

A large yellow offshore wind turbine tower stands in the ocean. The tower has a complex structure with multiple legs and a platform at the top with railings and a red fire extinguisher. In the background, other wind turbines are visible on the horizon under a clear blue sky.

Offshore oil and gas companies to drive offshore wind development in Brazil

2019



Panticon
RELIABLE · EFFECTIVE · SUSTAINABLE



Executive summary

Brazil has shown tremendous progress in onshore wind development. No official offshore wind plans have yet been announced, but recent developments related with the government-controlled oil and gas group **Petróleo Brasileiro SA (Petrobras)** mean that a pilot project by 2022 is realistic. With the country's offshore wind potential estimated at 600GW (about 71% more than the onshore wind potential) there is a good case for offshore wind. Brazil is definitely worth watching the coming years where decreasing offshore costs in Europe are likely to encourage policy makers to seriously consider developing an offshore wind focus.



Private image by Thomas Poulsen

This *Offshore oil and gas companies to drive offshore wind development in Brazil Report* (the Report) is part of a series of reports on the global emerging offshore wind markets. The reports have been crafted by the Panticon team during the months of April 2018 through January 2019 to mark the launch of the new name of the consultancy which is particularly strong in the Offshore Wind and Logistics sectors within the three core disciplines of Strategic Management Advisory, Mergers & Acquisitions, and Market Research & Analysis.

The Report has been created using an extensive library of data sources (see Reference section). The main data sources used as the basis for the Report were made up of 500+ pages and mainly consisted of various publications by government related organisations, academic journal articles, offshore wind industry articles, and press releases by firms across the offshore wind market supply side as well as demand side.

The Report contains forward-looking statements, which by their very nature, address matters that are, to different degrees, uncertain as they pertain to the future. These, or any other uncertainties, may cause the actual future results to be materially different than those expressed in the forward-looking statements as contained within this Report.

At Panticon, we do not undertake to update our forward-looking statements, nor do we assume any liability for actions or dispositions made by firms, organisations, and/or individuals based on information contained in this Report.

Copyright © 2019-2023, all rights reserved

ISBN 978-87-93809-03-1

The Report authors: Victor Musuku
Thomas Poulsen

Report information: Report release version: 1.0
Release date: January, 2019

This report has been produced by:



Panticon | Vivede Møllehuse 15, 4640 Faxe, Denmark

Web: www.panticon.com | Email: info@panticon.com



Offshore oil and gas companies to drive offshore wind development in Brazil



Image: Satellite map from Google Maps/cropped

Table of contents

List of abbreviations	7
1. Introduction	8
1.1 Factors favouring offshore wind development	8
1.2 Factors hindering offshore wind development	9
2. Policy and other developments	11
3. Local offshore wind supply chain	12
4. Conclusion	13
References	14
Who we are	15

List of abbreviations

BNDES	Brazil's National Development Bank
BRICS	Brazil, Russia, India, China, and South Africa
GW	gigawatt
MW	megawatt
NDB	New Development Bank
O&G	oil and gas
PDE	Power Expansion Plan

1. Introduction

Brazil has shown tremendous progress in onshore wind development. At end of 2014, it became the tenth largest country in terms of installed wind energy capacity when its cumulative installed capacity hit nearly six gigawatts (GW). Brazil has since climbed to global eighth, ending 2017 with 12.7GW onshore wind capacity. This progress is part of Brazil's plans to increase the share of renewable energy to 45% of its energy mix by 2030, with wind, solar and biomass together accounting for 23%. Brazil's 10-year power expansion plan (PDE 2026) targets 28.5GW of wind capacity by 2026 or around 8% of the country's energy mix.

However, the plans do not yet include offshore wind. The closest Brazil has come to making official offshore wind plans was in January 2015 when the incoming Minister of Mines and Energy announced the first official studies into Brazil's offshore wind potential. Unfortunately, the same year, Brazil became embroiled in an economic and political crisis and the studies were not completed.

1.1. Factors favouring offshore wind development

There are several factors favouring offshore wind development in Brazil with the country's rich offshore wind resources being amongst the most prominent.

- **Good offshore wind resources:** Brazil's offshore wind potential is estimated at 600GW (about 71% more than the onshore wind potential) at water depths of up to 100 metres. Notable offshore wind rich regions include waters off the Northeast and **Rio Grande do Sul** state.
- **Long coastline with shallow continental shelf:** Brazil has a long coastline - 7,491 kilometres on the Atlantic. The continental shelf is shallow, stretching some 200km from the coast at water depths of five to 50 metres. Coupled with characteristic calmer sea currents and smaller waves, this translates into relatively lower installation costs.
- **Proximity to population centres:** Brazil's offshore wind resources are located close to densely populated areas – nearly 30% of the population live in coastal cities and towns - thereby reducing investment costs in long transmission lines.
- **Power offshore oil exploration:** Offshore wind has the potential to power oil platforms in Brazil's growing offshore oil exploration industry and thereby mitigate the adverse effects to the marine environment of traditional diesel or gas power generation. Given the depths of oil platforms, there is an opportunity for Brazil to be a front runner in floating offshore wind.
- **Synergies with offshore oil and gas:** Brazil has as considerable offshore oil and gas (O&G) expertise and existing infrastructure to kick off its offshore wind development. Besides, the post-2014 fall in oil prices has had local and global O&G companies active in the Brazilian market looking for diversification opportunities.
- **Synergies with existing local onshore wind supply chain:** The supply chain behind Brazil's onshore wind development to date is mostly located in the both onshore- and offshore-rich Northeast of the country and includes leading global players active in offshore wind. This provides synergies for Brazilian offshore wind development to tap in.

- **Droughts:** Despite the surge in onshore wind installations, hydro power accounts for a significant share of Brazil's energy mix. Since 2012, droughts in parts of the country, e.g. the Northeast region which hosts the biggest share of Brazil's installed onshore wind capacity, have resulted in depleted reservoirs of hydro-dams. Offshore wind has potential to mitigate the drought-driven power deficits. In addition, offshore winds are stronger and more constant than onshore winds.

1.2. Factors hindering offshore wind development

The number of factors hindering offshore wind development in Brazil are less than those favouring offshore wind development. Nevertheless, they are very crucial and decisive.

- **Abundant unexploited and cheaper onshore wind resources:** Brazil's onshore wind potential is estimated at 340GW. At end of July 2018, the country's cumulative onshore wind capacity stood at 14GW or less than five per cent of the onshore wind potential. In addition, onshore wind is economically competitive, averaging 98.62 Reals per megawatt hour in the December 2017 A-6 energy tender.
- **Uninhabited or sparsely populated land:** Brazil also has plenty of uninhabited or sparsely populated land available for onshore wind development.
- **Regulatory hurdles:** Brazil's maritime territory is under federal jurisdiction / ownership. There is yet no corresponding regulatory framework to lease offshore areas for offshore wind similar to leases for offshore O&G exploration.
- **Lack of political will and finance:** Abundant unexploited and cheaper onshore wind resources as well as the post-2015 economic and political crises, have contributed to a lack of political will and finance to kick off offshore wind development in Brazil.
- **Limited offshore wind experience:** Due to a non-existent track record, Brazil has limited offshore wind expertise, particularly in installation.
- **Nuclear power:** The incoming, from January 2019, minister of Mines and Energy is head of Brazil's nuclear submarine programme. Though nuclear power's share in Brazil's energy mix is less than 3%, the country has huge reserves of uranium.



Private image by Thomas Poulsen

2. Policy and other developments

There have been developments in recent years, though not substantial, that Brazil will have offshore wind at pilot level before 2022.

- In May 2014, Brazilian developer **Eolica Brasil** announced plans to install a 12-megawatt (MW) pilot project by 2016 off the coast of **Ceara** state, using either **Siemens** or **Alstom** 6MW turbines, as part of the planned 11GW Asa Branca offshore wind project.
- In 2016, Brazil's national power regulator, **Aneel**, approved a proposal from government-controlled oil and gas group **Petróleo Brasileiro SA (Petrobras)** to build a 4-5MW offshore wind pilot project. The proposal also included plans to map Brazil's offshore winds by **CTGAS-ER**, a **Rio Grande do Norte**-based gas/renewables research centre jointly run by **Petrobras** and industrial training organisation **Senai**, as well as a potential supply chain, vessels and harbour infrastructure study by the **Federal University of Rio Grande do Norte**. The results have not been made public.
- In November 2016, the Board of Directors of BRICS' **New Development Bank (NDB)** approved a 2 billion renminbi sovereign loan for the 250 MW phase 2 of the Putian Pinghai Bay offshore wind power project in China. Brazil is a founding member of the NDB. The NDB was formed in July 2015 with a vision to support and foster infrastructure and sustainable development initiatives in emerging economies.
- In October 2017, **Petrobras** and global offshore turbine manufacturers **GE** of the United States and Spanish-German **Siemens Gamesa** were among attendees at a high-level meeting on offshore wind development held at Brazil's president's strategic planning office.
- The federal senator of **Rio Grande do Norte** assembled a team of experts to write a bill to regulate offshore wind development, which could be approved by Congress as early as 2019.
- In September 2018, **Petrobras** and Norway's **Equinor** signed a memorandum of understanding to jointly develop offshore wind projects in Brazil. The pair did not announce any investment nor capacity plans. They plan to spend two years identifying and assessing potential projects before moving towards development.
- In December 2018, **Petrobras** announced its five year (2019-2023) strategic plan which, for the first time, included offshore wind energy.

3. Local offshore wind supply chain

- Brazil's 12.7GW onshore wind cumulative capacity has attracted global turbine manufacturers as well as global turbine component suppliers who have strong track record in the global, albeit European, offshore wind market. And, thanks to local-content-tied **BDNES** (Brazil's National Development Bank) financing, these global players have set up local manufacturing bases. This would facilitate a quicker transition to offshore wind turbine component manufacturing.
- At the same time, Brazil's existing local offshore O&G supply chain, whose local and global players are looking to diversify, offers opportunities for a faster set up of a local offshore wind supply chain particularly for balance of plant.



Private image by Thomas Poulsen

4. Conclusion

There is a good case for offshore wind in Brazil. Recent developments related with the government-controlled Petrobras mean that a pilot project by 2022 is realistic. In addition, decreasing offshore costs in Europe are likely to encourage policy makers, as is and has been happening in other new offshore markets, e.g. in Asia, to seriously consider developing an offshore wind focused regulatory framework and channel some **BDNES** financing to this effect. However, the cheaper onshore wind's unexploited potential still weighs heavily against offshore wind. Finally, the incoming government's energy policy is still unclear.



Private image by Thomas Poulsen

References

1. Offshorewind.biz
2. Poulsen, T. and Hasager, C. B.: How Expensive Is Expensive Enough? Opportunities for Cost Reductions in Offshore Wind Energy Logistics, *Energies*, 9 (6), 437, June 2016; <https://doi.org/10.3390/en9060437>
3. Poulsen, T. and Lema, R.: Is the supply chain ready for the green transformation? The case of offshore wind logistics, *Renewable and Sustainable Energy Reviews*, Volume 73, June 2017, Pages 758-771; <https://doi.org/10.1016/j.rser.2017.01.181>
4. Recharge News
5. Windpower Monthly

Who we are

At Panticon, we are particularly strong in the Offshore Wind and Logistics sectors within our three core disciplines of **Strategic Management Advisory**, **Mergers & Acquisitions**, and **Market Research & Analysis**. We are mainly focusing on the business side to improve our clients' performance, create value in the long-term, and to create sustainable competitive advantages.

How we create value

- Tailor-made strategies
- Support M&A endeavours
- Share knowledge
- Analyse markets
- Advise our clients in every aspect of our three core disciplines



Strategic Management Advisory



Mergers & Acquisitions



Market Research & Analysis



Offshore Wind



Logistics



Panticon | Vivede Møllehuse 15, 4640 Faxe, Denmark

Web: www.panticon.com | **Email:** info@panticon.com

