

## **New Global Strategy Proposal**

Leading the Way to Sustainable Energy



# ***PETROBRAS***

**BUS 450 Global Business Strategy**

Group 5

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## Executive Summary

Currently, Petrobras is one of the leaders in extraction, production and refinery of oil and natural gas products in Brazil. Not only is it well established on the market, but also has continuous support from the government, but is also partially state-owned, which allows them to receive preferential agreements. However, despite the positive outlook of the current strategy, Petrobras still faces many threats and risks costs rooted in the nature of the industry. Price fluctuations and market volatility are only some of the reasons as to why Petrobras should consider switching to a new proposed strategy.

With the non-hydro renewables' energy market being relatively unexploited in Brazil, the joint venture of Petrobras and Eletrobras has an opportunity to enter while there are relatively little barriers and establish itself as a leader in non-hydro renewables. Additionally, the non-hydro renewables (particularly wind power) has an enormous financial potential and sustained growth for capacity and generation predicted for the decade, while not only having a minimal environmental impact, but also being infinite and abundant. Additionally, the proposed strategy would allow Petrobras not only to increase its profits, but also perfectly aligns with the key values of the company, mainly “people and the environment”, “market driven” and “ethics and confidence”. The strategy would revolutionize not only the company, but the Brazilian energy market as a whole.

Of course, the transition requires capital and technological investments, but engaging in a long-term partnership with Eletrobras through joint ventures will allow them to mitigate any potential costs, and allow them to not only become a leader, but also satisfy the needs of the government. Lastly, through these renewable energy initiatives and further potential implementation of digitalization and electrification innovations, Petrobras will be able to

undergo a structural change, becoming an energy transition business rather than “just” an oil and gas company.

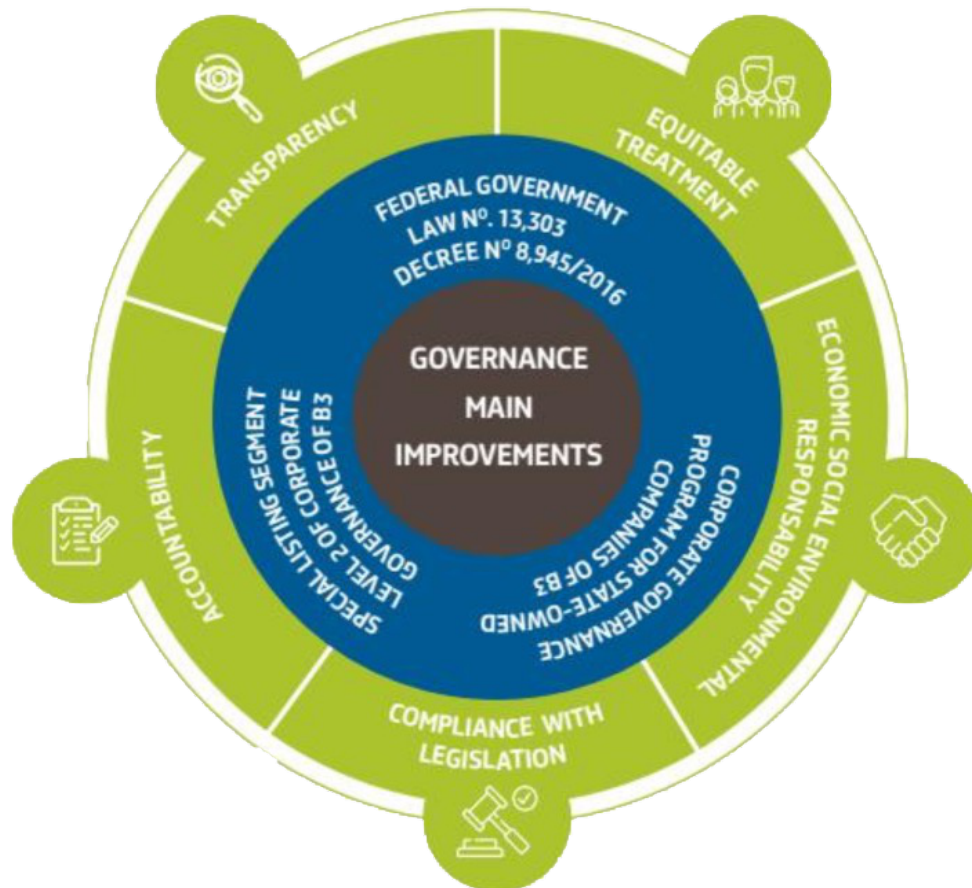
# 1. Introduction to Petrobras

Petróleo Brasileiro S.A., more commonly known as just Petrobras, is a Brazilian public and transnational company, which works in many different industries like exploration and production, refining, distribution of oil, electricity, biofuels and other renewable energy, and more (Rezende et al., 2013, p. 7). Petrobras has three main organizational capabilities that will allow them to succeed in the present and future: technology, structure & governance, and operational maturity in deepwater oil exploration. First, through recent accelerated developments, especially in management qualifications, modernizing internal and external governance, and improving their science and technology base, “Petrobras’ capabilities evolved from those of an imitative technology-user to those of a leading player at the international innovation frontier” (Goldstein & Baeng, 2012, p. 200). Furthermore, their technological organizational capability consists of the science and technology base established at Petrobras and the strategic planning behind the technology, which then helps promote innovation. Rezende et al. (2013) found that “Petrobras technology strategic planning provides intentional and systematic initiatives for open innovation. The flows in and out of knowledge and technology are considered and analyzed as soon as are defined technological guidelines for medium and long terms, supporting therefore the precepts of open innovation that addresses the importance of strategic alignment between the planning of internal R&D and the planning of an open innovation model” (p. 17). Petrobras has a vision of having a unique technical capability, so the constant innovation helps provide Petrobras that unique technical capability. Lastly, Petrobras has developed a model where they “prioritize partnerships with universities, research institutes and suppliers, resulting in a solid portfolio of national technology” (Rezende et al., 2013, p. 11). These partnerships will aid Petrobras with innovation since these universities and research

institutes all will bring in new experiences and knowledge that can create something unique when combined with Petrobras.

The second organizational capability of Petrobras is their structure and governance. As mentioned previously when discussing the technology organizational capability, modernizing internal and external governance helped turn Petrobras into a leading player. Additionally, the structure and governance of “Petrobras Technological System (STP) show evidence of intentional and systematic processes in the company to monitor, identify and facilitate opportunities for internal and external innovation, promoting the development of an open innovation model” (Rezende et al., 2013, p. 17). Petrobras wants to innovate in order to continue to have a unique technological advantage over the competition, and structure and governance is a vital part of this. Petrobras has different policies in place to help create a culture emphasizing innovation. This innovation has been focused on their core operations of oil and gas, which has helped them achieve great success. Furthermore, their governance helps shape their level of transparency. Petrobras is one of the industry leaders when it comes to transparency. In the first quarter in 2009, Petrobras ranked third for covalence ethical ranking among oil and gas companies and reported with a high level of revenue transparency in their 2008 report (Goldstein & Baeng, 2012, p. 199). This is important, especially for Petrobras, since they are a transnational company and disclosing the information allows the Brazilian citizens to know how much government money is going to Petrobras and not other public sectors in demand. Transparency is highly stressed by Petrobras as it is one of the key values that Petrobras has (see Performance Objectives & Measures). Despite these successes, Petrobras continues to improve their governance, whether intentionally or because of preceding. For example, Petrobras has also improved their governance by implementing an independent reporting channel, having 81%

independent members when the minimum is only 40%, training over 60,000 employees since 2015, and assessing over 15,000 suppliers since 2015 (Petrobras business and strategic management plan, 2019). Other improvements can be seen in Figure 1 below.



*Figure 1: Improvements in Governance (Source: Petrobras 2018 Annual Report, n.d.)*

The third organizational capability that Petrobras has is their operational maturity in deepwater oil exploration. In 1968, Petrobras was able to operate their first mobile drilling rig, the P-I, in waters up to 30 meters in depth (Petrobras: Get to know our history and evolution, n.d.). Their exploration continued and in 1973, Petrobras discovered the Campos Basin - a sedimentary basin with onshore and offshore components located near Rio de Janeiro (Petrobras:

Get to know our history and evolution, n.d.). Since then, through great R&D and innovation, Petrobras has become a “world leader in oil exploration in deepwater” (Rezende et al., 2013, p. 7). Between 2008-2013, “over 50% of oil discoveries in the world were in deepwater, and, of this total, 63% were held by Petrobras” (Rezende et al., 2013, p. 2). Petrobras is not just the leader in deep water exploration, but they are dominating the industry. Petrobras’s ambition doesn’t stop there. Petrobras has reached deeper depths than ever before and wants to continue pushing the impossible (Petrobras: Oil and gas exploration and production, n.d.). By pushing their limits, Petrobras is set to become the world’s largest oil producer among publicly listed companies by 2030, based on Rystad Energy’s latest data and forecasts (Petrobras set to become world’s largest oil producer says Rystad, 2019). This organizational capability allows Petrobras to not only compete with larger companies but dominate the oil discoveries found in deepwater.

### *Current Strategies*

Petrobras has a plethora of strategies that range according to all of the segments of their company (See Table 1). These strategies consist of exploration & production, natural gas, renewables, corporate strategies, and refining, transportation, marketing, and petrochemical (Petrobras business and strategic management plan, 2019).



|   |  |
|---|--|
| <b>EXPLORATION &amp; PRODUCTION</b>                             | <p>“Maximize Petrobras’ value through the active management of the E&amp;P portfolio”</p> <p>“Ensure the sustainability of oil and gas production, prioritizing deepwater operations”</p>  |
| <b>NATURAL GAS</b>  | <p>“Optimize the position in the Natural Gas and Power segment in Brazil and develop positions in the global market, through partnerships”</p>   |
| <b>REFINING, TRANSPORTATION, MARKETING, &amp; PETROCHEMICAL</b> | <p>“Maximize Petrobras’ value through active management of the refining, logistics, marketing and petrochemical portfolios, integrated into national oil and gas production activities”</p> <p>“Exit the fertilizer, LPG distribution businesses and biodiesel and ethanol production interests”</p>   |
| <b>RENEWABLES</b>   | <p>“Act profitably in the renewable energy segment, focusing on wind and solar energy in Brazil”</p>   |
| <b>CORPORATE STRATEGIES</b>                                     | <p>“Develop critical skills and a high performance culture to meet the company's new challenges”</p> <p>“Prepare Petrobras for a more competitive environment based on cost efficiency, scale and digital transformation”</p> <p>“Evaluate current and future partnerships seeking integrity and value creation”</p> <p>“Strengthen Petrobras' credibility, pride and reputation among our stakeholders”</p> |

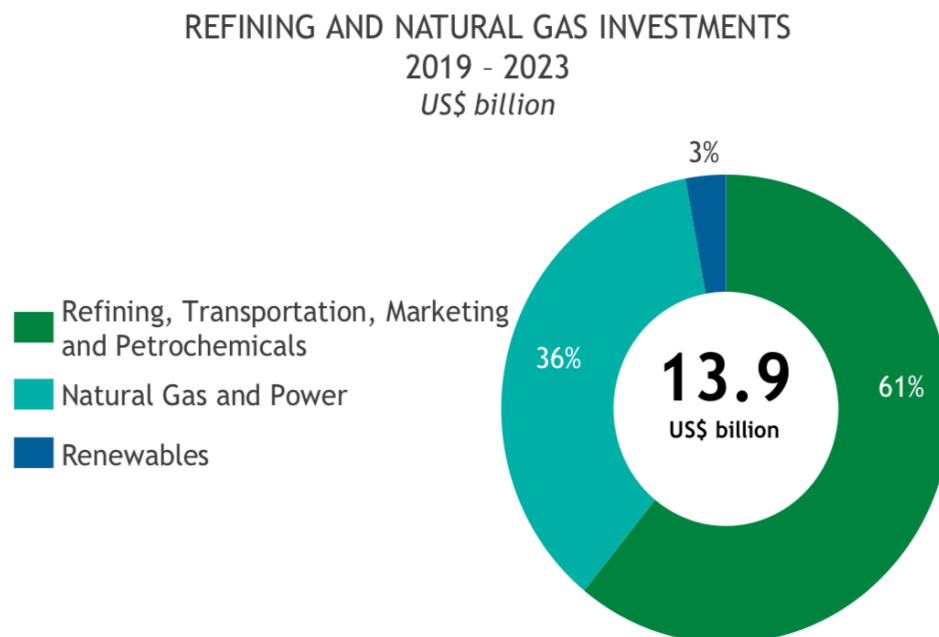
*Table 1: Current Petrobras Strategies (Source: Petrobras business and strategic management plan, 2019)*

Despite the continued success of Petrobras, they still fall behind their competitors in many aspects of their strategies. For example, their corporate strategy about preparing for a more competitive environment based on cost efficiency is not feasible after pursuing a price war with larger corporations. These price wars decrease their profit margins. This also minimizes what Petrobras can invest in, which could eventually distinguish themselves in the future, and thus, giving them a competitive advantage.

### *Renewable Resources*

When it comes to sustainability and renewable energy, they do not know as much as the field, even in just Brazil. For example, in Brazil where Petrobras is headquartered, there is another corporation called Centrais Elétricas Brasileiras, also known as Eletrobras, which is the largest Brazilian power generator, while also having many wind and solar plants. With the oil and gas industry, Total and Shell are leading the renewable industry. Total's solar technology "dominates Total's portfolio, with more investments made in the sector than every other technology combined. The company has installed 1.7 gigawatts worth of solar capacity" (Abington & Gilblom, 2019, p. 1). On the other hand, Shell closed the most amount of clean energy deals in 2019 and second most since 2010 - only following Total (Abington & Gilblom, 2019). Petrobras is not on the same level as Total and Shell, nor the same level as smaller organizations in their country of operations like Eletrobras. However, Petrobras is attempting to decrease the gap between them and their competition by partnering with Total and Equinor to improve their renewable energy (Petrobras business and strategic management plan, 2019). Additionally, Petrobras doubled their renewable generation between 2000-2017 (Petrobras business and strategic management plan, 2019). A reason why Petrobras is lacking behind the

competition is because of how little they have spent on renewables. As seen in Figure 2, Petrobras continues to barely invest in renewables in comparison to the other sectors of their company (Petrobras business and strategic management plan, 2019). Other projects related to renewable energy that Petrobras are partaking include participating in solar energy auctions, gradually entering the distributed solar generation market, committing to offshore wind power projects for the next decade, and BioQAV production and GreenDiesel in plants integrated to refineries (Petrobras business and strategic management plan, 2019). Other current projects include building Brazil's first offshore wind pilot plant expected to open in 2022, having stake in 4 other onshore generation plants, operating a solar energy pilot plant, operating the production of biodiesel and ethanol, reprocessing over 124 thousand tonnes of oily streams, an increase of 44% since 2017, and recycling 93% of paper, 78% of wood, 100% of scrap, 90% of glass, and 92% of plastics (Petrobras 2018 Annual Report, 2018).



*Figure 2: Petrobras Investments (Source: Petrobras business and strategic management plan, 2019)*

## 2. Performance Objectives & Measures

Petrobras was founded in 1953 and their first refinery was founded in 1961 in Rio de Janeiro. In 1968, their first mobile drilling rig was operated and was able to find oil up to 30 meters deep and was the Brazilian first continental shelf (Petrobras: About us, n.d.). Petrobras operates in Brazil, which is the 7th largest consumer of oil products in the world (2.3 MM bpd in 2017) with an upward trend as opposed to mature markets at +1.5% per year by 2023 (Petrobras business and strategic management plan, 2019). Petrobras' vision is to be "an integrated energy company that evolves with society, generates high value and has a unique technical capability" (Petrobras business and strategic management plan, 2019). Petrobras' purpose is then to "provide the energy that moves society to fulfill its potential" (Petrobras business and strategic management plan, 2019).

Petrobras has 5 key values that surround the company: respect for life, people and environment, ethics and transparency, overcoming and confidence, market driven, and results oriented (Petrobras business and strategic management plan, 2019). Petrobras had three main Key Performance Indicators (KPI) that they were focused on since 2018: safety, debt reduction, and profitability (Petrobras business and strategic management plan, 2019). When it came to the safety KPI, they looked at the Total Recordable Injury Frequency Rate (TRI). In 2019, Petrobras was below 1.0, which falls in line with the industry average. When it came to the debt reduction, Petrobras looked at the *Want Net Debt / Adjusted EBITD*, and they want it to be below 1.5 in 2020. As of Q4 2018, their Net Debt was \$77 Billion. Finally, when Petrobras looked at profitability, they analyzed Return over Capital Employed (ROCE), and they want to be above 11% in 2020. Petrobras had three main goals in their 2018 plan (Petrobras business and strategic management plan, 2019). Their first goal was to increase market share with active pricing policy.

Their second goal was to accelerate divestments with a \$5 Billion investment in a potential portfolio. Finally, their third goal was to be resilient to price levels. However, as mentioned previously, this will be harder to do if the prices get lower and lower due to price wars with larger companies.

The purpose of this business plan is to serve as a proposal for a new strategy, justify the need for this new strategy, demonstrate that this strategy will meet the need, and finally make recommendations. This strategy, if implemented, will ensure that Petrobras is in alignment with the upcoming energy transition and not as susceptible to commodity fluctuations by focusing too much on oil - a problem they have had as seen by planning to only invest 3% in renewables for the refining and natural gas component of their business (see Figure 2). Additionally, through these renewable energy initiatives, Petrobras will be revolutionizing the energy market in Brazil for a more sustainable future for future generations. A long-term goal for this strategy is for Petrobras to become an energy transition company instead of an oil and gas company.

### 3. Statement of Need for New Strategy

This section will identify, explore and justify the need for a new strategy, specifically the new strategy which is further described in the following chapters. The justification of the need is founded on the mentioned 5 key values of Petrobras and their vision to be “an integrated energy company that evolves with society, generates high value and has a unique technical capability”.

The analysis of the need for Petrobras to transition to a new strategy is based on two developments:



Petrobras faces headwinds with their current business direction and focus on oil & gas, due to two recent oil & gas market shocks and long-term challenges. Oil and gas are still considered key elements of the economy, with an important role in enabling prosperity for everyone (producers and consumers alike), however oil majors are gradually facing potential prospects as a declining industry (Bocca et al. 2020; Bloomberg, 2020). While peak demand for oil has not yet occurred so far, it may be expected that this scenario is indeed approaching as oil demand growth slows and eventually peaks (Financial Times, 2018). As the energy transition is expected to lead to structural changes in energy markets around the globe, oil companies and oil-exporting countries face serious challenges, as oil fields are being rapidly depleted. The challenge for oil companies is the need to disrupt their business models and integrate low-carbon

assets into their portfolios. (Fattouh, Poudineh, & West, 2018). Furthermore, global oil & gas companies are facing further challenges due to two recent seismic events on the supply and the demand side.

a.     **Demand-side risks due to the Coronavirus 2019 (COVID-19) pandemic:** The outbreak of Covid-19 has contributed to a dampened demand for oil, resulting in plummeting oil prices. Many countries have induced cautionary measures, including restricting public gatherings, travel bans, and slowing economic activity, which lead to a global decline of 0.7 percent in oil demand for the first quarter of 2020 (Statista, 2020). The impact of the demand-side shock depends on the extent and duration of restricted movement; however, they are usually short lived with a quick recovery post crisis (BCG, 2020).

b.     **Supply-side risks due to Russia-OPEC price war leading to global oil price shocks:** Due to the decreasing demand and the wake of the Russia-OPEC price war, Oil prices have fallen as much as 63% in 2020. Even though OPEC and its allies agree on 9.7 million barrels/day cut to boost prices starting on May 1st, (OPEC, 2020), the production cut may still not be enough to stop the wave of oil and gas bankruptcies expected over the next year. supply shocks are usually long-lived, requiring significant company cost reduction (BCG, 2020). Even before the COVID-19 pandemic, the oil & gas industry was challenged to manage the impact of oversupply. However, accumulated, these shocks are set to deepen and lengthen the current imbalance between supply and demand in oil & gas markets, leading to a lower-for-longer price environment and could lead to structural damage in the industry. According to a BCG study, up to 8% of global oil & gas demand could be at risk in the near term while the low-price environment could last another one

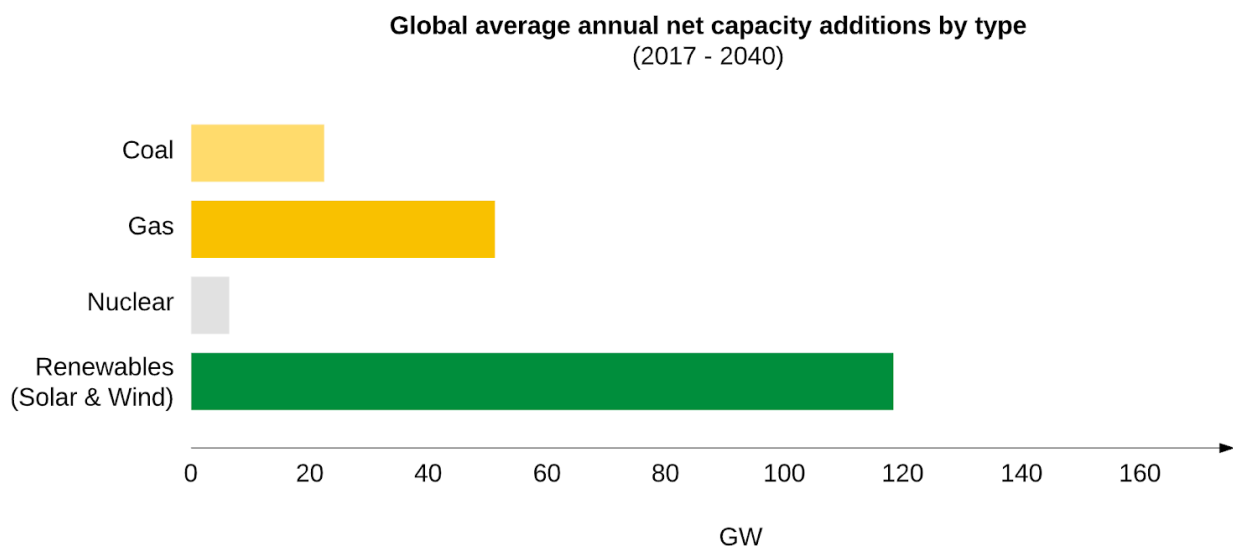
to two years (BCG, 2020). Additionally, the rising cost of hydrocarbon extraction creates an incentive to consider accelerating the energy transition away from hydrocarbons toward progressively more affordable renewable energy resources (Weijermars, Clint, & Pyle, 2014). The new market dynamic could jeopardize future projects and place some companies without enough diversification and heavy reliance on oil & gas under significant financial strain (BCG, 2020). The current headwind for oil and gas companies, which entail risks and challenges both on the demand (Covid-19) and supply side (Russia-OPEC price war), should be taken as an opportunity for course adjustment to long-term success of the Petrobras. The crisis offers a chance to consider a new energy order to enable the energy transition in a sustainable way.

On the other side, there is a need for a new strategy to react to current developments, such as decarbonization, electrification and digitalization, in the energy sector. Using them as tailwinds by initiating a substantial business transformation, could accelerate and foster a leading and long-term position in the global energy market.

In the effort to slow climate change, the energy sector matters. Electricity generation has traditionally been the world's biggest source of greenhouse-gas emissions (Bloomberg, 2020). The public pressure and mounting urgency of climate change mitigation, underpinned by recent reports from the Intergovernmental Panel on Climate Change (IPCC\_2018), UN Sustainable Development Goals on energy (SDG7), or the 2015 Paris Climate Agreement (UNFCCC\_2015), urges to accelerate the transition to a less carbon-intensive and more sustainable energy system. This may provide an additional need for such a strategy to hedge against hardening investor sentiment towards carbon emissions.



In particular, renewables are taking a role of increasing importance in the energy industry. considerable improvements in their economic, political, technical, and social feasibility have reinforced renewable energy sources as a crucial building block in the power system's transformation (IPCC, 2018; IEA, 2018; IRENA, 2019). Particularly, solar and wind energy have recently manifested remarkable growth trajectories: in 2018, solar and wind dominated the overall renewable energy additions in the power sector (IRENA, 2019b, p.15). Solar PV represents almost 60% (697 GW), and wind accounts for 29% (352 GW) of renewable energy growth expected until 2024 (IEA, 2019). Further growth is driven by supporting storage technologies, boosted efficiency, and decreasing costs (IPCC, 2018). By 2030, new solar and wind are expected to undercut the costs for commissioned coal or gas plants almost everywhere (BloombergNEF, 2019).



*Figure 4: Power capacity additions by fuel from 2017 to 2040 (Source: IEA, 2018)*

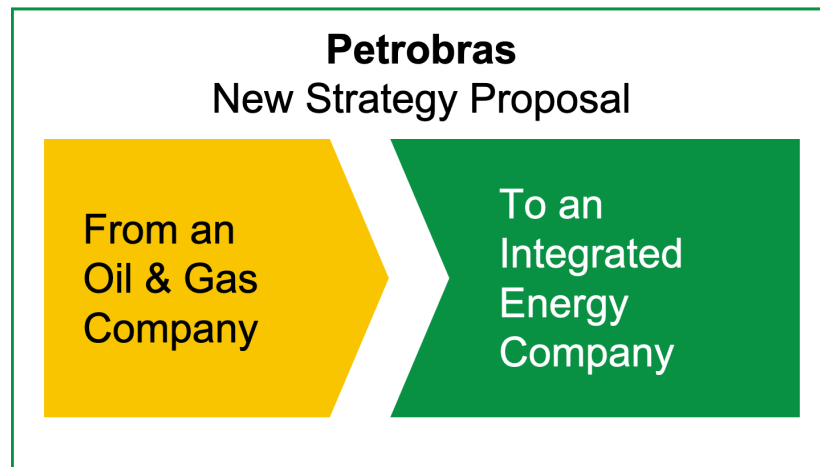
However, in order to meet global challenges and leverage new fuel technologies like solar and wind, Petrobras must do more than just invest and shift their knowledge towards renewable energy exploration. Despite the continued success of Petrobras in the oil & gas

industry, they still fall behind their competitors in many aspects of their strategies. A competitive analysis of Petrobras and its major competitors in the oil & gas industry shows that Petrobras is among the least prepared companies for a renewable energy transition (see figure 5). Compared to leaders investing in renewables development and generation, such as Shell (90%), Total (80%) and BP (75%), Petrobras is in second last place. This displays the significant accumulated need for Petrobras to catch up to keep up with the pace and leadership of its major competitors and not fall behind. Petrobras must innovate, invest and explore to be able to continue long-term success.

|  | Weight      | Petrobras  | Shell      | ExxonMobil | Chevron    | Total      | BP         | Eni        | Equinor    |
|--|-------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Hydro  | 5%          | 1          | 0          | 0          | 0          | 1          | 0          | 0          | 0          |
| Solar  | 5%          | 1          | 1          | 0          | 1          | 1          | 1          | 1          | 1          |
| Wind   | 5%          | 1          | 1          | 0          | 1          | 1          | 1          | 1          | 1          |
| Biofuels   | 5%          | 0          | 1          | 1          | 0          | 1          | 1          | 1          | 0          |
| Carbon Capture   | 5%          | 0          | 1          | 1          | 1          | 1          | 1          | 1          | 1          |
| Geothermal   | 5%          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          |
| Energy Storage / Charging / EV                               | 5%          | 0          | 1          | 0          | 0          | 1          | 1          | 0          | 1          |
| Explicit Renewable Strategy/<br>Renewable Capital Allocation | 20%         | 0          | 1          | 0          | 0          | 1          | 1          | 1          | 1          |
| Capital Investment into Renewable                            | 30%         | 0          | 1          | 0          | 0          | 0.5        | 0.5        | 0.3        | 0.5        |
| Dedicated Renewable Team                                     | 10%         | 0          | 1          | 0          | 0          | 1          | 1          | 1          | 1          |
| Renewable Venture Capital Arm                                | 5%          | 0          | 1          | 0          | 1          | 1          | 1          | 1          | 1          |
| <b>Total Score</b>   | <b>100%</b> | <b>3</b>   | <b>9</b>   | <b>2</b>   | <b>4</b>   | <b>9.5</b> | <b>8.5</b> | <b>7.3</b> | <b>7.3</b> |
| <b>Total Weighted Score</b>                                  |             | <b>15%</b> | <b>90%</b> | <b>10%</b> | <b>20%</b> | <b>80%</b> | <b>75%</b> | <b>64%</b> | <b>70%</b> |

*Figure 5: A qualitative and quantitative evaluation of Petrobras, its major competitors in the oil & gas industry in regard to their leadership in renewable energy generation (qualitative evaluation: 0 = no activity, 1 = activity; quantitative evaluation in billion \$ for capital investments)*

There is a need for a strategy which initiates the restructuring of traditional business models, since the current business models of oil majors and renewable companies are distinctively different, and the oil industry is likely to have, for example, a different cost of capital to the renewables sector (Pickl, 2019). Most renewable ventures, like wind and solar projects, churn out cash flows akin to annuities for several decades after initial up-front capital expenditure generally with low price risk, quite different to the business models of oil majors that face oil price risk.



*Figure 6: Need to restructure: from an oil & gas company to an integrated energy company*

## 4. Description of Proposed New Strategy

Considering that the overall share of oil, gas and coal in the global energy system will decrease, energy companies such as Petrobras are required to diversify their portfolios segments in order to reduce business risks and reduce exposure to unexpected changes in the energy scenario, as well as comply with social and environmental trends that are increasingly upcoming in the industry. While different prospect scenarios can be created and assumed in order to provide a reliable transition that is in pace with the socio-economic status of Brazil, Petrobras' current production plans and strategic positioning do not focus intensely on the long-term, which provides low capacity in shifting in and out of assets and investments depending on the actual outlook that will be proven in the future. Thus, current flexibility and adaptability of the company are not resilient to the energy transition that has been taking place in several developed countries and is expected to reach Brazil in a forthcoming future, especially considering the country's capacity and potential regarding renewable energy sources.

With the price of oil and gas and the price of renewable energy being unrelated, there is considerable room for both industries. While the changing global dynamics of energy had previously been reserved mostly for developed countries, considering the initial high investment costs into renewable sources, the situation has been swiftly changing. Scientific advancement in energy production as well as decreasing storage and development costs have allowed developing countries to engage in the transition as well, and, considering that oil and gas extraction and refining have reached an optimal degree of technological improvements, the access to renewables is foreseen to become even cheaper in relation to non-renewables, that will not only become costlier due to limited availability but also due to the environmental and social impacts they impose.

In order to hedge against fluctuations of oil as a commodity controlled by major exporters through portfolio assortment as well as cope with the energy transition that has already started globally, independently of the how rapid the outlook presents itself in actuality, we suggest that Petrobras adopt a diversification decision strategy in alignment with Ansoff's Product-Market Matrix, as exhibited in Figure 7. While still in the energy industry, the presence of renewables in Petrobras' portfolio will signify an enlarged market presence in different sectors of the economy, which we can consider as an expansion into new markets through a differentiated new product that the company would be offering to current and potential customers.

|        |          | PRODUCT                   |                            |
|--------|----------|---------------------------|----------------------------|
|        |          | EXISTING                  | NEW                        |
| MARKET | EXISTING | <i>Market Penetration</i> | <i>Product Development</i> |
|        | NEW      | <i>Market Development</i> | <b>Diversification</b>     |

*Figure 7: Ansoff's Product-Market Matrix*

Moreover, with "nontraditional renewable players, such as institutional investors and oil and gas majors investing significant sums to play their part in the global race for renewables" (McKinsey, 2019), Petrobras' action is required within a significantly short time period, considering that competitiveness in the market is heightening due to increased government support, lower technological cost and gradual supplier maturity, which allows for lower barriers to entry than previous, with an increasing tendency for even more intense rivalry in the future.

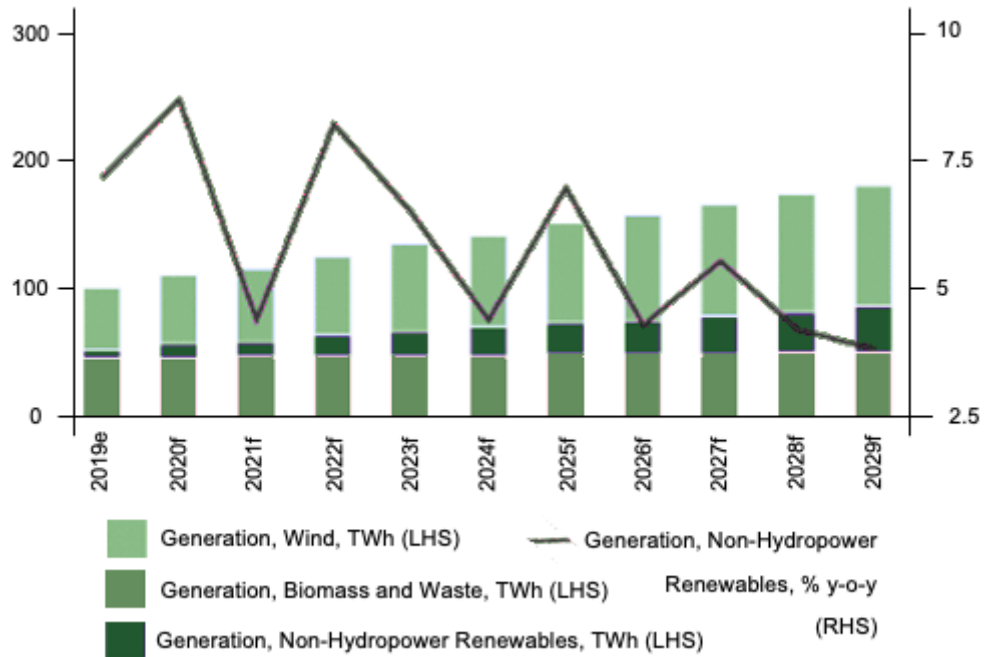
Thus, in order to ensure a successful strategy of entrance in this new market, Petrobras has to develop an efficient strategic management cycle which enables not only the implementation of the strategy but also its long-term feasibility and continuous monitoring. For that, Petrobras will have to work on value-chain excellence, optimizing activities at all levels, working towards economies of scale through perfecting of its production model, as well as investing in its operating agility, keeping up with the constant industry changes that a developing market is subject to as well as enabling resources to be rapidly adjusted in reaction to changing landscapes, which is primordial due to commodity volatility as well as government intervention and changing support, especially considering the large influence that Brazil's administration plays in the company due to governmental ownership and control.

While large governmental intervention subjects the company not only to Petrobras' own interests but also the government's, it also signifies solid and close ties to the country's jurisdiction and support. That allows the company's national presence to be capitalized on as well as provides deep market understanding which provides Petrobras with a competitive advantage over large competitors. Moreover, governmental interests can be pushed forward conjunctly with Petrobras' strategy which not only provides a sense of consistency and uniformity but also aids in popular acceptance of the proposed production shift in the energy major. In that manner, we suggest that Petrobras approach the transition through a partnership strategy, in which sufficient and competitive access to capital will be secured and technological advancements will be shared, as well as the ability to mitigate risks with the partner company.

While partnership possibilities are wide, we conclude through an analytical viewpoint that Centrais Elétricas Brasileiras, also known as Eletrobras, is the ideal partner that Petrobras should collaborate with. Eletrobras is the largest Brazilian power generator "by means of 48

hydroelectric plants, 112 thermoelectric plants, 2 nuclear plants, 70 wind farms and 1 solar plant" (FitchConnect, 2020). Moreover, Eletrobras is partly government owned as well, with a cumulative stock participation of 54% from the Brazilian federal government, organized as a holding company that operates through subsidiaries. The similarities between Petrobras and Eletrobras allows for joint action towards a common goal that is supported by the backing federal interests that are present in both companies in the same manner, and the technological and financial sturdiness of Petrobras combined with Eletrobras' knowledge of renewable resource development would prove a successfully shared effort to gradually mature and optimally expand renewable capacity in Brazil.

We evaluate that the best tactical option is to create a joint venture between both companies, which will work exclusively in the development of renewable energy production through various non-hydro capacities. Taking into consideration that Eletrobras has focused its past efforts largely on hydro-renewables as well as thermoelectric initiatives, which have proven at times financially challenging due to frequent droughts and lack of proper infrastructure, we intend that the joint venture explore other renewable energy capacities, mainly solar and wind power which are currently undergoing intense technological innovation initiatives globally and thus lowered in costs. Furthermore, the "wind sub-sector is set to emerge as the largest within the non-hydro renewables industry by 2029" (FitchConnect, 2020) and the solar sector in Brazil is also expected to experience very rapid growth through strong investor interest, as displayed in Figure 8, which exhibits non-hydropower renewables generation by type in Brazil through 2019 and the forecasted figures through 2029.



*Figure 8: Non-Hydropower renewables generation prediction 2019-2029 (Source: FitchConnect, 2020)*

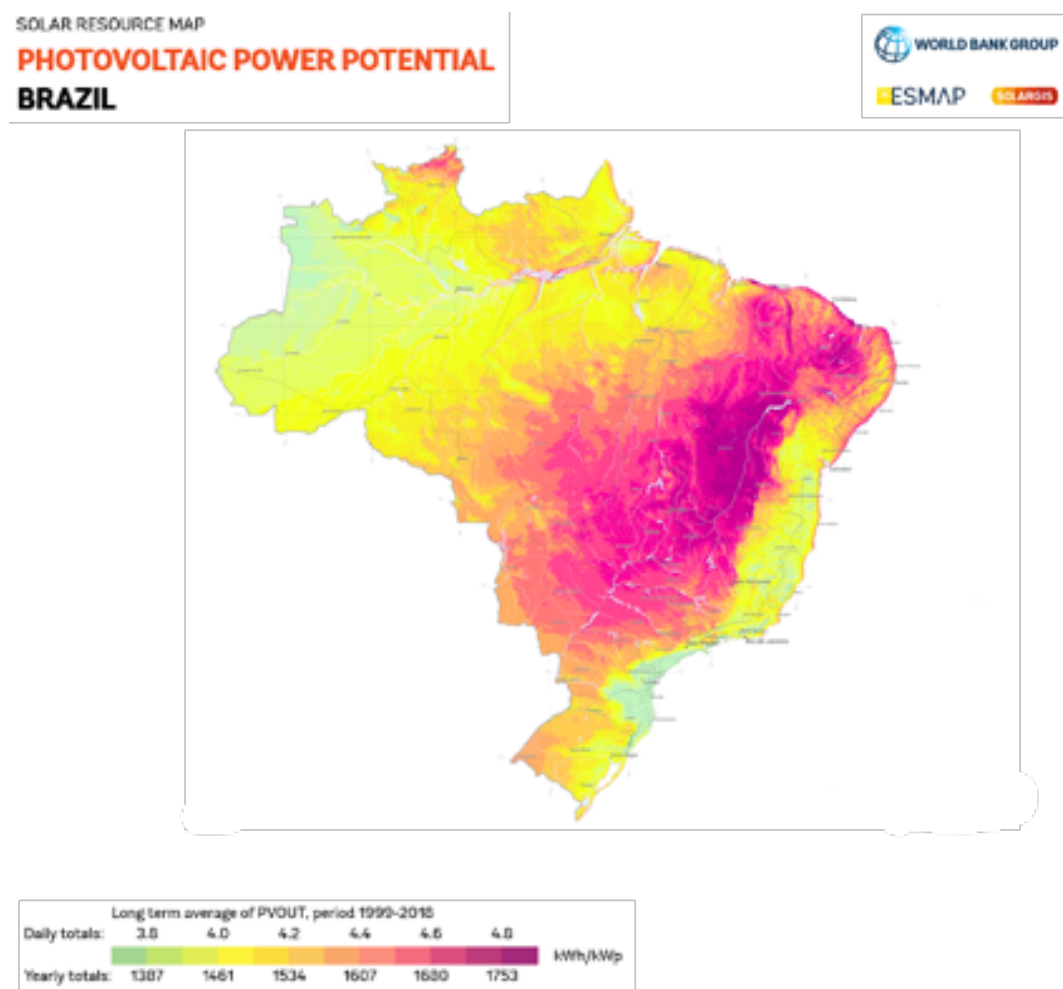
Through this partnership with federal government support, Petrobras and Eletrobras will not only be able to share resources based off of their own organizational competencies which will yield a share advantage for both companies, but will also be able to reach preferential agreements in regard to energy auctions held by the government and infrastructural access. Nevertheless, the venture will need to be aware, as any other competitors, of the country's heightened political uncertainty, corruption scandals or weak economic measures. Nevertheless, Petrobras' experience with national scandals such as the Car Wash case in 2015 has provided them with experience in regard to financial recovery as well as activity transparency, and the diversification of both companies' portfolios will provide a certain hedge against possible future macroeconomic issues that come to arise in the country. Thus, the joint venture can consider these possible threats ahead of time and act in a proactive manner instead of reactively as many external competitors, which would provide an advantageous position for the new partnership.



In order to achieve promising results in transitioning investments into the renewable resource sector, Petrobras will need to slowly disinvest from its current heavy focus on oil and gas production, in order to allocate a fair share of assets into the new venture. Through its current strategy that is expected to be developed until 2023, Petrobras predicts a capital expenditure of around 84 billion US\$ directed towards exploration and production of oil, which makes up more than 75% of the firm's investments throughout 2019 to 2023. In opposition, renewables have been assigned solely half a billion US\$ for that same period, less than 0.6% of the total anticipated investment portfolio (Annual Report, 2018). Based on the investment snapshot, a considerable disinvestment plan is required to allocate a proper and considerable amount of funds towards the development of renewables in the new strategy. The same will be required with Eletrobras, which will still be expected to contribute financially but more intensely, instead, in technology, production and market knowledge. Jointly, both companies will need to concentrate efforts, at first implementation of the strategy, into research and development of technologies that will allow for optimal execution and administration of the resources available as well as understand the technological lifecycle and infrastructural requirements of the project. Through this process, governmental support through policy-making and regulatory agencies is crucial, as to not hinder progress within the joint venture initiative. In that sense, the National Electric Energy Agency (ANEEL) plays an important role as it regulates and inspects the production, transmission, distribution and commercialization of electric energy. Moreover, it is relevant to note that the Agency's investment into energy generation capacity, mostly natural gas, heliothermic, eolian, and photovoltaic sources, has been significant for the sector's innovation, through tackling three main challenges in the energy technological development - digitalization, decentralization and decarbonization - which accelerates the renewable revolution that has

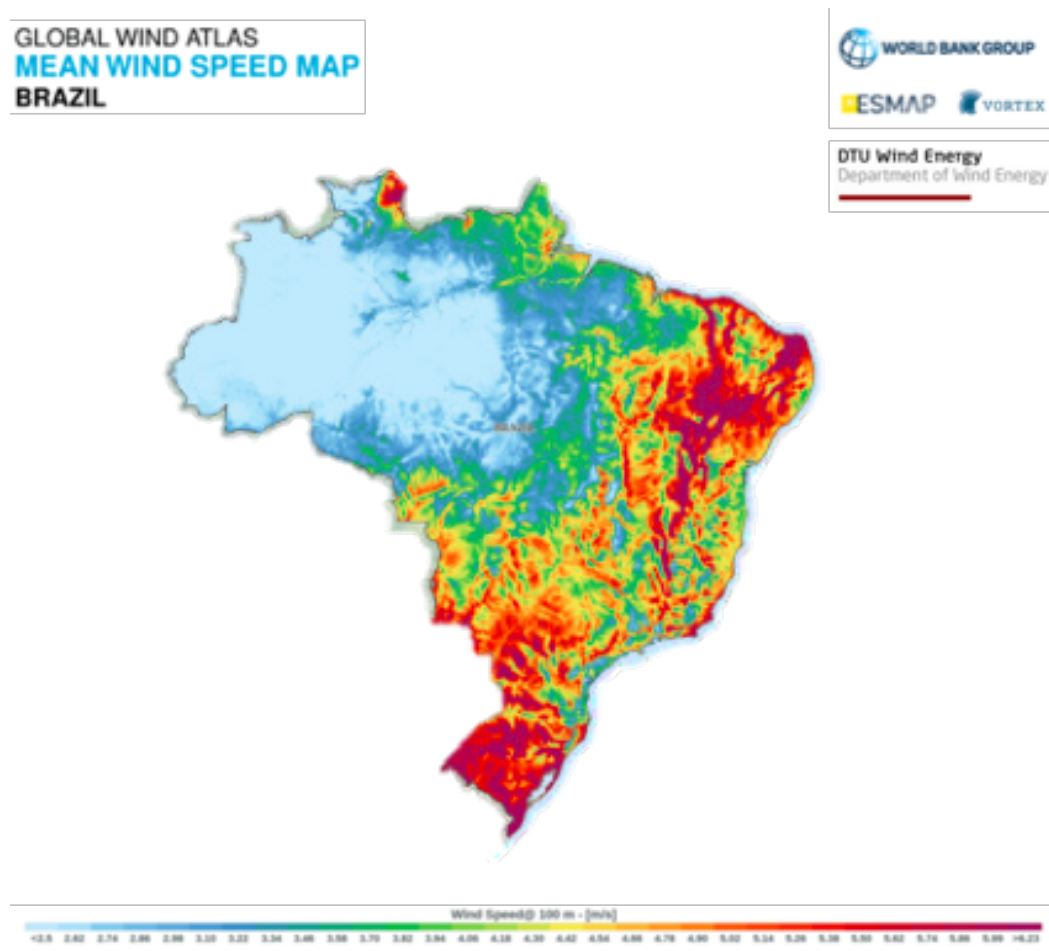
already been taking place in other countries and is being slowly implemented in Brazil as well, an opportunity that will be supported by the partnership of Petrobras and Eletrobras, considering that not only is governmental R&D required for a successful transition, but also corporate R&D initiatives as well.

Regarding placement, the joint venture should focus on areas in which the renewables focus, solar photovoltaic and eolian energy, yield the highest output per installation, thus cutting on the cost per generation of a certain quantity of electricity. As exhibited in Figure 9, the country's photovoltaic power potential is focused on the Northeast, Center and slightly on the Southeast of Brazil.



*Figure 9: Photovoltaic Power Potential in Brazil (Source: Solargis)*

More intensely generated in the state of Bahia, Petrobras' investment positioning should focus on the area. Moreover, Figure 10, which alternatively displays the mean wind speed throughout the country, which would be a large determinant of Brazil's eolian capacity throughout different regions, displays that the same area is one of the highest in the country regarding the wind speed, being comparable solely with the South of the country in its intensity.



*Figure 10: Mean Wind Speed Map Brazil (Source: DTU Wind Energy)*

Taking that information into consideration, it is conclusive that the joint operation should have more intense focus on the Northeast of the country, mostly Bahia, considering that the

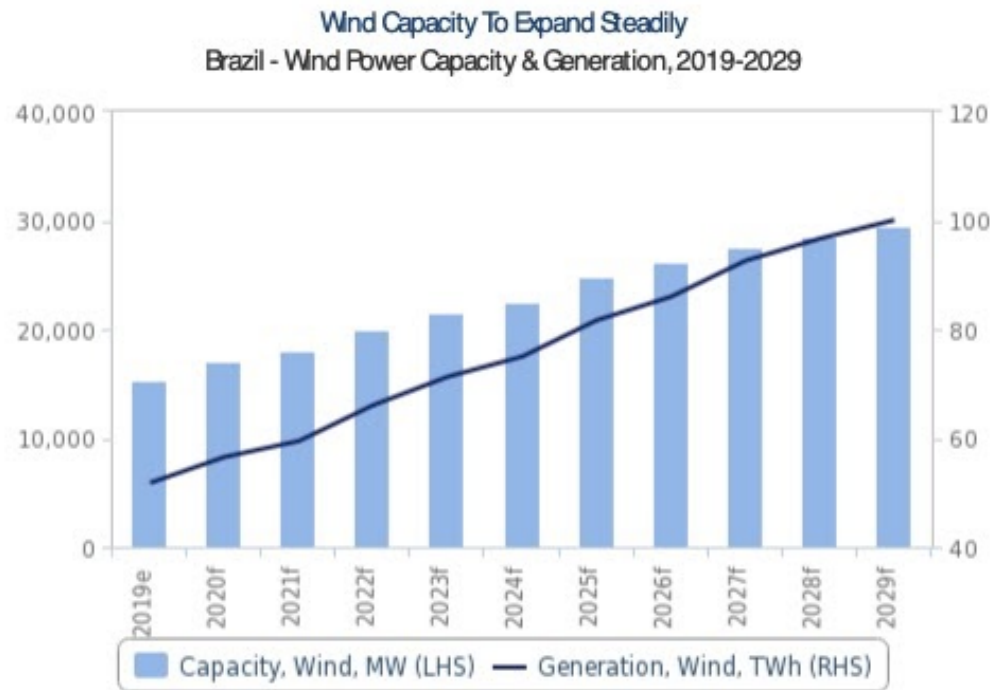
region provides both resources that the strategy puts forward, and, by narrowing the initial purpose into one area, the strategy could succeed considering that infrastructure and distribution should develop mainly from that area, saving on costs if the company were to focus on various distinctive areas and ensuring that not only will the production of energy be successful, but also its other components within the value chain, such as administration and commercialization of the available products of the strategic alliance thereafter.

Therefore, a management cycle that ensures the strategy possesses different levels and stimuli to its completion is fundamental for Petrobras' success in not only adapting its current portfolio but guarantee stakeholder comprehension and adherence to the steps to be followed by the company. The strategy should not only be developed in management and executive departments, but also presented and reinforced through all Petrobras' and Eletrobras' employees and significant stakeholders, considering that the companies should have aligned visions and goals and the whole structure of not only how business is conducted but also daily operations should be in constant arrangement with the new strategy.

## 5. Demonstration that the Proposed New Strategy Meets Need

Due to having a major focus on traditional sources of energy, Petrobras has already experienced a slight decrease in the power generation. In 2018, due to “a favorable hydrological scenario”, the company observed a 30% decrease in generation as compared to 2017 (Petrobras Annual Report, 2019). As presented in Figure 4, the renewable sources of energy will only continue to dominate the energy market. However, due to the fact that the hydropower has been proving itself extremely effective, the country “will remain heavily dependent on hydropower, which poses a risk of supply shortages and spiking wholesale prices in times of drought” (Fitch Connect, 2020).

One of the main reasons as of why we propose switching to eolian and solar energy production is a huge future potential - as mentioned earlier, both of those markets are expected to significantly increase the production capacity. According to Fitch Connect (2020), Brazil is among the countries with the strongest wind generation potential globally. It is also expected to experience a sustained capacity and generation growth (see Figure 11). By 2029 the wind sub-sector is expected to reach a total capacity of 29.6 GW, which constitutes about 44% of the total non-hydro renewables capacity - becoming the largest one (Fitch Connect, 2020). Additionally, wind power is plentiful and inexhaustible, and its abundance in the Bahia region (presented on Figure 10) provides a great opportunity for energy generation and increasing Petrobras revenue through diversification. What would allow Petrobras (and Eletrobras) to achieve an advantage over the competitors is the early entrance into the market, as much of the country’s wind and solar potential still remains unexploited.



*Figure 11: Wind Capacity and Generation 2019-2029 outlook in Brazil (Source: FitchConnect, 2020)*

As mentioned previously, the company is already willing to invest in wind power. Not only it has holdings in 4 onshore generation plants (through partnership), but it also began an initial planning on developing business in the offshore wind energy segment in Brazil - also through partnership with a Norwegian company (Petrobras Annual Report, 2019). Thus, Petrobras is already familiarized with the initial costs of investments and is willing to designate a portion of the budget in order to diversify its operations. The company believes in mitigating risks and mitigating costs through collaborations with businesses experiences in the areas where Petrobras lacks expertise - thus creating a joint venture with Eletrobras seems to be the most strategic choice. Eletrobras has a significantly better understanding of the technology and has already developed 70 wind farms with an average of 45 wind turbines on each farm. Similarly to

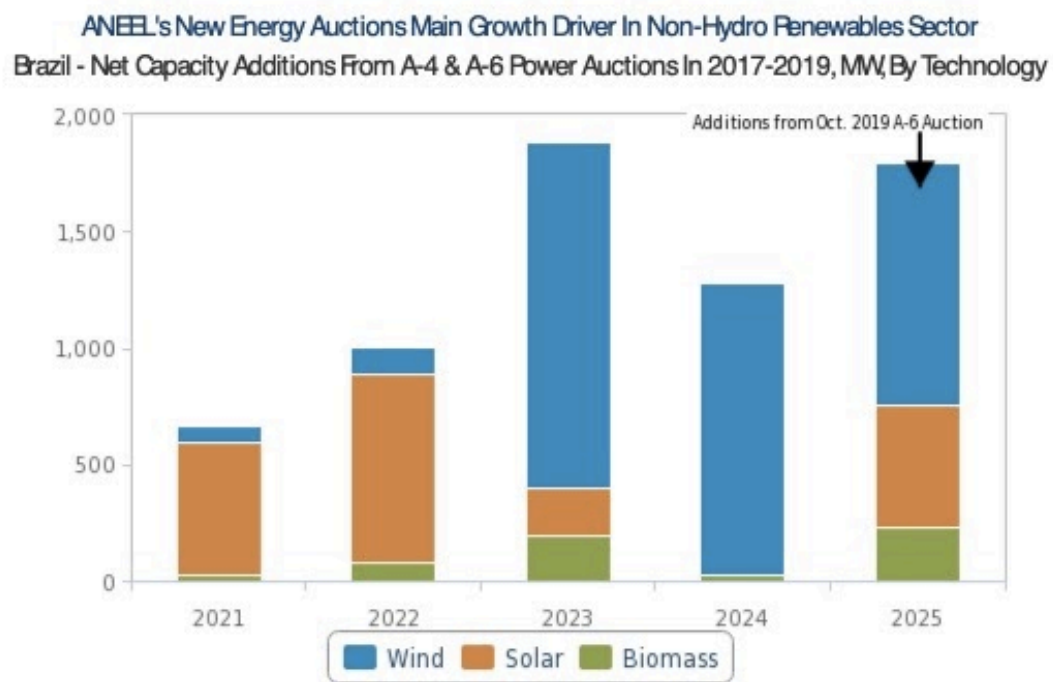
the oil company they are open to partnerships allowing them to lower the investment and potential risks costs. It has engaged in multiple joint projects - about 80% of their net wind energy generation, equal to 3,401.46GWh, comes from partnership projects.

According to the U.S. Office of Energy Efficiency and Renewable Energy (n.d.), a cost of a single commercial-scale wind turbine oscillates between US\$3-\$4 million. An average wind farm can have between 5 to 150 turbines. As previously mentioned, Petrobras predicted a capital expenditure of approximately 112 billion for investment - out of which only half a billion US\$ directed toward renewable sources of energy. By increasing the investment designated for renewable resources (specifically wind power) up to as little as 2%, Petrobras could potentially finance nearly 650 wind turbines. Eletrobras has planned an estimated total investment of US\$5.5 billion into infrastructure development, transmission and generation - including partnership projects. On top of that, in 2018 it dedicated 61 million in R&D, which combined with already available findings and technologies, could be an invaluable asset for the joint venture, considering Petrobras' relative lack of experience (Eletrobras Annual Report, 2018). At the same time, the remaining portion of the budget would be distributed among the budgeted areas accordingly. This will allow to create a long-term profit potential, while still ensuring the short-term needs of the company (and the investors) are being met.

Additionally, investing in this particular type of a renewable source of energy will mitigate the price uncertainty, which is highly expected when considering traditional sources of energy. According to the US Office of Energy Efficiency and Renewable Energy (n.d.) “electricity from wind farms is sold at a fixed price over a long period of time (e.g. 20+ years) and its fuel is free”, which allows to significantly lower added risk costs. What is more, “land-based utility-scale wind is one of the lowest-priced energy sources available today, costing

between two and six cents per kilowatt-hour, which will make it affordable for the consumers. Another advantage of a long period contract can also ensure a long-term capacity, which will help meet the long-term objectives of the strategy.

One of the main opportunities for the success of the strategy is the increasing governmental support. The Bolsonaro administration continues to support the renewable energy market, mainly through Brazil's National Electricity Agency (ANEEL), which only in the previous year has contracted selected projects for 44 wind, 11 solar and 6 biomass plants (Fitch Connect, 2020). Just in the current year ANEEL and power utility COPEL was expected to hold a minimum of 4 auctions for additional solar and wind projects - however, this may be impacted due to an outbreak of COVID-19. The number of actions is only expected to grow in the next 5 years (see Figure 12).



*Figure 12: Net Capacity Additions from Power Auctions 2021-2025 Outlook in Brazil*

*(Source: FitchConnect, 2020)*



Both Eletrobras' and Petrobras' main shareholder is the federal government - it has respectively a stock participation of 54% (Eletrobras Annual Report, 2019) and 28.7% (Petrobras Annual Report, 2019). For that reason, the joint venture would only not have to satisfy the independent needs, but also the needs of the government. However, this creates a stronger competitive competition, as the joint venture would have the support of the government, which has already shown its preference towards the companies in the past when issuing contracts or when meeting the regulatory requirements (FitchConnect 2020).

The proposed diversification strategy will allow Petrobras (and Eletrobras) to become a leader in the non-developed segment of the renewable energy market. Not only will it create an opportunity for a sustained increase in energy generation and capacity, but also allows for the continuity of operations through revenue obtained from traditional energy production channels.

## 6. Recommended Plan of Actions for Implementing New Strategy

The successful completion of a strategy arises from a disciplined progress, in which a logical sequence of activities interconnectedly operate to ensure effective implementation of each essential step that consists the ultimate goal. A productive utilization of the company's assets implies practical feasibility and sustainability of the strategy, mostly through financial, temporal, logistic and managerial aspects.

Historically, Petrobras has presented stable gradual increase in its profits, which remained positive during several years until the company's involvement in the Car Wash scandal, in which bribes were collected to facilitate negotiations between contractors and Petrobras, as well as the acquisition of bidding for the construction of large public works, which facilitated the diversion of public money into the hands of certain beneficiaries, which included politicians as well as Petrobras' directors. While Petrobras is not a target of the investigation anymore and has been formally recognized as a victim of the scheme, the corruption scandal did incur a financial impact in the firm, increasing its indebtedness and yielding negative profits through 2015 and 2016. Nonetheless, even as recovery is still incomplete and will fundamentally continue to develop in the upcoming years, Petrobras has been able to recuperate its financial position and eliminate any further uncertainties or costs of potential litigations.

Currently, the company presents a relatively strong financial position that would enable the execution of the proposed strategy, especially considering future estimates for the company. With an operating margin of 11,3% and a higher than average cash flow availability, Petrobras displays a strong ability to invest in further R&D as to develop the firm without disrupting current operations by an extreme and unsustainable proportion. The financial leverage presented

by Petrobras will ensure that the transition is implemented smoothly with no large impacts in the organization's ability to supply its current market while developing its presence in the new industry as well. Petrobras' profitability is also proven by other metrics such as the operating income and adjusted EBITDA of the company, as exhibited in Figure 13.

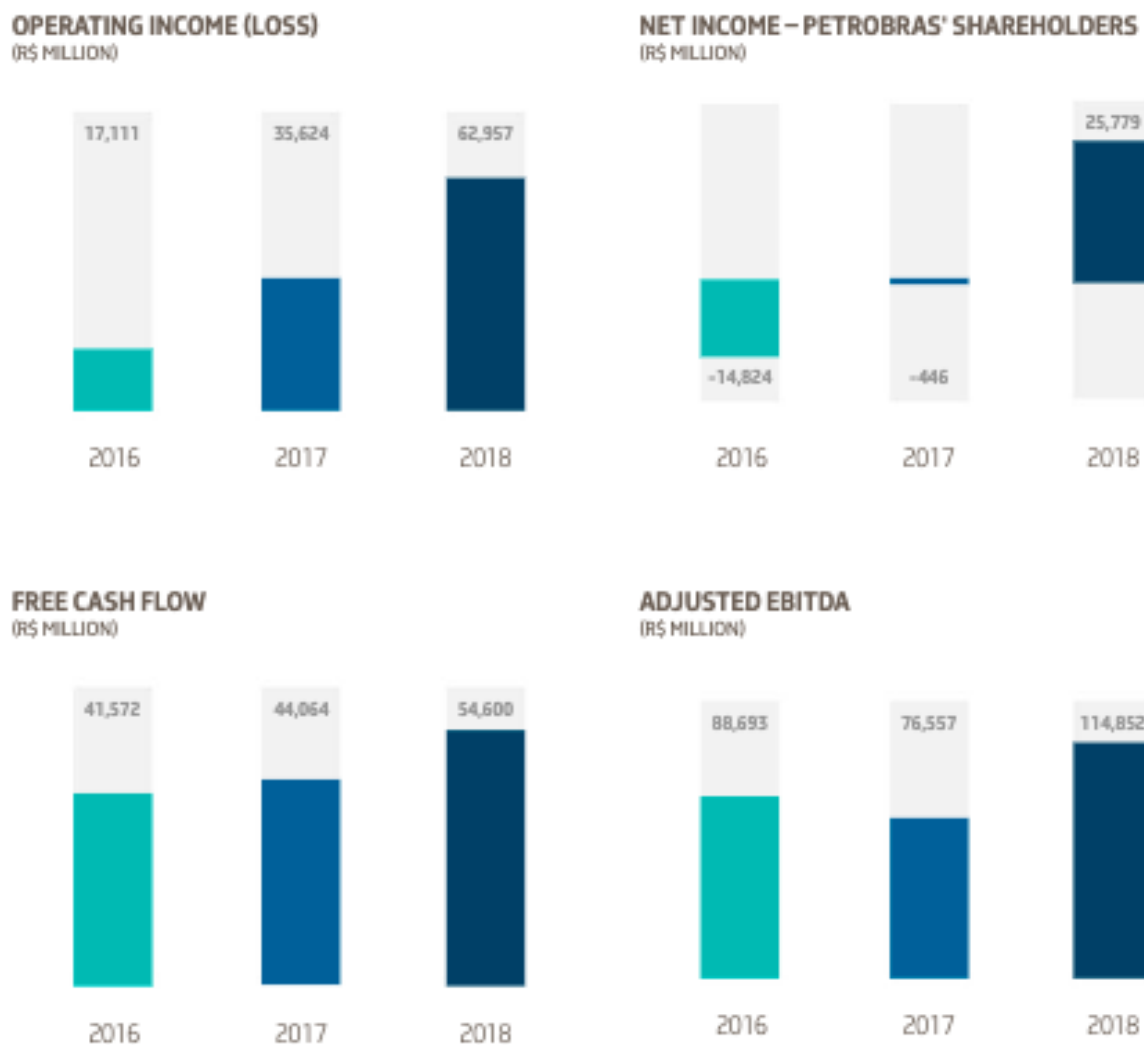


Figure 13: Petrobras financial metrics (Source: Petrobras Annual Report, 2019)

Moreover, it is important to note that "the company applies cash flow hedge accounting for certain transactions, when they involve a particular risk associated with a recognized asset or

liability or a highly probable forecasted transaction that may impact the statement of income" (2019 Financial Statements), which strengthens Petrobras' financial capabilities in entering this new strategy.

Nevertheless, although the company presents a stable enough financial position, it is crucial to consider other adjoining aspects that influence the strategy's success prospects. Temporal aspects largely determine how advantageous the strategy will actually be, in consideration of specific launch, impact and break-even periods. Petrobras' current business plan covers the company's operating estimates until 2023. Moreover, Brazil's presidential elections are scheduled for 2022. In that light, the strategy is suggested to be implemented in 2023, allowing the company time to devise an effective plan for the establishment of the joint venture with Eletrobras and acquire support from the newly elected candidate, which will be one year into office, allowing a long enough period of time for the company's to adapt to latest federal interests and acquire support for the launch of the new strategy that will proceed the company's current business plan. While that entails a certain level of uncertainty and possibly risk for Petrobras, the political alternative outcomes are likely to yield more favorable support towards initiatives that aim for sustainable development than the country's current leadership, Jair Bolsonaro and his supporting team, who "prioritizes the hydrocarbon energy matrix, without paying greater attention to alternative and renewable energies, which strengthens the country's lack of commitment to environmental and climate goals, which are currently a global debate", as stated by the technical directors of the Institute of Studies of Petroleum, Natural Gas, and Biocombustibles (INEEP), William Nozaki. The alignment of national political interests and Petrobras' own entrepreneurial initiatives would warrant no further stakeholder conflict and

support for the subsidiary's ambitions to be introduced effectively to the Brazilian market through governmental support.

Of as much importance as intra-organizational support, Petrobras' new strategy would require a foremost structural realignment in its managerial structure, envisioning that the subsidiary requires support from the parent companies to a significant degree in order to become prosperous and reward the investment put forward for its foundation. For that reason, it is suggested that a new department within the company is established, focusing on the development of renewables and the introduction of more intense sustainability principles, which will be responsible as well for the administration of the newly founded subsidiary through the joint venture. The creation of the subsidiary will facilitate communication through different levels in Petrobras and certify management support through direct disclosure to the CEO as well as the board of Petrobras, who all need to be in alignment and reconditioned to achieve a far-reaching impact of the new strategy. The department will not only act as a liaison of the strategy but will also track its execution and shadow its implementation, strengthening the purpose of the energy transition through all company operations. In that manner, inasmuch as Petrobras currently possesses strongly qualified professionals, we believe the optimal choice would be hiring a department leader with major and more considerable experience within the renewable energy industry, who would act not only as a transformative and reframing leader, but also as an instigative and motivating figurehead that promotes strategic operations throughout the whole company. In order to find a qualified individual, it is appointed that Petrobras' current Production and Technology Development Director, Rudimar Andreis Lorenzatto, who has been in the company for 30 years, corroborates the decision and proposes the potential candidate, in view of Lorenzatto's extensive presence in the field and knowledge of qualified contenders to execute the

position. The interconnection of an outside leader with Lorenzatto's experience within Petrobras will provide coordinated leadership and support of the new department by other levels of the company, from functional to managerial areas, including those focusing on innovation, digital transformation and corporate relations, all which will be essential in implementing the new strategy effectively.

## 7. Long-Term Outlook for New Strategy

The world urgently needs to put a laser-like focus on bringing down global emissions, and the energy landscape is evolving fast. This injects far-reaching implications for the global energy industry and actors, including oil & gas companies, resulting in multidimensional uncertainty in the sector.

Consequently, in the long run, the principal challenge for many oil & gas companies in portfolio diversification as this presents the ultimate safeguard against the energy transition (Fattouh, 2018). In these circumstances, oil companies are confronted with a strategic dilemma: endeavor the more-risky transition to low-carbon technologies by pushing beyond their core business or focus on maximizing their revenue from their hydrocarbon assets. This strategy suggests Petrobras establish itself as a major player to combat climate change and transition to low-carbon technologies while entering new markets and enhance the scalability and diversity of Petrobras portfolio and ensure the sustainable growth of the company.

To mitigate the multidimensional uncertainties, this strategy proposes an initial joint venture with Eletrobras. However, further partnerships or strategic alliances could be explored. Reducing carbon emissions and successfully transitioning into a low-carbon energy sector calls for a grand coalition of various companies, governments, and investors. Petrobras could establish itself as an integrated energy company, offering services that go beyond those of typical suppliers. Integration with other companies or organizations could be vertical across the supply chain to maximize the optimal integration of Petrobras' portfolio and services. For example, Petrobras could partner up with Electric Vehicle (EV) companies or companies providing EV charging stations. It could also be horizontal, to enlarge and improve Petrobras access to further markets, establishing it as a globally integrated energy industry. Thus, other fruitful alliances can

be explored in the future. Additional strategic alliances can further reduce the risks of entering uncertain markets or exploring new initiatives (Kourdi, 2015, p.137)

Finally, this strategy could be expanded with a digitalization strategy. First, it would be important to analyze the stakeholder's values and needs, which the digitalization of process could fulfill and satisfy (Cooper and Vyas, 2019). Being a player in the energy transition and the uncertain and volatile environment demands faster and more flexible reactions to events, in particular when dealing with variable and intermittent energy sources like solar and wind. Thus, the digitalization strategy should be designed to improve Petrobras' speed and flexibility. Lastly, the digitalization should be developed through engagement and alignment with Petrobras workforce, its core values, and its culture. Those are a few points, which could further advance the strategy and put it into a holistic concept of making Petrobras an integrated, agile, and user-friendly company with long-term success.



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