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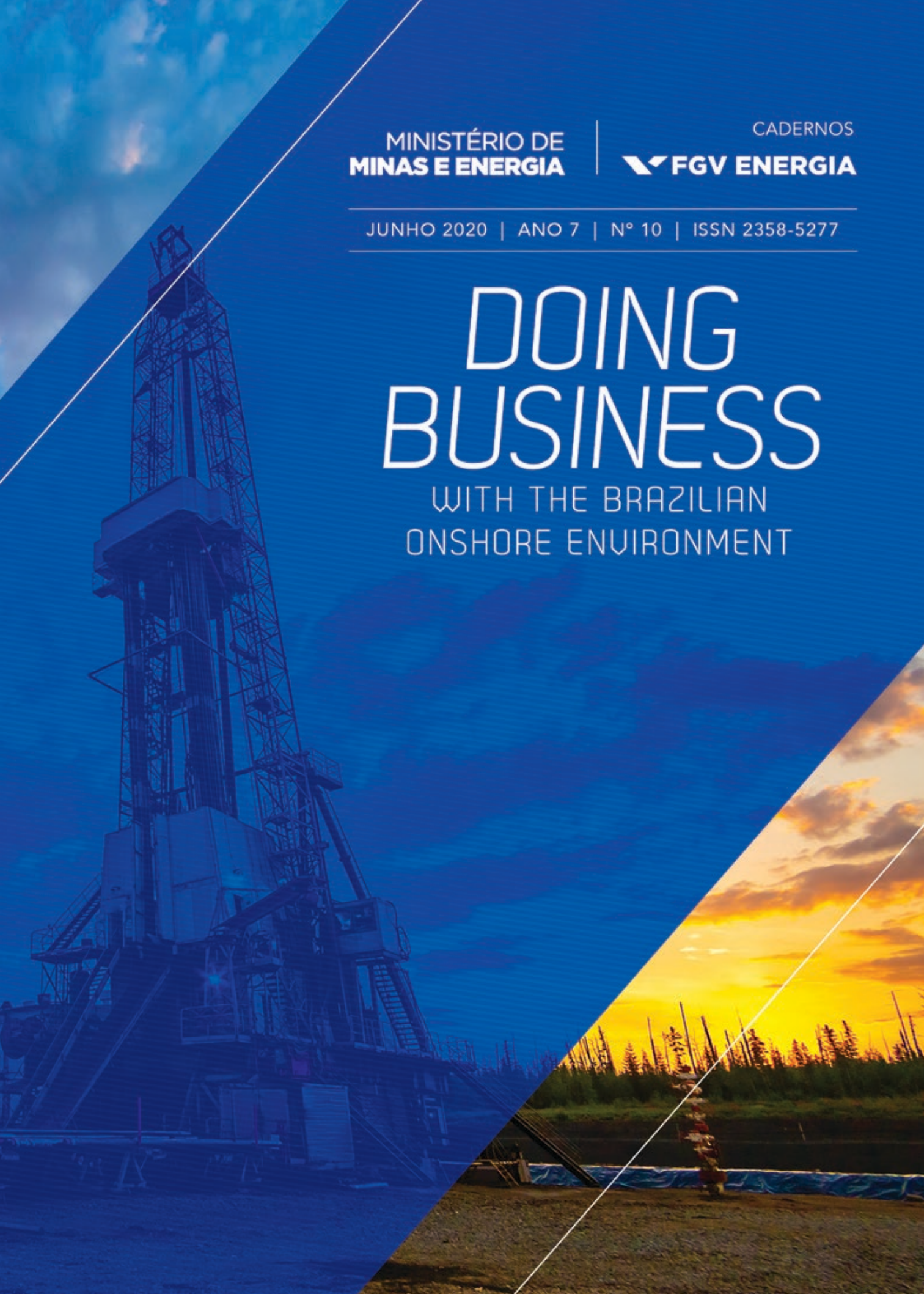
DOING BUSINESS

WITH THE BRAZILIAN ONSHORE ENVIRONMENT



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DIRETOR

Carlos Otavio de Vasconcellos Quintella

EQUIPE TÉCNICA

Coordenação
Fernanda Delgado
Professor and Strategic Advisor FGV Energia

Lucas Mota de Lima
Technical Advisor - REATE Coordinator MME

Autores
Adriana Queiroz Ramos
Energy Research Analyst EPE

Anabal Júnior
Executive Secretary ABPIP

Andre Mendes
Oil and Gas Department Manager BNDES

Carlos Agenor Onofre Cabral
Project of Manager - MME

Carlos Padilha
Oil and Gas Investments Analyst APEX

Diogo S. Baleeiro
Infrastructure Analyst – MME

Giselle de Castro Carvalho
Specialist in Regulation of Petroleum and its derivatives, fuel alcohol and natural gas - ANP

Guilherme Casarões
Professor FGV EAESP

Heloisa Borges
Bidding Promotion Superintendent – ANP

Heloise Helena Lopes Maia da Costa
Coordinator of Permanent Supply of Areas ANP

Jair Rodrigues dos Anjos
Federal Auditor of Finance and Control – MME

Juliana Lattari
Project Specialist ONIP

Karine Barbalho Fragoso de Sequeira
General Director - ONIP

Marcos Frederico Farias de Souza
Head of Oil and Gas Studies Department EPE

Maria Luisa Cravo Wittenberg
Investment Division Coordinator - APEX

Pamela Cardoso Vilela
Energy Research Analyst EPE

Pedro Righetti
Analyst ONIP

Rafael Bastos da Silva
Director MME

Raul Fagundes Leggieri
Energy Research Analyst EPE

Regina Freitas Fernandes
Technical Advisor EPE

Ricardo Cunha da Costa
Departamento Gás, Petróleo e Navegação BNDES

Roberto Escoto
Investment Department Manager – APEX

EQUIPE DE PRODUÇÃO

Coordenação Operacional
Simone Corrêa Lecques de Magalhães

Execução
Thatiane Araciro

Diagramação
Bruno Masello e Carlos Quintanilha

FGV ENERGIA

ESCRITÓRIO
Rua Barão de Itambi, 60 – 5° andar - Rio de Janeiro l RJ, CEP: 22231-000
Tel: (21) 3799-6100 l www.fgv.br/energia l fgvenergia@fgv.br

FGV

Instituição de caráter técnico-científico, educativo e filantrópico, criada em 20 de dezembro de 1944 como pessoa jurídica de direito privado, tem por finalidade atuar, de forma ampla, em todas as matérias de caráter científico, com ênfase no campo das ciências sociais: administração, direito e economia, contribuindo para o desenvolvimento econômico-social do país.

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CHAPTER

Introduction

The main principle of any "Doing Business" is founded on that economic activity benefits from clear rules: rules that allow voluntary exchanges between economic actors, set out strong property rights, facilitate the resolution of commercial disputes, and provide contractual partners with protections against arbitrariness and abuse. Such rules are much more effective in promoting growth and development when they are efficient, transparent, and accessible to those for whom they are intended (World Bank, 2019).

That said, on the beginning of 2020, with the launch of the REATE 2020 program by The Ministry of Mines and Energy - MME, the importance of describe and organize the onshore business environment became evident. The reform for the development of the onshore oil and gas exploration market in Brazil is at the top of the discussions of the Federal government. The REATE 2020 program has been launched with the ultimate objective to ensure incentives for the onshore activities in Brazil and competitiveness gains for the sector and for the economy.

Onshore oil production in Brazil dates back to the 1940s and it was only after 2003 that the absolute volume of onshore production started to decline. There are several onshore fields in production, which are mature and marginal, whose remaining

productive potential depends on the appropriate investment in advanced oil recovery techniques. The investment in revitalizing these assets and the consequent increase in terrestrial oil production in Brazil are important for several municipalities, as the terrestrial production fields are in the interior of the country. Most of the time, the municipalities involved have low income and a low human development index (HDI) and oil royalties weigh significantly on their budgets (as well the value chain generated by the activity when hiring labor, services and equipment in the region).

The MME and FGV Energia, the Getulio Vargas Foundation's Energy Research Center, has joined forces to put together this booklet, in its relentless struggle to seek knowledge and disseminate information, in an impartial manner for the public good. The moment could not be more challenging for the oil and gas onshore production. The REATE 2020 Program needs incessant regulatory discussions and constant vigilance, scientific thinking, as well as critical analysis.

Hence, this publication in partnership with APEX-BRASIL, ONIP, ABPIP, BNDES, FGV-SP, EPE and ANP aims to bring some light to the new features of the onshore production market in Brazil, looking to the given opportunities - expectations of increased production of onshore oil and gas in the near future. The goals are the gains in the economy's competitiveness and in order to take advantage of it, there is an urgent need to promote clear debate.

This booklet consolidates a long partnership between the two institutions involved in a broad discussion between policy makers, academics and the market.This Doing Business covers 10 areas of business. These are: dealing with political and economic environment in Brazil, why investing in the country, getting credit, protecting minority investors, the involved stakeholders, Petrobras participation on the whole market, how to became an operator, the REATE program, supply chain availability and issues, and finally, risks and opportunities. Was not the intention to use the full doing business methodology, but to give to the reader/investor, a light but rich material to guide him through Brazilian onshore environment business opportunities.

This is our contribution.

MME
FGV Energia

ORGANIZERS

Fernanda Delgado – Professor and Strategic Advisor FGV Energia

Lucas Mota de Lima – Technical Advisor – REATE Coordinator MME

AUTHORS

Fernanda Delgado – Professor and Strategic Advisor FGV Energia

Andre Mendes – *Oil and Gas Department Manager BNDES*

Ricardo Cunha da Costa – *Departamento Gás, Petróleo e Navegação BNDES*

Heloisa Borges – *Bidding Promotion Superintendent – ANP*

Heloise Helena Lopes Maia da Costa – *Coordinator of Permanent Supply of Areas ANP*

Giselle de Castro Carvalho – *Specialist in Regulation of Petroleum and its derivatives, fuel alcohol and natural gas - ANP*

Carlos Padilha – *Oil and Gas Investments Analyst APEX*

Roberto Escoto – *Investment Department Manager – APEX*

Maria Luisa Cravo Wittenberg – *Investment Division Coordinator - APEX*

Anabal Júnior – *Executive Secretary ABPIP*

Karine Barbalho Fragoso de Sequeira – *General Director - ONIP*

Juliana Lattari – *Project Specialist ONIP*

Pedro Righetti – *Analyst ONIP*

Guilherme Casarões – *Professor FGV EAESP*

Marcos Frederico Farias de Souza – *Head of Oil and Gas Studies Department EPE*

Regina Freitas Fernandes – *Technical Advisor EPE*

Adriana Queiroz Ramos – *Energy Research Analyst EPE*

Pamela Cardoso Vilela – *Energy Research Analyst EPE*

Raul Fagundes Leggieri – *Energy Research Analyst EPE*

Rafael Bastos da Silva – *Director MME*

Carlos Agenor Onofre Cabral – *Project of Manager - MME*

Diogo S. Baleeiro – *Infrastructure Analyst – MME*

Jair Rodrigues dos Anjos – *Federal Auditor of Finance and Control – MME*

ABPIP / ANP / APEX / BNDES / EPE / FGV EAESP / FGV ENERGIA / FIRJAN / ONIP / MME

FGV – Fundação Getulio Vargas

The Doing Business with the Brazilian onshore Environment for the oil and gas industry 2020 shows that developing economies are catching up with developed economies in ease of doing business.

The Brazilian institutions, together for the purpose of this venture, recognizes the important work countries have done to improve their regulatory environments. Doing Business is a valuable tool that governments can use to design sound regulatory policies. By giving policymakers a way to benchmark progress, it stimulates policy debate, both by exposing potential challenges and by identifying good practices and lessons learned.

It's important to note that Doing Business isn't meant to be an investment guide, but rather a measurement of ease of doing business. Potential investors consider many other factors, such as the overall quality of an economy's business environment and its national competitiveness, macroeconomic stability, development of the financial system, market size, rule of law, and the quality of the labor force.

I am honored to be at the head of the Getulio Vargas Foundation in its relentless struggle to seek knowledge and disseminate information, in an impartial for the public good. The moment could not be more challenging for the energy sector.

The reopening of the oil market, incessant regulatory discussions and expectations of divestments by the state company require constant vigilance, scientific thinking, as well as critical analysis. The reactive proposal for the onshore exploration and production activities foresees the production of 500 thousand barrels per day among eight states. Another important point of the program is the possibility of generating more than 10,000 new direct and indirect jobs, in addition to encouraging the ordering of countless Brazilian municipalities.

However, it comforts me to realize that FGV Energia has prepared itself in recent years to face these changes in the market with its staff of experts; its accumulated science and its muscles strengthened enough to face the new challenges that the fight offers.

2020 has been so far the most challenge year for the energy sector, and for the small companies of the onshore especially. The regulatory and geopolitical hiccups that have occurred over the past few years are enough to announce the depth of the issues ahead and reaffirm the importance of our work.

I hope, therefore, that together we can continue walking towards our ideal, consolidating FGV Energia as an exempt space, capable of promoting high level discussions and ensuring Brazil a position in the energy scenario compatible with its weight and your interests.

I am grateful for the confidence placed.

Carlos Ivan Simonsen Leal
President Fundação Getulio Vargas

Brazil Onshore Guidebook

Minister Bento Albuquerque's foreword

A strong and competitive land-based E&P industry, with increasing production and plurality of operators and suppliers of goods and services, is one of the State's challenge in establishing a prosperous business environment in Brazil.

Eight decades after the discovery of the first commercially exploitable field in the country, the onshore oil and gas area once again becomes a key player in socioeconomic terms.

The structural and regulatory changes underway mark a new cycle of the Brazilian Onshore Industry, making it more competitive, dynamic and attractive, thus leading to a new chapter of prosperity in the history of our Oil Sector.

These transformations are built through an unprecedented synergistic forum established between the Government, Producers, Suppliers, Financiers, Research Institutions, Academia and Civil Society, within the scope of the Program of Revitalization for the Activity of Exploration and Production of Oil and Natural Gas on Land Areas (REATE), which seeks to foster and advance even further in the implementation of a Public Policy to strengthen this Segment.

The Doing Business Project – a relevant compendium of knowledge – aims to provide, in a single Guide, all aspects of the business environment, primarily for companies, investors and those wishing to enter the onshore value chain.

Organized by chapters and containing texts characterized by precision, conciseness, simplicity, objectivity and clarity, this Primer was prepared by renowned and meritorious Institutions that work on behalf of the Sector.

By allowing companies and investors to get to know the new Regulatory Framework and the opportunities arising in the Oil and Gas onshore segment, in a consolidated manner, we are facing an innovative and disruptive instrument, reasons why I could not fail to thank, praise and congratulate all the Partners who have contributed, above all, to the achievement of this valuable Work.

Firmly following the GOOD GOVERNANCE, LEGAL AND REGULATORY PRACTICES, PERMANENT DIALOGUE WITH ALL Sectors, TRANSPARENCY AND PREDICTABILITY, ALWAYS, IN BENEFIT OF PUBLIC

We are convinced that we will be able to explore and develop the full potential of the Brazilian onshore and will be able to achieve yet another result that the Society so much desires and deserves.

Bento Albuquerque
Minister of State of Mines and Energy of Brazil

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CHAPTER

The Brazilian political system: an overview

Brazil is a Federative Republic, whose government is separated into three independent branches: Executive, Legislative and Judicial. Its political structure was established by the current federal Constitution, enacted in 1988, which ushered in a full-fledged democratic regime, based on universal and mandatory suffrage, after two decades of military rule.

With broad powers granted to the federal government, Brazil's political system is quite different from the US federal system, where states have a considerable degree of autonomy and power, and from parliamentary systems in Europe, given Brazil's predominance of the Executive over the Legislative branch. Big government in Brazil has roots both in the country's republican history and in its long-standing patriarchal political culture.

THE EXECUTIVE BRANCH

The President, who stands as the chief of the Executive branch, is elected by direct vote for a four-year term and might run once for re-election. Among the Executive branch's powers are the right to sanction and veto legislation, to propose the federal government's annual budget, and to appoint ministers of state as well as key executives to selected administrative and political posts. The President is also the commander-in-chief of the Armed Forces and may declare state of siege or emergency nationwide.

The structure of the Executive branch is rather complex. There are currently 16 ministries and six secretaries or state agencies with ministerial status, as well as regulatory bodies, state-owned banks and companies, federal universities, and research institutes. Brazil has about 600 thousand federal public employees, who have become progressively professionalized in the last three decades, and the share of public employees in the total workforce (12 percent) is still well below standards found among OECD countries.

THE LEGISLATIVE BRANCH

Brazil's Legislative branch, the National Congress, is composed of the House of Representatives and the Federal Senate. They have the constitutional competency to propose and pass legislation (including amendments to the Constitution, whose approval requires the favorable vote of three-fifths of both houses), to approve budgetary laws, to oversee the work of the presidency and to ratify international treaties and agreements.

The lower house, also known as the Chamber of Deputies (*Câmara dos Deputados*), has 513 seats, whose members are directly elected in multi-seat constituencies by proportional representation vote to serve 4-year terms. Such constituencies correspond to states (plus the Federal District) and their size is defined roughly by the state's population. With 46 million inhabitants, São Paulo has the largest number of seats in the House (70). States with smaller populations, such as Roraima (six-hundred thousand) and Amapá (eight-hundred and fifty thousand), are entitled to the minimum of eight seats.

The Federal Senate (*Senado Federal*) is the upper chamber of the Brazilian Congress. It represents the 26 states and the Federal District, which have 3 members each, totaling 81 seats. Senators are directly elected in multi-seat constituencies by simple majority vote to serve eight-year terms, with one-third and two-thirds of the membership elected alternately every four years (in 2018, 54 seats were put to a vote). Besides the legislative functions shared with the Chamber of Deputies, the Senate is responsible for indicting and impeaching the president, vice-president, ministries and other high officials, conducting hearings of presidential appointments for high Executive positions, and authorizing the government's external financial transactions.

EXECUTIVE-LEGISLATIVE RELATIONS

Brazil's political system has often been labeled 'coalitional presidentialism'. The fragmented nature of the Brazilian multiparty system, which largely relates to the country's regional discrepancies, proportional elections, and rules for campaign and party funding, has forced presidents to form broad governing coalitions so they could pass legislation and survive in power.

Between 1984 and 2014, the number of parties jumped from 5 to 32, with the most relevant ones being the centrist Brazilian Democratic Movement Party (Partido do Movimento Democrático Brasileiro, PMDB), the left-leaning Workers' Party (Partido dos Trabalhadores, PT), the center-right Brazilian Social Democratic Party (Partido da Social Democracia Brasileira, PSDB), the right-leaning Democrats (Democratas, or DEM). By 2015, Brazil had the single most fragmented party system in the world.

With a brief exception of the PMDB in the mid-1980s, no single party in Brazil has had control over the majority of seats in Congress, and none of the other big parties has held more than 20 percent of seats in either house. This is why party coalitions have become a pillar of any president. They would often offer parties ministries and other cabinet positions, budget earmarks, and sometimes specific policies to hold the coalition together.

THE JUDICIAL BRANCH

The Judicial branch consists of a system of federal, state and local courts throughout the country, headed by the Federal Supreme Court, whose decisions are final and cannot be appealed. The Supreme Court has 11 justices, who are appointed by the president and approved by the Senate, and their tenure lasts until they are 75 years old. As the 'guardian of the Constitution', the Supreme Court rules on the constitutionality of laws and, on appeal, decisions of those lower courts to which the Federal Union is party.

THE FEDERAL STRUCTURE

Brazil is divided administratively into 26 states plus the Federal District, whose capital (which is also the country's political capital) is Brasília. It also has 5,570 municipalities, and local politics remain a key element of Brazil's political dynamics. State governors and city mayors are elected for four-year terms, with the possibility of reelection. States and cities also have their own Legislative branches, whose tenures last for four years.

The Brazilian federation confers both states and cities the capacity to pass legislation, collect taxes and implement policy. Significant differences among states, cities and macro-regions in terms of wealth, inequality, basic sanitation, infra-structure and income make the federal government's

investments and redistribution mechanisms an essential pillar of the Brazilian 'federative pact'.

THE GOVERNAMENTAL REFORMS

Even though GDP growth is expected to very modest in the next years and despite new complexity in the global scenario, financial markets still have hope in the country's prospects following his early decision to give Minister of Economy control over economic policies. Minister of Economy, a proponent of economic liberalism, would like to redefine the state's role in the economy and foster private enterprise. The current administration's business-friendly priorities include two main reforms: public pension funds and taxes.

The Pension reform in Brazil was a proposal by the Brazilian government to amend the Constitution for the reform of the social security system of the country. By changing the country's constitution, it had to be approved in both houses of the National Congress by an absolute majority. The reform was created to combat the giant deficit in the pension system, of more than R$194 billion in 2018, and the rapid aging of the Brazilian population.

The reform proposal was approved by the Federal Senate on 22 October 2019, becoming law and coming into force automatically. It is seen by analysts as the first of a number of structural reforms needed to put the country on a path to higher and sustainable economic growth. Much more complex administrative and tax reforms are next, according to the President of the Chamber of Deputies, Rodrigo Maia. The 49-year old congressman from Rio de Janeiro was credited as the political architect of the social security reform and emerged from the process as a powerful and consequential leader.

Brazil's pension reform will directly affect 72 million individuals between public and private sector workers, and outlines a number of requirements for receiving pension—the most notable alteration being the imposition of a minimum retirement age for private sector workers, now 65 for men and 62 for women, up from averages of 56 and 53, according to the Organization for Economic Co-operation and Development (OECD). Contribution and minimum age requirements change in regards to some professions, principally rural workers, professors, and federal police (Wilson Center, 2020).

The other reform that has been in discussion in Brazil is the tax reform. As per the ITR website (2020), the Brazilian government and the Congress began 2020 by reiterating that reforming the tax system is one of the main priorities and that the initial objective is to consolidate the different propositions into a single project, which would follow the legislative process within the House of Representatives and the Senate. The reform is considered crucial by taxpayers and investors, not only because of the existing tax burden, but as a result of the complexity and risks associated with the number of taxes, rules, regimes, reports and particularities imposed by the Brazilian tax system.

According to the Brazilian Internal Revenue Service's (IRS) reports, approximately 20% of the Brazilian government revenues derive from income taxes, whilst almost 50% are raised by indirect taxes imposed on consumption, each of them with specific regulations and reporting requirements. Such numbers show the major problem affecting the Brazilian tax environment is, conclusively, the indirect tax system.

Among the various types of indirect taxes provided by the Brazilian system, the most relevant are:

- **PIS/COFINS**
  Federal social contributions levied on revenues;
- **IPI**
  Federal excise tax levied on manufacturers and importers;
- **ICMS**
  State VAT levied on the circulation of goods and on provision of communication and transportation services (interstate and inter-municipal); and
- **ISS**
  Municipal tax on services.

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CHAPTER

Why investing in Brazil?

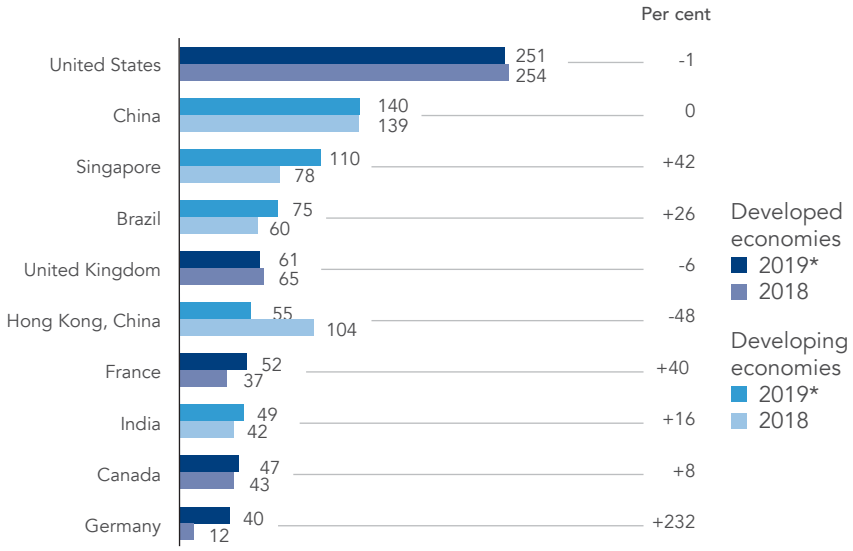
FOREIGN DIRECT INVESTMENT IN BRAZIL

Brazil is the largest economy in Latin America and ranks in the eighth position worldwide, with a population of more than 210 million people. In 2019, Brazil`s GDP grew 1.1%, inflation was at 4.3%, and the Central Bank lowered benchmark interest rates from 13.75% in 2016 to 5.9% (Brazil Central Bank, 2019).

A major player in international trade, Brazil has proven to be an open and vibrant country with a diversified economy, and one of the largest consumer markets in the world. It has a broad and sophisticated industrial base, one of the most solid and prudently regulated financial sectors in the G20, the largest stock market in Latin America and a highly productive agriculture sector.

UNCTAD's (United Nations Conference on Trade Development) most recent report ranks Brazil in fourth place for FDI (Foreign Direct Investment) inflows worldwide, ranking the country once more within the top investment destinations for global investors. According to UNCTAD's World Investment Report, global FDI inflows summed up to USD 1.39 trillion in 2019 and Brazil's share is approximately 5% of the total amount invested worldwide (UNCTAD, 2019).

GRAPHIC 1: FDI INFLOWS TOP 10 HOST ECONOMIES 2018



Source: UNCTAD

In 2019, FDI to Latin America and the Caribbean increased by 16% in 2019, reaching an estimated $170 billion. In South America, flows grew by 20% to an estimated $119 billion, Brazil registered a 26% increase to $75 billion, more than 60% of total amount invested in the region, partly driven by the country's privatization program launched as part of the administration's efforts to jumpstart the economy (UNCTAD, 2019).

In 2020, divestments of subsidiaries of State companies are expected to gain pace; the privatization of large companies like Eletrobras, Latin America's largest power utility, and Telebras is likely to attract further FDI. Preliminary data on announced Greenfield investments in the country support this outlook with the value of projects more than doubling compared to 2018, especially in the renewable energy and the automotive industries.

Manufacturing accounts for 11.8% of GDP and employs 11.1% of the workforce. Brazil's biggest manufactures include automobiles, consumer electronics, computers and software, and heavy industries. The world's third-largest commercial aircraft manufacturer by revenue also has headquarters in the country. Brazil's car industry exported more than 620,000 units in 2018. (Apex-Brasil, 2019)

Brazil's service sector makes up for 73.3% of GDP. Brazil's tourism market is one of the largest in the region. It has a variety of tourist attractions, such as the Iguaçu waterfalls, the Pantanal wetlands and the Amazon rainforest. In addition, its stunning beaches attract visitors from across the world. Brazil has an abundance of natural resources and mineral deposits (for example, bauxite, iron ore, manganese, chrome, lead, zinc, tungsten and nickel) and is the world's largest exporter of iron.

The energy sector has a record of significant foreign investment allocation. Energy auctions conducted by the National Petroleum Agency (ANP) in recent years gathered dozens of billions of BRL in investments in 2018, as was the case with the new energy generation (BRL 13 billion/ +/-USD 3.5 billion) and transmission lines (BRL 13.2 billion/ +/-USD 3.6 billion) tenders. In March 2018, auctions for oil exploration blocks raised over BRL 8 billion (USD 2.2 billion), boosted by new regulations, as partnering obligations with state-owned oil company Petrobras, the Brazilian NOC, are no longer mandatory in the promising pre-salt fields (ANP, 2019).

TOP 10 REASONS TO INVEST IN BRAZIL

1) LEADING REGIONAL ECONOMY

a. Brazil ranks among the top 10 economies in the world and being the largest in Latin America, with a GDP of USD 1.8 trillion in 2019.

2) GLOBAL DESTINATION FOR INVESTMENT

a. 4th global recipient of FDI inflows in 2019. Inward FDI flows totalled over USD 1 trillion from 2010 to 2019.

3) RESILIENT DOMESTIC MARKET

a. A population of over 210 million and a strong and steady domestic demand for services, goods and agricultural products (Household consumption of 64% of GDP - 2018).
b. Per capita GDP of USD 8,959.02 in 2018, above major emerging players such as India and South Africa.

4) DIVERSIFIED ECONOMY: WE HAVE IT ALL

a. Brazil's economy relies on a wide range of economic sectors – that includes Latin America's largest aerospace, automotive, oil and gas, mining, capital goods, medical equipment, chemical and technology industries.

5) ENERGY POWERHOUSE

a. 10th largest oil producer in the world and the largest in Latin America.
b. One of the top producers and exporters of ethanol biofuel in the world, with a growing fleet of ethanol fueled cars and light-trucks since the eighties.
c. Renewable sources are responsible for over 80% of Brazil's electricity generation.

6) LARGE POOL OF WORKERS

a. With an active working age population (15- 64 years old) of around 69% in 2018, above world average, Brazil's domestic market offers good opportunities for companies seeking to hire locally.

7) EXTENSIVE RAW MATERIALS

a. Brazil's is one of the biggest producers and exporters of agricultural and mining products (especially iron ore) in the world. The country is also estimated to hold the world's largest freshwater reserves.

8) CAPACITY TO ENDURE

a. In 2010, Brazil became a net external creditor, paying off its debt to the International Monetary Fund. International reserves totalling USD 388 billion by the middle of 2019.

9) GLOBAL PLAYER

a. Brazil has been an active and engaged global player, coordinating trade, policies and human rights advocacy, earning the respect of its peers in the process. With a large economy, sound political and judicial systems and active engagement in foreign affairs, Brazil plays an important role in the international community.

10) GATEWAY TO LATIN AMERICA

a. Brazil has free trade agreements with the largest markets in Latin America and signed Investment Facilitation Agreements with several other countries. Brazil is a founding member of the Southern Common Market (Mercosur), which has recently signed a big FTA agreement with the European Union.

THE OIL&GAS INDUSTRY IN BRAZIL

Brazil's Oil&Gas industry is mature and innovative, offering amazing investment opportunities for companies of all sizes and expertise. Ranked as the 10th among the world's largest oil producers, the largest oil producer in Latin America, it is also in the 7th place as consumer market for oil products and services in the world. The country has an outstanding market potential for experienced investors, international operators and service contractors, including companies of the supply chain from upstream to downstream.

In next years, the National Petroleum Agency will conduct an intensive calendar of bidding rounds and maintain available the opportunities in open acreage for E&P blocks, offshore and onshore. Additionally, Petrobras divestment plan, launched in 2019, includes eight refineries and E&P mature fields (ANP, 2019). The deregulation and privatization of the new gas market, creating many opportunities for experienced investors and newcomers to Brazil.

- 7th position in Oil&Gas products and services consumption of around 3.1 million barrels / day (3.1% of the world total);
- 10th position among world's largest producers, in a total of 3.1 million barrels / day;
- 15th position in the world ranking of proven oil reserves, with a volume of 13.4 billion barrels (5% growth);
- 18,000 is the average productivity of pre-salt well, E&P environment, 10 times higher than in a conventional offshore well and 1000 times higher than an onshore well;
- 7.5 million barrels / day is the potential growth of Oil&Gas production by 2030.

Brazil has a diverse energy matrix and a great potential of growth for companies in the Oil&Gas industry, which accounts for a share of 49% of all energy consumed in Brazil. It is a mature industry and highly relevant to the national economy and supply chain currently responding for almost 60% of all industrial investments in the country and a significant percentage of the country's GDP.

Brazil holds the 15th largest proven oil reserves in the world, with a total of 13.4 billion barrels, most of which offshore, especially in extremely deep waters. Brazil stands out in the deep-water pre-salt layer, having Petrobras, the national oil company, developed a unique and innovative technology that enabled the country to reach the 9th position among the world's largest producers. Supply chain standards are very high to face these challenges (ANP, 2019).

Innovation is a must in the Brazilian Oil&Gas industry in order to enable production in such a challenging environment. Pre-salt layer reaches an average oil production of 18,000 bpd per well, this is ten times higher than the production of a conventional offshore well, and one thousand times higher than an onshore well. Some pre-salt wells are producing more than 40.000 bpd constantly (ANP, 2019). Such a high level of productivity is an amazing achievement, considering the harsh and extreme conditions faced in the pre-salt layer. Petrobras and the Brazilian professionals involved in the pre-salt E&P activities are very proud of this accomplishment that proves competence and innovation capacity.

The southeast region concentrates 95% of Brazilian reserves, in two offshore basins, Campos and Santos, along the coast of Rio de Janeiro, Espírito Santo and São Paulo states. By 2030, the National Petroleum Agency (ANP) expects to raise oil production from 3.1 million barrels per day to 7.5 million barrels per day. The upcoming bidding rounds include 128 offshore blocks corresponding to 64,105 km^2. Considering the latest auctions, between 2017 and 2019, 90% of the world E&P bonuses and an amount of USD 6.1 billion were concentrated in Brazil, corresponding to 72 acquired blocks in an area equivalent to Portugal (87,549,20 km^2).

The onshore business also offers investment opportunities in Brazil. Onshore oil reserves in Brazil are still underexplored and scattered over more than six basins, most of them in the north and northeast region of the country. Onshore potential includes 740 blocks and mature fields that will be part of ANP's continuous offer in open acreage. In 2019, open acreage attracted ten new independent onshore operators to the country

Petrobras, the national oil company that currently accounts for roughly 90% of total oil production, launched a daring business plan for 2020-2024 to transform the Oil&Gas industry in Brazil (Petrobras, 2019). The plan includes a greater focus on pre-salt layer E&P production, foreseeing USD 64.3 billion in new investments. The opportunity in upstream involves certification of reserves, fast development of production and the development of a modern, diverse and competitive supply chain. Additionally, in downstream, Petrobras plans an offer for sale of eight refineries. In refining and oil supply there is an intention to create a competitive market, more diverse and open to new players.

Brazil's goal is to create a diverse oil industry by promoting changes in the regulatory framework and attracting new players, including operators and supply chain companies. An example is the opening of the natural gas market. Brazil has proven gas reserves of 370 billion m^3, with most

of this reserve offshore (82%). Consumption of natural gas in Brazil is mostly industrial (45% of the demand) and for power generation (36% of the demand) segments (ANP, 2019).

The effort to create a more favorable business environment increases the potential and demonstrates a willingness to foster the resumption of investments in the Oil&Gas sector. As local content regulation is still a requirement and time of response is a value for any oil operator, brownfield projects developed in partnership with Brazilian companies may be an interesting market entry strategy for foreign companies in the supply chain of goods and services.

The main reasons to invest in Brazil´s Oil&Gas sector:

- 6.1 USD billion representing a share of 90% of world's E&P bonuses for 72 acquired blocks in an area equivalent to Portugal (87,549,20 km^2);
- 128 offshore blocks (64,105 km^2) will be object of the 17thh bidding round in 2021;
- 740 is the continuous offer of blocks and mature fields in open acreage, especially in onshore areas;
- 215 USD billion is the estimated impact in new investments of recent oil auctions in the period of 2017 to 2019;
- 31st largest natural gas producer, totaling 137 million m^3/d.

ABOUT APEX-BRASIL - BRAZILIAN TRADE AND INVESTMENT PROMOTION AGENCY

Apex-Brasil is the Brazilian governmental trade and investment promotion agency. Regarding the investment activity, the institutions supports international investors as they analyze the opportunities to establish a plant in Brazil, start a partnership with a Brazilian company, or commit capital in Brazil through funds and companies. Our goal is to satisfy investor's needs and generate results as we attract technology, innovation, and new companies and generate jobs in Brazil.

The Agency has already served 1300+ investors to announce 118 projects worth $ 23 billion in Brazil.

We are part of the Brazilian Ministry of Foreign Affairs, through which we count with 120+ offices in the world, and we work in close collaboration with other Ministries, regulatory Agencies, class entities, and so on.

Apex-Brazil is ready to assist in all steps of the investor's decision-making process by:

- Sharing general information on tax, legal and regulatory matters;
- Providing tailored market and industry information;
- Providing deal flow of funds and companies;

- Supporting projects in site location;
- Softlanding for foreign companies;
- Networking to public and private institutions at federal and state levels;
- Fostering partnerships between Brazilian and foreign companies.

BRAZILIAN PETROLEUM PARTNERSHIPS - BPP

The Brazilian Petroleum Partnerships (BPP) program is designed to attract investments by fostering partnerships between Brazilian and foreign companies of the Oil & Gas sector, promoting the integration of Brazilian companies into the global supply chain.

To participate in the BPP, we invite you to register and participate in the selection process by filling out the link:
http://web.apexbrasil.com.br/cn/aotb0/BPP2019

Participation in BPP does not involve direct costs, only the company's dedication to forming partnerships. Vacancies are limited and depend on adherence analysis of the company profile.

If the company is selected, to start the work we require the signing of a Cooperation Agreement that guarantees confidentiality in the exchange of information and the commitment of the company to form international partnerships.

The BPP program also supports foreign companies interested to open a subsidiary in Brazil, in a greenfield or brownfield project, offering the same institutional support that the Agency provides to the partnerships between foreign and Brazilian companies.

4

CHAPTER

Who is who in the oil and gas sector decision making level

As defined in the Constitution of the Federative Republic of Brazil and explicit in Law n. 9.478/1997, known as the "Petroleum Act", are property of the Union the mineral resources, the oil and natural gas deposits in the national territory, including the land part, the territorial sea, the continental shelf and the exclusive economic zone.

Likewise, the activities of prospecting and exploitation of deposits of petroleum and natural gas and of other fluid hydrocarbons are a monopoly of the Union, however the Petroleum Act establishes the Union may contract with state-owned or with private enterprises for the execution of those activities by means of concession, authorization or contracting under the production sharing regime.

Thus, governing the Oil and Gas Sector, the Law deals with activities related to the oil monopoly and it defines the objectives of national policies for the rational use of energy sources, among which the following stand out:

- promote development, expand the labor market and value energy resources.
- promote free competition.
- expand the country's competitiveness in the international market.

In the Petroleum Act, CNPE and the National Petroleum, Natural Gas and Biofuels Agency (ANP) were created, which, respectively and in general terms, define the sector's strategic and regulatory guidelines. Also noteworthy is the Ministry of Mines and Energy (MME), which deals with the Oil and Gas Exploration and Production Policies.

The Sector is based on a solid environmental framework, so that activities take place in an environmentally safe and sustainable manner. Law n. 6.938/81, which defines the National Environment Policy, establishes that the construction, installation, expansion and operation of establishments and activities that use environmental resources, effectively or potentially polluting or capable, in any way, of causing environmental degradation will depend on previous environmental licensing.

Complementary Law n. 140/ 2011 establishes that the Union has a duty to promote the environmental licensing of undertakings and activities that meet the typology established by an act of the Executive Branch, considering the criteria of size, polluting potential and nature of the activity or enterprise. At the Federal level, environmental licensing is conducted by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), while at the State level is the responsibility for licensing onshore activities, which is carried out by the State Environmental Agencies (OEMAS).

CNPE

The National Energy Policy Council (CNPE), linked to the Presidency of the Republic and chaired by the Minister of Mines and Energy, whose task is to propose national policies and specific measures to the President, such as:

- promote the rational use of the country's energy resources;
- define the blocks/areas to be object of concession or production sharing;
- define the strategy and the policy for the economic and technological development of the oil and natural gas industry, as well as its supply chain.

THE COUNCIL IS COMPOSED OF REPRESENTATIVES FROM THE FOLLOWING INSTITUTIONS:

- Minister of Mines and Energy, who chairs it;
- Minister of State Chief of Staff of the Presidency of the Republic;
- Minister of Foreign Affairs;
- Ministry of the Economy;
- Minister of Infrastructure;
- Minister of Agriculture, Livestock and Supply;

- Minister of Science, Technology, Innovations and Communications;
- Minister of the Environment;
- Minister for Regional Development;
- Chief Minister of the Institutional Security Office of the Presidency of the Republic; and
- President of the Energy Research Office.

MME

The Ministry of Mines and Energy, is responsible for proposing guidelines for bidding in areas destined for the exploration and production of oil and natural gas; promote studies of the Brazilian sedimentary basins and coordinate the multi-annual planning studies of the Sector; coordinate and promote incentive programs and actions to attract investment and business; facilitate interaction between the productive sector and environmental agencies; propose guidelines to be observed by the ANP for the preparation of the drafts of the notices and production sharing contracts; coordinate the process of granting and authorizing the oil, natural gas and biofuels sector; and technically assist the CNPE, among others.

ANP

The National Petroleum, Natural Gas and Biofuels Agency has the purpose to promote the regulation, contracting and inspection of economic activities that are part of the oil, natural gas and biofuels industry, including, among others:

- implement, within its sphere of competence, the national policy for oil, natural gas and biofuels, contained in the national energy policy;
- promote studies aiming at the delimitation of blocks, for the purpose of concession or contracting under the production sharing regime for exploration, development and production activities;
- regulate the execution of geology and geophysical services applied to oil prospecting, aiming at collecting technical data, intended for commercialization, on a non-exclusive basis;
- preparing the public notices and promoting tenders for the concession of exploration, development and production, signing the resulting contracts and inspecting their execution;
- stimulate research and the adoption of new technologies in exploration and production;
- organize and maintain the collection of information and technical data related to the regulated activities of the oil, natural gas and biofuels industry;
- Consolidate, annually, the information of the national oil and natural gas reserves transmitted by the companies, being responsible for their disclosure;

- signing, by delegation from the Ministry of Mines and Energy, the concession contracts for the exploitation of the natural gas transport and storage activities subject to the concession regime;

- authorize the practice of natural gas commercialization activity, within the sphere of competence of the Union.

EPE

The Energy Research Company is a public company linked to the Ministry of Mines and Energy. Its purpose is to provide services in the area of studies and research designed to subsidize the planning of the energy sector.

IBAMA

The Brazilian Institute of the Environment and Renewable Natural Resources is the responsible for environmental licensing at the Federal level.

In compliance with Complementary Law N. n. 140/2011, the Decree N. n. 8437/ 2015 was published. This decree provides, in its art. 3rd item VI, which will be licensed by the competent federal environmental agency (Ibama) the exploration and production of oil, natural gas and other fluid hydrocarbons in the following cases:

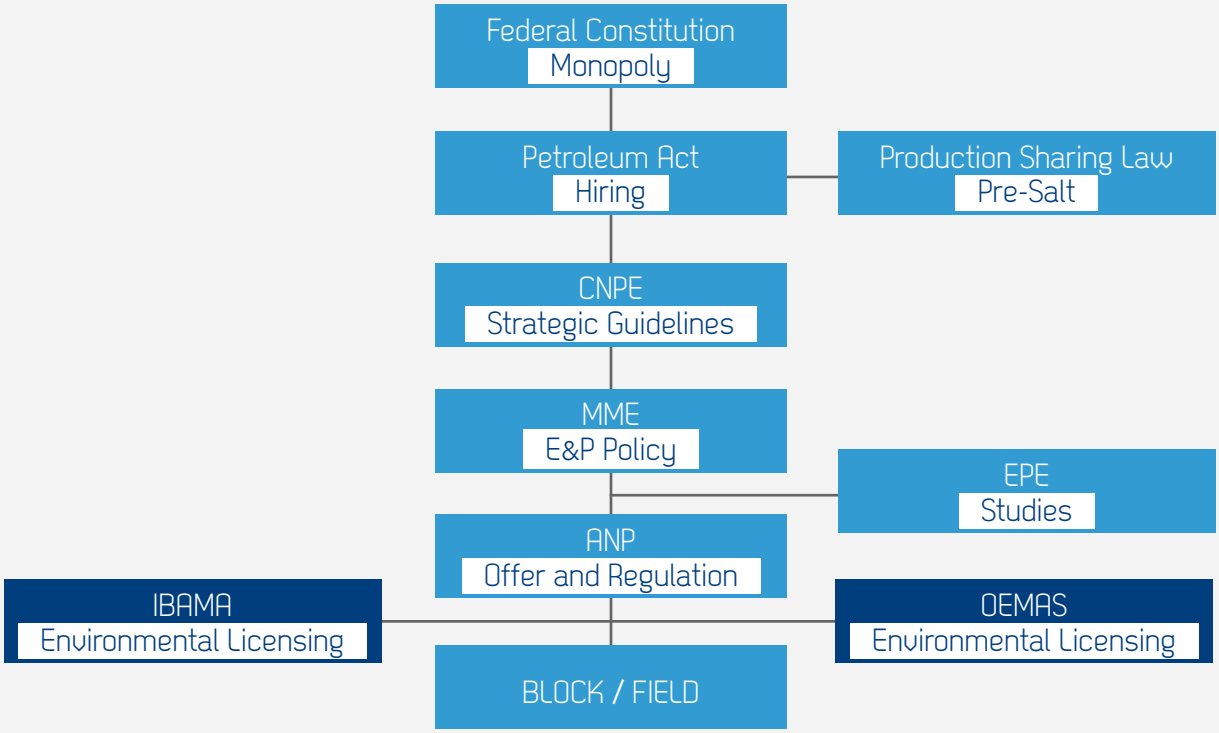
- exploration and evaluation of deposits, comprising seismic acquisition activities, collection of bottom data (piston core), drilling of wells and long-duration test when carried out in the marine environment and in the offshore transition zone.

- production, comprising well drilling activities, implementation of production and drainage systems, when carried out in the marine environment and in a land-sea transition zone (offshore);

- production, when carried out from non-conventional oil and natural gas resources, in a marine environment and in a land-sea (offshore) or onshore (onshore) transition zone, comprising well drilling, hydraulic fracturing and implantation activities production and disposal systems.

OEMAS

The State Environmental Agencies - OEMAS, in turn, are responsible for the environmental licensing of oil and natural gas exploration and production activities in the onshore environment, except for production, when carried out from unconventional oil and gas resources. according to the legislation.



MME

Exploration and Production
Rafael Bastos - rafael.bastos@mme.gov.br

Natural Gas
Symone Araújo - symone.araujo@mme.gov.br

REATE
Lucas Mota - lucas.lima@mme.gov.br

Environment
Maria Ceicilene - ceicilene.martins@mme.gov.br

ANP

Development and Production
Mariana Cavadinha - mcavadinha@anp.gov.br

Exploration
Marina Abelha - mabelha@anp.gov.br

Blocks Definition
Juliana Vieria - jrvieira@anp.gov.br

Bids
Heloisa Esteves - hesteves@anp.gov.br

Government Participations
Thiago Campos - tcampos@anp.gov.br

Technical Data
Claudio Souza - cjsouza@anp.gov.br

Safety, security and environnement
Raphael Moura - rmoura@anp.gov.br

EPE

Oil and Gas Studies
Marcos Frederico - marcos.souza@epe.gov.br
Regina - regina.fernandes@epe.gov.br

IBAMA

Environmental Licensing of Mining and Land Seismic Survey (Comip)
Ivan Benevenuto - comip.sede@ibama.gov.br

Environmental Licensing of Marine and Coastal Developments (CGMac)
Alex Garcia de Almeida - cgmac.sede@ibama.gov.br

Environmental Licensing of Exploration of O&G
Katia Adriana de Souza - coexp.rj@ibama.gov.br

Environmental Licensing of Production of O&G (Coprod)
Itagyba Alvarenga Neto - coprod.rj@ibama.gov.br

ABEMA

Brazilian Association of the State Environmental Agencies (OEMAS) - President
Germano Luiz Gomes Vieira - secretario.semad@meioambiente.mg.gov.br

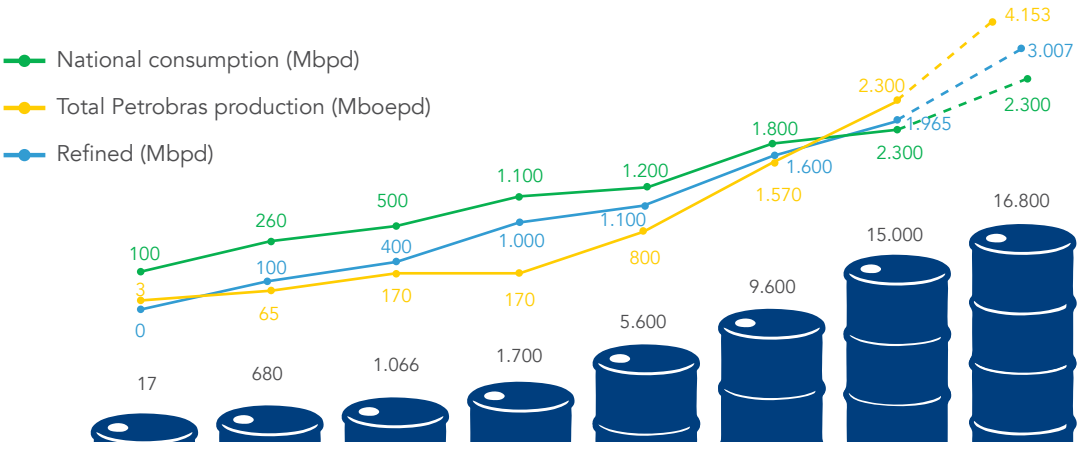
5

CHAPTER

Petrobras and its participation on the onshore market oil production

In 1940, the first commercial oil field in Brazil was discovered in the Recôncavo basin, receiving the name of the municipality in which it was discovered - Candeias (BA). The development of its production took place from 1941. Shortly after, Dom João fields were discovered in 1947 and Água Grande fields in 1951. The latter, in 1960, the year of peak production, produced 50 thousand barrels/day (in 2017, it produced more than a thousand barrels/day). Although this basin is mature, the volume of oil remaining is greater than the entire volume already extracted to date. After Petróleo Brasileiro S.A. (Petrobras) creation in 1953, Brazilian oil production has grown consistently to the present day.

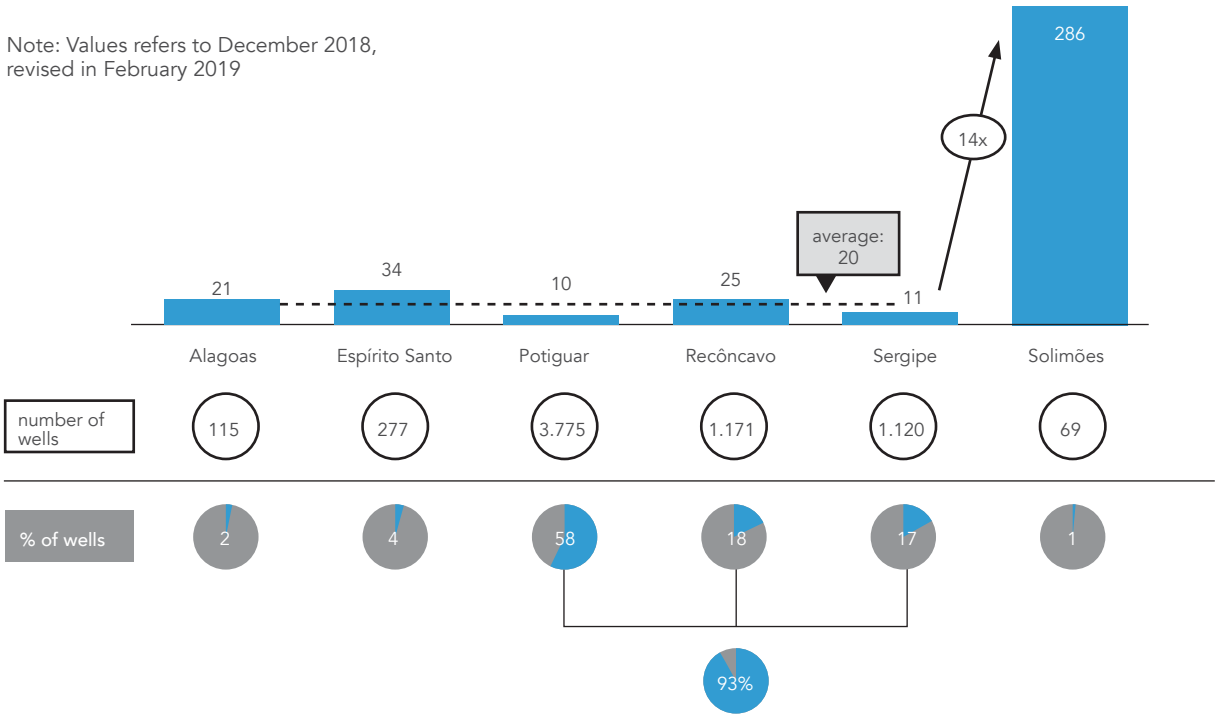
GRAPHIC 2: NATIONAL PRODUCTION, CONSUMPTION AND REFINE VOLUMES



Source: MME, 2018

Petrobras, overcoming contrary expectations at the time, discovered oil in several Brazilian onshore sedimentary basins, such as the Recôncavo, Sergipe, Alagoas, Potiguar and Solimões basins, in addition to the maritime basins, such as Espírito Santo, Campos and Santos and the pre-salt oil province.

GRAPHIC 3: AVERAGE ONSHORE OIL PRODUCTION PER WELL (BARRELS PER DAY)

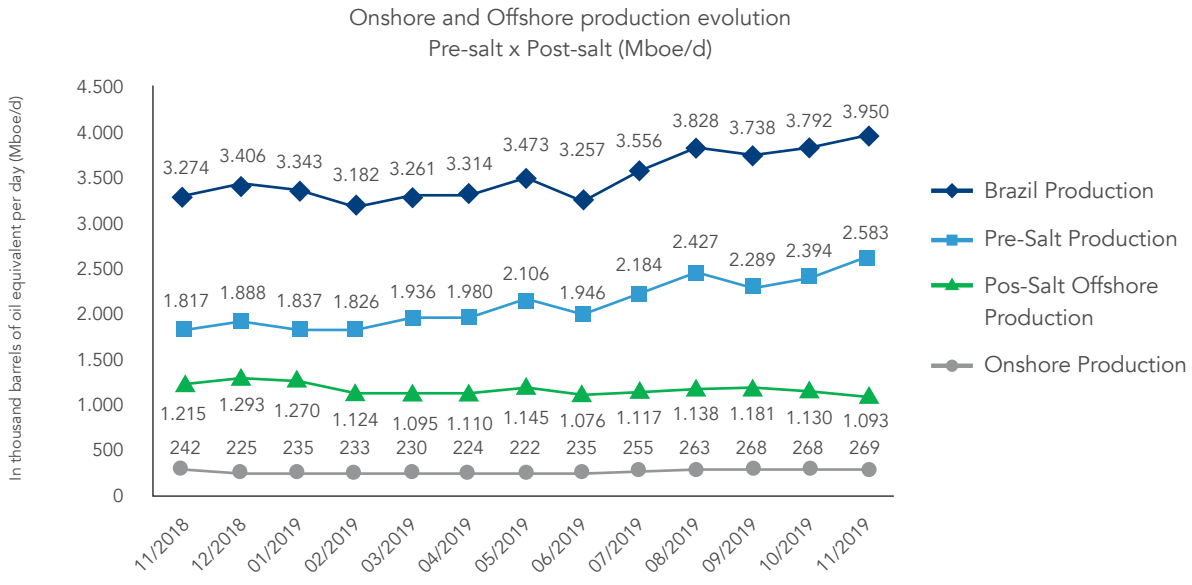


Source: IBP, 2018

After the breakdown of the oil monopoly in the late 1990s, the large foreign operators, as well as Petrobras, concentrated their efforts on exploratory investments and production in the mega-fields in ultra-deep waters, especially recently in the pre-salt. In general, it was up to smaller companies to dedicate themselves to onshore oil fields. Many bought mature onshore fields to try to revitalize them through advanced oil recovery. Still others have carried out exploratory campaigns in terrestrial basins.

Even so, investments in oil production on land, whether in new fields or in the revitalization of mature fields, were insufficient to, at least, prevent production from falling so drastically in recent years. Even so, it was only after 2003 that the absolute volume of terrestrial oil production started to decline year after year (BNDES, 2018). The fall in the price of oil in mid-2014 also contributed to the reduction of investments in recovery of production in the onshore fields (BNDES, 2018).

GRAPHIC 4: BRAZILIAN ONSHORE AND OFFSHORE PRODUCTION, 2020



Source: ANP, 2020

In 2019, Petrobras was responsible for 70% of onshore oil production. The 30% was mostly produced by 30 independent oil companies. In that year, Petrobras' land production, of 193 thousand barrels/day, represented only 5,7% of its total production. Many independent companies could acquire Petrobras' mature onshore fields and make new investments for advanced oil recovery, thus favoring a probable increase in Brazilian onshore oil production. In addition, the potential for increasing production from new exploratory campaigns in terrestrial basins is also considerable.

Operator	Onshore production 2020	Wells	Basins
Petrobras	229,000 boe/d	7000	Sergipe, Solimões, Tucano Sul, Recôncavo, Potiguar, Espírito Santo, Amazonas and Alagoas.

Source: ANP, 2020

INDEPENDENT PRODUCERS IN ONSHORE FIELDS IN BRAZIL

Independent producers are smaller companies that usually produce oil in onshore fields. In 2019, 30 operating companies produced a total of 80 thousand barrels/day. The seven most productive operators, controlling 33 fields, had a 93.9% share of this annual total, in the following order: Eneva, Potiguar, Maha Energy, Petrosynergy, Novapetroleo, Partex Brasil, Petrogal and Petro Recôncavo. The remainder, 6.1% of production, was shared by 15 other operators.

Operator	Onshore production Boe/d	Wells	Basins
Eneva	32,000	32	Amazonas and Parnaíba
Imetame	835	13	Espírito Santo, Potiguar and Recôncavo
Maha Energy	2,700	1	Recôncavo
Nova Petróleo	189	7	Recôncavo
Partex	214	25	Potiguar
Petrogal	185	3	Sergipe
PetroSynergy	421	24	Alagoas, Espírito Santo, Potiguar and Recôncavo
Phoenix Óleo e Gas	109	8	Potiguar
Potiguar E&P	5,500	245	Potiguar
Recôncavo E&P	108	7	Recôncavo

Source: ANP, 2020

After the breakdown of the oil monopoly held by Petrobras until 1997, several small and medium-sized companies began to undertake activities in the exploration and production of onshore oil activities. Many use advanced oil recovery techniques in mature and marginal fields, while others develop new production fields. It is clear that large oil companies devote most of their efforts to giant fields in ultra-deep waters, while small and medium-sized companies operate in onshore fields.

Onshore oil production has an additional importance to Brazil, as it occurs in the interior of the country, in most cases, in municipalities with low income and low human development index (HDI). Many of them rely on oil royalties in their budgets and depend on this activity so that there is a certain economic dynamism around their regions.

In order to have a proper dimension of the importance of investment in onshore production, a study prepared by the Technical Studies Management of the Industrial Development Superintendence (SDI) demonstrates that for every 10,000 barrels of oil production, 23,000 direct and indirect jobs are needed (SANTOS JR., 2018).

In 2019, the average Brazilian oil production was around 2.7 million barrels/day, of which 200 thousand barrels/day were produced in onshore fields representing only 5.7% of the total country production.

6

CHAPTER

How to become an operator on the Brazilian onshore

As explained throughout the text, several measures were taken to attract investments in the country's oil and gas onshore basins, whether by improvements in the energy policy or by regulatory advancements.

In order to be granted exploration and production rights for the Brazilian onshore companies may: (a) submit a bid in the Open Acreage Bidding Rounds; and/or (b) buy exploration rights from an existing operator and request a contract transfer.

Both for submitting bids and for acquiring E&P rights through contract transfers ANP classifies operators at the highest Qualification level possible, according to the documents each company submits. Qualification comprises the review of documentation to evidence the legal, tax, and labor compliance, the economic and financial capacity, and the technical capacity of the bidders.

Companies may be qualified as operators or non-operators, according to the criteria established in the latest available tender protocol, and shall be qualified at the following levels:

a) operator A – qualified to operate blocks located in ultra-deepwater, deepwater, shallow water, onshore and in areas with marginal accumulations;

b) operator B – qualified to operate blocks located in shallow water, onshore, and areas with marginal accumulations;

c) operator C – qualified to operate only in blocks located in shallow water, onshore, and areas with marginal accumulations;

d) operator D – qualified to operate only in blocks and areas with marginal accumulations;

e) non–operator – qualified to operate in a consortium

Therefore, onshore operators are required to achieve the minimum qualification of C (for onshore activities) or D (for onshore marginal fields).

The Open Acreage Bidding Round was created under article 4 of CNPE Resolution n. 17/2017, and it encompasses exploratory blocks and relinquished fields (or pending relinquishment), both onshore and offshore.

For all onshore basins, Decree n. 9.641/2018 delegates to ANP the competence to define blocks in terrestrial basins to be the object of bidding, and contract under the concession regime, through the Open Acreage.

In the Open Acreage Bidding Round, ANP selects blocks to study and discloses all blocks and fields under evaluation. In parallel, and in compliance with the provisions of CNPE Resolution n.17/2017, all the areas are previously analyzed for environmental viability by the competent environmental agencies. As a result of this analysis, the environmental agencies elaborate reports containing environmental guidelines and recommendations for environmental licensing, which allow the future concessionaire to include the environmental variable in its technical and economic feasibility studies of oil and natural gas E&P projects.

For all areas with favorable environmental guidelines, ANP presents the rules for participation and technical and economic requirements. Those requirements are detailed on the Tender Protocol of the Open Acreage Bidding Round (available at http://rodadas.anp.gov.br/en/open-acreage).

Periodically ANP includes new areas able to receive bids. Every new set of blocks inclusion is preceded by a Public Hearing, and all available blocs are detailed in Annex I of the Tender Protocol.

In order to participate in the Open Acreage Bidding Round, the companies shall meet all the registration requirements established in the Tender Protocol. That application is judged by the Special Bid Committee (CEL). Only one registration is required, and it is valid for the entire duration of the Open Acreage.

All registered bidders can submit a declaration of interest for any blocks or areas detailed on Annex I of the Tender Protocol, provided that it is accompanied by a bid bond. When one or more declarations submitted are approved, the CEL discloses the schedule for a cycle for submission of bids, and that cycle shall be no longer than ninety (90) days. ANP only calls for a bid submission if a registered company declares its interest.

FIGURE 1 PRESENTS SUMMARIZES THE OPEN ACREAGE BIDDING ROUND STEPS.

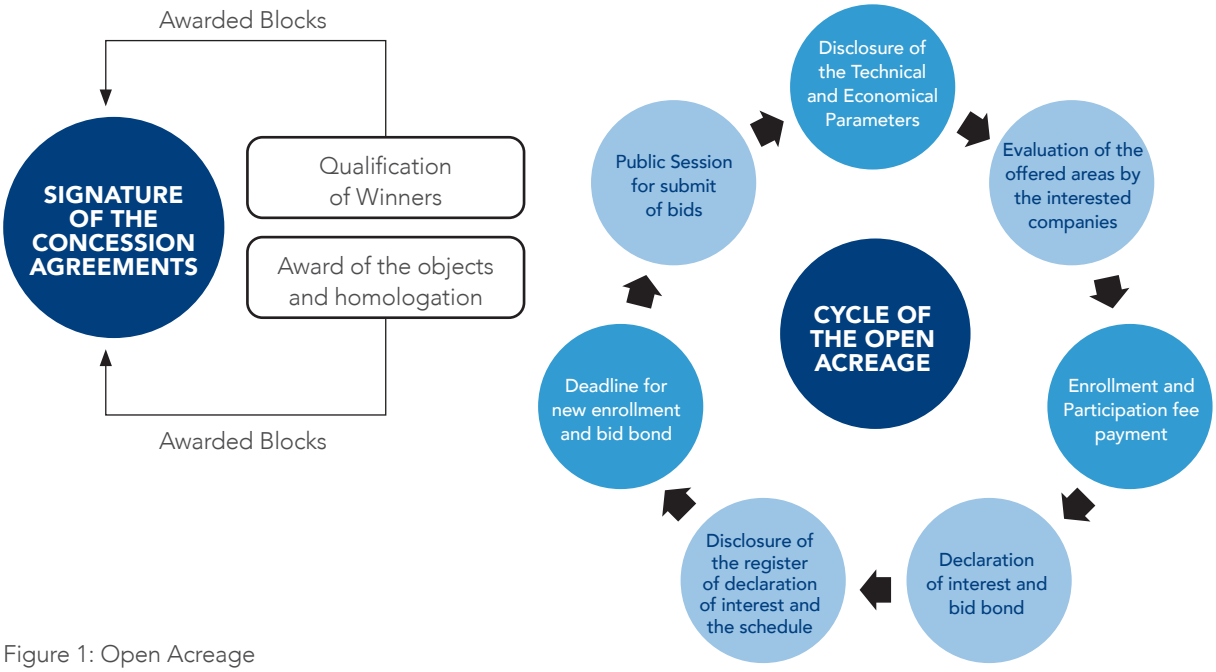


Figure 1: Open Acreage

Another option for acquiring exploration and production rights for the Brazilian onshore is to buy exploration rights from an existing contract and request a contract transfer.

Pursuant to Laws n. 9,478/1997 and n. 12,351/2010, the transfer of existing contracts, in whole or in part, is allowed, provided that: (i) the object and contractual conditions are preserved; (ii) the contract assignee meets the technical, economic, and legal requirements established by ANP, and (iii) ANP grants its prior express authorization.

Contract transfers are also expressly authorized in each concession contract. The clause regarding Contracts Transfers is included in the agreements for exploration and production of oil and gas. This clause defines the conditions to be satisfied by the assignors, assignees, and consortium members.

ANP´s approval process is regulated by ANP Ordinance n. 785/2019, and it includes not only contract transfers, but operator changes inside the consortium, and the replacement or exemption of a performance guarantee. Approval for all those situations shall be requested and detailed information on the process for contract transfers can be found on http://rodadas.anp.gov.br/en/agreements-assignment

PETROBRAS DISINVESTMENT PLAN

Since 2015, Petroleo Brasileiro S.A. (Petrobras) – Brazil's state-run oil company – has conducted an assets sale program (known as "Petrobras Divestment Plan) concentrated on E&P assets, refineries, thermoelectric plants, fertilizers and gas assets.

On September/2018, ANP approved measures to boost the renewal of onshore and shallow water activities, as a result of the Working Group created by Ordinance ANP nº 309/2018, that assessed the investments level and presented proposals to mitigate the current situation of falling production and activities in these environments. The measures were guided by the exploration & production (E&P) policies established by the National Energy Policy Council (CNPE), including maximizing of the recovery factor and encouraging competition and a greater plurality of actors. One of the measures was to officiate Petrobras to submit, within 90 days, a request for the extension of the onshore fields and shallow water contracts that were of interest, as well as indication of the areas the company was going to relinquish or transfer to new operators.

On January 2019 Petrobras announced that it intended to sell 70% of its 254 assets located in mature and shallow-water fields in the country. Most of the assets are located in Brazil's northeast region and most fields were grouped into clusters (comprising up to 30 fields)". Most of the assets sales was announced in two groups: Topazio Project (comprising 100 onshore fields) and Artic Project (comprising 30 shallow waters fields).

In line with the Brazilian Federal Count of Accounts (TCU) guidelines and current legislation, Petrobras Disinvestment follows six stages, detailed as follows:

TABLE 1: PETROBRAS DISINVESTMENT PLAN STAGES

Stage	Activities
Opportunity Disclosure (teaser)	This is when the intention of divestment is made public, and potential interested parties are invited to take part in the bidding process.
Beginning of the non-binding phase (when applicable)	Optional step, held to identify and select the participants who are really interested in the acquisition and that see greater value in the assets/companies.
Beginning of the binding phase	Step where the selection of the best offer made by the potential interested parties takes place, in order to maximize the value of sales.
Granting Exclusivity in the Negotiation (when applicable)	Optional step, which occurs when exclusivity is formally granted to a potential buyer, after the binding phase.
Transaction Approval by Senior Management (Executive Board of Directors and signing of agreements)	Step containing the signing of purchase and sale (or assignment of rights) agreements containing the conditions of the transaction, including the conditions precedent for the closing.
Closing of the Transaction	Step where the transaction is concluded with the fulfillment of the conditions precedent set forth in the agreement (including ANP´s approval).

Figure 1: Open Acreage

The current status of the disinvestment for the Onshore Clusters is presented in Table 1.

TABLE 1: STATUS OF PETROBRAS DISINVESTMET (BY CLUSTER)

	Cluster	# of fields	Environment	Disinvestment status
1	Riacho da Forquilha	30	Onshore	Concluded in July/2019
2	Macau	7	Onshore	Concluded in October/2019
3	Ponta do Mel/Redonda	2	Onshore	Concluded in October/2019
4	Lagoa Parda	3	Onshore	Concluded in December/2019
5	Tucano Sul	4	Onshore	Concluded in April/2020
6	Fazenda Belém	2	Onshore	ongoing
7	Sergipe Terra 2	1	Onshore	ongoing
8	Sergipe Terra 3	3	Onshore	ongoing
9	Miranga	9	Onshore	ongoing
10	Cricaré	27	Onshore	ongoing
11	Remanso	12	Onshore	ongoing
12	Rio Ventura	8	Onshore	ongoing
13	Recôncavo	14	Onshore	ongoing
14	Sergipe Terra 1	6	Onshore	ongoing
15	Carapanaúba/Cupiúba	2	Onshore	ongoing

7

CHAPTER

Financing sources in Brazil

BNDES SUPPORT TO THE O&G SECTOR

The aim of this chapter is to present some credit lines those investors can rely on the Brazilian financial market. The main provider of long-term credit lines in the domestic market is the Brazilian Development Bank (BNDES), whose mission is to foster sustainable development in order to create jobs and to reduce social and regional inequalities. The BNDES' support aims at implementing, modernizing or expanding undertakings of companies.

There is no doubt that the development of onshore activities in Brazil will trigger a number of opportunities in regions where Brazil needs the most. The dynamic nature of the modern onshore oil and gas sector encourages the BNDES to invest not only in large-scale projects, but also in undertakings by micro, small and medium-sized companies. As such, the Bank has made access to credit more universal, and thus contributes to fostering the advance of the economy and, consequently, to generating jobs and income.

Requests can be made directly with the BNDES or with an agent institution. However, owing to the fact that the BNDES does not have agencies, the majority of operations are carried out indirectly through a partnership with a network of accredited financial institutions located nationwide. These agents may be commercial, public or private banks, development agencies or cooperatives. In indirect operations, the Bank reallocates funds to accredited agents, which are responsible for credit analysis.

Products available for each of these two forms of support (indirect and direct modality) from BNDES are presented below.

1) INDIRECT MODALITY

a) BNDES Finame

The BNDES Finame product is used to finance the acquisition and sale of machinery, equipment, industrial systems, computer and automation goods, buses, trucks and executive aircraft. Everything must be nationally manufactured, new and accredited by BNDES. The Bank limits the financing amounts to less than or equal to US$ 35 million. Such limit is also respected per Client, for each 12-month period, counted from the date of approval of the operation by BNDES.

b) BNDES Automatic – investment projects

This is a financing line for companies, aimed at investment projects, the acquisition of assets associated with investments, the acquisition of software or working capital, whose financing amounts are less than or equal to US$ 35 million. Such limit is also respected per Client, for each 12-month period, such as BNDES Finame.

c) BNDES Small Business Credit

The BNDES Small Business Credit line offers a credit limit of up to US$ 2.5 million per beneficiary every 12 months. This line is restricted to companies with annual sales of up to US$ 20 million. There is flexibility to support items such as the acquisition of imported goods and services, asset transfers, corporate restructuring and working capital.

2) DIRECT MODALITY

a) Finem

Finem is the BNDES's standard line for financing from US$ 2.5 million for investment projects, public or private, aimed at generating and increasing productive capacity in the various sectors of the economy. The operation can be structured in the form of corporate financing or project finance.

Financeable items are such as:

- studies and projects;
- civil works;
- assemblies and installations;
- furniture and fixtures;
- training;
- pre-operating expenses;
- new national machines and equipment accredited by BNDES; and
- imported machinery and equipment without national similar.

BNDES can support the working capital associated with projects financed in this line.

b) Direct Medium Business Credit

The difference of the Medium Direct Credit line is that the client does not need to submit a project to claim credit. The project is known a posteriori, but prior to the disbursements. Resources must be allocated in the proportion of at least 60% for investments and, at most, 40% of working capital. Potential clients are companies with annual sales between US$ 10 million and US$ 250 million. The minimum amount financed is US$ 2.5 million, which will be released over up to 5 years.

Advantages compared to standard Finem: agility and flexibility

- One need not present a project, but to negotiate conditions that will be pursued by the contractor to improve the company.
- The contracted amount can be used in stages, over 5 years.
- To release each stage of the financing, compliance with the conditions agreed and established in the contract is previously verified.

c) Direct Finame

Clients who register with BNDES can obtain a pre-approved credit, which can be used for the acquisition or production of machinery and equipment accredited at BNDES, in a very quick way. The minimum credit amount is US$ 2.5 million. The line is intended for companies with annual sales exceeding US$ 20 million.

Advantages compared to standard Finem: agility and flexibility

- After execution, resources are requested and released via the Business Portal.
- Contracted credit can be used over 2 years.
- In the release order, the client defines the financed goods.
- Evidence of automated resource use, through electronic invoices.

d) Debentures: BNDES Corporate Bonds Product in public offerings

Currently, BNDES offers two forms of support through non-convertible debentures in public offerings: Corporate Debentures and Infrastructure Project Debentures.

d.1) Corporate debentures

This is the way in which BNDES operates in the market for non-convertible debentures in primary public offerings and in the negotiation of these securities in the secondary market, aiming at:

- the development of the market for corporate fixed income securities issued by nonfinancial corporations;
- the diffusion of transparent distribution and trading practices, which favor the dispersion and liquidity of securities, possibly with the participation of market makers, as well as access to the capital market by small investors and the standardization of issues; and
- meeting growth strategies of Brazilian companies, in an alternative or complementary manner to other BNDES Financing Lines.

d.2) Infrastructure project debentures

Infrastructure projects can be supported by BNDES through tax incentive non-convertible debentures, issued in public offers, under the terms of Law 12,431/2011 and with typical financing guarantees for infrastructure projects. The debentures cannot be subordinated.

Debenture issuers can be Special Purpose Entities (SPE); concessionaires, authorization holders or permit holders; or companies (holdings) that control SPEs or hold a concession, authorization or permission, operating in the following sectors: (a) logistics and transportation; (b) urban mobility; (c) energy; (d) basic sanitation.

8

CHAPTER

The onshore exploration environment: production history, production projection, new frontier and mature onshore basins potential, shale gas and tight oil expectations

Onshore Brazilian Production

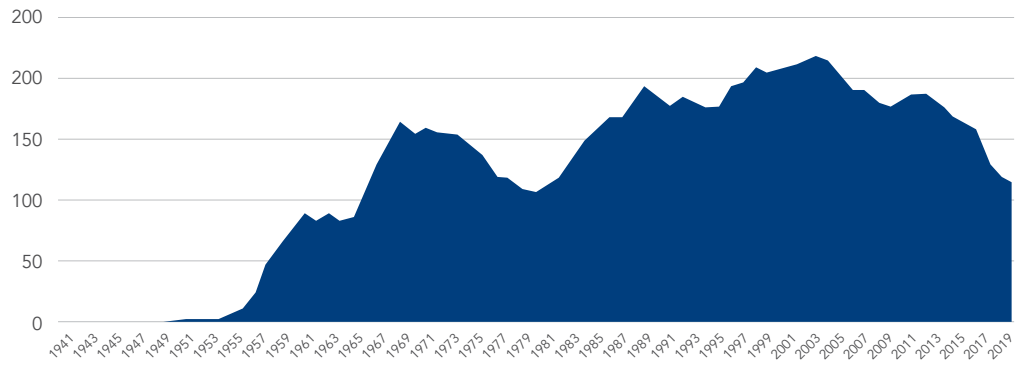
Brazil is a country of continental proportions and its onshore sedimentary basins are spread over 5 million km2. Most of that area remains unexplored and require further geological studies that help investigate the potential oil and natural gas resources.

Currently, there are 298 onshore fields, in 12 sedimentary basins. Every time there is a decision to assess a new discovery of oil or natural gas, the Consortium participant must develop a Discovery Assessment Plan (DAP) in compliance with ANP Resolution n. 30/2014, in order to confirm the commercial feasibility of the field. In 2019, in additon to the onshore fields, there were 20 new discoveries under assessment, in 5 different sedimentary basins.

Brazil has produced 3.5 billion barrels of oil from onshore basins so far, 45% of which originated in Recôncavo Basin, and 22%, in Potiguar Basin.

The commercial production of oil and natural gas in onshore sedimentary basins started in 1941, in Recôncavo Basin, in the Candeias field. In the 1970s, Brazilian production reached a peak, mainly due to Recôncavo and Sergipe basins, followed by a decrease coinciding with the start of offshore production. Onshore production then started a slow increase, reaching a peak in the 2000s, with the contribution of other basins, specially Potiguar and Solimões. Nowadays, most of the national onshore production comes from Solimões, Potiguar and Recôncavo. Graphic 7 shows the history of onshore oil production in Brazil.

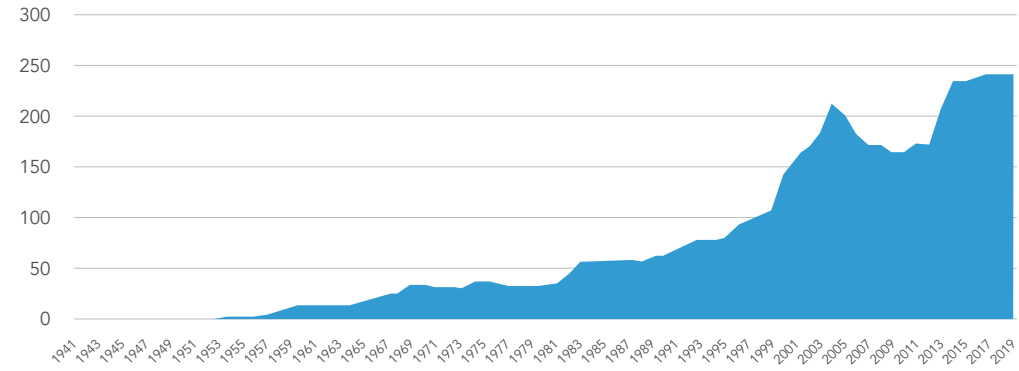
GRAPHIC 7: ONSHORE OIL PRODUCTION (THOUSAND BARRELS PER DAY)



Source: ANP (2020)

In the 1950s, the production of natural gas reached the relevant benchmark of 170 thousand m^3/day and it was consumed by the industrial sector. In 40 years of slow and steady growth, the Brazilian natural gas production increased to 116 million m^3/day. Around 78% of this amount nowadays comes from offshore associated petroleum gas. The biggest onshore producers are Solimões and Parnaíba basins. Graphic 8 shows the history of onshore natural gas production in Brazil.

GRAPHIC 8: ONSHORE NATURAL GAS PRODUCTION



Source: ANP (2020)

In 2019, onshore basins in Brazil produced around 104 thousand b/d of oil and 23 million m^3/d of natural gas, which correspond to 3.% and 18.6% of the total national production, respectively. Compared to 2018, there was a 6.5% decrease in oil and a 3.6% increase in natural gas. Even if the price points stay the same, difficulties in maintaining the oil production are expected.

It's estimated that the onshore oil production remains the same for the foreseeable future. Regarding natural gas, the onshore production may overcome 30 million m^3/d, specially if we consider the non-associated gas. The continuously low production tends to remain the same due to the lack of enhanced recovery techniques for mature onshore basins and measures focused in increasing competitiveness and attracting more investment to the segment, addressing the financial and operational specifications, which differ from the offshore segment.

Because of those market trends, the situation of oil and natural gas E&P activities in onshore sedimentary basins have been discussed in the governmental program REATE (Revitalization of Onshore Oil and Natural Gas Exploration and Production Activities). It's estimated that with the implementation of the program, market conditons allowing, we will be able to double the production of barrels of oil equivalent until 2030 (MME, 2017; 2019).

Among REATE's main actions, it's worth highlighting the Open Acreage, bidding system determined by article 4th of CNPE Resolution n. 17, 2017, contemplating the continuous offer of returned fields (or in the process of being returned) and exploratory blocks, offered in previous bidding rounds and not awarded, or returned to the agency. Later, the Decree 9641/2018 determined that ANP will define which exploratory blocks will be subject to bidding, under concession regime.

THE ONSHORE BRAZILIAN SEDIMENTARY BASINS' POTENTIAL

The potential of a sedimentary basin is determined by the amount of hydrocarbon that is likely to be accumulated in the area or prospective opportunities that might come up as a result of exploratory campaigns. Geological analyses of exploratory plays[1] define areas where hydrocarbon accumulations are expected to be found in sedimentary basins. The Law 10847, from March 15th, 2004, determines that EPE is in charge of identifying and quantifying potential energy resources. In order to accomplish that, studies have been conducted using the National Zoning of Oil and Gas Resources[2].

1. Exploratory play is a number of exploratory opportunities, with potential for hydrocarbon accumulation, genetically defined by the same geological control.
2. That study is conducted by EPE, under the supervision of MME and with the support of ANP – National Agency of Oil, Natural Gas and Biofuels – and is used as the basis for the definition of priority areas in the development and maintenance of the oil and natural gas industry in Brazil, both onshore and offshore. That also includes planning the areas for bidding rounds and the decision making process on research, projects and activities regarding basic geological surveys.

There are 25 onshore sedimentary basins with potential for hydrocarbon research in Brazil, spread over an area of 4.6 km^2 (EPE 2019), 11 of which have declared comercial reserves. Every year, production field operators must inform the total volumes[3] of oil and natural gas produced by their field in the previous year (ANP, 2014). In 2019, the onshore 1P reserves amounted to a total of 545 million barrels of oil and 70 billion m^3 of natural gas. Taking the 3P reserves into account, the numbers go over 742 million barrels and 85 billion m^3. Those numbers reach 1 billion barrels and 97 billion m^3 if we add contingent resources (potentially recoverable volumes which are not comercially viable yet) to the 3P reserves.

The total resources estimate is a result of the calculation of the total volume of fluids from the reservoirs in Brazil, following different methods according to local conditions and available information. Those methods, for instance, Analogy and Risk Assessment, are based on statistical calculations that use information with characteristics akin or similar to what is expected for the reservoir rock being assessed. Resource estimates, done by prospect postulation, based on statistical data of area and volume of previously identified resources, associated to onshore exploratory plays, besides other exploratory events (drilling wells, deposits, selected identified prospects, among others), made it possible to infer recoverable volumes between 1.5 and 5.0 billion boe in sedimentary basins. As a result, the following basins are the ones with the highest potential for oil (highest prospective[4]): Recôncavo, Sergipe, Alagoas, Solimões, Parnaíba, Potiguar and Espírito Santo-Mucuri.

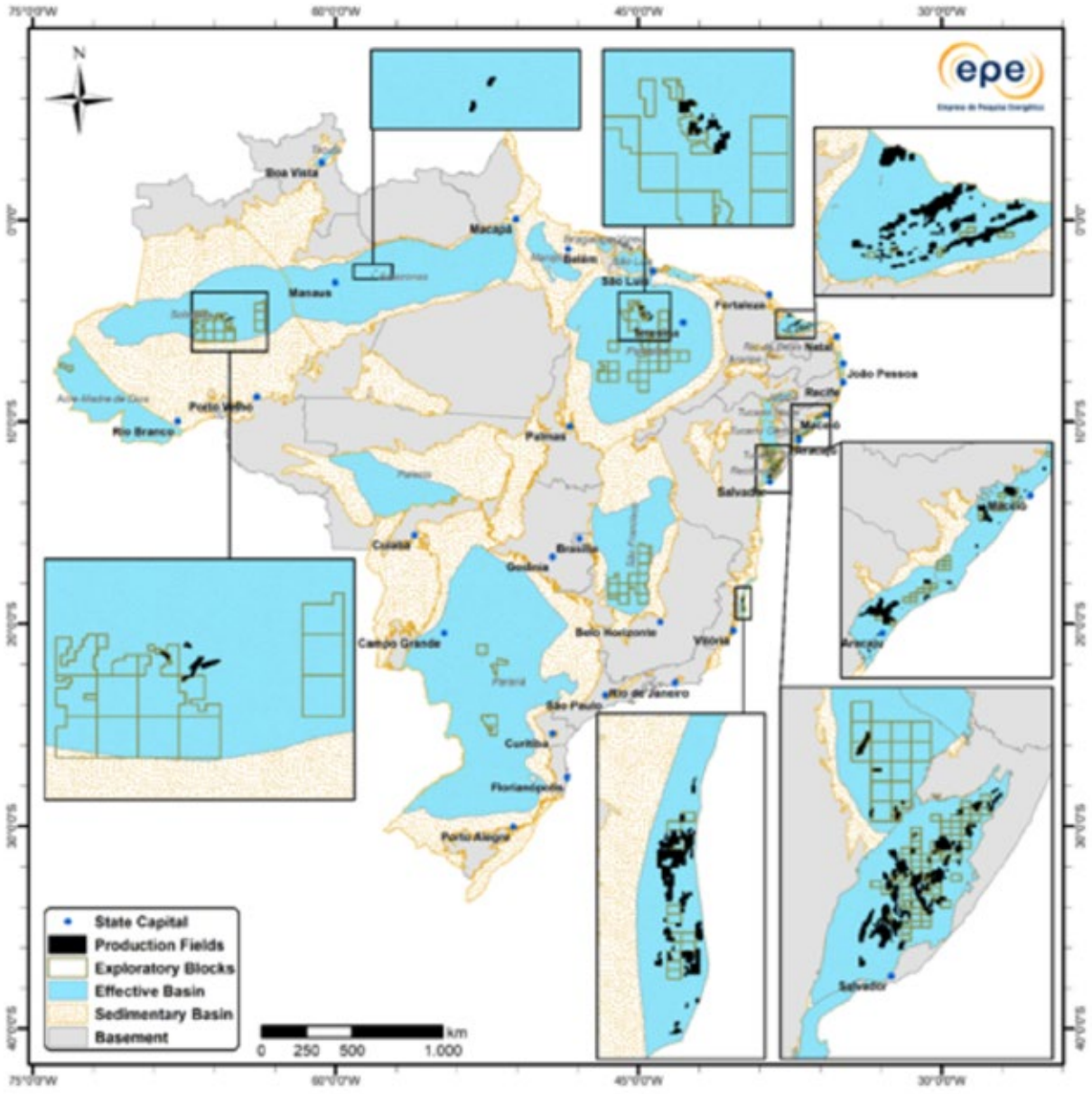
Among inland basins, the onshore areas with the highest potential for discoveries are found in Parnaíba and Solimões basins; whereas the coastal basins that stand out are Potiguar, Sergipe, Alagoas, Recôncavo and Espírito Santo-Mucuri (EPE, 2019).

The part of the sedimentary basin with potential for oil or natural gas accumulation is called Effective Basin. Outside the Effective Basin, the potential for oil of a sedimentary basin is virtually non-existent, according to the information gathered at the time of the assessment. The total area of sedimentary effective basins is around 2.5 million km^2 (EPE, 2019.) Image 3 shows the sedimentary effective basins in Brazil, the exploratory blocks and the production fields.

The sedimentary basins are classified according to their exploratory maturity, as determined by article 2 of CNPE Resolution 2, from June 25th, 2007 (CNPE, 2007), which defines areas in mature basins and in new frontier basins (in terms of geological knowledge and technological progress).

3. The criteria for estimating, classifying and categorizing Resources and Reserves must follow the guidelines from the PRMS guide (Petroleum Resources Management System).
4. The prospecting regards the petroleum potential in the areas of a sedimentary basin.

THE ONSHORE MATURE BASINS' POTENTIAL



Mature Basins are those that have already exhausted much of their oil potential. Generally, they are densely explored areas, thoroughly studied, and with great geological knowledge available. In Brazil, the terrestrial mature basins are Alagoas, Espírito Santo-Mucuri, Potiguar, Recôncavo and Sergipe. In the beginning of Brazilian exploration and production activities, between the 1940 and 1980 decades, these basins supported the national hydrocarbon production. The Brazilian mature basins' Accumulated Production reaches about 3.5 billion barrels of oil and 150 billion m^3 of natural gas.

Currently, the expectation of mature onshore basins is for small accumulation discoveries, considering that the greatest opportunities have already been discovered in the past. Mature basins also show potential for secondary and tertiary recovery of mature fields. As such, they are not the target of large oil companies, but they can represent a business opportunity for small and medium-sized companies in the oil sector. The volume of recovered resources has low potential, but the exploratory risk is smaller due to the geological knowledge of these areas. The areas can be attractive to companies looking for low-risk projects with less capital investment. Onshore Exploratory activities in mature basins, due to the geographic location and their own characteristics, promote regional development, with important socioeconomic and political consequences for the sector and the country.

THE ONSHORE NEW FRONTIER BASINS' POTENTIAL

The New Frontier Basins are geologically less known areas or with technological barriers to be overcome. Among the onshore new frontier basins recognized in Brazil, the most important areas for the oil and natural gas sector are the onshore portions of the Camamu-Almada and Barreirinhas basins, as well as Tucano Sul, Solimões, Amazonas, Parnaíba and the southern portion of São Francisco basin (EPE, 2019). Based on the probabilistic[5] basin concept, these basins have a greater chance of hydrocarbon discoveries on a regional scale (EPE, 2019). In the latest data analysis, the Solimões and Parnaíba basins are the ones with greatest prospectivity.

Most Brazilian sedimentary basins have evidence of hydrocarbon generation and migration, but these do not directly imply commercial accumulations. The exploratory potential is low to moderate for many terrestrial basins with expressive areal dimensions such as Acre-Madre de Dios, Paraná and Parecis. However, the new frontier onshore basins, in general, have high importance in "Need for Knowledge" (EPE, 2019), that is, the need to acquire geological and geophysical data, as well as the reprocessing of existing data. New geological studies, based on modern concepts and models, may give another direction to the prospect of exploratory potential

5. Probabilistic Effective Basin - part of the sedimentary basin with chances for the existence of oil or natural gas accumulations. In order to highlight the diversity of expectations regarding the existence of accumulations, the effective basin is segmented according to the overlap of the plays and subplays that comprise it, with each segment being assigned a chance at the basin level.

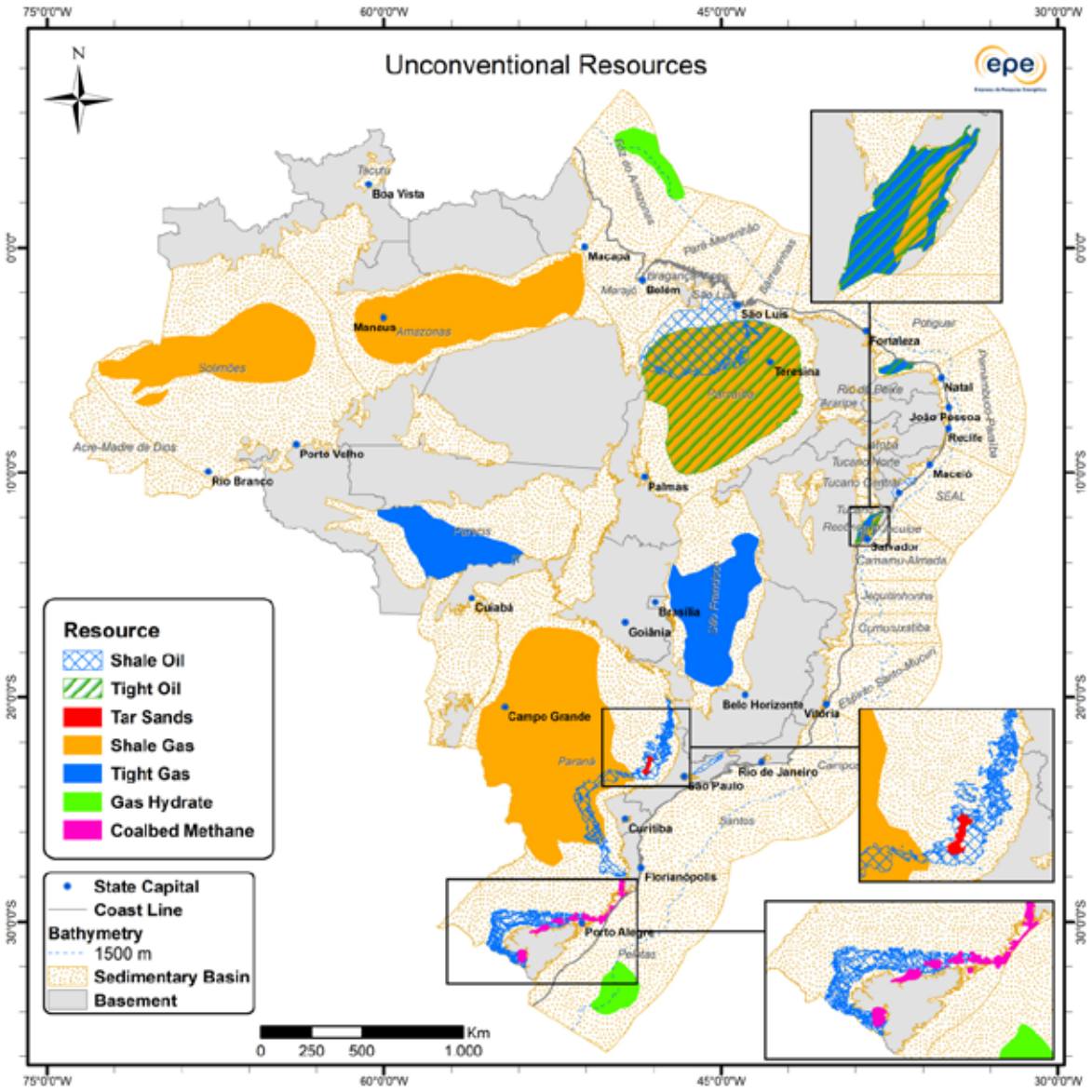
in these basins. For the exploratory frontier basins, considering the size of the sedimentary areas and the little accumulated geological knowledge, it can be said that the hydrocarbon production potential has not yet been properly dimensioned.

The basins of Amazonas, Barreirinhas (land portion), Camamu-Almada (land portion), Paraná, Parnaíba, Solimões, São Francisco and Tucano Sul are classified as producing basins, where there is already at least one accumulation discovery with declaration of commerciality. The Open Acreage model for bidding areas has been shown to be more effective in attracting companies to terrestrial exploratory frontier basins than conventional bidding rounds. In this context, the exploratory success obtained in neighboring basins and the geological correlation between many Brazilian basins are factors that help to highlight the terrestrial potential in the Open Acreage of areas. In the First Cycle of Open Acreage, in 2019, several blocks were offered in the Tucano Sul Basin in areas that do not coincide with discoveries, but the existence of production fields in the Tucano Basin and the correlation with the Recôncavo Basin express, by analogy, these blocks' potential.

In the inland areas, blocks were offered in the Parnaíba and Paraná basins. The Parnaíba Basin, with a relatively low risk of hydrocarbon discoveries, had many blocks purchased during the first cycle. This basin has a high success rate in the exploration of natural gas, as well as the presence of installed infrastructure. Although the Paraná Basin still needs a more intense exploratory campaign, it has an infrastructure network installed in proximal areas, as well as the presence of a strong consumer market and previous discoveries (such as the Barra Bonita field).

The Acre Madre de Dios, Amazonas, Rio do Peixe, São Francisco and Solimões basins can be requested in the Open Acreage in areas already available since the 5th Bidding Rounds. The Amazonas, São Francisco and Solimões basins have notifications of hydrocarbon discoveries in at least 20% of the auctioned areas. The São Francisco Basin has expectations for unconventional natural gas resources (shale and tight gas), which characterizes the motivation for expanding geological knowledge and greater investments in exploration. However, the obstacles to environmental licensing in the region are significant.

UNCONVENTIONAL RESOURCE IN BRAZIL



The potential of shale gas and oil, and tight gas resources in Brazilian basins is remarkable for the paleozoic (Paraná, Parnaíba, Amazonas and Solimões) and proterozoic basins (Parecis and São Francisco), also being relevant in the terrestrial area of the Potiguar Basin, and in the Recôncavo, São Luís, Sergipe, Alagoas and Taubaté basins (EPE, 2018b; EPE, 2019) .

A reference estimate (moderate) for the recoverable volumes of unconventional resources in Brazil, considering the horizon of the year 2050, reaches the amount of 1,384 billion m³ of natural gas. This estimate is obtained from volumetry based on statistical data compiled from international experiences (EPE, 2020). This volume is supported by the recoverable volumes expected in the onshore basins of São Francisco[6], Recôncavo, Parnaíba, Parecis, Paraná, Potiguar, Amazonas and Solimões (PROMINP / CTMA, 2016; EPE, 2020).

Despite the unconventional potential in Brazil, issues related to possible environmental impacts and hydraulic fracturing techniques have not yet made it possible to advance in the identification and effective characterization of these resources. In 2014, the ANP, based on ANP Resolution n. 14/2014, established the requirements to be met in the execution of the hydraulic fracturing technique in an unconventional reservoir, highlighting good practices in environmental management and in technical operations related to prospecting in this type of reservoir.

In the context of expanding knowledge about the potential of these resources and the impacts inherent to their production, initiatives such as the Transparent Well project, under the Program for the Revitalization of Exploration and Production Activities for Oil and Natural Gas in Terrestrial Areas (REATE), aim to promote the improvement of policies to solve obstacles to the development of E&P activities. The Transparent Well project aims to generate knowledge about the activities associated with these resources, and thus evaluate issues related to environmental licensing and impact monitoring (EPE, 2018a; EPE, 2020).

SHALE GAS AND OIL EXPECTATION

In the Amazonas Basin, the Barreirinha Formation Devonian shales occupy an area of about 338,414 km² with Total Organic Content (TOC) of 4% to 6%, a maximum depth of 2,300 m and a maximum thickness of 350 m (EPE, 2019). According to the North American agency U.S. Energy Information Administration, there are 2,832 billion m³ (100 Tcf) of unconventional gas - risked - technically recoverable (EIA, 2015).

In the Solimões Basin, the Jandiatuba Formation Devonian shales have an estimated net gas potential (not risked) of 991 to 4,955 billion m³ (35 to 175 Tcf) (HRT, 2010). EIA (2015) estimates a recoverable volume of 1,840 billion m³ (65 Tcf) of shale gas, with estimates of in place resource around 9,146 billion m³ (323 Tcf) of gas. The United States Geological Survey (USGS) in 2017 also indicated potential for shale gas in the Solimões

6. The São Francisco Basin, the only one with recent discoveries of unconventional gas, has its exploratory activities suspended due to environmental issues (EPE, 2020). Also offered in the 12th ANP bidding rounds, the Parnaíba and Recôncavo Basins have an important geological expectation for unconventional resources, as there already are accumulations and installed infrastructure for conventional production, and the Recôncavo Basin offers less geological risk as it is a mature basin.

Basin (SCHENK et al., 2017). These shales have TOC ranging from 1% to 4%, occurring up to 8%, at depths of 3,200 m and thickness of 50 m, in an area of approximately 269,327 km².

EIA (2015) indicated 800 million barrels of technically recoverable shale oil in the Barreirinha Formation of the Amazonas Basin, and 300 million barrels of shale oil, risked, for the Jandiatuba Formation of the Solimões Basin. Estimates of in place resource are of the order of 7.1 billion barrels of oil in the Jandiatuba Formation (EIA, 2015). The USGS in 2017, considers for this basin only the potential for shale gas (SCHENK et al., 2017).

In the Paraná Basin, the Irati Formation pyrobetuminous shales, on the eastern and southern edge of the basin have TOC between 1% and 5%, in deposits with an average depth and thickness of 50 m, with development through mining and retorting, by the Petrobras' Shale Industrialization (SIX) Business Unit, in the municipality of São Mateus do Sul in Paraná. Production started in 1982 in a concession area of 68 km² and daily production was approximately 3,000 barrels (ANP, 2015). The Devonian shales of the Ponta Grossa Formation, in the north-central area of the Paraná Basin are considered potential for shale gas, with TOC between 1% and 4%, 600 m thick at a depth of 3,500 m, in an area of about 640,000 km² (EPE, 2019). An estimated 12,742 billion m³ (450 Tcf) of gas, of which 2,265 billion m³ (80 Tcf) are recoverable (EIA, 2015).

In the Parnaíba Basin, shale gas it is expected to occur in the Pimenteiras Formation in an area of approximately 436,152 km² in the central region of the basin. They are deposits that reach an average depth of 2,200 m and an approximate thickness of 400 m, with TOC between 2% and 3%. The ANP announced in 2011 that the recoverable shale gas resources in the Parnaíba Basin can reach 51 billion m³ (1.81 Tcf), an estimate based on the analogy with Barnnet Shale play in Fort Worth Basin (ANP, 2015a). For shale oil it is estimated to occur in the Codó Formation in an area of approximately 146,177 km² in the northwest of the basin (EPE, 2019). These Aptian shales reach an average depth of 225 m and an approximate thickness of 50 m, with TOC ranging from 0.5% to 12% (EPE, 2019). Sharing a similar stratigraphy, the Codó Formation also occurs in the neighboring São Luís Basin, with TOC ranging from 0.5% to 12%, and deposits at an average depth and thickness of about 100 m in an approximate area of 8,974 km² (THIBES, 2016 ; EPE, 2019).

In the Recôncavo Basin, naturally fractured neocomian shales, of lacustrine origin, from the Candeias Formation (Gomo and Tauá members), are potential reservoirs for shale gas (SARZENSKI; SOUZA CRUZ, 1986 apud DAL-CERE Jr., 2012). These shales have TOC between 1% and 10%, in depths between 3,500 and 5,500 m, and thicknesses between 1,500 and 1,850 m (BONGIOLO; KALKREUTH, 2008; MATOS, 2013; MIRANDA, 2013; PESSOA, 2013). Despite occurring in an area of about 9,730 km², the shale with the greatest potential occupies an area of approximately 2,296 km², located on the flexural edge of the basin (COUTINHO, 2008).

For the Sergipe and Alagoas basins, is indicated the potential in the Barra de Itiúba, Coqueiro Seco, Muribeca and Maceió formations. EIA (2015) indicates only the Maceió Formation as potential, for pyrobetuminous shales with TOC between 2% and 6%, thickness of about 700 m in an area of 4,739 km².

The Taubaté Basin has potential for shale oil in the Tremembé Formation - Oligocene - with TOC between 1% and 5%, average depth of 400 m, thickness of about 40 m, in an area of about 2,354 km² (EPE, 2012).

TIGHT GAS AND OIL EXPECTATION

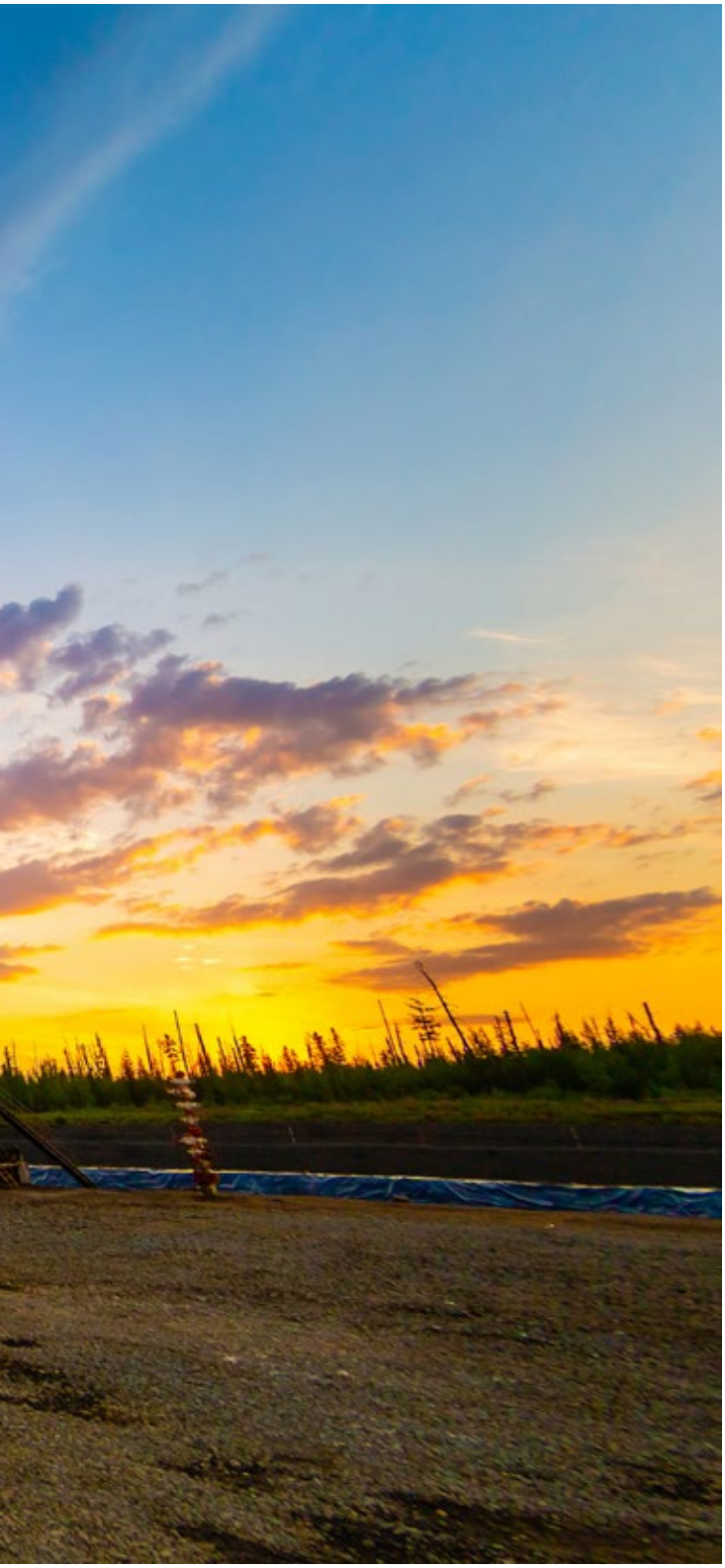
Considered an exploratory frontier basin, the occurrence of gas in tight formations is estimated in a large part of the São Francisco Basin (EPE, 2019). Being generated in the Macaúbas-Paranoá Group of neoproterozoic age and TOC between 3 and 5%, the gas is found in sandstone and carbonate reservoirs of the Macaúbas-Paranoá, Canastra and Bambuí groups, with porosities between 4 and 9% (EPE, 2019). The thickness of the reservoirs is about 400 m, in a context of moderately faulted structures, at depths of 2 to 5 km (EIA, 2015).

The Parecis Basin has scarce geologic knowledge and generated data, and it is not possible to confirm the potential for unconventional resources. The possibility of the occurrence of tight gas is adopted in an area of about 117,354 km², in the region of the Campo Novo and Salto Magessi grabens (EPE, 2019). ANP (2016) has interpreted seismic lines and, with well 2-SM-0001-MT correlation described two carbonate platforms, the first being associated with the Araras Group and the other, older, called Lower Carbonate Sequence. Both sequences would be possible reservoirs with tight formation characteristics.

In the Recôncavo Basin, tight gas and oil occur in Neocomian sandstones of the Candeias Formation, in an area of approximately 9,503 km². The generation of oil is in the shales of the Candeias Formation (Gomo Member), with TOC between 1% and 2% (peak of 10%). The tight sandstones deposits have an average depth of 3,000 m and a thickness of about 100 m, with porosity varying between 9% and 11% (EPE, 2019).

In the onshore area of the Potiguar Basin, tight Neocomian sandstones and conglomerates at the base of the Pendência Formation have been interpreted as reservoirs of gas and oil accumulation in the basin center (basin-centered oil and gas system), with an average depth of 3,400 m and a thickness of about 250 m. The few studies to characterize this type of reservoir in the Potiguar Basin have been carried out in the areas of Riacho da Forquilha, Cachoeirinha and Marizeiro (ALVES; CORSINO; REIS, 2008). The reservoirs that occur in the Apodi Graben consist of sandstones and conglomerates of low porosity (generally less than 10%) and low permeability (less than 1.0 mD[7]) deposited by gravitational flows in a lacustrine

7. Darcy, or more commonly mili-Darcy, or mD (1 Darcy = 1 x 10-12.m2), is the unit of permeability.



environment, and, some of these reservoirs produced gas in formation tests carried out by Petrobras. Generation occurs in the shale of the Pendência Formation, with TOC between 2% and 4%. The wide regional distribution (about 8,455 km²) of these reservoirs makes them important exploratory targets in the basin (EPE, 2019).

SOME CONSIDERATIONS

Brazil has highly promising petroleum potential with the expectation of discoveries of oil and natural gas in its onshore basins, mainly in those classified as New Frontier. However, it is necessary to stimulate exploratory activities. It is also necessary to revitalize activities in mature basins to increase production and the recovery factor and to encourage small and medium-sized companies.

In addition to the need to update studies of potential resources based on existing data, consideration should be given to resuming seismic surveys and potential methods, with new more affordable techniques in our onshore basins. In this context, the Open Acreage represents one of the mechanisms for the resumption of the Brazilian petroleum sector, however the maximum amount of information on the areas must be made available.

Investing in conventional and non-conventional resource extraction techniques is a great opportunity for the country, but it requires new regulations and investments.

9

CHAPTER

The REATE Program

The activity of exploration and production of oil and natural gas onshore in Brazil is taking a major step towards its consolidation in the country. For that, It was launched the federal government's Public Policy Program for Revitalization Exploration and Production Activity of Oil and Natural Gas Onshore - REATE 2020, which aims to advance the development and implementation of a national policy to strengthen the oil and natural gas exploration and production sector in terrestrial areas in Brazil.

Its purpose is to create synergies among producers, suppliers and financiers of this activity to increase the competitive of oil, and mainly, natural gas onshore, aiming a strong and competitive onshore E&P industry, with increasing production and a plurality of operators and goods and services suppliers.

Its great differential is the establishment of an unprecedented synergistic forum between Governments, producers, suppliers, financiers, research institutions, academia and civil society to increase the competitive exploration and production of oil and natural gas on land. In 2018, the program, in its first edition, registered important advances as a result of the actions contained in the Strategic Planning of the Ministry of Mines and Energy from Brazil, namely:

- Implementation of the Open Acreage Bid system for exploratory blocks and marginal fields by the National Agency of Petroleum, Natural Gas and Biofuels - ANP;
- Adequacy of royalties from new contracts to environments with high exploratory risk and low oil potential, related to mature basins and new frontiers;

- Simplification of contractual requirements for reservoirs of low materiality, relating to measurement, for example;

- Creation of terrestrial E&P coordination at ANP in order to facilitate communication and solve problems related to regulation.

In this context, the new "REATE 2020" complements the advances made by the previous version and opens important perspectives:

- Potential for oil and gas production in at least 14 states of the Federation - Alagoas, Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Piauí, Rio Grande do Norte, Santa Catarina and Sergipe.

- A goal of doubling production in 10 years, with gas growing at a faster rate than oil - production by 2030, at least, will double, from the level of 270 thousand barrels of oil equivalent per day, to 500 thousand barrels daily oil equivalent. As a result of the synergy between the "Reate 2020" programs and the "New Gas Market", we will move from a level of onshore natural gas production of 25 million cubic meters per day, to more than 50 million.

- Job creation - considering the goal of producing by 2030, 500,000 barrels of oil equivalent (boe) per day, we estimate the generation of hundreds of thousands of direct, indirect and income effect.

To achieve these objectives, the program was modeled on four action fronts with their respective objectives, namely:

1. Regulation and technological innovation - making the industry permanently open to technological advances and improve the management of regulation to the terrestrial environment, seeking simplification and agility.

   It is necessary to emphasize the need to constantly be reassessing the regulatory framework in order to protected the interests of society, facilitate and encourage the exploitation of assets of marginal economy, predominant characteristic of the Brazilian onshore, whereas its production volume and potential risks for the environment are generally smaller than those found in offshore assets, especially with regard to simplification, reducing bureaucracy, and reducing procedural processing times.

   Among the topics dealt with, the issue of environmental licensing stands out, a subject that will be addressed by the Committee for the revitalization of terrestrial areas created by the National Council for Energy Policy - CNPE. The objective is the elaboration of measures to enhance the agility propositions, efficacy, safety and predictability to the environmental licensing, in order to make more rational processing times of permits, especially those considered routine, and suggests standard methods aimed at harmonizing procedures environmental licensing.

Nevertheless, the possibility of using Research, Development and Innovation funds will be explored to create programs to support scientific and technological research applied to the oil and natural gas industry linked to onshore areas, including pilot projects. As well as study of the use of sectoral funds of funds and credit facilities to encourage increased recovery factor in the Brazilian onshore and introduce efficiencies in production processes. These measures are aimed at increasing efficiency and profitability in production and marketing through new technologies and new products.

2. Encouraging the Multiplication of O&G and Supply Companies - to support the creation and implementation of an integrated organization with the objective of facilitating adequate dialogue between economic agents in the O&G chain with policy makers and executors, attracting companies from exploration and production and providers of goods and services, as well as encourage the emergence of national companies including startups and encourage the attraction of foreign investments.

   Unlike the others, this front is coordinated by market agents with the purpose of promoting the development of the onshore environment in Brazil, which currently needs public development policies, seeking opportunities to transform the competitive and plural environment.

3. Potential for O&G - making feasible, identifying, and monetizing the potential for large-scale oil and natural gas production, including unconventional resources.

   The proposal is to identify the technical, economic and market potential of Brazilian terrestrial basins with government institutions, academia and sector agents who have knowledge about sedimentary basins, with the aim of organizing a set of data on the potential of oil and gas , including unconventional resources and natural gas storage, in addition to presenting technological solutions for the production of gas, promoting the reduction of information asymmetry.

   Regarding the opportunities and challenges in relation to unconventional oil and gas, the pilot project for unconventional resources in low permeability reservoirs called Transparent Well was classified as a national priority project by Presidency of the Republic for environmental licensing and enforcement purposes. The goal is to produce knowledge about the feasibility of using fracking technique in low permeability reservoir in safe conditions for the environment and to human health, and then to be used as a basis for the establishment of a regulatory framework that will bring technical security, environmental and legal.

   On the same subject, a communication plan will be developed with national coverage in order to clarify and demystify the stimulation in low permeability reservoirs to society.

4. Promotion of competition and competitiveness - formulation of possible measures and actions that encourage competitive practices, especially in the commercialization of oil.

   This theme will be addressed by the Committee created by CNPE, in which measures to promote competition in the sale of oil and gas in onshore fields will be studied, in particular to check existing barriers or limits for the sale of oil by agents and to analyze the adequacy and viability of performance of these agents in the commercialization of low volumes, aiming at improving the business environment.

   Nevertheless, it will be studied proposals aimed at progress in governance, transparency, and predictability of the divestment process of the dominant agent; to study the feasibility of creating an electronic oil and gas trading system in the downstream and models that provide commercialization at competitive prices; and the study of financing via debentures encouraged small producers.

   In order to achieve the program, a committee was constituted, through a resolution of the National Energy Policy Council - CNPE, to deal with themes and issues that require greater dialogue and articulation to be addressed, always aiming at measures to improve conditions for market and to increase the attraction of small and medium-sized companies in onshore oil and natural gas activities.

Such themes make up a robust Action Plan, through which measures are sought to implement:

- Increase the efficiency of environmental licensing;
- Improve guidelines in energy policies and regulatory measures for onshore activities in their value and production chains;
- Improve the rationality of licensing the production of unconventional resources;
- Run the project transparent well in low permeability reservoir;
- Form elements that promote the expansion of competition and improvement of the business environment in the exploration industry and production of oil and natural gas in the ground segment;
- Map the volumetric potential of conventional and unconventional onshore oil and gas, as well as cost and infrastructure analysis for production.

The expected result of the REATE 2020 program is considered to be in line with the guidelines of the national E&P policy for oil and natural gas. In addition, the impacts of the activity will attract investments to the onshore oil sector and the development of our reserves, generating employment, income and a strong and competitive onshore E&P industry, with increasing production and a plurality of operators and suppliers of goods and services.

10

CHAPTER

Supply chain for the main equipments

Over the years, E&P investments in Brazil have been heavily shifted to our maritime horizon. The large oil reservoirs off the coast, with a high attractiveness for the companies' activities, enabled the construction of this scenario, but do not prevent the development of onshore areas.

The new winds, which blow towards the earth, with the undertaking of actions to make feasible the activity in the interior of the country, stimulate the market with a new potential of demand, which due to this conditions, could be much more local.

This reflects in a highly motivating factor towards a new virtuous cycle of diversification of this segment, by intensifying the internalization of the multiplier effects for the local society, adding value at the entire value chain that can be encouraged.

This new chain began with the implementation of a Calendar of Bidding Round for Exploratory Blocks and with the Open Acreage of Areas, which had the First Cycle completed with an auction in September 2019. The result was 45 auctioned areas between exploratory blocks and areas with marginal accumulations, of which only 3 areas were in the offshore. It implies that 97% of the total guaranteed investments - US$ 312 million - will be destined to onshore blocks (ANP, 2019).

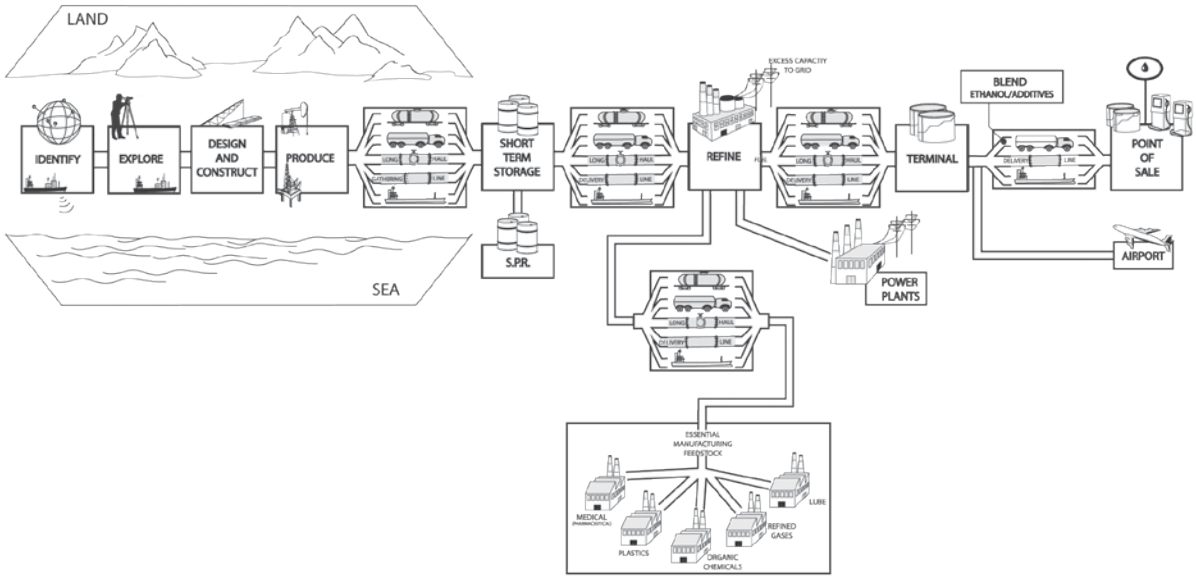
Actions mark a new beginning and bring the expected predictability for all agents, which adds to the possibility of investments in Brazil. In addition, while investors have had the opportunity to plan and elaborate strategies in the search for new market horizons, the country has been more receptive to the demands of the industry environment. That is why the various

programs implemented by the Government were highly opportune, among them, the greater emphasis on the O&G onshore segment, we highlight the REATE Program.

In turn, by boosting E&P activities across the country, including onshore and offshore, we boost the demand that comes as a result, in flow activities, distribution, commercialization, among others, which are supported through an extensive production chain, available in Brazil and abroad.

The Figure 2 shows the production chain sequence, from the exploration to final sale.

FIGURE 2: SUPPLY CHAIN



Source: http://www.energyinfrastructure.org/energy-101/oil-supply-chain

The entry of new operators in the Market, happened with the First Cycle of the Open Acreage, with 10 new players. That brings to the Market not only new investments, but the possibility to increase employments and income using the new job opportunities throughout the supply chain.

This is because the Operators in Brazil and worldwide, use a large and diversify group of suppliers. That means, suppliers companies directly and indirectly related, including of small and medium sizes, will have new markets to sale their products.

In the specific case of exploration and production in onshore areas, significant investments in seismic, drilling wells, production facilities and units of pumping and transfer of produced fluids are necessary.

Diversification among suppliers is really important, since alongside large multinationals of high added value and often technological goods and services, a large number of small and medium-sized companies gravitate in numerous activities through its supply chain. The lack of efficiency in the chain, in either of its links, results in higher costs for operators and decreasing attractiveness of projects.

In general, products and services related to onshore exploration and production activities can be separated by types of suppliers, considering here the highest incidence (Table 5).

TABLE5: PRODUCTS AND SERVICES X TYPE OF COMPANY

TYPE OF COMPANY	PRODUCTS AND SERVICES
Multinationals	Bottom hole Assembly Artificial Lift Equipment Logging Well Stimulation Drilling Fluids
Multinationals and Large suppliers	Casing Tubes Conduction lines Casing accessories API Valve Drilling Data acquisition
Large and Medium Suppliers	Pumps Compressors Cement and Additives Restoration
Local Suppliers	Chemicals and Reagents Sonolog Operations/ Acoustic Survey Machine shop Pipe shop Laboratory Services

Source: ONIP

Often, the large operators are able to meet part of their own demand for goods and Services, while smaller operators use the services of specialized companies.

Regarding the main equipment in the segment, the highlights are in the table 6 and companies often buy together the installation and maintenance services.

TABLE6: MAIN EQUIPMENT

Main Equipment	Well Coating Drill Bit Production Pipe packers Wellhead Christmas Tree Sucker-rod pumping units Sucker rod Bottom-hole pump manifolds Valves and pipes fittings Pumps and Compressors Pressure Vessels Heat Exchanger Storage Tank Measuring Instrument

Source: ONIP

These indicated items, together with the services described, will be strongly demanded with the increase of onshore activities in the country, but other services, such as logistics, food, work safety, meeting legal demands, for example, will also be impacted and are extremely important for the projects.

With the increase in activities and, based on the available natural resources, Brazil has the capabilities to make them a true legacy for the country. A targeted action, with a systemic eye, for the permanent attraction of investments in exploration, production and flow of production is part of the requirement for maintaining increasingly more qualified and competitive suppliers.

Thus, it is fundamental that our actions are directed at a systemic level, so that we can continue to work towards the attraction of investments for E&P and how to increase the participation our suppliers in it. Coordinated and joint actions are also neces-

sary for advances in infrastructure, which should be shared to promote onshore development.

ONIP

The National Organization of the Petroleum Industry, is committed to promoting interaction between institutions and governments, in order to guarantee e effectiveness in the implementation of an industrial policy focused on the O&G market development.

With a focus on increasing the productivity and competitiveness of the entire Brazilian industry, we have defined a permanent strategy to stimulate the technological potential and insertion of the development culture aimed at global market access.

An example of structuring action is the realization of the Virtuos Circuit: best practices event, meeting between plaintiff and suppliers of the market and field visits of several industrial parks.

Other two actions, that ONIP is committed since its foundation, are the Business Rounds, where buyers meet suppliers and the International Missions, where ONIP organize visits to fairs and industrial facilities, expanding business opportunities.

We also identify the installed capacity to meet the demands that are to come, bringing the reality of the corporate environment closer to daily business. And so, it is ONIP's duty today to be at the forefront in the articulation among all stakeholders, contributing to the interplay between productive chains, sectorial organized spaces, representative class associations and political leaderships.

We understand that only together, with synergy, we will move forward. An environment of permanent discussion between the main players of this market is fundamental, in which the exhibition of different visions materializes as a healthy and innovative practice, but always having as understanding that at the of the day it must converge in favor of Brazil. And, we will only achieve if we continue working together.

The moment is always challenging. We are here together, at the same time. It's time to add, to remain working and to trust.

11

CHAPTER

Business risks and opportunities

ABPIP - Brazilian Association of Independent Producers of Petroleum and Natural Gas was invited to contribute, with this chapter, to the document entitled "Doing Business in Brazilian Onshore Environment", compiled by the MME (Ministry of Mines and Energy) under the coordination of FGV ENERGIA (Center of Energy Studies of Getúlio Vargas Foundation). For the opportunity, we are very honored. Our institution has, for over a decade, represented independent oil producers in Brazil, always acting for the development of the onshore segment - and, more recently, the shallow waters segment as well - of the O&G industry in Brazil.

By leading and joining efforts with several other institutions that, over the years, have worked alongside us, ABPIP is recognized by the market as the association that best represents the business vision of operators in the Brazilian Onshore E&P market.

ABPIP's membership is endowed with opportunities for operating companies (effective partners), companies interested in being operators in the national market (aspiring partners) and suppliers (supplier partners), which allows us to encompass a wide range of the sector.

Taking our mission and this vision into consideration, we have aimed at the creation of a sustainable market with multiple agents and that generates wealth for the country.

See more about ABPIP at www.abpip.org.br

BUSINESS OPPORTUNITIES

Throughout this booklet the reader has had contact with valuable and important information about the Brazilian onshore environment. In this piece, the possibilities of access to the Brazilian onshore market and the main national basins have already been presented and, now, we intend to give you a broader and historical perspective that justifies why Brazil has such a significant stock of opportunities on its onshore.

We will show how the structure currently existing in onshore fields can become a significant source of opportunities for investors, including small and medium-sized ones. In fact, the current onshore framework has been built over decades needs investments to deliver society to its full economic potential, a situation in which everyone will benefit.

Upon a brief study of the history of the O&G sector in Brazil, it is clear that our country could have taken two important measures to leverage O&G exploration and production in terrestrial fields. The first measure would be the enhancement of natural gas as a relevant component of energy matrix; the second measure, and the other hand, would be to increase the investments in the onshore production and exploration of oil and natural gas. In the 1970s, due to limited funds to invest in different exploratory environments in Brazil, Petrobras, the only operator in the country at the time, opted to prioritize the activities in the Campos Basin. This course of action, slowly and discretely, drained human and material resources from the onshore to the offshore areas. Thus, as the country was experiencing the era of state monopoly on exploration and production, it cannot have access to the important foreign investments that would complement our energy matrix based on the model that the whole world currently uses.

In the figure 3, a table displays a customized Brazilian model of the P&G sector that the oil law tried to achieve.

FIGURE 3: OIL AND GAS BRAZILIAN MARKET MODEL

OIL & GAS BRAZILIAN MARKET MODEL
A BIG STATE COMPANY - PETROBRAS Focus: Big and strategic projects
BIG PRIVATE COMPANIES Focus: Dilute exploratories risks with state company
SMALL AND MEDIUM COMPANIES Focus: Low complexity and risk projects

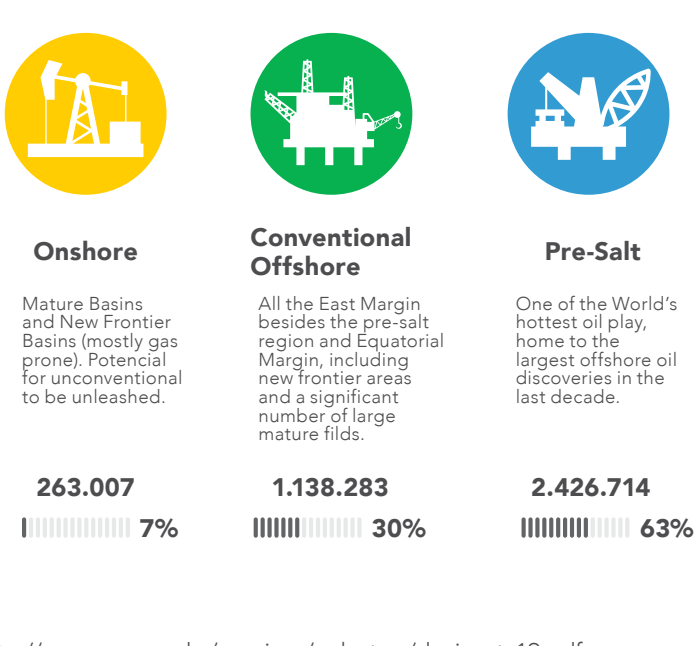
Only when the 1997 oil law came into force that other economic agents were attracted the Brazilian oil sector. In this context, new investors were also sought to enter onshore O&G sector, through the acquisition of exploratory blocks.

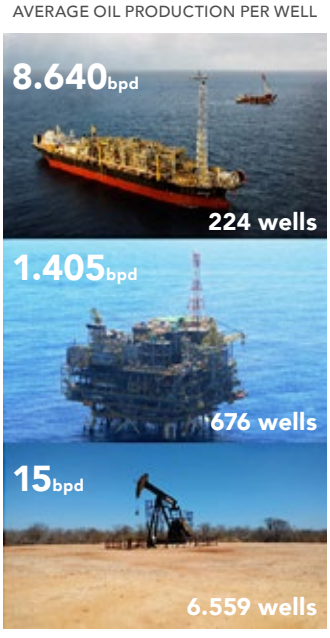
Recently, the pre-salt layer and the switch from the concession regime to the sharing regime demanded attention and mobilization from authorities during almost a decade, has once more draining resources that could be used in the development of the onshore sector.

This record caused only 7% of Brazil's proven reserves to be in onshore areas. This low percentage, despite the continental dimensions of our country, explains in part why, historically, Brazilian onshore fields and, consequently, their production have always been underexplored. Comparative data with other Latin American countries, collected by the ANP, shows that Brazil, despite having the largest geographical area, has smaller onshore production and reserves than most South American producers (Colombia, Argentina, Bolivia, Ecuador and Peru).

In the scope of internal affairs, we can see in the Diagram 1 (prepared by the ANP) the onshore numbers compared to offshore, both conventional and pre-salt exploration.

DIAGRAM 1: THREE DIFFERENT E&P ENVIRONMENTS





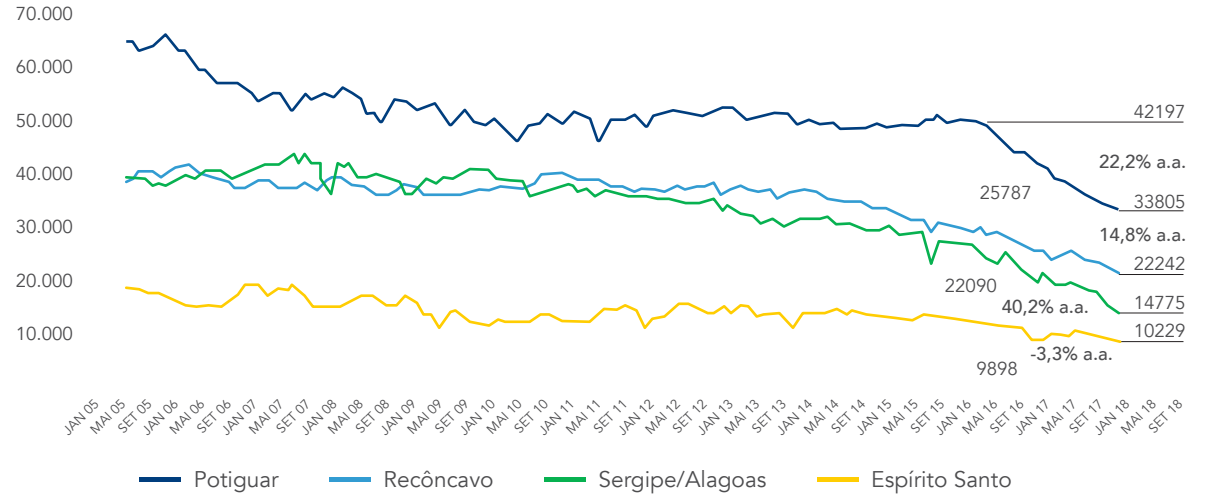
http://www.anp.gov.br/arquivos/palestras/decio-otc19.pdf

For all these reasons, a combination of three factors from these years of monopoly, transforms the Brazilian onshore industry into a source of potential and very significant opportunities:

- One of the largest areas in sedimentary basins in the world, with
- One of the worst rates of exploratory activity in the world (around 5%) and
- The share of sedimentary basins that are explored active has a low recovery factor index (21%) when compared to other countries. Norway, for example, has fields with up to 67% recovery and the world average is 35%.

In addition, Petrobras operated fields, which correspond to more than 93% of Brazilian onshore fields (2019), have had a sharp decline due to the low investments in recent years in these fields. The production data that we present below shows that the annual decline has been quite robust in the last 12 months. It is certain that the only basin that had a slight increase in production was the Espirito Santo basin, with its offshore production partly supplementing the decline of land fields.

GRAPHIC 9: PRODUCTION DATA ONSHORE MAIN BASINS



Source: ANP, 2018

However, this sharp loss can be quickly recovered with low investment, opening up opportunities for companies interested in onshore assets. To demonstrate its potential, ABPIP made a simulation of how much onshore fields operated by Petrobras in the Reconcavo, Sergipe / Alagoas, Potiguar and Espirito Santo basins, would grow were they managed by independent companies. We applied the production growth rate of fields operated by these companies to the real production curve of Petrobras' fields. In this rough and simplified estimate, we calculated these four basins would have a growth of more than 300%, reaching about 260,000 bpd.

On the other hand, the MME itself has, in our view, rather conservative estimates that the Onshore has the potential to produce up to 500,000 bpd in 10 years, which would be practically five times its current production.

To prove this is indeed possible, we have examples of good performance from independent producers, our associates, who already operate and also make revitalization as well as new discoveries on inland areas.

Therefore, with a greater investment in onshore fields and subsequent growth in production, we will have affected the entire production chain and positively impacted the demand for supplies of goods and services.

Another relevant aspect regarding opportunities for input suppliers is the pent-up demand for decommissioning wells and production facilities. We have a very low well abandonment history though wells will inexorably have to be abandoned soon. It is estimated that there are about 12,000 wells that will require at least 36,000 production rig days in addition to other essential inputs for decommissioning.

RISKS

Although Onshore activities have existed in the country for over 80 years – in fact, it's how Brazil began its efforts to produce oil, as we mentioned in this chapter, only in 1997 we started preparing for the entry of independent companies, which only happens in 2000, so this can still be considered a new market.

Therefore, it takes governmental effort to mitigate the risks of onshore projects in Brazil and efforts to resolve these bottlenecks. It was for this purpose that the REATE initiative emerged, whose actions and scope have already been widely discussed throughout this document.

Briefly, we have 3 majors challenges that we will now address:

OIL'S COMMERCIALIZATION

Currently, Petrobras has a control, in fact, of refineries in Brazil, and this condition gives it commercial advantages in the purchase of private oil production. Hence, this will be a great challenge for REATE because the decision to sell

some of Petrobras' refineries to the private sector, in isolation, will not be a solution to this problem. As Brazil has continental dimensions to transport crude oil by truck for thousands of kilometers to a refinery is not economically viable, if there is another one just a few kilometers away.

Until our midstream market has matured, we have been working so that, at least, the minimum price used in the oil auctions mediated by the ANP would be the same used for calculating royalties in fashion that is similar to the successful biofuel program.

ENVIRONMENTAL LICENSING

Before any productive activity starts, an environmental license for the project is needed. In principle, in the onshore activity in Brazil, licensing is responsibility assigned to each State (except some sensible areas), which, despite being governed by principles of federal law, have specific and distinct local laws.

This subject, being previously discussed on REATE, will require a lot of coordination from MME to be successful in its resolution.

ABPIP has already presented its proposal for the use of the Simplified Adhesion License (LAS), which is actually a self-license, provided in federal legislation and which we expect to be used soon in the country for oil activity.

REGULATION IMPROVEMENT

This, in our view, is the most laborious challenge but perhaps the easiest to implement because it depends on a single public entity, which is the ANP.

The ANP implemented important changes in Brazilian regulation for the oil and gas sector, but which need to be adapted to the size of onshore operations, since the same requirements are made for projects that are much bigger, such as pre-salt.

Therefore, this is equal treatment for unequal situations, which needs to be adjusted.

A point of concern is the agency's ability to respond to these demands because by legal determination, regulatory reviews are long procedures, which will certainly take lots of time until all is adjusted.

Nowadays, the good news regarding the management of these changes is that public agents, both in top management and in the workforce, as well as technicians involved in this effort to address this as society cries out for this to a quick solution.

These initiatives under the realm of REATE have a high structural impact and the country needs to face the difficulties of each of them while considering urgent solutions.

ABPIP has always argued that onshore assets should be the subjects of a government strategy that maximizes their historically underutilized socio-economic potential.

Finally, we reiterate our optimism, believing and defending that the economic logic prevails to optimize the exploration and development of Brazilian onshore basins with a plural market consisting of companies of different sizes and expertise, coexisting and complementing the architecture of the national P&G market.

"Onshore is beautiful"

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