Ocean Energy Pathway

The Untapped Power of BRICS: Can Offshore Wind be their Next Big Leap?

Report

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The Untapped Power of BRICS: Can Offshore Wind be their Next Big Leap?

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Acronyms and Abbreviations

BRICS – Brazil, Russia, India, China, and South Africa

CIF – Climate Investment Fund

ERCP – BRICS Energy Research Cooperation Platform

FYP – Five-Year Plans

GCF – Green Climate Fund

GEF – Global Environment Facility

GDP – Gross Domestic Product

GST – Global Stocktake

GW – Gigawatt

GWEC – Global Wind Energy Council

kWh – Kilowatt hour

MDBs – Multilateral Development Banks

MW – Megawatt

NDB – New Development Bank

NDC – Nationally Determined Contribution

OSW – Offshore Wind

O&M – Operation and Maintenance

PPA – Power Purchase Agreement

TW – Terawatt

UN – United Nations

VGF – Viability Gap Funding

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1 Foreword

Julia Paletta
Head of Ocean Energy Pathway in Brazil

Mohana Priya
Head of Ocean Energy Pathway in India

The world stands at a critical juncture in the global energy transition. As countries grapple with the urgency of delivering on the Global Stocktake (GST) goals, particularly the collective commitment to triple renewable energy capacity by 2030, offshore wind has emerged as a cornerstone solution, offering vast, underutilized potential. Among the key actors capable of reshaping the renewable energy landscape are the BRICS countries. Collectively, these nations represent not only immense demand for clean energy but also a unique opportunity for technological cooperation, investment alignment, and policy coordination.

This paper, *The Untapped Power of BRICS: Can Offshore Wind Be Their Next Big Leap?*, seeks to understand how enhanced collaboration among BRICS countries can serve as a catalyst for scaling offshore wind. It investigates what drives their collective potential, spanning over 10 terawatts (TW) in estimated technical capacity—and how coordinated action can turn this latent promise into real, transformative progress.

Through an analysis of shared opportunities and barriers, the paper highlights why BRICS leadership is essential to unlocking the next wave of offshore wind deployment. In particular, it emphasizes how offshore wind can seize the momentum created by the Roadmap for BRICS Energy Cooperation 2025–2030, which calls for increased integration, innovation, and resilience across clean energy systems. Offshore wind offers a concrete pathway for operationalizing this vision—strengthening cross-border industrial supply chains, boosting local job creation, and enhancing energy security across the Global South.

By exploring the intersection of geopolitics, innovation, and sustainability, this work makes a compelling case: BRICS countries are not just followers in the global energy transition—they have the power, and perhaps the responsibility, to lead it.

2 Executive Summary

This policy paper maps the current status and trajectory of offshore wind energy (OSW) in BRICS nations, assessing opportunities and challenges. It explores insights to unlock investments in OSW in the BRICS as a cornerstone solution for green industrialization, economic development and energy diversification/resilience.

The energy transition is a priority on the international agenda and represents a strategic challenge for BRICS countries[1] (including founding members Brazil, Russia, India, China, and South Africa, and new members Egypt, Ethiopia[2], United Arab Emirates, Iran, and Indonesia) as they seek to balance industrial growth with emissions reduction and energy security. In a context marked by regulatory asymmetries, financing constraints, and low regional integration of supply chains, the absence of coordinated guidelines undermines the bloc's ability to develop clean technologies such as offshore wind energy.

Among renewable energy sources, OSW stands out as strategic due to its potential for large-scale generation, its ability to attract investment, and its capacity to stimulate supply chains. However, unlocking its potential in BRICS countries requires addressing regulatory, technical, infrastructural, and financial barriers, as well as creating support mechanisms to enable projects and promote industrialization linked to the technology.

This policy paper proposes five strategic directions for south-south cooperation between BRICS to untap OSW in the context of the Roadmap for BRICS Energy Cooperation 2025–2030.

Offshore wind as a converging point of BRICS Renewable Strategies by 2027:
BRICS members can exchange best practices through technical workshops, data repositories, seminars, pilot projects and joint training members whilst the Energy Research Cooperation Platform (ERCP) offers a dedicated channel for OSW inter-bloc interaction;

China's leadership as a driver of offshore wind readiness in BRICS:
Through the BRICS multilateral framework, countries can harness China's experience by sharing strengths and addressing technological, financial, and knowledge data;

NDB as a financial catalyst for the BRICS Offshore Wind Industry:
The New Development Bank (NDB) can act as a key enabler by offering tailored financial tools and provides direct support to OSW through long-term loans, green credit lines, risk guarantees, and investment in infrastructure;

Coordination of inter-bloc OSW implementation and capturing trading opportunities:
Coordination can accelerate deployment, align strategic priorities, and unlock trade opportunities across members by reducing trade trade barriers, facilitating intra-bloc commerce, and enhancing industrial integration;

Powering economic transformation and sustainable development through Offshore Wind deployment:
OSW can generate high-quality employment creating opportunities for sustainable economic growth, through synergies with the oil and gas (O&G) and wind energy sectors, while presenting a great opportunity for decarbonization of the fossil sector within the bloc. Early investment in local OSW supply chains can enable BRICS countries to supply into regional markets (e.g. Southeast Asia, South America, Africa).

[1] While Russia and Iran remain as active BRICS members, ongoing international sanctions and geopolitical tensions may affect the feasibility of certain forms of cooperation
[2] Although Ethiopia is a new BRICS member, it is excluded from the scope of this analysis given its landlocked condition and the absence of maritime jurisdictional areas necessary for offshore wind deployment.

3 Pursuing Energy Transition at BRICS

The global race to mitigate and to adapt to the impacts of climate change has become a defining challenge for nations and a strategic priority for emerging economic blocs [1]. The process of decarbonizing economies while promoting sustainable industrial development is increasingly viewed as an opportunity to redefine growth models around clean energy pathways.

BRICS stands as a strategic coalition for South-South cooperation. Originally formed by Brazil, Russia, India, China, and South Africa, the bloc was established to strengthen multilateral dialogue on critical global issues, including energy, infrastructure, climate, trade, and governance [2]. These priorities align closely with the United Nations Sustainable Development Goals and the 2030 Agenda [3,4].

It is important to note that the bloc is undergoing a process of expansion and openness, aiming to increase the influence and representation of the Global South in international governance through BRICS. From 2023 to 2025, new members—Egypt, Ethiopia, Iran, the United Arab Emirates, and Indonesia—were admitted and began actively participating in the bloc's decisions and initiatives.

The inclusive and just energy transition agenda of BRICS plays a strategic role and reflects the urgency of addressing challenges in the energy sector that are shaped by issues such as economic development, energy security, access to resources, geopolitical positioning, climate commitments, and increased representation in global multilateralism.

Crucially, this agenda also recognises the internal diversity of the bloc, marked by differing energy landscapes, levels of socio-economic development, and industrialization potential among its member countries.

The growing energy demand in BRICS countries is a central factor for the future of global energy systems. With a combined population of over 3.2 billion—approximately 42% of the global total—and accounting for around 25% of global energy consumption [4], BRICS countries occupy a strategic position in shaping the future of global energy systems both as major consumers and as key players in the energy transition.

Rising per capita income, urbanisation, industrial expansion, and the electrification of productive and residential sectors are set to significantly increase energy demand in these nations over the coming decades.

[3] The expansion of BRICS aims to increase the influence and representation of the Global South in international governance. Members participate in all meetings, with decision-making based on consensus. Following this, during the 2024 Kazan Summit, a new category—BRICS Partner Countries—was created, designating nine new nations as partners: Belarus, Bolivia, Cuba, Kazakhstan, Malaysia, Nigeria, Thailand, Uganda, and Uzbekistan [6]. Partners are invited to participate in the BRICS Foreign Ministers' and Leaders' Summits, and may attend other meetings if there is consensus among member countries. The nations that make up "BRICS Partners" seek to fulfill climate agendas based on their natural resource availability and energy security needs. Offshore wind energy is one of the candidate sources for countries with favorable wind conditions and extensive coastlines suitable for developing this technology.

3 Pursuing Energy Transition at BRICS

Reflecting this perspective, the Roadmap for BRICS Energy Cooperation 2025–2030, launched in 2025, is one of the initiatives designed to advance the energy agendas of member countries, considering offshore wind energy (OSW) as one of potential key drivers for the industrial development of these economies [5].

The roadmap emphasizes the exchange of experiences in public policy, research, and innovation, and encourages stronger connections between governments, the private sector, academia, and civil society. It is guided by core objectives (Figure 1).

The launch of the Roadmap marks an important milestone by consolidating a shared agenda for the energy transition among countries, and reinforcing the bloc's commitment to a more diversified, resilient, and sustainable energy matrix, aligned with the United Nations (UN) 2030 Agenda and carbon neutrality goals.

Figure 1: Objectives of Roadmap BRICS Energy Cooperation

Source: [5]

3 Pursuing Energy Transition at BRICS

With an integrated approach based on South-South[4] cooperation and respect for national specificities, the roadmap fosters collaboration among member countries. In a bloc characterized by diverse energy realities, building a shared yet flexible vision strengthens BRICS's role as a cooperative force capable of leading sustainable and inclusive energy development pathways—while honoring national contexts and leveraging opportunities for technological and socio-economic advancement.

From 2025 through 2030, the roadmap lays out a series of actions (milestones) [5] to guide BRICS efforts in energy solutions, including the development of emerging technologies, energy storage, smart grids, energy policy, and strategic partnerships.

It is complemented by the BRICS Energy Research Cooperation Platform (ERCP)—an initiative previously launched in 2019 that provides participants with opportunities for collaboration across various thematic lines and priority areas, as well as serves as a repository for documents and records of initiatives [5].

In this context, BRICS member countries can utilize the Roadmap and the platform as strategic instruments to boost offshore wind development, facilitating the exchange of experiences through data sharing, best practices, and technical guidelines.

This collaborative approach contributes to building a more favorable institutional environment for technological cooperation, strengthening regional value chains, and mobilizing investments in critical infrastructure—essential elements for enabling large-scale offshore wind projects.

Within the framework for cooperation of the Roadmap, wind energy is listed as one of the key priority issues related to sectoral cooperation. The technology has been gaining prominence in the energy transition and climate agenda, mainly due to its ability to generate large-scale electricity and provide security and diversification to clean energy matrices [5].

[4] South-South Cooperation is a form of collaboration among developing countries of the Global South, carried out through the exchange of knowledge, resources, and technologies. It strengthens national capacities through joint actions involving governments, civil society, academy, and the private sector.

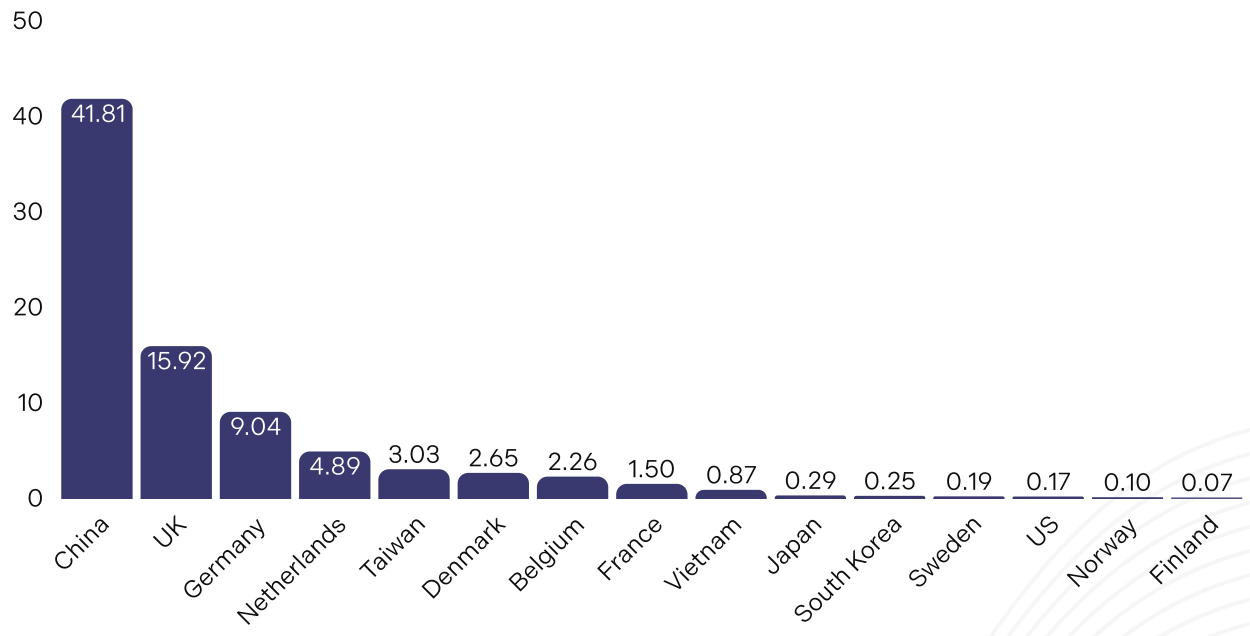
4 Offshore Wind in the BRICS countries

According to data from the Global Wind Energy Council (GWEC), OSW has already reached 83.2 GW of installed capacity globally and continues to expand each year. The global leader in installed capacity is a founding member of BRICS, the People's Republic of China, with 41.8 GW [7]. Following China, Global North countries such as the United Kingdom, Germany, and the Netherlands stand out as the main developers of this technology in recent years.

Collectively, BRICS member countries hold an identified technical potential of 17.28 TW[5] (Table 1), positioning the bloc as a strategic player in the expansion of OSW [8,9].

This potential enables the bloc to contribute decisively to the global goal of tripling renewable generation capacity to 11 TW by 2030 [4]. OSW alone is projected to grow from 83 GW in 2024 to 430 GW by 2030 where BRICS could play a critical role in achieving this projection [7].

Figure 2: Top 15 - Total Installed Capacity (GW)



Source: [7]

[5] Excluding Iran and the UAE, which do not have mapped potential, as well as Ethiopia, which is a landlocked country.

4 Offshore Wind in the BRICS countries

However, so far only China has installed offshore wind[4] capacity. Chinese leadership is the result of an aggressive government strategy involving subsidies (feed-in tariffs), local content requirements, and investments in adapted port infrastructure.

Through its Five-Year Plans (FYPs), China has incorporated offshore wind as a key driver for diversifying the energy matrix, reducing dependence on fossil fuels, and promoting industrialization.

With government support, the Chinese supply chain has established itself as one of the most competitive manufacturers globally, with companies like Goldwind, Mingyang, and Dongfang [7].

Other BRICS countries remain at earlier stages of sectoral development, facing challenges due to the specific characteristics of their energy matrices, economic-political-institutional contexts, regulatory aspects, infrastructure, and industrial capacity.[6]

[6] Specific details about the offshore wind sector for the other BRICS countries can be found in the supplementary material.

4 Offshore Wind in the BRICS countries

Table 1: OSW maturity in BRICS

Countries	Share of renewables in energy mix	Installed capacity (GW)	Technical Potential (TW)	National targets status	Regulatory framework	Auction	Marine Spatial Planning	Status
Brazil	50%	-	1.2	-	Yes	Not yet	Under develop-ment	Moving
Russia	18%	-	11.55	-	Yes	Not yet	Under develop-ment	Late comer
India	22%	-	0.67	30	Yes	Yes	Under develop-ment	Moving
China	38%	46	2.9	300	Yes	Yes	Yes	Frontru-nner
South Africa	17%	-	0.6	-	No	Not yet	Yes	Moving
Egypt	11%	-	0.16	-	No	Not yet	No	Late comer
Iran	6%	-	-	-	No	Not yet	Under develop-ment	Late comer
UAE	10%	-	-	-	No	Not yet	Yes	Late comer
Indonesia	8%	-	0.2	-	No	Not yet	Yes	Late comer

Source: [10-32]

4.1 Offshore Wind in the BRICS Founding Members

BRAZIL

Brazil has one of the largest technical potentials for OSW among BRICS countries, with estimates of 1.2 terawatts (TW) distributed across the Northeast, Southeast, and South regions [7,32]. Despite this significant potential, the country currently has no installed projects and has 104 projects in the environmental licensing phase with IBAMA [33].

The approval of Law No. 15,097/2025, which establishes the sector's legal framework, along with complementary decrees and regulations, marks a decisive step toward structuring the first auctions and attracting investments [12].

However, challenges remain related to defining area selection criteria, auction structuring, financial guarantees, grid expansion, and port adaptation. Ports such as Pecém (CE), Açu (RJ), and Rio Grande (RS) stand out as potential logistical hubs but still require significant infrastructure investments [35].

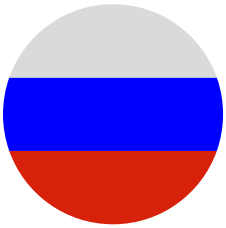
Brazil's experience in sectors like offshore oil and gas and onshore wind can foster synergies for developing a local supply chain, particularly in the manufacturing of components, vessels, and workforce training [34].

Although the country does not have specific offshore wind targets, its Nationally Determined Contribution (NDC) calls for a 59% to 67% reduction in emissions by 2035, making this energy source strategic for meeting climate goals [35,36].

Beyond increasing the share of renewables in the energy matrix (which is already 50% renewable today), offshore wind can boost coastal industrial development, decarbonize hard-to-abate sectors, and create skilled jobs [13].

Brazil is also well positioned to share its experience with BRICS members in the early stages of development, such as Egypt, Iran, Indonesia, and the United Arab Emirates, while benefiting from South-South cooperation with countries like China, which already have mature supply chains in the sector.

4.1 Offshore Wind in the BRICS Founding Members



RUSSIA[7]

Russia holds the largest technical potential for offshore wind energy development among BRICS countries, estimated at 11.55 terawatts (TW) [14], with notable regions including the Caspian Sea, Black Sea, White Sea, and Sea of Okhotsk [37,38].

Despite favorable wind conditions, factors such as extreme climate, long distances from demand centres, and limitations in grid infrastructure compromise the economic viability.

The country currently has no installed projects or specific offshore wind targets. A pilot project announced in the White Sea, in partnership with China, was canceled in 2022 due to economic infeasibility [39].

The lack of projects partly reflects the absence of specific regulations for the sector, although Federal Law No. 3-FZ/2023 provides a general framework for renewable energy sources [15].

Russia does, however, possess significant industrial and technological capabilities in the naval and oil & gas sectors, which could underpin the development of a national offshore wind value chain, especially in component manufacturing and maritime logistics [39].

However, the absence of clear regulations regarding licensing, area concessions, and grid access, combined with geopolitical restrictions and international sanctions, severely limits sector advancement [38].

Considering that Russia's energy matrix remains heavily dependent on fossil fuels and renewables account for less than 18% of its energy mix [16], OSW presents a significant opportunity for diversification and greenhouse gas emission reduction.

In this context, cooperation with other BRICS countries—especially China, which leads the global offshore turbine and industrial component sector—could be decisive in enabling Russia's first projects and overcoming the barriers imposed by the current international scenario.

[7] While Russia remain as active BRICS active member, ongoing international sanctions and geopolitical tensions may affect the feasibility of certain forms of cooperation.

4.1 Offshore Wind in the BRICS Founding Members

INDIA

India has an estimated technical potential of 67 gigawatts (GW) for offshore wind energy, concentrated mainly along the coasts of Gujarat (36 GW) and Tamil Nadu (31 GW) [18,32]. The country has set an official target of 30 GW by 2030, with projections reaching up to 120 GW by 2047 [19].

In terms of regulation, India already has a robust framework based on the Electricity Act of 2003, the National Offshore Wind Energy Policy of 2015, and the Offshore Wind Energy Lease Rules of 2023 [20,21,40].

Recently, the first offshore wind energy auction was launched for projects off the coast of Tamil Nadu, with completion expected by 2025. The government also approved a support mechanism via Viability Gap Funding (VGF), which will allocate approximately USD 893 million to enable 1 GW of capacity, divided between Gujarat and Tamil Nadu, with 25-year contracts (PPAs).

The maturity of India's onshore wind supply chain opens significant opportunities for manufacturing, installation, and operation & maintenance (O&M) of offshore components [41,42]. Nevertheless, important challenges remain, such as environmental licensing processes, the need for investments in port infrastructure, and grid connectivity.

Within the BRICS context, India stands out as one of the most advanced countries in offshore wind energy development, both due to its structured regulatory environment and its industrial capacity. This positions India as a potential exporter of components and technologies, while also enabling domestic gains such as increased energy security, emissions reduction, attraction of international investments, and regional development.

India's experience can be shared with BRICS members in earlier stages of development, such as Egypt, Iran, Indonesia, and the United Arab Emirates, and further expanded through South-South cooperation with countries like China, which have established offshore supply chains.

4.1 Offshore Wind in the BRICS Founding Members

CHINA

China leads the global offshore wind energy market, with approximately 42 GW of installed capacity in 2024, representing about 50% of the world's total capacity [7].

This leadership results from a long-term state strategy coordinated through the FYPs, which have integrated offshore wind into national goals of energy diversification (China's energy mix already includes 38% renewables) [22], decarbonization, and industrialization of coastal provinces.

The sector's rapid growth has been driven by mechanisms such as feed-in tariffs (effective until 2021), priority grid access, and integrated maritime infrastructure planning [43].

The regulatory framework is based on the Renewable Energy Law of the People's Republic of China (2009), supplemented by provincial laws and guidelines. Decentralization of approval processes has empowered local governments to lead project development within their jurisdictions.

This strong government support enabled the overcoming of technical and financial bottlenecks, promoting economies of scale and the emergence of major national developers and manufacturers such as Mingyang, Goldwind, and Dongfang, now among the leading global players [44].

With an estimated technical potential of 2.9 TW [32], China plans to establish five major offshore wind energy bases in the Shandong Peninsula, Yangtze River Delta, South Fujian, Guangdong, and Beibu Bay regions, and already projects a total target of 300 GW across plans from 11 provinces [7].

Its competitive supply chain and industrial know-how position China as a strategic provider of technological solutions for emerging markets, including other BRICS countries.

Thus, China plays a decisive role in the global energy transition and in strengthening South-South cooperation, offering technical and commercial support to nations seeking to develop their own offshore wind sectors.

4.1 Offshore Wind in the BRICS Founding Members

SOUTH AFRICA

South Africa, although it does not yet have operational offshore wind energy projects, presents favorable technical and strategic conditions for developing this sector, especially given its high dependence on coal and the low share of renewables, currently around 17% of the electricity mix [23].

With an estimated technical potential of 646 GW, predominantly for floating solutions, offshore wind emerges as a promising alternative to diversify and decarbonize the national power system. The areas with the highest viability are located in the Western Cape and Eastern Cape, regions that combine consistent winds with good capacity factors [24,25].

Although there is not yet a specific regulatory framework for this source, the South African government has indicated interest in including it in upcoming revisions of the Integrated Resource Plan (IRP), which currently only covers onshore wind generation [26,45].

South Africa has a relevant industrial base in offshore oil and gas, maritime logistics, and onshore wind energy sectors, offering strategic synergies to boost the offshore sector.

Additionally, modernization of strategic ports such as Duncan Dry Dock (Cape Town) and the Port of Ngqura (Eastern Cape) expands the logistical potential to support these projects [25].

The advancement of offshore wind can help alleviate the overloaded power system, reduce blackouts, attract foreign investment, generate skilled jobs, and stimulate new productive chains.

Within the BRICS context, South Africa has a unique opportunity to accelerate its learning curve through South-South cooperation, leveraging the exchange of technologies, regulatory models, and practical experiences with more advanced countries in the sector, such as China, thus contributing to a safer and more inclusive energy transition on the African continent.

4.2 Offshore Wind in the BRICS New Members[8]

EGYPT

Despite having a technical potential of 166 GW along the Mediterranean Sea and the Gulf of Suez [25], Egypt does not yet have any installed offshore wind projects nor has it established specific targets for this energy source.

With only 11% of its energy mix composed of renewables [27], mainly solar and onshore wind, the country aims to reach 16 GW of renewables by 2029 [46] and 40% of its energy mix by 2040 [28].

Major challenges include the absence of a specific regulatory framework, limitations in the electric grid, and insufficient port infrastructure.

On the other hand, Egypt has strategic advantages such as its proximity to Europe and the potential to export renewable energy.

Within the BRICS framework, the country can benefit from South-South cooperation by exchanging experiences with more advanced countries like China, India, and Brazil.

IRAN[9]

Iran remains highly dependent on fossil fuels, with only 6.5% of its energy mix coming from renewables [29], and it has no installed offshore wind projects or specific targets for this energy source.

Its technical potential is distributed along the Persian Gulf, Gulf of Oman, and Caspian Sea, with an estimated total of 845 GW shared among the coastal countries in the latter region [48].

Major barriers include the lack of specific regulation, technical challenges related to the marine geography, as well as geopolitical obstacles and international sanctions.

Still, given its strategic position between Europe, Central Asia, and the Middle East, offshore wind energy represents an opportunity for diversification, energy security, and greater international engagement. Through BRICS, Iran can seek technical and regulatory cooperation with China, India, and Brazil.

[8] Ethiopia is not listed because it is a landlocked country. Ethiopia has no access to maritime jurisdictional areas, which makes the development of offshore wind energy projects unfeasible. Therefore, the country has no technical potential or strategies focused on this sector. Its energy matrix is dominated by biomass and waste (90%) and it concentrates its efforts on developing new biomass technologies and renewable sources such as wind, solar, and hydropower [47].

[9] While Russian and Iran remain as active BRICS members, ongoing international sanctions and geopolitical tensions may affect the feasibility of certain forms of cooperation.

4.2 Offshore Wind in the BRICS New Members

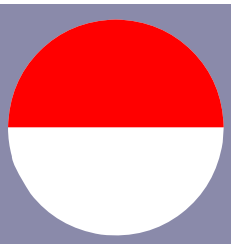
UNITED ARAB EMIRATES (UAE)

In the UAE, offshore wind energy is not yet considered viable on a large scale due to low wind speeds at sea (3–6 m/s) and the high cost of the technology compared to alternatives such as solar [30].

While offshore wind is not an immediate focus, wind mapping and site assessment initiatives may reveal viable areas in the future. Currently, less than 10% of the country's energy mix comes from renewables, although there is a target to reach 30% by 2030, with an emphasis on solar energy [49].

UAE shares OSW experience through Masdar's engagement in discussions and stakeholder's participation in projects, providing expertise in international collaboration and project financing of offshore wind farms.

Notably, the experience in project financing establishes UAE as a key provider of equity and debt capital for offshore wind projects globally. Within the BRICS context, the UAE can exchange experiences with countries of similar geography, such as Indonesia, and benefit from the regulatory learnings of China, India, and Brazil.



INDONESIA

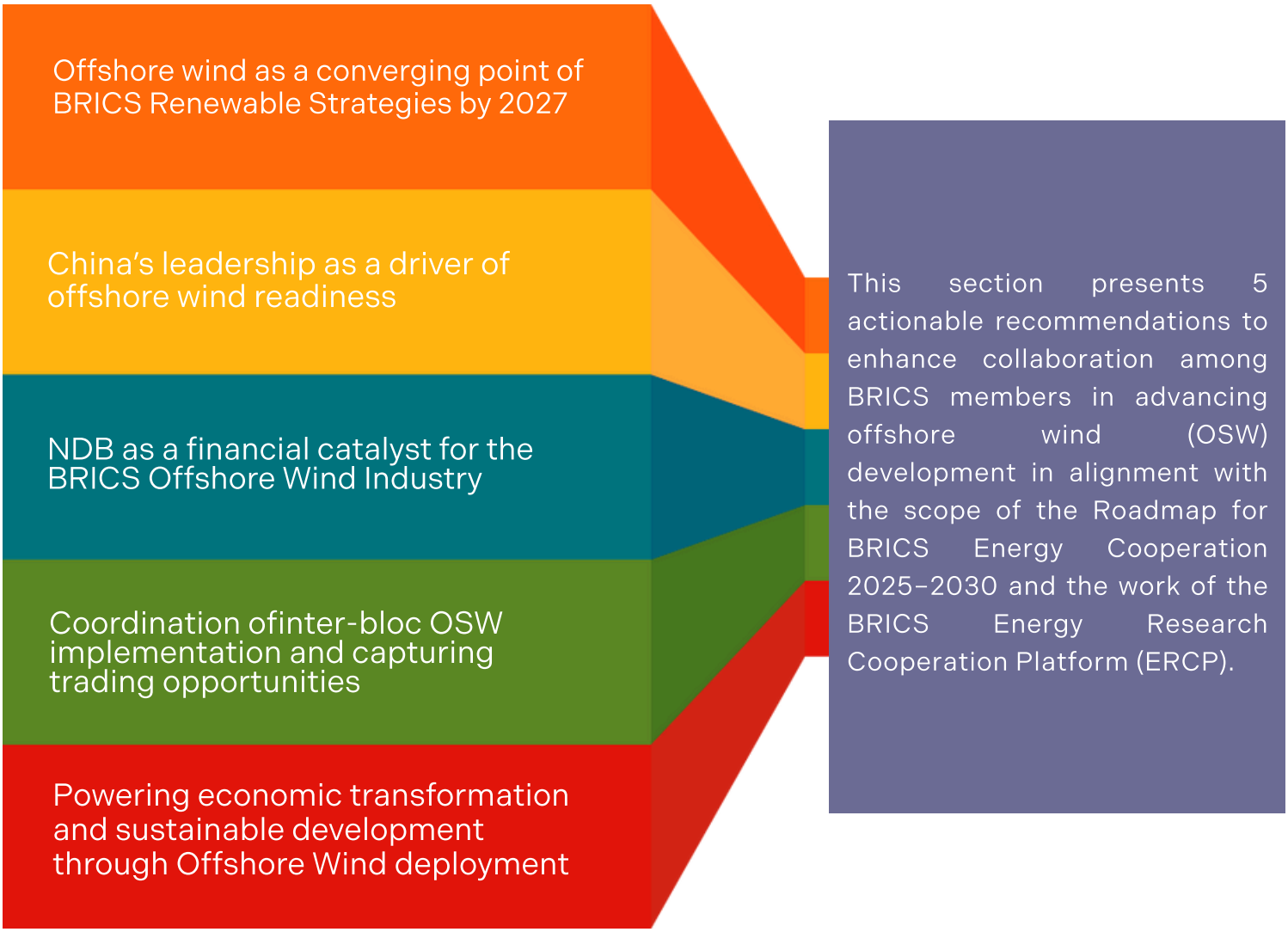
With an estimated technical potential of 277 GW [32], Indonesia faces significant obstacles to the development of offshore wind, such as weak open-sea winds, high technology costs, and regulatory complexities typical of tropical countries.

Despite this, the country aims to increase its renewable energy share from 8% to 44% by 2030 [31], with offshore wind being one of the possible solutions.

The most promising areas include the southern coast of Indonesia (Java–Timor), the Java Sea, the Banda Sea, and the Arafura Sea. Technical mapping and feasibility assessment initiatives are already underway.

Within the BRICS framework, Indonesia has the opportunity to exchange technical and regulatory knowledge with China, India, and Brazil, accelerating the development of the offshore wind sector in the archipelago.

5 Offshore Wind: Five Pathways for cooperation between BRICS countries



5.1 Offshore wind as a converging point of BRICS Renewable Strategies by 2027

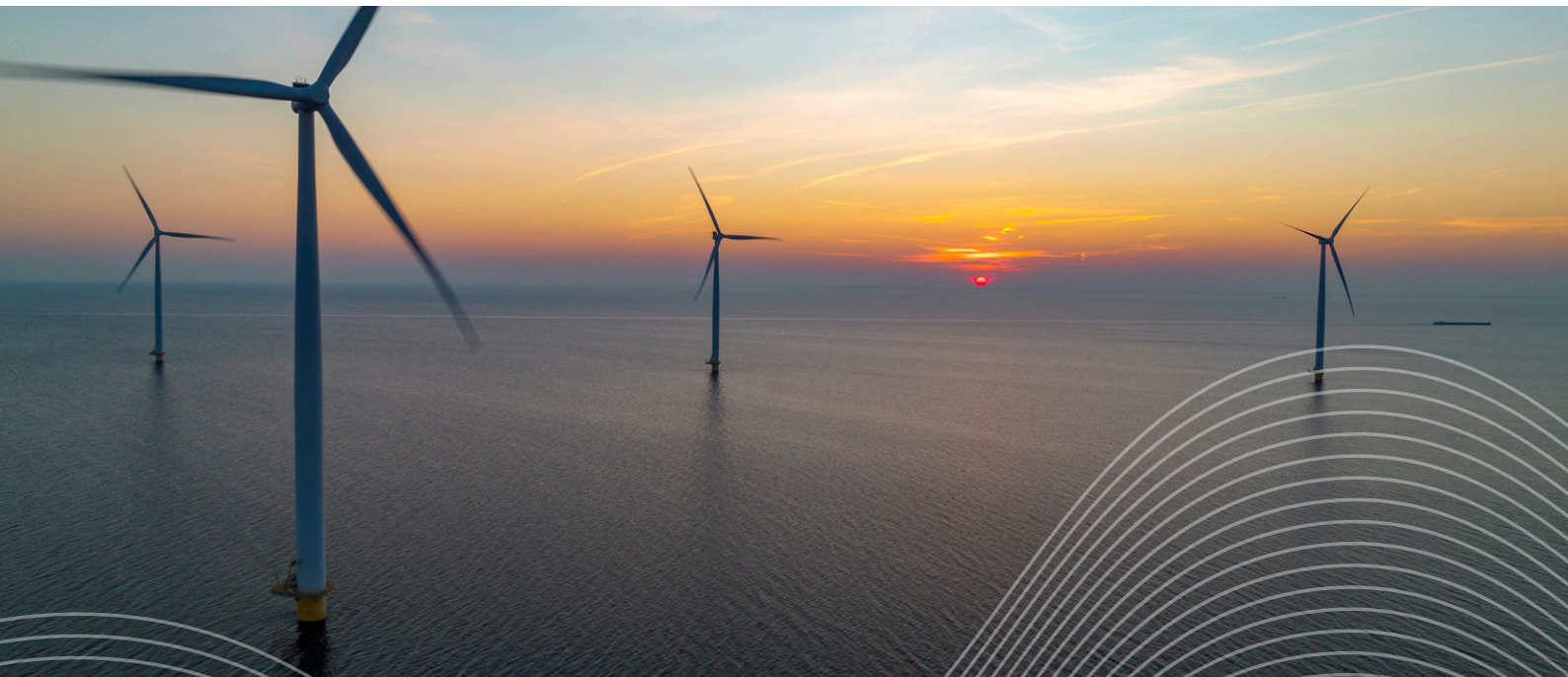
OSW is firmly positioned within the BRICS Energy Cooperation Roadmap 2025–2030 as a shared technology priority in diversifying their energy matrix. By 2027, the roadmap aims to coordinate the development of emerging energy technologies where OSW can be supported to integrate energy transition goals.

Turning the 2030 milestones into actionable projects, BRICS countries can accelerate offshore wind (OSW) deployment through coordinated efforts in the international energy agenda.

Through technical workshops, data repositories, seminars, pilot projects and joint training members can exchange best practices in public policies, investment, research, technological cooperation, regional interconnection and required infrastructure.

ERCP offers a dedicated channel for OSW interaction between BRICS. Along with other existing mechanisms including the Energy group of the BRICS Business Council, BRICS Science and Technology Initiative, and BRICS Think Tanks Council, ERCP can provide technical support for the implementation of OSW through the roadmap while NDB provides financial support.

This approach supports the roadmap's goals of a just, inclusive, and secure energy transition, with respect for national sovereignty and the legitimate interests of members, helping integrate OSW into national energy plans by 2030 and scale it as a shared pillar of BRICS clean energy efforts.



5.2 China's leadership as a driver of offshore wind readiness

China remains the only BRICS member with a significant volume of installed offshore wind capacity, positioning itself as the clear frontrunner within the bloc. Other BRICS nations are at different stages of sector maturity (movers and latecomers), facing specific challenges related to their regulatory framework, infrastructure gaps, and industrial capacity.

Given its advanced market and robust supply chain, China's mature offshore wind market can provide valuable lessons to support members to implement OSW.

Through the BRICS multilateral framework, countries can harness China's experience by sharing strengths and addressing technological, financial, and knowledge data.

Structured cooperation in areas such as technology transfer, joint demonstration projects, capacity-building programmes, and regional financing mechanisms can significantly reduce the risks and costs of OSW development.

China's engagement in this effort can help fast-track institutional learning, promote localisation of supply chains, and support the creation of inclusive, resilient offshore wind markets throughout the Global South.

5.3 NDB as a financial catalyst for the BRICS Offshore Wind Industry

The expansion of offshore wind in BRICS countries hinges on robust financial structures to overcome high capital costs and investment risks. In emerging economies, where domestic financing is limited and expensive, multilateral development banks (MDBs) play a strategic role.

The New Development Bank (NDB), established by BRICS in 2014, acts as a key enabler of sustainable development by offering tailored financial tools for the energy transition. Its financing capacity, aligned with sustainable development and regional integration goals, enhances the attractiveness and scalability of offshore wind across the BRICS.

BRICS Energy Roadmap has as one of its main objectives expanding trade in energy-related goods and creating favorable conditions for mutual investments and includes mapping financing needs and dialogs with NDB for priority investments for energy transition as a milestone to be reached by 2030.

NDB provides direct support to OSW through long-term loans, green credit lines, risk guarantees for innovative technologies, and investment in enabling infrastructure such as ports and transmission lines.

Concrete examples include the Putian Pinghai Bay and Guangdong Yangjiang Shapa offshore wind projects [48], which demonstrate technical and economic viability, build regional expertise, and set replicable precedents.

By providing a regional green guarantee facility to de-risk projects, establishing joint concessional credit lines specifically for offshore wind, and blending resources with climate finance funds (e.g., CIF, GEF, GCF) NDB could enhance financing mechanisms for OSW development [51].

5.3 NDB as a financial catalyst for the BRICS Offshore Wind Industry

Table 2: China OSW projects financed by NDB

Projects	Putian Pinghai Bay Offshore Wind Power Project	Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project
Timeline	Approved in November 2016 and implemented from 2018 to 2020.	Approved in November 2018 and implemented from 2019 to 2021.
Total Project Cost	RMB 4.63 Billion	RMB 6,778 million.
Limit of NDB Financing	RMB 1.97 Billion long-term loan repayable in 30 semiannual equal principal installments, over a period of 15 years starting from 2021.	RMB 2 billion, accounting for 30% of the total cost.
Project Implementing Entity	Fujian Investment and Development Group Co., Ltd	Guangdong Yudean Group Co., Ltd. selected through a competitive and transparent bidding process.
Objective	Installation of a 250 MW OWF (50 turbines of 5 MW. Modified to 246 MW (41 Siemens turbines of 6 MW) In the first year of operation, the project generated 873 million kWh, avoiding approximately 869,900 tonnes of CO_2 emissions per year. In 2022, annual electricity generation reached 1,043 million kWh.	47 turbines (one 5.5 MW turbine and 46 6.45 MW) installed in phase I. Phase II commissioned 62 Mingyang turbines of 6.45 MW.

Source: [52,53]

5.4 Coordination of inter-bloc OSW implementation and capturing trading opportunities

Strengthening inter-bloc coordination on offshore wind (OSW) within BRICS can accelerate deployment, align strategic priorities, and unlock trade opportunities across members.

The BRICS Energy Cooperation Roadmap identifies as key milestones the structured dialogues between national energy ministries and NDB to coordinate and prioritize investments for energy transitions.

To operationalize this coordination, BRICS should create a dedicated intergovernmental OSW task force under the Energy Research Cooperation Platform (ERCP).

This body would be responsible for guiding joint action on aligning permitting frameworks, harmonizing technical standards, coordinating infrastructure and grid planning, and integrating maritime spatial planning efforts.

BRICS countries coordination can facilitate intra-BRICS trade and generate mutual economic gains by leveraging each country's comparative advantages in manufacturing, infrastructure, and services.

Developing coordinated policies and regulations can reduce trade barriers, facilitate inter-bloc trade, and enhance industrial integration.

By promoting the use of local currencies in transactions, coordination can also reduce exchange-related costs and strengthen financial resilience, while joint financial instruments— such as concessional green finance and multilateral funds — can facilitate access to concessional capital for infrastructure and innovation. Collectively, these efforts can increase bargaining power in international multilateral negotiations on energy, climate, and trade.

5.5 Powering economic transformation and sustainable development through Offshore Wind deployment

OSW represents an opportunity for BRICS countries to advance green industrialization, drive economic development, and strengthen energy diversification and resilience. As global decarbonisation efforts intensify globally, OSW offers a scalable pathway to supply large volumes of renewable energy capable of decarbonising hard-to-abate sectors and increasing the share of renewables within national energy matrices.

Beyond its role in clean energy generation, OSW fosters green industrialization by stimulating domestic manufacturing, driving infrastructure modernisation, and developing regional supply chains.

Early investment in local OSW supply chains can enable BRICS countries to supply into regional markets (e.g. Southern Asia, South America, Africa).

As a technologically advanced sector, OSW can generate high-quality employment creating opportunities for sustainable economic growth, through the synergies with the O&G and wind energy sectors, also as a great opportunity for decarbonization of the fossil sector within the bloc.

To ensure equitable and inclusive growth, BRICS countries should prioritize social and gender considerations in their OSW strategies, especially in the context of the global south, where countries are less developed. OWS would contribute to socioeconomic development, increased GDP, reduced social inequality, community inclusion and gender equity.

OSW also contributes directly to diversifying the energy mix and enhancing system resilience. Several BRICS countries, such as Iran, Indonesia and the United Arab Emirates, have a low share of renewable energy in their energy mix.

5.5 Powering economic transformation and sustainable development through Offshore Wind deployment

Through multilateral cooperation strategies between nations, OSW can alter this trajectory by harnessing offshore wind's high capacity factors and complementary generation profiles to onshore renewables, offering a stable and dispatchable source of clean energy—particularly suited for coastal industrial hubs and energy-intensive sectors.

Moreover, OSW can help mitigate one of the major challenges facing renewable energy systems globally: curtailment. By delivering power closer to demand centres and during complementary timeframes, offshore wind reduces grid congestion, enhances system efficiency, minimises energy losses, and increases the effective utilisation of renewable resources.

Thus, BRICS countries reduce dependence on fossil fuels, mitigate exposure to energy price volatility, develop their marine spatial planning in such a way that the offshore wind industry coexists with environmental aspects and local communities, and reinforce their commitment to climate goals.

CASE STUDY: SEASKETCH – FROM MARITIME ECONOMY TO A BLUE ECONOMY

In Brazil, the SeaSketch tool was developed by the Federal University of Santa Catarina (UFSC), in partnership with the Integrated Coastal Management Laboratory.

SeaSketch is a collaborative geodesign platform that serves as an intermediary between coastal and marine managers, data, and society. It provides strategic and efficient support through public policy tools, human and financial resources, and communication strategies aimed at improving marine governance.

As an initiative of the Ministry of the Environment and Climate Change (MMA), SeaSketch was applied in the context of Marine Spatial Planning (MSP) through the Brazil Ocean Use Survey.

The tool enables the mapping of ocean uses, supports the identification of priority areas, and assists in scenario analysis for MSP. It helps monitor ocean activities such as artisanal fishing, recreational sports, energy developments, and aquaculture.

Furthermore, the tool enhances public participation by engaging various stakeholders and promoting awareness about offshore wind energy and biodiversity conservation. It ensures strategic communication between government and society while facilitating the collection and dissemination of ocean-related data.

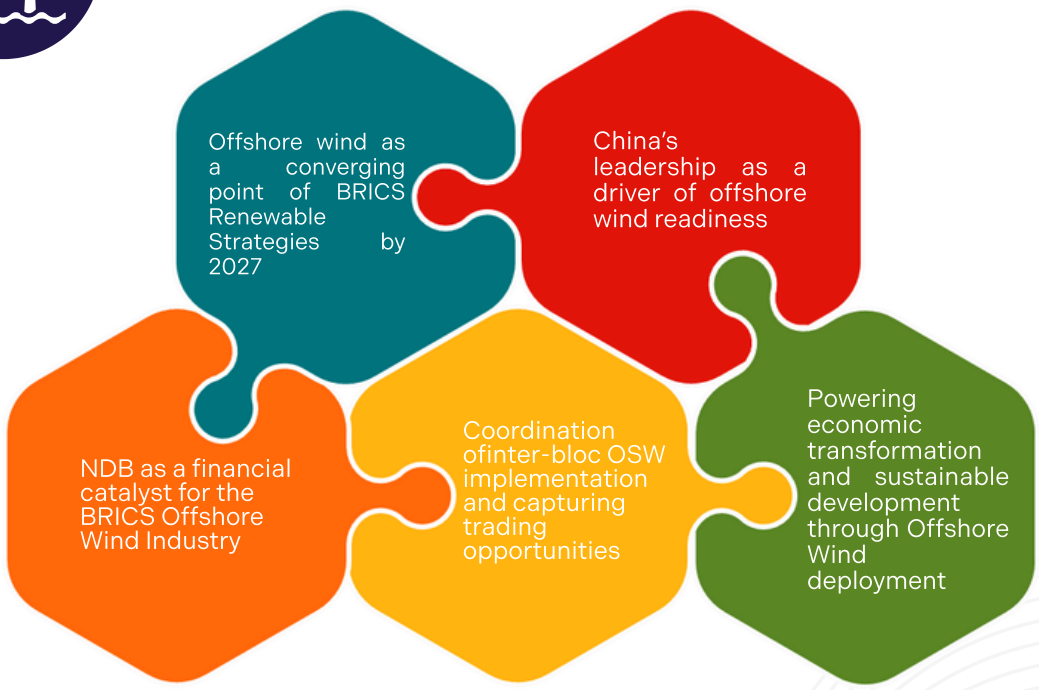
6 Next Steps and Recommendations

To fully seize the offshore wind (OSW) opportunity across BRICS countries—estimated at 17.28 terawatts of technical potential—the bloc must enhance governance and foster collaborative frameworks.

By promoting technical, institutional, and industrial synergies, BRICS members can advance more strategically and cohesively toward a sustainable, inclusive, and just energy transition. The five strategic pathways outlined in this paper offer a direction for BRICS collaboration and accelerating OSW development across the bloc.

BRICS nations mutual learning and cooperation can facilitate the exchange of lessons, experiences, and resources, supporting a more integrated and mature model of development. BRICS members should actively harness China's leadership and technological maturity in offshore wind to accelerate regional readiness, including through structured South–South exchanges focused on port infrastructure, grid integration, and supply chain development, tailored to national contexts.

Directions for BRICS collaboration in the development of offshore wind in the medium and long term



6 Next Steps and Recommendations

The establishment of a common energy transition agenda, centred on OSW, should be prioritized, particularly in countries where the resource remains largely untapped. Aligning national OSW strategies by 2027 will be essential to avoid regulatory fragmentation, harmonise efforts, and create a coherent framework for long-term planning and deployment.

The New Development Bank (NDB) must assume a central role as a financial enabler of offshore wind expansion, offering concessional finance, long-term credit lines, and risk guarantees, while also supporting cross-border infrastructure. Prioritizing OSW within the Bank's clean energy portfolio can stimulate investor confidence, unlock private capital, and enable project scalability across member states.

Coordination of inter-bloc OSW implementation should be institutionalised to align strategic priorities and unlock intra-BRICS trade opportunities in OSW technologies and services. This includes reducing trade barriers, aligning technical standards, and investing early in local supply chains.

Early investment in local manufacturing and service capabilities—particularly in synergy with the existing oil, gas, and onshore wind sectors—will ensure sustainable development across the Global South and can enable BRICS countries to supply into regional markets (e.g. Southeast Asia, South America, and Africa).

7 List of Rerefences

[1] Molitor, M. R. (2023). *The United Nations climate change agreements. In The global environment* (pp. 210–235). Routledge.

[2] Banco Central do Brasil. (2025). *The BRICS*. São Paulo: Departamento de Relações Internacionais.

[3] BRICS Brasil. (2025). *BRICS approves declaration and advances sustainable industrial agenda with focus on technology and small businesses.* Brasília: Secretaria Executiva do BRICS Brasil.

[4] International Energy Agency. (2024). *Renewables 2024:* Executive summary.

[5] Ministério de Minas e Energia. (2025). *Roadmap for BRICS energy cooperation 2025–2030.* Brasília: MME.

[6] BRICS. (2025). *About the BRICS*. Nova Déli: Secretaria de Comunicação do BRICS.

7] Zhao, F. (2025). *Global Offshore Wind Report 2025.* Lisbon: Global Wind Energy Council – GWEC.

[8] Global Energy Monitor. (2025). *Energy in the BRICS.* San Francisco: Global Energy Monitor.

[9] World Bank. (2021). *Going global: Expanding offshore wind to emerging markets*. Washington, D.C.: World Bank.

[10] MSPglobal. (n.d.). *Marine spatial planning around the world.* Intergovernmental Oceanographic Commission of UNESCO.

[11] Ember. *India energy profile*.

[12] Brasil. (2025). *Law nº 15.097 - January 10th 2025*. Diário Oficial da União.

[13] Empresa de Pesquisa Energética. (2025). *Balanço Energético Nacional – Síntese 2025*.

[14] Kudelin, A., & Kucherov, V. (2021). *Wind energy in Russia: The current state and development trends*. Energy Strategy Reviews, 34, 100627.

[15] Rússia. (2003). *Federal Law nº 35-FZ - March 26th 2003: Electricity Industry.*

[16] Ember. (2025). *Russia energy profile.*

[17] Global Wind Energy Council (GWEC). (2024). *Global Offshore Wind Report 2024.*

[18] European Union. (2017). *From Zero to Five GW: Offshore Wind Outlook for Gurajat and Tamil Nadu 2018–2032*. FOWIND.

[19] European Union – India Clean Energy and Climate Partnership. (2020). *Supply chain study for offshore wind in India.*

[18] European Union. (2017). *From Zero to Five GW: Offshore Wind Outlook for Gurajat and Tamil Nadu 2018–2032*. FOWIND.

[19] European Union – India Clean Energy and Climate Partnership. (2020). *Supply chain study for offshore wind in India*.

[20] Krishnan, D., Tilotia, A., Kumar, V., Bharadwaj, A., & Kajol. (2022). *Winds of change: Learnings for the Indian offshore wind energy sector.* World Resources Institute.

[21] Ministry of New and Renewable Energy (MNRE). (2023). *Offshore Wind Energy Lease Rules*.

[22] Ember. (2025). *China energy profile*.

[23] Ember. (2025). *South Africa energy profile*.

[24] African Development Bank Group. (2021). *Assessing the potential of offshore renewable energy in Africa.* African Natural Resources Centre; Sustainable Energy Fund for Africa.

[25] Umoh, K., Hasan, A., Kenjegaliev, A., & Al Qattan, A. (2024). Assessment of the locational potential of floating offshore wind energy in South Africa. *Sustainable Energy Research, 11*, Article 12.

[26] Department of Mineral Resources and Energy RSA. (2019). *Integrated Resource Plan 2019*. Republic of South Africa.

[27] World Bank. (2021). *Technical potential for offshore wind in Egypt: Map*.

[28] Reuters. (2024). *Egypt cuts 2040 renewable energy target to 40%, keeps focus on natural gas*.

[29] Ember. (2025). *Iran energy profile*.

[30] Guidehouse. (2023). *Exploring UAE wind energy potential*.

[31] BW Geohydromatics. (2025). *Unlocking Indonesia's offshore wind energy potential*.

[32] World Bank. (2020). *The vast potential of offshore wind in emerging markets*. Offshore Wind Development Program.

[33] Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA). (2025). *Processos de licenciamento ambiental de eólicas offshore abertos no Ibama até 10 de março de 2025*.

7 List of Rerefences

[34] World Bank. (2024). *Scenarios for offshore wind development in Brazil*. Offshore Wind Development Program.

[35] Empresa de Pesquisa Energética. (2023). *Plano decenal de expansão de energia 2034 (PDE 2034)*.

[36] Empresa de Pesquisa Energética. (2020). *Plano Nacional de Energia 2050 (PNE 2050)*. Brasília: MME/EPE.

[37] Durakovic, A. (2021). Huge offshore wind potential in Eastern Europe, Turkey sits untapped. *Offshore Wind*.

[38] MacAskill, J. (2023). Is the Black Sea ready for offshore wind power? *ABL Group*.

[39] Karélia. (2023). Деньги на ветер: Почему инвесторы не реализуют проекты ВЭС в Карелии. *RBC Karelia*.

[40] Ministry of New and Renewable Energy (MNRE). (2015). *National offshore wind energy policy*.

[41] BVG Associates. (2024). *Accelerating the deployment of offshore wind in India: International insights and recommendations*.

[42] Ocean Energy Pathway (OEP). (2025). *Tamil Nadu Offshore Wind Manufacturing Supply Chain Investment Study*.

[43] Ji, J., Chi, Y.-g., Chi, Y., & Yin, X. (2024). The blue treasure of hydrogen energy: A research of offshore wind power industry policy in China. *International Journal of Hydrogen Energy, 62*(1), 99–108.

[44] Sun, T. (2024). A comparative analysis of offshore wind energy industries in China and the United States: Policy, supply chain, and development pathways. *Journal of Education, Humanities and Social Sciences, 42*, 975–987.

[45] Department of Mineral Resources and Energy RSA. (2021). *Independent Power Producers Procurement Programme (IPPPP)—An overview: 30th June 2021*. Centurion: RSA.

[46] Zawya. (2025). *Egypt targets 16 GW renewable energy in 2029*.

[47] EA Energianalyse. (2025). *Ethiopian Energy Outlook 2025*.

[48] United Nations Development Programme. (2025). *Clean energy efforts in Iran*.

[49] Government of the United Arab Emirates. (2025). *UAE Energy Strategy 2050*.

[50] Masdar. (2025). *Offshore Wind*.

[51] World Bank. (2023). *The role of concessional climate finance in accelerating the deployment of offshore wind in emerging markets*. Energy Sector Management Assistance Program (ESMAP).

[52] New Development Bank. (2018). *Yudean Offshore Wind Power Project Completion Report*.

[53] New Development Bank. (2017). *Putian Wind Power Project Report (Updated)*.

Authors and Credits

AUTHORS AND TECHNICAL TEAM

Julia Paletta
Ocean Energy Pathway
julia@oceanenergypathway.org

Matheus Noronha
ABEEólica - Brazilian Wind Energy Association and New Technologies, Brazil
matheus@abeeolica.org.br

Andressa Santiso
Ventos Nexus
andressamsantiso@gmail.com

Monalisa Godeiro
Ventos Nexus
monalisagodeiro@gmail.com

David Cassimiro
Ventos Nexus
davidcassi@yahoo.com.br

Rodolfo Gonçalves
JB Energy
goncalves@jbenergy.jp

Ocean Energy Pathway

Technical elaboration

VENTOS NEXUS

jbenergy JAPAN BLUE ENERGY ジャパンブルーエナジー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