Opportunities in the Brazilian Oil & Gas Industry

Ongoing Actions &
2018-2019 Upcoming Bidding Rounds

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1. The Oil & Gas Industry in Brazil

Figures from the Brazilian Association of Petroleum Services Companies (Abespetro) show that the oil & gas industry accounts for 13% of the Brazilian GDP. It is an extremely important economic sector for Brazil, responsible for generating hundreds of thousands of jobs and injecting billions of dollars in investments.

As reported by the International Energy Agency, Brazil is the 10th largest global oil producer and the largest in Latin America. In October 2017, oil production in Brazil recorded 2.6 million barrels per day; natural gas, in turn, accounted for 115 million m³ per day. From 2005 to 2016, oil & gas production in Brazil yielded, in government participations (royalties and special participation) alone, R$295 billion.

These figures are significant. Nonetheless, the oil industry is still a fraction of what it could be in Brazil. Its whole potential is still unknown. Less than 5% of the sedimentary basins are granted for O&G exploration purposes and only 30 thousand wells were drilled in Brazil so far. The offshore portion of the Pernambuco-Paraiba basin and the Madre de Dios basin, in Acre, for example, do not have a single well drilled. Argentina, with a significantly smaller area, has drilled twice as many, and the USA has already drilled millions of wells.

The truth is that, with the flexibilization of the monopoly in 1997 and the annual rounds carried out until 2008, there has been an injection of new funds into the industry, which showed how promising the Brazilian O&G potential could be. This potential is not limited to the pre-salt, which producing fields derive from the 2nd Bidding Round, held in 2000. The 9th Bidding Round (2007), for example, offered fields in the Parnaiba Basin. These areas have given rise to the current Parque dos Gaviões, a natural gas production hub, with production capacity that surpasses 8 million m³ per day.

However, after the 10th Bidding Round, in 2008, the auctions were discontinued to resume only in 2013. These five years gap caused a decline in the exploratory activities which became far more marked as of 2012. Later, this reduction was intensified due to the hefty drop of oil price and investments reduction by Petrobras. Specifically, the drilling of exploratory wells dropped sharply and, therefore, discoveries have shrunk as well. The drilling of development wells have also fallen. The current cenarium represents only a fraction of what we had in the past.
Were it not for the pre-salt layer and its amazing prospectivity Brazilian production would also be declining. The curves presented below show the declining offshore post-salt production. Offshore production in the post-salt play dropped 30% in the last five years. The number of drilled wells declined about 70% from 2014 to 2017.

Image 1. History of the No. of exploratory wells concluded and No. of discovery notifications

In the onshore portion, the situation is also worrying. From 2012 to 2017, oil production dropped from 180 thousand to 129 thousand barrels per day and well drilling dropped by approximately 80%.

2. The Global Scenario

Worldwide, shale revolution put an end to the era of expensive oil. With short life-cycle projects, declining costs, abounding reserves and flexibility to start producing quickly, shale contributed significantly to maintain a long period of low oil prices (low for longer).

With less capital, oil companies are more selective. Consequently, global competition for funds has increased. Recently, many countries such as the USA and the United Kingdom announced incentives to attract E&P investments. To have a clear picture, Brazil holds only 5% of the overall amount of investments.

The world is going through a transition towards a carbon-free economy. Pressure to reduce the consumption of fossil fuels has increased. The challenging targets of the Paris Agreement are a good example of that. Countries such as the Netherlands, France and Germany have announced their deadlines to end the sale of petrol and diesel vehicles. Electric cars expand their presence in the market of new vehicles.

Other sources of clean energy, such as solar and wind, are also progressing at a fast pace and at increasingly competitive costs. Governments are supporting clean energy sources more and more. Oil companies are starting to diversify their businesses and allocate resources to renewable projects.

The perception of global population has changed. Oil is likely to lose room and become obsolete in the long run. The peak oil debate is now behind us. Now we are discussing peak demand. This confirms the forecast of the former Saudi Minister of Petroleum, Ahmed Yamani,
who had said last century that “the Stone Age did not end for lack of stone and the oil age will end, but not for lack of oil”.

As a result, Brazil needs to explore its potential as soon as possible, generating the greatest possible wealth from oil resources found underground. Innovation and technology should be applied to imprint development to these reserves. The national business environment should improve on a constant basis, in order to establish measures to attract capital.

3. Unlocking Investments: accomplished actions and results

Since the end of last year, measures have been implemented to materialize the resumption of the Brazilian oil & gas industry. Many improvements have been made to the energy policy, and results are being felt.

The end of Petrobras’ obligation of being the sole operator of the pre-salt, by the end of 2016, brought the opportunity to streamline the development of these reservoirs. A significantly higher volume of investments will be attracted and applied. Additionally, for the first time we have an annual auction schedule. With a five-year perspective, the multiannual plan for the supply of areas brings Brazil to the attention of investors.

A new local content policy has followed the 2017 rounds. This increased the attractiveness of auctions and will bring efficiency to the assessment of committed values, considering the definition of global indexes.

New E&P policies have also been issued. Guidelines are based on the priority of optimizing the recovery of reservoirs, quantifying the national oil potential, intensifying exploratory activities nationwide and promoting the proper monetization of existing reserves.

Many government programs have been launched, such as Reate, to revive onshore areas, Gás para Crescer, Combustível Brasil and Renovabio – the latter focused on the natural gas and supply industries.

CNPE has also published guidelines to unitization and Repetro (the special customs regime for export and import of assets destined to research activities and production of oil and Natural Gas) was extended until 2040. More attractive concession contracts have been designed, with innovations such as the adoption of the single exploration stage, distinguished royalties for areas of new frontiers and mature basins, reduction of the minimum net equity for non-operators and incentives to increase the participation of investment funds.

This set of measures has already produced a broad effect. The four rounds carried out in 2017 have exceeded the expectations and have shown that investors are starting to feel confident about Brazil again.
The 4th round of Marginal Accumulations sold eight out of the ten offered areas and had the highest signature bonus within the category of mature fields. In the 14th Bidding Round, 37 exploratory fields were acquired, with the highest signature bonus ever collected in concession auctions: R$3.4 billion. In the 2nd and 3rd Pre-Salt Production Sharing Rounds, six out of the eight offered areas were acquired, yielding 6.15 billion in signature bonuses and fixing significant profit oil share for the Federal Government. The offered rates correspond to an additional amount of R$200 billion of expected collection, amounting to R$600 billion.

In 2018, the 15th Bidding Round, the 4th Pre-salt Production Sharing Round and the beginning of the Open Acreage will take place. For 2019, the 16th Bidding Round and the 5th Pre-Salt Production Sharing Round are already envisaged. Additionally, ANP will refer to CNPE’s consideration the sectors pertaining to the 2020 and 2021 rounds.

4. Unlocking Investments: ongoing actions for the short run

Additional actions are still being carried out by ANP to unlock investments in the short run. These investments are rather related to existing contracts. The new bidding rounds will only take effect in the medium/long run. Historically, from the conclusion of the contract to the first oil, it takes, on average, over 6 years, in case of a successful hydrocarbon discovery.
4.1 Extension of the exploratory phase (R11 and R12)

Regarding exploration activities in ongoing contracts, ANP issued Resolution No. 708/2017, which governs the extension of the exploration phase, for two years, of concession contracts from the 11th and 12th Bidding Rounds.

This is justified, since contracts signed in the 11th and 12th Rounds represent more than half of licenses granted in Brazil. Taking into account that, for the sake of the Brazilian oil industry, the massive return of exploratory licenses and the interruption of research activities in Brazil is not interesting, this extension will allow investments to be allocated to the continuance of the Minimum Exploratory Programme (PEM, for its acronym in Portuguese).

4.2 Promotion of mature fields

Another way of leveraging investments in the short run is promoting activities in mature fields. A mature field is defined as a field which production is already declining. Typically, it has produced more of what is left to produce. Currently, most of the Brazilian fields may be considered as matures.

The image below presents the main ongoing actions to encourage the increase of the recovery factor and the extension of the life cycle of mature fields.

| Reduction of royalties, for up to 5% on the exceeding production |
| RBL (Reserve based lending) |
| Extension of the production phase |
| CNPE 17/2017: promotion of new recovery technologies |
| CNPE 17/2017: promotion of the assignment of rights |

Image 5. Ongoing actions to foster activities in ongoing fields

This is because, despite the maturity of the fields, the Brazilian recovery factor is low. According to the Annual Report of Reserves from 12/31/2016, 9% of the total volume contained in the reservoirs have already been recovered and it should reach 21% on the Brazilian average, considering the total reported reserves. In Campos Basin, the Recovery Factor is 24% and, in the best scenario, such as in Recôncavo Basin, the recovery factor may reach 33%.
Worldwide, the recovery factor is 35% and in Norway, for example, for oil alone, this factor reaches more than 50%. Even considering the more favorable characteristics in Norway (shallow water line, light oil, etc.), it is undeniable that figures show that Brazil can go further.

To have a clear picture, an additional 1% in the Brazilian recovery factor would potentially yield US$18 billion in new investments and US$11 billion in royalties. That represents additional reserves of 2.2 billion of barrels of oil equivalent. Considering Campos Basin only, another 1% of increase in the recovery factor would generate US$8 billion in investments and US$5 billion in royalties, which corresponds to around 1 billion barrels of oil equivalent.

Around the world, to increase the recovery factor of the fields, governments authorize the extension of the Production Phase and the transfer of the operation for companies specialized in the recovery of mature fields. Additionally, they launch a package of economic incentives, such as tax reduction, and they carry out a number of regulatory adjustments, in order to optimize and simplify requirements at this stage. Another common action is to offer areas surrounding the field, in order to discover new reservoirs that, when producing, will optimize the idle infrastructure, extending infill the life cycle of mature fields connected to it.

In Brazil, ANP has also been working in this direction. CNPE’s resolution No. 17/2017 has brought a number of guidelines focused on the increase of production in mature fields. Among them, we can mention the incentive to the assignment of rights of fields which operators are not investing the funds required to the maximization of the recovery of discovered volumes.
Such measure is crucial for the success of the recovery of mature fields. It is extremely important that these fields are operated by companies with a focus on an increased RF, extended life cycle and reduced costs. These companies, in general, do not have a portfolio of large projects that can compete for funds with mature fields. In the United Kingdom, for example, data obtained from the Wood Mackenzie reports show that, in 1997, 43 supermature offshore fields had plans to end the decommissioning until 2027. Over the years, more than 20 fields have been granted to independent companies focused on life extension. As part of these endeavors, in 2010, only 1 field had been decommissioned.

To encourage the participation of these companies in Brazil, ANP is regulating the reserve based lending. It is a funding backed by oil reserves. Considering that raising capital is one of the greatest challenges of the industry, these companies may use remaining reserves of mature fields as collateral to raise funds required to their activities in Brazil. This device is commonly used in other countries, such as the USA. In the contracts of the 14th Round, the licensees could constitute, within the framework of their credit operations or loan contracts, a guarantee on reserve based lending.

Another ongoing guideline is the incentive to new recovery technologies, which application is key to increase volumes extracted from reservoirs. Hence, ANP announced, for the 2018 Innovation Award, a new category, aiming to reward the best recovery project. Additionally, the regulation of the application of funds of the R&D clause is being reviewed, and it will comprise this guideline.

The extension of the Production Phase is also a crucial condition for the extension of the life cycle of the fields. ANP has already accepted the extension of the contracts for the Marlim (BC), Voador (BC), Frade (BC), Araçás (Recôncavo) and Ubarana (Potiguar) fields and is assessing a number of other demands. The renewal of contracts for an additional period enables new investments in the fields. The first contracts signed with ANP in 1998, in Round Zero, will expire in 2025. Many investments to be made in these fields in the short run will only pay for themselves after 2025, which demands the extension of contracts.

The last remarkable measure within the scope of mature fields is the reduction of the royalty rate on the incremental production, established by the new investment plan to be implemented. Pursuant to Paragraph 1 of article 47 of Law 9.478/1997, in comma XII of article 3 of CNPE Resolution No. 17/2017 and on tender protocols and contracts, ANP is conducting studies to regulate the matter. The goal is not to reduce royalties, but rather increase the collection of royalties and the absolute value perceived by society.

4.3 Local content and Onerous Transfer of Rights Surplus

Two other actions are being carried out by ANP to leverage investments in the short term: a resolution dealing with local content waiver requests; and the negotiation of the onerous transfer of rights, the latter under the management of the Ministry of Mines & Energy.
The approval of the waiver resolution is key, so that development projects in the contracted areas may be implemented within competitive economic parameters, attracting investments and benefiting the Brazilian society. Surveys by the independent consultancy business Wood Mackenzie show that the approval of the new regulation is capable of expediting the development of 20 billion of barrels of oil equivalent in pre-salt projects. ANP estimates that there are 22 new platforms to be procured until 2026 (for ongoing contracts), with a potential to raise R$2.6 billion per year each.

These figures might be understood according to the following explanation: most part of the income (profit) from E&P projects is perceived by the State. Income is defined as revenues less operating costs and investments. Tax burden is what the State receives.

Tax burden is a sum of royalties + special participation + profit oil + signature bonus + income tax + indirect taxes. It is the set of instruments levied by the State to take ownership of the oil income.

The tax burden varies according to the contract terms. In general, in the concession contract, from 55% to 65% of the income is perceived by the State, and in the sharing contract, it ranges from 70% to 75%. Which means that most of the oil income belongs to the State.

Image 7. Distribution of the income of a typical pre-salt project

But what does that mean? To answer to that question, ANP carried out a test run for a standard pre-salt production unit, of 150 barrels per day. It used the typical costs of an E&P project and oil price was quoted at US$50 per barrel. As a result, in the first ten years of production by a platform, the State raises, on average, around R$2.6 billion per year, in nominal values. Companies receive a smaller share: R$0.87 billion.
Therefore, considering the current scenario, it is key to encourage the procurement of new platforms in the short term. After all, who earns the most when new units start producing is the Brazilian State. Consequently, who loses the most with the postponement of these investments is the Brazilian society.

Regarding the negotiation of the onerous transfer of rights, studies by Gaffney, Cline & Associates, an independent global oil and gas consultancy, show that surplus volumes of these contracts range from 6 to 15 billion barrels (oil equivalent). Bearing in mind that these resources have already been found and deemed commercial, the offer of these volumes will require the procurement of many production units in the short term, with a substantial payback for society.

This set of measures is causing the greatest transformation of the Brazilian oil and gas industry.

5. Upcoming Bidding Rounds

5.1 Opportunities for the three exploration & production environments in Brazil

The 2018 rounds include opportunities for different company profiles, in the three different Brazilian exploration & production environments: onshore, conventional offshore and the pre-salt.

The pre-salt is one of the best exploration plays in the world, with the largest offshore discoveries of the last decade. A pre-salt field produces, on average, over 30,000 thousand barrels of oil per day in the beginning of its life cycle. In 2017, around 80 wells already account for about half of the Brazilian production. As an example, a single pre-salt well produces as much as the entire State of Bahia, a traditional oil producer, with more than 1,300 wells (~33 thousand oil barrels per day) and corresponds to one and a half times the total production of the Potiguar Basin, with around 4,000 wells (~45 thousand oil barrels per day).

The conventional offshore plays comprises other opportunities beyond the pre-salt, that runs along the entire Brazilian coast, from the Foz do Amazonas basin to the Pelotas basin. These are post-salt reservoirs, which are found in the East and equatorial margins. In 2017 these reservoirs contributed with around 44% of the Brazilian production.

The onshore comprise on-land opportunities, including the remaining potential in mature basis and new discoveries in new frontier basins, most of them gas prone. In 2017, the onshore production was responsible for approximately 8% of the Brazilian production.
5.2 Bidding rounds under the concession regime

5.2.1 15th Bidding Round

The 15th Bidding Round includes areas in the onshore basins of Ceará, Potiguar, Sergipe-Alagoas, Campos and Santos, as well as the onshore new frontier basins of Paraná and Parnaíba.
70 blocks will be offered, located in 12 sectors of 7 Brazilian sedimentary basins, totaling 94,601.78 km² of area up for offer.

The 15th Bidding Round will be held on March 29, 2018 and companies may indicate their interest until February 5, 2018.
Pursuant to Paragraph 1 of art. 47 of Law 9.478/1997, ANP has set different royalty rates for new frontier areas, in order to increase the attractiveness of the auction.

**Royalties established for the 15th Bidding Round**

<table>
<thead>
<tr>
<th>Basin</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potiguar</td>
<td>10%</td>
</tr>
<tr>
<td>Ceará</td>
<td>7.5%</td>
</tr>
<tr>
<td>Sergipe-Alagoas</td>
<td>10%</td>
</tr>
<tr>
<td>Campos</td>
<td>10%</td>
</tr>
<tr>
<td>Santos</td>
<td>10%</td>
</tr>
<tr>
<td>Parnaíba</td>
<td>7.5%</td>
</tr>
<tr>
<td>Paraná</td>
<td>5%</td>
</tr>
</tbody>
</table>

*Image 12. Royalty rates set for each basin offered in the 15th Bidding Round*

**Offshore Basins**

The Brazilian East Margin Basins holds great potential. Santos and Campos basins, both of them included in the upcoming bidding rounds are responsible for around 88% of the current Brazilian production (data from November, 2017). Nonetheless, there is still potential for major discoveries both in the pre-salt and in the post-salt plays. To have an idea of the prospectivity of the areas on offer in the 15th Bidding Round in Campos and Santos Basin (beyond the limits of the pre-salt polygon), the estimated unrisked in place volume for the leads identified in the pre-salt play are around 18 billion barrels.

The Brazilian Equatorial Margin also has a great oil potential, with close similarity to the prolific West African Basins. It is estimated an unrisked in place volume of around 12 billion barrels of oil for the leads identified in the blocks on offer in Potiguar and Ceará basins.
Ceará Basin (SCE-AP2 and SCE-AP3 sectors)

Image 13. Location map of the Ceará basin appointing licenses offered in the 15th Bidding Round

Ceará basin produces high quality oil in the fields of Atum, Curimã, Espada and Xaréu, all of them located in shallow waters and discovered in the 70’s.

The blocks on offer in the 15th Round are located in deep waters, in the SCE-AP2 and SCE-AP3 sectors.

The area on offer has potential for oil discoveries in turbidite reservoirs from the Upper Cretaceous to the Paleogene, similar to the discoveries of the West African Margin (Jubilee, Tweneboa, Mahogany-1) and the South American Margin (Liza discovery in Guyana).
Potiguar Basin (POT-AP1, SPOT-AP2 and SPOT-AR1 sectors)

Image 14. Location map of the Potiguar Basin, appointing fields being offered in the 15th Bidding Round

Potiguar Basin is a traditional oil and natural gas producer, both onshore and in shallow water.

The area on offer in the 15th Bidding Round is located in a distal context, in depths mostly above 1,000 meters. Most of the blocks are located above the oil kitchen, enabling both lateral migration and vertical migration through faults to reservoirs.

Potiguar Basin likewise has a geological evolution similar to West African Margin Basins, specially Accra-Keta and Benin Basins, with potential for oil discoveries in turbidite reservoirs from the Late Cretaceous to the Paleogene.
Sergipe-Alagoas Basin is a traditional oil and natural gas producer, both onshore and in shallow water.

However, in the last few years, important discoveries of light oil, natural and condensate have been made in deep and ultra-deep water, called Barra, Farfan, Cumbe, Moita Bonita, Muriú and Poço Verde.

The accumulation model of these discoveries is characterized by marine source rock from the Albian/Cenomanian/Turonian periods, with accumulation in turbidite sandstone reservoirs from the Upper Cretaceous.

The blocks on offer have potential for similar discoveries in the same exploration play.
Campos Basin is one of the two main Brazilian oil and natural gas producing basins in Brazil, particularly in post-salt sandstone turbidite reservoirs (Marlim Complex). In October 2017, Campos Basin produced 1.3 million barrels of oil per day and around 25 million m³ of natural gas per day.

Besides the post-salt plays, there are also important discoveries in the pre-salt play, such as those in Parque das Baleias, an important cluster of fields in Campos Basin deep water. Parque das Baleias produces around 270 thousand barrels of oil per day, 63% of which come from pre-salt layers (data from October 2017).

The area on offer has potential for discoveries of oil in the aptian carbonate of the pre-salt play and in the Upper Cretaceous turbidites in the post-salt layers.

In blocks C-M-657 and C-M-709, large-sized structures have been identified in the pre-salt play. The prospects are included in prominent four-way closure trap structures and consist of Aptian microbial carbonate reservoirs sealed by layers of salt. The prospectivity is indicated by seismic data, where the seismic facies points to the occurrence of reservoir rocks.
Santos Basin is one of the most important oil producing basins in Brazil due to the giant prolific pre-salt deposits.

The area on offer has potential for large-sized oil discoveries in the pre-salt play.

The S-M-534 and S-M-645 blocks cover part of the Titã and Saturno prospects, respectively. Titã and Saturno are prominent four-way closure trap structures and preliminary seismic data suggests the occurrence of the main pre-salt sequences as well reservoir seismic facies and amplitude anomaly.
Onshore Basins

Parnaíba Basin (SPN-N and SPN-SE sectors)

Image 18. Location of the fields on offer in the Parnaíba Basin in the 15th Bidding Round

Parnaíba basin is located in Northeast Brazil, covering a total area of around 600 thousand km². It is a gas prone basin and already accounts for around 7% of the total Brazilian production of natural gas (data from November, 2017).

The production comes from three fields at the production stage, in addition to four other fields at the development stage, at Parque dos Gaviões. The current production capacity of natural gas at Parque dos Gaviões is around 8.4 million m³ per day.

The accumulation model is marked by the presence of climbing diabase sills, acting as catalysts for gas generation as well as traps for the accumulations.

The area on offer has potential for discoveries of natural gas similar to those of Parque dos Gaviões.
Paraná Basin is located at a very attractive geoeconomic context, in the most industrialized region in South America. It does not have any commercial discovery yet. However, it has a promising potential for natural gas accumulations.

The expected play is similar to that of Parque dos Gaviões, at Parnaíba Basin, with diabase sills controlling the natural gas accumulations.
5.2.2 16th Bidding Round

The 16th Bidding Round, scheduled for 2018, will focus on the East Brazilian Margin, which is distinguished for its producing basins in addition to its potential for new oil and gas discoveries.

The offers will comprise areas in Pernambuco-Paraíba, Jacuípe, Camamu-Almada, Campos and Santos basins. This bidding round will also include blocks in the onshore new frontier basins of Solimões and Parecis.

Parecis Basin has potential for natural gas discoveries, while Solimões Basin is an oil and natural gas producer, currently responsible for 11% of the national natural gas production. Besides, from the 30 largest onshore oil producers wells in Brazil, 27 are located in Solimões Basin (data from November, 2017).

Image 20. Location map of the Brazilian sedimentary basins, appointing sectors selected for studies, aiming at the 16th Bidding Round
5.3 Bidding rounds under the production sharing regime – Pre-salt Bidding Rounds

5.3.1 The pre-salt play

The pre-salt is a sequence of sedimentary rocks deposited during the break-up of the ancient continent Gondwana, which originated the continents of South America and Africa. Initially, deep depressions were formed between the two continents, giving rise to great lakes that allowed the deposition of the source rocks. As the process moved forward, it caused the deposition of the carbonates that comprises the reservoir rocks during the Upper Rift and Sag stages, followed by the deposition of thick salt layers.

The Rift section was deposited at a stage of mechanical subsidence and precedes the deposition of the sag sequence. The Lower Rift sequence is characterized by the deposition of siliciclastic rocks, including Aptian lacustrine shales, that holds excellent source rock properties. The Upper Rift sequence comprises mainly carbonate rocks mainly deposited by microbial and chemical processes, but it also includes isolated occurrences of coquina, with an excellent reservoir potential. Occasionally volcanic rocks intercalation is observed in the Rift sequence.

The sag sequence is a thermal subsidence stage resulting from the cooling of the crust. In Santos and Campos basins this sequence is represented by carbonate deposited by microbial and chemical processes. These layers are the main reservoir of the pre-salt play, resulting from a lacustrine/restricted marine depositional environment (hyper saline).

The region of the pre-salt polygon distinguishes itself due to the presence of thick salt layers, mainly in Santos Basin, where salt walls are located, which allowed an effective sealing and
provided the proper thermal conditions for the preservation of liquid hydrocarbons. This region includes large structures with discovered accumulations in the pre-salt interval.

With high quality reservoirs, large structures and an average of 27 API, pre-salt reservoirs are among the best opportunities in the world.

### 5.3.2 4th Pre-salt Production Sharing Round

The 4th Pre-salt Production Sharing Round, scheduled for June 07, 2018, includes areas in Campos and Santos basins.

![Image 22. Location of areas on offer in the 4th Pre-salt Production Sharing Round](image)

In Campos Basin, two areas will be offered: Dois Irmãos and Itaimbezinho. In Santos Basin, three areas are up for offer: Uirapuru, Saturno and Três Marias.

The Dois Irmãos block is characterized by structures with four-way closure trap in the pre-salt play. Seismic data indicates the occurrence of reservoir seismic facies and amplitude anomaly.

Itaimbezinho, has potential for oil discoveries in the pre-salt play and in turbidite reservoirs from the Upper Cretaceous.

The Uirapuru prospect is a very prominent four-way closure trap structure in the pre-salt play. It is delimited by NE-SW faults following the same structural trend as the Carcara prospect. Seismic data indicates the main pre-salt sequences as well reservoir seismic facies and amplitude anomaly.
The Três Marias block is located south of the Libra field. The block includes two medium-sized structures in four-way closure trap.

The Saturno block, which is located in the Eastern portion of Santos Basin, includes the Dione prospect and part of the Saturno and Titã prospects, which extend beyond the pre-salt polygon.

Preliminary seismic data indicates the occurrence of the main pre-salt sequences, including reservoir rocks, in addition, the structures feature amplitude anomaly. The Dione structure features a very well defined flat spot, which indicates a contact between fluids.

**5.3.3 5th Pre-salt Production Sharing Round**

The 5th Pre-salt Production Sharing Round, scheduled to take place in 2019, includes three blocks in Santos Basin: Aram, Bumerangue and Cruzeiro do Sul.

Aram is a large-sized four-way closure trap structure in the pre-salt play. It shows amplitude anomaly in seismic data and has potential for a giant oil discovery.

Cruzeiro do Sul block includes three small and medium-sized structures located between Lula field and Júpiter Prospect.

Bumerangue is a prominent basement high in four-way closure trap located at the south-western border of the Pre-salt polygon.
5.4 Open Acreage

The Open Acreage or permanent offer, approved by Resolution CNPE No. 17/2017, consists of the continuous offer of relinquished fields (or about to be relinquished) and exploration blocks offered in previous bids, which have not been acquired or have been returned to ANP.

It is a bidding model employed in many countries, such as the USA and Canada, where there is a permanent stock of areas on offer, giving the opportunity for investors to acquire exploration areas on a continuous basis.

In Brazil, a non-acquired area at a certain auction may form the stock of areas on the open acreage offer. On the other hand, an investor who was not able to acquire a desired field at the auction may use the capital available to acquire another opportunity in the Open Acreage. Thus, we can enhance the granting of areas, while providing dynamism and agility to the offers. Consequently, more investments are directed towards Brazil, and we get a deeper understanding of the basins.

Additionally, fields returned to ANP can also be offered to the market quickly. With that, relinquished fields, which would be included in the 5th and 6th Marginal Accumulation Rounds, are now incorporated into the Open Acreage. Thus, specific bidding of areas with marginal accumulations are no longer necessary.

ANP consolidated the first set of blocks and relinquished fields to be included in the open acreage. This first proposal comprises 846 blocks and 15 brownfields, from 13 Brazilian sedimentary basins, totaling over 285 thousand km². The selected areas include blocks in the onshore mature basins of Recôncavo, Potiguar, Sergipe-Alagoas and Espírito Santo. Other blocks to be included are in the onshore new frontier basins of Acre, Amazonas, Paraná, Parnaíba, São Francisco and Tucano, in addition to the blocks in the offshore basins of Pará-Maranhão, Sergipe-Alagoas, Campos and Santos.

This measure will contribute significantly for the resumption of onshore activities and for the development of small and medium companies. Additionally, it will add value to the poles offered in Petrobras’ divestment program, as the new licensees will be able to acquire the surrounding areas quickly, in order to discover new reservoirs that will increase the profitability of the fields.
A tasting data package per sector will be available in February for a lower price. The rules of engagement and technical and economic parameters will be set until April 30, 2018, when the Bidding Process will be launched on an ongoing basis. From May 2, 2018, the deadline for registration and expression of binding interests begins. The offers shall be submitted from November 2018.
6. Conclusion

The year of 2017 was a breakthrough for the oil and gas industry in Brazil. The four rounds carried out consolidated the resumption of the industry. For 2018 and 2019, four other rounds are approved, in addition to the start of the open acreage. All of this, along with the areas made available in Petrobras’ divestment plan, make up the greatest window of opportunity in decades.

With the offer of areas and the implementation of the presented measures, it is estimated that R$845 billion in investments are targeted to development and production projects in the next ten years (between ongoing contracts and new contracts), transforming the hydrocarbons contained in the Brazilian underground into wealth. This will lead to the generation of hundreds of thousands of jobs and billions of reais in government participations, contributing to develop the Brazilian economy.

The oil and gas industry is going through its greatest transformation, complementing the opening started in 1997. There are opportunities for all kinds and profiles of exploration and production companies. This will give rise to a competitive and diverse market. Companies interested in investing in Brazil have the greatest opportunity in the history of the industry.
For more details, please refer to

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