

# Analysis of the Economic Impact of Oil and Gas (O&G) Investments on the State of Sergipe

*Impact and Diagnosis of  
the Natural Gas Market*

**MARCH/2024**





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This notebook expresses the opinions of the authors and does not necessarily represent FGV'S institutional opinion, as well as that of the participating companies.



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The State Government is committed to the future of Sergipe. We believe that development walks along with the oil and gas sector, which unveils a scenario of countless opportunities for our state, especially those linked to explorations in onshore fields and in ultra-deep waters.

We are focused on making regulatory and tax adjustments in order to create a business environment favorable to investors, taking special care to offer legal certainty and other necessary conditions for the development of new projects in Sergipe.

The State is also committed to developing an industrial region, within the Port Industrial Hub, defining priority areas for the implementation of new ventures, offering locational support, providing the necessary infrastructure and already anticipating studies for licensing.

The partnership between the State Government and Fundação Getúlio Vargas, through FGV Energia, to carry out the study **“Analysis of the Economic Impact of Oil and Gas Investments on the State of Sergipe”**, with the support of several market players, will certainly be a great contribution to giving greater visibility to existing opportunities in Sergipe, as well as serving to incorporate proposals raised in the diagnosis into the Government’s public policies, seeking to foster Sergipe’s competitiveness to attract new ventures.

The outcome of the work will be an important source of consultation for companies and public bodies to better understand what the State has to offer. It will be a fundamental tool to substantiate public and private decision-making.

I would like to thank the FGV Energia team for believing in the importance of this work, the sponsors who had decisive contribution to its feasibility, the team at the State Secretariat for Economic Development, Science and Technology who were really dedicated to the completion of this project, and the huge group of more than 40 professionals, from different areas of the sector, who made their precious time available to contribute their visions of the market, ideas and suggestions incorporated in the study.

**Fábio Mitidieri**  
Governor of Sergipe

The natural gas market in Brazil has been undergoing changes after approval of law 14.134, dated April 2021, which I had the pleasure of reporting to the Chamber of Deputies. Over these almost 3 years, we have observed countless advances, such as the entry of new players and the change from concession to authorization, which enabled the construction of the gas pipeline connecting the ENEVA LNG terminal to the TAG transport network, in Sergipe. Sharing essential infrastructure was also another important progress.

We are aware that there is still a lot to be done to achieve the dynamic, open and competitive market that we all wish for, with an increase in national natural gas production and greater opening in the market being essential to promote competition and the much-desired drop in prices capable of boosting the development of national industry. We also hope that greater encouragement will be given to initiatives to replace diesel with natural gas in cargo transport, through the structuring of green corridors to ensure the supply of LNG/CNG to fuel the fleet.

All the dedication and effort that I have spent in my parliamentary work in 3 terms of office as Federal Deputy and now as Senator of the Republic to promote the development of the oil and gas sector in Brazil, also has a strong commitment to the exploration of the riches of our State of Sergipe, skilled to be the Natural Gas Hub of the Northeast.

We presented other important bills for this sector that could also contribute to speeding up the transformations that the market needs, such as PROFERT and PROESCOAR, which seek to stimulate the national production of natural gas and contribute to the development of the consumer market.

The partnership between the State of Sergipe and FGV Energia, also counting on the participation of Rice University and the Baker Institute, to develop major work, will certainly have a decisive contribution to making them known and support for the opportunities offered by the State.

We are very optimistic with all this mobilization and the dedication of Governor Fábio Mitidieri to create a favorable context for business, promoting actions to increase the State's competitiveness in attracting investments, thus enabling the generation of thousands of jobs and a redemption and economic transformation of Sergipe.

**Laércio Oliveira**

Senator of the Republic for the State of Sergipe

The State of Sergipe is a historical reference for the development of the oil and natural gas sector in Brazil. From the discovery of the largest onshore field in the country, Carmópolis, in 1963, to the drilling, five years later, of the first offshore field, Guaricema, besides the pioneering production in deep waters in the Northeast, in the Piranema field, in 2007, Sergipe is used to be at the forefront.

This time, a new horizon is unveiling for the State, with the revitalization of mature onshore fields, the interconnection of a private LNG terminal to the gas transport system and the production of significant volumes of natural gas in ultra-deep waters. This is a unique environment to boost the Brazilian gas supply, which is expected to meet more demands for this energy source.

Acknowledging the relevance of this potential to unlock a cycle of prosperity in Sergipe, Fundação Getulio Vargas presents this study, developed by FGV Energia, with the aim of analyzing the main barriers and opportunities for the development of the gas market in Sergipe, as well as the economic impacts ensured by the O&G sector.

In addition to contributing to the State of Sergipe with a detailed survey of its unique features to attract investments, the debates segmented by each link in the gas chain go beyond the state range and deeply reflect a market in the process of opening up, with its setbacks and progresses.

I am thankful for the partnership of the Government of the State of Sergipe, in particular the State Secretariat for Economic Development and Science and Technology and the Executive Secretary, Marcelo Menezes, whose trust in FGV allows us to consolidate the mission of disseminating knowledge and stimulating national socioeconomic development.

**Carlos Otavio de Vasconcellos Quintella**

Director of FGV Energia

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# 1. ABOUT THE STUDY

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## 1.1. OBJECT AND OBJECTIVE

In the last decade, new discoveries in deep waters in the State of Sergipe coastal area have placed the state of Sergipe among the most important production frontiers in Brazil. The expected supply from offshore projects, especially natural gas, combined with the revitalization of onshore fields and the interconnection of the Liquefied Natural Gas (LNG) terminal to the transport pipeline grid, enhances the formation of a natural gas hub in the country.

In this context, the object of this study is the natural gas market and investments in the oil and gas (O&G) sector in the state of Sergipe. The objective is focused on providing a diagnosis of the gas market and analyzing the economic impacts of O&G investments on Sergipe. The diagnosis of the natural gas market seeks to identify opportunities and barriers for attracting investments linked to gas activities in Sergipe, considering aspects of regulation, legal certainty, taxation, infrastructure, competitiveness and gas tariffs. The analysis of the economic impact, in turn, aims to identify the direct, indirect and induced effects caused by investments in the O&G sector for the economy of Sergipe.

## 1.2. RELEVANCE AND JUSTIFICATION

The relevance of this study is based on the oil and natural gas exploration and production activities in Sergipe and the gas market in the state, which reflect state particularities, but also evoke debates at the national level, considering the context of development of the O&G sector and the opening of the gas market in the country. Based on the analysis methodologies used, the main debates involved in the process of opening the Brazilian natural gas market and its impacts on Sergipe were captured, in addition to the barriers and opportunities from the perspective of different segments covered by the O&G chain

The justification for this study is based on the potential for leveraging economic and social development from investments in the O&G sector and the process of opening the natural gas market, including other economic sectors. In Sergipe, for example, there is an emphasis on consumer segments or potential consumers of gas, such as the fertilizer, chemical, ceramics, glass and cement industries, in addition to the transport and thermoelectric sectors, among others. Furthermore, the possibility of forming a

natural gas hub enhances the creation of regulatory solutions, new operations and business models in the country related to offshore gas, onshore gas and LNG. Finally, there is the contribution of investments to strengthening logistics infrastructure and natural gas infrastructure.

The diagnosis of the gas market and the analysis of the economic impacts of the O&G sector on the State of Sergipe will allow the preparation of public policy proposals to overcome the actual barriers to attracting investments for the development of the state of Sergipe.

### 1.3. METHODOLOGY

The methodology adopted in this study to diagnose the natural gas market in Sergipe is based on qualitative exploratory analysis, through in-depth interviews with relevant stakeholders in the national and state gas market.

To carry out the interviews, the main agents involved in the natural gas market were mapped, focusing on the state of Sergipe. The respondents were divided into the segments closest to their areas of activity, as detailed below:

- Association;
- Consultancy;
- Consumption;
- Distribution;
- Financing;

- Government;
- Infrastructure and Logistics;
- Production;
- Regulation; and
- Transport.

After mapping and identifying the main agents, in-depth interviews were scheduled with 37 specialist agents, holding leadership and executive management positions in companies and associations in different links in the gas market, strategic leaders in the federal and state government, federal and state regulatory agencies, financing institutions.

The interview phase took place from December 5, 2023 to January 30, 2024, in face-to-face and remote formats, depending on the availability and physical distance of the respondent and interviewer. Face-to-face interviews with stakeholders based in Sergipe were held in the state capital, Aracaju, and other cities in the metropolitan region. Other face-to-face interviews were held in Rio de Janeiro. The duration of the interviews varied from 40 minutes to 2 hours, with the participation of two interviewers and at least one respondent.

The script of the interview encompassed 15 questions, divided among the following themes: supply, demand, regulation, competitiveness, taxation, tariffs (distribution and transport), legal certainty and infrastructure (See Attachment 1). The interview aims at a qualitative and inductive

analysis, which allows for a deeper understanding of the selected topics, as well as the comparison of responses from different stakeholders. Unlike the structured questionnaire, aimed at survey research methodology, the in-depth interview seeks to involve the respondents in expressing themselves freely, allowing the deepening of the debate of interest in this analysis.

The methodology adopted in this study to analyze the economic impact of expenses and investments in O&G exploration, production, transport and distribution activities on the state of Sergipe is based on the sum of the estimates of direct, indirect and induced effects on the rest of the economy.

Direct effects estimate the value of production, added value (income) and employment generated by economic agents operating in the oil and gas exploration and production in the state of Sergipe.

Indirect effects estimate the value of production, added value (income) and employment generated by companies supplying inputs for O&G activities in the local economy. The values are estimated using the coefficients of the regional input-output matrix, calculated by IBGE or by Brazilian universities and research centers, updated based on annual surveys of industry (PIA), commerce (PAC) and services (PAS).

The induced effects estimate the income generated by spending on salaries paid to employees of companies in the O&G sector

and their suppliers, who spend on the consumption of goods and services, inducing economic activities in Sergipe.

The consolidated results will be presented in monetary units, except for employment, which will be calculated in terms of the number of employed personnel, distributed among the following variables: production value, added value and employment.

#### **1.4. STRUCTURE**

The report of this study is structured in sections 2 "Diagnosis of the Natural Gas Market in the State of Sergipe" and 3 "Economic Impacts of Investments in O&G on the State of Sergipe".

Section 2 is divided into the following subsections: main debates, barriers and opportunities.

The main debates present the critical points of regulation and legal certainty, supply and demand, taxation, tariffs and infrastructure that impact the national and state gas market. The analysis is segmented by the perspective of the interviewed agents and their respective role in the gas chain (producers, transporters, distributors, consumers, specialized consultancies, federal and state regulators, federal and state governments). Analysis by segments does not necessarily mean the common positioning of the specific segment, but the particular vision of each agent interviewed in their respective role in the link in the chain they represent.

The barriers present in topics the main problems for the development of the gas market, national and state markets. Opportunities, finally, present in topics opportunities raised for new businesses, potential, vocations, recommendations and suggestions. Both barriers and opportunities are not exhaustive and were captured according to the analysis of the interviews carried out, so that they express particular perspectives on the development of the gas market in Brazil and Sergipe. Thus, the

barriers and opportunities captured may be conflicting, given the abundance of data collected in the interviews, and deserve dedicated attention by the public policy maker, agents in the gas chain and other investors, academics, among other readers of this study.

Section 3 presents the economic impact analysis, prepared using the input-output matrix.

## 2. DIAGNOSIS OF THE NATURAL GAS MARKET IN THE STATE OF SERGIPE

### 2.1. ANALYSIS OF REGULATION AND LEGAL CERTAINTY

In this section, the main debates on regulation and legal certainty in the gas market, at the federal level and in Sergipe, are mapped. There is an emphasis on the process of opening of the gas market motivated by the New Gas Law and Petrobras' Cease and Desist Agreement with the Administrative Council for Economic Defense (CADE), in addition to the regulatory agenda, harmonization of federal and state regulations, public policies, specifically 'Gás para Empregar' (Gas for Employment), and the new regulation of the local piped gas distribution service in the state of Sergipe. Regarding legal certainty, the debates focused on market contracts, such as supply, transportation, distribution and concession.

#### 2.1.1. MAIN DEBATES AT THE NATIONAL AND STATE LEVELS

##### • GAS MARKET OPENING PROCESS

The gas market in Brazil witnesses a set of ongoing changes and transformations, not only due to the New Gas Law, but the path traveled to reach this current milestone for the

country, including the previous Gas Law (Law no. 11.909/2009 ) and the Petroleum Law, "which is also the gas law" (Law no. 9.478/1997). Recently, however, there has been an acceleration of changes that culminated in the New Gas Law (Law no. 14.134/2021). **According to the production agent**, Petrobras' divestments in production assets, in share in the distribution link, among others, brought a new dynamic to the sector, which ended up in the need for changes in legislation, as the Law in force until then was holding back investment, also for Petrobras.

"A LAW THAT TOOK YEARS TO BE CHANGED, BECAUSE THE PREVIOUS GAS LAW WAS A LAW THAT DIDN'T BRING ANYTHING, IT BROUGHT NO DYNAMISM, NO INVESTMENT."

Changes in the international market are also important, because they have made gas more relevant, since the last decade with the shale gas revolution in the United States, which became the largest LNG exporter in the world, and the emergence of the war between Russia and Ukraine in 2022.

Furthermore, changes motivated by the energy transition, present in discussions at the climate COPs, have increased the importance of gas. In this last aspect, a producer agent considers that gas is a “very important” element of energy transition and energy solution, for the industry and the thermoelectric market, as it facilitates the insertion of renewables.

In the national context, the ongoing transformations play the leading role of the state of Sergipe, as it has a parliamentarian who took upon himself the responsibility of approving the New Gas Law in the House of Deputies, and supporting the process, which was **considered by the producer agent** “a great challenge overcome”.

The background of the New Gas Law, **according to the distribution agent**, occurs in a long discussion aimed at unlocking the development of the market by inducing competition and “taking advantage of the window” created by the entry of large volumes into the country, whether from national production, or import via LNG terminals.

Thus, the opening of supply begins with Petrobras not being anymore the only company purchasing the gas at the wellheads, especially when the gas belongs to its concession partners, in addition to other

producers, given that it has all the means of outflowing and processing. In the previous market design, Petrobras produced more than 80% of the gas and sold 100%<sup>1</sup>, this being the only sales channel, as it purchased from its partners or imported, and served distributors and some third-party thermoelectric plants. Currently, **according to the production agent**, most gas producers already sell directly to the market, hence, the market share of other companies (not Petrobras) in the non-thermoelectric market reached around 25% in 2023.

“IN A RETROSPECTIVE MANNER, UNTIL JANUARY 2022, NO SALE TICKET HAD BEEN ISSUED IN THE COUNTRY OTHER THAN BY PETROBRAS. FROM JANUARY 2022 ONWARDS, THERE HAS BEEN SOME DYNAMICS (HAS EMERGED) OF NEW PLAYERS WHO COULD SELL THEIR PRODUCTION”.

Combined with the opening of supply, the New Gas Law guarantees non-discriminatory access to essential infrastructures, making it possible to economically and fiscally treat Petrobras’ processing units for third parties to access and optimizing the use of the facilities and the costs for society<sup>2</sup>. Likewise, access to transportation as part of the Petrobras’ Cease and Desist Agreement (TCC) signed with

<sup>1</sup> There were other players in the Brazilian gas market, but in isolated projects and not relevant in the integrated grid, such as Eneva in Maranhão and GNL with thermoelectric power plant in Sergipe.

<sup>2</sup> All processing and outflow hubs (Guamaré, Catu, Espírito Santo, Rio de Janeiro and São Paulo) currently have negotiated third-party access contracts.

CADE in 2019 – later confirmed in the New Gas Law – allowed an agreement with carrier companies to make remaining capacities available on the market, ensuring greater dynamism as new agents contract transport, including other producers, free consumers and distributors.

**The transport agent** indicates that it was essential for the sharing of pipeline infrastructures to address the issue of legacy contracts, which refer to Petrobras' broad rights to indicate the need for use that would make reserve capacity impossible for newcomers to the market to inject gas.

“THE MAIN CHANGE [SINCE APPROVAL OF THE NEW GAS LAW] IS NOT TO PUT ANYMORE EVERYTHING ON PETROBRAS' BACK, THE MARKET IS MATURING, ALTHOUGH BEING QUITE YOUNG IN THIS GAS AREA.”

Changes in the market after the approval of the New Gas Law, such as the opening of supply and non-discriminatory access to essential infrastructures, allowed greater exchange of contracts between different suppliers directly with distributors and sales to free consumers, in addition to swaps (exchanges of gas) that allowed producers or Petrobras' partners to sell gas in the Northeast. This process also works as a result of Petrobras' policy of no longer investing in gas in the Northeast, opening space for new

suppliers, that is, more than 30 short-term contracts<sup>3</sup>, **according to the specialized consultancy agent**. Short-term contracts with a price marginally cheaper than Petrobras' price stand out, in addition to short and medium-term products enabled by private carrier companies TAG and NTS, which boosted sales. Thus, there was an opening of competition for the acquisition of the molecule of gas; including biogas, although its participation is still minor.

“IT SHOULD BE NOTED THAT THESE CONTRACTS THAT BOOSTED SALES A LOT, PARTICULARLY IN THE NORTHEAST MARKET, ARE ALWAYS SHORT-TERM CONTRACTS, FROM 1 TO 2 YEARS, 6 MONTHS, AND ALWAYS WITH PRICES A LITTLE LOWER THAN PETROBRAS' PRICES, BUT THERE IS NOT A MAJOR DISCOUNT AND VARIOUS PRICE PRODUCTS AS WELL.”

The New Gas Law, **according to the regulatory agent**, is gradually opening the market after a long period of monopoly, especially in gas transportation. **The production agent** adds that an important change in the structuring of the transport system was the change from the concession model to authorization, allowing flexibility in the construction of pipelines. The change in the granting model aims to promote

<sup>3</sup> Typically, short-term contracts between producers, such as Shell, Galp and Equinor, and small producers such as PetroRecôncavo and Origem.



investments in the expansion of transport and distribution infrastructure, including the construction of new gas pipelines to improve access to gas and facilitate the integration of producing states into consumer markets.

In addition, the definition of the regime for contracting capacity in transport by entry and exit at tariffs defined by distance, boosting the market by allowing other agents to access the grid, although the ANP still needs to regulate infra-legal standards. The entry and exit system, which emerged in Decree no. 9.616/2018 and was formalized in the New Gas Law, allowed a boom in market opening in the Northeast, with its landmark being the first contract in Sergipe, interruptible, combined with the handling contract with the local distributor, by Fafen, from Proquigel/Unigel.

“[THE NEW GAS LAW] BROUGHT TO THE PIPELINE SYSTEM THE ISSUE OF ENTRY AND EXIT, WHICH PROVIDES GREATER LIQUIDITY FOR THE AGENTS TO BE ABLE TO CONTRACT POSITIONS TO ENTER AND EXIT IN THE SYSTEM SEPARATELY, NOT IN THE HAND OF THE SAME AGENT.”

**For the producers**, this change in contracting was fundamental as it simplified the period and space, allowing the producers to contract entry in the network and sell the contract with his client. In the previous model, it would be up to the producers to discover their client over a long period of time to contract in all

links, which was not noticed by the agents because Petrobras was the only one that contracted.

Furthermore, the New Gas Law brings a systemic view of transport, as it was designed for Brazil to be a large hub, in which the entire commercialization occurs at a single virtual point of negotiation, regardless of the point of supply, and, in theory, all agents would pay for transportation.

The connection between the transport system and the commercialization activity also implies overcoming difficulties that emerged in the process of opening the market. **In the producers' perspective**, a bottleneck in transportation refers to the national scope of tariffs, as the uniqueness of the commercial activity finds a system in which each carrier has its specific tariffs. Therefore, to contract transport on different grids, it is necessary to enter into interconnection contracts, which add an additional cost of approximately 10% and introduce different rules according to the contractual flexibility and nomination clauses specific to each carrier. This scenario makes management difficult and increases transaction costs, especially in the case of penalties for scheduling failures.

**The transport agent** cites the importance of flexibility in gas acquisition options according to its importance for the relevant industry. If the gas is not of great relevance to an industry's activity, a trader may be responsible or may purchase a complete solution at the gas injection and withdrawal site using DDP, *delivery duty paid*, which means that the gas

will be received at the site without the need for direct involvement of the industrial consumer in the process. However, if gas is an important part of the production process, such as the fertilizer industry where gas represents 80% of the production cost, the industry can choose to buy EXW, Ex Works, which means assuming the right to be part of the market. Thus, the consumers themselves would contract their own exits, engaging on the platform to negotiate terms and conditions that meet the specific needs of the consumption profile.

Changes in the transportation system also imply contractual changes for the free consumer with the piped gas distributor, since transport entries and exits contracted by the user include the handling of gas in the state. This service is part of contracts for the use of the network and distribution system, called CUSD (Distribution System Use Contract), and is celebrated between the free consumer and the distributor.

Thus, the changes perceived in the market since 2021 reflect a more structured regulatory framework to guarantee legal certainty for companies, especially advances in the activities of traders and free consumers. The various innovations resulted in the same way, **according to the producer**, in some normal complexities.

In contrast, **from the distribution agent's perspective**, the New Gas Law is recognized for bringing some advances and creating the path for regulatory conditions to open the market. However, it is not effective because

the gas supply has not developed, that is, the demand level remains, only increasing reinjection. There is a lack of ways to expand supply and stimulate demand because an increase in supply would only be possible by monetizing this supply with new demands. In addition to not enabling an increase in supply, it does not generate competition between agents, as Petrobras continues to be the price maker in this market and, "putting the floor of this ceiling up high", makes the development of new applications for natural gas unfeasible.

This criticism emerges possibly due to the expectation that the New Gas Law would reduce the price and contribute to setting forth the conditions for the resumption of growth in the national industry.

"I LEARNED A MAXIM SAID BY THE INDUSTRIALISTS IN THE COUNTRY. THEY SAID: 'LOOK, OUR MAIN INPUT IS GAS AND IF WE CAN DO IT, STARTING WITH THIS LAW [NEW GAS LAW], GAS AT COMPETITIVE PRICE, THE INDUSTRY WILL GO WHERE THE GAS IS'."

**The production agent** confirms that the new market arrangement did not automatically entail the sale of cheaper gas to distributors, because the players themselves adjusted their pricing policies, following Petrobras' price, since this company has a market share of almost 80% and continues to be the price maker.

**“EVERYONE FOLLOWS THE PRICE THAT IT [PETROBRAS] MAKES.”**

Therefore, the New Gas Law brought evolution, but not from the perspective of economic development because the balance of supply and demand did not change, and the price paradigm did not change either, as what happened was the transfer of income which was previously in the hands of Petrobras.

**“A LITTLE MORE DYNAMICS CAUSED DISTRIBUTORS TO GET UPDATED IN THE SENSE OF SEARCHING FOR ALTERNATIVES (...) WHICH DID NOT EXIST. AND THE MARKET IS A LITTLE MORE DYNAMIC THAN IT WAS, BUT I THINK IT IS STILL FAR FROM BEING A COMPETITIVE MARKET IN WHICH DEVELOPMENT IS ENCOURAGED.”**

In fact, the recognized advances, mainly in the Northeast, occurred due to an issue related to the outlook, due to a strategic decision by Petrobras, rather than the Law. At the end of 2022, with the expiration of the distributors' contracts, Petrobras' repositioning guided its production to concentrate in the Southeast and South, instead of the Northeast<sup>4</sup>. In fact, producers managed to organize themselves and meet demand in the Northeast, generating diversification in Bahia, for example, with more than 15 different contracts, in Alagoas and Rio Grande do Norte, with onshore producers. In the

Southeast and South, there was no diversification in supply, that is, little impact on Brazil's largest markets.

In Sergipe, specifically, **the distribution agent** indicates that Sergás left Petrobras' supply exclusivity by opening Public Calls for gas acquisition, which resulted in a mix of suppliers with acquisition prices that guaranteed the competitiveness of the tariff charged in Sergipe.

**“SERGÁS NEVER THOUGHT OF HAVING A SUPPLIER OTHER THAN PETROBRAS, FOR EXAMPLE, LAST YEAR [2023] TWO SUPPLIERS WERE NOT PETROBRAS.”**

Despite this advance in the New Gas Law, it is still very incipient for the market and not enough to open it effectively. Accordingly, free consumers such as the Fafens of Sergipe and Bahia were paralyzed even in the midst of the market opening in the Northeast.

**“THE STATE OF BAHIA, FOR EXAMPLE, WHICH HAS A GREATER DIVERSIFICATION OF CONTRACTS AND ONE OF THE LOWEST DISTRIBUTION TARIFFS FOR THE CHEMICAL AND PETROCHEMICAL SECTOR, IT DID NOT REFRAIN THIS PLANT [FAFEN] FROM CLOSING, AND THIS ALSO HAPPENED IN THE STATE OF SERGIPE.”**

<sup>4</sup> A contrary movement is currently underway, as Petrobras is taking a new stance to occupy some lost spaces.

There are, therefore, some perceptions that movements that are more relevant emerged due to Petrobras' commitments to CADE than with the New Gas Law. The TCC resulted in divestments made by Petrobras with some restrictions placed on not contracting gas from partners in the fields after the contracts expire. Therefore, the entry of new players into the distributors' public calls and the migration of consumers from the distributor's captive market to the free market are questioned as being movements resulting from the Law, but rather as a result of the process of Petrobras' divestment and release of capacity in transportation and flow.

For the Northeast region and in particular the state of Sergipe, the New Gas Law immediately created a negative situation, **according to local consumers**, because Petrobras' lack of commitment to offering gas generated a risk of withdrawal. Then, there was a process of change with new players supplying, although in the Sergipe scenario the local concessionaire was affected in terms of negotiation capacity, resulting in losses in competitiveness in the industrial chain compared to other states in which distributors obtained very attractive contracts. On the other hand, **the distribution agent** signals the advancement from two suppliers, in 2023, to four, in 2024, so that the end customer has a direct benefit from reducing the price of the molecule and, consequently, the final price.

“THERE ARE COMPLAINTS ABOUT THE PLAYER WHICH WAS OMNIPOTENT, BUT WE ARE ONLY DISCUSSING GAS MARKET OPENING BECAUSE SOMEONE DID IT TOO. NOW THIS IS ANOTHER MOMENT, THAT IS, DIFFERENT PLAYERS IN THE CHAIN TAKE DECISIONS. HOW TO MAKE A HEALTHY COORDINATION ENVIRONMENT AMONG THESE DECISIONS BETWEEN THE PUBLIC AND PRIVATE?”

In short, **according to the government agent**, there would still be few and regionalized changes. However, according to ANP Joint Technical Note no. 2/2023 “Competitive Diagnosis of the Brazilian Natural Gas Industry Aiming at the Proposal for a Concentration Reduction Program”, regarding the effects of the opening, there was confirmation of the economic theory that “competition is good”, given the increase in the number of agents operating in the market. Still, very concentrated in the Northeast due to independent onshore gas producers, in addition to the fact that the northeastern states were the first to change their legislation.

“WE SEE THAT THIS MOVEMENT OF OPENING IN BRAZIL WAS A SOMEWHAT FAST MOVEMENT, EVEN WHEN COMPARING WITH OTHER EXPERIENCES, WITH INTERNATIONAL EXPERIENCE. BUT, IN SOME POINTS WE ARE STILL IN A CURVE OF LEARNING, OF MATURING”.

## • REGULATORY AGENDA

The New Gas Law, **according to the government agent**, brought a structural change in the sector, but progress was made with regulation by Decree no. 10.712/2021 and CNPE Resolution no. 3/2022, which resulted in a deeper understanding of the themes of the Law and consolidation of the various CNPE resolutions previously published. These instruments directed the sector's themes to regulation by the Agency.

In 2022, the ANP's collegiate board decided to initially list ten priority actions, which later became twelve because the last ones tied in the score achieved, **according to the regulatory agent**. Of these twelve actions, five are related to the gas market (gas release, access to infrastructure, definition of the commercialization model, the definition of the transport gas pipeline itself and information regarding the tariff), recognizing the market's anxiety with the effective realization of the regulatory action in full.

"WE RECOGNIZE THAT THE MARKET IS EAGER FOR NEW REGULATION AND IT IS ABSOLUTELY CORRECT, BECAUSE (...) REGULATION INDICATES VISIBILITY OF LEGAL CERTAINTY."

**According to the government agent**, ANP did not advance as quickly on the regulatory agenda as desired, but managed to signal its importance and that some measures could be taken on an ad hoc basis. The delay, **in the**

**consumer's perspective**, impacts on the lack of transparency regarding the cost of gas processing at UPGN and the use of pipelines, which requires regulation by the federal agency, and on the issue of penalties in contracts, especially for industrial consumers who has long-term gas supply with ship or pay or take or pay contracts and the conditions and fines set out in the contract are "not absurd".

For the states, **the producer agent** notes that the regulatory agenda is also important, because it is not something fixed, but continuous, which requires monitoring and changes as the market follows.

## • MATCHING OF FEDERAL AND STATE REGULATIONS

The New Gas Law brought the provision of regulatory harmonization, through the MME and the ANP, which was an advance, **according to the government agent**, in order to be able to regulate the opportunity to interact with the states.

"WE ARE DEALING WITH RULES AMONG LINKS IN THE CHAIN THAT ARE RESPONSIBLE FOR NATIONAL SUPPLY. THERE IS NO DOUBT THAT THIS TOPIC [HARMONIZATION] WITH THIS FORECAST IN LAW AND WITH THE PROVISION IN THE DECREE OF THE FEDERATIVE PACT (...) IS ALREADY A VERY POSITIVE POINT."

The challenge in harmonization occurs, **according to the transport agent**, because the national energy market regulation structure is more complex than in other countries that have a single energy regulator. In Brazil, there is an electricity and oil and gas regulator, the latter being divided into federal and each state.

Regulatory harmonization is a “great challenge” that finds parallels in other political contexts already covered before the New Gas Law: from the first movement of the Gás para Crescer (Gas to Growth) Program, which later became the Novo Mercado de Gás (New Gas Market), and the more recent Gás para Empregar. In these contexts, **according to the producer agent**, “the point was addressed that this would interfere with Article 25 of the Federal Constitution”, which paragraph two attributes to the states “directly exploring, or through concession, local piped gas services”. In Gás para Crescer, it was understood that it could go to the limit of what was federal and what was state, without modifying the Constitution, which was maintained. In the Novo Mercado de Gás, the idea was to promote the harmonization of state and federal legislation.

However, this border turned out to be thinner and more nebulous than imagined and there are discussions on harmonization that, **according to the producer agent**, will certainly go all the way to the Federal Supreme Court (STF), which will decide on the constitutionality of some issues. **The regulatory agent** considers that decisions in the STF related to harmonization belong to the process of a Federal Law and gradual adaptation of the states afterwards.

In Brazil, **according to the perspective of a specialized consultancy agent**, harmonization in all states would be desirable, but Article 25 of the Constitution results in a division of competences. Therefore, the ANP regulates the sector up to the city gate and, from the city gate forward, the state is responsible. **According to consumer agents**, conflicts of competence and different regulatory approaches challenge harmonization.

**For the producer agent**, there is no overlap with what is already determined in the Constitution, as all links are the responsibility of the Federation, except distribution, which remains at the discretion of the states. It also emphasizes that the New Gas Law did not bring bypass, risks and legal advances of any interpretation that would remove this condition from the states. **The distribution agent**, on the other hand, questions whether the opening is a bypass and who benefits from the bypass, which creates difficulty in understanding harmonization.

**For the transport agent**, the challenge of harmonization is to show the power of cooperation in the gas chain and win-win planning, due to the tenuous border of multiple players to regulate and, eventually, a state wanting to protect local regulation by not realizing a larger context.

“MATCHING OF REGULATIONS IS NOT A TRESPASSING COMPETENCE, BUT FAIRLY BRING A MARKET INTELLIGENCE, WHICH IS GOOD FOR REGIONAL DEVELOPMENT AND NATIONAL DEVELOPMENT.”

**The government agent** agrees by observing a barrier in the case of each state creating a rule when looking at itself and not understanding the general functioning, and cites the movement that the state of Sergipe has carried out, "being at the forefront", according to analysis from the market itself (not from the government).

**The regulatory agent** recognizes that the harmonization of 27 states with the Federal Government is not an easy process and cites the reference of Europe having harmonized 28 countries over 30 years. In the Northeast, for example, there are particularities due to onshore production that may not be equalized in some states in terms of the federal rule that the primary source should be linked to transportation, instead of being linked to the direct distribution. There are questions regarding the onshore producer connecting to transport and then "returning" to the distributor, which has led states to adjust with their own solutions. Sergipe, in this aspect, has managed to provide "good guidance", as is the case with LNG.

"THE LAW, WHEN IT IS MADE, IT IS DELTA ZERO, IT IS UNTOUCHED AND THEN THE MARKET ADJUSTS, AND THIS LAW IS NOT ALWAYS UPDATED, AS THE MARKET ADJUSTS ITSELF, THEN THE STATES TAKE THEIR OWN SOLUTIONS, WHICH DISTANCE THEM FROM THE SPIRIT OF LAW"

**The producer agent** analyzed that federal regulation, due to the fact that it refers to a product that also has its decisions granted to

the states within the constitutional scope, needed to give directions in certain elements, that is, depending on the adhesion of the states. Concurrently, the states that did not follow these best practices would be left behind in the sense of not being a good host for new investments.

In this sense, RELIVRE emerged, a ranking involving IBP, ABPIP and Abrace; a "kind of Olympic competition among the states, so that each one would have the best possible regulation", **according to the producer agent**. In the case of Sergipe in this "Olympic competition", even with Alagoas, a review of its rules was carried out and it is in first place. The degree of this dispute varies from state to state, but some states realize the importance of change. **The agent from the state government** disagrees about the competition, but confirms the importance of RELIVRE to provide legal certainty to investors, who are faced with regulations that do not create problems for them.

"SERGIPE IS ABLE NOT ONLY TO PARTICIPATE IN NATIONAL CONSTRUCTION, BUT ALSO TO PLAN FOR A BETTER SOLUTION FOR ITSELF."

As for RELIVRE, **there are considerations in the distributor's perspective** as it is a ranking with a very specific look, prepared by professional class entities to reflect the defense of their positions and benefit them, including producers. There is no score, for example, on increase and diversification of supply, or a look at the downstream side

regarding the municipalities served and the amount of network to reach new markets. In discussions about harmonization, the regulation of the free market predominates, and the states with the highest scores within RELIVRE, for example, do not have the largest number of free consumers or the free market does not develop, not due to a lack of regulation, given the score, but due to lack of gas molecule and competitive gas.

From a third perspective, RELIVRE was positive in showing the difficulties of state regulations from the perspective of consumers and producers, leading many states to seek regulatory updates.

“RELIVRE AIMED AT THE DISCUSSIONS, BECAUSE PREVIOUSLY THERE WAS A CONSENSUS, A GENERAL DISSATISFACTION THAT NOBODY STATED. THAT IS BAD BECAUSE IT IS VERY DIFFUSE. WHEN YOU PUT THAT IN A RANKING, IT IS OBJECTIVELY STATED ‘THIS IS THE CAUSE’ (...) THAT IS GREAT FOR THE NATIONAL SCENARIO. WHAT THE DISTRIBUTORS DISCUSS IS WHAT WOULD BE THE PROPORTION, THE WEIGHT OF EACH ELEMENT, BUT YOU HAVE AN OBJECTIVE MEASUREMENT FACTOR.”

In general, the current process for matching the federal and state regulation means, for the states, **according to the specialized consultancy agent**, to regulate issues such as free consumer and methodology for

establishing tariffs, in addition to demanding efficiency from distributors in a similar way. In the first aspect, large consumers who would like to be free consumers encounter difficulties in state legislation or regulation. In the second aspect, in some states state regulation sets a fixed margin of 20% on OPEX and a return rate of 20% per year on CAPEX, which generates a somewhat high cost for large consumers, which occurs in the case of Sergipe because Sergas’ expenses are remunerated at 20% when building a gas pipeline. Thus, matching would be relevant, because faced with a state with very restrictive regulation and very expensive tariffs, the consumer - when choosing between one state or another, under equal conditions - would prefer the one with more simplified regulation.

“SOMETHING IS MISSING FOR AGENTS TO HAVE THE COURAGE TO MIGRATE (...). THE CONTRACT WITH THESE CONCESSIONAIRES ATTEMPT TO PLACE IN ORDER NOT TO LOSE THE AGENTS, WHICH THEY ACTUALLY DON’T, TO CONQUER MARKET AND THE BUSINESS THAT IT [DISTRIBUTOR] DOES NOT DO, BECAUSE ITS CONCERN IS NOT TO TRADE GAS, IT IS TO DISTRIBUTE.”

**For the producer agent**, the matching and alignment of concepts avoid possible conflicts in the future, moreover in trade activities and definition/classification of gas pipelines. In trade, the distributor carries out



this activity with its captive customers, but the trade activity carried out by basically all gas producers in Brazil seeks the market to buy their gas, be it a distributor or another user, and the state cannot interfere as it is already regulated by the ANP, which is defined in the New Gas Law, although interpreted in a not so clear way by all agents, **according to the producer agent**. Regarding the definition and classification of gas pipelines, Article 7 of the New Gas Law, clearer compared to the old law, has all the definitions of a transport gas pipeline, with the ANP being able to arbitrate if a pipeline does not meet any of the criteria and provides the definition on a case-by-case basis. However, some states advance in regulation by defining a distribution pipeline, which conflicts with the Law.

**According to the distributor**, although the New Gas Law promotes legal certainty, and is admittedly well written, it does not always have practical repercussions throughout the matching process, such as the perception of a lot of legal uncertainty in São Paulo.

**For the consumer agent**, conflicts related to the definitions of what is transportation and what is distribution of gas entail double tariffs because in some states there may be a transportation tariff plus a distribution tariff and a third tariff that the state gas distributor considers itself legally able to charge a state transport fee.

The state monopoly is an element identified as hindering regulatory matching and a more dynamic market, **according to the producer agent**. An example of this is the possibility of

a state importing LNG and injecting it directly into the state piped gas network without going through the transport network. The state monopoly would thus hinder the better use of infrastructure. Parallel observation identifies that the distributor prefers to have control and tries to put up obstacles supposedly not to lose agents over a business that it does not carry out, such as trade, although the pipeline continues to belong to it.

**“THE STATES HAVE A CLAIM, AN ILLUSION THAT THEY NEED TO REGULATE THE TRADER TO PROTECT THE MONOPOLY OF THEIR DISTRIBUTORS. HENCE, THIS HAS ALWAYS BEEN A CLAIM TO HAVE TRADE REGULATED. HOWEVER, THE STATES STARTED TO HAVE TRADE REGULATION IDENTICAL OR SUPERIOR THAN THE FEDERAL REGULATION.”**

**In the distributor’s perspective**, the discussion on matching is very appropriate, however, “out of time” and mistaken, as the possibility or viability of matching the state regulations is uncertain if there is no increase in supply, presenting the same barriers. Brazilian regions have different concentration rates: from the North region with the highest concentration rate to the Northeast region with the lowest, therefore different concentration conditions could not require equal state regulation for all states. In this sense, matching requires a careful look from state to state, so that its development is not

made impossible. In addition, distributors have a role in the development of states by expanding infrastructure and attracting new investments.

In this argument, there is the perspective of divergent interests, **as per the consumer agent**, as a challenge for federal and state matching, especially in tax issues such as tax incentives and distribution of royalties.

**For the distributor** matching of regulations can frustrate expectations because state markets have completely different maturities and realities. Furthermore, matching state regulation and federal regulation sounds positive, but in the event of all matched states having the same regulation, the autonomy to generate state development is lost. The opposite argument **from the producer agent** visualizes that many times the states interested in implementing public policies to meet state needs can, in a certain way, kill the opening of the gas market in the broader domain in which supply and demand are connected via transport, as the security of the supply occurs at the federal level.

RELIVRE, in the **distribution agent argument**, is referred to as a medicine that can be very bad and kill the development of states that are seeking to increase the number of networks and municipalities served to diversify their demand, as it is harmful when benefiting specific projects of consumers already served and producers who prefer to leave the gas ceiling higher than to reduce the price of gas and develop new applications.

**“IF MARKET CONCENTRATION IS DIFFERENT, WILL THE REMEDY BE THE SAME?**

**AND, PERHAPS THE REMEDY I GIVE TO ONE REGION MIGHT KILL THE OTHER REGION.”**

In order to develop the matching, it would be necessary to first open the market on the supply side, then on the downstream side, but initially the increase in the supply of federal gas and the number of suppliers, investments in production outflow so that the gas reaches the coast, in addition to increasing onshore gas production to stimulate other price makers.

Furthermore, the matching under discussion has a top-down perspective, but this process should also be reflected from the state to the federal level, questioning what is underway in the states and is not being done at the federal level. An example of this is the review of tariffs and bottlenecks related to the interconnection of transport gas pipelines, **according to the distributor**.

Another obstacle pointing to the matching, **according to consumer agent**, is the lack of coordination between federal and state regulatory bodies, which can lead to regulatory gaps and hinder the implementation of policies in the country. The **consumer agent** considers, however, that the state of Sergipe “has done an excellent job of institutional coordination and is at the forefront of the country in this regard”.

In Sergipe, regulatory matching has occurred easily, given the relevant role of public agents in supporting this process. **For the producer agent**, regulatory matching means not creating conflicts, and Sergipe, with one of the most modern state regulations and the main shareholder of the gas distribution company, is able to define the strategy to attract industries to set up in the state. This view is in line with the argument of a **state government agent**, who mentions the governor's work to profit from the window of opportunity and "do the state's homework", moving towards updating the regulation of piped gas to dialogue with the federal government.

**Another consumer agent** states that the government of the state of Sergipe is "taking the lead" and anticipating the regulatory process, which the **regulatory agent** confirmed by clarifying that, in terms of matching, Agrese adhered to the Manual of Good Regulatory Practices as soon as the ANP and the Natural Gas Market Opening Monitoring Committee (CMGN) launched it, which was not an imposition, but a recommendation from the MME to state agencies. The first movement, in 2019, of opening the market with the reduction of limits for migration and the definition of a free consumer, followed by the New Gas Law, complete the state agency's perception of hyperactivity in changing the market.

#### • NEW GAS REGULATION IN THE STATE OF SERGIPE

Gas became an element of competition for

attracting investment. Sergipe anticipated by realizing this and, even after the change of state government; there is continuity in improving state legislation, through the regulatory agency and decrees, to make the state very competitive for gas.

**"THIS REVIEW CARRIED OUT THIS YEAR IS NOT THE FIRST, IT IS THE OUTCOME OF A SEQUENCE OF UPDATES FROM THE REGULATION PREVIOUS TO THE [NEW] GAS LAW, (...) WHICH ALWAYS SHOWS THE INTEREST, GROUNDBREAKING OF THE STATE [OF SERGIPE] IN THE NATIONAL GAS INDUSTRY SCENARIO".**

The favorable regulatory framework that the state of Sergipe is seeking to develop can attract companies that will invest in consumption closer to the source of production. It is an active state welcoming investments, wishing that projects to expand gas supply shall occur soon, and, therefore, with showcase actions towards regulation in harmony with federal regulation, being a benchmark for other states. The state government's ambition to position Sergipe ahead with more modern gas regulation is a positive fact.

In the free market ranking, Sergipe has the best score in Brazil, followed by Alagoas. Sergipe emerged, as an important element in the transformations of the gas market, be it first place in the RELIVRE ranking, or

leadership in the transformations of federal and state legislation internally, or changes in the dynamics of the local market, seeking to optimize the market, which has its own limitations.

**“THE STATE OF SERGIPE HAS PROGRESSED A LOT IN THESE MATCHING CONCEPTS, (...) THE FIRST STATE TO UNDERSTAND THE ENTIRE DYNAMICS OF THE NEW GAS MARKET, AND THEY OVERCAME THE BARRIER OF 80% (...) OF RELIVRE.”**

With the New State Regulation, the need to have an operational agreement was published, in which day-to-day information between the carrier and distributor is shared in a transparent manner with the agent who migrated to the free market and the penalties provided for in state contracts are allocated in the competence link. This means preventing duplication of penalties related to balancing (provided that this has already been paid at another link in the chain), because if a large industry has a scheduling problem and needs more gas, it will get it from the market and it will be delivered by transport., and with the balancing in transport, consequently, the distribution would already be adjusted. In addition to the operational agreement, the New State Regulation provides, in Resolution no. 24, to encompass matching with federal characteristics.

As for trade, the new state regulations brought innovations:

- No requirement at state level for proof of surety, as it would be sufficient to present it to the ANP, which deals with resolution no. 52/11 about various requirements for trade activities, including the presentation of surety to be able to sell the gas (a rule that many states replicate);
- No requirement at state level regarding the quality of the gas, as, unlike other state regulatory agencies, Sergipe understood that the quality in measuring the chemical and physical conditions of the gas carried out by the chromatograph is prior to the distribution system, being a requirement aimed at the initial carrier when injecting the gas into transport;
- No requirement for the trader to serve the distributor’s emergency market in gas contingency emergencies, as many state rules require this, despite the fact that bilateral conditions celebrated with the free consumer do not affect the distributor’s captive market;
- Removes the need for authorization, opening a branch in the state and proof of minimum gas availability, replaced by a more lenient registration rule without charging duplicate obligations at the federal and state levels; and
- Veto on self-dealing in Article 6, that is, the new regulation prevents the state distributor from selling gas to itself when acting as a Trader, which could place obstacles on business leverage.

**For the distribution agent,** the direction taken by Sergipe in removing the gas Trader's obligations towards the state in relation to what ANP already regulates, in order to avoid duplication of requirements, aims to relieve the burden on entry of new players as much as possible; however, the Constitution granted states the power to regulate local piped gas services, considered a relevant responsibility. Reinforcing this perception, a **second consultancy respondent** reveals that in the matter of penalties, for example, difficulties emerge because the carrier and distributor are different entities and – although the new regulation seeks to reduce the cost of migration to the free market, not subjecting the consumer to charges on both links – the events would replicate throughout the chain, imposing consequences for each of the links and even potentializing litigation.

Advances in the new regulation aimed at the end consumer also include the secondary market, which allows, through flexible CUSD, large users who have a contract and do not use the volume to sell surplus gas to the local distributor. **The producer agent** considers, however, that this is a partial advance in Sergipe because previously the trade contract should have had a clause that prohibited the free consumer from withdrawing an additional volume of gas and, in the new regulation, they replaced prohibition with restraining, that is, there is still negotiation for additional volumes on the secondary market.

**According to the producer agent,** some states place restrictions on the secondary market, such as authorizations, due to a mistaken understanding that the gas had entered distribution and the resale of surplus would be gas removed from the state, when, in fact, the gas is still in transportation grid and the agreement between the parties is made at a federal level.

Other advances include capacity allocation and consumer migration from the captive market to the free one. First, allocation means making gas more competitive in distribution since the calculation of the service provision margin is carried out on the total volume handled through the distributor's pipelines, whether destined for free or captive users. Second, user migration was made easier, as previously there had been relative difficulty for the company due to the longer time needed to migrate<sup>5</sup> and the minimum volume of consumption.

“THE COMPETITIVENESS OF GAS DOES NOT INCLUDE ONLY THE PRICE OF THE MOLECULE, BUT IT GOES THROUGH ALL TRADE CONDITIONS. HENCE, WHAT THE STATE OF SERGIPE IS DOING IS IMPROVING THE TRADE CONDITIONS FOR THIS TO REFLECT ON THE PRICE (...) MORE COMPETITIVE TO ATTRACT THE INDUSTRY.”

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<sup>5</sup> In the process of migration, according to the New Gas Law, free consumer has to present prior notice to exit the distributor's captive market and have minimum consumption volume, according to the State regulation.

Despite benefits such as the ability to negotiate the molecule price with the supplier and suitable transport conditions for the free consumer, there are complexities to be assumed by the user such as contract management. Upon becoming free, the consumer will now have to negotiate three new essential contracts: GSA<sup>6</sup> (gas purchase and sale contract), transport and distribution. Furthermore, contracts must come into effect on the same date to avoid interruptions in supply, which involves complex negotiations.

The new regulation, **according to the regulatory agent**, also addressed what was a conflict of competences, as what would not compromise the legal competence of the state agency was changed based on public contributions received, citing the removal of the inspection fee on the trader and respective contract obligations.

**For consumer agents**, changes in local legislation have provided greater legal certainty; however, what really interferes with the security of making the investment is the issue of whether there will actually be investments in SEAP in the oil and gas area or whether it will be only another promise. The regulatory agent stated that the new regulation reduced barriers, but other mechanisms are necessary to absorb the entry of new consumers via taxation.

“SERGIPE TOOK A BIG STEP, IN SENSE OF PROVIDING LEGAL CERTAINTY TO FREE MARKET AGENT, THE TREND IS FOR THIS MARKET TO GET STRENGTH.”

**In the regulatory agent’s perspective**, Sergipe is becoming a model for other states, due to very active legislation, with changes following public consultations, the modernization of the regulatory agency, in addition to tax incentives that place Sergipe on a “very good” path to attract investments, and with gas arriving, become a major hub for investing in the Northeast. The expectation is that with the base created and the framework bringing legal certainty, industries will be attracted, although this has not yet happened so far, because the reformulation is recent, in force since November 2023. Hence the importance of prospecting, including at international events.

“LEGISLATION AND THE ISSUE OF THE RISK OF MOLECULES ARE SOME FACTORS THAT HAVE NOT BEEN REALLY ENABLING THE FREE GAS CONSUMER IN BRAZIL. NOT ONLY IN SERGIPE, BUT ALL ACROSS BRAZIL.”

**For consumers**, there is the expectation that the new regulation will be aligned with national policies and guidelines for the sector, facilitating cooperation between federal and

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<sup>6</sup> GSA - Gas Supply Agreement.

state governments, and promote sustainable practices in production, distribution and consumption, according to environmental and energy objectives of the state and country.

“THE NEW GAS STATE REGULATION OF SERGIPE IS EXPECTED TO CREATE A MORE FAVORABLE ENVIRONMENT FOR INVESTMENTS IN THE SECTOR, ENCOURAGING COMPETITION AND EFFICIENCY. THE STATE OF SERGIPE HAS ADVANCED IN A QUICK AND EXEMPLARY MANNER IN THIS SENSE.”

Due to the modernization of the regulation, there is the registration of new traders and the diversity of suppliers already supplying gas, in addition to the gas pipeline to connect Eneva’s LNG terminal to the transport grid. This project, considered unprecedented in Brazil, was made possible by an “avant-garde” regulatory solution, with the engagement of Sergipe, for a specific authorization for that pipeline before the New Gas Law.

The project discussions, still under the validity of the previous Gas Law, presented the difficulty of construction under the concession regime and the complexity of the bidding process.

**The local consumer** mentioned that there was progress in the regulatory aspect, but points out the need for further advances, for

example with complementary regulation for biomethane, and criticizes the fact that there are no free consumers other than Fafen. For these gaps, the **local consumer** mentions the recently created Association of Natural Gas Consumers of Sergipe.

“THIS MODERN REGULATION IS A GREAT ENCOURAGEMENT FOR CONSUMPTION, IT REMOVES OBSTACLES, FACILITATES EACH OF THE CUSTOMERS (...) CHOOSE BETWEEN THE CAPTIVE MARKET AND THE FREE GAS MARKET. (...) WE HAD A GREAT EXPERIENCE, WE HAD VERY LARGE SUPPORT FROM STATE GOVERNMENT THROUGH SEDETEC AND AGRESE WHEN WE WERE IN THE IMPLEMENTATION PHASE”.

**The producer agent** recommends a step-by-step guide to enable a suitable business environment for investment: modernization of the distributor’s concession contract; legal framework aligned with best practices and privatization of the distributor. In the case of Sergipe, the purchase of another part of the distributor would have been a step in the opposite direction, but it could be a necessary step to “fix it later”. In short, make the political, regulatory and tax environment as stable as possible and its provisions clear to provide stability to the investor.

## • FORMULATION OF PUBLIC POLICIES

**The government agent** identifies the need for public policies to stimulate demand, especially for the benefit of industry, because cheap gas would be sufficient to displace coal, firewood and fuel oil, combined with the energy transition movement, given the value of gas in reducing emissions.

“CLARITY AND PUBLIC POLICIES THAT STIMULATE THIS DEMAND ARE NECESSARY FOR US TO PROGRESS FASTER. IT WILL BENEFIT A LOT FROM THE INDUSTRY. IT’S NOT BY CHANCE THAT WE ARE FOCUSING ON THE ISSUE OF INDUSTRY IN THE SUBCOMMITTEE OF GÁS PARA EMPREGAR; I AM NOT SURE IF THE WHOLE INDUSTRY, BUT DEFINITELY THE EXPORT INDUSTRIES, (...) I WOULDN’T SAY ONLY THE HARD TO ABATE. AVAILABILITY OF NATURAL GAS AND REDUCTION OF EMISSIONS BECOMES AN APPEAL FOR AN INDUSTRY TO SET GROUND.”

**Another government agent** mentions that the question “what paths are necessary to ensure the competitiveness of gas and develop firm demand?” is the Gás para Empregar question.

Gás para Empregar was defined **by a consumer agent** as a program set up by the current government to generate jobs in Brazil through the use of gas in the chemical and fertilizer sectors, but the progress is criticized, due to the current monopoly in the gas market.

**For the regulatory agent**, Gás para Empregar is a “very good” program, because it is shedding light into the new market and the search for gas for energy transition and security. Although effective actions were expected in a shorter period of time, **the expectation of large consumers** is that Gás para Empregar will “effectively succeed”, as the ground of the Program is to increase availability, so that the increase in supply generates affordable tariffs that encourage demand, especially in sectors considered strategic, generating employment and income in the states where the gas is used.

There is an argument in the sense of putting pressure on the government so that public policies foreseen in Gás para Empregar become an incentive for the arrival of investors, especially for industrial opportunities in Sergipe such as expansion or new factory of ammonia/urea, a factory of methanol and other chemical industries, steel mills, as well as ceramics and glass industries. Also depending on the impact on price reduction, enable the consumption of around 800 thousand cubic meters per day from a potassium plant, through the exploration of carnallite.



**Another consumer** identifies that Gás para Empregar targets gas with a “better price”. In the case of the fertilizer industry, for example, ammonia - the main product - is very sensitive to the price of gas, so being competitive in the trade of ammonia requires a low gas price. Thus, Gás para Empregar could be an important program for Sergipe, where there is already a fertilizer factory.

### “THE WAY IS THE PUBLIC POLICY; ITS ABSENCE IS THE BARRIER.”

The producer agent, on the other hand, makes a critical analysis of the government initiatives, which would not be good to encourage firm demand. Demand would exist at a competitive price due to an increase in supply, and the role of public authorities would focus on ensuring a stable political environment, legal framework and workforce.

“TO HAVE THIS GAIN IN SCALE, YOU NEED TO HAVE INVESTMENTS. TO HAVE INVESTMENTS, YOU NEED TO HAVE LEGAL CERTAINTY. SO, IT IS A KIND OF VIRTUOUS CYCLE, GOOD REGULATION, PREDICTABILITY, TRANSPARENCY UNLOCK A CYCLE OF INVESTMENT THAT WILL END UP BENEFITING THE MARKET AS A WHOLE.”

## 2.1.2. BARRIERS

- The imbalance in terms of regulatory incentives and penalties between gas supply agents with a small portfolio and others with a large portfolio was cited as a barrier to newcomers, given the difference in perceived cost between a large agent and other small ones.
- The variation in contractual rules for interconnection between gas carriers was cited as a barrier to the transition in the grid from one carrier to another, making it a challenging process for opening the national market.
- The lack of indication on the expansion of the transport network was cited as detrimental to investors’ planning, regarding operational costs and infrastructure benefits, including issues related to the approval of public calls and the parameters used in the tariff review, such as the WACC (Weighted Average Cost Capital) of transportation.
- The complexity of the regulatory structure in Brazil was cited as a challenge in matching the federal and state regulations, as in the country there is an electricity and oil and gas regulator, the latter being divided into federal and in each state.

- The lack of federal and state regulatory matching was mentioned as a motivator for state regulations to invade the competence of the Federal Government in terms of the trade activity and classification of gas pipelines, generating possible lawsuits.
- The state monopoly was an element identified as hindering regulatory matching and a more dynamic market, generating, in this argument, the possibility of a state, for example, importing LNG and injecting it directly into the state piped gas network without going through the gas transport network. The state monopoly would make it difficult, in this argument, to make better use of infrastructure.
- In the sphere of gas trading, it was mentioned that states seek to regulate traders in a restrictive manner to protect the monopoly of their distributors in their areas of activity, enhancing regulatory divergences between the state and federal spheres, as well as limiting national market opening.
- State regulations were classified as "stiff", which would result in consumers preferring to remain in the captive market, instead of migrating to the free market, that is, the more normative barriers in state regulation, the smaller the range of benefits expected for the free consumer for boosting the market.
- The contractual inflexibility of distributors and the lack of supply to meet additional demands were mentioned as impediments to the growth of the gas market.
- The migration to the free market was highlighted as a challenge at a time when consumers would have greater complexity in managing contracts and allocating risks.
- Regarding gas suppliers and traders, it was mentioned that they would tend to give preference to a higher consumption unit to the detriment of free consumers, which would allow the sale of a larger volume in a single circumstance - such as public calls from piped gas concessionaires.
- Sergipe was cited as one of the smallest natural gas markets in the country, which would put pressure on the balance between tariffs and gas competitiveness in the state. In the event of offshore projects operating in the state, production would exceed what Sergipe anchors in consumption.
- The state of Sergipe, according to respondents, does not have a demand that anchors the supply, the production of SEAP would exceed the usual consumption volume. Therefore, it would be interesting to take an industrial look at formulating public policies that could anchor future consumption, through project guides, for example.

- The concession contract for the piped gas distributor in Sergipe was criticized by different agents in the chain, mainly in relation to the applicability of the current remuneration margin of 20% per year on investments made by the distributor and the anachronism of the contract, from 1993, which would not have followed the updates in the gas industry and remains in force for another 20 years.
- The current concession of the piped gas service in Sergipe was mentioned as a possible inhibitor for the entry of a new industry interested in developing a dedicated gas network, due to the capital cost linked to the project.
- The possible discontinuity of annual tariff reviews, in addition to the adjustment based on the IGP-DI<sup>7</sup> (instead of an index relevant to the gas market), were mentioned as elements of legal uncertainty for the local distributor in terms of the decision on network projects and consumer diversification.
- Sergipe was mentioned as a state active in unlocking projects to expand gas supply, but the state's planning could be ineffective if the producer decides to reinject the gas into expected offshore projects, since this decision is taken by the producer based on an economic balance (if it is more profitable to reinject than to take the gas to the coast) regardless of the political will of the state.
- The paths designed to enable offshore projects and consumption of the respective volume of gas in Sergipe were highlighted as controversial, as the state of Sergipe supposedly would not be looking at its gas distributor as an asset of the state and its role in the development of the state gas market.
- The price of the molecule was highlighted as a problem for the market, which would limit state efforts to attract companies by guaranteeing legal certainty and updating the state's gas regulations.
- The slowness in the federal regulatory agenda, followed by renegotiations and delays in the deadline, was considered a barrier, by different agents, to boost the gas market, especially in aspects of access to infrastructure, definition of the trade model, definition of gas pipeline and transport tariff.

### 2.1.3. OPPORTUNITIES

- Considering the estimates of increased availability of natural gas in the state due to the SEAP I and II projects, the opportunity for flexible contractual models according to the consumer profile and alternatives to maintain the liquidity of the new supply was mentioned. In this argument, the ability to offer long-term contracts with guarantees would be linked to the successful development of production projects, as they would provide the necessary backup to sustain contractual commitments.

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<sup>7</sup> General Price Index - Internal Availability (IGP-DI).

- Legal-regulatory rules so that production and consumption in the state avoids the cost of transportation were mentioned as potential developers of competitiveness, provided that, in this argument, the state's distributor is not burdensome so that its cost is higher than that of the complete gas chain, with payment for transport and sale to other states.
- The service of gas distributors was cited as mitigating the risks of migration to the free market, since the free consumer would face difficulties in managing contracts with suppliers and carriers and contractual penalties.
- A state regulation for predictable and stable natural gas, which does not change frequently, was mentioned as an opportunity for investments since these precede the operation and are premised on a long recovery time. A project, of both supply and consumption, would require high investor confidence in the long-term institutional plan of that location.
- State regulation was mentioned as fundamental for understanding the existing demand profile and the demand wished for. In this argument, understanding the demand profile would be decisive in the construction of public policies and attracting investors.
- In terms of the state, the possibility of formulating public policy to encourage an increase in gas supply through a tax on reinjected gas was mentioned, which would supposedly be compensation for the lack of economic development despite the impact on the viability of projects.
- The expansion of the piped gas network was cited as an opportunity for Sergipe to meet expected demands with the potential for gas production in the state.
- The amendment to the concession contract of the local piped gas distributor in Sergipe was cited as an opportunity to reduce the remuneration rate of 20% per year on CAPEX, in order to encourage the concessionaire to make additional investments in technologies that are more efficient and/or in natural gas internalization infrastructure.
- It was recommended that the local piped gas distributor in Sergipe give priority to strategic supply management, aiming for greater negotiation capacity on the most competitive price of the molecule between different suppliers and tariffs compatible with neighboring states.
- In the discussion about harmonizing federal and state regulation, the opportunity mentioned for Sergipe is to have simplified legislation and regulation, beneficial to the industrial consumer and proactive in relation to investments, without making it unfeasible for the state distributor to also attract investments.
- The migration to the free market was mentioned as an opportunity as it offers advantages to consumers looking for a contract that meets their specific consumption profile with a portfolio of suppliers.

- Sergipe was mentioned as one of the states most at the forefront of a collaborative vision from an institutional point of view, which would be positive for a regulatory framework with an integrated vision and tax optimization.
- The fine-tuning between state and federal legislation was mentioned as an advantage for Sergipe to facilitate investments. Otherwise, in this argument, the potential supply of gas would be injected into the gas transport pipeline and consumed in larger markets in the Northeast, such as Pernambuco and Bahia.
- One solution indicated for gaps in regulatory matching is the claim of competence through a decentralization agreement between the ANP and Agrese to support the matching process and interrupt any existing discussions about possible conflict with the Federal Constitution or the New Gas Law.
- Regarding the state regulatory agency, the robustness of its structure was mentioned, with public entrance exam and definition of more competencies, in addition to the regulatory decision process with a technical and transparent nature - based on public hearings, technical notes with contributions and the response to each one of them - as a practice aligned with the regulatory modeling of the OECD (Organization for Economic Cooperation and Development), generating opportunities for the regulatory agenda.
- The New Sergipe Gas Regulation was treated as a competitive advantage to offer the legal certainty necessary to attract companies and promote an investment cycle.
- The veto on self-dealing was mentioned as an opportunity for the Sergipe distributor to act as a gas trader in other state markets, ensuring competition between traders in Sergipe.
- The reduction in the minimum volume of gas consumption for migration to the free market was highlighted as relevant to expand and boost the Sergipe market.
- The conditions for the secondary market provided for in Sergipe's state regulation are mentioned as motivating a more dynamic market, in which the distributor offers a flexible CUSD and transport allows capacity contracting at different deadlines.
- The dedication of the state of Sergipe to train labor was mentioned as an opportunity for companies that require certifications, such as technical courses in sector-specific standards (ISO <sup>8</sup>, for example), and the growing need to adapt to compliance standards and integrity.

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<sup>8</sup> ISO, International Organization for Standardization.

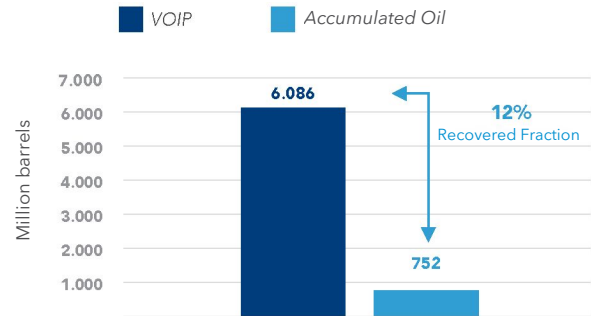
## 2.2. ANALYSIS OF GAS SUPPLY AND DEMAND

In this section, the main activities relating to supply and demand in the gas market will be mapped, focusing on the state of Sergipe. The main debates regarding the supply of natural gas are centered on the productive potential of Sergipe, based on the Sergipe Águas Profundas (SEAP) (Deep Waters) project and the challenges for the development of the project, the interconnection of the LNG terminal to the transport network and onshore gas. On the demand side, the main industries that consume natural gas were identified, as input and energy, and which can anchor socioeconomic development.

### 2.2.1. CONTEXTUALIZATION OF SUPPLY AND DEMAND IN THE STATE OF SERGIPE

Oil production in mature fields in Sergipe reached an accumulated 752 million barrels (MMbbl) in 2022, accounting for 12% of the volume of oil in place (VOIP) in the state. This fraction signals a potential to expand oil production in mature fields in Sergipe, as the fractions recovered in Brazil and the Northeast region are, on average, at 19%.

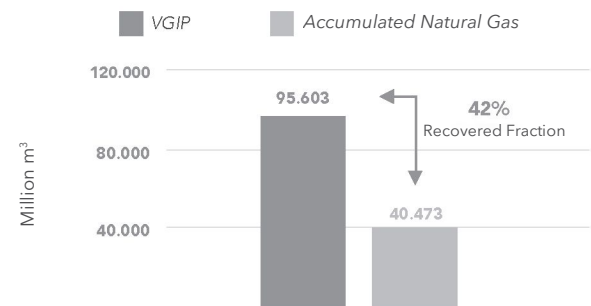
GRAPH 1: OIL FROM MATURE FIELDS IN SERGIPE



Source: prepared by the author with data from ANP

Gas production in mature fields in Sergipe reached an accumulated 40.5 billion m<sup>3</sup> in 2022, accounting for 42% of the volume of gas in place (VGIP) in the state. The fractions recovered on average for Brazil and the Northeast are, respectively, 35% and 54%, indicating a possible increase in gas recovery in Sergipe and its more appropriate destination depending on the production environment.

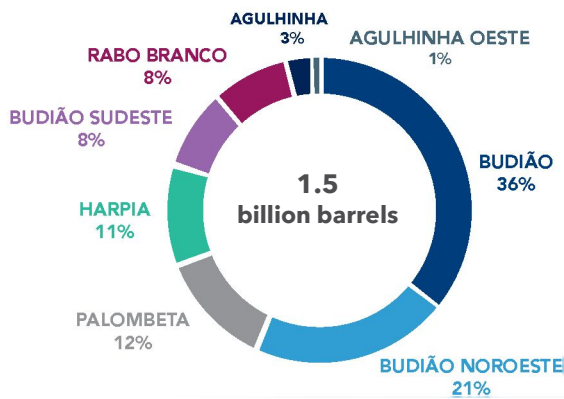
GRAPH 2: NATURAL GAS FROM MATURE FIELDS IN SERGIPE



Source: prepared by the author with data from ANP

In addition to the potential in mature fields, non-mature fields total a VOIP of 1.5 billion barrels, with more than 8% of the volume located in a new maritime border formed by the fields of the Sergipe Águas Profundas project (Agulhinha, Agulhinha Oeste, Budião, Budião Noroeste, Budião Sudeste and Palombeta), operated by Petrobras.

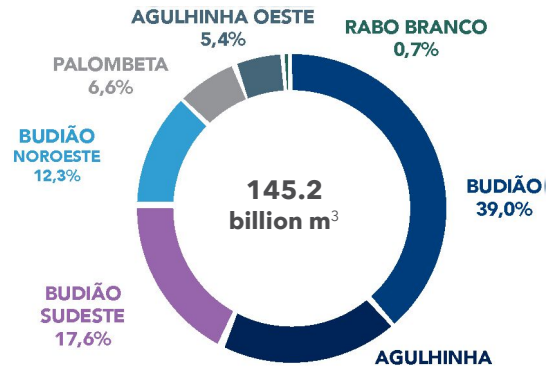
**GRAPH 3: OIL FROM NON-MATURE FIELDS (VOIP)**



Source: prepared by the author with data from ANP

The Sergipe Águas Profundas Project is prominent mainly for holding the entire VGIP mapped in non-mature fields in the state of Sergipe or 99% of 145.2 billion m<sup>3</sup> of gas. Other fields such as Rabo Branco, Harpia and Dó-Ré-Mi are located in the onshore part of the sedimentary basin.

**GRAPH 4: NATURAL GAS FROM NON-MATURE FIELDS (VGIP)**

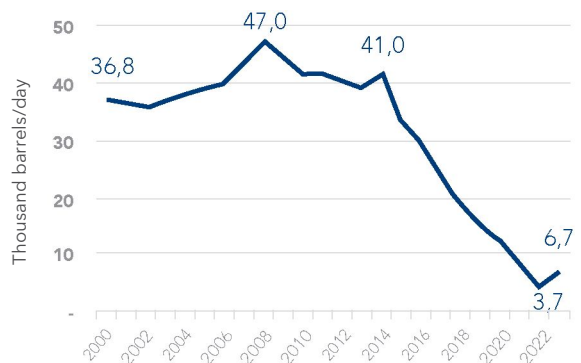


\*Harpia and Dó-Ré-Mi respectively and 0.1% and 0.01% share.

Source: prepared by the author with data from ANP

After a peak of 47 thousand bbl/d recorded in 2008, oil production in Sergipe fell continuously from 2015 onwards due to the natural decline of wells, Petrobras divestments and the hibernation, in 2020, of production units in shallow water fields. However, production doubled in 2023, growing again eight years later due to investments in the Carmópolis Hub.

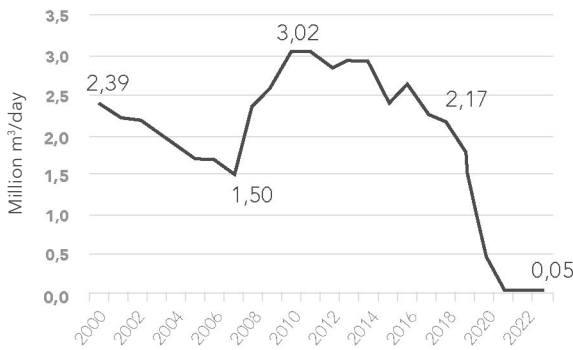
**GRAPH 5: OIL PRODUCTION IN THE STATE OF SERGIPE**



Source: prepared by the author with data from ANP

The drop in oil production in the historical series is accompanied by the accelerated decline in gas. In 2020 alone, gas production fell by 73%, mainly impacted by the interruption in shallow waters, which represented more than 90% of the volume of gas produced in Sergipe.

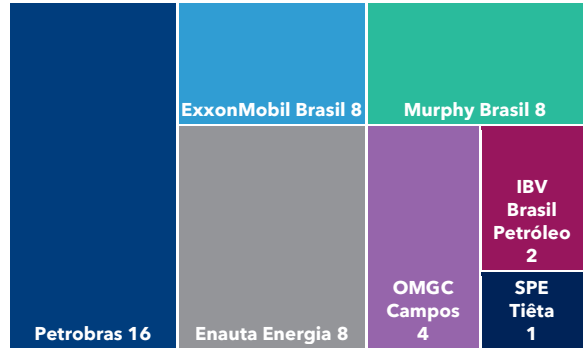
**GRAPH 6: GAS PRODUCTION IN THE STATE OF SERGIPE**



Source: prepared by the author with data from ANP

There are seven companies with participation in exploration block concessions or offshore development in the Sergipe basin. Petrobras leads in terms of participation in concessions, with sixteen, followed by ExxonMobil (50%), Enauta Energia (30%) and Murphy (20%), which are partners in the concession of nine blocks (including the SEAL-M-430\_ R15 block in the Alagoas basin).

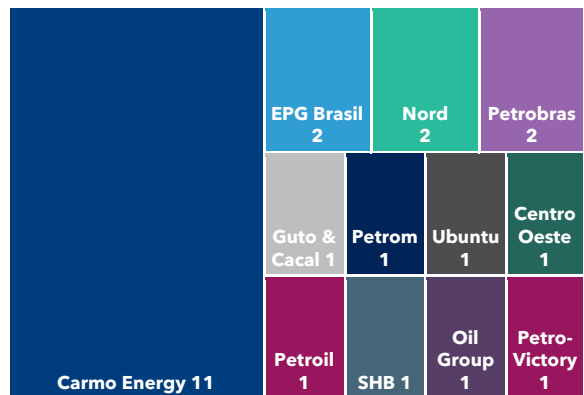
**GRAPH 7: CONCESSIONAIRES IN OFFSHORE BLOCKS**



Source: prepared by the author with data from ANP

The onshore environment presents greater diversification of concessionaires than the offshore one, with a total of twelve companies. Carmo Energy has the largest number of participations in concessions, with eleven, followed by EPG, Nord and Petrobras, concessionaires in two blocks each.

**GRAPH 8: CONCESSIONAIRES IN ONSHORE BLOCKS**

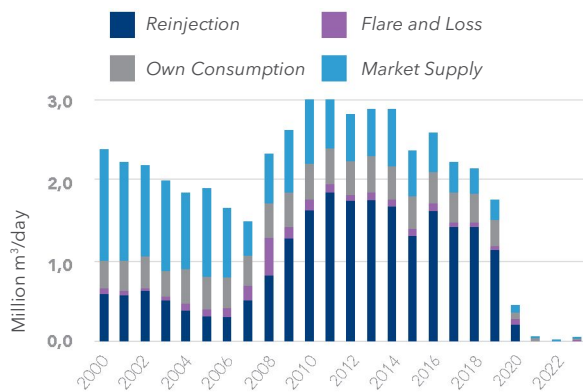


Source: prepared by the author with data from ANP



Gas production in Sergipe presented two predominant moments in the historical series. Until 2006, most of it was offered to the market, followed by a period with higher volume destined for reinjection. Currently, gas production is concentrated in the onshore environment, and doubled in 2023, destined for flaring and loss, followed by reinjection and own consumption.

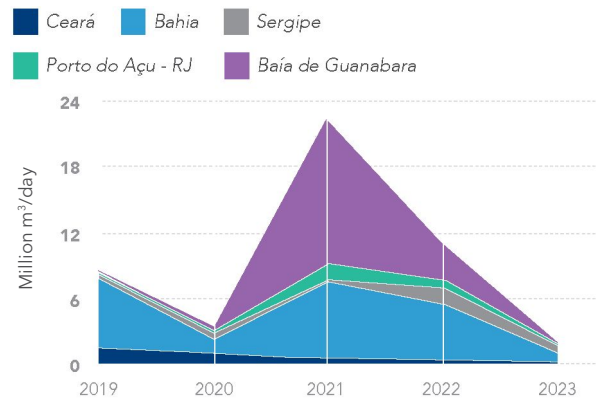
**GRAPH 9: SEGMENTATION OF GAS PRODUCTION IN SERGIPE**



Source: prepared by the author with data from ANP

Sergipe has a Floating Natural Gas Storage and Regasification Unit (FSRU) with a capacity of 21 MMm<sup>3</sup>/day and to meet the consumption of 6MMm<sup>3</sup>/day at the Porto de Sergipe thermoelectric power plant. In the period of 2019/2023, the terminal in Barra dos Coqueiros-SE accounted for 6% of total LNG imports in Brazil.

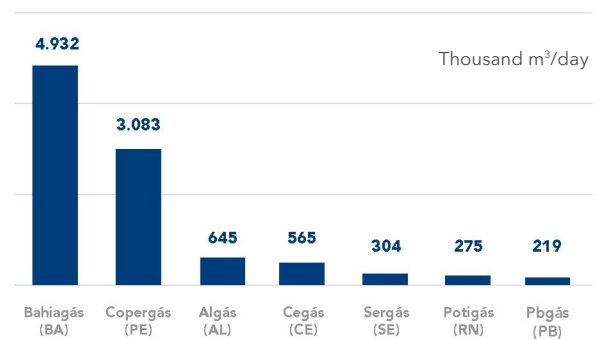
**GRAPH 10: LNG IMPORT BY TERMINAL**



Source: prepared by the author com dados do Comexstat

Gas consumption by distributors in the Northeast region is led, in volume, by the state of Bahia. Sergipe is the fifth largest consumer of gas in the Northeast, with an average of 304 thousand m<sup>3</sup>/day, in 2022. This consumption was addressed for customers in the captive market, that is, disregarding the free consumer Unigel Agro-SE.

**GRAPH 11: GAS CONSUMPTION BY DISTRIBUTORS IN THE NE (2022)**

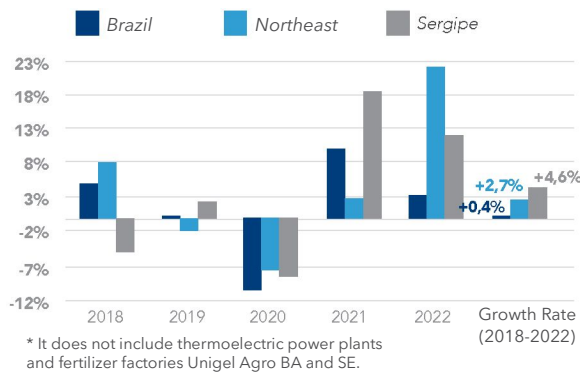


\* It does not include thermoelectric power plants and Unigel Agro BA and SE fertilizer factories.

Source: prepared by the author with data from the Ministry of Mines and Energy (MME)

Comparing the annual variation in gas consumption in Brazil, in the Northeast and Sergipe, the performance of Sergipe’s gas demand was higher than the national and regional average in the last five years. The growth rate in Sergipe was almost 5% per year, while in the Northeast growth was almost 3% per year.

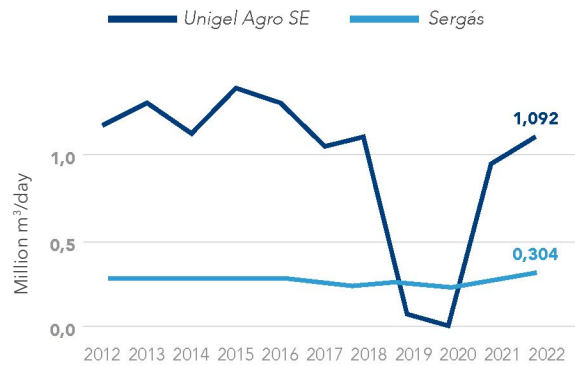
**GRAPH 12: ANNUAL VARIATION IN GAS CONSUMPTION (2018-2022)**



Source: prepared by the author com dados do MME

Gas consumption in Sergipe basically has shown a stable trajectory over the last ten years. However, since 2020, Sergipe’s gas demand has grown by more than 30%, reaching the highest level in the historical series. Demand from the fertilizer factory, in turn, has shown volatility due to the hibernation period and subsequent lease by Unigel in 2020.

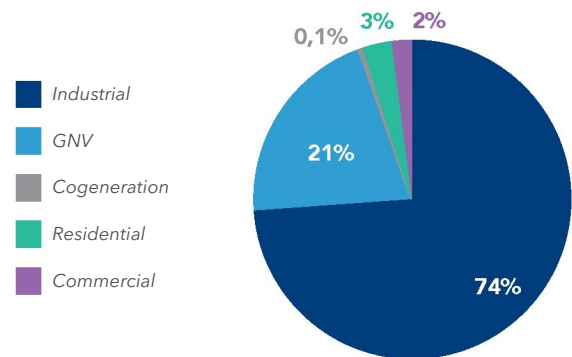
**GRAPH 13: GAS CONSUMPTION IN SERGIPE**



Source: prepared by the author with data from the Ministry of Mines and Energy (MME)

Industry is the segment with the largest share of gas demand in Sergipe, followed by automotive, residential, commercial and cogeneration consumers. Among the main industrial sectors with the potential to increase gas demand in the state, ceramics, glass, chemicals and fertilizers stand out.

**GRAPH 14: GAS CONSUMPTION IN SERGIPE BY SEGMENT**



Source: prepared by the author with data from Sergás

## 2.2.2. MAIN DEBATES AT NATIONAL AND STATE LEVEL

### • NATIONAL NATURAL GAS SUPPLY

In Brazil, there is an expectation of a gas supply shock of more than 50 MMm<sup>3</sup>/d with the commissioning of the Rota 3 gas outflow pipeline and the Raia (BM-C-33) and Sergipe Águas Profundas projects. **The producer agent** explains that, in fact, the expected supply shock is a net increase, smaller than the sum of the capacities of the projects individually, in addition to highlighting the importance of exploratory investments to think about the decade following the opening of production projects to the next decade and give succession to current projects.

Sergipe has become a relevant state in discussions on the New Gas Market, in view of the potential volume of gas availability, even when compared to the growth of the pre-salt, the drop in supply in Bolivia and the difficulty in connecting with Argentina.

Sergipe has the potential of almost 40 MMm<sup>3</sup>/d, adding the LNG terminal, with 21 MMm<sup>3</sup>/d, the SEAP project, with 18 MMm<sup>3</sup>/d, and onshore production, being a very relevant point for increasing gas supply. Depending on the price outlook, with LNG imports, the state of Sergipe will be able to provide 32 MMm<sup>3</sup>/d, considering 18 MMm<sup>3</sup>/d from SEAP plus 14 MMm<sup>3</sup>/d of regasified LNG, as the thermoelectric power plant consumes 6MMm<sup>3</sup>/d when dispatched. In this scenario, the **producer agent** explains that the state could be an important hub in the gas

market, because it will have more supply and existing infrastructure to guarantee flexibility and reliability for the system and consumption.

“THERE IS NO DOUBT THAT THIS WILL MEAN AN UPSTREAM MOVEMENT FOR THE STATE OF SERGIPE, (...) IT BECOMES PART OF THE GAS PRODUCER REGIONS MAP IN BRASIL.”

### • SERGIPE ÁGUAS PROFUNDAS PROJECT (SEAP)

In Sergipe, **according to the producer agent**, there is a promise of a very large increase in gas supply for the Brazilian market with SEAP and with access to the molecule imported from the LNG facility acquired by Eneva. Therefore, the state has a “genuine desire” to take advantage of it and revert it to development, employment, income and improvement of the population’s quality of life.

The discovery occurred more than ten years ago, but the volume was not realized until it integrated all the potential that was observed in isolation.

The **producer agent** mentions that the SEAP project “has an extremely relevant impact for the state and the region”, bringing a contribution of 240 thousand bbl/d in oil production, that is, four times what the Sergipe/Alagoas region combined “in its golden times” produced, 50-60 thousand bbl/d. In the case of gas, production is 10

times higher. Thus, a different horizon appears for Sergipe, as the state has always been a producer of heavier oil, in the terrestrial environment, and little relevant in gas production, which was more evident in the gas production hub in Alagoas.

**For the distribution agent**, the SEAP project has “huge potential” for new consumption applications, because the expected volume makes a difference to the market by bringing more competitive gas, which due to current pricing prevents the development of these new applications. Furthermore, SEAP’s estimated break-even between US\$ 6-7 per million BTUs, **according to the government agent**, is “very competitive” for the offshore environment, due to the reduction in costs associated with the project structure, such as the absence of CAPEX and OPEX of onshore processing, which will be carried out on the platform. Finally, according to **the specialized consultancy agent**, Sergipe guaranteed an “avant-garde solution” for the discussion of the regulatory nature of SEAP’s 128 km gas pipeline (100 km at sea and 28 km on land), which was classified as flow, instead of transport, facilitating project implementation.

The entry of SEAP gas envisions an environment of regional and national competition, according to **the producer agent**. Regionally, gas from Petrobras, in Sergipe, and Origem, in Alagoas, would be in dispute for markets, and there could be a “price war”. At the national level, two other competing projects in Sergipe are the Raia project (BM-C-33), operated by Equinor, and the gas from Rota 3. In the state itself, the

**government agent** also states that the stimulus to competition also comes from of the SEAP gas volume (between 4 and 5 MMm<sup>3</sup>/d) owned by two Indian concessionaires (IBV and ONGC), which will need to offer their production on the market.

According to the **producer agent**, the SEAP project is “very important” for the long-term planning of Petrobras’ portfolio of offers, since the project contributes a volume to the replacement of offers that have their natural depletion on the horizon, such as the offer originating in Bolivia and post-salt production fields

“THE STRATEGIC PLAN [OF PETROBRAS] SEE THIS EVOLUTION OF THE SUPPLY (...) TO BE ABLE TO OFFER CUSTOMERS LONG-TERM CONTRACTS WITH CERTAIN GUARANTEES. THAT IS THE REASON WHY (...) IT IS SO IMPORTANT TO MAKE THIS PROJECT [SEAP] FEASIBLE BECAUSE IT IS WHAT ALLOWS MAKING LONG-TERM GAS SALE CONTRACTS FEASIBLE.”

The **consumer agent** also considers as positive the impacts of the SEAP project on the state’s economy. The direct and indirect effects of a deep-water project, combined with the decommissioning of currently idle shallow water platforms, are felt mainly in value-added industrial services, such as boiler making for oil and gas and maritime services.

**According to the regulatory agent**, for the state it is relevant to think about the externalities of the SEAP project in relation to royalties, which can be a very important source of income for Sergipe. Royalties, **according to the government agent**, will be

five times greater than the state's own collections - where just over 50% of total revenues are federal transfers from the States Participation Fund.

In an oil and gas production development project, the main impacts are generated after its implementation, **according to the producer agent**. The State keeps around 70% of the net revenue from a project with a high level of production, captured in the form of income tax, royalties and special share. However, many policies such as local content rules seek to remove value from the implementation process, resulting in project delays.

**“FORCES SHOULD CONTRIBUTE SO THAT NOTHING DISTURBED OR DELAYED THIS PROJECT.”**

#### • CHALLENGES OF THE SEAP PROJECT

**According to the producer agent**, the SEAP project delayed many years in identifying the opportunity. The complete assessment of the deposit was quite complex because there are several unconnected reservoirs, with almost 30 wells to delimit all the deposits in the area where commerciality was declared. Subsequently, there was no agility in approvals due to financial difficulties, at a certain time, for some of Petrobras' partners. Recently, the difficulty rested in the heated FPSO market, with excessive bidding prices and few participating companies, increasing the price well beyond what was projected.

**According to the producer agent**, the leverage of a billion-dollar gas production

project depends on demand, and the project is unable to take off because there is no demand. In the case of the SEAP project, production goes far beyond what Sergipe can currently anchor consumption.

In parallel to the pre-salt, gas is also expensive to produce when incorporating the components for the deep-water project to have economic viability, such as FPSOs, submarine lines and gas pipelines to land. In the Raia and SEAP 1 and 2 projects, UPGN is incorporated into the top side, which also makes the FPSOs more expensive. SEAP, however, is close to the coast, 100km distant, equivalent to half the distance of Raia.

Furthermore, Brazil's gas price has LNG price parameters, since the country is an importer of this commodity.

**“WE DEFINITELY DON'T HAVE A CHEAP GAS WHEN COMPARED TO GAS PRODUCING COUNTRIES THAT HAVE DEPOSITS ONSHORE. (...) FOR GAS TO BE PRODUCED IT IS NECESSARY TO HAVE THIS INTERNATIONAL MARKET BENCHMARK PRICE TO MAKE ENABLE PRODUCTION, OTHERWISE, THE PROJECT IS NOT GOING TO TAKE OFF. THERE IS NO WAY TO PRODUCE IN SERGIPE, ALAGOAS AT US\$5/MMBTU, FORGET THE GAS, IT WILL STAY THERE IN THE DEPOSIT, IF YOU ARE SELLING THE PRODUCED GAS [AT THIS PRICE], THAT DOES NOT PAY THE PROJECT, THE PROJECT DOESN'T TAKE OFF.”**

**According to the consumer agent**, the risk of continually postponing the SEAP project is that the investors may look for other opportunities, because they “don’t have their money sitting idle”. In this case, despite the prominence and visibility achieved by Sergipe, distrust towards the project still remains<sup>9</sup>.

“PETROBRAS PUSHED FORWARD THIS INVESTMENT, WHICH WAS PRECISELY TO PREPARE FOR THE OPERATION IN 2027-28, AND IT HAS ALREADY PUSHED IT TO 2028-29. AND IT KEEPS PUSHING IT, WHEN IT GETS CLOSE, IT PUSHES FORWARD. THE INVESTOR OBSERVES THAT AND SAYS: ‘OH, WHEN THERE IS SOMETHING MORE REAL, I WILL START TO PAY BETTER ATTENTION TO THAT, FOR THAT INVESTMENT’, MEANWHILE, THE INVESTOR SEEKS FOR OTHER OPPORTUNITIES.”

**Another consumer agent** criticizes the fact that the economic part of the project is not yet closed, there being no investment division, and that the platform charterers are still in the selection phase. **According to the producer agent**, the postponement of the bidding for the two SEAP FPSOs, combined with the additional time spent exploring resources in the Sergipe sea due to an “unsuccessful” result from ExxonMobil in its first attempt at exploratory blocks, does not motivate seeking more gas in that region.

For the **transport agent**, the lack of investment decisions could be equated with coordination between links in the chain on long-term commitments to transparency. It should be noted the importance of this coordination at the current moment in the market, since decisions were previously centralized by a single agent.

#### • LIQUEFIED NATURAL GAS (LNG)

The value of LNG to the market lies in its flexibility, as basically the price of national gas is lower than a contract for importing LNG. And, only LNG has added this value of flexibility, since, in Brazil, there is no storage and little production of non-associated gas, an environment in which production could be interrupted at a time of sharp drop in market prices and function as a storage to offset revenue in the future. As Brazilian production is mostly associated gas, gas needs to flow regardless of short-term prices and fluctuations in demand, because the relationship is very costly in the event of interrupting an operation that flows out gas to land and also produces oil.

“BRAZIL’S LNG TERMINALS ARE THE GREAT SOURCES OF FLEXIBILITY FOR THE GAS MARKET. (...) THE CONTEXT OF LNG IN BRAZIL IS TO BRING FLEXIBILITY FOR THE SYSTEM, WHETHER FOR THE THERMOELECTRIC MARKET, OR FOR OTHER NATURAL FLUCTUATIONS OF THE SYSTEM.”

<sup>9</sup> The signing of two Protocols of Intent between the Government of the State of Sergipe and the companies Toyo Setal and Macaw Energias, in the 2<sup>nd</sup> Edition of Sergipe Day, in March 2024, respectively aimed at developing a project for nitrogen fertilizers and natural gas liquefaction, indicates the importance attributed to negotiations and business models to ensure SEAP demand.

The value of flexibility would also apply to producers, as an incentive to hire backup to continue selling gas. In the case of associated gas, especially, production is not constant, depending on oil, and, **according to the producer agent**, the system needs a level of security for the molecule to be available regardless of natural supply fluctuations.

In Sergipe, the experience with the implementation of the Celse LNG terminal – opened in 2020 and acquired by Eneva in 2022 – revealed a regulatory construction prior to the New Gas Law that was “extremely innovative<sup>10</sup>”, **according to the specialized consultancy agent**. At that time, discussions in similar projects in the country regarding the incidence of handling or distribution service charges on the gas pipeline that connects the LNG terminal to the thermoelectric power plant were predominant. For Sergipe, the regulatory solution that involved MME, ANP and Agrese found was to determine the non-incidence of T-MOV<sup>11</sup>, provided for in state regulation, in projects in which the gas pipeline handles gas for own consumption.

“FOR THE MARKET, IT WAS THE FIRST MAJOR SIGN THAT SERGIPE REALLY WAS VERY ENGAGED AS A STATE IN ATTRACTING INVESTMENTS. SO, THIS PROJECT BECAME ONE OF THE MOST CRITICAL PROJECTS FOR BRAZIL, ONE OF THE BIGGEST LNG AND THERMAL POWER TERMINAL PROJECTS IN BRAZIL.”

The next step, with the connection of the terminal to the grid, will be a watershed, **according to the specialized consultancy agent**, for using the FSRU’s capacity. The **consultancy agent** considers that, although LNG is more expensive than nationally produced gas, increasing supply can bring greater competitiveness.

“WE HAVE AN IMPORTANT MILESTONE (...) THE FIRST CONNECTION IN BRAZIL OF AN LNG TERMINAL WITH THE TRANSPORTATION GRID, SO THIS WILL GIVE FLEXIBILITY WITH DEVELOPMENT OF DISCOVERIES IN DEEP WATERS OPERATED BY PETROBRAS.”

**According to the distribution agent**, the connected LNG terminal does not immediately contribute to the competitiveness of gas: i) the LNG terminal will compete with other terminals to serve the thermoelectric spot market; and, ii) the price of LNG is very high, due to the international scenario. However, interconnection is very important for planning in the next five to ten years, when global LNG supply is expected to increase and international prices to fall.

Furthermore, the LNG plant, interconnected to the system, allows the acquisition of gas at a lower cost than when a consumer has to pay for overflow gas. Hence, the interconnected LNG would bring the benefit of meeting

<sup>10</sup> The first gas storage operation in Brazil was carried out by Eneva, and received a cargo of LNG to store for a few months, and then re-exported it.

<sup>11</sup> The regulatory arrangement triggered a judicialization, but Sergas and Eneva agreed in January 2024 that once the terminal is connected to the grid, a specific TMOV will be charged on the gas handled to the thermoelectric power plant and to projects already licensed in the same location, regardless of the origin of the gas.

peaks in demand, instead of the consumer being subject to very high contractual penalties, due to an imbalance in supply.

**The distributor agent** considers that this benefit is “very specific”, because from the perspective of developing new applications the contribution is small, and highlights, in that sense, the importance of offering SEAP.

**The regulatory agent** adds that the interconnection with TAG is “very intelligent” because, in the absence of LNG, the integrated system could replace the gas necessary to activate the thermoelectric power plant at this specific moment. Furthermore, **the government agent** mentions that offshore production systems undergo maintenance shutdowns, which reinforces the role of LNG in energy security by balancing the gas handled in the network. In the event of another source failure, the LNG terminal connected to the network can offer different products not only to users, but also to the transportation system itself, **according to the transport agent**.

The LNG terminal has allowed new operations in the state. **The producer agent** mentions storage operation using the ship as advanced stock for a third party supplier, which can be traded on the futures market. **According to the specialized consultancy agent**, State Decree No. 407/2023 enables importing LNG to be subsequently re-exported, opening a channel for new businesses and uses of gas storage and regasification<sup>9</sup> infrastructure.

In this aspect, **the producer agent** states that,

among the ways to offer flexibility, there is the sharing of the FSRU terminal, which is on the ANP’s regulatory agenda for 2024. However, there are tax difficulties regarding the molecule swap between two agents who share the gas stock in the FSRU. A swap agreement will be necessary because, **the producer agent explains**, when sharing the terminal with a third party, the arrival of cargo from an LNG ship to one of the agents and the sale of the gas to the third party’s customer will require the supply of that gas until the arrival of the next cargo of the third party and, consequently, the return of the molecule that was removed through the swap.

However, the tax reality considers that swaps are purchases and sales, which generates a prohibitive cost for this type of operation, so that the ICMS legislation related to cargo imports would need to be adapted to enable this type of operation. Another difficulty would be in the coordination of agents, since the third party’s LNG cargo could not be delayed, under the risk of failing with the customer of the first agent who provided the gas.

Another operation enabled by the connection to the grid, **highlighted by a regulatory agent**, is the potential gains from the sale of the volume of gas that is currently lost through the FSRU boil-off. **According to the distribution agent**, another business, still maturing in Brazil, is the trade of LNG in bulk via road transport and cabotage, with Eneva having the greatest potential to carry out this activity through the terminal in Sergipe.

<sup>9</sup> Regasification involves transforming LNG - kept in a liquid state to facilitate transport - back to a gaseous state.



**The consumer agent** notes that if there are investments in infrastructure for gas liquefaction, the port terminal in the state could become an LNG export point in the event of an increase in natural gas production in the region. Additionally, a project to supply ships with LNG has the potential to develop other industry links related to maritime movement.

### “LNG IS A WAY IN; IT CAN BE A WAY OUT.”

Regarding the possibility of the Sergipe LNG terminal connecting directly to a distribution pipeline, **the distribution agent** identifies margin for interpretation in the New Gas Law, although it is clearer than the previous one. In this perspective, it is emphasized that such a connection to the distributor would be a way of bringing competitiveness to the Sergipe user and to the terminal itself. Another opportunity identified **by the distribution agent** concerns the possibility of the distributor connecting industries in the free market that installs in the port area close to the LNG terminal, eliminating the need for the transport pipeline.

#### • ONSHORE NATURAL GAS

The main destination of the onshore gas in Sergipe is self-consumption by production and flaring units and losses. However,

**according to the producer agent**, there are alternatives being analyzed for the use of gas: own consumption and availability to the market via connection to the TAG grid, which would require investments in pipelines and compressors, and through on-site compression for CNG (Compressed Natural Gas), which would be carried by trucks to the final consumer.

In the alternative of connecting with transport, **the regulatory agent** highlights that the 25 km and 24 inch diameter gas pipeline has the potential to interconnect with other municipalities, as the route traveled from the municipality of Barra dos Coqueiros to Carmópolis crosses other municipalities with potential areas for integration. Hence, the resumption of production in onshore fields and the potential to monetize the state’s gas could take advantage of the forming hub.

In the CNG alternative, **the consumer agent** evaluates the possibility of using compressed gas as an alternative to the absence of gas piped to onshore fields.

**For the regulatory agent**, the molecule being produced in the state offers conditions for the state to influence the reduction in the price of the molecule, compared to other states that do not have onshore production, such as Pernambuco. Sergipe, in turn, could encourage Carmo Energy’s growing local production by reducing the ICMS taxation

## • NATIONAL AND STATE NATURAL GAS DEMAND

Brazil had the experience, at the time when the Brazil-Bolivia gas pipeline was concluded, of anchoring demand for an increase in supply of 30 MMm<sup>3</sup>/d. For that purpose, the Natural Gas Use Massification Plan was created, managed by Petrobras, which allowed distributors to saturate the gas pipeline in 2008. During this period, demand in Brazil rose from 20MM to 50MMm<sup>3</sup>/d, disregarding the thermoelectric energy market. This level of demand remains to this day, because there is a lack of replacement market.

**The producer agent** clarifies that users could not be treated “as if they were a box”, that is, a static consumption profile, because market has seasonality, peaks and volatility. **The consumer agent** adds that the lack of flexibility in gas contracts in Brazil negatively impacts companies that do not operate “24 hours a day” and face seasonality in demand, with such rigidity being indicated as a restriction on the growth of the gas market in the country.

These particularities of consumption are not necessarily reflected in contractual aspects. **According to the producer agent**, the ship or pay clause occupies, for example, 80% of the gas volume in contracts in the state of Sergipe, advocating negotiation between the parties. Although the preference for long-

term contracts for large consumers offers some stability, challenges might be posed for smaller consumers. Therefore, flexibility in contracts would be crucial to handle unexpected events and ensure that both parties can adapt their supply and consumption commitments over the course of the contract. The make up clause, for example, mitigates take or pay, by mitigating losses or offsetting losses arising from the payment obligation, even in situations where the contracted volume of gas is not used <sup>10</sup>.

“(…) FOR EXAMPLE, IF I AM A THERMELECTRIC POWER PLANT, IT IS NOT POSSIBLE TO PAY FOR 80% OF SOMETHING I DON'T KNOW IF I'LL USE, THIS DEPENDS ON THE ELECTRIC SECTOR. SO THIS IS A POINT FOR IMPROVEMENT.”

In the contractual aspect, distributors are considered by **some market agents** as “very inflexible” when negotiating tariffs and availability of additional volumes, as they act as a natural monopoly. This becomes an obstacle for industries that may have sporadic opportunities, such as exports or extraordinary and/or seasonal demands. Therefore, consumers are afraid of being exposed to distributors that have high CUSD, even if there is competition in negotiating the basic tariff, in the event of migration to the free market.

<sup>10</sup> Long-term supply contracts, common in the gas market, have take or pay clauses (the consumers must pay for a specific volume of natural gas, regardless of whether they use it or not) or ship or pay clauses (the consumers agree to receive and pay for a specific volume of natural gas, regardless of whether it is used or not).

Offering conditions for the secondary market would guarantee, on the other hand, dynamism to the market due to the flexibility of the users being able to sell the additional unconsumed molecule, **from the perspective of the producer agent.** In Sergipe, it is possible to have the secondary market because it is provided for in state regulation, the state distributor offers a flexible CUSD, whereby the TUSD or T-MOV charged are considered to be of little relevance compared to the cost of gas, to meet this flexible demand. Furthermore, the transport system allows contracting of daily, weekly and quarterly capacity.

This experience, **according to the regulatory agent,** has already occurred in Sergipe with free market users selling gas to the local distributor, a possibility that would benefit the industry's capillarity. Other possibilities for a free consumer include taking advantage of possible sales of gas through the transportation system itself, whose operations, according to the transportation agent, have already sold gas five times cheaper than the market average.

Firm demand for natural gas, in the perspective of the **distribution agents,** is generated from a combination of diversity of supply, competition in the molecule, gains in scale, number of users and unit cost, which must be as low as possible. In the case of Sergipe, which is a state with a less expressive number of consumers, if there were problems with demand, the impact would be huge for everyone, including distributors. When there

is scale and diversity of demand, it is possible to adjust the supply portion.

“SERGIPE WILL BE COMPETITIVE AT THE INSTANCE GAS STARTS TO BE PRODUCED (...) FOR INDUSTRIES THIS IS DIRECTLY RELATED TO COST, IF COST IS REDUCED, SERGIPE BECOMES ATTRACTIVE, SO, AT THE TIME THIS GAS IS REALLY COMING OUT OF SERGIPE, WE WILL BE, IN TERMS OF PRICE, DISPUTING WITH BAHIA AND ALAGOAS”.

The dilemma of gas demand in Sergipe, in the perspective of **consumer** representatives, is that the state went through a period of very large restrictions in stimulating high gas consumers and, currently, is suggesting people to assemble gas production units, which was previously concentrated in the Petrobras' monopoly. When Petrobras left Sergipe, industry and economy of Sergipe were also affected as a whole. Several companies, including outsourced companies that provided services linked to the Oil & Gas Industry, also decided to close their businesses in the region.

“SO, THAT WAS A HUGE BLOW FOR SERGIPE'S ECONOMY, AS IT DEPENDED A LOT ON ROYALTIES, VERY IMPORTANT FOR GOVERNMENT PUBLIC POLICIES. YOU NO LONGER HAS THAT AND (...) WHO WILL COME TO SERGIPE TO SET UP AN INDUSTRY?”

In Sergipe, the average consumption is around 300 thousand m<sup>3</sup>/d, without the thermoelectric power plant and the Unigel plant. This is a very small market, when compared to Pernambuco, for example, where the scale is ten times greater in terms of volume. For Sergipe, the biggest difficulty is achieving demand for the very large supply of SEAP, as the current gas demand “does not meet” the supply. To achieve this, it is necessary to encourage residential use and the conversion of vehicles and industries.

“IN THE SHORT AND MEDIUM TERM, IF I COULD SAY SOMETHING TO THE STATE, I WOULD MAKE A HUGE EFFORT IN THE SENSE OF CREATING A DEMAND WITH LNG, WHICH WILL BE MADE AVAILABLE THROUGH THIS INTERCONNECTION, AND ENSURE THAT THIS DEMAND WAS SUSTAINED OVER TIME, BECAUSE SPACE IS IMPORTANT TO BRING GAS FROM THE SEAP PROJECT (...) AND TO START WORKING WITH THE CONCEPT OF DEVELOPING THE SURROUNDING MARKETS, SO YOU CAN CREATE THE CONDITIONS TO EFFECTIVELY COMPLETE THE SEAP PROJECT.”

**The producer agent** agrees when defending that the “best possible result” in time depends on orchestrating the entry of LNG to a project, and using the effect of the possibility of competition between the two sources, allowing an industry to decide, for example, to buy a firm part and another flexible one. Therefore, it is essential to have an equation

to begin negotiating future gas, such as a gas-intensive industry and a thermoelectric power plant, given Sergipe’s ambition to add value through business.

In this case, the SEAP project gas pipeline, designed to integrate with the TAG grid, would provide “a web to hang projects on” in Sergipe, but parallel designs would also occur with projects in Alagoas – consuming the gas that is produced in Alagoas plus another part from Sergipe – and in Bahia. This regional perspective, **adds the transport agent**, is favorable for Sergipe’s integration into the market as a gas “exporter”.

“(…) THERE IS A NEED FOR ANCHOR PROJECTS IN SERGIPE, THAT THEY ARE ALREADY LAUNCHED, THE CORNER STONE, SO THAT THEY GROW ALONG THE ARRIVAL OF GAS. IF ALL OF THAT IS NOT TIED-UP, THIS SEAP PROJECT IS IN JEOPARDY OF BEING CONSTANTLY POSTPONED.”

**According to the specialized consultancy agent**, the state would need to define the industries it really wants to attract. A large volume of gas favors a gas-consuming industrial hub, not necessarily heavy industries, but it is important to define what type of industry, based on gas and/or electricity, to design an industrial park. And, in parallel, work with Petrobras so that the gas price and tariff are more competitive, in view of the current market size being very small, if the state wishes to “put a big weight” on attracting industries.

“DEFINE AN INDUSTRIAL PARK AND DEFINE INCENTIVE STATE POLICIES, AND ACTIVELY GO AFTER THESE INDUSTRIES IN BRAZIL AND IN OTHER STATES. IF THE GAS COMES, IT WILL BE A COMPETITIVE ADVANTAGE, CERTAINLY, IT CAN ENABLE (...) SERGIPE BEING A HUB, BECAUSE IT WILL HAVE THREE SOURCES [OFFSHORE, ONSHORE AND LNG].”

**According to the government agent,** the rise of SEAP led to the enactment of a state law that creates a port industrial hub, with ten municipalities surrounding the port and the thermoelectric power plant. However, Sergipe’s challenge is to have a more competitive tariff compared to its neighbors Alagoas and Bahia. For the **regulatory agent,** creating the possibility of building branches without the remuneration rate of 20% per year of CAPEX and 20% of the OPEX of the local concessionaire could make the tariff more attractive for new consumers in Sergipe, as, currently, capillarity of users in the state is a hindrance compared to other states.

**For the consumer agent,** the benefit of attracting a large industry lies in hiring many local suppliers, which boosts the economy, and, therefore, the concern of guaranteeing

the infrastructure and logistics to facilitate attraction. Another **consumer agent** highlights that there is already an industrial market such as the Fafens in Sergipe and Bahia, which could be complemented by a new plant in Sergipe close to the coast, in addition to gas infrastructure in Atalaia to be expanded.

Sergipe, **in the view of a government agent,** “does not want to live off royalties”, but to transform this wealth into well-being and development for the state, through the creation of the most diverse industrial hubs possible: ceramists, glassmakers, cement makers, among others. The gas market for industry “hardly” finds a competitive price of US\$ 5 to 9 per million BTUs, **according to the specialized consultancy agent.** In this maximum price range, it would be possible to achieve a degree of competitiveness for exports. Based on this, the **consumption segment** argues that infrastructure will be made viable through this integrated vision of economic development for Sergipe.

“THE NATIONAL INDUSTRY IS TODAY SCRAPED AND IN NEED FOR REDUCTION IN IMMEDIATE COSTS OF ITS MAIN INPUT, WHICH IS GAS.”

## THERMOELECTRIC POWER PLANT

A future flexibility hub with probably competitive gas favors an expansion project for the existing thermoelectric power plant in Sergipe. Initially, according to **consumers**, gas regulation came under a lot of pressure due to the LNG operation in relation to the supply of gas to thermoelectric power plants, due to the fact that the CUSD of the operation would be taxed or not. Thus, there is a context of absorbing Celse's operation in which the first appropriation of the new gas regulation occurs, but "it was not complete and we had a second round of adjustments to this regulation".

In the national context, the big dilemma for thermoelectric power plants currently is that they are being contracted with the so-called "inflexibility" in which the electricity sector only needs the dispatch from the thermoelectric power plant when it deems it necessary. In turn, **consumers** highlight that the oil segment wants the thermal to operate fully, that is, 100% of the time, otherwise the users will not receive gas. Therefore, they argue that it will be necessary to make regulation in the electricity sector compatible with the O&G sector.

In the perspective of the **Government representative**, it is necessary to understand that just anchoring the demand for natural gas

in the consumption of electricity will not be enough, also due to the seasonality of electrical dispatch. So, the question posed is whether the Northeast region will increase the supply of electricity using gas or through dispatch, which can supply eventual peak loads or drops in renewable energy that are used in the production of electricity.

**The producer agent** mentions the transport tariff review as an opportunity to use gas for thermoelectric power plants. In the current configuration of the system, around half of its capacity is contracted by Petrobras to serve the thermoelectric market. Considering the end of the term of Petrobras legacy contracts, recontracting through thermoelectric power plants would benefit the system. For the **producer agent**, it is imperative to create a transport tariff that takes thermoelectric power plants into account. For that purpose, the **producer agent** suggests carrying out studies to enable the ideal tariff with the current cost diluted in the system by the agents.

"SERGIPE HAS A POTENTIAL TO GROWTH OF THERMOELECTRIC POWER PLANTS, VIA THE CELSE [ENEVA] TERMINAL."

## CERAMICS

Sergipe has a natural vocation in the production of ceramics. There is potential to increase the share of gas in a context of greater competitiveness and supply of this energy source, even for sectors with a somewhat small share of natural gas. The replacement of other energy sources, of poorer technical quality, includes, for example, red ceramics (bricks and tiles) which uses wood for the burning process, but does not find the feasibility for replacing them with gas.

Red ceramics are heavily produced in Sergipe. On the other hand, white ceramics (floors and coverings), which was once

competitive for export, lost its competitiveness due to energy costs. The trend is for labor to no longer be the most important cost due to technology and the cost of energy to be more significant.

**In the perspective of the consultants**, when considering that ceramics is not a product that is sold to very distant markets, transportation is an aspect that can make the entire process more expensive. Accordingly, it is an Industry that has greater local potential and can benefit from competitiveness with the price of gas.

## FERTILIZERS

Sergipe has a vocation to be a fertilizer hub associated with the natural gas competitive economic conditions. The state has significant production of nitrogen fertilizers and, to a lesser extent, potassium. **According to the government agent**, a competitive gas could attract other urea and ammonia production units, in addition to potassium based on carnallite, which has not yet been implemented because it depends on a "very low" gas price.

**According to the specialized consultancy agent**, Brazil has a "fantastic" agricultural vocation, positioning the country as the largest importer of nitrogen fertilizers and the second largest consumer of ammonia and

urea in the world, while production in the country is limited to just 15% of the demand. The fertilizer industry is very sensitive to the price of gas because the cost of producing urea and ammonia from gas - the method used worldwide - is 35 times the price of the molecule and, currently, the lowest gas price is found in the Middle East (Saudi Arabia, Qatar and Kuwait), Africa (Nigeria and Algeria) and Russia, while the national cost of gas production is much more expensive than in Trinidad and Tobago.

In turn, the **regulatory agent** states that gas consumption in the state has an industrial profile and that the distributor manages a volume influenced by the consumption of the

fertilizer plant. If there is a repressed demand for gas due to a lack of supply, the demand becomes less price sensitive as it is responding to the shortage. To make gas more attractive it would be necessary, in this argument, to guarantee a supply to meet the repressed demand.

Sergipe's potential in fertilizers may be equally important to supply the product to agricultural consumers in the MATOPIBA region<sup>11</sup>. However, the **consumer agents** note that some elements are required to advance the fertilizer agenda nationally and locally, such as the National Fertilizer Program, which does not yet have sufficient political strength to mobilize the construction of an industrial policy<sup>12</sup>.

According to the production of fertilizers in the state of Sergipe, representatives of the infrastructure segment claim that it is possible to carry out cabotage to supply other regions of the country. In fact, the state of Sergipe meets several conditions that make production viable, such as storage and availability of productive area. Thus, **consumer agents** argue that fertilizer plants in Sergipe can complement other units that could be implemented in the region, at the instance the offered gas is available at a competitive price.

“THEN, IT MEANS THE RESUMPTION OF THE CAMAÇARI HUB; IT MEANS THE RESUMPTION OF FN-1 AND FN-2, WHICH ARE TWO AMMONIA AND UREA FACTORIES. AND IT MEANS IMPLEMENTING OTHER INDUSTRIAL UNITS HAVING GAS AVAILABLE AND SERGIPE WOULD BE A WONDERFUL BENEFIT (...) FOR THE STATE”.

Natural gas, **the consumer agent explains**, is the raw material and fuel for nitrogen fertilizers, representing from 80% to 90% of the total cost of ammonia production. Different nitrogen fertilizer projects are planned for Rio Grande do Sul, Rio de Janeiro, Espírito Santo, Minas Gerais, Bahia and Sergipe, but no progress is made due to the price of gas. Brazil would need five fertilizer factories to meet 70% of demand, an investment that could be made once the gas is available, because the demand for nitrogen fertilizers in the agricultural sector evolves over the years.

**For the consumer agent**, the SEAP supply potential represents “everything” for the two Fafens - Petrobras assets leased by Unigel<sup>13</sup> - which are the only urea producers in Brazil on a large scale and are paralyzed because gas price reaches US\$ 12 MMBTU and imported urea does not pay import tax. In this

<sup>11</sup> It comprises the agricultural region of the states of Maranhão, Tocantins, Piauí and Bahia.

<sup>12</sup> Bill 699/2023 which creates the Fertilizer Industry Development Program - PROFERT, approved by the Federal Senate in March 2024 and sent to the Chamber of Deputies, provides for tax incentives for the acquisition of new machines, devices, instruments and equipment, construction material to use or incorporate into the fertilizer production infrastructure project, in addition to tax burden relief on gas delivered to the fertilizer manufacturer, among other measures.

<sup>13</sup> The lease agreement was signed in November 2019 and became effective in August 2020 after the legal requirements were fulfilled. In April 2021, Unigel restarted Fafens production with investments of over R\$500 million.



argument, to guarantee competitiveness the gas price would have to be US\$ 7 MMBTU.

These factories were one of the foundations for the implementation of industrial units in the region, so that the stoppage of Fafens, the **specialized consultancy agent** explains, occurs after the shortage of fertilizers on the international market had been resolved and prices fell “drastically” by the end of 2022, but the price of gas, on the other hand, rose or remained high. According to the **consumer agent**, from 2023 onwards, operational continuity became unfeasible, putting the factories to work in the “firefly” format (operating for two months and stopping for one month).

“WHILE IN 2022 PRICES OF FERTILIZERS WERE IN APPROPRIATE LEVEL, [PROVIDING] GOOD PROFIT FOR THE BUSINESS, IN 2023 THERE WAS A DROP IN THE PRICE OF FERTILIZERS, [BEGINNING] TO HAVE COST OF GAS, ALONE, HIGHER THAN THE VALUE OF THE MAXIMUM REVENUE EXPECTED WITH THE FACTORIES OPERATING AS USUAL.”

The alternative found was for Petrobras to provide transfer gas to the Fafens and receive the fertilizer to be traded, which, as argued by the **consultancy agent**, means that Petrobras will bear loss by subsidizing its own gas to produce and sale fertilizers on the market. The advantage, however, would be to keep Fafen and its employees on the market, **according to the government agent**, until a definitive solution is found. The solution

would depend, **for the consumer agent**, on public policy that allows having a gas price for strategic activities, since the fertilizer would be strategic for the food security of Brazil and the world.

Considering these challenges, Sergipe faces another obstacle in the production of fertilizers due to interruptions at the fertilizer and nitrogen fertilizer factory, due to the lack of competitiveness in gas supply. Furthermore, according to **consumers**, it is necessary to resolve the issue of gas prices for the large consumer industry, which, theoretically, consumes a significant amount of gas, but is not competitive due to the prices charged.

In the consumers’ perspective, since the moment of the FID (Final Investment Decision) of the inauguration of the fertilizer plant, it is imperative that the supply of natural gas is supported at a price defined by a minimum supply of 15 years, in other words, the Fertilizer Industry will only build its infrastructure if it has supply guaranteed.

In addition to the price of gas, different agents mention that the production of national fertilizers depends on aligning the import rate, as there is free import while national fertilizers are taxed. This is an issue that dates back to CONFAZ Agreement no. 100/1997, which consists of exempting imported fertilizer, which differentiated the national product from the imported one by more than 8%. The negative impact on the fertilizer industry in Brazil motivated Agreement no. 26/2021, which seeks to reduce the ICMS on the national product from 8.4% to 4% and increase the ICMS on the international

product by 1% per year until 2025, aiming at an isonomic tax rate. This Agreement, however, establishes that the national industry must expand 35% by 2025.

“THE STATE OF SERGIPE WAS THE STRONGHOLD TO ACHIEVE THIS CHANGE. (...) THE IDEAL WOULD BE TO HAVE AN INCENTIVE TO NATIONAL PRODUCTION, AT LEAST

NOW SHALL NO LONGER HAVE THIS COMPETITIVE DISADVANTAGE WITH THE IMPORTED PRODUCT. SERGIPE WAS VERY STRONG, THE SUPPORT OF THE GOVERNOR, THE SECRETARIAT OF FINANCE AND SEDETEC WORKING TOGETHER.”

## METHANOL

In the **consumers’ perspective**, to boost methanol production in the country, in which gas participates almost entirely in its production chain, it will be necessary to promote a commercial and industrial policy that meets the requirements of methanol production so that it can gain scale. Therefore, considering the existing deposits in the state of Sergipe, the installation of a methanol factory in the region would be an opportunity both in terms of gas consumption and in terms of industrial policy, in view of the multiplier effect.

“WHEN YOU HAVE SUCH A DEMAND, YOU HAVE THE MEANS TO LOWER THE PRICE OF GAS AS A WHOLE, IF DEMAND INCREASES, IT WILL SOON MAKE FERTILIZERS VIABLE.”

Bearing this in mind, the **consumer segment** defends the development and expansion of the fertilizer and methanol industries in Sergipe, as they are considered the “flagship” for the state’s gas-based industrialization. Both industries demand important volumes of gas, prominent in the issue of demand when compared to other industries. Consequently, they expect this volume to flow via port, which would subsequently enable the exit of ammonia and urea, considered solid products, but also the creation of a liquid terminal, specifically for methanol.

“GAS IN BRAZIL IS VERY EXPENSIVE AND THAT MAKES, FOR EXAMPLE, THE INDUSTRY OF METHANOL TO HAVE DISAPPEARED AS A RESULT OF SUCH PRICE OF GAS.”

## MINERALS

The state of Sergipe has important mineral reserves, with the capacity to prospect for sylvinite and carnallite from potassic rocks. In addition to these, the region also has halite production, which, through electrolysis, can produce sodium hypochlorite, still very incipient in production in Brazil, making the country dependent on imports from China.

Therefore, considering the potential of halite in Sergipe, **consumer** representatives assume that it is possible to carry out electrolysis and then a competitive generation with gas, for the production of sodium hypochlorite.

That said, Sergipe's mining condition is an important factor in attracting investments. In addition to the minerals mentioned above, Sergipe also has the potential to produce clay, which are considered sedimentary minerals, besides concentrating deposits of rock salt, which can contribute to the demand for this product in Maceió, contributing to the petrochemical industry.

## GREEN HYDROGEN

In the opinion of **consultancy agents**, combined with the expansion of O&G facilities in Sergipe, the state could also invest in sustainable energy, such as Green Hydrogen

According to the **regulatory agent**, the state of Sergipe has the potential to be a green

hydrogen producer through a clean source of electrical energy generation. The **regulatory agent** adds the state's advantage by signaling the project for a second thermoelectric power plant, the private gas terminal on the coast and a fertilizer plant that can be integrated into the grid.

## COMPRESSED NATURAL GAS (GNV)

Not having gas available in the interior areas, **according to the government agent**, is a bottleneck in attracting investments in the productive sector, including the vehicle market, which would be able to access CNG at gas stations across the state. The

replacement of diesel has been treated as a great opportunity, **according to the regulatory agent**, which depends on the supply and price for the "effective interest" in gas consumption.

**“GAS IS A REPLACEMENT FUEL. IF GAS IS NOT EFFECTIVELY COMPETITIVE, YOU CANNOT REPLACE GAS BY ITS MAIN COMPETITORS.”**

In the tax aspect, the state reduced the ICMS from 18% to 12%, in 2022, which led Sergipe to have the third cheapest CNG in the Northeast, after Pernambuco, where the ICMS rate is zero, and Bahia. However, the lack of gas available in the interior areas, especially due to the lack of gas pipelines and CNG stations in these regions, **according to the government agent**, are bottlenecks in attracting investments in the productive sector, including the vehicle market, which would be able to access CNG at the service stations.

Currently, the market is reasonably balanced, disregarding thermoelectric demand. The entry of Rota 3, Raia and SEAP will bring a new dynamic to the market until the end of the decade and the importance of developing new demands to absorb this growth in supply.

**According to the producer agent**, “it is not possible to predict the price level that will result from that”. **Another producer agent** states that “when this is put on the table”, the competitiveness of national gas will become very clear.

The argument is endorsed by **Government representatives**, who declare that it is necessary to indicate the issue of using other modes of transport, since fuels such as LNG and CNG act in enabling the construction of demand, especially in the interior of the state.

## PRICE OF THE NATURAL GAS MOLECULE

The price of the gas molecule, according to **the specialized consultancy agent**, is defined according to Petrobras’ commercial policy, and “these are not cheap prices”. **The consumer agent** highlights that the price of gas between US\$ 12 and US\$ 14 per million BTUs makes investments in fertilizers, chemical industry, ceramics and glass unfeasible.

**“UNFORTUNATELY, PETROBRAS’ PRICING LEVEL IS NOT TO BE QUESTIONED FOR THE TIME BEING, BUT IT HAS TO BE ADDRESSED: 10%, 12%, 15% OF THE PRICE OF THE BARREL IS ABSOLUTELY FOR THE INDUSTRIAL POLICY.”**

The level of gas reinjection above 50% of total production is also criticized by the **consumer agent**, because, although its need is recognized, a level of 20% to 30% would be reasonable to enable a greater supply of national gas to the market.

In the case of LNG, the price is internationally indexed and most contracts use Brent, such as the thermoelectric power plant contract. For industrial consumers with short-term or spot supplies, the price depends on whether the price maker is Europe (TTF), Asia (JKM) and the United States (Henry Hub), with whom Brazil and, specifically Sergipe, would have to compete by paying the relevant price at the moment, depending on where the market is the hottest, and for shipping as well.

“LNG (...) IS AN INPUT WITH INTERNATIONAL PRICES, AND YOU CANNOT RELY ON LNG FOR EVERYDAY LIFE OF THE MARKET. LNG IN BRAZIL IS STILL A FUEL TO SUPPLY CONSUMER PEAKS OR PLANTS THAT ALREADY HAVE A SPECIFIC CONTRACT FOR LNG, WHICH ARE MOSTLY FLEXIBLE, SEMIFLEXIBLE.”

The term competitive price is often read as low price. **According to the producer agent**, the technically correct reading would be the price resulting from a free competition process, which is recommended in Brazil's constitutional and legal framework for this gas segment.

The gas market in Brazil is linked to global, economic and geopolitical conditions, and current contracts reflect the fact that the country is a gas importer, especially in the case of dispatch from thermoelectric power plants. **The producer agent** states that normally producers are also importers and have global operations, so that the risk is included in the contracts. In addition, the price of the molecule involves the risk of other activities subject to the agents' negotiation conditions and which are embedded in this price, such as flow and processing.

“WE HAVE THE ONSHORE, WE HAVE THE IMPORTS FROM BOLIVIA, WE HAVE THE OFFSHORE, WE HAVE THE LNG. BRAZIL TODAY HAS DIFFERENT TYPES OF SUPPLY AND EACH WILL REPRESENT THAT [PRICE OF THE MOLECULE] THAT IS LINKED TO THEIR BUSINESS.”

**The producer agent** clarifies that “gas is not just about price” and, concerning serving the gas market, the main value is to guarantee the reliability of delivery. The objective way to guarantee reliability would be to have a portfolio of offers, with multiple injection points on variable scales and varied profiles, of production types, including geographically. In the same sense, the guarantee of supply, **according to the government agent**, values the connection of the LNG terminal to the grid, because it does not jeopardize the consumers who invested in converting their production process to gas.

From a price perspective, gas has an “apparent paradox”, because, **according to the regulatory agent**, the price would have to be attractive enough to encourage upstream and infrastructure investments, while being competitive enough to displace its main competitors in the final consumption.

**According to the consumer agent**, the new dynamics in Sergipe, with the increase in supply and diversification of gas sources, puts pressure on reducing prices in the state, stimulating economic development with the growth of existing companies and the creation of new businesses.

However, the model designed in the New Gas Law of commercialization in a single virtual trading point would not benefit Sergipe, **according to the distribution agent**. This would mean that the geographic factor of the potential supply of SEAP and the interconnection of the LNG terminal to the grid would have no effect on the state’s competitiveness. On the other hand, in the direction of trading hubs in the country and not a single hub, SEAP and the LNG terminal could benefit the state of Sergipe. **The specialized consultancy agent** agrees that a great opportunity for Sergipe is to become a natural gas hub: offshore gas, onshore gas despite the small volume and LNG, which interconnected to the grid can make Sergipe one of the gas hubs for Brazil.

In a scenario of investment restrictions, distribution representatives argue that there may be a limitation in access to natural gas, since investment in distribution is the expansion of the customer base. By providing customers with options regarding the use and access to gas, different types of customers are taken into account. Regarding the concession contract, if it is not fulfilled, the company may be discouraged from making the necessary investments to expand and diversify the customer base.

**For the producer agent**, the proximity of production to the coast of Sergipe would benefit the state with a smaller transport component, in addition to the incentives that the state itself could offer for this gas to be consumed and processed.

**Another producer agent** agrees on the advantage of being established in Sergipe by not paying the gas transportation fee, or paying a “very small” amount, due to the proximity to the LNG terminal and the point of arrival of the SEAP gas. However, **the producer agent** considers that it depends on how tariffs evolve, which should be based on distance. **The regulatory agent** adds that other appeals would be relevant to attract an industry, because the alternative of proximity for a cheaper price would be difficult to achieve, since the price of gas is indifferent to the distance from the consumer.

### 2.2.3. BARRIERS

- At a national level, there is no definition as to the model for trade hubs in the natural gas market, which was mentioned to be a point of tension between a single virtual trade point for the country and the formation of regional hubs.
- The price of gas in Sergipe was mentioned as uncompetitive in relation to neighboring states, in particular due to the volume of the market size.
- Regarding the legislation related to the import of LNG cargo, the need to adapt tax legislation to enable swap operations in the FSRU was mentioned, regarding the decision whether or not to impose state and municipal taxes (ISS and ICMS).
- The need to make natural gas more competitive compared to other energy uses was identified, especially firewood, which is currently the main energy competitor in Sergipe, mainly in the red ceramic industry. Thus, specific strategies would be necessary to make gas a more attractive and competitive option in terms of cost and environmental benefits.
- The need to analyze mechanisms for the direct contracting of natural gas was identified, recognizing the “successful” model of the free electricity market, to guarantee the industry a constant supply of gas. However, implementing this model demands investment, especially for the conversion of industries, which may involve significant costs.
- The heated FPSO market with excessive bidding prices and few participating companies was mentioned as a barrier to the development of the SEAP project, increasing the price far beyond what was projected. The postponement of the bidding for the two SEAP FPSOs, combined with the timing of resource exploration in the Sergipe sea, could bring uncertainty for new gas suppliers in that region
- The state of Sergipe, according to respondents, does not have a demand that anchors the supply, the production of SEAP would exceed the usual consumption volume. Therefore, it was mentioned that an industrial look at formulating public policies to anchor future consumption, through a project guide would be an interesting point.

- The high price of LNG on the international market was mentioned as a barrier to making the gas supply competitive in Sergipe, considering the interconnection of the LNG terminal to the transport grid.

- Reduction in the ICMS calculation base through Agreement no. 26/2021 (which extends and amends ICMS Agreement 100/97), equivalent to the application of 4% on the value of the operation on imports and internal and interstate exits, was mentioned as a barrier because it is conditional on a 35% increase in national fertilizer production by the end of 2025.

#### **2.2.4. OPPORTUNITIES**

- The firm and interruptible supply of national gas production projects was mentioned as an attraction for a base of companies to set up in the state of Sergipe.

- The SEAP project was considered “very important” for the long-term planning of Petrobras’ portfolio of offers, since the project would contribute a volume to the replacement of offers.

- The break-even estimated for Sergipe was mentioned as “very competitive” for the offshore environment, due to the reduction in costs associated with the SEAP project structure, such as the absence of CAPEX and OPEX from onshore gas processing.

- The commissioning of offshore projects was mentioned as an encouragement for the supply chain, attracting companies to E&P activities that provide offshore support, services and maintenance.

- The increase in supply and molecule competition from projects in the Northeast region, with the gas dispute in Sergipe, with Petrobras, and in Alagoas, with Origem, was mentioned as an encouragement for the competitiveness of the price of the gas molecule.

- The state was suggested the possibility of exploring the availability of natural gas to enable gas-intensive industrial ventures, especially those that can form a portfolio of projects contributing to the local economy.

- For the gas consumer in Sergipe, the opportunity was mentioned to be able to choose the supply basket that best suits them, be it national gas or LNG, that is, to have options to create portfolios and arbitrate with the two markets as they bring benefits.

- The possibility of interconnecting the gas network with landfills and the production of biomethane with the system was mentioned as an opportunity, although conditional on the competitive system tariff.



- Creating an environment that is welcoming for efficient interaction between decentralized producers, such as small onshore and biomethane producers, and natural gas free consumers was highlighted to provide benefits in terms of optimizing network logistics, promoting competition and creating a more dynamic and efficient market.
- To the free consumer, there was mention of the opportunity to purchase a molecule at a low price through auctions to balance the transport system.
- The potential production of hydrogen was mentioned as an opportunity for application in the fertilizer industry or to be directed to the port for export to the European market, which could contribute both to the expansion of the port and to attracting agents who want to operate in the hydrogen market.
- The state has the capacity to monetize natural gas available onshore or surplus from a large consumer such as thermoelectric power plants, which at a particular moment would not be fully used, either due to lack of demand or limitations in the infrastructure to transport the gas to other regions in Brazil.
- Encouraging the hiring of local suppliers to boost the economy and facilitate the attraction of investments in infrastructure and logistics.

- The state of Sergipe was considered a “bulwark” to achieve tax equality between imported and national fertilizers, within the four years (2021-2024) provided for by Agreement no. 26/2021.

## 2.3. ANALYSIS OF TAXATION

This section will map the main challenges and obstacles to taxation that may affect the natural gas industry in Sergipe, with an emphasis on the debate on the implementation of tax reform. Considering that the energy segment was one of the main contributors to tax collection in Sergipe, its benefits will be detailed in light of the Sergipe Social Development Program (PSDI). In addition, tax mechanisms in LNG operations at the Sergipe hub will be analyzed.

### 2.3.1. MAIN DEBATES AT NATIONAL AND STATE LEVEL

In the operational tax context of natural gas, challenges were identified within the scope of negotiated third-party access to essential gas processing infrastructures, which is still being implemented in the ANP’s regulatory agenda. Furthermore, tax challenges in contracting gas transportation are also identified after the changes implemented by the New Gas Law.

In this aspect, there is a need to issue invoices for the entry and exit of gas regime in each section where there are negotiations (withdrawal and insertion of the input into the grid), with strict monitoring through the Electronic Transport Bill (CT-e). This document is issued in collaboration between the trader/shipper and the carrier company, and plays a fundamental role in tracking the gas, but is of great operational complexity, **according to the transport agent**. The need for optimization to simplify and improve tax processes is highlighted, because it would be common for there to be a mismatch between the contractual or legal flow and the physical flow of the molecule handled in the free market operating model (entry and exit), since the mixing gases with different owners becomes inevitable since gas is a fungible asset and different agents operate in the grid.

As transactions become more complex, challenges arise in a virtual hub that facilitates the exchange of molecules. This includes the creation of a secondary market for the right to use transport capacity, creating inefficiencies in the original tax paradigm. The original paradigm of the physical flow of the molecule in the gas pipeline was not replaced, because although SINIEF presented a way of allocating pairs, the effects appeared in the operational aspect, without tax effects, ensuring that states do not lose revenue.

In addition to the tax challenges at the national level, the respondents presented a debate that touches on the relationship between states to attract investments related to the natural gas market, because tax incentives have played a fundamental role in attracting investments, especially industrial gas consumers.

Currently, the tax structure of the gas chain has a predominant incidence of ICMS, PIS and COFINS. These taxes are non-cumulative, which means that the production and marketing chain carries out credits and debits, paying on the additional margin added to the service. For example, if a trader buys gas and adds value, PIS, COFINS and ICMS are paid on this increase in relation to the original cost of the gas. However, with the changes expected from the tax reform in Brazil, this logic might change, in view of the monophase. If gas is exempt, all links in the chain will be able to charge the tax at the end of the transaction.

**“THE TAX ISSUE IS ALWAYS VERY COMPLEX, BECAUSE IN FACT, ULTIMATELY, IT’S ALL ABOUT TAXES, THAT’S WHAT WILL TELL WHETHER THAT IS ECONOMICALLY VIABLE OR NOT.”**

The Tax Reform proposes the elimination of five taxes: the federal taxes (PIS, Cofins and IPI) will be replaced by the Contribution on Goods and Services (CBS), while the state taxes (ICMS and ISS) will be replaced by a Value Added Tax (VAT) dual. This dual VAT consists of the Goods and Services Tax (IBS), which unifies ICMS and ISS, and a part of the CBS. These changes aim to put an end to the tax war between states, reducing ICMS tax benefits. As a result, states will need to find new attractions for industries, with the “business environment” mentioned by several respondents as one of these advantages.

Therefore, a challenge is on the horizon for states that have used tax benefits to boost economic development. The state of Sergipe, although considered by different respondents to have a proactive approach to attracting investors, presents advantages of a predominantly fiscal nature. In 2019, the state carried out a review of its legislation, incorporating tax incentive provisions from other states in the region, as established by Complementary Law 160, which deals with agreements for the remission of tax credits. In this context, measures such as the reduction of the ICMS calculation base in operations involving natural gas and the exemption in certain gas transactions are noteworthy, especially for companies accredited in the Sergipe Industrial Development Program (PSDI).

PSDI<sup>13</sup>, established by Law no. 3.140/1991, aims to boost investments and strengthen local industry with the aim of promoting socioeconomic development in Sergipe. Its main instruments are incentives, such as financial, credit, locational, fiscal and infrastructure support.

“IT IS A GOOD PROGRAM, BECAUSE PSDI HAS A TAX PROGRAM AND ALSO LOCATIONAL INCENTIVE (...), HERE IT IS AN INDUSTRIAL DISTRICT WHERE YOU HAVE THE SQUARE METER AT THE LOWEST PRICE THAN ANY OTHER LOCATION IN TERMS OF REAL ESTATE (...). TODAY, THE PSDI BASE IS A 92% DEFERRAL OF ICMS ON REVENUE.”

In relation to tax benefits, the PSDI allowed significant changes: previously, a percentage with deferral was applied, but now payment is immediate. ICMS collection varies with the location of the companies, being 8% (92% discount) for the capital and region, and 6.2% (93.8% discount) for the countryside. In addition, ICMS deferral is granted on imports of raw materials used exclusively in the production of the incentivized goods. In terms of location and infrastructure, the state grants the assignment or sale of land or warehouses for ventures, in addition to offering special conditions for the implementation of natural gas supply systems, among others.

<sup>13</sup> The PSDI is administered by the State Secretariat for Economic Development, Science and Technology (SEDETEC), with the Industrial Development Council being its highest advisory and normative body.

Besides the PSDI, State Decrees no. 40.401 and 40.402 of 2019, established exemption from ICMS on the internal acquisition of natural gas, to be effectively used in the industrial process, for the moment of subsequent exit of products resulting from industrialization (clause thirteen of the ICMS Agreement 190/2017). The ICMS Agreement 59/21, dated April 8, 2021, includes the State of Sergipe in the ICMS Agreement 07/19 - which grants presumed ICMS credit on operations carried out by facilities that develop the economic activity of manufacturing oil and natural gas refining products, as well as reducing interest and fines and partial remission of tax, in the manner specified therein.

The tax benefit framework is relevant to the state. In 2023, Sergipe presented a record revenue collection, with the main contributors being the fuel, energy, communication sectors, among others, **according to government agents**. In addition, the relevance of the O&G sector, including the activities of Carmo Energy, with investments in the revitalization of onshore fields, and Eneva, which operates as a gas import hub.

Sergipe gained national prominence by acting as a facilitator in the LNG operation, by granting ICMS deferral on imports destined for the regasification terminal. Furthermore, in order to facilitate gas re-export operations, special tax treatment was granted by State Decree No. 407/2023, with the internal rate of 19% replaced by a deferral of just 1.17% on gas imports, without the right to credit. This

tax treatment was considered a deal breaker, because, according to respondents, the standard tax burden would often make any business unfeasible if it did not have a differentiated tax regime.

LNG operations still face some barriers in the country. According to the **government agent**, there is a debate, at the federal level, regarding the legal nature of the industrialization of regasification activity with effects on the collection of IPI (Tax on Industrialized Products) and customs warehousing: whether it should be considered as processing or transformation. The challenge lies in regasification being considered a transformation process due to the industrial stages involved, such as heating with sea water and analytical processes, changing the tax classifications (NCM) between natural gas and LNG. However, the **government agent notes** that regasification could not be considered processing, as LNG undergoes a liquefaction process just to allow transportation, without modifying its substantial properties, and the change in the NCM makes it difficult to argue that regasification is processing, instead of transformation.

The resulting legal impasse is the fact that the customs warehouse specifically prohibits transformation. Customs warehousing refers to a special customs regime in which goods are stored in a bonded warehouse, but have not yet been officially internalized into the country. Considering the LNG merchandise, the use of the customs warehouse would offer

the opportunity to take advantage of both the terminal facilities and the regasification process with the LNG still in the exporter's possession, therefore before the merchandise is internalized<sup>14</sup>. Nationalization, in turn, would only occur at the city gate, where the gas has already undergone the regasification process and is ready to be distributed internally. This approach, finally, would allow efficient management of operations, taking advantage of the resources available during different phases of the process.

Despite the relevance of Sergipe's current tax framework to enable new businesses, changes in tax reform imply identifying new advantages. Among the differences pointed out by the respondents, the state could "take the lead" by taking advantage of the availability of gas, considered an important vector for the dispute for investments in industries that use energy as an input and thermal generation, in addition to the environmental issue for the energy transition.

**"THE STATE WILL HAVE TO THINK ABOUT OTHER MECHANISMS THAN JUST THE TAX BENEFIT THAT IS CURRENTLY GIVEN TO ATTRACT THIS INDUSTRY, THAT IS, THERE IS ALREADY ANOTHER COMPLICATING FACTOR, WHICH IS THE ISSUE OF THE TAX WAR THAT IS ENDING."**

The complexity of competitive advantages for the state increases with the end of the "tax war", since the mechanism of benefits through the PSDI represents the main attraction for the industry in the state. Considering a tax reform transition schedule organized until 2033, the approach to attracting investments allows the continuity of the PSDI tax benefit within this period, which, combined with the expectation of gas availability at more competitive prices, enhances the creation of an environment conducive for the development of new businesses. Following the logic of the production chain, the arrival of large industries in the state not only directly benefits, but also boosts local economy by hiring regional suppliers. Therefore, the prospect of strengthening the production chain with the current benefit of the PSDI, plus the advantage of more accessible gas, represents an effective, but limited, strategy to attract gas-intensive using industries.

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<sup>14</sup> The Regional Superintendence of Brazilian Internal Revenue Service (5<sup>th</sup> Fiscal Region) declared the LNG terminal bonded, through Executive Declaratory Act SRRF05 No. 8, dated March 7, 2024, in order to be able to handle and store LNG in entry or exit operations, loading, unloading, transshipment, import and export clearance, among others.

A promising tax strategy identified for the state of Sergipe would be a policy inductive of industrialization, fostering with ICMS incentives on natural gas for a period pre-determined by law so as not to benefit one link in the chain to the detriment of another. For example, to stimulate the production of methanol, an imported product essential for the production of biodiesel and industries synergistic with corn production, supported by the states that make up the SEALBA region (Sergipe, Bahia and Alagoas). This strategy would be relevant for the development of consumption in the state, **according to the consumer agent**, given the change in tax reform with the collection of IBS (successor to ICMS) based on final consumption, that is, the change in current collection at origin to collection at destination.

Other interviewed agents mentioned the opportunity for states to encourage industries through alternative approaches, with direct benefits and subsidies for production with resources from the National Regional Development Fund. The Fund will have contributions of “a few billion” annually by the Federal Government, distributed to the states to foster economic activities. These resources can either be used by the state itself in investments in infrastructure, or also rendered to companies conditioned to invest in the state, generating jobs and income. The regulation and institution of this fund still depends on complementary law; however, each state should prepare to structure strategies to optimize the use of this fund, especially for smaller states such as Sergipe.

### 2.3.2. BARRIERS

- Brazil has a very high cost in the tax chain, which was mentioned to be an obstacle for international companies to understand its functioning, and, despite the simplification foreseen in the tax reform, it does not mean that the aggregate tax will be lower than it currently is.
- Current taxation has been criticized for not taking into account the particularities and complexities of the natural gas fungible molecule and its network system, which should have a more rational approach aligned with the nuances of the industry.
- The new tax reform mechanism, which changes tax collection at origin to collection at destination, was mentioned as a barrier for Sergipe, which would no longer collect up to 12% ICMS on interstate gas sales in the state.
- Considering that tax reform requires complementary laws, a possible selective tax on gas was pointed out as reducing the competitiveness of gas expected from offshore projects in the state, in relation to other energy projects.
- State tax legislation was mentioned as being “dense and intricate” because there were several autonomous decrees, with provisions in the ICMS regulation, the PSDI decree, and others in law. Such a plurality of normative acts, dealing with different links in the natural gas chain and network industry, makes state tax legislation complex.

- In a development plan such as the PSDI, some market agents pointed out that incentive policies can give priority to certain regions without developing the whole, thereby making it difficult, for example, for the internalization of gas in the state.
- Regarding the deferral of ICMS on gas for PSDI beneficiaries, it was mentioned that, initially, it had positive effects on the industry, but, currently, there is a negative impact related to the configuration of tax deferral for the end of the chain, which can impair the entry of new suppliers into the free market due to economic unfeasibility resulting from an accumulation of ICMS credit.
- Regarding the PSDI, the lack of clarity in its legislation was mentioned, as the deferral on imports and reduced taxation on exit are different from other states that apply deferral on imports and presumed credit on exit, or exemption from payment of ICMS on imports, in addition to its complex system that continues to calculate the ICMS and applies a reduction on the outstanding balance. In legislation, it would be difficult, in this argument, to understand this practice.
- The absence of monitoring indicators and evaluation to monitor the impacts of incentives granted by the PSDI was mentioned as a barrier. In this argument, the incentive programs would need this stage to follow-up market demands and trends, identifying strategic sectors and promoting policies that stimulate the growth and competitiveness of local industry.
- Some agents indicated an issue related to the State Fiscal Balance Fund of the State of Sergipe (FEEF). During the fiscal crisis, SEFAZ-SE implemented a 10% cut in the value of the benefit granted by PSDI as part of the fund's policy; however, it did not obtain legal support and resulted in legal challenges.
- In terms of different states regarding the possibility of taxing onshore wells, some respondents point out that the state could take advantage of its autonomy to veto this possible taxation, because excess fees could make new and existing projects unfeasible.
- In the current LNG import process, it was mentioned that only the company that operates the private terminal can clear its own cargo, which creates a model in which only the owners or importers of the terminals have the capacity to import and regasify the LNG. The issuance of an invoice, an import requirement, could only occur after the formalization of the availability of the imported cargo, that is, after the completion of customs clearance. Some respondents referred to the delay in the ANP's regulatory agenda for infrastructure sharing and gaps in legislation in terms of obligations and customs control as significant obstacles to regasification or imports by agents who do not own the terminals. The main bottleneck would rest on the need to possess the goods to issue an invoice, which only occurs after customs clearance.

- Celse (an Eneva asset) pays for gas even when its thermoelectric power plant is not dispatching. The gas is sold to other agents before it even arrives in Brazil, in operations known as back-to-back. Therefore, a tax bottleneck was mentioned with regard to the federal regulation of tax incidence in these operations, which can be summarized as follows: the company imports gas and then exports it, there is taxation of financial income and PIS/COFINS, because the import takes place even if it is not formally considered. In short, the financial cost of the tax, added to the high transportation cost, can make the operation unfeasible.

### 2.3.3. OPPORTUNITIES

- Some respondents point out that it is possible to implement smarter taxation in the chain without reducing collection. The proposal would be to find a more “rational” approach, considering the real cost of taxation in the chain that stimulates the economy and competitiveness.
- It was suggested to the state to prepare a study in a specific tax diagnosis format, considering the tax reform, for industries considered natural gas intensive consumers and to study what will be the impact of taxation at the state and federal levels, and what the cost-benefit would be. In fact, these projects can generate high investments, jobs and benefits, which train and use local labor and foster the supply chain.

- The tax reform proposes the unification of taxes; some respondents reported that the competitive advantages for Sergipe will depend on the quality of infrastructure, having an attractive business environment and specific conditions for each sector according to the industrial vocation.

- In a network industry, such as the natural gas sector, the creation of specific regulatory standards that could be beneficial to the state was mentioned, such as tax differentiation for production and consumption within the state, transforming the input into another product, with ICMS exemption in the chain. On the other hand, if the product were destined for other states, the ICMS would be applied, to promote competitiveness in favor of the state of Sergipe.

- A personalized taxation of products that become part of the natural gas industry (prospecting, production, exploration and synergies) was mentioned as an opportunity for the industrial and port development of Sergipe. For example, different rates on imports of products, turbines and turbo generators, not necessarily for use only in the state, but for the national level - “everything that enters the O&G industry through Sergipe will have a different condition”.



- Programs to foster the use of natural gas were highlighted for specific sectors, such as public transport, commercial and industrial vehicle fleets, through tax discounts on the acquisition of gas-powered vehicles, installation of CNG supply infrastructures and subsidies for conversion of fleets. A differentiated tax treatment in the context of transport would allow the liquidity of natural gas sales at the hub and encourage the decarbonization of one of the sectors that most pollute the environment.
- Stimulating cogeneration and energy efficiency through tax incentives for companies that invest in this sector using natural gas was mentioned as a way to boost energy efficiency and reduce costs for industries.
- One suggestion that aims to improve the financial efficiency of the back-to-back operation is to ensure that PIS/COFINS is applied only to the difference between the purchase and sale value of the operation. This way, taxation would be more specific, considering the profit margin of the transaction, making the operation financially viable, even without the need to physically import the LNG.
- The government of Sergipe reduced the ICMS of CNG from 18% to 12% in 2022, aiming to make it more competitive, but ethanol would be cheaper than natural gas. Accordingly, the opportunity was mentioned for the state to develop an alternative to equalize the rates of these fuels.
- The state is revitalizing areas that have been vacated by companies for some time, including warehouses, which was mentioned as a relevant use of state resources to attract and accommodate new industries with special conditions.

## 2.4. ANALYSIS OF THE TARIFFS

This section will identify the main debates referring to the tariff issue at both national and state levels. In that sense, the tariff discussion was segmented into four tariff models: transport tariff, short haul tariff, distribution tariff and other related tariffs such as TUSD or T-MOV. Based on this segmentation, this section aimed to detail the main opportunities and barriers.

Therefore, the formation of a competitive gas tariff is considered to be an indispensable element for the development of the gas market and, for Sergipe, the attraction of new businesses and industries.

## 2.4.1. MAIN DEBATES AT NATIONAL AND STATE LEVEL

### • TRANSPORTATION TARIFFS

The transportation system has the potential to improve security of supply and promote a competitive environment. **From the carriers' perspective**, by reducing costs associated with transportation, there is the opportunity to improve the infrastructure of the chain financed by the regulated sector. However, considering that transport costs represent only 13% of the total cost of gas, being the smallest portion of the entire chain, the carriers claim for a more efficient allocation of costs. In summary, as the cost of transportation is linked to supply and the responsibility for custody is transferred to distribution, which meets gas demand, it is essential to have coordinated planning in order to ensure efficient gas flow.

“TRANSPORTATION AND DISTRIBUTION ACTIVITIES, BY THE ESSENCE OF REGULATED SECTORS, IS NOT SELLING THE GAS, BUT IT IS TO ENSURE THAT IT EFFICIENTLY REACHES THE CUSTOMER.”

The allocation of **carriers'** revenue rights over market contracting volume results in the tariff. Consequently, to establish a “win-win” relationship within the gas market, carriers demand an increase in their right to revenue (composed of the WACC, in addition to the unpaid OPEX for maintenance and operation of the assets), that is, capacity to expand their

investments which could, in their perspective, give more dynamism to the market and boost growth.

“THE THING ABOUT TRANSPORTATION IS THAT IT IS NOT AN ISSUE OF TARIFF BUT THAT OF REVENUE. THE CARRIERS HAVE THE RIGHT TO REVENUE ACCORDING TO THE INVESTMENTS THAT THE COMPANY MAKES”.

In this context, **the transport agent** expects that the expansion of the right to will directly contribute to the reduction of tariffs (result of the allocation of the right to revenue). Without effective coordination between transport revenues and tariffs, there is a risk of tariff increases due to decreased revenues. This decrease is a consequence of the need to amortize older investments and the slow entry of new investments. On the other hand, with more investments and an integrated market, there is the possibility of a better allocation of infrastructure costs and a reduction in tariffs. In this scenario, carriers argue that, by adopting this approach, the state of Sergipe must commit to integrated planning.

“THE GREATER THE VOLUME OF TRANSACTIONS, THE TARIFF COST WILL BE DILLUTED, [HENCE] THE IMPORTANCE OF MULTIPLE AGENTS. THE MORE DYNAMIC THE MARKET, THE MORE THE COSTS OF LOGISTICS FALL. THE COST OF LOGISTICS FALLING, THAT WILL HELP TO ATTRACT MORE INVESTMENTS TO INCREASE THE MARKET, BECAUSE THE TARIFF PERCEPTION BECOMES (...) AN ECONOMIC ISSUE”.

**In the distributors' perspective,** it would be necessary to advance the discussion on the formation of transport tariffs, including the lack of tariff revisions on the agenda. In that sense, they recall that the last tariff review took place just over 20 years ago. Unlike transportation tariffs, distribution tariffs follow the valuation of assets annually with adjustments according to the curve of demand for investments made, **according to the distribution agent.** Due to the lack of tariff review, depreciated transport gas pipelines have already been identified. Accordingly, the transport tariff review should be a national priority, as a way to boost the competitiveness of the gas market and that does not limit the distributor to a specific size/volume.

Thus, within the scope of a proposal for tariff review, the distribution segment argues that the review should be carried out at the federal level, as many discussions related to tariffs end up limited to the state level. Therefore, transport tariffs have been an issue that distributors have valued for the linear matching of the debate, that is, bringing the state and federal spheres closer to each other.

In turn, **regulatory representatives** claim that it is equally important to have transparency in the composition of the transport tariff. In the same vein, **consumers** argue that it is necessary to have efficient regulation for balanced transport tariffs.

**"(...) ALLOW CARRIERS TO COVER THEIR OPERATIONAL COSTS AND NECESSARY INVESTMENTS, WHILE GUARANTEEING AFFORDABLE PRICES FOR CONSUMERS."**

Within the confusion of the tariff review defended by the distributors, challenges were also identified in terms of remunerating the use of pipeline capacity, due to the sale of Petrobras assets in the transport segment that resulted in legacy contracts for current carriers. The challenge lies in the fact that the transport tariff paid by the distributor to the carrier, and passed on to the end consumer, was not calculated by transport tariff regulation, but based on the remuneration of the pipeline buyer. In other words, according to the distribution agent, the transport tariff in Brazil is defined by the sale of the Petrobras' pipeline to third parties, with leaseback, which represents the purchase of the pipeline's capacity.

**"SO, IN FACT, WHOEVER IS PAYING FOR USE OF THE PIPELINE CAPACITY IS NOT PETROBRAS. THE ONE WHO IS REMUNERATING THE PIPELINE BUYER IS THE FINAL CONSUMER, WHO PAYS FOR TRANSPORTATION TARIFF THAT WAS NOT CALCULATED BY ANP."**

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<sup>14</sup> The sale of the carriers by Petrobras was carried out including the contracting of gas pipeline capacity by Petrobras itself.

**Specialized consultancy agents** add that the increase in transport tariffs is linked to the opening of Petrobras' monopoly, which consisted of production, transport and distribution. In this argument, the gas pipelines sold were "at new prices", resulting in a high investment to depreciate and increase in transport tariffs. Thus, the end consumer pays for a more expensive depreciation of a gas network that is also depreciated, according to **the consultancy agent**.

"AND THESE TRANCHES, ALL HEAVY, LEAD GAS TODAY TO ABSOLUTELY ABUSIVE LEVELS, LOOKING FROM THE POINT OF VIEW OF THOSE WHO WANT TO GENERATE JOBS AND INVESTMENT IN BRAZIL".

**Regulatory agents** corroborate the argument that the Brazilian tariff system is "stiff" and that tariffs could be applied for shorter distances, with different prices. However, they highlight that this study is still insufficient for Sergipe as the set of existing gas pipelines have legacy transport contracts. A significant portion of these contracts are expected to expire by 2026, which will contribute to the revaluation of the regulatory asset base and have a positive effect on reducing tariffs for gas pipelines that are amortized.

In addition to the issue of tariff review and legacy contracts in the system, another difficulty identified by the **distributors** in transport tariffs is the divergence between

links in the chain that pay for transport and others that do not pay. This movement happens, according to the **distributors**, because ANP regulation does not require that the entire volume of gas consumed passes through transport, limiting potential gains in scale and reductions in unit tariffs.

For Sergipe and the SEAP project, the **distribution agent** recognizes that the New Gas Law does not oblige the consumer to pay the transportation fee. However, this hypothesis could be a problem for Sergipe to face in the future with carriers, as it could inhibit its gas competitiveness with restrictions on scale gains.

"BRAZIL NEEDS TO DECIDE WHAT IT WANTS, BECAUSE THIS GENERATES HUGE UNCERTAINTY, ALSO FOR SERGIPE. DOES THE GAS HAVE TO GO THROUGH TRANSPORTATION OR NOT?"

This is an externality that would serve all players in the gas market, **according to the distribution agent**, as the greater the scale and access of different players to gas, the lower the unit cost will be to serve each of these actors. For **the distribution agent**, the ideal configuration would be for the gas from SEAP to undergo transportation before being distributed to the customer, placing Sergipe subject to the same transportation tariff paid by other states in the Federation.

“BRAZIL IS LIVING IN A DRAMA, WHERE IF YOU WANT TO OBLIGATE THE GAS [OF A CERTAIN REGION] TO GO THROUGH TRANSPORTATION, YOU HAVE TO OBLIGATE THE ENTIRE BRAZILIAN GAS TO PAY FOR TRANSPORT. THUS, THERE IS A GAIN IN SCALE, TARIFF REDUCTION AND INCREASE OF VOLUME WITHIN THE SYSTEM, WHICH WILL BRING BENEFITS TO EVERYONE.”

In this discussion, the connection of SEAP with the transport grid is relevant because the volume of gas offered will not be anchored in Sergipe only, but will be transported to other states. And, considering a potential drop in gas production from the Pre-Salt, **distribution agents** argue that this volume from SEAP can be redirected to the Southeast, reversing the current flow.

Currently, for **consumers**, transportation is a link that increases the cost of gas for the Brazilian consumer, due to high tariffs. The tariffs can be almost ten times higher than the average tariffs charged in countries such as the United States and European countries. In turn, in Brazilian territory the consumer pays around US\$2.5 to US\$3/MMBTU for gas transported on the national grid, “(...) with TAG being the one that serves us the highest rate”. On the other hand, **regulators** mention that they have already managed, to some extent, to mitigate the locational effect present in the TAG tariff. As it is a carrier operating in areas distant from each other, such as Sergipe and Ceará, it is influenced by

lower consumption and at the end.

**Producer agents** highlight that transport tariffs are high for several reasons, including those associated with the depreciation of pipelines, which should only account for the O&M of the pipeline or even the associated CAPEX. The formation of the TAG tariff considers 90% as postal, having the same cost for everyone, and 10% represents the locational signal, which will consider the distance from the center of the load, that is, the volume of gas that enters and exits within these points. In this context, they state that TAG is more uniform in guaranteeing the economicity of transport tariffs.

As for the market discussions about defining the most appropriate transport tariff, **producers** see a dichotomy between states where each one must approach a specific tariff logic. Therefore, they must observe the characteristics of the consumer, especially if it is a large industrial consumer that has a greater attraction factor than others. So, two paths can be taken, in which the first is the definition of the rule to avoid unpredictability and the second concerns monitoring a specific and modest tariff.

Alluding to the attractiveness of tariffs in the state of Sergipe, **consumer agents** stated that the transport tariff will be basically the same for all links in the chain. However, it could have even lower costs in the state if TAG was not connecting the LNG Terminal to the grid. For the **producer agent**, the pipeline under construction in Sergipe to connect the LNG terminal could adopt an equally high tariff as it is a new venture.

“[THE CONNECTION OF THE LNG TERMINAL TO THE TRANSPORT GRID] FOR TAG WAS WONDERFUL. THE COMPANY BUILDS IT IN SERGIPE AND THOSE WHO WANT TO CONNECT TO IT WILL PAY THIS AMOUNT TO TAG. BUT FOR THE STATE IT WAS BAD (...). IT’S A BRANCH OF TRANSPORTATION AND WILL HAVE THE SAME TRANSPORTATION TARIFF, THOUGH IT COSTED MUCH LESS.”

In this chain, **consumers** argue that it is necessary to adopt greater aggressiveness in transport regulation in order to make tariffs more competitive. For purposes of illustrating the topic, for the viability of production in fertilizer factories, natural gas has an estimated cost of US\$ 5/MMBTU, which represents the sum between the transport molecule and the handling molecule. Since transportation alone is half this price, even if there is a reduction in the price of the molecule, the tariff cost will continue to be high.

“SO, IF I HAVE TO PAY THE SAME TARIFF, I WILL SET UP MY INDUSTRY IN BAHIA, WHICH HAS A MUCH LARGER CONSUMER MARKET. OR ELSE I WILL GO TO RECIFE (...).”

Some **consumers** propose the proportionality of the tariff to the detriment of the cost invested in the construction of the gas

pipeline. Hence, a tariff would be defined that remunerates the investment made. If a small pipeline is built, in terms of kilometer, the transport tariff may also be lower and the opposite also occurs if mega gas pipelines are implemented. However, the current configuration, **according to the consumer agent**, does not bring benefits to the player who installed the gas pipelines, as everyone pays the same transport tariff that serves a consumer market considered small, such as Sergipe.

To provide economic transport services, **consumers** suggest to stakeholders in the gas market that they value operational efficiency, so that carriers adopt efficient management practices. In that sense, they also encourage investment in technologies capable of reducing operating costs and, thus, improving the quality of natural gas supply in the region. To this end, they claim that EPE should create a transport infrastructure scenario for the region, which is not “at the mercy of the limitations or otherwise of a private company, in absorbing transport capacity from Brazilian infrastructure”.

Therefore, **the consumer agent** states that competitiveness based on the potential of natural gas supply would only be possible if there is legislation that differentiates the price of the transport tariff, with a competitive advantage for the local consumer. Otherwise, this potential gas from Sergipe can go to neighboring states and reach the end consumer for the same price.

“(…) THEN PRODUCING IN SERGIPE AND IF THERE IS NO DIFFERENTIATING FACTOR FOR CONSUMING IN THE STATE UNDER MORE COMPETITIVE CONDITIONS, IT IS NOT AN ADVANTAGE TO COMPETE, IT IS GENERATING ONLY THE MOMENTARY JOBS FOR CONSTRUCTION OF A GAS PIPELINE, THEN A JOB AT THE LEVEL OF PLANT OPERATION AND THE OPERATION OF THE GAS PIPELINE, BUT THERE IS NO INCENTIVE FOR INVESTORS TO GO TO SERGIPE”

The ambition, according to **the government agent**, is for the producing state, in this case Sergipe, to have an advantage in the transport tariff, which could occur from the gas pipeline under construction by TAG. In turn, Eneva’s gas will be traded when it uses gas from a ship that is not dispatching and sells it and transports it through the TAG gas pipeline. The **government agent**’s assumption, therefore, is that based on the geographic proximity to the supplier, the transport distance is reflected in the tariff.

Concurrently, with the possibility of making the state of Sergipe more competitive through the availability of SEAP gas, the proposal of a short-haul tariff aims to attract investments to the state with the advantage of a lower tariff. However, **distribution agents** argue that even with this tariff, considering the scenario of inversion of gas flows, it will be the consumer in the Southeast who would bear the sum of two tariffs: short haul and transportation.

“SO, THE CURRENT QUESTION IS WHETHER THIS SPECIFIC TARIFF [SHORT-HAUL] WILL BE ALLOCATED FOR TRANSPORTATION GAS PIPELINE OR INSIDE THE SYSTEM. THAT ENDS UP BEING INDIFFERENT, BECAUSE IT WILL BE A SUM OF THESE TARIFFS.”

Another point related to attracting investment in production that was raised by government representatives is the signaling of an expansion of the transport grid that supports the increase in production volume. However, the current lack of clarity in terms of the transport grid expansion, regulation and WACC are some of the factors that inhibit investment attraction. Therefore, this lack of clarity can be an unfavorable point at the instance of reviewing the tariffs.

#### • SHORT HAUL TARIFF

Regarding the short haul tariffs, the **transport agents** express their opposition, as to make the “tariff feasible” it would be necessary to expand market integration, in order to generate competition and expand business. In the meantime, it would be necessary to advance the availability of hydrocarbons in a more competitive way for other players. By way of comparison, they point out that if the short haul tariff were calculated today, Sergipe would be at a disadvantage, as it constitutes a market that so far does not have significant gas production.

As a solution, the **transport agents** adopted the CWD (Capacity Weighted Distance) model as the tariff calculation methodology, which includes distances from a center of gravity that will move according to the volume of production offered to the market. Based on this calculation, it is estimated that the fostering of production and market attraction in Sergipe can contribute to reducing this center of gravity, which is currently concentrated in the Pre-Salt.

“(…) AND IF WE MAKE A SMART TARIFF, WITH A GOOD ALLOCATION OF THESE COSTS, WE WILL FOSTER THE MAIN CHAIN, WHICH IS TO LEAD GROWTH OF THE GAS MARKET”.

The fear, on the part of **carriers**, is that the short haul tariff will also be linked to a tariff considered “long haul”. Considering the gas market in the state of Sergipe, they argue that the existence of other delivery points could make the tariff cheaper for some, while for others, it would be more expensive.

“THE SHORT HAUL AS IT IS CONCEPTUALLY DESIGNED, IF IT IS ADOPTED, WILL NOT JUST BE FOR SERGIPE, THERE WILL BE THE SHORT HAUL IN THE PRE-SALT AS WELL”.

In the perspective of **consultancy agents**, short haul was inspired by the European model to avoid the so-called transport by-pass, which could occur when a consumption center very close to the point of supply does

not connect to transport. Short haul, therefore, would create an incentive for the consumer to connect to the transport grid by paying a lower price due to the reduced distance from the point of supply. On the other hand, the mechanism would be similar to a cross-subsidy on the network, **according to the consultancy agent**, in which there is a reduction in the tariff at a certain point close to the injection site and, subsequently, the cost is spread among other carriers.

In the perspective of **producer agents**, the short haul resembles a by-pass, questioning whether the gas market would be impaired or made viable. The solution **for some consultancy agents** would be to maintain the supply connection in the transport grid in order to lower the tariff. Considering that the price of the molecule in Sergipe is not competitive in relation to its neighbors, it is believed that the short haul tariff is not the most appropriate option, as there are other factors to increase the state’s competitiveness and attract industrial ventures, such as availability of labor, infrastructure and financing.

In contrast, the implementation of the short haul tariff, in the perspective of **consumer agents**, would be capable of enhancing investments in Sergipe. The segment is positioned as favorable to the tariff, as it would reduce the costs of transporting natural gas to local consumers. Consumers postulate that if there are no short haul tariffs, the state of Sergipe will not have a competitive advantage with local production.



In this argument, the existing facilities in Atalaia could be expanded to supply gas to an industrial hub, through the TAG grid, and even to the UNIGEL fertilizer plant, in Laranjeiras, and possibly a new plant close to the coast. This incentive to the development of industrial hubs could increase the competitiveness of companies located in Sergipe, compared to competitors from other states, who would not have access to this tariff.

For **consumers**, the link in the gas chain that is considered contrary to the tariff are the **carriers**, as they see the tariff as a loss of revenue. **Producer agents** agree that the current challenge is to make short haul an interesting tariff for both the carrier and the industrial consumer.

In their analysis, **consumer agents** counter-argue that the short haul tariff does not represent a loss of revenue for transport, as it is not real revenue. If it were a hypothetical revenue, they argue that this would only happen if there is modest tariffs and if there is not, there will be no revenue.

**“THE CARRIER RECEIVING A TARIFF THAT IS HALF OF THE ORDINARY TARIFF IS MUCH BETTER THAN NOT RECEIVING ANYTHING BY MAINTAINING A FULL PRICE LIST.”**

For **the government agent**, the implementation of short haul tariffs brings advantages in terms of total project cost to the

stakeholder closest to the entry point of gas supply into the grid. Despite the advantages, **another government agent** also mentions that the implementation of the short haul tariff could cause a pile-up of tariffs under the ANP’s monitoring responsibility.

In the perspective of **producer agents**, the short haul tariff can benefit competitiveness in Sergipe and attract investments to the state, because if there is differentiation by distance and not by fixed transport tariff, regardless of where this gas outflows, there is a preference for being close to the production site. This tariff would benefit society, since resources will not be wasted by transport taxation that is not directly proportional to the distance.

**“IT WILL MAKE THIS FERTILIZER INDUSTRY VIABLE AND WILL MAKE THIS METHANOL INDUSTRY VIABLE, FOR SURE. BECAUSE THE STATE OF SERGIPE IS SMALL, DISTANCES ARE VERY SHORT. SO, THIS [SHORT HAUL RATE] IS AN ADVANTAGE.”**

**Producer agents** mention that the discussion about the short haul tariff has “pros and cons”, because, by accessing the transport grid, the consumer would have access to different suppliers even if they use a small section of the pipeline. They also stress that contracting in the entry and exit system occurs independently, which does not take into account how many kilometers the gas consumed has traveled, given its fungibility.

**Other producer agents** argue that the uniform transport tariff drives the installation of gas thermoelectric power plants where there is no gas, which represents a “tremendous subtraction of value for Brazilian society”. However, they argue that the short haul tariff would need to be extensively debated so as not to be applied to larger markets, which would harm smaller ones. Another point of attention is that, in the long term, the short haul tariff could have a “wicked effect on the viability of the gas market itself”. In this sense, it would be necessary to have a balance between the links in the chain according to ANP’s decision.

Currently, ANP is analyzing short haul tariffs, and already introduced locational and postal components in public calls from carriers, with the possibility of increasing the locational content annually. **According to the producer agent**, this set up could eliminate short haul through a lower average tariff applicable to consumers located close to the supply.

In the perspective of the **regulatory agents**, there would be a common agreement that any gain in the value of the short haul tariff would be important to make Sergipe’s gas more competitive. However, they note that the molecule still constitutes the most important element in tariff formation. To corroborate their line of argument, they resume the tariff calculation made by the Energy Research Company (EPE) in which the transport tariff is around 10% of the gas value, followed by the distribution tariff with around 14% and the remainder would be the total

divided into taxes, or about 24%, of which the remainder is the molecule.

Thus, if the state of Sergipe creates short haul, **for regulators**, there is the possibility of forming a differentiated transport tariff that balances with the attractive distribution tariff, promoted by the state. However, from the perspective of **regulatory agents**, they have not yet defined a concrete case of the short haul tariff, but they consider that it is necessary to have social participation during the regulatory process on this topic.

In the same vein, **regulators** are already studying the application of the short haul tariff for shorter gas pipelines, in order to favor the fact that this scenario does not have a high entry and exit cost. Furthermore, they highlight that the industry in Sergipe is very spread out, where the division of operational costs by the number of agents is very small. Thus, as a solution to dilute this cost, that is, to reduce Sergipe’s tariff, **regulators** argue increasing the number of users.

#### • DISTRIBUTION TARIFFS

**In the perspective of distribution agents**, the role of distribution is to generate market value, with tariff neutrality and use of the state’s infrastructure. At the same time, they highlighted the role of the distributor in mobilizing investments that benefit the growth of the gas market.

“PIPED GAS DISTRIBUTION IS A NATURAL MONOPOLY, BY DEFINITION. BUT, UNLIKE OTHERS MONOPOLIES, IS IT A MONOPOLY WHERE I HAVE TO FIGHT FOR THE MARKET, AND WHAT IS OUR VISION OF DISTRIBUTION? IT IS THE ONE WHO DISCOVERED THE MARKET”

The distribution tariff varies according to the purchase of gas from suppliers, so the volume purchased influences the tariff, that is, the tariff table is regressive: the higher the gas consumption, the lower the tariff. In this aspect, **according to the distribution agent**, gas in Sergipe becomes more expensive due to the volume sold.

“NOWADAYS, GAS IS BECOMING MORE EXPENSIVE DUE TO VOLUME (...), BECAUSE THE OTHER COSTS ARE THE SAME AS THE DISTRIBUTORS. THE PRICE OF THE [CARRIER] IS THE SAME. THEN, YOU DON'T HAVE TO DEAL WITH IT, YOU DEAL WITH THE PRICE OF THE MOLECULE, YOU DEAL WITH THE RATE OF THIS COST TO THE CONDOMINIUM (...). THIS IS DIRECTLY RELATED TO THE VOLUME THAT IS TRANSACTED.”

Therefore, considering the entire national gas market, the most burdened link is the captive consumer, who pays a higher price for a volume considered low, **according to the consultancy agent. Distribution agents**

highlight that ensuring competitiveness in the distribution link fundamentally involves scale, market diversification and increasing the volume of gas for consumers. In addition to these actions, competitiveness in gas tariffs depends on the combination of three other factors: molecule, transport and taxes.

“WE WILL ONLY HAVE COMPETITIVENESS WHEN THESE FOUR LINKS ARE AT THE SAME TIME PRODUCING, BE IT COMPETITION, BE IT EFFECTIVE AND TRANSPARENT REGULATION, BE THE GOVERNMENT GIVING SIGNALS.”

**In the perspective of the distributor**, if some state policies aimed at serving all markets were to be applied, the State of Sergipe would have the lowest tariff in the country, because in the event that the thermoelectric power plant is included in the system with payment of the margin, this margin would contribute to reduce the average margin of the entire distribution system, allowing the use of CNG or the development of industrial condominiums, for example, to be mobilized by a lower rate.

**Other distribution agents** add that Sergipe's distribution margins for industries would be one of the most competitive in the country. However, the reason would be negative due to the state regulatory agency allegedly not complying with the tariff review rule. **According to the consumer agent**, it would be necessary to guarantee greater transparency regarding tariff reviews and

emergency rules, which should be decided at a public hearing. In this argument, tariff reviews bring new configurations on an almost monthly basis, which, at times, are no longer adequate to the contracts signed by certain industries, especially affecting the gross margin.

“IMAGINE AN INDUSTRY THAT CLOSED A CONTRACT WINNING A TIGHT MARGIN AND IS ENTIRE COST, DULY CALCULATED, THEN THE [DISTRIBUTOR] COMES AND SAYS ‘LOOK, NO, THE REVIEW IS FROM LAST MONTH, OK? THAT TARIFF I AM PRESENTING, IT STARTS TO BE VALID SINCE LAST MONTH.’”

Among **consumer agents**, the need to adapt legislation on the mechanisms for calculating gross margin was indicated, although the **producer agent** positively indicated the capacity allocation provided for in state regulations, which calculates the distributor’s margin based on the total volume handled.

**Producer agents** endorse consumers that the tariff formation rule should be more transparent, allowing understanding of the investments made by the distributor, which should be rational over time. The 20% rate of return for distributors in the Northeast (20% per year of CAPEX and 20% of OPEX) is mentioned to be an outdated measure, created in a period of high inflation, and which currently discourages investing in the states. **Consumer agents** mention other challenges related to the gas distribution

monopoly, as regardless of investments by the distributor, any handling of gas in the state must pay a distribution tariff.

Despite the profile of the state of Sergipe being considered “pro-business”, **production agents** highlight that the distributor still assumes a controlling stance, especially regarding the migration of consumers to the free market. In the perception of the **producer agent**, it should not be important to the distributor whether the consumer is in the free or captive market, but the charge for the gas distribution service and how much of this volume will be flown through its pipeline.

**Consultancy agents** argue that, although the great advantage of distribution is the certainty of supply with the guarantee of gas delivery “under any circumstances”, the disadvantage lies in the formation of the distribution tariff. In this argument, the distributor would have no incentive to seek a competitive price, as it simply passes on the entire cost, through the pass thru movement, without seeking modest tariffs as provided for by the public service concession.

“THE FIRST THING IS AN ADVANTAGE THAT EVERYONE IS LOOKING TO MIGRATE TO FREE MARKET IS THE COMPETITIVENESS OF GAS PRICE AND (...) LEAVING THIS SYSTEM WITH INCENTIVE OF NOT VERY COST EFFICIENCY, AND FIND A SUPPLIER THAT WILL AGREE TO PROVIDE YOU WITH CHEAPER GAS.”

Hence, **consultancy agents** highlight the migration of captive consumers to the free market as an opportunity to reduce this distribution tariff, allowing them to negotiate directly with producers and evaluate the best location for setting up the industry. Thus, the relationship with the distributor occurs through CUSD for the gas to be handled and delivered to the final point of consumption. For Sergipe, for example, a competitive tariff table was created to include high volumes of gas, which allowed Fafen to become the first free consumer in Brazil.

“DEPENDING ON STATE LEGISLATION, IF THIS FREE CONSUMER TARIFF IS EQUAL TO THE DISTRIBUTION TARIFF, IT HAS TO BE CHEAPER FOR THE INDUSTRIAL CONSUMER TO DECIDE TO BE FREE”.

Sergipe also offers a flexible CUSD - a type of short-term service contract for handling gas in the concession area for the acquisition/sale of opportunity gas. Opportunity gas is defined as a volume of casual or seasonal supply gas that can be traded between free market agents. **Regulatory agents** mention that this instrument is an advantage for Sergipe, as it would not be provided for in other states. This instrument would allow free consumers to sell or purchase opportunity gas “without major bureaucracy”. **Production agents** validate that flexible CUSD “is interesting” in creating the secondary market.

The trend, according to the **consumer agent**, is for large consumers to choose to migrate to free consumers and participate in the Movement Tariff (TMOV) table. According to **consumer agents**, TMOV is considered more competitive and appropriate as it represents a small fraction in relation to the total cost of gas.

“THE HANDLING TARIFF IS APPLICABLE FOR FREE CONSUMERS, IT IS NOT IN THAT SERGAS DISTRIBUTION TARIFF TABLE, WHICH IS FOR THE CAPTIVE CONSUMER. (...) IT WILL DEPEND ON THE CASE; AN INDUSTRIALIST THAT WILL CONSUME 30 OR 50 THOUSAND CUBIC METERS CAN ALWAYS TRY A NEGOTIATION WITH AGRESE TO APPROVE, TO THAT CONSUMPTION RANGE, A VALUE SMALLER THAN IN THE TABLE. THESE TABLES ARE CASCADE, NOT A UNIQUE VALUE ‘X’ CENTS OR ‘X’ REALS PER CUBIC METER.”

**Regulatory agents** mentioned that TMOV represents 8% of the value of the captive market, but some costs that could be removed are still identified. To this end, a public hearing is expected to be held to discuss price formation and an appropriate TMOV mechanism. **Regulatory agents** mention the need to reduce operational costs and ensure that TMOV is a modest tariff for the consumer, since, in this argument, distributors would supposedly like to receive

TMOV in the distribution values under the justification of not affecting the “condominium” of gas consumers. Therefore, it is necessary to establish a balance point, as, **according to regulators**, the distributor would continue to have the same revenue, eliminating the cost of purchasing the molecule that would be distributed.

In addition to TMOV, the **producer agents** mentioned TMOV-e <sup>15</sup> (Tariff of Specific Handling) as a vector for attracting industries and investments in Sergipe. However, even if the tariff is personalized per consumer, **producer agents** suggest the adoption of a defined and regulated methodology for all users who want to adopt TMOV-e.

The **distributor agents** believe that TMOV-e is unfavorable to the system. In the case of migration to the free market, TUSD or TMOV allows consumers, especially those located furthest from the system, to have the full benefit of the market, while TUSD-e or TMOV-e, which refers to the interconnected section with the system, would only benefit users close to the gas network while increasing costs for other consumers.

**Distributor agents** highlight that, removing the distributor’s costs to serve that consumer who migrated to the free market, the reduction in the tariff would be the same as “segmenting the link”, as the free consumer would have to hire labor to assume the purchase of the molecule, contracting

transport and monitoring the network balance, just as the distributor does, that is, manage different contracts.

Another challenge for the free consumer highlighted by **the distribution agent** is in the event that the supplier fails and the volume is contracted with the distributor, the price would be higher because it was not scheduled.

“I ALREADY HAVE A CONTRACT FOR WHAT I SELL. IF I’M GOING TO CONTRACT MORE, IT’S MORE EXPENSIVE, THAT IS, I’LL BUY MORE EXPENSIVE MOLECULE, I WILL CHARGE YOU THE TRANSPORTATION WITH A COMMERCIAL COST AND A MORE EXPENSIVE MOLECULE. [THE FREE CONSUMER] WILL PAY MORE THAN WHAT TO PAID TO THE COMPANY [DISTRIBUTOR], BECAUSE I AM BEING FORCED TO BUY MORE EXPENSIVE. (...) IS THE DISTRIBUTOR SELLING MORE EXPENSIVE? NO, IT IS TAKING MORE EXPENSIVE COST, BECAUSE I DIDN’T PROGRAM THAT PURCHASE.”

<sup>15</sup> TMOV-e is used specifically for free consumers who use the dedicated distribution infrastructure.

In view of these challenges, **other distributor agents** question what would be the reasons for preventing the industry in Sergipe from migrating to the free market, in view of favorable state regulations. At the same time, they mention the importance of a distributor with large customer base, especially for the large industrial customer with erratic consumption (chemical, ceramics and glass sector), which would be less burdened in case of penalties at the transportation system. In free market, on the other hand, there would be greater demand unpredictability, resulting into higher penalties.

“WHEN YOU HAVE A VERY SMALL CUSTOMER BASE, (...) AN OSCILLATION IN DEMAND FROM THE DISTRIBUTOR IN THE TRANSPORTATION SYSTEM WILL CAUSE A VERY LARGE PENALTY. THAT IS WHY, TO THE LARGE INDUSTRIAL CUSTOMER, IT IS IMPORTANT THAT THE DISTRIBUTOR HAS A LARGE BASE, BECAUSE ULTIMATELY IT WILL COST LESS, IT WILL BE LESS BURDENSOME.”

#### 2.4.2. BARRIERS

- The price of the gas molecule was mentioned as the most “worrying” factor in making projects viable or developing them, compared to transport and distribution tariffs.
- Gas competitiveness was referred to as dependent on an assessment of competitive

links, subject to market supply and demand conditions, since transport and distribution links are natural monopolies in which tariffs are not negotiated;

- The absence of tariff review in transport and the legacy contracts for carriers after Petrobras’ divestment in this link are highlighted as obstacles to transparency and the evaluation of depreciated assets, with an effect on the tariff.
- The Brazilian tariff system was characterized as “stiff”, with a low location factor, which prevents differentiated prices.
- Interconnection tariffs in the transport grid, although reduced over time, and different rules between carriers were cited as obstacles to the national coverage of transport tariffs and the conception of a single trade area.
- Short haul tariff was equated to a cross-subsidy in the network, which would benefit consumers located close to the supply injection site by reducing the transport tariff, to the detriment of spreading the cost to other consumers in the grid.
- The specific use tariff model in the distribution system was mentioned as a potential obstacle to the long-term development of the market with the best-diluted cost among consumers connected to the network.
- The lack of definition about the classification of pipelines and, therefore, what constitutes gas transport and distribution tariffs was

mentioned as a risk associated with duplicated tariffs.

- The 20% remuneration rate on distributors' investments was highlighted as a relatively high cost for the distribution tariff and an obstacle to the internalization of gas;

### 2.4.3. OPPORTUNITIES

- Integrated planning, coordination between transportation revenues and tariffs, as well as combating disintegrated markets were indicated as a solution for more competitive transport tariffs.

- The CWD tariff calculation model, which refers to a center of gravity that moves according to the volume offered to the market, was mentioned as an alternative to reduce the center of gravity currently concentrated in the Pre-Salt and benefit Sergipe's competitiveness when the state's potential gas supply is available to the market.

- Implementation of short haul tariff was seen as capable of boosting investments in Sergipe, by reducing transport costs for local consumers and ensuring the use of the state's gas supply in the local market.

- The short haul tariff was mentioned as an incentive for the consumer to connect to the transport grid, instead of carrying out a bypass due to the risk to the competitiveness of a project located close to the supply having

to connect to the transport and pay its conventional tariff.

- Supporting incentives for the distributor to pursue reasonable tariffs was mentioned as a path to make distribution tariffs in Sergipe more competitive.

- Implementing programs to reduce losses and waste in the gas transport and distribution chain was mentioned in order to minimize costs and increase the efficiency of the system.

- Investment in pipeline infrastructure was mentioned to ensure the expansion and modernization of gas transport and distribution infrastructure.

- Transparency in the formation of tariffs, the participation of society and the monitoring of public policies were mentioned as solutions for tariff competitiveness.

- The TMOV charged in Sergipe was considered competitive and suitable for large industrial consumers, as it represents a small fraction in relation to the total cost of gas.

- Discussing pricing and a more appropriate TMOV mechanism were mentioned to identify and remove additional operating costs.



## 2.5. INFRASTRUCTURE ANALYSIS

This section will identify the main debates referring to logistics and natural gas infrastructure in Sergipe. Logistics infrastructure is centered on the role of the state's port terminal, while in terms of gas infrastructure, the interconnection of the LNG terminal to the transport grid was highlighted. Finally, the barriers and opportunities are specified.

### 2.5.1. MAIN DEBATES AT THE NATIONAL AND STATE LEVEL

#### • LOGISTICS INFRASTRUCTURE IN THE STATE OF SERGIPE

The state of Sergipe is strategically located in the Northeast region. Sergipe is close to the consumer centers of the Northeast region, 500 km from Recife (PE), 300 km from Salvador (BA) and 280 km from Maceió (AL). The state's logistics infrastructure comprises two federal highways: BR-101 (crosses the state in a South-North direction) and BR-235 (crosses the state in a West-East direction). In terms of airport infrastructure, Santa Maria International Airport, in Aracaju, has a runway capable of receiving all types of commercial aircraft. However, it lacks greater frequency of direct flights to reference hubs in the O&G sector, such as Rio de Janeiro.

The port infrastructure is concentrated at the Inácio Barbosa Maritime Terminal (TMIB), located 15 km North of Aracaju, with interconnection to BR-101.

TMIB, a Petrobras asset and managed by VLI, carries out operations in the areas of grains, fertilizers, ore, cement and coke. The pier has a draft of 9.5 meters and serves vessels up to the Red Max vessel class (65000 DWT). Currently, the main activity is port lifting services, in addition to services carried out by other players with independent structures installed in the port.

The port has more than 2.1 million m<sup>2</sup> in area, of which 78 hectares is a bonded polygonal area, that is, only 30% of the land is occupied as an area available for operations. From a logistical infrastructure point of view, the port is well located, away from urban conflicts and 22km from one of Brazil's main transport roads, BR-101.

In this aspect, Sergipe can be considered as a fertilizer port, with the increase in shipments of grains and bran to the MATOPIBA region through BR-235, since the state of Sergipe would not have a market for all the fertilizer it could produce.

TMIB is a terminal dedicated mainly to solid bulk, **according to consumer agents**, its tonnage capacity at the pier is limited due to its bulk shiploader structure. Despite the possibility of handling liquid bulk, such as fuels, the infrastructure was not initially designed to receive heavy loads, resulting in significant limitations. The existing tank for liquids is inactive, **according to the infrastructure agent**, but could be rehabilitated for new operations.

According to **the infrastructure agent**, the port's recent history has demonstrated the implementation of more competitive prices for port use, which has contributed to its growth in recent years. Initially, the Port Infrastructure Utilization Fee (TUIP) was priced in dollars, but the strategy was adjusted to make the port more competitive and attract more cargo. Investments made by VLI in the last five years exceeded R\$70 million, aimed at remodeling and retraining assets. This modernization, which includes automation and the replacement of obsolete assets with new ones, resulted in reduced operating costs.

Still from the perspective of the **infrastructure agent**, some actions are being carried out to prepare it for SEAP commissioning projects, and they would be carrying out engineering studies and delimiting areas for specific operations in the O&G sector. The terminal has the competitive advantage of being at the shortest distance between the coast and SEAP, so the development of the SEAP project would be "strongly influenced" by the role of the port of Sergipe, although the infrastructure is not specialized in handling loose cargo.

#### • NATURAL GAS INFRASTRUCTURE IN BRAZIL AND THE STATE OF SERGIPE

The natural gas infrastructure in Brazil covers 6,329 km of flow and transfer gas pipelines, 9,409 km of transport gas pipelines, 187 delivery points (city gates), 33 compression stations, 13 processing hubs in operation (capacity of 101.8 million m<sup>3</sup>/d) and 6 LNG regasification terminals.

The transport system is operated by the following companies:

- TAG - operates in the North, Northeast and Southeast regions;
- TBG - connects the Mid-West, Southeast and South regions;
- TSB - operates in the South region;
- GOM - takes natural gas from Bolivia to the state of Mato Grosso; and
- NTS - operates in Rio de Janeiro, Minas Gerais and São Paulo.

In the distribution link, Brazil has a grid of approximately 45 thousand kilometers in length, operated by 24 gas distribution companies.

In the state of Sergipe, there are the Atalaia-Itaporanga and Carmópolis-Pilar gas pipelines, in addition to the Fafen-Sergas Branch, 9 city gates and the Atalaia Natural Gas Processing Unit (UPGN), with a capacity of 3 MMm<sup>3</sup>/d, which is currently paralyzed. Regarding the distribution grid, the state is approximately 314 km long. **According to the producer agent**, there are limitations in the infrastructure that make it difficult to transport gas from Sergipe to Pernambuco and Alagoas. Significant gas production in Alagoas currently goes to Bahia, crossing Sergipe. In the case of Ceará, there is isolation due to the stoppage of the LNG terminal, which causes difficulties for several projects in the region.

In addition to existing infrastructure, new projects underway in the state of Sergipe include the interconnection of Eneva's LNG Terminal to the Transportadora Associada de Gás (TAG) grid, which consists of a 25km gas pipeline with a capacity of 14 MMm<sup>3</sup>/d, crossing the municipalities of Barra dos Coqueiros, Santo Amaro das Brotas and Rosário do Catete. It should be noted that the "Hub Sergipe" has a 1.6 GW generation plant (which corresponds to 15% of the energy demand in the Northeast and is considered one of the largest gas-fueled plants in Latin America) and a Floating Storage and Regasification Unit (FSRU) with regasification capacity of 21 MMm<sup>3</sup>/d and storage capacity of 170 thousand m<sup>3</sup>.

The Celse terminal connection is considered crucial, as it allows greater dynamism for both industrial and thermal consumers. The existence of this terminal offers additional security to industrial consumers, allowing that, even when contracting gas based on Petrobras' regional offer, there is a backup when connecting LNG to the grid. The proximity of the terminal is also seen as beneficial in the long term, contributing to a tariff model that is more favorable to industrial consumers due to being close to this terminal, which could have a more advantageous entry and exit tariff.

**"THE HIGHEST COST IS THE COST OF ABSENCE, THE SECOND HIGHEST COST IS TO HAVE INFRASTRUCTURE AND NOT USING IT WELL, THEN THERE IS SUCH A STRUCTURE AS THIS ONE TO MAKE THE SYSTEM WORK."**

This will be the first interconnection of a terminal that does not belong to Petrobras with the grid, providing greater flexibility in the state's natural gas supply. It is important to highlight that the project follows a secondary market logic, where the gas allocated to the thermoelectric power plant, if not used, can be resold in a more competitive way.

**The consumer agent** mentions that the reliability of the system is essential, and the connection to the gas grid is important to avoid interruptions in supply. The discussion extends to the viability of the system; access to the transport grid cannot be conditioned on specific use, as this would compromise the economic sustainability of the system, which works more efficiently when everyone contributes continuously.

Eneva uses the FSRU with LNG supply to store gas, charging for this service, being considered an operating strategy involving gas storage. This practice brings benefits, such as increased supply security, immediate availability in the event of thermoelectric dispatches and the possibility of meeting local market demand. Furthermore, there is the opportunity to carry out trade operations, taking advantage of price variations in the futures market. With this project, Eneva

begins to operate in the integrated gas grid in addition to being just the producer.

“THEN, THERE IS A PLURALITY, REALLY EASY ACCESS TO THE MOLECULE IN THE STATE, BUT THERE IS VERY SMALL CONSUMPTION WITHIN THE NATIONAL SCENARIO. SO WHAT IS SERGIPE’S BIG CHALLENGE TODAY? IT IS TO ATTRACT THE CONSUMER, IN ORDER TO REALLY HAVE SIGNIFICANT AND SHARP GROWTH OF THE STATE GAS INDUSTRY.”

### 2.5.2. BARRIERS

- Some respondents pointed out the absence of a distributed gas grid in Sergipe countryside, preventing the diversification of customers and the dissemination of natural gas consumption.
- The legislation related to the import of cargo would need to be adapted to allow exchanges (swaps) involving the LNG process to take place without onerous taxation, this is because the legislation considers swaps as purchase and sale. The model adopted makes regasification or imports impossible by agents who are not owners of the terminals, as proof of possession of the goods is necessary to issue the invoice.
- Some agents point out that the state’s regulatory framework could favor maximizing the use of TMIB, considering its strategic importance in the state.
- Different agents mentioned that the TMIB is unable to admit a Panamax vessel, as major work would be required to expand the mooring berth, with a draft of 12 meters being “indispensable”. Based on this limitation, it becomes a decisive investment criterion, given the costs of chartering and maritime agency, which end up becoming sensitive - the larger the ship, the more diluted the maritime costs, consequently, greater competitiveness in the operation.
- The lack of investment in more robust infrastructure, such as the need for frequent dredging due to rapid sedimentation and limited pier load capacity were mentioned as obstacles to fully meeting the demands of the SEAP project (commissioning) and decommissioning projects.
- Commissioning and decommissioning activities in the O&G sector were mentioned as conflicting to enable the TMIB meet the necessary port operations.
- Access to the port was mentioned, by some links in the chain, as being restricted to a pier, with no capacity for handling containers due to the absence of cranes. This limitation would be aggravated because the port was developed to meet the specific demands of Petrobras and container activities are currently carried out in the port of Salvador, considered as a hub for this type of operations, due to the higher volume, well-established transactions with customs clearance and are a reasonable distance from Sergipe.

- It was mentioned that the state lacks a clear demarcation of its areas/zones, which are industrial zones, rural zones, port zones and urban zones. The risk of conflict between urban and port regions then arises due to the increase in civil construction works around the TMIB, in Barra dos Coqueiros, this could dismiss players who cannot be at the risk of convergence of the zones.

### 2.5.3. OPPORTUNITIES

- The ability to flow products and the offer of different modes of transport were mentioned as fundamental to the success of an industry, especially sectors such as fertilizers, where efficient logistics are crucial due to the need for cargo exit and return, and industries such as cement, which depend on adequate transportation. Therefore, in this argument, investments in logistics would be a priority to attract investment.

- The state has the strategic opportunity to have an LNG terminal connected to the transport grid. Despite existing projects, there is a need for anchors, companies or initiatives that can boost the region's development. Some respondents declared that the state continues to work in favor of the energy sector regardless of the SEAP schedule and analyzing contracts, maps and tax regulations to enable business within legal limits.

- The oil and gas production anticipated with SEAP creates a need for offshore support. Therefore, TMIB was mentioned as a natural candidate to offer maritime services for vessels, platform maintenance, embarkation and disembarkation of personnel and pipeline maintenance.

- With investments amounting to R\$6 billion from Petrobras to remove shallow platforms, off the coast of the state of Sergipe, decommissioning activities could occur in the state, requiring a transformation of the port's business model to fulfill the activities.

- It was mentioned that TMIB could analyze the feasibility of diversifying its matrix and opting for the consumption of natural gas to guarantee logistical efficiency in operations, without energy losses and continuous supply reliability. In this argument, it was mentioned that it is common for port terminals to use electrical energy, which leads to instabilities and failures.

- Regarding business models for TMIB, it was mentioned that the terminal could receive new cargo that fosters gas consumption in the Northeast, such as trucks powered by CNG, turbines, turbogenerators or other products that will be part of the oil and gas industry, taking advantage of SEAP's potential for cargo entry through the port of Sergipe.

- TMIB is available to build tanks, reservoirs for storing some petroleum-derived matrix, with installed capacity in an available area of more than 100 hectares. The port already operated sulfuric acid before the VLI concession and has a plant as a Petrobras asset, which could be adapted.
- In the event of investments in infrastructure for natural gas liquefaction, TMIB was mentioned as a potential LNG export point, generating significant new cargo for the port, especially with the prospect of increased availability of natural gas in Sergipe. Infrastructure can also promote interiorization and green corridors in the Northeast.
- The creation of a logistics corridor could facilitate the efficient flow of goods, stimulate the use of gas and increase the competitiveness of local industry by reducing freight costs, also during the construction and assembly phase of projects, taking advantage of the TMIB idle port capacity.
- The state of Sergipe would be dedicated to creating a port industrial hub by building new areas surrounding the thermoelectric power plant and the port, to serve as an attraction for companies that use natural gas, including expansion of the thermoelectric power plant.
- Gas storage was mentioned as strategic for a state like Sergipe, which is developing a national offshore and international gas market with the supply of LNG and SEAP.
- The TAG grid integration gas pipeline crosses potential areas that can interconnect with other municipalities in the state of Sergipe. With the revitalization of onshore fields and increased production, the state can take advantage of the hub that is being formed to capitalize on this potential and monetize gas.
- The state has, through a northeastern financial institution, a specific and targeted source of resources for infrastructure projects, structuring projects and the productive sector (whether primary, secondary or tertiary). For example, if the local distributor needs investment for gas internalization projects, it was mentioned that financing could be done through specific programs for energy infrastructure.
- An intermediate solution to optimize export logistics was proposed to create a ferry to transport goods from the port of Sergipe to the port of Bahia, from where cargo would be exported. This approach would help simplify the process, eliminating the need for local industries to go to the port of Salvador to get an empty container to ship products. With exports taking place directly from the local port via ferry, there would be a significant reduction in logistics time and cost. The proposed frequency for viability of this operation is once a week, which seems to be sufficient to meet current demand.

## 2.6. DECOMMISSIONING

One of the activities that holds great investment potential in the O&G Industry is decommissioning. Classified as the final stage of the exploration and production cycle of oil and natural gas fields, ANP Resolution no. 817, dated April 24, 2020, defines it as the “set of activities associated with the definitive interruption of the operation of the facilities, by permanent abandonment and razing of wells, the removal of installations, the adequate disposal of materials, residues and waste and the environmental recovery of the area”.

The Resolution, a milestone for the industry, also defined that wells that are in the process of being returned can be placed in Permanent Offer bids from 24 months before the scheduled date, so that the transition of operators does not interrupt production. On the world scene, Brazil is the third largest in investments in decommissioning, behind only the United States and Norway. This move towards disinvestment in new fields, including mature fields, can be justified by the peak in oil supply in some countries, in addition to a global movement towards transitioning the energy matrix and reducing greenhouse gas emissions.

**Respondents pointed out** that for the next five years, the forecast for Brazilian investments in decommissioning is around R\$57 billion, of which R\$39 billion will be allocated to decommissioning facilities in the Campos Basin and another R\$6.4 billion for Sergipe-Alagoas Basin (SEAL), amounting to

just over R\$1 billion per year during this period.

The amount is significant in SEAL, as the exploratory basin currently has 26 fixed platforms that need to be decommissioned. However, according to **an agent specialized in the sector**, even though the state of Sergipe has considerable potential for the procedure, the state would have to be ready to prevent the same thing that happened with P32 in the Campos Basin, in Rio de Janeiro, which was taken to a shipyard in Rio Grande do Sul to finally be decommissioned.

“THE BIG PROBLEM OF DECOMMISSIONING IS THAT I CAN SIMPLY DECOMMISSION THESE PLATFORMS, CUT THEM, TOW THEM, TAKE OUT EVERYTHING FROM THEIR SUBSEA, AND TAKE THEM TO ANY ANOTHER STATE THAT IS READY TO DO THE REST OF THE CHAIN: DISMANTLING, SALE OF SCRAP, ALL OF THAT.”

Regarding the second decommissioning cycle, which should last until 2050 or even beyond that date, these are the platforms commissioned from 2008 onwards, in the Pre-Salt. Thus, the state of Sergipe would have the opportunity, **according to experts**, to map the requirements for decommissioning activity, such as which facilities will receive these platforms, shipyards, ports and dikes, in addition to being necessary to evaluate the conditions listed in the notice from Petrobras.

“THE GREAT MOMENT OF DECOMMISSIONING OF SERGIPE WILL PERHAPS BE THE NEXT TEN YEARS, WHEN THESE 26 PLATFORMS WILL BE THERE.”

The need to build a shipyard was indicated, since the state does not yet have one. On average, the expected investments for construction of a shipyard are around US\$100 million, which could generate just over 10 thousand jobs, divided between direct and indirect, **according to an expert**. Therefore, it would be attractive for the state to invest in these characteristics, so that it shall be able to carry out the decommissioning within its own jurisdiction or, at least, the majority of it in order to prevent the platforms from being transferred elsewhere.

Another challenge noted is the environmental issue, especially NORM (Naturally Occurring Radioactive Materials), which are radioactive waste present in small quantities in the oil produced. It accumulates throughout the structure of production plants, mainly in risers and storage tanks. Therefore, it could also be a business opportunity for Sergipe, given the potential of this activity to attract companies that have expertise in the treatment of NORM. However, there is still a lack of specific standards and regulations aimed at treating NORM in appropriate locations for the correct disposal of waste, which is currently regulated by CNEN (National Nuclear Energy Council).

In this preamble, it is imperative that the legislation on radioactive waste be clearer and that operators qualified in the treatment of radioactive material are monitored. Currently, there are two ways to carry out this treatment: a team entering the platforms to isolate and treat the waste, which would be costly; and, through techniques such as cutting all NORM within a safe environment, bringing it to the continent and storing it in a suitable environment, which tends to be more economically viable.

An opportunity identified in decommissioning **by experts** is the formulation of specific policies for the removal and disposal of scrap, which could become an attractive market for the state of Sergipe. Besides the opportunities for developing the scrap market, strategies can also be created to expand the steel industry in the region. Although the steel industry is considered an activity that is difficult to decarbonize, one of the simplest and most agile techniques for disposing of the steel industry is scrap. Instead of iron ore for steel production, the steel industry has the potential to use recycled scrap and, in doing so, reduce a considerable portion of its carbon emissions. Bearing this in mind, decommissioning would also boost the circular economy in Sergipe, which impacts the state’s socioeconomic development.



To make this scenario possible, Sergipe will also need to develop the human resources linked to this activity, in order to generate jobs and local training. If there is no such movement by the state, to the detriment of labor, there is the possibility that the users who bring the platform will bring labor from other states, such as Rio de Janeiro and São Paulo, in addition to attracting companies from the same regions.

In short, to take advantage of the opportunities arising from the decommissioning activity in Sergipe, it is relevant for the state to develop a ready

business framework. For example, the state could review the ICMS on scrapping or dismantling at the port, port fees, among other actions, that contribute to building a business environment capable of attracting companies to decommission in Sergipe.

Finally, the decommissioning activity would also require necessary investments in infrastructure due to the port leasing activities, ship chartering for the decommissioned cargo, safe transportation of NORM and the business model to allocate scrap to industries.

# 3. ECONOMIC IMPACTS OF INVESTEMENTS IN O&G ON THE STATE OF SERGIPE

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## 3.1. OBJECTIVE AND METHODOLOGY OF THE IMPACT STUDY

This section estimated the economic impact of Petrobras' investment in the Sergipe Águas Profundas project, in the Sergipe-Alagoas Basin, approximately 100 km away from the coast. As a proxy for such an investment, the input-output matrix (MIP) methodology was used as a reference, with the disaggregation of its impacts for the State of Sergipe and the rest of Brazil. The reference for the state Input-

Output Matrix (MIP) was the work developed by Haddad, Gonçalves Junior Nascimento (2017)<sup>16</sup> who calculated the interstate input-output matrices for the various states in Brazil.

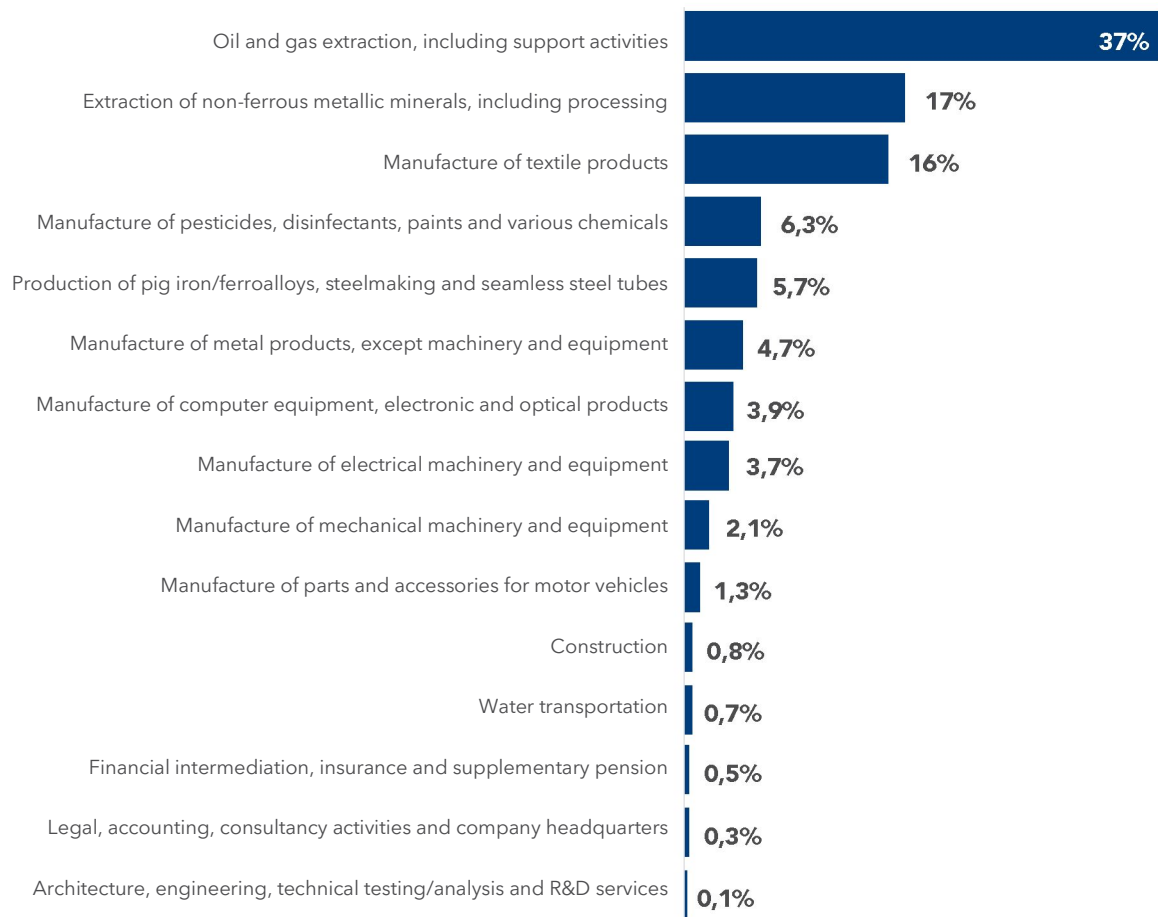
For this work, an investment vector typical of Pre-Salt oil and gas exploration projects was also used, as proposed by Kupfer *et al.* (2008)<sup>17</sup>, with the various investment components being allocated in their respective sectors, for the purpose of accounting for indirect effects.

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<sup>16</sup> HADDAD et al. (2017). Matriz Interestadual De Insumo-Produto Para O Brasil: Uma Aplicação Do Método IIOAS. V. 11 N. 4 (2017): Revista Brasileira De Estudos Regionais E Urbanos. Available at <<https://revistaaber.org.br/rberu/article/view/271> >.

<sup>17</sup> Kupfer et al. (2008). Impactos Econômicos Da Exploração De Petróleo. Available at: <Relatório IPT vfinal.doc (ufrj.br)>

GRAPH 15 - VECTOR OF INVESTMENTS IN O&amp;G



Source: Prepared by the author

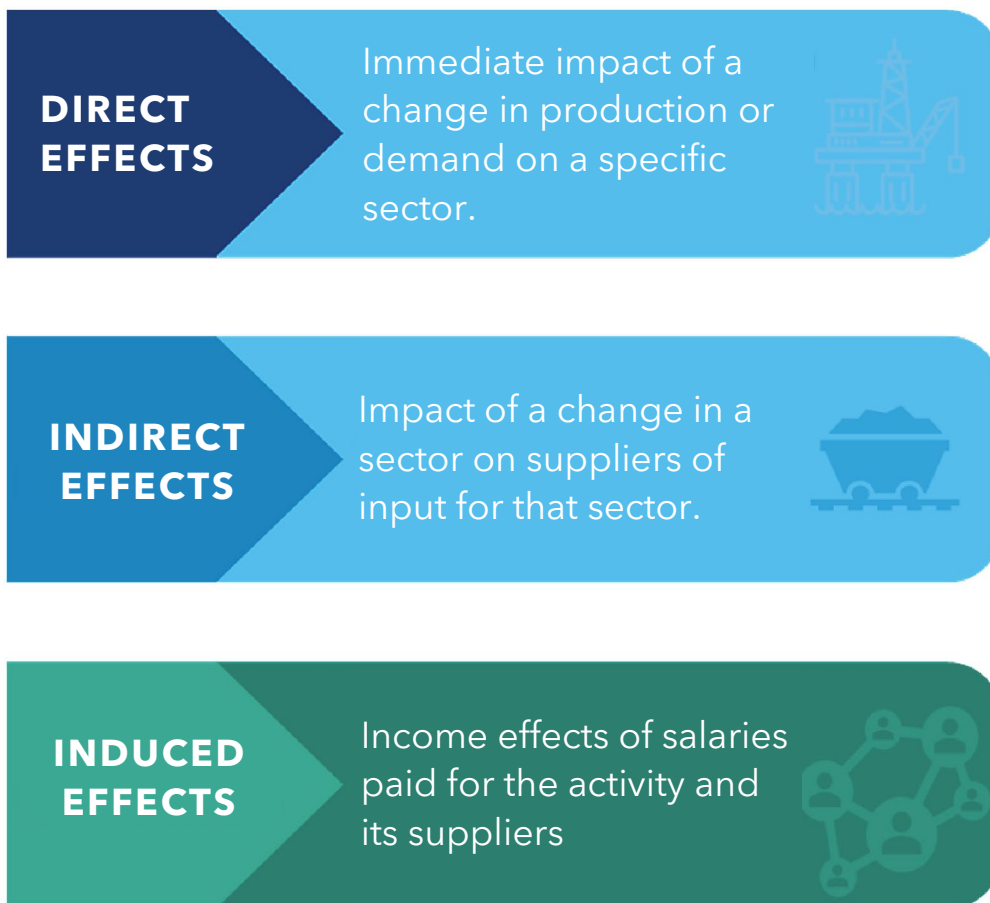
The methodology adopted estimates the impacts of the SEAP Project investments on the local and national economy. The effects of this exogenous shock are distributed in direct activity, which represents where the company's investments and expenses in the activity are made.

Added to these investments are the multiplier effects on the chain of suppliers, inputs and services, which will have to expand their

activities to meet the new demand created by the investment. And, a shock induced on other activities in the local economy, resulting from the increase in consumption of workers in these activities on the units selling products that are induced by the salaries paid to the workers involved allocated in these two activities, who must spend this new income generated on consumption, resulting in more income, consumption and investments in the affected sectors.

**Figure 1** details the effects on the various segments affected by the investments foreseen by Petrobras to be made in the Sergipe Águas Profundas Project.

FIGURE 1 - DIMENSIONS OF IMPACTS ON THE ECONOMY



Source: Prepared by the author

### 3.2. INPUT-OUTPUT MATRIX

Table 1, represented below, presents estimates of the direct, indirect and induced effects of the investment of R\$1 billion for new oil production activities in Sergipe and the rest of Brazil. The results reveal that the direct impacts are entirely concentrated in the state of Sergipe. Table 1 indicates that the investment generates an additional indirect

impact of R\$736 million, of which R\$206 million remains in the state of Sergipe and R\$530 million is distributed to the supply chain in other states in Brazil. The income effect increases the gross value of production by R\$475 million, with R\$221 million in the state of Sergipe and R\$254 million in other states in Brazil.

TABLE 1 - AVERAGE IMPACT OF INVESTMENT OF R\$1 BILLION ON GROSS PRODUCTION VALUE (IN R\$1,000,000)

	DIRECT	INDIRECT	INDUCED	TOTAL
<b>Sergipe</b>	<b>1,000</b>	<b>206</b>	<b>221</b>	<b>1,427</b>
<b>Rest of Brazil</b>	<b>0</b>	<b>530</b>	<b>254</b>	<b>783</b>
<b>Total</b>	<b>1,000</b>	<b>736</b>	<b>475</b>	<b>2,211</b>

Source: Prepared by the author

Analyzing Table 1, it is possible to see that total investment impact reaches R\$1.4 billion in the state of Sergipe and R\$783 million in the rest of Brazil.

Thus, total impact reaches R\$2.2 billion in the Brazilian economy as a whole<sup>18</sup>.

<sup>18</sup> The calculation is based on use of investment vector to explore oil under conditions similar to those of the Pre-Salt.

**Table 2**, represented below, shows the average number of jobs created for every R\$1 billion invested in oil and gas exploration in Sergipe. This table presents the jobs generated directly, indirectly and induced by the investment of R\$1 billion in new oil and

gas production capacity in Sergipe and the rest of Brazil. Furthermore, the result is based on an investment vector for oil extraction under conditions similar to those of the Pre-Salt.

TABLE 2 - AVERAGE IMPACT OF INVESTMENT OF R\$1 BILLION ON JOBS (IN R\$1,000,000)

	<b>DIRECT</b>	<b>INDIRECT</b>	<b>INDUCED</b>	<b>TOTAL</b>
<b>Sergipe</b>	<b>2,529</b>	<b>1,589</b>	<b>2,508</b>	<b>6,625</b>
<b>Rest of Brazil</b>	<b>0</b>	<b>2,082</b>	<b>2,034</b>	<b>4,116</b>
<b>Total</b>	<b>2,529</b>	<b>3,671</b>	<b>4,541</b>	<b>10,741</b>

Source: Prepared by the author

Analyzing Table 2, it can be seen that the average generation of direct jobs is 2.5 thousand jobs. The indirect jobs added to the economy by the R\$1 billion investment reach 3,700 jobs, with 1,600 in Sergipe and 2,100 in the rest of Brazil.

Furthermore, the total number of jobs induced reaches 4.5 thousand jobs, with 2.5 thousand in Sergipe and 2.0 thousand in the rest of Brazil. In the aggregate, the additional investment of R\$1 billion for the generation of oil and gas creates a total of 6,600 jobs in Sergipe and 4,100 jobs in the rest of Brazil, totaling more than 10,700 jobs.

Ultimately, Table 3 below demonstrates the average impact of investment vectors on GDP (added value) for the state of Sergipe and the rest of Brazil. The direct impact of the R\$1 billion investment, in this case, is entirely concentrated in the state of Sergipe.

The indirect and induced impacts generate an additional GDP increase in Sergipe of R\$118 million and R\$141 million, respectively. Thus, the total impact on Sergipe reaches R\$1.259 billion for each R\$1 billion of additional investments.

**TABLE 3 - AVERAGE IIMPACT OF INVESTMENT OF R\$1 BILLION ON VALUE ADDED (IN R\$1,000,000)**

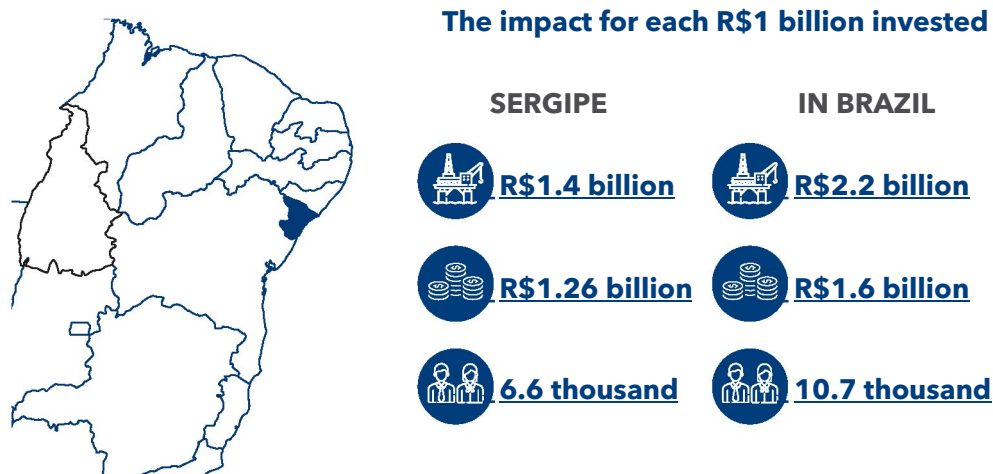
	<b>DIRECT</b>	<b>INDIRECT</b>	<b>INDUCED</b>	<b>TOTAL</b>
<b>Sergipe</b>	<b>1,000</b>	<b>118</b>	<b>141</b>	<b>1,259</b>
<b>Rest of Brazil</b>	<b>0</b>	<b>209</b>	<b>129</b>	<b>337</b>
<b>Total</b>	<b>1,000</b>	<b>326</b>	<b>270</b>	<b>1,597</b>

Source: Prepared by the author

For the rest of Brazil, the indirect impact adds R\$209 million in added value and the induced one adds another R\$129 million, totaling an increase in added value (GDP) of R\$337 million for the rest of the country; the total impact on Brazilian GDP reaches R\$1.60 billion reais.

As shown below, Figure 2 presents the consolidated results graphically. The impacts on the economy of Sergipe and Brazil are highlighted, in different dimensions, direct, indirect and induced.

**FIGURE 2 - IMPACTS DETAILED BY ACTIVITIES**

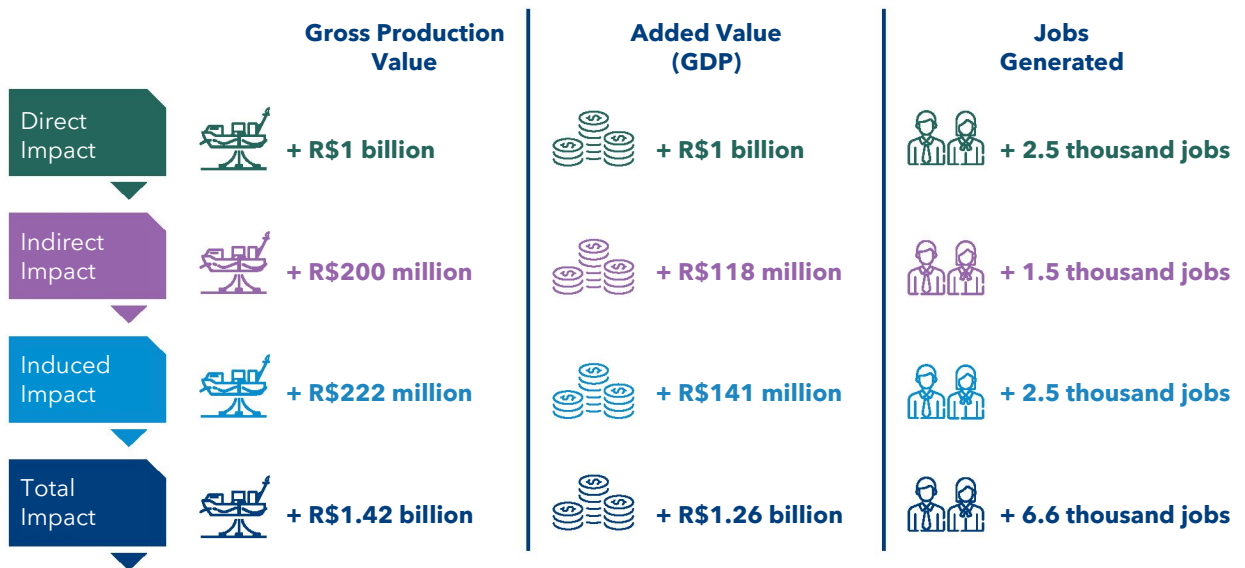


Source: Prepared by the author

Figure 3 presents an alternative approach to observing the effects, highlighting the direct, indirect and induced effects for each

indicator, that is, on production, GDP and potential to generate jobs.

FIGURE 3 - IMPACTS DETAILED BY ACTIVITIES



Source: Prepared by the author



### 3.3 ESTIMATED IMPACT OF ROYALTIES AND SPECIAL PARTICIPATION ON SERGIPE

This is a simulation based on market assumptions, such as operational capacity, investments and costs provided in studies published by Petrobras and others. The results obtained are in line with the expected returns on projects of this nature. When executed, the values must be revised to reflect the reality of the time and the actual situation found.

The total present value of royalties and special participations provided by the SEAP project

are estimated at, respectively, R\$20.1 billion and R\$12.3 billion.

To estimate these government participations (royalties and special participations), an expected production model of the SEAP project's production fields was used, aligned with the production curve provided by Petrobras. The assumptions of the financial model include the oil price at US\$70 per barrel, the gas price at US\$6 per million BTUs, the dollar exchange rate at R\$5.00, the production time of 20 years and the rate of 8% discount per year.

TABLE 4: ASSUMPTIONS FOR ESTIMATED ROYALTIES AND SPECIAL PARTICIPATIONS IN THE SEAP PROJECT

INVESTMENTS (USD BILLION)	
Data	Value
Petrobras Exploration Investment	1,8
Initial Investment	3,1
<b>Total Pipelines</b>	<b>0,459</b>
Subsea	2,6
FPSO Charter	6,9
OPERATIONAL ASSUMPTIONS	
Data	Value
Peak Oil Production (Thousand bbl/day)	230
Peak Gas Flow (MM m <sup>3</sup> /day)	18
Peak Gas Production (MM m <sup>3</sup> /day)	20
CASH OUTPUTS	
Data	Value
Operational Cost per barrel (USD)	4.2
PIS	1.65%
COFINS	7.6%
Royalties	10%
Income Tax + CSLL	34%

Source: Prepared by the author

The distribution of royalties and special participations observes the following division:

- Royalties of up to 5% - Confronting States (30%), Confronting Municipalities (30%), IED Municipalities (10%), Federal Government (20%), State Special Fund (2%), Municipal Special Fund (8%);
- Royalties of 5% to 10% - Confronting States (22.5%), Confronting Municipalities (22.5%), IED Municipalities (7.5%), Federal Government (40%), State Special Fund (2%), Municipal Special Fund (6%); and,
- Special Participations - Confronting States (40%), Confronting Municipalities (10%), Federal Government (50%).

TABLE 5: ESTIMATED NET PRESENT VALUE OF ROYALTIES DISTRIBUTION AND SPECIAL PARTICIPATIONS

MILLIONS OF REAIS	ROYALTIES			SPECIAL PARTICIPATION
	0-5%	5-10%	TOTAL	
Confronting States	3,010	2,258	5,268	4,910
Confronting Municipalities	3,010	2,258	5,268	4,910
IED Municipalities	1,003	753	1,756	-
<b>Total for Producing States and Municipalities</b>			<b>12,292</b>	<b>6,138</b>
Federal Government	2,007	4,014	6,021	6,138
State Special Fund	201	151	351	-
Municipal Special Fund	803	602	1,405	-
<b>Total Federal Government and Funds</b>			<b>7,757</b>	<b>6,138</b>

Source: Prepared by the author

Estimated royalties and special participations for the States and Municipalities was also calculated in nominal value in monthly average for the respective years of the SEAP

project lifecycle, according to the following table.

**TABLE 6: ESTIMATED NOMINAL VALUE OF ROYALTIES DISTRIBUTION AND SPECIAL PARTICIPATIONS IN MONTHLY AVERAGE (MILLIONS OF REAIS)**

YEAR	ROYALTIES			SPECIAL PARTICIPATIONS		
	STATES	MUNICIPALITIES	STATES AND MUNICIPALITIES	STATES	MUNICIPALITIES	STATES AND MUNICIPALITIES
1	58.1	77.5	135.5	0.7	0.2	0.9
2	80.4	107.1	187.5	56.5	14.1	70.6
3	77.1	102.9	180.0	108.2	27.0	135.2
4	65.8	87.8	153.6	124.6	31.1	155.7
5	55.9	74.6	130.5	73.6	18.4	92.0
6	48.2	64.3	112.5	62.7	15.7	78.3
7	43.4	57.8	101.2	44.3	11.1	55.4
8	38.8	51.8	90.6	39.7	9.9	49.6
9	35.7	47.7	83.4	26.3	6.6	32.8
10	31.4	41.8	73.2	22.7	5.7	28.3
11	26.5	35.4	61.9	22.5	5.6	28.1
12	23.9	31.8	55.7	14.7	3.7	18.4
13	21.1	28.1	49.1	7.0	1.7	8.7
14	20.0	26.6	46.6	6.6	1.6	8.2
15	18.0	23.9	41.9	5.9	1.5	7.4
16	17.0	22.7	41.9	-	-	-
17	15.3	20.4	35.7	-	-	-
18	15.2	20.2	35.4	-	-	-
19	13.3	17.7	31.0	-	-	-
20	11.5	15.4	26.9	-	-	-

Source: Prepared by the author

## 4. FINAL COMMENTS

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The analysis of the economic impact of investments in the O&G sector on the state of Sergipe, specifically in the deep-waters offshore project, results in R\$1.4 billion on the gross value of production, R\$1.26 billion on the added value (GDP ) and 6,600 jobs in Sergipe alone, for every R\$1 billion invested. Including the impacts of this investment on the rest of Brazil, the results reach R\$2.2 billion on the gross value of production, R\$1.6 billion on added value (GDP) and 10.7 thousand jobs.

**“THOSE NATURAL FROM SERGIPE CARRY THE CERTAINTY THAT GAS AND THIS DISCOVERY, WHEN IT IS FULLY OPERATIONAL, WILL IMPROVE THEIR LIVES, LIFE OF THEIR CITY, LIFE OF THEIR MUNICIPALITY, LIFE OF THEIR TOWN, THEY WILL BENEFIT FROM THAT.”**

The diagnosis of the natural gas market in the state of Sergipe presented the main debates, barriers and opportunities captured through an in-depth interview script with 15 questions on the following topics, coded through the ATLAS.ti software: regulation, competitiveness, taxation, transport and distribution tariffs, legal certainty and infrastructure. The results were achieved with

the participation of around 40 respondents from different companies in the gas chain and their associations, including the main gas-consuming industries, as well as agents from the federal and state public sector, both government and regulatory agencies, of financial institutions and logistics infrastructure. In addition to the previously prepared script, the free and spontaneous expression of the respondents allowed specific questions and complementary debates to be raised, according to the experience of each interview, enriching the research results.

The main debates, barriers and opportunities related to regulation and legal certainty focused on legal-regulatory changes in recent years and their effects on the development of the natural gas market in Brazil and Sergipe, including Petrobras' TCC with CADE, the New Gas Law, the ANP regulatory agenda, market contracts (supply, transport, distribution and concession), the matching of federal and state regulation, the new regulation of local piped gas services in the state of Sergipe and the policies public services such as Gás para Empregar.

In terms of gas competitiveness, the fundamentals of supply, demand and price were highlighted by gas production projects

in the country, the supply environment in Sergipe with the prospect of becoming a hub with offshore, onshore production and import/export of LNG, the profile of national and state demand, especially the consumption potential in Sergipe, such as the thermoelectric, transport and industrial sectors (fertilizer, ceramics, glassmakers), in addition to methanol and hydrogen.

Concerning the tariffs, the main results related to the tariff review and legacy contracts in the transport system, the transport tariff and its variations such as the short haul tariff, the distribution tariff and its variations such as TUSD or TMOV (including specific ones), in addition to the process of migrating consumers from the captive market to the free market, and the secondary market.

In taxation, discussions emphasized the tax reform and the difference between states in light of the expected end of the "tax war", the incentives currently offered by the state of Sergipe, such as the Sergipe Industrial Development Program (PSDI), the exemption from ICMS on gas for industries covered by the PSDI, the deferral of ICMS for LNG imports, among other customs issues relating to the LNG regasification terminal.

In the scope of infrastructure, results relating to the logistics and natural gas infrastructure of the state of Sergipe were surveyed, focusing on the potential of the port terminal (TMIB) for new business models using natural

gas, operations linked to commissioning and decommissioning in the O&G sector, in addition to operations with containers and handling of liquid bulk. Another result surveyed is the interconnection of the LNG terminal to the transport grid and the formation of a logistics corridor integrating Sergipe with other states in the Northeast.

Finally, the decommissioning of platforms in shallow waters in the Sergipe basin was identified as an additional economic activity in Sergipe, besides the gas market. Therefore, decommissioning was highlighted in a complementary section, based on specific questions raised in the interviews, giving rise to regulatory, economic and environmental characteristics related to this activity and its potential to mobilize the state's infrastructure and circular economy.

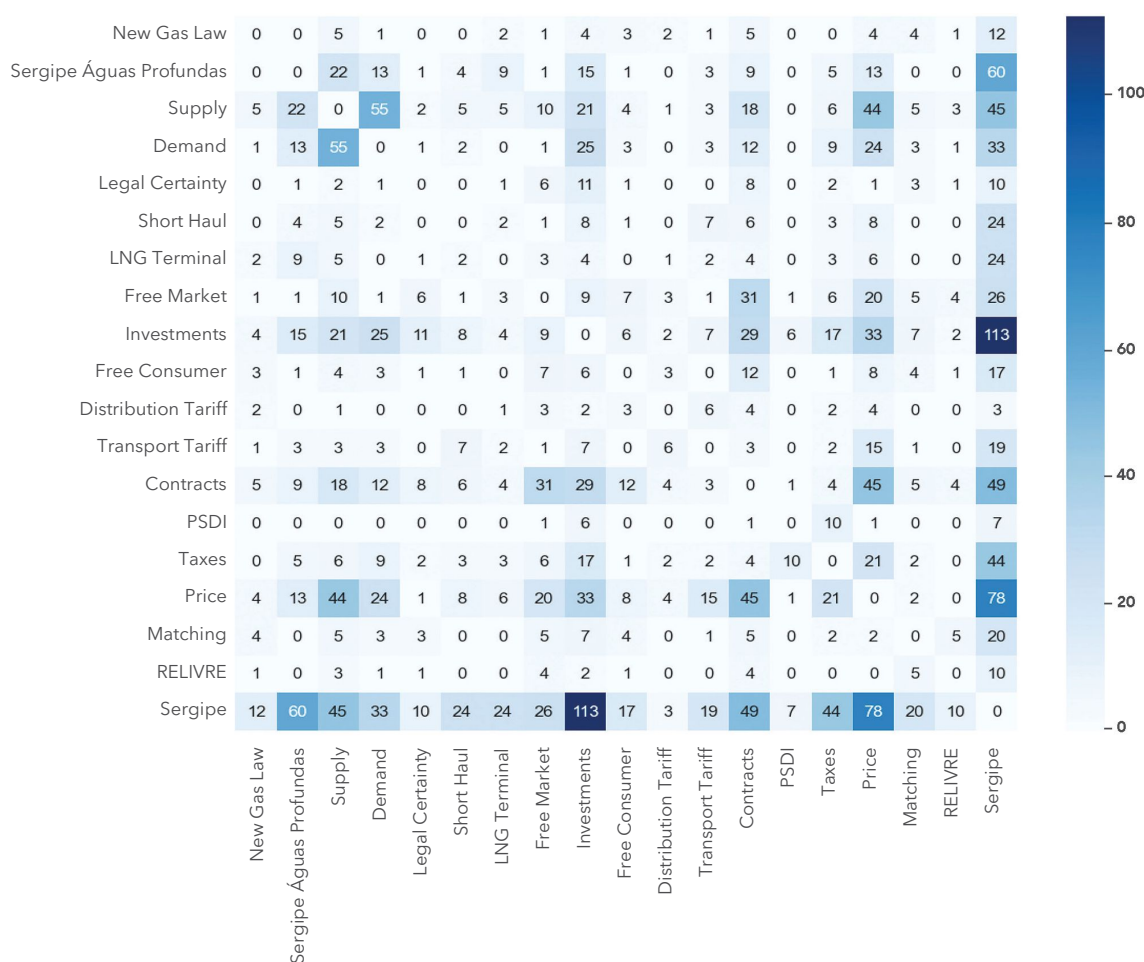
In addition to the debates, barriers and opportunities identified in the qualitative analysis of the natural gas market, some visual tools were developed based on a mathematical model, such as the word cloud, which highlights the frequency of words in a text. The cloud, represented in **Figure 4**, collected the prominent words from the transcription of the interviews carried out. The prominent words have their level of repetition according to the font size, allowing the identification of the main realities and themes that characterize the national and state gas market addressed by the respondents.



In extension to assessment of feelings, the co-occurrence matrix, illustrated by **Figure 6**, suggests connections when two codes occur together in the same data context. This matrix is relevant in offering insights into the interactions between the codes considered important in the interviews. Figure 6 identifies the intensity of the codes connection on the

natural gas market, according to the topics covered in the Interview Script (**See Attachment**), such as supply-demand, supply-price, price-contracts, demand-investments, free market-contracts, investments-price, Sergipe Águas Profundas-LNG Terminal, taxes-price, among others.

**FIGURE 6 - CO-OCCURRENCE MATRIX**



Source: Prepared by the author

The results of this study aim to observe the role of the state of Sergipe in the O&G sector and in the development of the natural gas market. The debates presented support the understanding of the elements that make up the process of opening the gas market in Brazil, and in Sergipe, and the role of each

segment in developing this market. The barriers and opportunities captured reflect the abundance of perspectives and require dedicated analysis, but they provide guidance for new studies and strategic decision-making by market agents and public policy makers.

# GLOSSARY

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**ABPIP** - Brazilian Association of Independent Producers

**Abrace** - Brazilian Association of Large Industrial Energy Consumers and Free Consumers

**Agrese** - Public Services Regulatory Agency of the State of Sergipe

**ANP** - National Agency for Oil, Gas & Biofuels

**ANP** - National Agency for Oil, Natural Gas and Biofuels

**CADE** - Administrative Council for Economic Defense

**CAPEX** - Capital Expenditure

**CDL** - Local Distribution Companies

**CNEN** - National Nuclear Energy Council

**CMGN** - Monitoring Committee for the Opening of the Natural Gas Market

**COP** - Conference of the Parties

**CUSD** - Distribution Service Use Agreement

**CWD** - Capacity Weighted Distance

**DWT** - Deadweight

**E&P** - Exploration and Production

**EPE** - Energy Research Company

**Fafen** - Nitrogen Fertilizer Factory

**FPSO** - Floating Production, Storage and Offloading

**FSRU** - Floating Storage and Regasification Unit

**CNG** - Compressed Natural Gas

**CNG** - Compressed Natural Gas

**LNG** - Liquefied Natural Gas

**CNG** - Vehicle Natural Gas

**GSA** - Gas Supply Agreement

**IBP** - Brazilian Institute of Oil and Gas



**ICMS** - Tax on Operations relating to the Circulation of Goods and on Provisions of Interstate and Intermunicipal Transport and Communication Services

**IGP-DI** - General Price Index - Internal Availability

**ISS** - Service Tax

**MME** - Ministry of Mines and Energy

**MMI** - Input and Output Matrix

**NORM** - Naturally Occurring Radioactive Materials

**O&G** - Oil and Gas

**OECD** - Organization for Economic Co-operation and Development

**OPEX** - Operational Expenditure

**RELIVRE** - Free Gas Market Ranking

**SEAL** - Sergipe Alagoas

**SEAP** - Sergipe Águas Profundas

**SEDETEC** - State Secretariat for Economic Development and Science and Technology of the Government of Sergipe

**STF** - Federal Supreme Court

**TAC** - Conduct Adjustment Agreement

**TCC** - Cease and Desist Agreement

**TMIB** - Inácio Barbosa Maritime Terminal

**TMOV** - Gas Handling Tariff in the Concession Area

**TMOV-e** - Gas Handling Tariff in the Specific Concession Area

**TUIP** - Port Infrastructure Usage Tariff

**TUSD** - Distribution System Usage Tariff

**TUSD -e** - Specific Distribution System Usage Tariff T Distribution

**UPGN** - Natural Gas Processing Unit

**WACC** - Weighted Average Capital Cost

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# ATTACHMENT

## Script of Interviews

### SCRIPT

Name:

Position:

Institution:

Email:

### QUESTIONS

- 1) What are the main changes, two years after the approval of the New Gas Law, and how will they impact the gas market in the State of Sergipe?
- 2) What are the challenges for matching the federal and state regulation, especially in the State of Sergipe? And what are the future expectations regarding the new state gas regulation?
- 3) What are the main barriers to attracting investments in the State of Sergipe?
- 4) What is the necessary path to ensure competitiveness and develop a firm demand for natural gas in the State of Sergipe?
- 5) How do you evaluate the work developed by the State of Sergipe to prepare the business environment done in order to attract new ventures, compared to other state?
- 6) What do the potential gas supply from the Sergipe Águas Profundas (SEAP) project and the connection of the LNG Terminal to the TAG gas pipeline grid represent for Sergipe's price competitiveness?
- 7) What are the necessary tax measures to foster the natural gas sector and its consumption by different segments (industrial, residential, transport, etc.) in the State of Sergipe?
- 8) Are you familiar with Sergipe Industrial Development Program (PSDI)? If so, is there any gap for improvement in the incentives offered (locational, tax and infrastructure)?
- 9) Considering the future changes to the Tax Reform, what is the advantage that the State of Sergipe can offer in incentives compared to other states in the Northeast?
- 10) Are the transport and distribution tariffs charged in the State of Sergipe attractive compared to other states? What are the measures to offer greater savings in these services?
- 11) What would be the potential impact of the initiatives from the short haul tariff on the State of Sergipe's competitiveness? And how can that attract investments?
- 12) What are the advantages of the free market for the state's industrial consumer? What are the main barriers to the migration of consumers from the captive to the free market?
- 13) What are the legal and bureaucratic difficulties that natural gas trading companies and consumers in Sergipe face to operate in the state? And how do they affect the legal certainty of contracts in the sector?
- 14) How can the development of natural gas activities enhance the generation of new cargo for the Inácio Barbosa Maritime Terminal (TMIB) and justify the future expansion of this port infrastructure?
- 15) Is there any subject you would like to comment on that has not been addressed?

# Sponsors

Gold



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Silver



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Bronze



# Maintainers









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