW SILVER LINING?

By Décio Oddone



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Atlantic Council
1030 15th Street NW, 12th Floor
Washington, DC 20005

ISBN: 978-1-61977-475-9

July 2016

Cover photo credit: Dana Smillie/World Bank/Flickr.

Acknowledgements

This report was produced with the invaluable help of a number of Atlantic Council colleagues. In the Adrienne Arsht Latin America Center, Thomas Corrigan, Senior Research Assistant, and Andrea Murta, Associate Director, helped ensure this report's timely production. In the communications department we would like to thank Sarah Lucia and Susan Cavan, Editors, and Romain Warnault, Assistant Director, Publications, for their hard work and flexibility. Our consultant, Donald Partyka, designed yet another excellent report for the Arsht Center.

— Peter Schechter, Director, Adrienne Arsht Latin America Center, and Jason Marczak, Director, Latin America Economic Growth Initiative, Adrienne Arsht Latin America Center

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The Oil & Gas Sector: A First Glance at Its Changes

Brazil today faces unprecedented challenges. In the midst of the biggest recession in the country's history and the impeachment trial of President Dilma Rousseff, Petrobras—the giant state-owned oil company—is going through difficult times as well. But problems bring opportunities.

The energy industry in Brazil is on the verge of its biggest transformation in decades. Petrobras is reducing its investment and the sector is transitioning from a hydroelectric power system to, effectively, a hydrothermal one.¹

When Petrobras was founded in 1953, Brazil was an agrarian country. Only 36 percent of the population lived in cities. The industrial sector accounted for about 10 percent of gross domestic product (GDP).

This landscape has changed over the past sixty years. Brazil is now predominantly urban, with a large diverse industrial complex. However, the state oil company has continued to dominate the oil and gas sector—a model similar to that of neighboring countries such as Argentina. But Argentine government-owned YPF (Yacimientos Petroliferos Fiscales) competes with relevant private stakeholders in the petroleum refining industry. In Brazil, even though the market is considerably more open than that of Venezuela or Mexico, the flexibility introduced in legislation over the past few decades has not significantly changed the framework of state control.

Entering into risk contracts for oil exploration in the 1970s had minimal impact on Petrobras's dominance. Only one natural gas field was discovered. Although Petrobras's monopoly ended in the 1990s—revolutionizing the exploration and production (E&P) industry—no significant changes occurred in downstream, logistics, and natural gas. One result: No private company has had success in the oil refining industry in Brazil.

The 2007 discovery of large oil reserves in the Brazilian pre-salt layer generated a wave of optimism about the future of the domestic



oil industry. But it also exacerbated nationalist sentiment. An intense debate followed over rules for exploring the new reserves and distributing the resources generated. The inability to find consensus led to a five-year hiatus in auctioning areas for exploration.

At the time, the government decided not to continue the concessions model that had successfully attracted investment and increased exploration. Instead, it implemented a new contract model, making Petrobras the sole operator in the new geological frontier. It also expanded and strengthened local content rules. The changes meant that opportunities created by the pre-salt layer could no longer be fully explored.

Meanwhile, a rise in energy demand between 2010 and 2014 pushed Brazil—which for decades depended mostly on hydroelectric energy—to rely more heavily on thermal power plants and natural gas.

▲ Acting Brazilian President Michel Temer assumed duties in May 2016 at a tense time for both the country's economy and its energy sector.



▲ Transformations in Brazil's energy sector could affect power transmission across the country.

Petrobras has never experienced such a profound transformation.

After the 2014 presidential election—and the second term won by Rousseff—the political and economic situation greatly deteriorated. The Brazilian economy entered a recession and, for the first time, the economy contracted two years in a row. GDP declined 3.8 percent in 2015 and will likely decline at a similar rate in 2016. Corruption investigations, many of which focus on the interactions between politicians and Petrobras contractors—the so-called *Lava Jato* or Operation Car Wash—have probed the problems of the state-run company and its key suppliers. Petrobras's debt has soared. Consequently, Petrobras was forced to cut investment and lower production forecasts.

An ambitious divestment plan was prepared. Some assets are expected to be sold to private companies. Companies in electricity and other segments of the industry affected by the recession are also putting assets up for sale. Weakened by charges of corruption, Brazilian construction companies that had diversified their activities in recent years now need to divest.

Petrobras has never experienced such a profound transformation. In fact, this is the first time the energy landscape has significantly changed since Brazil became an industrial economy. Power markets are strongly influencing the natural gas sector. This presents a huge challenge for Petrobras and the entire industry, but it also brings great opportunities for companies that can fill the void left by the contraction of the state oil company and other traditional players.

The potential to increase oil and gas E&P, the need for investments in downstream, logistics, natural gas infrastructure, and thermal electricity generation, and the large pool of assets for sale create a unique moment for companies interested in increasing their presence in Brazil. Simple changes in legislation will enable them to quickly step in.

This is potentially the biggest transformation in the Brazilian energy sector since Petrobras was founded in 1953.

Petrobras: The Big Change

The success of deep-water exploration has given Brazil the lead in the number of very large oil fields discovered in the past twenty years. The pre-salt layer, where recoverable volumes may exceed 40 billion barrels, catapults Brazil near the top of the list of countries with large reserves of oil and gas.

Following the discovery of the pre-salt layer, Petrobras benefited from the estimated increase in reserves (see figure 1) and its position as the sole operator of new production sharing contracts. In 2010, the company obtained approximately \$70 billion in the largest capitalization process ever.² Production forecasts increased significantly, reaching 4.910 million barrels a day by 2020, according to the Petrobras business plan 2011-15 released in 2011. At the same time, to finance investments that would total \$47.3 billion during this same period, the company went into more debt, reaching \$100 billion, the largest corporate debt in the world.

Before the increased production could generate the resources needed to service and repay the debt, however, a series of setbacks damaged Petrobras's financial health. Between 2011 and 2014, international gasoline and diesel prices were higher than domestic prices, which meant Petrobras lost money when it imported derivatives—eating into cash reserves.

Since 2014, corruption investigations have led to write-downs and massive damages to Petrobras's reputation. The loss of the company's investment grade rating that increased the cost of obtaining new financing, the decrease in oil prices, and the devaluation of the Brazilian real were the last nails in the coffin for the state-owned company's expansion plans.

Investments planned for 2015 to 2019 were cut to \$19.7 billion per year. Oil production estimates went down to 2.700 million barrels per day by 2020. As a result, the company was forced to announce an aggressive plan to sell assets and focus its efforts on exploring reserves in the pre-salt layer.

Investments in downstream and natural gas were among the cuts. Natural gas distribution

assets, oil derivatives, and liquefied petroleum gas (propane or LPG) distribution assets, as well as pipelines, terminals, power plants, and investments in other petrochemical companies, have been or may be put up for sale. Petrobras began to seek partners to invest in petroleum refining.

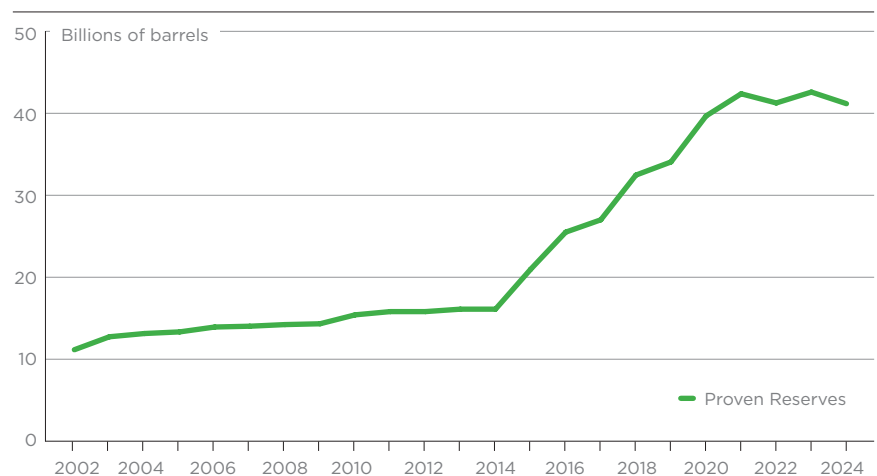
These reductions in investments and asset sales create unprecedented opportunities for other companies. Petrobras needs investment partners to help it maintain or increase production in existing fields. Negotiating participation in nonpriority areas in the pre-salt layer can generate resources for more valuable projects and accelerate production growth.

Selling fields in shallow water and onshore areas could strengthen small and midsize companies that focus on operations in marginal or mature fields.³ This would rekindle production in areas that are no longer attractive to Petrobras, increase royalties and taxes, and thus stimulate the development of business service providers and generate new jobs.

After this adjustment period, Petrobras could focus on E&P in its large offshore fields. Its smaller position in the petroleum derivatives, petrochemical, and gas markets will mean private companies may participate more fully in the supply of oil products and natural gas, including liquefied natural gas (LNG), in Brazil.

Brazil's pre-salt layer may contain recoverable volumes that exceed 40 billion barrels.

FIGURE 1. Evolution of Proven Oil Reserves in Brazil



Source: Energy Research Company (EPE); National Agency of Petroleum, Natural Gas and Biofuels (ANP).

Opportunities

Brazil needs to unlock its potential and increase production by opening the pre-salt layer to different operators.

The oil, gas, and petrochemical industries present significant barriers to entry and high geological and financial risks. They also require long-term commitments. Therefore, confidence in the stability of regulations is a crucial driver of investment.

Brazil does not lack resources to be explored, nor does it lack opportunities. It has stable political institutions with a history of honoring contracts. But building trust depends more on the stability of regulations over time than on the introduction of new laws or rules. Thus, the country can attract huge investment once the markets recover confidence in the existing system. That means Congress must approve economic reform measures, agencies must define regulations, companies must get to work, and the market must set prices.

Once the regulatory environment is stable, what are the main trends and investment opportunities in the various industry segments? What can be done to improve the business environment?

Oil and Gas Exploration and Production

The Brazilian Petroleum Law was approved in 1997, ending Petrobras's monopoly. It established the National Agency of Petroleum, Natural Gas, and Biofuels (ANP) and set new rules that authorized auctions of blocks for oil and gas exploration to new companies entering the field. A boom in E&P in Brazil followed.

Regulatory debates after the pre-salt layer was discovered sparked reform in the auctions system and led to the approval of Law No. 12.351 in 2010. This law introduced production-sharing contracts and established Petrobras as the sole operator with a minimum 30 percent ownership in joint ventures created to explore the new reserves.⁴

Concession contracts for other exploration regions were maintained, but auctions stopped between 2008 and 2013, for the reasons mentioned above.⁵ The sector lost its momentum. In late 2015, the ANP held a tender for 266 exploration blocks. Only

thirty-seven were acquired, for approximately 120 million Brazilian reais (about \$33.5 million), which was well below expectations.⁶

Despite the large increase in reserves, the highly productive pre-salt layer whose wells were producing 30,000 barrels a day, and the competitive costs, Petrobras's limitations prevented production from growing as expected. Production forecasts, which were at about 6.092 million barrels a day according to a ten-year Plan for Energy Expansion for 2020 published by EPE (Energy Research Company) in 2011,⁷ were reduced to 4.032 million barrels a day, according to the 2024 version of the same plan presented last December. Natural gas production estimates were also reduced.⁸

The pre-salt layer is perhaps the most promising exploration area in the world. Brazil has additional potential both on land and in shallow and deep water, plus in unconventional resources and mature and marginal fields. There are many areas with reserves already identified and others yet to be discovered. Collectively, they represent unprecedented potential in the region.

There are opportunities in the services sector as well. New investments and capacity expansion will be needed to keep the oil and gas sector operating in the long term. The service sector shall also be impacted. The weakening of some of Petrobras's traditional suppliers opens up space for the appearance of new service contractors. Since Petrobras and the other E&P operators in Brazil are reducing costs, logistics support for the offshore industry must be more efficient and integrated.

The country needs to unlock its potential and increase production. The pre-salt must be opened to different operators. A regular calendar for exploration blocks must be defined. The service industry must be more efficient.

Downstream, Distribution, and Logistics

Although there is no formal monopoly, in practice, Petrobras controls the refining industry in Brazil. This is due to the fact



that the company's pricing policies have discouraged private companies from building refineries.

But even though it controls refining, Petrobras has limited its investments. Since the 1970s, Petrobras has prioritized E&P projects, and did not resume investing in new refineries until the middle of the past decade. However, the recent reduction in investment has affected plans to increase refining operations, including projects that were already underway. The Northeast Refinery was partially operational,⁹ but the Rio de Janeiro Petrochemical Complex (Comperj) was stopped.¹⁰ Work on Premium I and II in Maranhão and Ceará states was suspended.¹¹ Resuming these projects in the short or medium term is contingent on the company's ability to attract new partners.

The lack of refining capacity ended up hurting Petrobras, forcing it to import petroleum products—often at disadvantageous prices—between 2011 and 2014.

In 2015, as the average household income in Brazil declined, the demand for petroleum products decreased as well. Yet, despite Brazil's recession, domestic gasoline and diesel prices have remained above

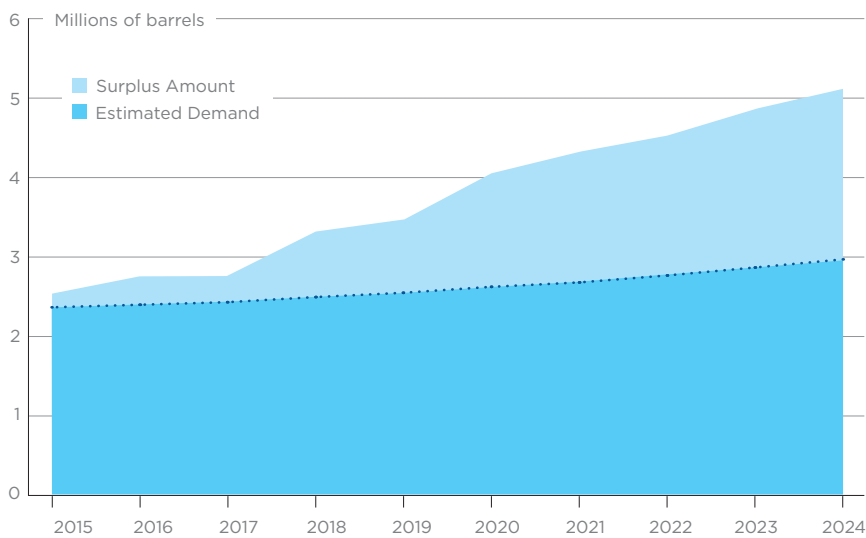
international market prices.¹² Since refinery projects have been postponed or canceled, petroleum product imports are projected to grow in the coming years. In this new scenario, Petrobras will cease to be the sole relevant importer. As long as there is logistics infrastructure available and domestic prices remain high, private companies will continue to import gas and diesel.

But the downstream sector needs a revamp. Brazilian downstream infrastructure is large enough to handle only about 10 percent of imports. Most facilities are controlled by Transpetro, Petrobras's logistics company (which may also have assets to be sold). Brazilian ports currently have a limited ability to receive larger volumes of imported derivatives. For imports to increase, there must be investment in tanks, pipelines, and port facilities. But such projects are not feasible unless local fuel prices are aligned with those in international markets long enough to assure private companies that these rules will remain stable.

Aligning with market prices will highly benefit Petrobras, but will also be crucial to attract private investments in refineries. The high logistics costs arising from exporting oil

▲ Itaipu Dam on the Brazil-Paraguay border currently supplies 15 percent of Brazil's energy—but that proportion has an uncertain future.

FIGURE 2. Estimated Oil Production Versus Demand in Brazil



Source: Energy Research Company (EPE); National Agency of Petroleum, Natural Gas and Biofuels (ANP).

prices have made it difficult for the industrial sector to use natural gas as an energy source. The decrease in natural gas prices in the international market (which have reached their lowest point in years), however, has made LNG imports more attractive. LNG imports have increased strongly to meet thermoelectric demand.

Due to the expected increase in oil production, it is likely that the associated production of natural gas will rise, thus increasing the supply of natural gas in the domestic market (see figure 3, p. 7). New thermal plants should burn LNG initially, switching to offshore natural gas later on.

Brazil's natural gas infrastructure requires improvement. The country needs new LNG terminals. The pipeline network to transport offshore production from the Campos and Santos Basins must be upgraded. New natural gas hub facilities to receive and treat the incoming offshore natural gas, as well as pipeline connections to the national transport pipeline system are needed in the southeast region.

Currently, Petrobras has a contract with Yacimientos Petrolíferos Fiscales Bolivianos (YPFB)—the state-owned company in Bolivia—to import 30 million cubic meters of natural gas per day for twenty years. This agreement expires in 2019. Volumes and terms of renewal are uncertain. If the import volume goes down, LNG imports and offshore natural gas production in the Campos and Santos Basins are expected to grow to meet the demand that is currently being met by Bolivian natural gas.

Petrobras contracts with natural gas distribution companies in several states in Brazil will also expire in 2019. If Petrobras stops acting as an aggregator in the agreement signed with Bolivia, and if the natural gas market in Brazil becomes more open, renegotiating these contracts and the corresponding transport agreements will be handled by private companies.

Petrobras's decision to sell its stake in natural gas distribution companies, natural gas pipelines,¹³ LNG terminals, and power plants to focus on the pre-salt layer combined with improved regulations being introduced by the ANP, looks a lot like the start of a major reform in the Brazilian natural gas sector. More private companies will participate, requiring a new regulatory framework.

Natural Gas Power Generation

Between 2012 and 2014, the demand for energy grew in Brazil. At the same time, rain levels were below the historical average, curtailing hydropower generation. Most of the new hydropower plants were run-of-river

and importing petroleum products can help spur future investment in domestic refineries.

Access to port facilities also needs to be improved. Renovating or opening new roads and railways that lead to major ports would increase efficiency and reduce costs. Simplifying the tax system—especially the rules that apply to the tax on the circulation of goods and services (ICMS), a sort of value-added tax charged by Brazilian states—and stimulating investment in private terminals are crucial to expanding new opportunities in the sector.

Oil production should increase to almost 5 million barrels per day by 2024. A large part of this increase will target the export market, which will require a new, reliable logistics infrastructure (see figure 2). Currently, only a few terminals have facilities that are operationally and environmentally safe enough to transship the oil extracted from offshore platforms. In the near future, with an increase in oil production and exports, petroleum product imports, and coastal navigation, Brazil will need to enhance these operations—creating opportunity for investment in transshipment, storage tanks, and treatment facilities.

In order to cope with growing oil derivatives demand the country needs to keep prices aligned with the international markets and stimulate investments in logistics.

Natural Gas

The natural gas industry is still developing in Brazil. Petrobras controls most production, imports, natural gas pipeline networks, and sales to distribution companies.

Until now, the lack of competition and high

Given the expected increase in oil production, it is likely that the supply of natural gas in the domestic market will rise.

facilities with only small reservoirs; they depend on the rainy season to generate large amounts of electricity. Some biomass plants, wind farms, and solar parks also began operating in this period. They have a lower environmental impact and emit less carbon, but are even more subject to seasonality and can generate power only intermittently.

Thermoelectric plants were therefore the solution of choice to meet rising demand starting in 2012. Thermal plants powered by natural gas, which had generated just 5 percent of electricity in Brazil in 2011, generated 23 percent of the total by 2015. During this period, plans were made to build natural gas-powered thermal power plants and terminals to import LNG.

Since 2014, however, as rainfall increased and the economy slowed, power demands eased. Energy consumption decreased 2.4 percent in 2015,¹⁴ and abundant rain at the beginning of 2016 raised reservoir levels.¹⁵ Since power distribution companies had already contracted for enough power to meet current demand, energy auctions do not seem attractive for natural gas-powered thermal plants in the short term.

This may be a risky scenario. Demand is likely to rise again in the medium term, driven by an economic recovery. And the country will not have the same market conditions as it has today.

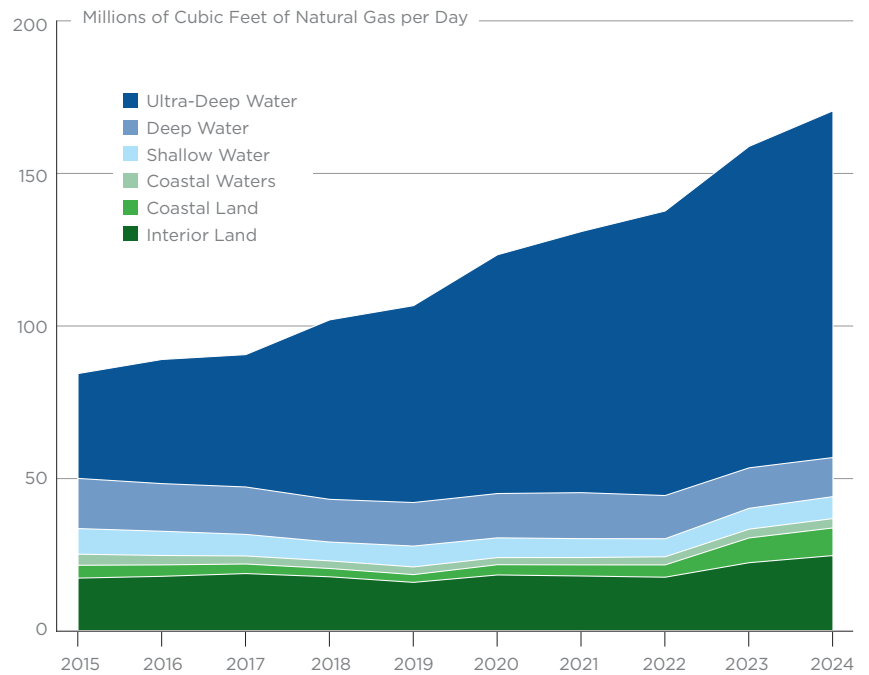
For example, the Itaipu Dam on the Brazil-Paraguay border currently supplies 15 percent of Brazil's energy. The contract governing the terms for Brazil to buy the surplus energy produced by the Itaipu hydroelectric plant will expire in 2023. Brazil financed the plant's construction, and the current rate accounts for repayment terms. After 2023, Paraguay will be free to sell its surplus volume.

In addition to a possible reduction in power from Itaipu, some of the planned natural gas-powered plants may not be built, creating even more of a potential deficit in Brazil's power supply.¹⁶

The energy reserves in Brazil depend largely on the volume of water in existing hydroelectric plant reservoirs. After opting for run-of-river plants and then suffering drought in recent years, the volume stored has not matched the growth in demand (see figure 4). The country does not have any natural gas storage system.

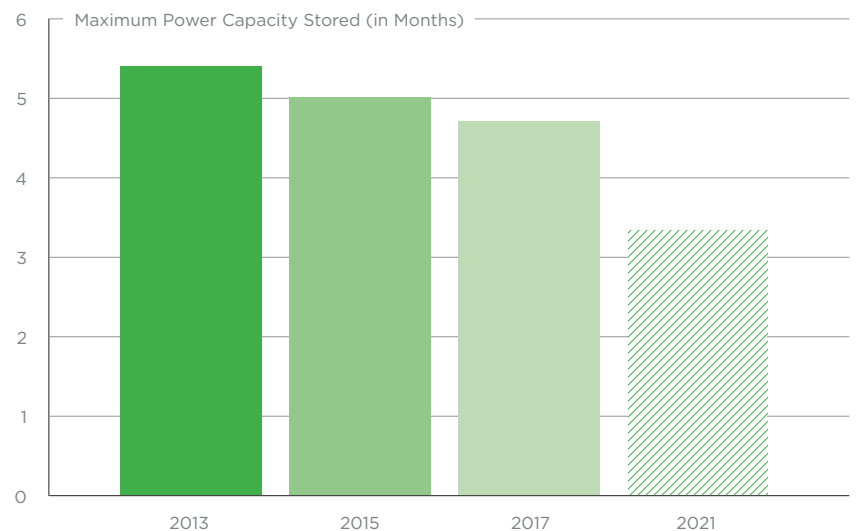
Similar to what has happened in the oil and gas sector, Brazil is seeing a transformation in the power generation sector. This transition from a hydroelectric power model to a largely hydrothermal system represents the most important change in the sector in the past eighty years. Regulation must be adjusted to allow an efficient transition.

FIGURE 3. Potential Total Production of Conventional Natural Gas, per Current E&P Environment



Source: Energy Research Company (EPE); National Agency of Petroleum, Natural Gas and Biofuels (ANP).

FIGURE 4. Gradual Reduction of Power Capacity Stored in Water Reservoirs



Source: Abraget Forum on Thermoelectric Generation, "Scenarios and Executive Perspectives for the Thermoelectric Market"

Recommendations



▲ Thermoelectric power plants, like this one in Camacari, became a solution to Brazil's rising demand for electricity.

To quickly tap into Brazil's potential, measures to encourage investment must be taken. Recommendations for the E&P, downstream, distribution, logistics, natural gas, and gas fired power generation sectors are presented below.

Exploration & Production

The first step to stimulate investment in the sector is to **revise the production-sharing contracts for the pre-salt layer**. The government needs to end the requirement that Petrobras be part of all consortia, allow different operators to come in, and reassess the tasks assigned to the company (Pré-Sal Petróleo S.A.—PPSA) responsible for managing the contracts.

Ending Petrobras's requirement to operate in all pre-salt fields is already the target of a bill in Congress. After its likely passage, the return of concession contracts for the pre-salt layer should be evaluated. A new auction of pre-salt areas would be possible. It is also important to set a permanent calendar for auctions involving all exploration environments: pre-salt layer, conventional and unconventional areas, and mature and marginal fields.

Additional measures could include **accelerating the process of unitization of the reserves identified in blocks already granted with existing reserves in adjacent areas** not

yet open for bidding and still under government control. Authorities could also encourage exploration of deeper reservoirs in fields already in production and stimulate exploration of unconventional resources. Repetro, the special customs rule for the oil and gas industry, expires in 2020. Renewing it is important.

The **environmental licensing process for exploring conventional areas should be simplified and accelerated**. In addition, debates about environmental and regulatory issues¹⁷ have been delaying the exploration of unconventional resources. **Adopting a specific system to approve environmental licenses in these areas would help unblock their exploration**.

Brazil has world-class facilities to manufacture flexible lines and other materials required for oil and gas E&P. The country could benefit from implementing a more competitive local content policy. The impact would be even greater if special export zones were created for the production of goods to meet both the local demand and the export market. Equipment exported as a result of the production base developed to meet this regulatory requirement should be considered in the local content calculation.

The industry would also benefit if Brazil improved the efficiency of its offshore support industry and infrastructure.

Brazil is one of the world's major centers of offshore operations, with hundreds of floating platforms, ships, and support vessels operating in the Campos and Santos Basins. These vessels require regular inspections, maintenance, and repairs. They must dock in a safe location when they are not working.

Unfortunately, restrictive rules on importing vessels and classifying domestic maritime companies mean many of these tasks, which could be conducted in Brazilian territory, end up being handled outside Brazil. Maritime companies consequently lose time and money due to displacement costs, while the domestic industry loses out on offering services that would generate jobs and boost tax revenue. The regulation must be addressed to allow these services to be performed in Brazil.

Downstream, Distribution, and Logistics

Gasoline and diesel prices in Brazil were below international market prices

between 2011 and 2014. In this period, Petrobras lost tens of billions of dollars. Since 2015, international oil prices have declined but domestic prices have been maintained. Since imports are currently advantageous, Petrobras is recovering part of the losses incurred before 2015.

Petrobras should align domestic gasoline and diesel prices with international markets.

This adjustment in the pricing policy would ensure the supply of petroleum products in the future, drive investment, and give new momentum to the biofuels sector, which was heavily affected by the price policies adopted between 2011 and 2014.

Regulations must be improved to attract investment and accelerate project implementation. Operations related to transshipment, storage, oil treatment and exporting, derivatives import, and coastal shipping must be licensed quickly and proficiently, while still ensuring environmental and operational safety and efficiency.

The Brazilian tax system should be simplified. Each state has its own ICMS rules. These twenty-seven sets of regulations must be unified.

To increase oil exports and facilitate the import and coastal shipping of a growing volume of petroleum products, available infrastructure must be improved. To do this, roads and railways with access to port facilities should be improved, constructed, or transferred to the private sector. Brazilian authorities should encourage investment in terminal and port facilities.

Natural Gas

To make the most of the opportunities presented in the natural gas sector, supplies must increase, investment must be made in infrastructure, and legislation for the sector must be improved. Below are a few concrete ideas.

An increase in the supply of natural gas in Brazil depends on the availability of an import and logistics infrastructure and the growth of exploration activities. Therefore, **new LNG import terminals must be built, especially in regions where the demand for natural gas and thermal energy has the greatest potential for growth.** A permanent calendar for auctions must also be established for conventional and unconventional hydrocarbon exploration areas.

The country needs a transport pipeline network covering not only the coast but also inland areas, with the ability to distribute both domestically produced and imported natural gas. To facilitate this, licensing processes must be streamlined for natural gas pipelines and natural gas facilities. The rules established for network expansion—currently

defined by PEMAT, the ten-year plan to expand the natural gas transportation pipeline in Brazil—must be reviewed.

New regulations must help creating a competitive, open market in which natural gas prices, access to infrastructure, natural gas swaps and tariffs can be freely negotiated.

This will attract the participation of more companies in production, import, transport, and distribution.

To manage the transition to a model in which private companies can have a greater participation, **a national natural gas operator¹⁸ should be created, following the model used in the power sector by the Electric System National Operator (ONS).** This organization can take over the role that Petrobras has played until now.

Natural Gas Power Generation

To benefit from the opportunities in the natural gas power generation sector, a series of regulatory measures must be implemented and investments in infrastructure made.

The most important measure is to create power sector regulations consistent with the needs of the natural gas industry. To preserve the volume of water stored in reservoirs and make it possible to produce the associated natural gas from offshore fields, thermal power plants must generate continuously, as part of the base load. This would reduce the risk of energy shortfalls and Brazil's dependence on imported LNG.

Brazil must also revise its energy auction system. At the very least, modifications must be introduced to value those characteristics that generate earnings for the integrated system, such as location, emissions, and flexibility in operations and dispatch.

Auctions should be arranged at the regional level to cut transmission costs, and should be organized by energy source type.

In areas where power and natural gas consumption is high, energy auctions should be associated with those aimed at expanding the natural gas pipeline network.

To stimulate the exchange of energy between regions, transmission auctions must become more attractive by increasing the return on capital. The power sector needs thermal plants in high-consumption areas. **Developing gas-fired thermal plants, gas fired thermal plant condominiums, and regasification terminals that are strategically located in the northeast and southeast regions should be a priority.**

Finally, since there are no storage systems for natural gas in Brazil, LNG is being stored offshore in ships. To improve system security and reduce the risk of unmet demand, the country must develop natural gas storage facilities.

To make the most of the opportunities presented in the natural gas sector, regulation changes must open the door to investment.

What to Expect from Brazil Going Forward



▲ Brazil needs new LNG import terminals to boost electricity production in thermal power plants.

The oil and gas sector has the potential to attract capital and leverage economic growth in Brazil. The pre-salt layer represents the biggest untapped opportunity in the country. The recommendations in this report, if implemented, would trigger an immediate surge in investment, especially in oil exploration and production. This is possible even in the current context of low oil prices. Results would include stimulating the economy, creating jobs, generating tax revenue, and supporting economic growth.

Traditionally, private actors are reluctant to buy assets or make investments during uncertain times. But the current economic and political turmoil in Brazil can

have positive as well as negative effects; the change in administration may accelerate other developments. Opening up the energy sector for private investment and decreasing the participation of the state will be extremely beneficial. After the process to impeach President Dilma Rousseff was initiated in May 2016 and a provisional government was put in place, the changes expected in this sector may occur more quickly, yielding an influx of capital sooner.

One thing is certain: Due to the continued recession and the political climate, Brazil is experiencing a period of instability. The country's risk classification is high, raising the discount rate used to evaluate projects. However, it is important to remember that risk assessments fluctuate. In 2002, the interest of Brazilian sovereign bonds went over 20 percent a year in the secondary market, leading to very high discount rates. Years later they retreated to about 5 percent.

The oil and gas industry is going through a down cycle, and the appreciation of Brazilian assets is hurt by the macroeconomic environment. The complex and slow decision-making process that is characteristic of very large international conglomerates has also contributed to making the approval of projects more difficult in unfavorable times.

But there are several positive developments as well. Risk assessment variations are subtle. The exchange rate is not as clearly overvalued as it was in the recent past.

Because the recession has affected company profits, assets can be acquired at prices that are more attractive for buyers and at high revenue multiples for sellers. Following the recession, Brazil's eventual economic recovery will be vigorous and raise profits across the board. Regulatory measures are already being discussed to drive new E&P investments and a large amount of Petrobras's assets, as well as those of other companies, are already up for sale.

This is a unique moment for companies seeking to invest in Brazil. The changes

are not occurring by choice but by necessity. Regardless of any possible setbacks or delays, the long-term trend is set and it is a positive one for the private sector. The expected increase in energy demand and the simplification of rules will expedite this trend.

Brazilian companies in this sector need capital and technology. They need partners to share risks. The new government, despite its provisional status, indicates that it will take measures to improve public finances, attract investment, reduce the presence of the state in the economy, and speed up investments in infrastructure. It has announced its support for a bill that opens the possibility for companies other than Petrobras to operate in the pre-salt fields and for studies to redefine the natural gas sector regulatory framework.¹⁹ The new Petrobras administration might accelerate the sale of assets, with more control stock available. It has announced that, going forward, the price policy shall be defined by the company.²⁰

Whatever happens in the short term from a regulatory point of view or around the transfer of asset ownership will be key to the future of the Brazilian oil and gas industry. The more Brazil puts the current political and economic difficulties in the past, the more likely it is to see a greater appreciation of assets.

Even if some companies remain reluctant to take a position, transactions are occurring. Private equity funds and other traditional investors, especially Asian companies, are active.²¹

Petrobras is unlikely to be privatized, for political and historical reasons. But a moment of transformation like this is almost as big—and will be hard to repeat. The energy sector is about to go through the most important changes it has seen since Brazil began to have a modern economy. Investors who are able to price business opportunities, assets, and companies correctly in Brazil have the greatest window of opportunity we have seen in decades.



This is a unique moment for companies seeking to invest in Brazil's oil and gas sector.

▲ Regulatory adjustments in the next several years will impact how cities like São Paulo will source their electricity.

About the Author

Décio Fabricio Oddone da Costa is an engineer. He has held different positions in oil, gas, energy, petrochemical, and logistics companies. He is a former president of Petrobras Bolivia S.A., CEO of Petrobras Energia S.A., and vice president of Braskem S.A. He is currently a director at Prumo Logística S.A. Oddone was a counselor at the Institute of the Americas and the president of the Argentine Oil Industry Chamber. He is a member of the University of São Paulo's International Affairs Analysis Group (GACINT) and of the Brazilian Center for International Relations (CEBRI).

This policy brief reflects his personal views.

Endnotes

1. In a hydrothermal system, the energy generated comes from both hydroelectric and thermoelectric sources (natural gas, biomass, coal, diesel, fuel oil, etc.).
2. "Petrobras: a maior capitalização da história do capitalismo," Blog do Planalto, Presidência da República, September 6, 2010, <http://blog.planalto.gov.br/petrobras-a-maior-capitalizacao-da-historia-do-capitalismo/>.
3. "Petrobras venderá campos em terra e águas rasas," Brasil Energia, March 4, 2016, <http://brasilenergiaog.editorabrasilenergia.com/daily/bog-online/ep/2016/03/petrobras-vendera-campos-em-terra-e-aguas-rasas-468291.html>.
4. In 2007, the Conselho Nacional de Política Energética (National Council for Energy Policy) issued Resolution No. 6 to withdraw forty-one blocks located in the pre-salt layer region from the bidding. It ordered the executive branch to assess the need for changes in the regulatory framework of the sector so as to present "a new paradigm of production and exploration for oil and natural gas resulting from the discovery of new provincial oil, while respecting existing contracts."
5. After a halt in 2008, the bidding process for blocks was resumed in 2013 with the completion of the eleventh and twelfth bidding rounds. There was only one bidding round involving the pre-salt layer; it took place in 2013 for a block known as Libra.
6. Cristiane Caoli, "Leilão da ANP termina com só 14% dos blocos arrematados," Globo, October 7, 2015, <http://g1.globo.com/economia/negocios/noticia/2015/10/anp-faz-13-rodada-de-licitacoes-e-oferece-266-blocos-em-12-estados.html>.
7. Ministério de Minas e Energia, Empresa de Pesquisa Energética, Plano Decenal de Expansão de Energia 2020, 2011, Gráfico 86, http://www.epe.gov.br/PDEE/20120302_1.pdf.
8. Ministério de Minas e Energia, Empresa de Pesquisa Energética, Plano Decenal de Expansão de Energia 2024, Gráfico 101, <http://epe.gov.br/PDEE/Relatório%20Final%20do%20PDE%202024.pdf>.
9. "Refinaria Abreu e Lima," Petrobras, <http://www.petrobras.com.br/pt/nossas-atividades/principais-operacoes/refinarias/refinaria-abreu-e-lima.htm>.
10. "Petrobras retomará licitação para obras do Comperj," Valor, December 31, 2015, <http://www.valor.com.br/empresas/4375064/petrobras-retomara-licitacao-para-obras-do-comperj>.
11. Clarissa Carramillo, "Petrobras cancela 'refinaria premium' e cidade lida com perdas e frustração," February 7, 2015, <http://g1.globo.com/ma/maranhao/noticia/2015/02/petrobras-cancela-refinaria-premium-e-cidade-lida-com-perdas-e-frustracao.html>.
12. "Relatório do Mercado de Derivados de Petróleo," Ministry of Mines and Energy, January 2016, <http://www.mme.gov.br/documents/1138769/1732807/Relat+percentC3+percentB3rio+mensial+de+mercado+121+jan-16.pdf/2788c4ec-c56b-4237-8730-3f060f233a13>.
13. Romona Ordoñez, "Petrobras se aproxima de vender malha de gasodutos para Brookfield por US\$5 bi," O Globo, June 16, 2016, <http://oglobo.globo.com/economia/petrobras-se-aproxima-de-vender-malha-de-gasodutos-para-brookfield-por-us-5-bi-19517418>.
14. Nielmar de Oliveira, "Consumo de energia elétrica no país cai 2,1% em 2015," Agência Brasil, February 1, 2016, <http://agenciabrasil.ebc.com.br/economia/noticia/2016-02/consumo-de-energia-eletrica-no-pais-cai-21-em-2015>.
15. SE/CO Reservoirs should have 63.9 percent of their volume by the end of April. The turnout expected this month in the submarket is 92 percent of the MLT, according to NOS Carolina Medeiros, from Agência CanalEnergia, March 24, 2016.
16. PSR estimates that effective system surplus averages 4.2 GW. CanalEnergia, http://www.canalenergia.com.br/zpublisher/materials/Operacao_e_Manutencao.asp?id=111070.
17. The twelfth bidding round was suspended due to a judicial decision triggered by an order from the Federal Public Prosecutor, as disclosed by the ANP on a website dedicated to the bidding process: "The Federal Public Prosecutor in the State of Bahia filed a Public Civil Action No. 0030652-38.2014.4.01.3300 with the 13th Federal Court of Bahia whose objective is to suspend contracts related to SREC-T2 AND SREC-T4 sectors arising from the 12th bidding round, exclusively in relation to the possibility of exploration of unconventional resources through hydraulic fracturing. This suspension shall remain valid until specific regulation by the CONAMA is in place regarding the use of hydraulic fracturing methods, and until an environmental assessment in the form of Interministerial Ordinance No. 198/2012 is carried out in sediment areas covering the Recôncavo Basin." See "12ª Rodada de Licitações (2013)," Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, http://www.brasil-rounds.gov.br/round_12/index.asp.
18. Adriano Pires and Marcio B. da Silveira, "Petrobras: desinvestimento e oportunidade," O Estado de São Paulo, February 6, 2016, <http://www.pressreader.com/brazil/o-estado-de-s%C3%A3o-paulo/20160206/282127815516290>.
19. Vera Magalhaes, "Grupo interministerial discutirá impactos da venda de ativos de gás da Petrobras," Veja, June 22, 2016, <http://veja.abril.com.br/blog/radar-on-line/energia/grupo-interministerial-discutira-impactos-da-venda-de-ativos-de-gas-da-petrobras/>.
20. Adriana Fernandes, Murilo Rodrigues Alves, Carla Araujo, "Governo não vai interferir em preços da Petrobrás, diz Parente," Estadão, June 1, 2016, <http://economia.estadao.com.br/noticias/geral,governo-nao-vai-interferir-em-precos-da-petrobras-diz-parente,10000054605>.
21. Ordoñez, op. cit.; Beth Moreira, "Petrobras negocia com Mitsui a venda de participação em distribuidoras de gás," Estadão Conteúdo, September 22, 2015, <https://br.financas.yahoo.com/noticias/petrobras-negocia-mitsui-venda-participa%C3%A7%C3%A3o-distribuidoras-g%C3%A1s-121800593>.

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