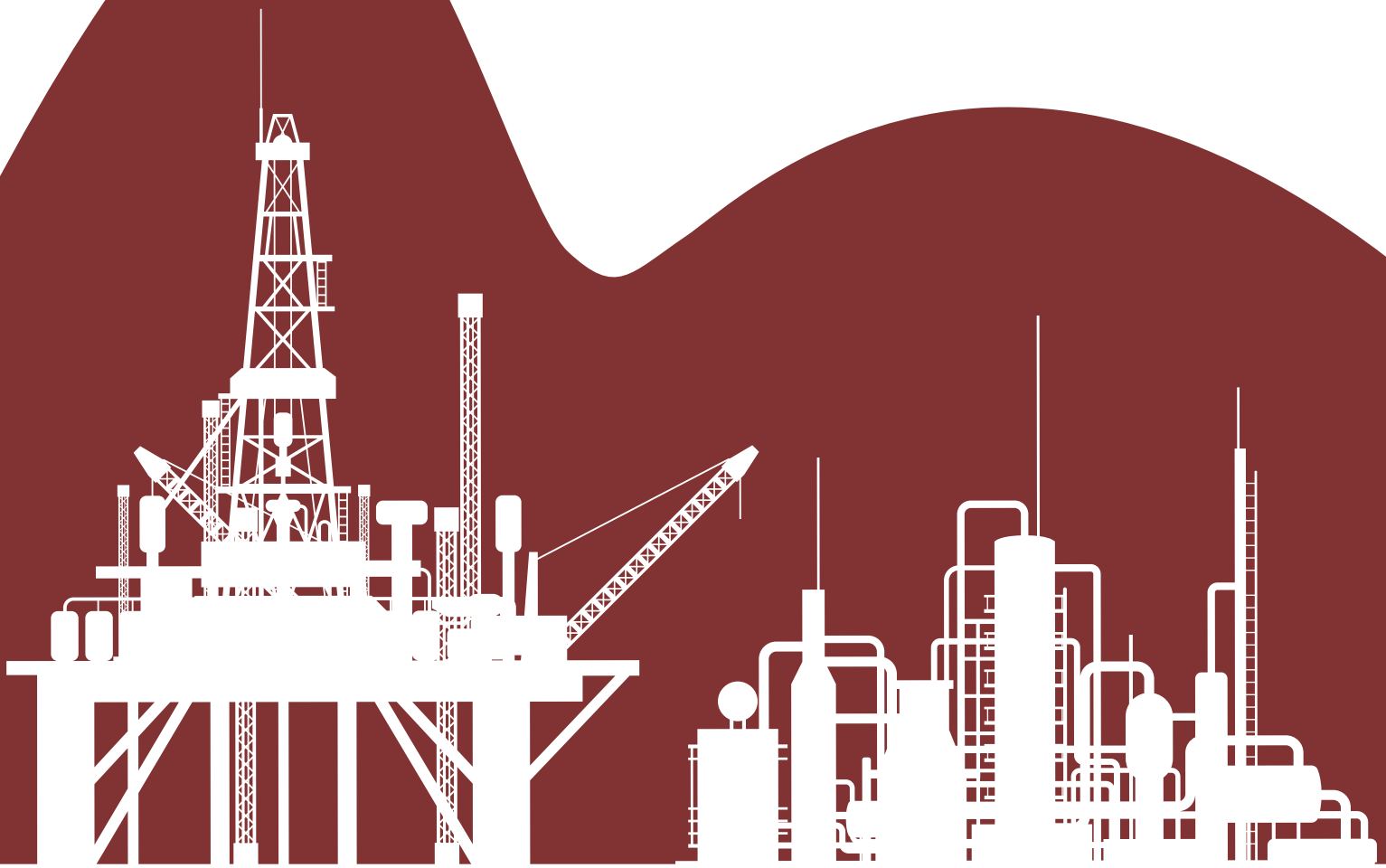


RIO DE JANEIRO OIL INDUSTRY YEARBOOK

OVERVIEW 2017

EXECUTIVE
SUMMARY



www.firjan.com.br

Sistema
FIRJAN



INFORMING, FORMING, TRANSFORMING.

SISTEMA FIRJAN

Federation of the Industries of the State of Rio de Janeiro

President

Eduardo Eugenio Gouvêa Vieira

Executive Vice President

Ricardo Carvalho Maia

Superintendent of SESI-RJ / Regional Director of SENAI-RJ / Superintendent of IEL-RJ / Executive Director of Operations

Alexandre dos Reis

Oil and Gas Business Council

President: Armando Guedes Coelho

Vice President: Raul Eduardo David de Sanson

Relations with Associates Executive Board

Director: Ricardo Carvalho Maia

Oil, Gas and Maritime Management

Manager: Karine Barbalho Fragoso de Sequeira

Technical team

Fernando Luiz Ruschel Montera

Heber Silva Bispo

Itamar Alves dos Santos Junior

Iva Xavier da Silva

Renata van der Haagen Henriques de Abreu

Thiago Valejo Rodrigues

Support

Anderson Jalles de Meneses Vieira

Bruno Ladeira Andrade

Gustavo Silva Loureiro

Rafael Marques Guazelli

Verônica França Pereira

Vinicius Santos Ramos

Internal Collaboration

Relations with Associates Executive Board / Enterprise Support General Management / Research and Statistics

Management: Tatiana d'Aboim Inglez Sanchez

FIRJAN International: Thiago Pacheco Ramos

External Collaboration

- Brazilian National Agency of Petroleum, Natural Gas and Biofuels - ANP: Décio Oddone
- Brazilian Association of E&P Service Companies - ABESPetro: Telmo Ghiorzi
- Brazilian Petroleum, Gas and Biofuels Institute - IBP: Milton Costa Filho
- Economics Institute of the Federal University of Rio de Janeiro - IE/UFRJ: Adilson de Oliveira
- Ministry of Industry, Foreign Trade and Services - MDIC: Marcos Pereira
- Ministry of Mines and Energy - MME : Márcio Félix
- Brazil's National Organization of the Petroleum Industry - ONIP: Bruno Musso
- Petróleo Brasil S.A. - Petrobras: Solange Guedes

Communication General Management

Manager: Daniela Araújo Lins Teixeira

Marketing Communication Management

Manager: Ingrid Buckmann Cardoso de Mello

Technical Team

Fabiana M. de Barros

Patrícia Mendonça Lima

Contact

fmontera@firjan.com.br

EDITORIAL

We believe that everyone will need to work together in order for us to transform our reality and put ourselves on the path to prosperity with ethics and social responsibility. Accordingly, in a spirit of renewal, we present another Rio de Janeiro Oil Industry Yearbook, taking a closer look at the partnerships we have built.

The oil market's situation in Brazil and across the world has changed significantly in recent years, and Rio de Janeiro has been strongly affected. For this reason, we must support all decisions aimed at making our economy more dynamic, allowing new players to participate and encouraging the existing ones to expand their presence.

Brazil is still a country of many opportunities, and Rio has the infrastructure and professional skills needed to make the most of new scenarios. There are still many unexplored reserves, a huge potential to revitalize older fields, and the government has a duty to free up post-salt areas, which are trapped within the polygon of pre-salt and may only be explored through production-sharing agreements.

Furthermore, we should make the most of Rio's large, diverse and complex oil supply chain to develop fruitful partnerships in the different production environments – onshore, shallow water, deepwater, and ultra deepwater. We should stimulate the construction of a market that is strengthened by the presence of micro, small, medium and large enterprises throughout the production chain, from concession-holders and operators to suppliers of parts, raw materials and services. We should reduce our vulnerability and encourage a new economic dynamic in this market.

Not far from these challenges lies the downstream sector, whose potential is under-exploited. Brazil's trade deficit in oil products is projected to grow even higher. Adding value to crude oil, reducing imports and expanding the supply of products is desirable in any economy, and it must be possible for us. We must work hard to achieve these goals, based on a solid medium and long-term strategy that ensures domestic prices are aligned with international markets.

Let us restore, improve, reinvent and create the best we can do. This is our spirit.

Enjoy your reading!

Eduardo Eugenio Gouvêa Vieira
President of Sistema FIRJAN

The **Executive Summary of Rio de Janeiro Oil Industry Yearbook Overview 2017**, is a synthesis of the full document. Our contribution is based on the belief that the oil market in Rio de Janeiro state is the main responsible for generating highly valued jobs, which allows to increase demand in other markets not necessarily related, besides contributing fundamentally with tax collection and the realization of investments in the infrastructure sector and also implement a variety of social care actions.

This complex market and full of new challenges makes us move away from the comfort zone and find solutions to keep mitigating its risks, while we make use of its benefits.

OVERVIEW OF DOCUMENT

The second edition of the **Rio de Janeiro Oil Industry Yearbook** features analysis of the market's opportunities, challenges, most relevant data up to 2016 and prospects for 2017. Resulting from **Sistema FIRJAN**'s efforts to demonstrate the importance of Rio's oil industry to the Brazilian economy, the document offers its readers access to high-quality information that will help support companies' investment decisions and business plans.

The document identifies market trends, most notably opportunities for companies to expand, whether they are focused on exploration and production, refining, or distribution of oil products.

Like the first edition, this year's Yearbook edition was mainly based on data publicly disclosed by the **Brazilian National Agency of Petroleum, Natural Gas and Biofuels - ANP**. The international data was obtained from the **U.S. Energy Information Administration - EIA** and oil company **BP**, which operates internationally and regularly publishes market data.

To analyze the oil market's present situation and future prospects, the Yearbook was supported by renowned organizations, adding even more value and legitimacy to its content. Considering the global nature of this business, the document begins with an appraisal of the market's international and domestic context, written by the **Brazil's National Organization of the Petroleum Industry - ONIP**.

The remaining part of the document is structured in line with the industry's value chain. For the first chapter, which addresses activities related to exploration and production, the Yearbook was supported by **Petrobras**, which provided an evaluation of the Libra Project's impacts on Rio de Janeiro, and the **Brazilian Petroleum, Gas and Biofuels Institute - IBP**, which described the context of activities in this segment.

The second chapter presents data on the downstream segment, which encompasses the refining and distribution of oil and oil products. The **Economics Institute of the Federal University of Rio de Janeiro - IE/UFRJ** evaluated the segment's prospects in Rio de Janeiro, taking into consideration the events of recent months and the importance of refining projects being completed.

The third chapter of this edition provides information on investment in research, development and innovation. The **Brazilian Association of E&P Service Companies - ABESPetro** wrote this analysis, which highlights the importance of this investment to overcome technological challenges and ensure the sustainable development of our reserves and supply capacity.

The fourth chapter presents data on foreign trade and government royalties, and also contains an evaluation by **Sistema FIRJAN**'s Research and Statistics Area of the oil market's job market, focusing mainly on Rio de Janeiro.

The Final Considerations section of the Yearbook presents an assessment of the Brazilian market and Rio de Janeiro's role within it. The complete document may be found on **Sistema FIRJAN**'s website, in the Oil, Gas and Maritime section: www.firjan.com.br/oilandgas



Scan the QR code to
download the full report.

CONTEXT

EXPECTATIONS HAVE IMPROVED, BUT BUSINESS HAS NOT YET

Excerpt from ONIP article

After falling to under US\$30 a barrel at the start of 2016, the oil price subsequently recovered and reached an average price of more than US\$43 by the end of the year. In the first four months of 2017, it averaged over US\$53, confirming the recovery, although far below the high prices seen during the commodities boom. This does not yet mean a recovery in investment, but it points to better prospects in the second half of this year and especially next year. E&P companies are once again making profits and discussing expanding their investment. Just as prices and external circumstances have improved, things have also become better in Brazil. The agenda for the market's recovery is moving toward expanding opportunities and the attractiveness of private investment in E&P. Petrobras' financial recovery is also making a major contribution to the

new environment. The company has managed to reduce its excessive leverage, extend its debt terms and raise funds at lower interest rates. Its market capitalization, which reached more than US\$300 billion in 2008, plummeted to less than US\$17 billion in the first half of 2016, but it has recovered to around US\$80 billion this year, clearly indicating a recovery of market confidence. Based on Brazil's huge oil reserves, the big challenge is to strengthen the country's competitive and globalized supply chain, and this calls for a specific agenda. The lack of industrial policy for this market resulted in a major missed opportunity during the remarkable cycle of investments we saw in the recent past. We need to complement the oil market agenda. The environment and expectations have undoubtedly improved, but on the other hand, business has not yet.

GRAPHIC 1. EVOLUTION OF THE PRICE OF WTI AND BRENT OIL



Source: ANP, 2017.

EXPLORATION AND PRODUCTION

THE OIL INDUSTRY, CHALLENGES AND OPPORTUNITIES FOR RIO DE JANEIRO

Excerpt from Petrobras article

Rio de Janeiro, as one of the states within the pre-salt province, has a privileged role in the future of the Brazilian oil and gas industry. Pre-salt, in turn, now represents one of the regions with the greatest potential for oil and gas exploration and production growth in the country, thus the already intense partnership between Petrobras and the state of Rio de Janeiro and its productive chain is set to

become even stronger. The fast production growth in the Pre-salt layer, high well productivity and low lifting costs in this province represent a milestone for Petrobras and its partners, and unequivocally point to major opportunities for the goods and services chain in the country. The Rio de Janeiro industries are ready and able to grasp this opportunity.

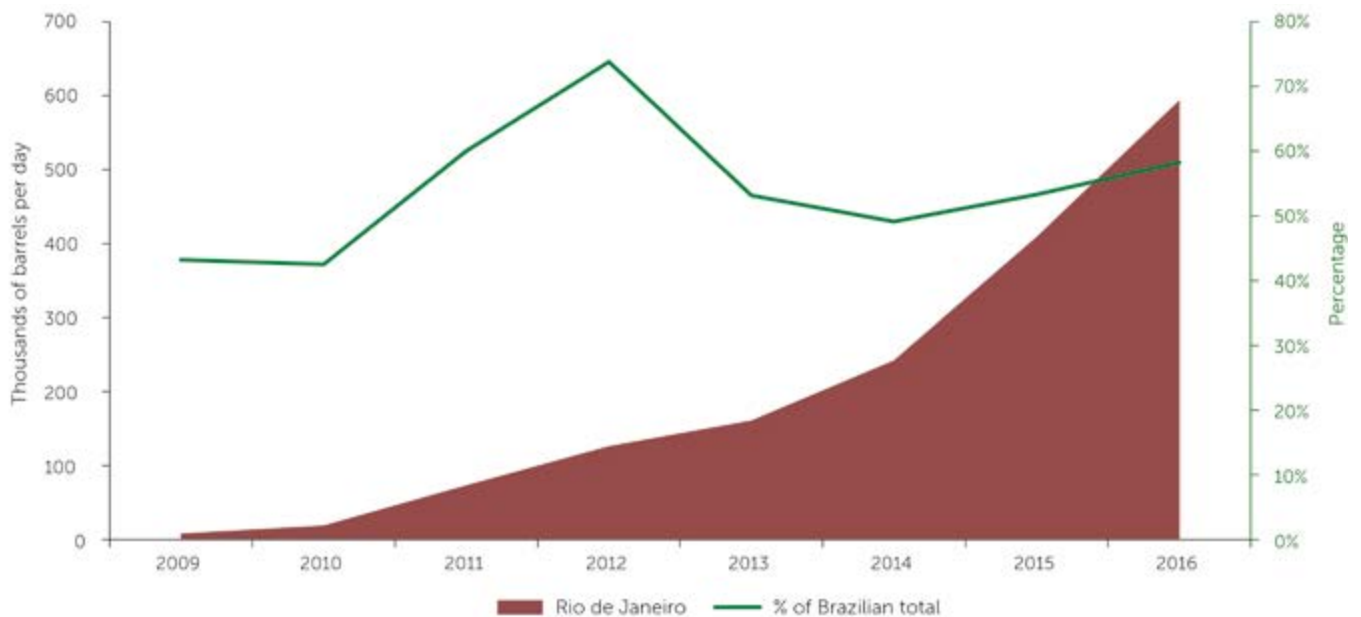
AUCTIONS: OPPORTUNITY TO RENEW THE OIL AND GAS INDUSTRY

Excerpt from IBP article

Since 2006, no oil field auctions with the expected results have been held in Brazil, holding back development in the country, and especially in Rio de Janeiro. There are still very relevant issues to be solved that all the oil and gas companies want to see through, with the required agility to boost the market. The

conditions to improve the business environment are exposed. A lot has already been done - and in considerable short time -, but there are still adjustments to be done so that Brazil, and specially the state of Rio, can benefit from the opportunity of converting the oil and gas reserves potential in richness for all society.

GRAPHIC 2. EVOLUTION OF THE PRE-SALT PRODUCTION IN RIO DE JANEIRO



Source: ANP, 2017

DOWNSTREAM

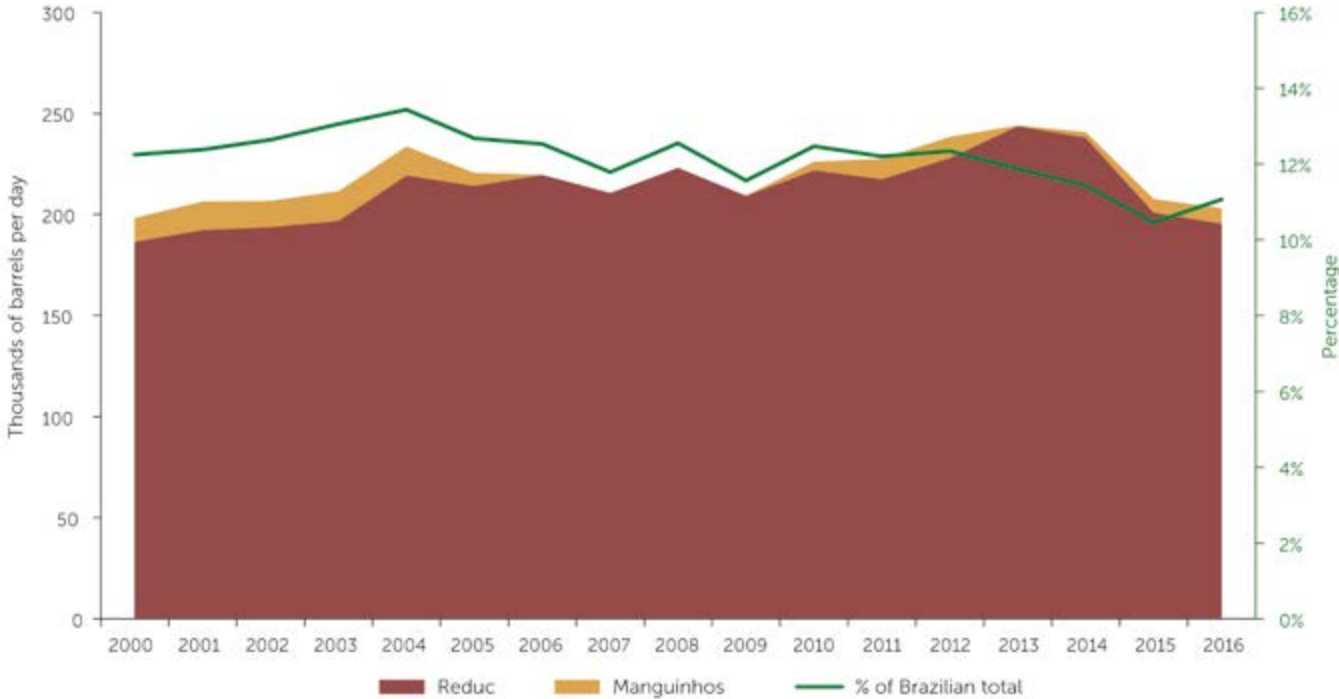
COMPERJ: A MANDATORY OPPORTUNITY

Excerpt from the Economics Institute of UFRJ article

Brazil is in a paradoxical situation. Despite being a growing oil exporter, the country imported 487,000 barrels of oil products per day in 2016. In practice, the country failed to add US\$2.5 billion to the value of the oil produced and consumed here, and thereby failed to generate thousands of jobs, while subjecting our energy supplies to international market risks. And this situation will tend to worsen if Brazil’s domestic refining capacity is not expanded. To incentivize private companies to do

so, the government could reduce the amount of royalties paid for oil processed at the Rio de Janeiro Petrochemical Complex (Comperj) that originates off the coast of Rio. In this way, the government would be giving up future tax revenues, that would be widely compensated by tax revenues arising from the value added to oil produced in Rio. The creation of a ring fence by ANP to guarantee the application of rules for Comperj is an essential condition for the success of this proposal.

GRAPHIC 3. OIL REFINING IN RIO DE JANEIRO



Source: ANP, 2017.

RESEARCH, DEVELOPMENT AND INNOVATION

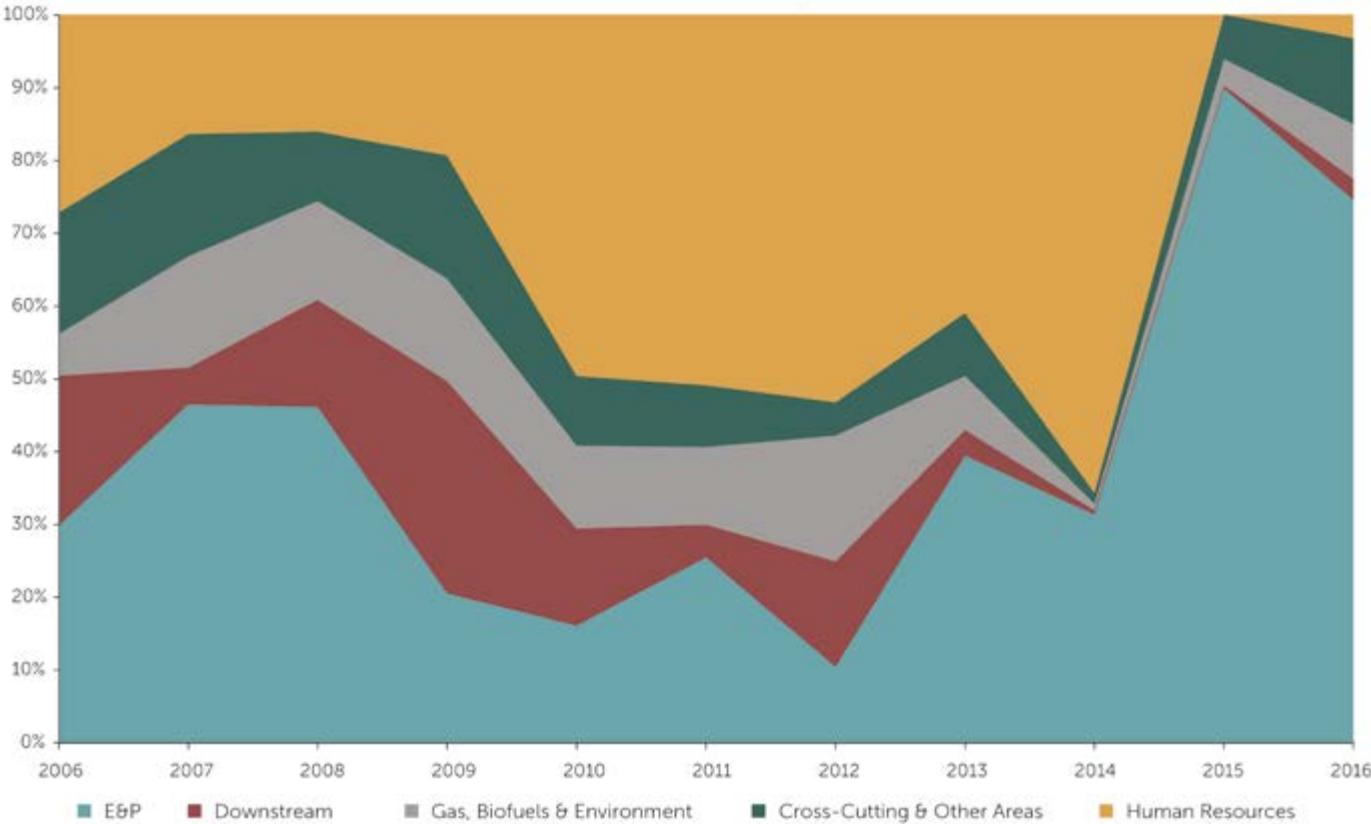
INNOVATION – THE FOUNDATION OF THE BRAZILIAN OIL INDUSTRY

Excerpt from ABESPetro article

Under a scenario guided by an industrial policy based on innovation, the State of Rio de Janeiro would exert with greater intensity the role of catapult of the Brazilian oil market. It is in Rio de Janeiro that the oil companies and most of the suppliers are, and, because of a decades' history, so is a relevant part of the accumulation of knowledge necessary for the innovation process. Also in Rio de Janeiro, associations of great relevance to the market are based, such as FIRJAN, IBP and ABESPetro,

among others. Together with the government, universities and other stakeholders in the industry, these associations must lead the discussion and implementation of the industrial policy that will be able to transform Rio de Janeiro into the epicenter of innovations in the Brazilian oil market, and thus lead the country to an unprecedented level not only in oil production, but also in importance and presence in the oil and gas business international environment.

GRAPHIC 4. INVESTMENT IN RESEARCH, DEVELOPMENT AND INNOVATION, BY AREA



Source: ANP, 2017.

SOCIOECONOMIC IMPACTS

EVALUATION OF JOB MARKET IN OIL PRODUCTION CHAIN

Excerpt from Sistema FIRJAN article

Rio de Janeiro's professionals have a homogenous age distribution between the ages of 25 and 39 years, although there is a slightly higher proportion of people between 30 and 34 years (19.4%). Regarding education, approximately 80% of formal employees in the oil industry have a university degree (41.9%) or a high school diploma (38.2%). In relation to workers' wages in the market, Rio de Janeiro

once again stands out. The state has the most highly educated professionals, and they are also the best paid in the country: the average monthly salary in Rio's oil market is R\$11,166, two and a half times the national average of R\$4,392. As well as significantly boosting investment and tax revenues, this market generates large numbers of specialist, well-paid jobs.

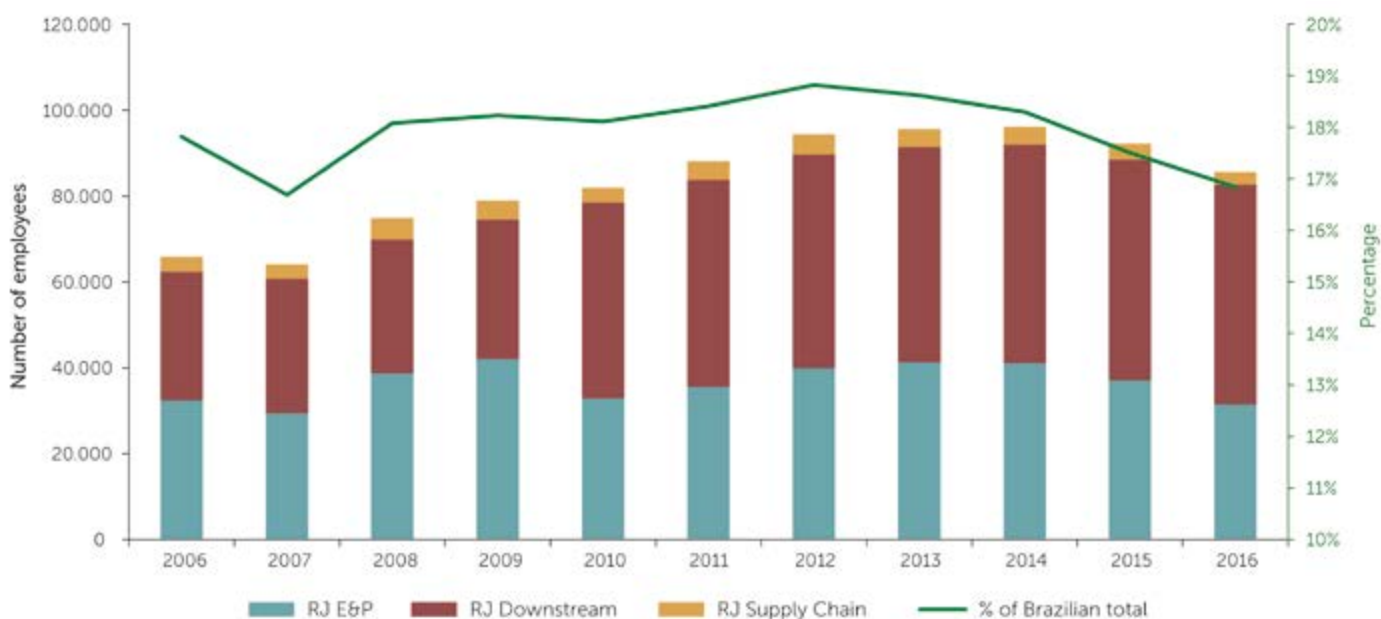
OVERVIEW OF FOREIGN TRADE RESULTS IN THE OIL MARKET

Excerpt from the Sistema FIRJAN article

Being the major state for the oil market in Brazil, the importance of Rio de Janeiro is not different when we evaluating the representativeness of foreign trade results. When compared to Brazil, in terms of financial volume, the state accounts for around 60% of exports and 15% of imports from this market during the period of 2007 to 2016. It is also worth mentioning that in 2016 the state of

Rio exported a record volume of oil (231 million barrels), an increase of 13% over the previous year. Thus, the oil market in the state of Rio de Janeiro had a balance of US \$ 10 billion in 2016, being one of the main responsible for the primary result of Rio's public accounts. In addition, it should be noted that 66% of Rio's exports related to the chain were Crude oil.

GRAPHIC 5. TOTAL EMPLOYEES IN OIL VALUE CHAIN



Source: ANP, 2017.

FINAL CONSIDERATIONS

NEW SCENARIOS, GREAT OPPORTUNITIES

Excerpt from Sistema FIRJAN article

It is irrefutable that the oil projects have transformative effects on national and regional wealth production. Regarding wages, on average, Rio's oil workers earn just over three times the average income of workers as a whole in the state. It is also worth mentioning that the business plans of concessionaires operating in Brazil exceed the 200 billion dollar mark for the next 5 years. And the fulfillment of these demands will depart from the state of Rio de Janeiro. The multiplier effects of oil investments on the economy as a whole are significant, according to institutions such as the Federation of Industries of the State of São Paulo - FIESP, and the Fundação Getúlio Vargas - FGV, it is considered to be around two and a half. This means that for every R\$1 invested in the market, the

economy grows R\$2.5 thanks to indirect impacts and the income effect. Therefore, the oil business, whether it is well or poorly managed, as Rockefeller would say, may be considered not just the best business in the world, but also a major engine of economic development. Accordingly, we will continue to work, together with all market players, to overcome our challenges in this period of transition and to contribute to the recovery of the Brazilian oil market. We should all take responsibility for grasping opportunities in the global market, in order to improve Brazil's strategic position. The Rio de Janeiro Oil Industry Yearbook Overview 2017 is a delivery from Sistema FIRJAN to companies in Rio and throughout Brazil, providing a source of information to support their business decisions.

The oil market has significant potential. Sistema FIRJAN offers specialized support for investors who wish to establish their business in Rio de Janeiro State.

The partnership with Sistema FIRJAN facilitates coordination with:

- government agencies;
- financial institutions;
- municipal governments;
- institutes;
- research centers and more.

With our support, it is much easier and faster to invest in the Rio de Janeiro State.

Learn more: suporteaoinvestidor@firjan.com.br