National sovereignty and the inland-maritime nexus: an alternative approach to integrating the Green and the Blue Amazons

Thauan Santos[1], Diogo Vianna Grion Velasco[2] e Carine Lacerda[3]

Executive summary

Brazil has a vast coastline and extensive waterways network connecting the country through inland rivers, essential for transporting goods and people. The United Nations 2030 Agenda comprises 17 Sustainable Development Goals (SDGs), promoting a more integrated vision between inland regions and coastal/maritime areas, which brings to the fore concepts such as marine spatial planning (MSP). The country is currently developing its MSP, highlighting the concepts of the Blue Amazon, the Blue Economy, and ocean governance. This indeed stresses the existing inland region/coastal-maritime area nexus.

Despite the country's efforts, there is a significant gap between developing its green and blue economies. The green economy in Brazil has shown greater maturity and diversity, largely due to a longer history of discussions and investments, particularly after the 1992 United Nations Conference on Environment and Development (Rio-92). In contrast, the blue economy still heavily relies on traditional sectors like offshore oil and gas (O&G), which are not fully aligned with the global energy and climate transition agenda. This imbalance poses a challenge to achieving sustainable development across both realms.

To address this issue, it is essential to promote greater integration and sustainable development between the inland and coastal/maritime regions. Encouraging the growth of the Blue Economy in Brazil requires aligning it with sustainability principles and the broader energy transition agenda. This can be achieved by redirecting investments to diversify beyond traditional sectors, promoting the sustainable use of marine resources, and expanding renewable energy, ecotourism, and climate-resilient infrastructure. Additionally, it is crucial to implement training programs for local communities, ensuring that the development of the blue economy is inclusive and sustainable.

Analysis of data from the Brazilian Development Bank (BNDES) on financing the Green and Blue Amazon from 2002 to 2023 reveals that disbursements for the Green Amazon were significantly higher than those for the Blue Amazon. This discrepancy indicates a more established trajectory for the green economy compared to the blue economy in Brazil.

Recommendations:

1. Redirect investments to diversify the Blue Economy sectors beyond traditional areas like oil and gas and transport. The same applies to the Green Economy, whose investments are currently concentrated in the energy and transportation sectors.

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2. Promote policies that encourage the sustainable use of marine resources, including expanding renewable energy, ecotourism, climate-resilient infrastructure, and food security. Fishing and processing sectors, aquaculture, and tourism could receive more investments, for example. Together, these three sectors received less than 5% of the total resources allocated to the Blue Economy in Brazil from 2003 to 2023.

3. There should also be greater diversification in the allocation of resources: in the case of the Blue Economy, resources are heavily concentrated in the State of Rio de Janeiro, and in the case of the Green Economy, resources are heavily concentrated in the State of Pará.

4. There is a need for greater investments in the Blue Economy, which received about three times less investment between 2002 and 2023 compared to the Green Economy.

The proposed recommendations could lead to a more balanced and sustainable development of Brazil's green and blue economies, leading to greater environmental conservation and improved quality of life for local communities. However, transitioning from traditional sectors to more sustainable practices may present challenges.

Implementing these recommendations is crucial to aligning Brazil with the 2030 Agenda, promoting a balanced integration between the green and blue economies. This will enable the country to move towards a development model that respects the environment and climate and promotes the well-being of future generations

Keywords
Brazil; Green Amazon; Green Economy; Blue Amazon; Blue Economy.

1. Introduction

Brazil has a vast coastline and an extensive network of waterways that connect the country through inland rivers, essential for transporting goods and people. In this area, the Brazilian Navy (MB) plays a key role in protecting these routes and ensuring maritime and river transport security, in line with national defense policies emphasizing territorial integrity and sovereignty. The United Nations 2030 Agenda comprises 17 Sustainable Development Goals (SDGs), promoting a more integrated vision between inland and ocean environment once this framework aims to address interconnected challenges such as climate change, biodiversity loss, and sustainable resource management. As a result, the SDG Agenda brings to the fore concepts such as marine spatial planning (MSP), which is closely related to the idea of governance of the use of marine space.

Brazil is currently developing its MSP. This complex context highlights the emerging concepts of the Blue Amazon[4], the Blue Economy [5], and ocean governance, stressing the existing nexus between the Green and Blue Amazons. Regarding the concept of the Blue Economy and considering the Brazilian case, there is a strong integration perspective between the Blue Amazon and the Green Amazon[6], as it is an umbrella concept that includes issues of governance, sustainable development, climate change, and sovereignty.

"The concept of the Blue Economy highlights the need for Brazil to consider national sovereignty by understanding the elements that bring the Green Amazon and the Blue Amazon closer together."

The concept of the Blue Economy highlights the need for Brazil to consider national sovereignty by understanding the elements that bring the Green Amazon and the Blue Amazon closer together. Dichotomizing policies and investments for the Green Economy[7] (considering only sovereign land areas) and the Blue Economy (considering sovereign maritime areas) calls into question, for example, the role of the coastal zone and inland waters. It therefore makes no sense to analyze only one of the two, which is why this article considers both areas in its analysis.

In this context, the Blue Amazon concept stands out. According to the Brazilian Navy (2022), this concept was coined by Admiral Roberto de Guimarães Carvalho in 2004, Commander of the Brazilian Navy (MB) at that time, through a comparison of the properties of this maritime territory with those of the terrestrial territory. It encompasses 5.7 million km2, including the Brazilian territorial sea, the exclusive economic zone (EEZ), and the continental shelf extension (Brazilian Navy, 2024).

According to the Brazilian Navy (2022), 95% of Brazil's foreign trade passes through the Blue Amazon, and 95% of the national oil and gas exploration and production occurs in this region, which also has abundant living resources, hosts many strategic ports, and other activities. To cope with this challenging agenda, this article proposes a methodology that combines

4. The Blue Amazon is a political-strategic concept widely used by the national defense sector. The Blue Amazon covers approximately 5.7 million square kilometers, encompassing Brazil's jurisdictional waters and accounting for nearly 70% of Brazil's continental area (Santos, 2022).

5. There is no single definition of the Blue Economy in the world. In this article, the Blue Economy is a concept that involves an approach that goes beyond the economic scope, including topics such as ocean governance, maritime security, sustainability, and marine spatial planning (Santos, 2022).

6. In this article, we refer to "Green Amazon" as the administrative designation known as "Legal Amazon," which was established by the Brazilian government to plan the socio-economic development and environmental preservation of the Amazon region.

7. Green Economy fosters sustainable growth while minimizing environmental harm. It focuses on efficient resource use, reducing greenhouse gas emissions, and adopting renewable energy. The aim is to achieve economic development that conserves natural resources for future generations.

a literature review, documents, and data from the National Bank for Economic and Social Development (BNDES) on financing the Green Amazon and Blue Amazon from 2002 to 2023.

2. Methodology

The methodology considers a literature review, official documents, and Brazilian Development Bank (BNDES) data related to the financing of both Green and Blue Amazons from 2002 to 2023. The time frame refers to data available in the BNDES download center (BNDES, 2024).

The next section presents a theoretical and data analysis of how the Green Amazon and the Blue Amazon converge and diverge. For that, we highlight some of the main connecting factors between the Green and Blue Amazons, such as the role of the Brazilian Navy in the Green Amazon and the relationship between sustainable development goal 14[8] (SDG 14) "Life below water" and other SDGs. Besides, the discussion will delve into how the concept of marine spatial planning (MSP) shows synergies between the inland region with the coastal/maritime area in the case of Brazil, identifying points of convergence and divergence between the Green and Blue Amazons.

"By examining the institution's financial disbursements in the Green and Blue Amazons, we aim to identify the priority economic sectors for investment, as well as the amount disbursed in each sector within the study regions."

When analyzing the financing approach of the Green Amazon and the Blue Amazon, we examined the financial operations contracted by the BNDES, based on data available in the bank's database. The BNDES is a key financial institution for Brazil's sustainable economic growth, promoting investments in strategic areas, supporting innovation, reducing regional inequalities, and contributing to the modernization of the country's infrastructure. By examining the institution's financial disbursements in the Green and Blue Amazons, we aim to identify the priority economic sectors for investment, as well as the amount disbursed in each sector within the study regions. The analysis considered both direct and indirect transactions, including automatic and non-automatic ones. Direct transactions refer to financing requested directly from the bank. Indirect financing indicates that the financial operation is carried out through an accredited financial institution, which analyzes the financing and assumes the risk of non-payment of the operation (BNDES, 2024).

The geographic scope of the data encompasses municipalities categorized under the Legal Amazon (characterized as Green Amazon) and coastal municipalities with economic activities related to sectors of the Blue Economy (characterized as Blue Amazon), as well as projects characterized as "no municipality" or "diverse" but with economic activities in either the Green or Blue Amazon. Municipalities were classified according to criteria established for Legal Amazon and Coastal Municipalities by the Brazilian Institute of Geography and Statistics (IBGE, 2024a; 2024b).

Investments in Blue Economy sectors located in coastal municipalities within the Legal Amazon were considered "Green and Blue Amazon" (highlighted in yellow in some figures). The economic activities related to the Green Amazon were classified according to the national classification of economic activities (CNAE), and all the economic sectors were considered in the analysis. The Blue Economy sectors were classified according to the Organization for Economic Co-operation and Development's (OECD) 2016 guidelines encompassing coastal aquaculture; fishing and fish processing; maritime transport; oil and gas exploration and production; port activities; shipbuilding and repair of marine equipment; and tourism. More details about the Blue Economy sectors can be found in Table 1. To permit the data comparison, we consider Green Amazon data as "Green Economy," even if the disbursement was not directed to green or sustainable projects.

8. Conserve and sustainably use the oceans, seas and marine resources for sustainable development (UN, 2024).

After different graphical analyses of investments in Brazil's Green and Blue economy, we present final considerations with some challenges. Finally, we show the bibliographical references that served as a basis for the research.

3. Theoretical and documentary analysis: understanding the aspects that bring closer the Green and Blue Amazons

"Brazil is currently developing its Maritime Spatial Planning (MSP), which will require special attention to the Green Amazon region. This focus is due to broader issues of sovereignty and defense, given the size and significance of the Amazon River, one of the country's main waterways."

Brazil is currently developing its Maritime Spatial Planning (MSP), which will require special attention to the Green Amazon region. This focus is due to broader issues of sovereignty and defense, given the size and significance of the Amazon River, one of the country's main waterways. This is one of the complex contexts where the concepts of Blue Amazon, Blue Economy, and ocean governance emerge to support understanding of the existing nexus between the Green Amazon and the Blue Amazon.

Elements that help recognize the existing connection between the Green Amazon and the Blue Amazon can be found in aspects of the concept of spatial planning. The concept of spatial planning is linked to the management of resources on land (Douvere, 2008). Spatial planning has been an essential tool for land management in many parts of the world since the Industrial Revolution in the 19th century, and over the years there has been an increase in the use of marine space, which influenced the emergence of the concept of MSP (Douvere, 2008).

The emergence of the United Nations 2030 Agenda was a milestone for the international context and for the development of a more integrated vision between inland, coastal, and maritime areas. With greater integration between themes, the 2030 Agenda emerged, comprising 17 SDGs, 169 targets, and 232 indicators (Santos, 2022). The SDG 14 "Life below water" maintains a relationship of interdependence with several others, such as SDG 6 "Clean water and sanitation", SDG 13 "Climate action", and SDG 15 "Life on land" and such relationships in Brazil bring the Green Amazon closer to the Blue Amazon.

Regarding the integration of terrestrial and maritime spaces into the 2030 Agenda, it is important to indicate that some specialists, such as Santos (2022), are conducting research to investigate this relation. In this scenario, some authors, such as Santos (2022) and Ntona and Morgera (2018), already indicated that SDG 14 has a strong connection with SDG 1 "No poverty", SDG 2 "Zero hunger", SDG 11 "Sustainable cities and communities", SDG 13 "Climate action" and SDG 15 "life on land". In Brazil, when it comes to the SDG 15, there are 55 programmatic interventions and 25 of them are occurring in coastal states (UN-Brazil, 2024). One of the targets of SDG 15 is to take care of places that face problems like periods of drought and floods. Thus, it is an integrated approach regarding SDG 14 and SDG 15, setting aside limited approaches that dichotomize land and sea regions.

Brazil boasts an extensive network of waterways that connect the entire country through its inland rivers. The country has a 42,000 km network of waterways, comprising 21,000 km of navigable rivers and 15,000 km of partially navigable stretches (Santos and Fontes, 2020). In 2019, a total of 109.820.237 million tons of cargo were transported via these waterways, accounting for 10% of the total cargo transported in Brazil that year (ANTAQ, 2020). Furthermore, it is noteworthy that 68 million tons were transported solely in the Amazon region (ANTAQ, 2020).

To protect all this inland water space, the Brazilian Navy (MB) plays an important role, aiming to fulfill much of what is related to the concept of defense. Therefore, the MB is responsible for ensuring security in maritime and inland water transportation, which involves the development of national maritime policies that also relate to the social aspects of inland waters and the Green Amazon. As an example, one can highlight the actions of the Navy through the "Navios da Esperança" (Ships of Hope) which provide medical and social assistance in various parts of the Amazon region (Brazilian Navy, 2024).

These actions are connected to a vision of an integrated approach to the Green Amazon with the Blue Amazon and reflect other existing integration relationships in the international climate agenda. Into the scope of SDG 15, for example, there is the necessity to combat the trafficking in flora and fauna species. In the Brazilian case, this situation may occur in inland waters in the Amazon region. Therefore, the presence and the actions of the MB to ensure security in maritime and inland water transportation can help to reduce such activities, once again connecting SDG 14 to SDG 15.

"The concept of the Blue Amazon was born from a comparable perspective to the Green Amazon, both in terms of territorial extension and wealth of natural resources. The Blue Amazon is a political-strategic concept widely used by the national defense sector; however, this concept is still little known by Brazilian society in general."

One of the strongest indications of convergence between the Green Amazon and the Blue Amazon is one of the reasons for the origin of the concept of the Blue Amazon. The concept of the Blue Amazon was born from a comparable perspective to the Green Amazon, both in terms of territorial extension and wealth of natural resources. The Blue Amazon is a political-strategic concept widely used by the national defense sector; however, this concept is still little known by Brazilian society in general. The Blue Amazon covers approximately 5.7 million square kilometers, encompassing Brazil's jurisdictional waters and accounting for nearly 70% of Brazil's continental area (Santos, 2022).

To deal with these maritime and oceanic regions, several definitions have appeared in the literature in recent years. Regarding the Blue Economy concept, it was first used in 2010 by Gunter Pauli (Bueger 2015). Furthermore, according to Santos (2022), there is no single definition in the literature, therefore it varies due to several factors, such as local aspects of each country or region. The author conducted extensive bibliographic research encompassing over 1,300 documents from 1959 to 2022 finding that there is a consensus that it encompasses a broader framework. Within this broad approach, the Blue Economy would consequently stand out as an umbrella concept, as it involves an approach that goes beyond just the economic realm, including themes such as ocean governance, maritime security, sustainability, and marine spatial planning.

It is for these reasons that the concept of the Blue Economy is key to building a bridge between the Blue Amazon and the Green Amazon. It involves a broader concern with issues linked to sustainable development for the ocean, connecting it with events on the ground. In this sphere, issues arise from many topics, such as education, social, science and innovation, and environmental issues. The Blue Economy concept therefore can be considered a spin-off of the Green Economy itself (Santos, 2022).

"...the concept of the Blue Economy is key to building a bridge between the Blue Amazon and the Green Amazon."

Brazil still lacks an official definition of the Blue Economy concept and is working on a methodology delineating which sectors of the economy belong to the Brazilian ocean economy. In this context, it is important to mention that in July 2020, the Technical Group (GT) "PIB do Mar" (GDP of the Sea) was created under the coordination of the former Ministry of Economy. The GT aims to define the concept of the blue and the ocean economy for Brazil; identify their sectors and activities, and develop a proposal for a methodology to measure the GDP of the Brazilian Sea. There are many definitions for ocean economy, so countries and international institutions present different definitions. But in general, it is possible to state that the ocean economy is more linked to the definition of sectors and economic activities linked to the sea — although in some cases it is broader and considers marine resources and ocean ecosystem services (OECD, 2026).

In this context, the definition by the OECD regarding the concept of the ocean economy gains importance, as it is widely used by various countries and includes a delineation of economic sectors. According to the OECD (2016), the concept of the ocean economy promotes the integration of many sectors into two groups: (i) established ocean-based industries and (ii) emerging ocean-based industries. The division of sectors belonging to the two groups is outlined in the table below:

Table 1. Established and emerging ocean-based industries

Established	Emerging
Capture fisheries	Marine aquaculture
Seafood processing	Deep- and ultra-deep water oil and gas
Shipping	Offshore wind energy
Ports	Ocean renewable energy
Shipbuilding and repair	Marine and seabed mining
Offshore oil and gas (shallow water)	Maritime safety and surveillance
Marine manufacturing and construction	Marine biotechnology
Maritime and coastal tourism	High-tech marine products and services
Marine business services	Others
Marine R&D and education	
Dredging	

Fonte: Hernández-Quevedo, 2022, p. 14

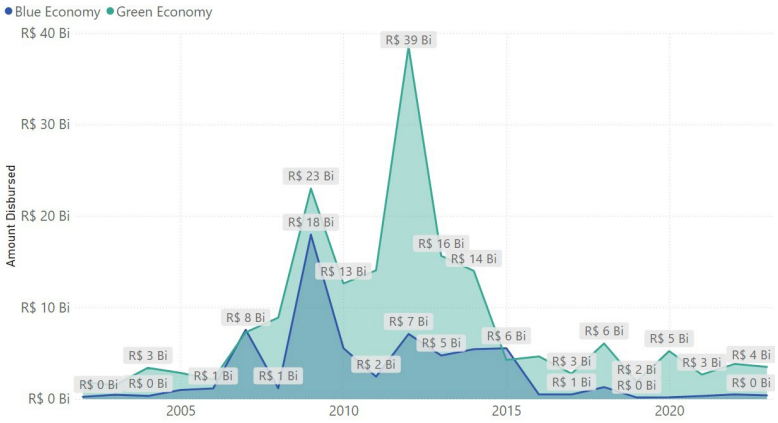
It is from the sectors defined by the OECD in 2016 that the analyses on the Blue Economy will be further deepened in the next section. Based on these data, it will be possible to understand the points that bring the Blue Amazon and the Green Amazon closer together, considering the Brazilian context.

4. Financing: a comparative analysis between the Green and the Blue Amazon

> "In general, when comparing BNDES disbursements during this period, the disbursements for the Green Amazon are more significant than the disbursements for the Blue Amazon."

Figure 1 and Table 2 compare the amounts disbursed to the Green Economy and the Blue Economy between 2002 and 2023. In general, when comparing BNDES disbursements during this period, the disbursements for the Green Amazon are more significant than the disbursements for the Blue Amazon. Figure 1 shows four phases with different disbursement profiles at BNDES through the data presented.

Figure 1. Total value of resources disbursed for the Green Economy and Blue Economy, by year (2000-2023)



Source: Authors' elaboration based on BNDES data, 2024.

1. 2000-2005: during the period referring to the end of the second term of the Fernando Henrique Cardoso (FHC) government and the beginning of the first term of the Lula government, the Green Economy and the Blue Economy had low disbursements, with a slight increase in 2004, when the Green Economy received disbursements of R$ 3.4 billion and the Blue Economy R$ 349 million;

2. 2006-2010: corresponding to Lula's first and second terms, the Blue Economy peaked significantly in 2009, reaching R$ 17.97 billion, but in 2010 it decreased to R$ 5.5 billion. The Green Economy also received increasing disbursements, reaching R$ 23 billion in 2009 and decreasing to 12.6 billion in 2010;

3. 2011-2015: mainly Dilma Rousseff's government term, the Green Economy reached its highest value in 2012 at R$ 38.52 billion, followed by R$ 15.62 billion in 2013, while the Blue Economy decreased to R$ 4.7 billion in 2013; 2015 was the only year that the Blue Economy received more resources than the Green Economy - (the Blue Economy received around 5.5 billion in 2015 and the Green Economy received around 4.2 billion in 2015); and

4. 2016-2023: referred to after Dilma Rousseff's impeachment, Michel Temer's term, and Bolsonaro's government, both types of economies presented lower disbursed values than previous years, with the Green Economy reaching R$ 6.08 billion in 2018 and the Blue Economy only R$ 1.3 billion in the same year. In 2020, the Green Economy disbursed R$5.25 billion, while the Blue Economy disbursed R$200 million. In 2023, the Green Economy disbursed R$3.5 billion and the Blue Economy R$415 million.

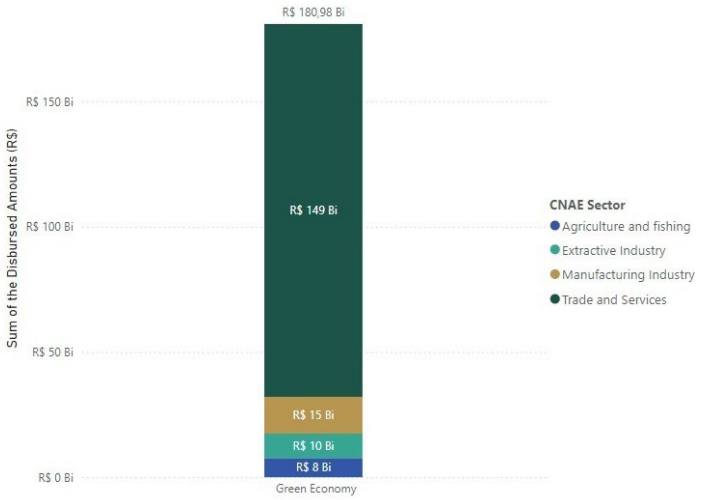
Table 2. Total value of resources disbursed for the Green Economy and Blue Economy (2002-2023)

Year	Blue Economy	Green Economy	Total
2002	R$ 0,25 Bi	R$ 1,84 Bi	**R$ 2,09 Bi**
2003	R$ 0,48 Bi	R$ 1,56 Bi	**R$ 2,04 Bi**
2004	R$ 0,35 Bi	R$ 3,42 Bi	**R$ 3,77 Bi**
2005	R$ 1,00 Bi	R$ 2,86 Bi	**R$ 3,86 Bi**
2006	R$ 1,17 Bi	R$ 2,15 Bi	**R$ 3,32 Bi**
2007	R$ 7,58 Bi	R$ 7,30 Bi	**R$ 14,88 Bi**
2008	R$ 1,19 Bi	R$ 8,91 Bi	**R$ 10,10 Bi**
2009	R$ 17,97 Bi	R$ 23,01 Bi	**R$ 40,99 Bi**
2010	R$ 5,57 Bi	R$ 12,63 Bi	**R$ 18,21 Bi**
2011	R$ 2,45 Bi	R$ 14,07 Bi	**R$ 16,52 Bi**
2012	R$ 7,12 Bi	R$ 38,53 Bi	**R$ 45,65 Bi**
2013	R$ 4,77 Bi	R$ 15,65 Bi	**R$ 20,42 Bi**
2014	R$ 5,46 Bi	R$ 14,02 Bi	**R$ 19,48 Bi**
2015	R$ 5,56 Bi	R$ 4,29 Bi	**R$ 9,85 Bi**
2016	R$ 0,51 Bi	R$ 4,67 Bi	**R$ 5,18 Bi**
2017	R$ 0,51 Bi	R$ 2,79 Bi	**R$ 3,30 Bi**
2018	R$ 1,32 Bi	R$ 6,09 Bi	**R$ 7,40 Bi**
2019	R$ 0,18 Bi	R$ 1,91 Bi	**R$ 2,09 Bi**
2020	R$ 0,20 Bi	R$ 5,25 Bi	**R$ 5,45 Bi**
2021	R$ 0,34 Bi	R$ 2,68 Bi	**R$ 3,02 Bi**
2022	R$ 0,51 Bi	R$ 3,84 Bi	**R$ 4,35 Bi**
2023	R$ 0,42 Bi	R$ 3,52 Bi	**R$ 3,94 Bi**
Total	**R$ 64,91 Bi**	**R$ 180,98 Bi**	**R$ 245,89 Bi**

Source: Authors' elaboration based on BNDES data, 2024.

During the study period, we had a distribution of amounts disbursed for the Green Economy of R$ 180.98 billion, distributed mainly in the national classification of economic activities' (CNAE) sector of commerce and services (R$ 149 billion, 82.26%), followed by the manufacturing industry (R$ 15 billion, 8.11%), extractive industry (R$ 10 Bi, 5.39%) and agriculture and fishing (R$ 8 billion, 4.24%). This information complements the previous analysis on the amount disbursed for the Green Economy and Blue Economy, showing the predominance of commerce and services in Green Economy investments throughout the period, as shown in Figure 2.

Figure 2. Total amount disbursed for the Green Economy, by BNDES and by sector (2002-2023)

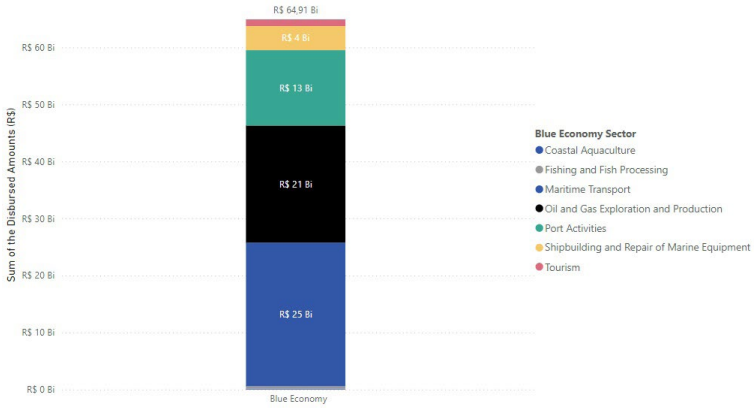


Source: Authors' elaboration based on BNDES data, 2024.

“This scenario indicates the predominance of maritime transport, O&G exploration and production, and port activities.”

Figure 3 details the values disbursed to the Blue Economy by CNAE’s sector of R$ 64,91 billion, distributed mainly in maritime transport (R$ 25 billion, 38.81%), followed by the oil and gas (O&G) exploration and production (R$ 21 billion, 31.65%), port activities (R$ 13 billion, 20,36%), shipbuilding and repair of marine equipment (R$ 4 billion - 6.51%), tourism (R$ 1.1 billion, 1.8%), fishing and fish processing (R$ 446 million, 0.69%), and coastal aquaculture (R$ 122 million, 0.19%). This scenario indicates the predominance of maritime transport, O&G exploration and production, and port activities.

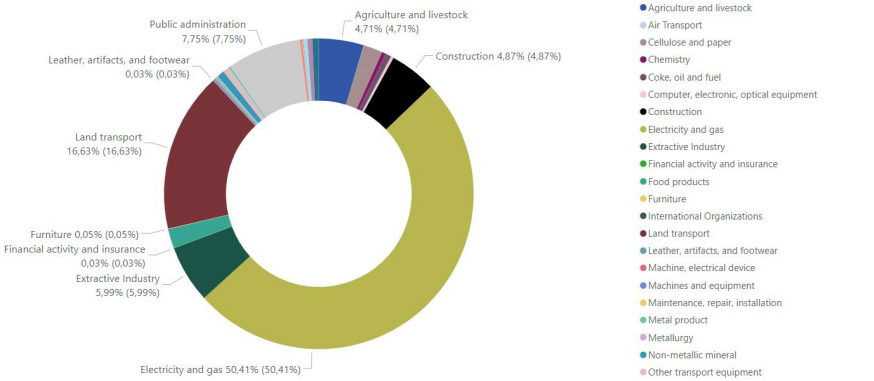
Figure 3. Total amount disbursed for the Blue Economy, by BNDES and by sector (2002-2023)



Source: Authors’ elaboration based on BNDES data, 2024.

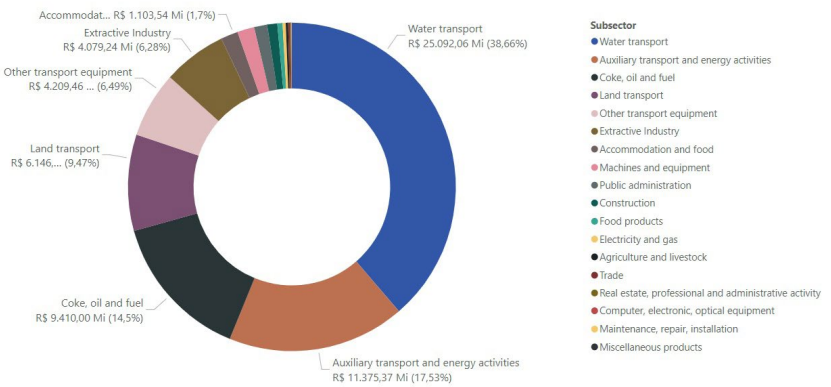
To provide greater detail on disbursements, Figures 4 and 5 show the share of resources disbursed to the Green Economy and the Blue Economy by CNAE’s subsectors.

Figure 4. Share of resources disbursed made by BNDES for the Green Economy, by CNAE subsector (2002-2023)



Source: Authors’ elaboration based on BNDES data, 2024.

Figure 5. Share of disbursements by BNDES of the Blue Economy, by CNAE subsector (2002-2023)



Source: Authors’ elaboration based on BNDES data, 2024.

Figure 4 shows that the main benefiting subsectors are electricity and gas, which received 50,41% of the resources, followed by land transport with 16,63%, public administration with 7,75%, extractive industry with 5.99%, construction with 4,87%, and agriculture and livestock with 4,71%. Other sectors, such as financial and insurance activities, machinery and equipment, and the chemical industry, represent smaller shares, showing a significant diversification of investments in the Green Economy.

Comparatively, Figure 5 shows the sectors with the highest rate of resources disbursed for the Blue Economy are water transport (38%), auxiliary transport and energy activities (17,53%), coke, oil and fuel (14,5%), land transport (9,47%), other transport equipment (6,49%), extractive industry (6,28%) and other subsectors. This scenario shows that the Blue Economy also focuses on energy and transport aspects.

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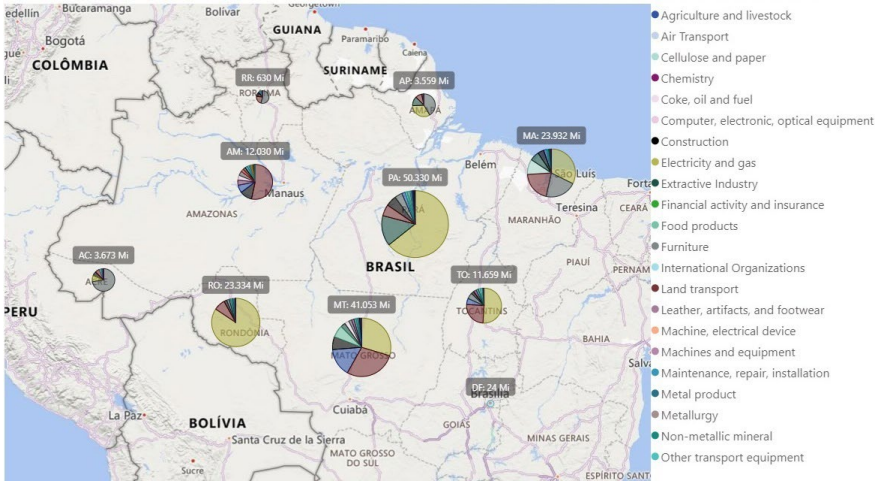
This comparison highlights how resources are allocated differently across economies and reflects their respective priorities and areas of development. Besides, the fact that the energy sector stands out in the investments disbursed by the BNDES both on land and at sea leads us to reflect on whether these investments are oriented towards renewable energy sources or not. This debate is particularly relevant in the current context of the 2030 Agenda, particularly SDGs 7 and 13, as well as in the ongoing energy transition debate.

To deepen the comparative analysis between the Green Economy and the Blue Economy, Figures 6 and 7 help understand how the BNDES’s resource distribution is allocated in Brazil by CNAE subsectors and by States.

Figure 6. Total resources disbursed for the Green Economy, by State and CNAE subsector (2002-2023)



Source: Authors’ elaboration based on BNDES data, 2024.

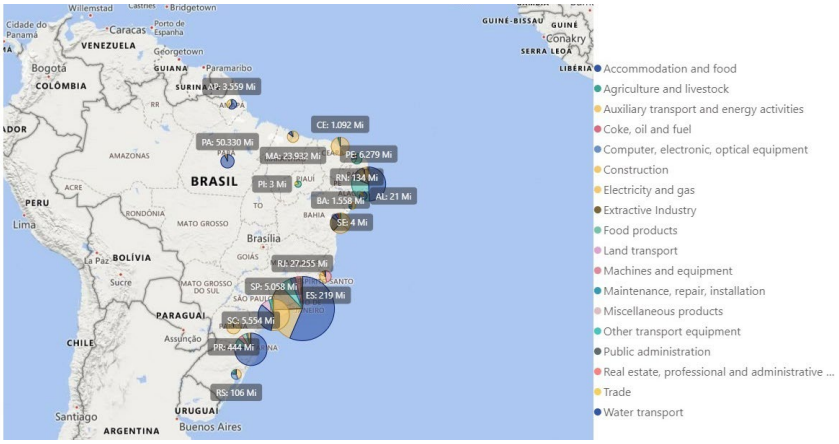
“Disbursements for the Green Economy are concentrated in the North, Northeast, and Midwest regions of Brazil.”

Disbursements for the Green Economy are concentrated in the North, Northeast, and Midwest regions of Brazil. The state of Pará (PA) is the state that receives the most disbursements, followed by the state of Mato Grosso (MT) in second place and the state of Maranhão (MA) in third place. Three coastal states receive disbursements for the Green Economy and, among them, two are among those that receive the most resources. Regarding the CNAE subsectors that stand out, the result reflects what was already shown in Figure 4. An important observation is that electricity and gas encompass energy generation, transmission, and distribution.

“Regarding the disbursements for the Blue Economy, the state of Rio de Janeiro (RJ) appears in first place. The state of Pernambuco (PE) comes in second place, followed by the state of Santa Catarina (SC), and the state of São Paulo (SP) in fourth place.”

Regarding the disbursements for the Blue Economy, the state of Rio de Janeiro (RJ) appears in first place. The state of Pernambuco (PE) comes in second place, followed by the state of Santa Catarina (SC), and the state of São Paulo (SP) in fourth place. This visualization shows that the Southeast, Northeast, and South regions are the largest recipients of resources for the Blue Economy. When it comes to CNAE subsectors that stand out, the result reflects what was already shown in Figure 5 with water transport being the largest recipient of resources, followed by the auxiliary transport and energy activities.

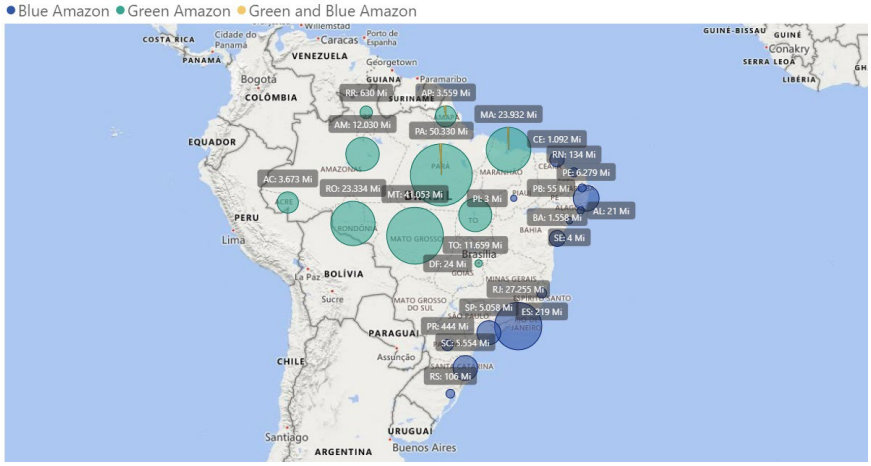
Figure 7. Total resources disbursed for Blue Economy, by State and CNAE subsector (2002-2023)



Source: Authors' elaboration based on BNDES data, 2024.

After visualizing the green and blue economies, it is now possible to have a comparative perspective considering the two Amazons. Figure 8 presents the resources disbursed to the Green and Blue Amazons by state from 2002 to 2023.

Figure 8. Total resources disbursed for Green Amazon and Blue Amazon, by State (2002-2023)

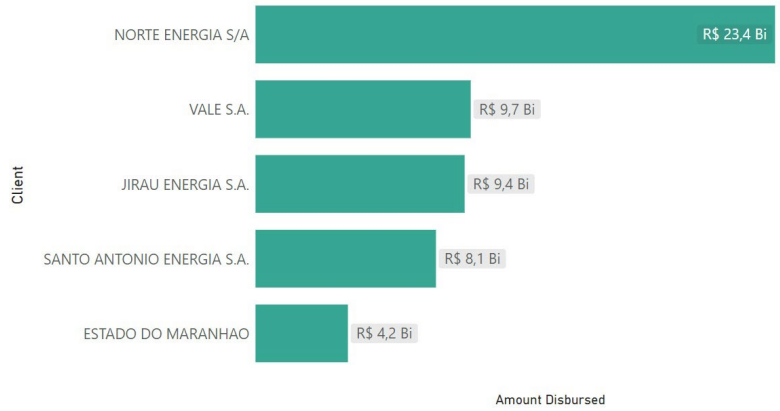


Source: Authors' elaboration based on BNDES data, 2024.

The state of Pará (PA) stands out with the most significant amount received, totaling R$ 50.33 billion, the majority destined for Green Amazon. Rondônia (RO) follows with R $23.334 billion, mostly in Green Amazon. Maranhão (MA) and Mato Grosso (MT) received R$ 23.932 billion and R$ 41.053 billion, respectively, with a significant portion allocated to Green Amazon. Amazonas (AM) received R$ 12.030 billion, concentrated in Green Amazon. Other states also received considerable resources. Rio de Janeiro (RJ), Pernambuco (PE), Santa Catarina (SC), and São Paulo (SP) received R$ 27.255 billion, R$ 6.2 billion, R$ 5.5 billion and R$ 5.05 billion, respectively, with a greater allocation for Blue Amazon. Acre (AC) and Roraima (RR) received R$ 3.673 billion and R$ 3.559 billion, respectively, mainly from Green Amazon. Tocantins (TO), Ceará (CE), and other states showed more minor disbursements, varying between the Green Amazon, Blue Amazon, and Green and Blue Amazon categories.

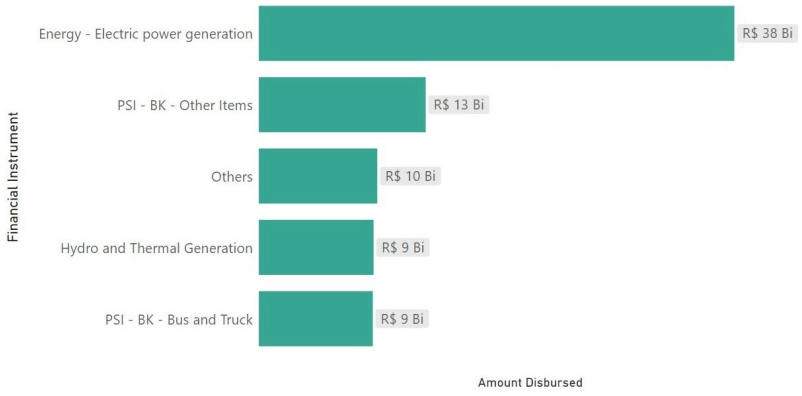
Figures 9 and 10 show the primary beneficiaries and financial instruments of the resources disbursed by BNDES in the Green Amazon and once again highlight the predominance of the energy sector in disbursements.

Figure 9. Top 5 clients benefiting from resources disbursed by BNDES in the Green Amazon (2002-2023)



Source: Authors' elaboration based on BNDES data, 2024.

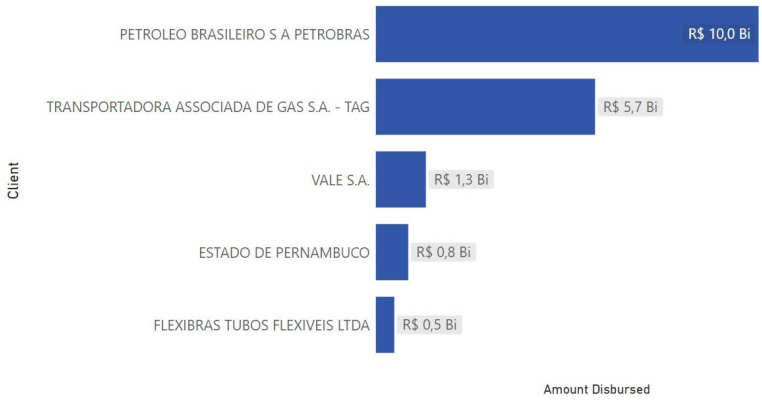
Figure 10. Top 5 Financial Instruments of resources disbursed by BNDES for Green Amazon (2002-2023)



Source: Authors' elaboration based on BNDES data, 2024.

In Figure 9, the five largest beneficiary customers are Norte Energia S/A with R$ 23.4 billion, Vale S.A. with R$ 9.7 billion, Jirau Energia S.A. with R$ 9.4 billion, Santo Antônio Energia S.A. with R$ $8.1 billion and the State of Maranhão with R$ 4.2 billion. Figure 10 shows the five leading financial instruments used were Energy - Electricity Generation with R$ 38 billion, PSI - BK - Other Items with R$ 13.4 billion, others with R$ 10 billion, Hydric and Thermal Generation with R$ 9.28 billion, and PSI - BK - Buses and Trucks with R$ 9.22 billion. Other financial instruments added up to R$ 9.5 billion.

Figure 11. Top 5 clients benefiting from resources disbursed by BNDES in the Blue Amazon (2002-2023)

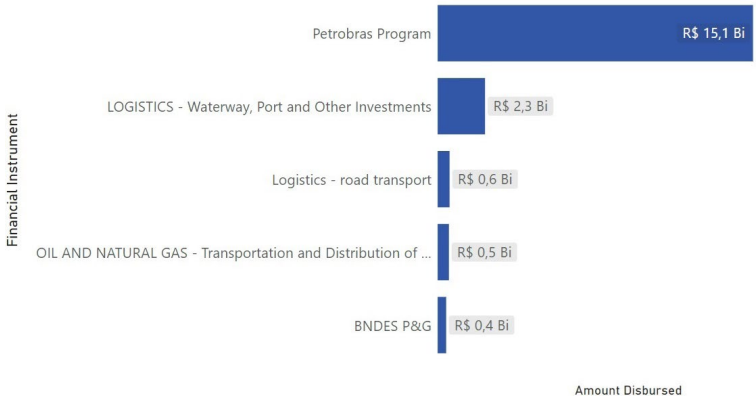


Source: Authors' elaboration based on BNDES data, 2024.

"...the primary beneficiaries and financial instruments of the resources disbursed by BNDES in the Blue Amazon, once again, indicate the predominance of the O&G industry for the Blue Economy."

Following the same analysis, Figures 11 and 12 show the primary beneficiaries and financial instruments of the resources disbursed by BNDES in the Blue Amazon, once again, indicate the predominance of the O&G industry for the Blue Economy.

Figure 12. Top 5 Financial Instruments of resources disbursed by BNDES to the Blue Amazon (2002-2023)



Source: Authors' elaboration based on BNDES data, 2024.

In Figure 11, the five largest beneficiary customers are Petrobras with R$ 21.7 billion, Petrobras Transporte S.A. (Transpetro) with R$ 6.5 billion, Transportadora Associada de Gás S.A. (TAG) with R$ 5.7 billion, Porto of Açu Operações S.A. with R$ 4.5 billion and UTE GNA II Geração de Energia S.A. with R$ 3.5 billion. In Figure 12, the five leading financial instruments used were the Merchant Marine Fund with R$ 28.3 billion, the Petrobras Program with R$ 25.0 billion, Logistics - Waterway, Port and Other Investments with R$ 10.4 billion, Energy - Hydroelectric and Thermoelectric Power Generation with R$3.1 billion and BNDES Exim Post-Shipment with R$2.8 billion.

5. Final remarks

"The economic activities involving the energy and transportation sectors receive most resources in both the Green and the Blue Economy, therefore there are not many sectors and economic activities receiving substantial resources."

The analysis based on the BNDES database made it possible to understand the Brazilian scenario for the Green and Blue Amazons, as well as for both green and the blue economies. Overall, the State of Pará (PA) receives the most disbursements from BNDES intended for the green Amazon, while the State of Rio de Janeiro (RJ) stands out when it comes to disbursements from BNDES intended for the blue Amazon. However, there is a significant financial difference between these two states: the PA receives almost twice the amount of resources allocated to the green Amazon compared to what RJ receives for the blue Amazon. This simple comparison shows the significant financial difference between the resources allocated to the green Amazon and those allocated to the blue Amazon, showing that BNDES investments in the country's Green Economy have exceeded those in the Blue Economy.

The economic activities involving the energy and transportation sectors receive most resources in both the Green and the Blue Economy, therefore there are not many sectors and economic activities receiving substantial resources. Thus, the allocation of resources is concentrated in a few sectors and economic activities. This characteristic brings the two Amazons and the two economies (Green and Blue) closer. However, this concentration of resources in a few sectors and economic activities may not benefit the development of the two Amazons and the two economies (Geen and Blue).

The presence and activities of the Brazilian Navy in the environmental and social areas across approximately 42,000 km of navigable and partially navigable waterways are one of the factors that connect the Green Amazon with the Blue Amazon. Furthermore, there is no doubt

that the green-blue nexus is closely linked to the climate agenda and economic development, which should be inclusive, equitable, sustainable, and resilient.

"Based on the Brazilian case, investments in sectors traditionally linked to the Green Economy stand out from those in the Blue Economy. This is not an isolated case, but a global reality."

In Brazil, many areas are indeed geographically influenced by the dynamics of rivers and the sea. In the literature, it is evident that the 2030 Agenda encompasses different SDGs when it comes to the blue agenda (way beyond SDG 14 and SDG 6). Therefore, this cross-cutting agenda on sustainable development is also a factor that brings the Green Amazon closer to the Blue Amazon. The cross-cutting nature of the agenda and the intersectoral, systemic, complex approach across land/sea/biome borders are necessary to meet the global challenges of the ongoing sustainable development agenda. Additionally, the birth of the concept of spatial planning to promote social and resource governance in terrestrial areas was one of the factors that encouraged the emergence of the concept of marine spatial planning (MSP), bringing the Green Amazon closer to the Blue Amazon.

It is worth mentioning that in January 2024, the BNDES launched the Blue BNDES initiative, which aims to promote the Blue Economy in Brazil through investments in research, MSP, coral reefs, decarbonization of the naval fleet, and infrastructure port. In fact, BNDES and some partners are funding the MSP in Brazil, which will be developed in four stages. The first study is being carried out in the south of Brazil, will last 36 months, and has the financing of R$ 7 million, non-refundable from the Bank's Project Structuring Fund (BNDES FEP). During COP 28 in Dubai, BNDES announced a call for the development of the MSP in Brazil's Southeast region. In June 2024, BNDES selected the MSP partner for this region, which comprises 40% of the Blue Amazon, with up to R$ 12 million in funding. A 36-month study will be conducted on the marine, coastal, and oceanic environments of São Paulo, Rio de Janeiro, and Espírito Santo. The MSP for the Northeast region will be financed by the Brazilian Biodiversity Fund (FUNBIO) through the Protected Marine and Coastal Areas Project, with expected funding of up to R$ 15 million, though no winning proposal has been defined yet. There are currently no further details for the MSP in the Northern region.

Based on the Brazilian case, investments in sectors traditionally linked to the Green Economy stand out from those in the Blue Economy. This is not an isolated case, but a global reality. Access to ocean finance for various sectors and activities remains limited and is not well understood by potential beneficiaries, especially in countries classified as developing countries (Sumaila *et al.*, 2020).

"The disorganized growth of maritime activities and ocean-related financing in Brazil and worldwide imposes a risk on marine resources and biodiversity, leading to the need for a broad debate on spatial planning and ocean governance."

Another challenge is that most resources made available for ocean-related activities and sectors are concentrated in a small group of sectors (Osterblom *et al.*, 2020, BNDES data). For a more significant number of ocean-related sectors to receive support from ocean finance, we should learn from the experiences of Green Economy projects supported by so-called green finance, which already manage to include many beneficiary sectors (Sumaila *et al.*, 2020). To this end, the connection between the Green Economy in the Green Amazon could be positive for developing the Blue Economy in the Blue Amazon, paving the way for a new sustainable route in the country.

Finally, it is worth considering the possibility of blue acceleration and blue risks to Brazil (Jouffray et al, 2020). Based on the data analyzed, the current investment profile in the Blue Economy in Brazil has been very concentrated in traditional sectors such as offshore O&G, which is not necessarily renewable or in line with the global energy and climate transition agenda. The disorganized growth of maritime activities and ocean-related financing in Brazil and worldwide imposes a risk on marine resources and biodiversity, leading to the need for a broad debate on spatial planning and ocean governance.

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