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Master's thesis

Addressing the 'new in the New Development Bank (NDB)': A mission-oriented institution to finance the BRICS' ecological transitions

by

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As with any intellectual exercise, a thesis results from a collection of academic and personal knowledge one accumulates while preparing for a Master's degree. No exception to this rule, this Master's Thesis cannot be interpreted only as the result of a 2-year study programme on applied economics. Given the special circumstances of these two years, I believe this research represents the culmination of the shared experiences lived in different cities, countries and continents over four intense semesters in which I set myself to understand the meanings of development by rethinking and unthinking it. Before jumping into the research itself, in these acknowledgements I make some space to thank the people and institutions who supported me throughout this journey.

Since I didn't join this master's as a *tabula rasa*, this work owes a lot to the valuable lessons on research and pluralism I acquired during my studies at the Federal University of Rio de Janeiro. On a personal note, it is the result of the love and dedication I received from my parents, Simone Loureiro and Paulo Braga, over the past 24 years. It is also an outcome of the companionship shared with Pedro Ferreira. Even my most sincere acknowledgements would not be enough to express how grateful I am to count on them to help pursue my dreams - as far-fetched as they may be.

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This thesis argues that development implies local agents that form a development community. Building my own local community has been the most valuable gift of this EPOG journey. Hence, I would like to thank all the relationships that made the last two years an indescribable experience of personal development by sharing joys, thoughts and anxieties. Creating a welcoming environment to exchange with colleagues that became friends helped me to conceptualise a fair transition. From now onwards, I am eager to see us being part of the transition we want to see in the world.

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ABSTRACT

The New Development Bank (NDB) has not yet received the attention it deserves in the development community. As a multilateral development bank (MDB) established by the BRICS in 2014, its mission is to provide the basis for sustainable development cooperation supporting public and private projects through loans, guarantees and equity participation (BRICS 2015a). To address the research gap on the 'new in the NDB', this thesis analyses how the bank can position itself as a mission oriented institution to finance just ecological transition in the BRICS countries. The argument in favour of the NDB asserts that it is a demand-driven institution aiming to finance sustainable infrastructure. However, a critical assessment of this argument is needed to shed light on the challenges facing its green finance framework and address the 'new in the NDB'. This means articulating an analytical framework that critically assesses the NDB's engagement with sustainability and evaluates its claims of originality to materialise alternative sustainable development strategies for the BRICS countries. To do so, this thesis starts by reviewing the literature on the mission-oriented roles of development banks in climate finance to materialise sustainable development strategies for a just transition. This is followed by an empirical analysis of the BRICS challenge to finance sustainable infrastructure via the NDB, then an qualitative case-study assessment of the bank's projects and its engagement with the country-specific challenges for a just ecological transition. The conclusions focus on opportunities to address the 'new in the NDB' and consolidate it as a full member of the development community by positioning it as a mission-oriented institution to co-finance the BRICS ecological transitions.

Keywords: New Development Bank (NDB); BRICS; development banks (DBs); sustainable finance; Sustainable development goals (SDGs); ecological transition

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RESUMO

O Novo Banco de Desenvolvimento (NDB) ainda não recebeu a atenção que merece na comunidade do desenvolvimento. Como um banco multilateral de desenvolvimento (MDB) estabelecido pelos BRICS em 2014, sua missão é fornecer a base para a cooperação para o desenvolvimento sustentável apoiando projetos públicos e privados através de empréstimos, garantias e participação acionária (BRICS 2015a). Para preencher a lacuna de pesquisa sobre o "novo no NDB", esta tese analisa como o banco pode se posicionar como uma instituição orientada por missões para financiar apenas a transição ecológica nos países BRICS. O argumento em favor do NDB afirma que ele é uma instituição voltada para a demanda com o objetivo de financiar investimentos em infraestrutura sustentável. Entretanto, uma avaliação crítica deste argumento é necessária para ilustrar os desafios enfrentados por sua estrutura financeira verde e abordar "o novo no NDB". Isto significa articular uma estrutura analítica que avalie criticamente o engajamento do NDB com a sustentabilidade e avalie suas reivindicações de originalidade para materializar estratégias alternativas de desenvolvimento sustentável para os países BRICS. Portanto, esta tese começa com a revisão da literatura sobre o papel orientado por missões dos bancos de desenvolvimento no financiamento climático para materializar estratégias de desenvolvimento sustentável para uma transição justa. Segue-se uma análise empírica do desafio dos BRICS para financiar a infraestrutura sustentável através do NDB e então uma avaliação qualitativa de estudos de caso dos projetos do banco e seu envolvimento com os desafios específicos do país para uma transição ecológica justa. As conclusões focam nas oportunidades para abordar o "novo no NDB" e consolidá-lo como membro pleno da comunidade de desenvolvimento, posicionando-o como uma instituição orientada por missões missão para co-financiar as transições ecológicas dos BRICS.

Palavras-chave: Novo Banco de Desenvolvimento (BDN); BRICS; bancos de desenvolvimento; finanças sustentáveis; objetivos de desenvolvimento sustentável (ODS); transição ecológica

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LIST OF ABBREVIATIONS:

AIIB - Asian Infrastructure Investment Bank

AMEs - Advanced-market economies

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

BWI - Bretton Wood Institutions

CRA - Contingent Reserve Arrangement

DBs - Development Banks

DFIs - Development Finance Institutions

EMEs - Emerging-market economies

ESG - Environmental, Social, and Governance

GND - Green New Deal

IMF - International Monetary Fund

IMS - International Monetary System

MDBs - Multilateral Development Banks

NDB - New Development Bank

NDBs - National Development Banks

RDBs - Regional Development Banks

RE - Renewable Energy

SIBs - State Investment Banks

WBG - World Bank Group

WC - Washington Consensus

WSC - Wall Street Consensus

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INTRODUCTION

The New Development Bank (NDB) has not yet received the attention it deserves in the development community. As a multilateral development bank (MDB) created by the BRICS countries in 2014, its mission is to provide finance for sustainable development by supporting public and private projects through loans, guarantees and equity participation (BRICS 2015a). This lack of attention to the bank could be partially explained by its short existence, as the first operations only took place in 2016. Since then, the bank has consolidated as a reliable source of BRICS development finance. In this sense, the lack of attention to the NDB may point to a research gap in the study of sustainable development. Addressing the 'new in the NDB', this thesis analyses the potentials and impediments for BRICS sustainable development cooperation via the NDB.

The NDB is BRICS's most successful case of financial cooperation, with three alleged claims of originality: (i) its member equality principle, (ii) focus on sustainable infrastructure investment and (iii) capitalisation in local currency-denominated green bonds (Cooper 2017). Through optimistic lenses, the bank represents an alternative to traditional development finance institutions (DFIs), rejecting conditionality by promoting member equality in its internal governance and in its niche of sustainable infrastructure. On a critical note, scholars perceive that the bloc's internal structural heterogeneity hinders the bank's effectiveness (Humphrey 2020). This paper argues that the NDB has *de facto* claims of originality - thus deserving more attention in the development community.

The argument in favour of the NDB asserts that it innovates in key 21st-century areas as a borrow-led and demand-driven institution, providing finance for BRICS ecological transition via its sustainable infrastructure investments. However, a critical assessment of this argument is needed to overcome the limitations of the bank's current sustainable development strategy and help address the 'new in the NDB'. This thesis argues that this shift requires reevaluating the bank's corporate strategy to position itself as a mission-oriented institution to finance just ecological transitions in the BRICS. To do so, the structure of this thesis is as follows: Chapter 1 presents a theoretical framework on the roles of development banks in financing developments. Chapter 2 provides an institutional and quantitative analysis of the bank's operations in its first years, setting the basis for Chapter 3's project case studies illustrating the roles the NDB plays in co-financing the BRICS ecological transitions. The conclusions focus on opportunities to address the 'new in the NDB'.

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CHAPTER 1 - A theoretical framework on the mission-oriented roles of development banks in climate finance to implement national sustainable development strategies

> We have, then, thorough evidence that economic development is simply unattainable. We now know, incontrovertible, that peripheral economies will never be developed in the sense of being similar to the economies that currently make up the centre of the capitalist system. (...) It is, therefore, necessary to affirm that the idea of economic development is simply a myth.
>
> Furtado (1971)

Summary of the chapter:

As unveiled by Furtado's quote, the idea of development is a foundational narrative of economics. Intending to question the notion of development as progress, this chapter provides a theoretical framework to understand the mission-oriented roles of development banks in national sustainable development strategies, setting the basis for the analysis of the NDB. It starts by reviewing the dependent development literature and assessing alternative strategies for the so-called emerging countries to 'emerge from their former peripheral status'. Then, it reviews the developmental constraints of the International Monetary System (IMS), both in terms of the financial and ecological hierarchies it reinforces and the policy constraints it imposes on these countries in the context of the ecological transition. After discussing the uneven distribution of the transition risks, it focuses on the theoretical and historical roles of development banks in reforming the financial system from within to achieve such development missions. Finally, the case for development banks is illustrated when critically analysing the current multilateral development bank governance to deliver climate-aligned development via green finance and sustainable infrastructure investment.

A recurring idea in this chapter is that development requires adopting national strategies constrained by a hierarchical international arena. This is even more pertinent in the case of the ecological transition. Since climate change is a global issue, successful national development strategies must also rely on international cooperation. One of the mechanisms to achieve sustainable development is South-South cooperation which materialises into different principles and institutions. The object of this thesis is an institution allegedly materialising new principles for development finance: The New Development Bank, a bank fortuitously named after its originality claims. In the next chapters, I aim to address the 'new in the NDB' by questioning its sustainable development paradigm.

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1.1 Dependent development and the New Developmentalism

A recurring theoretical question in the field of development economics is the one surrounding the historical, social and economic conditions to kickstart the development of nations. For most of the mainstream economic approaches, development consists of the stagist process in which prosperity arises as the idyllic consequence of a succession of stages in the socioeconomic life of societies (Rostow 1991). It is particularly appalling that development economics as an isolated field of study gives little space for a historical investigation of the origins of the productive structures and socioeconomic relations of power within and between countries (Chang 2010). This is particularly true in the discipline's lack of engagement with structural power and the history of imperialism, as it turns a blind eye to its colonial roots (Zein-Elabdin 2004). Historically, the biases of mainstream economics contributed to defining development as progress and measuring it via economic growth, with dreadful consequences in terms of mounting inequalities and environmental damage.

Given the shortcomings of the mainstream understanding of development, it is necessary to look for alternative perspectives on this complex phenomenon. Departing from a less idyllic view on development, critical scholars coming from the Dependency Theory research paradigm question the very notion of development as progress when defining it by contradiction to its pair - underdevelopment (Rao 1994; Kvangraven 2021). On a general note, dependence is conceptualised as a historical condition shaping the structures of the world economy that limits the developmental possibilities of peripheral economies to the development of the core ones (Dos Santos 1970).

A diverse body of scholarship focusing on the unequal character of economic development between the centre and peripheries of capitalism, dependency theories study underdevelopment in parallel with development as it sees them as two sides of the same coin (Frank 1966). Hence, the notion of 'development of underdevelopment' is the most important contribution of dependency scholars (Hoogvelt 1997). More precisely, it refers to the underemployment of socioeconomic resources benefiting core classes and states to the detriment of subordinate peripheral ones (Stuenkel 1969). In this perspective, long-term dependent development must come from a strategic rupture with the dependent relationship from within to allow for endogenous developments. This notion of delinking provides a theoretical basis not only for the continuous decolonisation movements in the Global South but also for the idea of South-South cooperation as an alternative development strategy.

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As in this thesis' conceptualization of development, specific focus is given to the economists of the Economic Commission for Latin America and the Caribbean (ECLAC) and their contribution to underdevelopment theory. Using the centre-periphery model, both the Latin-American Structuralists and broader school of Dependency Theorists adopt a holistic perspective on development by including consideration of the historical structures behind underdevelopment (Palma and Pincus 1994; Bracarense 2021). Authors such as Prebisch (1961) and Furtado (1969) point to the continent's economic dependency as a result of unequal exchange due to the historical specialisation in commodities and the deterioration of its terms of trade.

Given his relevance in the broader dependency theory research paradigm, this analysis focuses on the contributions of Celso Furtado to a theory of underdevelopment. Brazil's most prominent economist, Furtado's view on development evolved through his career, from defending convergence in early structuralist debates to a more pessimistic dependent approach after the military coup in Brazil (Loureiro et al. 2021). In his book 'The Myth of Development', Furtado (2021a) defines underdevelopment as a founding aspect of industrial capitalism, pointing to the external character of dependency. Central to this theory are the historical factors of his notion of development as a foundational myth of economics (1971; 2021b), as illustrated in this chapter's opening quotation:

> It is, therefore, necessary to affirm that the idea of economic development is simply a myth. Thanks to it, it has been possible to divert attention from the basic task of identifying fundamental collective necessities, and from the possibilities that the advance of science opens up to humankind. Instead, it has concentrated people's attention on abstract objectives, such as investments, exports, and growth.
>
> Furtado (1971)

As this thesis adopts Furtado's notion of development as a powerful foundational narrative of economics, some brief considerations are important. Firstly, it should be noted that development is not a universal phenomenon, as it implies subjects and objects, being highly dependent on the perspective and definitions that one adopts. Furtado (1971) highlights that even when conceiving development as an unattainable myth of capitalist societies, the concept can still be used to mobilise resources into achieving common societal goals to 'identify the fundamental collective necessities of the people'. Hence, this thesis argues that the Myth of Development provides a powerful starting point to rethink and unthink development economics towards a more socially relevant field.

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These remarks on dependent development allow academics and practitioners to learn from previous experiences, with important consequences for designing development strategies to try and overcome dependency today. The Latin American structuralists argued that breaking the continent's relationship of dependency implied a necessary delinking through a process of import-substitution industrialization led by both the State and national bourgeoisie (Palma 1978). Since then, industrialization was achieved in most of the region, but it still faces several economic vulnerabilities. In fact, from the late 60s to the early 80s, national developmentalism crumbled due to the internal exhaustion of the import-substitution model led by the state and the weakening of highly indebted national states. It was then replaced by conventional orthodoxy in the adoption of the conventional prescriptions of the Washington Consensus (WC) (Bresser-Pereira 2011). As a result, most of the Latin American states lost much of their already low policy autonomy to implement national development strategies during the lost decade of the 1980s (Sicsú et al. 2007).

Given that neither traditional structuralism nor conventional orthodoxy were enough to provide long-term development strategies for Latin America, alternative theories have gained ground under the umbrella of the 'New Developmentalism' (Bresser-Pereira 2020). These strategies combine structuralist development theory and macroeconomic policies deriving from the Post-Keynesian tradition - such as responsible fiscal practices, a moderate average interest rate and a competitive exchange rate. Hence, the New Developmentalism paradigm lies somewhere between national developmentalism and conventional orthodoxy, having a more pragmatic approach towards the market when allegedly aiming to reconcile growth and redistribution (Bresser-Pereira 2016).

A recurring idea both in this section and in this chapter is the notion that development requires designing national and international cooperative development strategies, defined as a paradigm of practices oriented towards achieving broad societal goals. Today, given the need to implement long-term development strategies for the Global South, an alternative set of policies has gained ground under the notion of national Green New Deals (GND) for a just ecological transition. As with every developmental strategy, they materialise in specific policies and institutions aiming at achieving such goals. The main object of this thesis is an institution materialising a new paradigm for development finance: The New Development Bank (NDB), a bank fortuitously named after this set of principles. In the remainder of this work, I aim at addressing the 'new in the NDB' by questioning what exactly the bank understands as development and how it aims to achieve it.

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1.2 The developmental constraints of a hierarchical International Monetary System

Building on the last section's analysis of dependent development, this section presents a careful consideration of the constraints imposed on peripheral countries' ability to design their development strategies deriving from their peripheral position in the hierarchical International Monetary System (IMS). These constraints hinder a country's policy autonomy to set lower interest rates, pursue less volatile exchange rates and attract long-term finance for investment, thus hampering national developmental strategies (De Conti et al. 2014). Hence, this section argues that the IMS needs to be radically reformed to finance the green transitions and that a new development paradigm responsible for 'greening of the IMS' also needs to be attentive to the hierarchies it reinforces.

To put it in simple terms, the main reasons why the IMS needs reform are its foundational financial and ecological hierarchies rooted in the geopolitical power of nations. In the heterodox economic literature, financial hierarchies consist of power asymmetries among currencies preventing peripheral countries from attracting long-term finance, reinforcing their structural balance of payments constraints (Prates 2020). Complementary, the ecological hierarchy argument emphasises that these countries are systematically driven to export more embodied nature than they import as the short-term external restriction impedes value-added catching up (Hornborg 2014). As for the financial needs of the green transition, these hierarchies are intertwined as external vulnerabilities and the risks of the ecological transition are deeply entangled (Svartzman and Althouse 2020).

In this sense, peripheral economies are characterised not only by a lower level of productive diversification and dependence but also by the State's limited ability to pursue autonomous economic policies (De Conti et al. 2014; Prates 2020). It should be noted that currency hierarchies have been even more deleterious since the emergence of financial globalisation in peripheral countries that engaged indiscriminately in capital account liberalisation and integration into global value chains - herein defined as emerging market economies (EMEs) (de Paula et al. 2017). Hence, the hierarchies of the IMS result in significant structural challenges for EMEs that reinforce the divergence between centre and periphery. This is the case since structural vulnerabilities hamper the policy autonomy of EME's strategies aiming to emerge from their 'former' peripheral status[1].

[1] To keep the terminology critical, core countries are henceforth called 'advanced market economies' (AMEs), as this thesis avoids using the terms 'developed' and 'developing' countries given its non-universal understanding of development. Even as a central element of the discussion, the notion of hegemony goes beyond the scope of this work.

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To understand how to 'reform and green' the IMS, Svartzman and Althouse (2020) develop their political ecology of international monetary relations emphasising that the currency hierarchies hampering EMEs' development paths are intrinsically related to the ecological hierarchies keeping them in the role of providers of cheap resources to the AMEs (Hornborg, 2014; Moore, 2015). Hence, accounting for the historical nexus between the hegemonic currency and the key resources driving capitalist accumulation is essential for the formulation of a new paradigm aiming to overcome global imbalances of the current IMS. Additionally, tackling the structural imbalances between EMEs and AMEs is an important challenge in the way out of the ecological crisis by designing sustainable development strategies such as Green New Deals (GND) (UNCTAD 2019).

As a matter of fact, the urgent nature of the ecological crises materialised in climate change presents an important challenge to the stability of economic systems around the world. Presented as the way out of the current crises, a fair and sustainable transition could be seen as one the greatests development missions of the century (Mazzucato 2021). To implement this mission, the financial sector is key not only to allocate finance to key sustainable infrastructure sectors such as renewable energies but also to guarantee that the climate mission will have the economic impact to tackle societal goals framed under the Sustainable Development Goals (SDGs) (Plihon and Rigot 2022). For that matter, it is critical for policies in an ecological transition to reform the institutions under the IMS to allow them to finance climate-aligned development (Svartzman and Althouse 2020).

In the context of the need to 'green' the IMS to finance climate-aligned development for a fair sustainable transition, another developmental constraint of EMEs is the nature of this transition. In fact, it can be seen as a rapid structural change in which low-emission industries grow and high-emission industries decline due to targeted sectoral policies in national sustainable development strategies such as GNDs (UNCTAD 2019; Semieniuk et al. 2021). Since different countries have different degrees of exposure to the risks of the ecological transition, different GNDs need to be adapted to specific country contexts (Espagne et al. 2021). In the case of EMEs, the main risks of the ecological transition include not only the direct financial ones but also the indirect ones regarding public debt, inflation, trade imbalances and unemployment (Semieniuk et al., 2021; Espagne et al. 2021). As argued, emerging market economies' external vulnerabilities will also constrain their strategies for the ecological transition if the set of GND policies does not account for the hierarchical character of the IMS, nor aims to systematically break away from them.

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In terms of policies, it should be noted that there are no single and isolated policy alternatives to reform and green the IMS, as the solution should be part of international cooperation. However, addressing the links between financial and ecological hierarchies in the IMS is key (Svartzman and Althouse 2020). In this sense, the case for a special issuance of SDG-specific Special Drawing Rights (SDRs) by the IMF would allow development finance to go beyond blended finance. It could represent an alternative beyond de-risking towards more inclusive developmental strategies if linked to sustainable development goals (SDGs). Additionally, if unused SDRs are lent to peripheral countries, their financial and ecological vulnerabilities could be jointly addressed to finance a just ecological transition in EMEs (Ocampo 2019; Aglietta and Coudert 2019). Therefore, materialising a critical political ecology approach, the case for green SDRs represents a policy change that contribute to rebalancing the financial and ecological hierarchies of the IMS.

Given the shortcomings of the current international and financial monetary system, the need to 'green' the IMS to tackle climate-aligned development cannot be separated from the need to reform this system (Svartzman and Althouse 2020). What follows next in this section is an assessment of the recent paradigm shift in development finance described as the Wall Street Consensus (WSC), questioning its notion of development as de-risking and its climate tools. By evaluating its implications for sustainable development, I argue that the paradigm shift towards development as de-risking only marginally reforms the IMS and will also reinforce the constraints to development strategies in the Global South since it accelerates the financialisation of development.

In the search to reform the IMS, Gabor (2021) conceptualises the Wall Street Consensus (WSC) as an elaborate effort to reorganise development interventions around partnerships with private global finance via the notion of development as de-risking (Gabor 2021). This is exemplified by the UN's Billions to Trillions agenda, the World Bank's (2017) Maximising Finance for Development or the G20's (2018) Infrastructure as an Asset Class. By turning development finance into de-risking of blended finance investments, the paradigm shift towards the WSC takes sustainable infrastructure as an asset class, therefore contributing to the commodification of nature and the financialisation of development (Gabor 2019). Additionally, the WSC's development paradigm imposes its selected market-based policy tools - climate Public-Private Partnership (PPP) infrastructure, climate rescuer of last resort, disclosure of climate-related financial risks and carbon pricing - narrowing the scope for green developmental States' instead of recovering the role of the State (Dafermos et. al 2021).

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The concept of de-risking is central to this logic and operates within regulatory and financial de-risking of private investments by the State. When applied to the field of sustainable development, these are particularly dangerous. First, development as de-risking should be conceived as an accumulation strategy of financialization with green characteristics (Gabor 2019), operating in the sense that SDGs' development missions become a self-reinforcing strategy of accumulation through which private finance manages the environmental crisis without involving the developmental state (Bigger and Webber 2021). As argued, the financialization of sustainable development implies private finance control over the definition of 'green' in ESGs for sustainable assets at the expense of the State's capacity, transferring the costs of dirty finance to the State.

It is important to emphasise that financialization with green characteristics is an essential feature of the de-risking State which brings daunting consequences for the formulation of developmental strategies in the Global South. Especially, the re-engineering of financial systems in the EMEs threatens the space for alternative development strategies, and for green developmental States, because it shifts the responsibility of the transition to international and private finance via blended finance since it considers PPP Infrastructure as an asset class (Humphrey 2018). Since these policy tools do not take into account the nature of ecological hierarchies, they too exacerbate the financial hierarchies of the IMS. Therefore, by reinforcing the links between financial and ecological hierarchies, the shift towards the WSC constitutes an obstacle for climate aligned-development.

Not only is the shift towards the WSC inconsistent with the climate urgency by failing to finance a just transition, but its hegemony undermines the prospects for development strategies that put public institutions, public finance and climate justice at the core of climate mitigation and adaptation (Dafermos et al. 2021). It will ultimately undermine climate-aligned development by deviating the attention from what matters for a just transition: recovering the role of the state as a developmental actor. Since the WSC's 'development as de-risking' paradigm does not focus on the institutions and policies that would allow emerging countries to directly address the challenges of the climate crisis, it is of ultimate importance to rethink other paradigms, institutions and policies aiming to reshape public value in missions that are compatible with the Green New Deal discourse (Mazzucato 2021). In the remainder of this work, I argue that State Investment Banks play a pivotal role in this mission and that the BRICS' NDB is a well-positioned institution to finance the ecological transitions in the emerging countries via its sustainable infrastructure framework.

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1.3 The mission-oriented roles of development banks

Given the need to reform the IMS, this section reviews the roles of development banks in reforming the financial system from within to achieve specific development missions. In the economic literature, there are several definitions of development banks (DBs), ranging from national to regional, multilateral and global institutions. Building on Ferraz et. al (2013), this thesis defines development banks as financial institutions to some extent controlled by states, having a mandate to incentivize sectoral investments with high socioeconomic impacts or finance the development of a specific region. In this sense development banks, also sometimes called State Investment Banks (SIBs), are institutions that help materialise national developmental strategies.

Due to their privileged position in local financial markets, national (NDBs) and multilateral development banks (MDBs) could be understood as tools providing alternative integration mechanisms into the global economy. It should be noted, though, that this argument differs slightly from NDBs to MDBs (Luna-Martínez and Vicente 2012; Bazbauers and Engel 2021)[2]. Regardless of their areas of operation, DBs are tools for the delinking of endogenous development strategies (Ocampo 2006). Indeed, the case for development banks as providers of patient finance for tackling development missions is based on theoretical and historical arguments (Ocampo and Ortega 2020).

Due to their public mandate within local financial markets, development banks are fundamental to reform the financial sector from within (Gutierrez et al. 2011). On the theoretical level, DBs shape and create markets via four main roles. These are (i) recession countercyclical lending; (ii) funding the economy's long-term capital development; (iii) new venture capital in high-risk innovation and (iv) the promotion of mission-oriented investments (Mazzucatto and Penna 2016). Going beyond fixing markets by adopting a mission-oriented approach, the rise of DBs illustrates that finance is key for development since its direction can be transformed by the State via industrial policy (Mazzucato 2021). DBs provide patient financing for development missions towards sustainability, innovation and social return. These institutions materialise national developmental strategies, transforming markets to achieve missions that could not have been achieved without their presence.

[2] The works on NDBs and MDBs are to a certain extent disconnected due to their different governance structures, missions and financing instruments. To fill in this gap, this section relies heavily on Ocampo and Ortega's (2020) analysis of the architecture of global development banks. For a further look into the architecture of the development banks and their roles in the sustainable development agenda, see the Review of Political Economy's special issue and symposium on Development Banks (Griffith-Jones et al. 2020; Marois 2022. Marois and Barrowclough 2022).

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The historical role of DBs in providing finance for development is evident due to their transformative roles which go beyond correcting market failures, rather shaping and creating markets (Mazzucato and Penna 2015). This is the case since their origins, as the first modern development bank was created to provide finance for European reconstruction. Since then, development banks have grown both in number, regions and investment profile - amounting to 450 state investment banks worldwide (ODI 2018). Their areas of operation have also radically changed, expanding into emerging economies where financial vulnerabilities and credit constraints are structural obstacles for development. All in all, while diversifying their roles, scale, areas of operation and innovating in terms of missions, development banks have consolidated themselves as key actors in the international development finance community (Macfarlane and Mazzucato 2018).

As explained by Ocampo and Ortega (2020), the system of development banks dates back to the Great Depression when governments turned to SIBs to support national recovery strategies such as Roosevelt's New Deal. Without diving deep into their history, this section details the emergence of a global network of development banks. The first international development bank - the International Bank for Reconstruction and Development (IBRD) - has its origins in the 1944 Bretton Woods conference, where the new set of rules for the post-war IMS was established (Helleiner 2014). Its initial mission was to support European reconstruction, but the IBRD was soon absorbed into the World Bank Group (WBG) with the creation of the International Finance Corporation (IFC) in 1956 and the International Development Agency (IDA) in 1959. Together with the International Monetary Fund (IMF), the WBG forms the Bretton Woods Institutions (BWI) materialising the hierarchies of the IMS which need to be reformed as discussed in the last section.

The imperative of reconstructing infrastructure and achieving a peaceful world order after WW2 also gave birth to important national state investment banks to support their economies (Ocampo and Ortega 2020). In Europe, an important example is the Kreditanstalt für Wiederaufbau (KfW), created in 1948 in the context of the Marshall Plan and still active today as the main financier of Germany's energy transition (Mazzucato and Pena 2015). This was also the period in which many other NDBs were created to help peripheral countries materialise their national strategies of catching up via import-substitution industrialization. Some of the most successful include the Brazilian Development Bank (BNDES) in 1952, the Korea Development Bank (KDB) and the Industrial Development Bank of India (IDBI), both in 1964 (Ocampo and Ortega 2020).

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In the multilateral arena, the 1950s not only marked the consolidation of the WBG, as the IRDB was joined by the IDA and the IFC, but the community of MDBs was also enlarged with a second wave of regional development banks, the European Investment Bank (EIB in 1958) and the Inter-American Development Bank (IADB in 1959) (Ocampo and Ortega 2020). The system of MDBs was further expanded into the periphery with the creation of the African Development Bank (AfDB in 1964), the Asian Development Bank (ADB in 1966), the Development Bank of Latin America (CAF in 1968) and the inter-regional Islamic Development Bank (IsDB in 1973). It should be noted that these second-wave MDBs still follow the same business model of a financial cooperative to mobilise loans into emerging markets set by the WBG. However, important innovations were made by enlarging their areas of operation with the emergence of South-South and borrow-led institutions such as CAF and the IsDB (Humphrey 2015; Bazbauers and Engel 2021).

All in all, by the early 1970s, a global network of public development banks (PDBs) was in place in the IMS, including global, regional, sub-regional, national, and sub-national institutions (Ocampo and Ortega 2020). Since the foundation of the first development bank until the late 70s, for about 40 years these institutions materialised developmental strategies to achieve catching up in the periphery. In the 1980s, however, they were accused of generating financial repression and underwent heavy attacks from the market reform agenda behind the Washington Consensus (WC) (Ocampo and Ortega 2020). Despite these attacks DBs resisted. With the failure of the Washington Consensus, they came back into fashion in the 90s with the creation of new national and regional DBs such as the European Bank for Reconstruction and Development (EBRD in 1991), the China Development Bank (CDB in 1994) the Eurasian Development Bank (EDB in 2006).

Today, in almost all EMEs and certainly in all BRICS, DBs play a key role in the economy's capital development (Torres Filho and Costa 2012; Wang 2016; Goga et. al 2019). Also, at the multilateral level, the emergence of China as a global economic power has materialised a third wave of MDBs pushing for the reform of the IMS towards financing sustainable infrastructure investment in the creation of the New Development Bank (NDB in 2014) and the Asian Infrastructure Investment Bank (AIIB in 2016) (Wang 2019). Innovating in key governance schemes, these banks materialise a different development paradigm towards multilateral banking for sustainable development missions that is the object of the next chapters. All in all, development banks are still key components both of the international financial system and the development finance community.

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1.4 MDBs' corporate governance for climate finance

As argued in the last section, the case for development banks is based on the institutional roles they played in shaping and creating markets to achieve development missions that would not have been possible without their action. In this sense, the transformative role of development banks in mission-oriented finance is heavily dependent on their different corporate governance mechanisms. In this short section, by focusing on the mission-oriented role of MDBs in climate finance, the case for development banks is exemplified in one of the greatest mission of our times: the fight against climate change (Mazzucato 2021; Griffith-Jones et al. 2020). This section argues that adapting MDB's governance is essential to finance Green New Deals and achieve just ecological transitions.

To understand the limitations of the current architecture of MDBs for climate finance, it is necessary to delve deeper into their business models. On the operation side, first-wave MDBs built a successful business model based on mobilising and blending public and private capital to co-finance projects supporting socio-economic development. On the funding side, as financial intermediaries, they capitalise on its initial equity and bond issuances by keeping reputable market credit ratings (Griffith-Jones et al. 2020). However, the traditional MDB business model shows limitations that constrain these institutions from fully realising their developmental impact, especially when it comes to reforming their funding and governance mechanisms (Wihtol 2014).

The problems of MDBs corporate governance are materialised into their project's long approval times, heavy bureaucracy, and policy conditionalities (Humphrey 2015). For these reasons, many countries are reluctant to ask for loans if other alternatives such as government investment spending are available. Unfortunately, for fiscally constrained EMEs, this option is not on the table. On the issue of conditionalities, traditional MDBs such as the WBG can easily become split between borrowers and non-borrower shareholders, as risk-aversion and credit-rating concerns translate into a high degree of policy impositions that may go against national development strategies (UNCTAD 2019). Indeed, underlying many of the constraints to realising MDBs' developmental impact is their governance - as its funding and projects are interlinked by corporate governance mechanisms (Humphrey 2015). To understand how to tackle governance issues in traditional and new MDBs and reform their architecture either by internally restructuring them or creating new institutions, it is necessary to delve deeper into their corporate and environmental governance mechanisms.

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On a conceptual note, the Corporate Governance (CG) literature studies the mechanisms by which the suppliers of finance assure themselves of getting a return on their investments (Shleifer and Vishny 1997). It should be noted, however, that CG is highly context-dependent and therefore governance in EMEs is fundamentally different from AMEs (Hall & Soskice 2001). Since corporate governance matters for institutional performance, reform of governance structures is key to development (Armitage et al. 2017). The concept of CG can be mobilised in corporation-level strategy analysis and comparisons on governance standards between countries, but this section's focus is on the corporate and environmental governance of development finance institutions (DFIs).

In the financial governance of DFIs, favourable credit ratings are central for MDBs to be able to offer concessional finance in the form of their projects (Humphrey 2015). Given the dominance of international credit rating agencies upholding a conservative development paradigm (Ban and Blyth 2013), this imposes constraints on MDBs' policy space. Indeed, MDBs are not as effective in reforming the financial system from within if their business model relies on impressing these agencies. In particular, MDBs' role as mission-oriented institutions is constrained by this factor if they have to reinforce the dominant development paradigm to obtain reputable credit ratings.

In the environmental governance of DFIs, the concept of Corporate Social Responsibility (CSR) and Environmental, Social and Governance (ESG) standards are central. While the former refers to corporations' responsible behaviour towards social goals, the latter measures how investors integrate environmental, social and governance concerns into their business models (Gillan et al. 2021). All in all, corporations that abide by high standards of CSR and ESGs acknowledge that they have a responsibility towards broad societal missions (Campbell 2007). This is why most development financial institutions have adopted strong ESG frameworks enabling them to, in theory, maximise their sustainable developmental impact in providing climate finance.

In practice, however, the focus on ESGs is a constraint for MDB governance in the context of providing climate finance for the ecological transition. This is because these criteria distract from the central role of states as major stakeholders in MDBs. Hence, to let the market regulate MDB's ESG criteria may not be enough to maximise their development impact in climate finance. There is, in this sense, a need to analyse the limitations of the traditional MDB approach to climate finance to deliver sustainable development via green bonds, sustainable infrastructure and ESG frameworks.

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On a conceptual note, climate financing mobilises finance towards sustainability. It is therefore centred on financial instruments to support climate mitigation and adaptation projects via sustainable infrastructure investment loans, green bonds and environmental guarantees. (Griffith-Jones et al. 2020). As such, MDB's sustainable finance operates via the establishment of criteria such as the mentioned ESGs to evaluate the sustainability of their projects. As argued before, the concept of ESG is central to sustainable finance and its fight against climate change, providing a market-based evaluation of a firm's engagement with environmental factors (Schoenmaker and Schramade 2018). As argued by Tordjman (2021), the problem with this focus on ESG is that it implies the commodification of the environment by assuming that market-based solutions such as blended finance are enough to fight climate change. On the contrary, this logic is quite susceptible to 'greenwashing' as it denies private finance's historical role in the destruction of the environment, thus contributing to the financialization of development (Gabor 2021).

The limitations of private-based sustainable finance emphasize the need to recover the role of the State in a just ecological transition towards a new pattern of low-carbon, climate-resilient and inclusive economic structures (Griffith-Jones et al. 2020). This is the case since the state plays a market-shaper role via green industrial policy which is key to shift the patterns of investment and financing that currently shape economic structures (Mazzucato 2021; Gabor 2021). Since climate change is a global challenge, sustainable finance cooperation in the development community is also part of this effort to support national industrial policies (Ocampo 2020; ODI 2018). In this sese, financial cooperation between NDBs and MDBs represents alternative approaches to private ESG-based finance to fight climate change and achieve the SDGs (Wihtol 2014).

Illustrating the potentials of development cooperation for climate finance, the Joint Report on MDB climate finance (2021) shows that traditional actors in the MDBs arena are now followed by the complementary efforts of South-South borrow-led MDBs such as the IsDB, ADB, AfDB, AIIB and the BRICS's NDB. Their action is particularly important in emerging economies by addressing the financial and social risks of the ecological transition in the Global South. In this sense, South-South cooperation via MDBs is essential to reform the IMS from within and finance EMEs ecological transitions via green industrial policies (Barrowclough and Gottschalk 2021). The next chapter of this thesis argues that the NDB is the BRICS' most successful case of sustainable development cooperation, with opportunities ahead to finance the BRICS countries' ecological transitions.

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CHAPTER 2 - BRICS: South-South development cooperation for sustainable infrastructure investment via via the New Development Bank (NDB)

> "As countries acquire economic and military power, they start exercising their geopolitical muscle. The challenge for advocates of the world order is to accommodate emerging powers. (...) All that the emerging powers want is a place at the table. After all, in the global system, you are either at the table or on the menu."
>
> - Shashi Tharoor (2015)

Summary of the chapter:

Beyond the acronym, the BRICS bloc represents an institutionalised coalition for development cooperation between five of the world's major emerging economies - Brazil, Russia, India, China and South Africa. Due to large internal consumer markets and the less restrictive policy autonomy deriving from it, these economies have partially emerged from their former peripheral status and were to a certain point successful in materialising their own national development strategies. Bilaterally, the BRICS face important cultural, historic and linguistic differences. Together, they formed a platform for cooperation focusing on their greater ambitions in the international arena, as the acronym was formalised with annual ministerial meetings, civil society fora and shared institutions. Considering the BRICS as an unfinished project, this chapter analyses the bloc's approach to South-South development cooperation to reform the global financial architecture.

This chapter's main argument is that, focusing on common interests and avoiding internal disputes, the BRICS model of cooperation provides important opportunities and challenges for South-South cooperation in development finance. Providing context for the case studies of the NDB, it offers an overview of the BRICS platform of cooperation, its origins and institutional evolution in development financing. It starts by reviewing the history of the BRICS project and its challenge to reform the global financial architecture from within, then covers the range of BRICS institutions with a special focus on the NDB. After discussing the nature of the BRICS challenge to finance the sustainable infrastructure in the Global South via the NDB, the chapter concludes with an empirical analysis of the bank's portfolio to critically assess its alleged claims of originality present in the bank's articles of agreement and corporate strategy documents. This assessment of the bank's financial statements, operations and projects aims to complement the next chapter's study cases on the transformative role of the NDB in financing the BRICS ecological transitions. Together, these chapters provide important policy implications for addressing the 'new in the NDB'.

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2.1 BRICS coming to age: The NDB and the CRA

Beyond the acronym, the BRICS represent an institutionalised coalition for development cooperation between five of the major emerging economies - Brazil, Russia, India, China and South Africa. The origin of the acronym dates back to Goldman Sachs' fund for investment opportunities in the fast-growing BRIC countries at the beginning of the millennium. In 2010, with South Africa joining the bloc, the BRICS formalised its cooperation and met annually as an institutional platform for financial cooperation pushing reforms in the global financial architecture (Lagutina 2018; Suchodolski and Demeulemeester 2018). Since then, much has changed both in terms of their economic performance and geopolitical alliances, but the BRICS have kept together as an important platform for South-South development cooperation. This section offers an overview of the origins and institutional development of the BRICS' platform of development cooperation.

In the context of an emerging multipolar world system, the BRICS project gained institutional contours pushing for global governance reform after the global financial crisis (Stuenkel 2015; Batista 2019). In particular, the coalition mobilised resources to gauge a greater collective voice for the Global South in development finance institutions (Bond and Garcia 2015; Bond 2016). Since its first ministerial meetings, cooperation focused on pushing for voting structure reforms in the IMF and the World Bank to respond to the rise of emergent countries (Abdenur 2015). Sharing the need for reform, the coalition rejects market fundamentalism, promoting more state-centric approaches to development (Abdenur and Folly 2015). Despite being anti-hegemonic, the bloc doesn't aim for systemic rupture, bargaining to expand its influence within institutions (Qobo and Soko 2015). This soft confrontation is characteristic of the BRICS' platform of convenience as a political and, to a certain extent, unfinished project of South-South development cooperation (Ban and Blyth 2013).

In the field of development finance, the BRICS project aims at expanding member countries' influence in the international financial arena by applying the principles of mutual benefit, solidarity and non-conditionality to their reformist agenda (Rosero and Rosero 2018). In this sense, as a South-South cooperation platform, the BRICS cooperation represents an important mechanism to enable alternative development strategies for emerging countries (UNCTAD 2017). These principles were applied in the 2014 Fortaleza BRICS summit when creating the Contingent Reserve Arrangement (CRA) and the New Development Bank (NDB), the two BRICS institutions.

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The CRA consists of a USD 100 billion monetary fund created to provide liquidity to BRICS countries in the aftermath of financial crises without depending on imposed conditionalities (BRICS 2015b). However, analysts point out that the structure of the CRA does not deviate from the IMF's (Agarwal 2014). Additionally, even if formally established, the CRA has never been effectively put into use as a precautionary instrument to deal with liquidity crises or short-term balance of payment constraints - therefore remaining a virtual institution. The NDB, a borrower-led MDB, also adopts many features of the World Bank but claims originality to innovate by focusing on member equality and sustainable infrastructure investment - as the next section details. In addition to these institutions, the bloc was also set to create a BRICS credit rating agency to challenge the dominance of US agencies, but the consensus was tougher on this front since the BRICS have heterogeneous credit ratings, thus implying different political priorities on this agenda (Helleiner and Wang 2018).

The main object of this thesis, the NDB is the BRICS' most concrete success story of financial cooperation (Deus et al. 2019). Agreed upon the BRICS' 2014 Fortaleza Summit, the bank's mission is to mobilise resources for infrastructure and sustainable development projects in member countries, in a complementary effort with existing DFIs (BRICS 2015a). Since its first operations in 2016, the bank consolidated itself as a reliable partner in the development community (NDB 2020). Membership was restrained to the five BRICS until 2021 - when Bangladesh, Egypt, Uruguay and the UAE were admitted to the bank. As for its internal governance, the Shanghai-based bank is governed by an equally divided representation in the non-resident Board of Governors, a rotating President and one Vice-President for each founding member. Beyond its Shanghai HQ, the bank also established regional centres in Johannesburg, Brasilia, São Paulo, Moscow and Ahmedabad.

In financial terms, the initial authorised capital was $100 billion, while the initial $50 bi subscribed capital consisted of $10 bi paid-in shares equally distributed among founders, so every member has equal voting power, and $40 bi callable shares (BRICS 2015b). It should be noted that this is a considerable amount for establishing a new MDB, as the bank was created to have a wide mandate, expand rapidly and become an important player in the development community (Griffith-Jones 2014). As argued in this chapter, the NDB consolidated as a reliable partner in BRICS development cooperation by partnering up with national development banks as a financier of infrastructure investments, but some of the huge expectations towards its initial performance were not fully met.

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In the aftermath of its foundation, the academic perception of the NDB in the development community was intense (Wang 2019). Indeed, prominent scholars welcomed its creation as part of the collective effort of DFIs to help close the US$1 trillion yearly investment gap in infrastructure in the Global South (Bhattacharya et. al 2012; Griffith-Jones 2014). This overall positive reaction was intensified by the fact that the bank was founded in the same year as the Asian Infrastructure Investment Bank (AIIB). As detailed in the previous chapter, the NDB and the AIIB embody a new generation of borrow-led MDBs driven by emerging countries. More specifically, both banks reflect the ambitions of the most proeminent of the BRICS - China - to become a bigger player not only in development finance but also in global economic governance overall by creating its own international institutions (Zhu 2019). The fact that these banks are reshaping the architecture of the international development finance community also contributes to illustrating that China's rise has important and conflicting implications for the development alternatives in the Global South.

As a matter of fact, both banks embody a different approach to development finance. However, since its first operations, they opted for different strategies to consolidate as members of the development community. In comparison with the AIIB, the NDB has faced a higher level of scepticism from the international community due to its narrower membership, limited transparency and lower profile in the international arena (Humphrey 2020). Figure 2.1 details how the NDB institutionally differs to a great extent from the AIIB in terms of membership, governance and operations. To overcome the DFI community's mistrust, the bank needs to systematically justify and address the 'new in the NDB' - not by following the AIIB, but by finding its own strategy.

Arguably, for an extremely young MDB, the New Development Bank stands out due to the centrality of member equality in its corporate governance structure - a revolutionary push away from the WBG's conditionalities in its operations by emphasising country-systems. Additionally, two other claims of originality justify the 'new in the NDB': advancing product innovation in sustainable infrastructure investment, and the bank's aim to build its capital base by issuing green bonds denominated in BRICS national currencies (Cooper 2017). To assess these claims of originality and address the 'new in the NDB', the next section details the bank's strategy to tackle sustainable infrastructure investment before empirically assessing its operations to understand how successful the NDB has been in providing an institutional framework for BRICS cooperation.

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Figure 2.1 - Key comparative characteristics of AIIB and NDB [3] [4]

	Asian Infrastructure Investment Bank (AIIB)	New Development Bank (NDB)
Membership	105 members from full range of geographies and income levels	9 members (BRICS + Bangladesh, UAE, Uruguay, Egypt)
Governance	Dominated by borrower nations; China holds veto power while non-borrowers hold over 25% voting	Divided equally among BRICS; BRICS minimum of 55% voting, nonborrowers limited to 20% maximum
Project Focus	Infrastructure mainly; open to projects in other productive sectors	Infrastructure mainly; open to other projects as demanded by borrowers
Borrower Focus	Mainly public sector with several private sector operations; Ramping up private sector with creative financial structures	Almost entirely public sector, including national development banks, SOEs and sub-national government levels
Approval Disbursements [2]	Approved: US$22.02 billion (to 12/20) Disbursed: US$9.13 billion (to 12/20)	Approved: US$25.7 billion (to 12/20) Disbursed: US$6.93 billion (to 12/20)
Environmental and Social Standards	Safeguards similar to traditional MDBs, more streamlined and less prescriptive	Strong push towards national legislation and regulation, transparency is weak
Administration	No national limits on hiring; top management fully international with strong background in MDBs	Staffing limited to member country nationals; top management with a mix of international and domestic experience
Transparency	In line with legacy MDBs; some complaints by CSOs on lack of specific project information	Minimal public information on projects beyond annual reports; Unresponsive to CSO information requests
Bond Rating	International rating: AAA	International Rating: AA+ (S&P, Fitch) AAA (JCRA, ACRA) Local Rating (China): AAA
Funding Focus	Mainly hard currency capital markets	Mainly BRICS capital markets; expanding towards hard currency markets
Procurement Policies	Open to firms from any country	Open only to firms from member countries

Source: Elaborated by the author, based on Humphrey (2020)

[3] Further research assessing the institutional, governance, financial and environmental differences between the NDB, AIIB, the World Bank Group and other borrow-led MDBs is needed but goes beyond the scope of this thesis.
[4] For comparison purposes, the disbursements refer to 2020 since the NDB's website does not display its disbursements data - in contrast to the AIIB. Instead, the data is published in its Annual Reports which are released yearly in June.

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2.2 The BRICS challenge to finance sustainable infrastructure via the NDB

The last section argued that the NDB is the BRICS' most concrete success story of development cooperation as it consolidated as a reliable source of finance in the bloc. It should be noticed, however, that it is still to live up to the mission of reforming the development finance architecture from within. According to its articles of agreement (AoA), the bank's mission is to mobilise resources for infrastructure and sustainable development projects in member countries (BRICS 2015a). To achieve this mission, the NDB's main strategy has been to measure the success of its operations in terms of engagement with the SDGs in its internal documents and annual reports (NDB 2020). This section provides a comprehensive assessment of the bank's mission effectiveness by analysing its corporate strategy, financial statements and environmental framework.

Indeed, the NDB's mission is quite related to the existence of an infrastructure investment gap in emerging countries. This gap is estimated at around 1 trillion dollars yearly for emerging countries to be able to meet their sustainable development goals (Bhattacharya et. al 2012). Particularly, the gap is centred in the areas of sanitation, energy and transport - covering SDGs 6, 7 and 9 (Sachs et al. 2019). Since the bank focuses on sustainable infrastructure, its mission centres on SDG 9: to build resilient infrastructure, promote sustainable industrialization and foster innovation. As the next chapter details, the progress of all BRICS on SDG 9 is described as of significant challenges remaining (Ali et al. 2018). Hence, the NDB represents an important effort to close the investment gap and advance on SDG 9, but the bank needs to evaluate the sustainability of its developments.

This analysis argues that even if the NDB is a concrete case of financial development cooperation, its sustainable framework has important limits and opportunities ahead. Since its first sustainable infrastructure projects started in 2016, the bank published three documents detailing its approach to sustainability: (i) its first General Strategy (2017-2021); (ii) an Environment and Social Framework and (iii) a Sustainable Financing Policy Framework governing green financial instruments. As the first section of this chapter broadly outlined the bank's corporate governance, this section analyses these three documents to assess how the bank is implementing its mission to validate its claims of originality as a 21st-century MDB. The aim of this analysis is, therefore, to identify the limits of the NDB's sustainable finance framework, providing context to the next section's assessments of its engagement with SDG 9 - paving the way for policy interventions to address the 'New in the NDB'.

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The first document is the bank's first five-year general strategy (2017-2021). It lays out how the NDB intends to fulfil its mandate to establish itself as a trusted provider of development finance both for the BRICS but also generally for the Global South (NDB 2017b). Reinforcing the claims of originality previously described, it argues that the NDB intends to be "new" in three broad areas: (i) relationships, (ii) projects/instruments and (iii) approaches. These areas pave the way for materialising the bank's claims of originality - respectively defined in (i) the principles of member equality in its corporate governance, (ii) its focus on sustainable infrastructure projects and (iii) its intention to build its capital base by issuing green bonds denominated in national currencies. In terms of new relationships, the notions of equality, mutual respect and national sovereignty are reflected in the bank's internal governance by adopting an evenly distributed voting structure.

In terms of new projects and instruments, the general strategy places sustainable infrastructure investment at the core of NDB's activities, mandating the bank to dedicate at least two-thirds of financing commitments to this area. Sustainable infrastructure finance is defined as "infrastructure that incorporates economic, environmental and social criteria in its design, building and operation", adopting a strong sustainability approach to generate positive impacts in economic structures (NDB 2017b). In terms of the types of its operations, the bank's loan portfolio focuses on sovereign loans using country-system safeguards, as guarantees and private equity were expected to increase as the bank gained scale. Additionally, the NDB's aim to build its capital base via green bonds in local currencies such as the Chinese Panda Bonds depicts a truly green bank, both in the operations and funding sides. As analysed in the following section, not all of those missions have been achieved.

As for its new approaches, the bank aimed at being a fast and flexible MBD by adapting this business model to reduce project review, implementation and disbursements delays (NDB 2017b). Operating with a non-resident board of governors, the bank works closely with regional offices and a strong network of partner DFIs such as NDBs - whose main function is to identify and prepare bankable projects to cut administrative costs. Assessing the accomplishment of the NDB's first general strategy, figure 2.2 provides the financial indicators used to provide a roadmap of where the bank should be by the end of its first strategy in 2021. In detail, it contrasts loan approvals and disbursements in two forecasted scenarios - optimistic and pessimistic - with the registered one. As shown, the bank's performance is barely above the pessimistic scenario due to a mix of internal and external aspects further explored in the next section' evaluation of NDB's claims of originality.

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Figure 2.2 - Selected financial indicators on the NDBs strategy and reality, USD million [5] [6]

X	2016	2017	2018	2019	2020	2021
Predicted by the AoA						
Yearly Contributions to Paid-in Capital	1,000	1,200	1,300	1,500	1,500	1,750
Paid-in Capital (cumulative)	1,000	2,200	5,000	6,500	8,250	10,000
Forecasted - Pessimistic Scenario						
Loan Approvals (per year)	1,500	2,500	4,000	6,000	8,000	10,000
Cumulative Loan Approvals (total)	1,500	4,000	8,000	14,000	22,000	32,000
Loan Disbursements (per year)	0	700	1,350	2,600	4,100	5,850
Cumulative Loan Disbursements (year-end)	0	700	2,050	4,650	8,750	14,600
Forecasted - Optimistic Scenario						
Loan Approvals (per year)	1,500	3,000	5,000	8,000	12,000	15,000
Cumulative Loan Approvals (total)	1,500	4,500	9,500	17,500	29,500	44,500
Loan Disbursements (per year)	0	750	1,550	3,150	5,350	8,100
Cumulative Loan Disbursements (year-end)	0	750	2,300	5,450	10,800	18,900
Registred - Realistic Scenario						
Loan Approvals (per year)	1,544	1,851	4,697	7,192	10,277	6,928
Cumulative Loan Approvals (total)	1,544	3,395	8,092	15,284	25,561	32,489
Loan Disbursements (per year)	0	24	626	1,544	6,612	6975 [3]
Cumulative Loan Disbursements (year-end)	0	24	650	2,194	8,806	15781 [3]

*Note: Based on the assumptions of no reserve accumulation, no contributions to capital from new members, no amortizations.

Source: NDB's strategy document (2017b) and NDB's Annual Report (2020a)

[5] As mentioned previously, the publicly available disbursement data goes until 2020 - as published in the last NDB Annual Report (2020). To have a number for the total disbursements in 2021, I relied on the average between the pessimistic and the optimistic scenarios. This choice may underestimate the disbursements, but is the only one available since the 2021 Annual Report had not been released as of the date of completion of this thesis in May 2022. However, given the discrepancy between the optimistic and the registered scenario, it should not change the main conclusions that registered disbursements were just above the pessimistic scenario - indicating a slow start for the bank in 2017-21.

[6] Additionally, the bank has not replied to official information disclosure requests on its 2021 disbursements. The letters and email exchanges submitted both via the bank's official channel and emails displayed in Annex A exemplify its lack of institutional responsiveness. The communications were attempted for a whole year from April 2021 to Abril 2022, when the author finally received an evasive response pointing to documents which were already in the website but without giving exact disbursement numbers. These issues add up to the lack of up-to-date information on disbursements and minimal project-level data that have rendered the execution of this research particularly difficult on the quantitative aspect. Hence, the author concludes that the bank scores quite low in terms of openness and transparency with civil society organisations and academia. As argued in the next chapter, opening up the bank to different actors in the development community is one of the main challenges ahead for addressing the 'new in the NDB'.

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The second document (NDB 2017c) on ESG is divided into two parts: Part 1 on Environmental and Social Policy guidelines to project's operations, and Part 2 on Environmental and Social Standards setting requirements to stakeholders of the bank's operations. It specifies that the bank operations follow country-system safeguards for product implementation by ranking the projects according to their social and environmental risk in three categories: A, B and C - from riskier to less risky in terms of environmental safeguards and socioeconomic risks. It also defines an exclusion list of sectors that do not comply with its ESGs, but does not mention how country-specific safeguards are complemented when legislation is insufficient, thus not effectively providing alternatives to ESG.

The third document (NDB 2020b) sets the guidelines for the NDB to promote sustainable infrastructure projects via green financial instruments. This document is divided into two parts: (i) the Objectives of the bank's green strategy and (ii) an Overview of the eligible sectors for green and social bonds, as well as setting impact indicators to assess the specific projects. When compared to the first document, this document adopts a less vague tone by conceptualising sustainable finance as the key driver of the bank's strategy to finance infrastructure investment via green and social bonds. This is an improvement from the ESG document. However, since it adopts a de-risking paradigm, it does not tackle the risks that green finance may pose to enhance currency and ecological hierarchies. Additionally, the document does not make any mention of how the bank's sustainable finance framework can help achieve the SDGs by partnering up with local DFIs such as NDBs. In this sense, neither the bank establishes a dialogue with the extended sustainable development commnity, nor does it set the space in which it aims to finance the ecological transitions in the BRICS. As these challenges are not addressed, it's not clear how the NDB achieves sustainability.

On a broader critical note, these three documents are still quite vague when it comes to defining and achieving sustainable development in the NDB's operations. In particular, its reliance on a single definition of sustainability is limitating, since it implies a homogenising set of goals for such a diverse group of countries (Vazquez et al. 2017). The next chapter of this thesis argues that for the NDB to position itself as a mission-oriented institution to finance the BRICS ecological transitions, a shared commitment to strong sustainability is required by articulating its sustainable framework with the specific country challenges of the ecological transition in each of its members. This illustrates the need for the bank to rethink its green framework in its next 5-year strategy, addressing the 'new in the NDB' to consolidate it as a full member of the development finance community.

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2.3 Evaluating the limits of NDB's claims of originality in sustainable finance

Assessing the 'new in the NDB', this section consists of an empirical evaluation of the bank's operations aiming to verify its success in materialising its three claims of originality. As mentioned in the last section, there are: (i) the principle of member equality, (ii) its focus on sustainable infrastructure investment and (iii) its issuance of green bonds denominated in local currencies. Together, they materialise the bank's strategy to help closing the infrastructure investment gap in the Global South and advance on the BRICS' ecological transitions. Indeed, these claims manifest themselves into the bank's portfolio and should be systematically evaluated to assess its mission effectiveness. Therefore, an empirical assessment of the claims of originality provides important policy implications to address the 'new in the NDB', that is, to effectively position the bank as a mission-oriented institution to finance the ecological transition in the BRICS countries.

In terms of methodology, to empirically assess the extent to which the NDB implemented its first strategy, this section relies on the construction of a detailed operations dataset from the information available in the NDB's website by web scraping (NDB 2022). To make the analysis comparable with an assessment of its first five-year strategy, the dataset covers the period from 2016 until 2021. Additionally, the bank's annual reports were used to orient the exploration of the data and to provide a longer time frame of analysis (NDB 2020a; NDB 2019; NDB 2018; NDB 2017a; NDB 2016). In the next chapter, this empirical analysis is integrated with a more contextualised approach to assess the bank's mission via 5 project case studies in relation to the BRICS' ecological transitions. Further specifications on the NDB's project dataset are found in the annexes B and C [7].

This thesis' quantitative contribution, the following figures provide a graphical review of the bank's operations by showcasing the number of projects and the bank's portfolio in thousands of dollars. It starts with figure 2.3, displaying the number and total portfolio of loan approvals and disbursements per year. Assessing the 3 claims of originality, first figure 2.4 depicts the approvals by country to illustrate its equality, then figure 2.5 analyses the key areas of operations focusing on sustainable infrastructure investment and, lastly, figures 2.6 and 2.7 focus on the operations' type to assess its local currency focus. The figures are followed by brief interpretations to evaluate to the extent to which the NDB facilitates BRICS sustainable development, articulating its opportunities ahead.

[7] Annex B provides a reduced version of the dataset with all NDB's approved operations and a link for the full database. Annex C presents a table with the distribution of the operations by sector, country, type and currency.

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Established as the main BRICS financial institution for development cooperation, the effectiveness of the NDB in financing sustainable development depends on building a robust and diversified portfolio of operations that is compatible with its main strategies. As shown in figure 2.3, the Bank's cumulative approvals net of cancellations consist of 78 operations summing up to USD 30.4 billion (NDB 2022). In recent years the bank accelerated its efforts to increase in portfolio size and speed, bringing total disbursements to USD 6.9 billion in 2020[8]. This amount is considerable for the seventh year of operation, with a remarkable acceleration of approvals and disbursements between 2019 and 2020. As seen previously, even though the total commitments amount is higher than the AIIB's, the NDB is significantly slower in disbursing its loans (NDB 2022a).

It should be noted, however, that in its first six years the bank has faced important internal and external challenges to increase its disbursements proportional to the total loan portfolio[9]. According to figure 2.3, cumulative disbursements started at a very low level in 2018 below 10% of total commitments and only stepped up in 2020 - when it represented 35% of its commitments. In 2020, the bank's COVID-19 fast-track credit line for emergency projects bumped up disbursements, as the success of this facility illustrates that adaptability is essential in a demand-driven institution. As one of its main challenges ahead for its next general strategy, the NDB needs to step up its disbursements to fully consolidate itself as an important member of the DFI community, thus providing an important lesson for the bank's second general strategy (NDB 2022j).

To evaluate the member equality principle, the project distribution by country is depicted in Figure 2.4. It shows that, even if the bank's portfolio is lightly concentrated in China and India (24 and 23 %) at the expense of South Africa and Russia (18 and 16 %)[10], it has become more balanced as the NDB develops its capacity to work in all member countries by implementing its regional offices. The fact that regional offices scaled up the approval indicates a successful framework for future BRICS cooperation by further engaging with NDBs. A challenge ahead is that after expanding its membership, the NDB is yet to approve projects beyond the BRICS. If this move will alter the portfolio's geographic composition, it is a fundamental step to justify the NDB as a global MDB.

[8] As mentioned previously, publicly available disbursements data goes up to 2020.
[9] Internally, the bank's Shanghai HQs was only fully operational in 2021. Externally, the pandemic and the geopolitical conflicts involving Russia and Ukraine implied a slower and bumpier path for the NDB to execute its strategy.
[10] To aggravate these imbalances, the NDB halted all its proposed projects in Russia due to the pressure of international credit rating agencies in the context of the financial sanctions deriving from the war between Russia and Ukraine.

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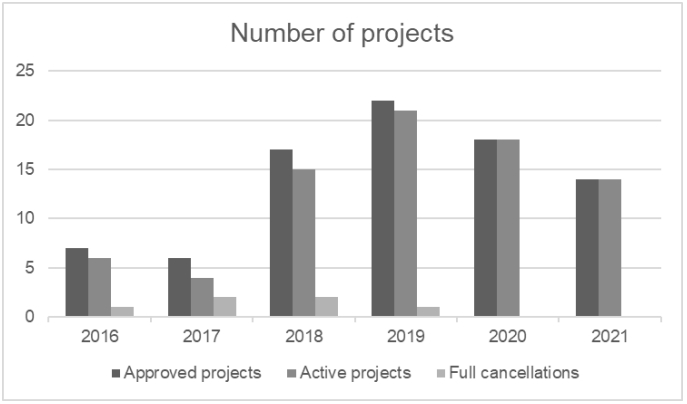
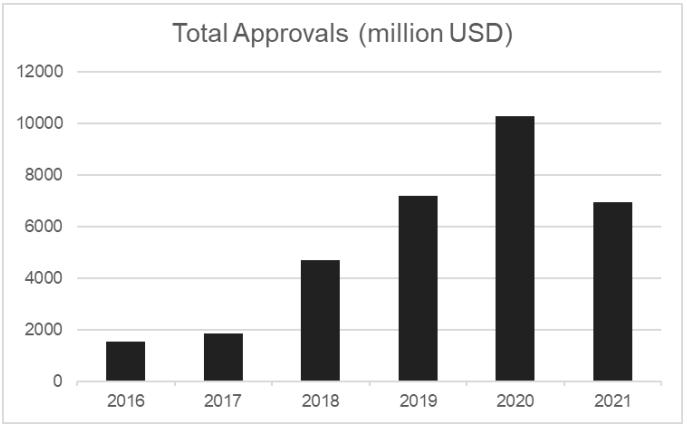
Figure 2.3 - Overview of approvals and disbursements, 2016-2021

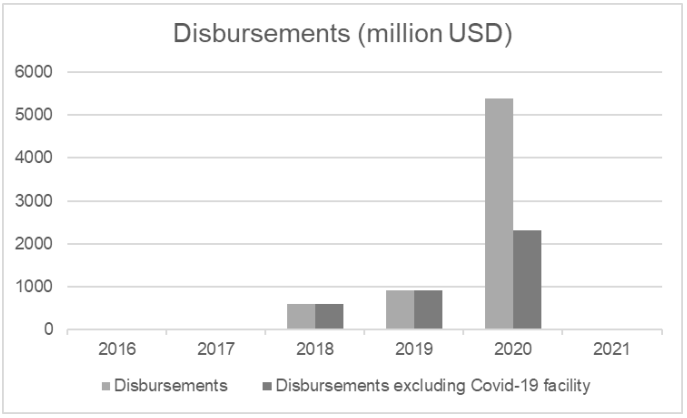
2.3.1



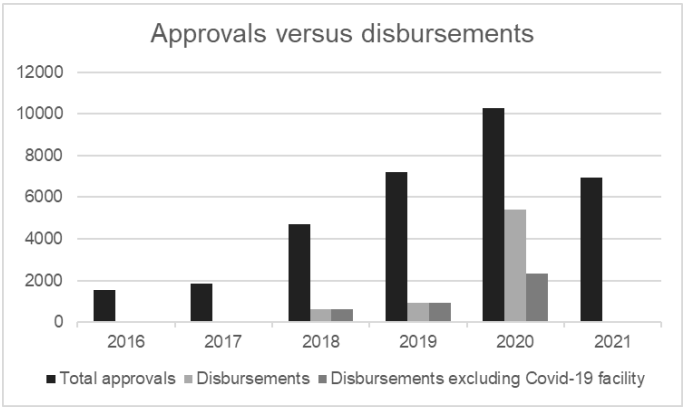
2.3.2



2.3.3



2.3.4



Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

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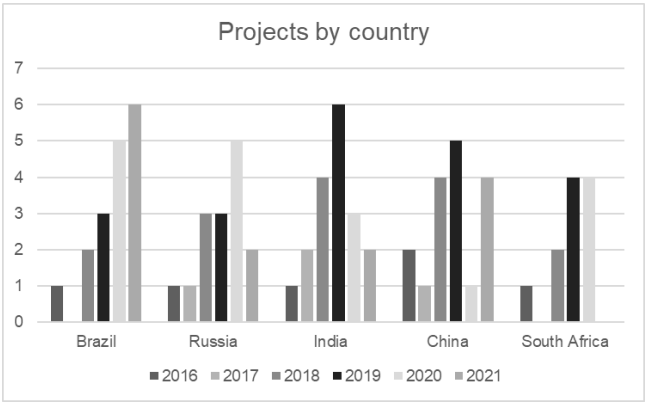
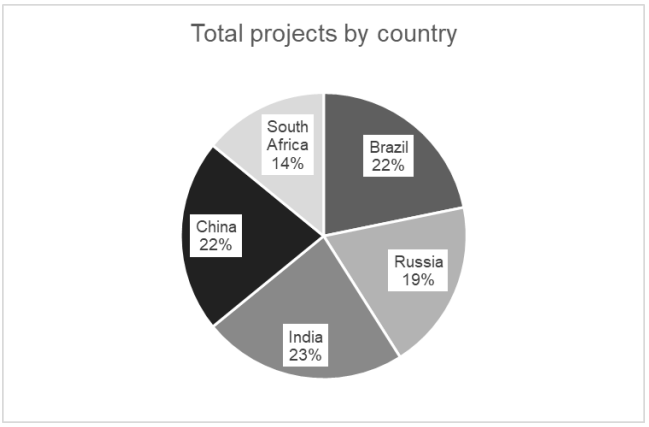
Figure 2.4 - Projects and portfolio by country (Principle of member equality)

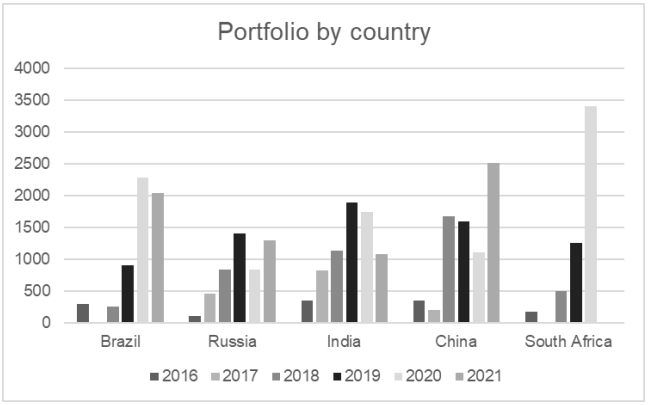
2.4.1



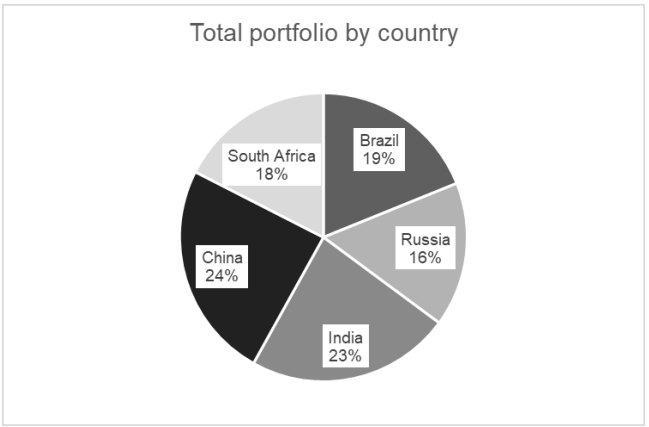
2.4.2



2.4.3



2.4.4



Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

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Concerning the bank's focus on sustainable infrastructure investment, figure 2.5 provides a more detailed look into the sectoral distribution of the operations and its engagement with the SDGs. Initially the bank focused mainly on clean energy projects (SDG 7), gradually moving towards projects on urban transportation (SDGs 8 and 11) or sustainable infrastructure (SDG 9). In 2020, in the context of the pandemic, the health emergency and recovery assistance credit line (SDG 3) overshadowed all other areas. Overall, the total portfolio is quite concentrated on transportation and emergency assistance (32 and 27%), followed by sustainable infrastructure and clear energy (16 and 12%). It should be noted, however, that this classification reflects criteria which are to a great extent arbitrary as most projects have structural implications for more than one sector and SDG at a time.

Given the inseparability of the SDGs, it is difficult to effectively assess the bank's commitment to allocate at least two thirds of its commitments into operations described as sustainable infrastructure investment (SDG9). To try to assess this claim of originality, I define projects as belonging to this category if they comply with two criteria: (i) having minimum environmental impacts (ESG criteria B or C) and (ii) having their primary SDG alignment related to economic infrastructure (SDGs 6, 7, 8, 9, 11 and 17). In short, this excludes projects with high environmental risks (ESG A) and health or social infrastructure projects (SDGs 3, 4 and 12). Following these criteria, only 41 projects summing up to 39% of the portfolio could be classified as sustainable infrastructure investment - below the 66% target present in the first five-year strategy. The bank's underperformance in this area is understandable since development finance priorities changed with the urgent character of the pandemic. However, it indicates that the NDB's focus on sustainable infrastructure should be reviewed to broaden the institution's mandate towards financing the BRICS ecological transitions.

The third claim of originality in the NDB is its commitment to local currencies, providing emerging countries' access to sovereign-backed loans and issuing green bonds without increasing their external vulnerability. Indeed, as seen in figure 2.6, 85% of the bank's portfolio consist of sovereign operations. However, in figure 2.7, loans not denominated in hard currencies represent 28% of the portfolio. Even if this is a relatively high value for MDBs, there is room for further improvements. Especially because most of the local currency-denominated approvals and bond issuances were concentrated in yuan in the first years of operations, even though approvals in rands and rublos were also registered. All in all, as the bank benefits from its access to Chinese financial markets, it is yet to capitalise on other members' markets - reflecting the BRICS bloc internal imbalances.

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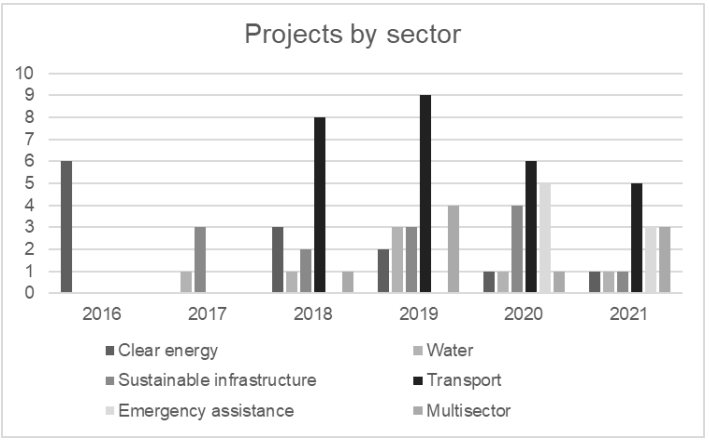
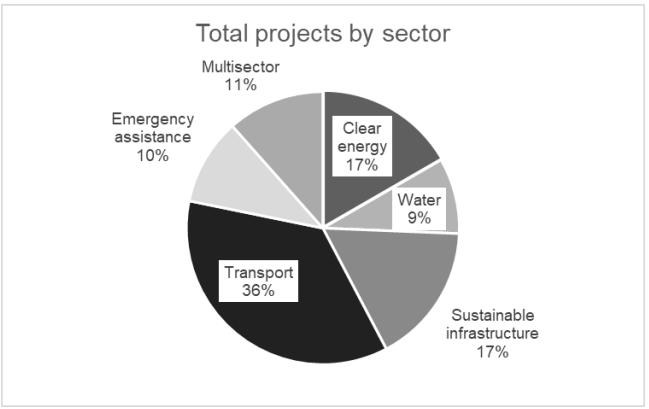
Figure 2.5 - Projects and portfolio by key area of operation (Sustainable infrastructure)

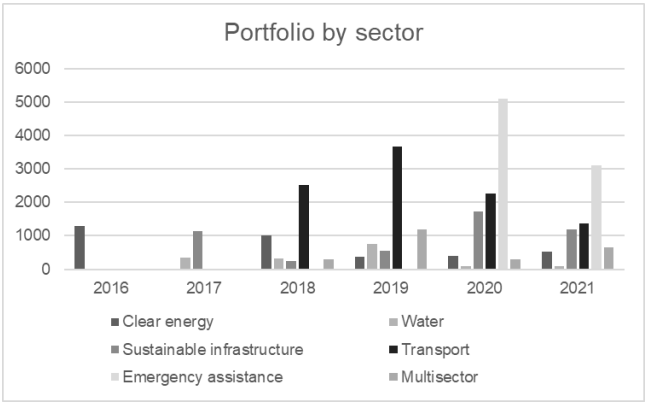
2.5.1



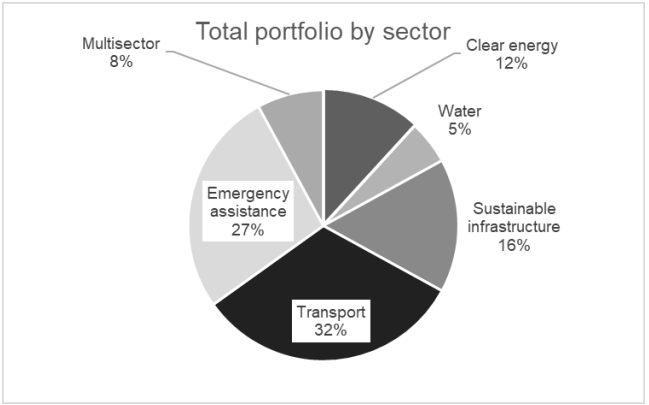
2.5.2



2.5.3



2.5.4



Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

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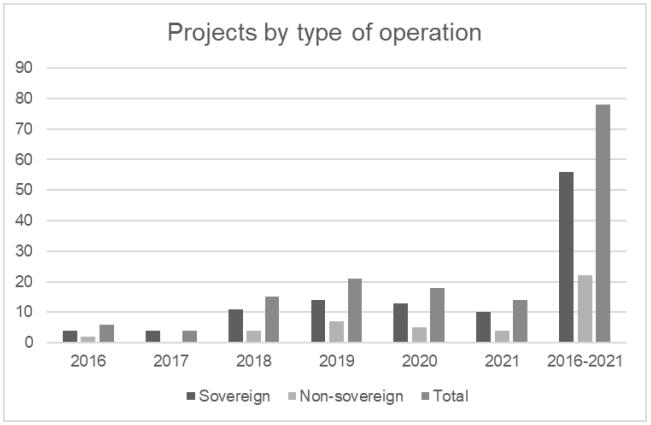
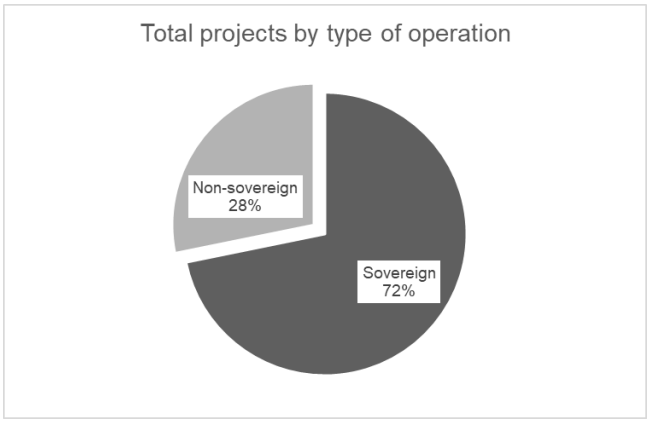
Figure 2.6 - Projects and portfolio by type of operation (funding source)

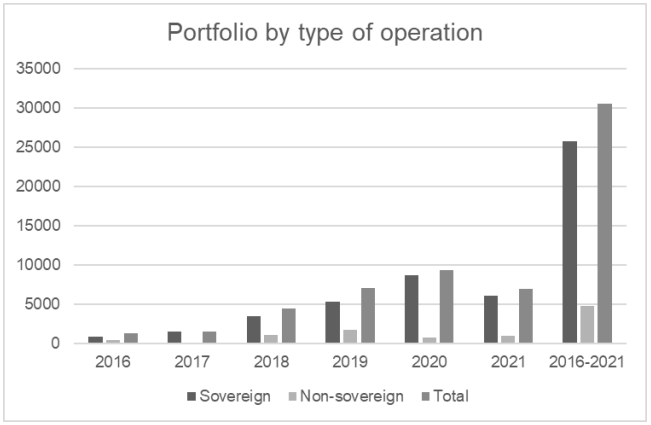
2.6.1



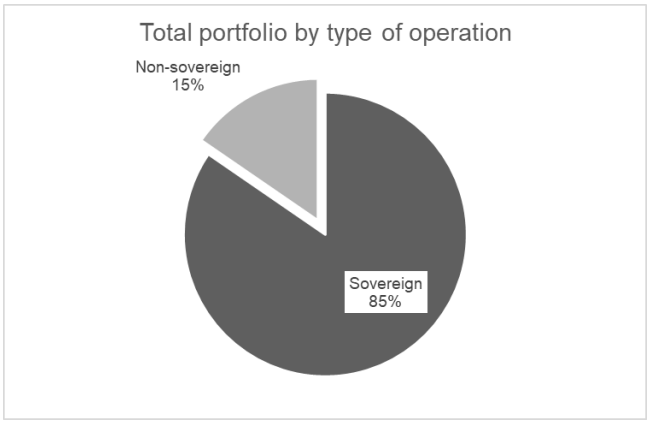
2.6.2



2.6.3



2.6.4



Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

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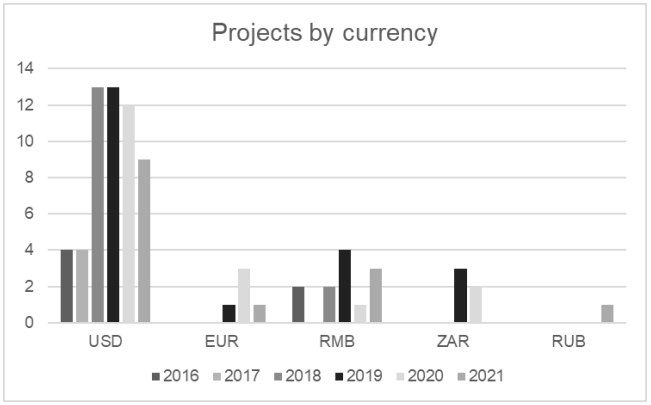
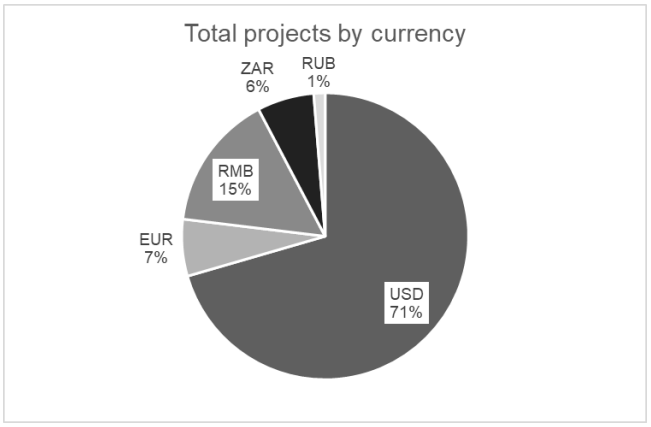
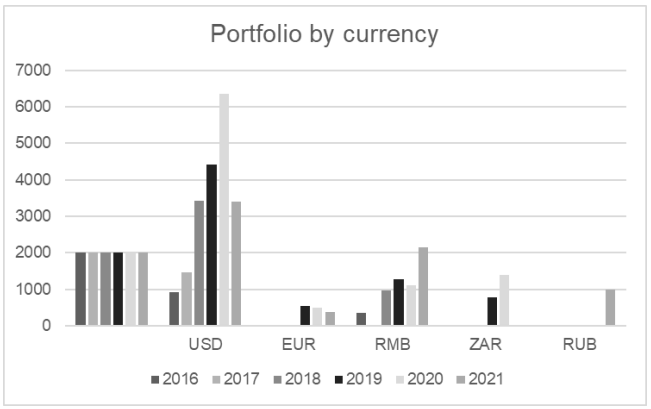
Figure 2.7- Projects and portfolio by currency of operation (green bonds in local currencies)



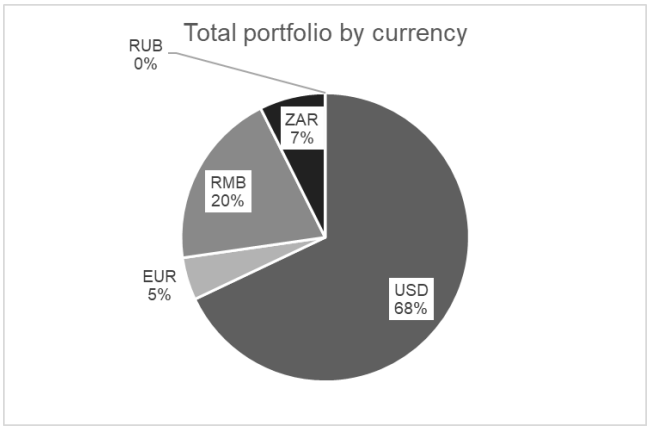
2.7.1



2.7.2



2.7.3



2.7.4

Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

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The main findings of this empirical analysis partially corroborate the NDB's claims of originality and highlight the bank's challenges and opportunities ahead. Before wrapping up this chapter, the rest of this section provides a discussion on the main results of the empirical analysis to assess the 'New in the NDB'. Firstly, the principle of equality defined in the articles of agreement in terms of the voting rights of each member does not fully translate into the bank's portfolio since there is a light concentration of project approvals towards India and China at the expense of Russia and South Africa. Even if a certain level of imbalances is expected given the greater appetite for investments in the bigger economies, the activities of the regional offices seem to contribute to balance out these discrepancies. In this sense, this claim of originality is validated, but should be continuously assessed given the impacts of the bank's membership expansion and the halting of the bank's projects in Russia in the context of the financial sanctions deriving from the Russian-Ukranian war.

As for two other claims of originality, the bank's focus on sustainable infrastructure investment and capitalisation via green bonds denominated in local currencies, the NDB's performance is much more nuanced. On the former, in the context of the pandemic, the NDB could not keep up to its general strategy promise of investing two-thirds of its portfolio in sustainable infrastructure investment. On the latter, even if the bank succeeded in approving loans and capitalising mainly in dollars, euros and yuan, there is room for improvements when developing activities in reais, rublos, rupees and zars - facilitating the BRICS' access to climate finance. As argued, both findings highlight the case for broadening the bank's mandate beyond closing the infrastructure gap towards positioning itself as a mission-oriented institution to finance the BRICS ecological transitions.

To understand these opportunities, further research is needed to assess the NDB's sustainable development paradigm. Beyond the chapter's scope, a qualitative assessment of the bank's projects and their engagement with the ecological transition agendas in the BRICS should be integrated into the analysis. Given the need to truly address the 'new in the NDB', the goal of the next chapter's five case studies is to understand how the bank can position itself as a mission-oriented institution to finance the BRICS's ecological transitions. It argues that, to accomplish this mission, a shared commitment to strong sustainability is required by articulating the bank's operations with the country-specific challenges of the transitions by partnering up with other institutions, civil society and academic partners. This illustrates the need for the NDB to rethink its sustainable strategy, addressing the 'new in the NDB' to consolidate it as a full member of the development community.

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CHAPTER 3 - Five case studies on the NDB as a mission-oriented institution to finance the BRICS' ecological transitions via its sustainable infrastructure projects

"If we wait for the governments, it'll be too little, too late; if we act as individuals, it'll be too little; but if we act as communities, it might just be enough, just in time."

- Rob Hopkins on the ecological transition (2022)

Summary of the chapter:

As argued in the two previous chapters, the New Development Bank (NDB) has not yet received the attention it deserves in the development community. On the one hand, the lack of attention to it could be partially explained by its short existence, as the first operations took place only in 2016. On the other hand, in its first five years of operations, the bank consolidated as a solid source of development finance in the bloc by claiming originality from the traditional MDB business model. In this sense, the research gap on the bank points to a miscommunication between the NDB's claims of originality and its engagement with the extended development community. Addressing the 'new in the NDB' to consolidate it as a full member of the community, this chapter analyses opportunities for the bank to position itself as a mission oriented institution to finance the ecological transition in the BRICS countries by partnering up with local actors and institutions committed to public value.

To understand these opportunities, this chapter sheds light on five selected NDB projects and their engagement with the local sustainable development agendas. These projects form case studies to illustrate how the bank has contributed to finance the BRICS' ecological transitions. All selected operations were approved in 2016, as they had more time to be disbursed and implemented. However, as with all operations, their short description available in the NDBs website lacked detailed information on project disbursements and implementation. To overcome this transparency issue, I approached institutionally and individually the NDB's corporate communications division and its staff - see letters in Annex D. The attempts to communicate institutionally with the bank via the official information disclosure form failed, but the strategy to approach its staff individually via email and invite them to an academic interview on the NDB proved to be more effective. To put together the 5 case studies of this section, I interviewed 10 NDB staff and BRICS academics using a semi-structured interview method (see annex F) to shed light on how selected projects materialised the bank's corporate strategy. These exchanges benefited my research to a great extent by getting a first-hand perspective on the projects and the reality of NDB's new development banking paradigm.

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Without diving too deep into the projects, it is important to define them and point out some differences and similarities which will be further addressed in the conclusion of this chapter. These projects are, namely, Brazil's *Financing of Renewable Energy Projects and Associated Transmission* in partnership with the Brazilian Development Bank (BNDES); Russia's *Two loans for Nord-Hydro* in partnership with the two other MDBs, the EIIB and the IIB; India's *Canara Renewable Energy Financing Scheme*, in partnership with the public Canara Bank which was later cancelled without further explanations; China's *Putian Pinghai Bay Offshore Wind Power Project* guaranteed by the the People's Republic of China; South Africa's *Project Finance Facility for Eskom*, the state-owned electricity company. These operations sum up to USD 1.1 billion, a significant amount for the NDB's first operations but still low relative to the yearly 1 trillion dollar infrastructure investment gap. Undoubtedly, they set the basis for the bank's corporate strategy.

Approved in the NDB's first year of operation, these projects were fundamental for accelerating the bank's learning curve by combining the expertise of existing local DFIs, national sovereign guarantees and simplified loan structures to deliver renewable energy infrastructure. As the next sections show, these operations incorporate significant aspects of sustainability in their descriptions given the NDB's focus to finance sustainable investment. As such, they focus on the intersection of clean energy and sustainable infrastructure (SDGs 7 and 9) - central areas both for the NDB's mission and the 2030 SDGs Agenda. In addition to their sectoral focus, the projects also have in common a strong element of public value in their partnerships for development (SDG 17).

Studied together, the case studies provide important lessons for the NDB to position itself as a mission-oriented institution to finance the BRICS's ecological transitions. To achieve that, this chapter suggests a mission roadmap for the bank to consider in its corporate strategy. This implies a perspective shift from its current narrow focus on sustainable infrastructure investment (SDG 9), by partnering up (SDG 17) with local actors of the extended BRICS development community. For that matter, a shared commitment to strong sustainability and public value is required when connecting the bank's operations with the country-specific challenges for the ecological transition. As the mission roadmap in the conclusion argues, this can be done by opening up the bank's corporate governance for public-value partnerships with local development actors. This illustrates the need for the NDB to rethink its engagement with sustainability, addressing the 'new in the NDB' to consolidate it as a full member of the development community and finance just BRICS transitions.

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3.1 Brazil's sustainable investment transition by 2050 via the BNDES

Country context and challenges for the ecological transition:

The largest and most populous country of South America, Brazil's economy accounts for a big share of the continent's investment, greenhouse gas (GHG) emissions and forest reserves (CAT 2022). After a decade of unprecedented continuous growth and political stability that made it be considered as one of the emerging economies to join the BRICS, Brazil's development was severely halted by successive politico-economic crises since 2014. In the context of these multiple crises, investments fell significantly as the public sector adopted an austerity-centred economic policy from 2016 onwards. On the climate side, under Bolsonaro, the expansion of the agricultural frontier was associated with higher deforestation rates in decades in the Amazon Rainforest. This scenario poses important challenges for the ecological transition in Brazil (Alvarenga et al. 2022).

Indeed, the Green New Deal (GND) Agenda in Brazil is a recent phenomenon. One GND bill has been proposed to the Congress, but its approval depends on the support of a federal government that integrates public investment as a key driver of climate action (Molon 2022). Meanwhile, a Brazilian GND consists of engaging developmental actors to support and finance the transition (Green New Deal Brazil 2022). These include not only NDBs such as BNDES but also MDBs such as the NDB.

Even if Brazil doesn't have detailed concrete plans for the transition, it played a pivotal role in the Paris Agreement negotiations to keep global warming well below 2°C. In its National Determined Contributions (NDC), it committed to lower GHG emissions when compared to 2005 levels by 37% in 2025 and 43% in 2030. Brazil's goal to reach emissions neutrality by 2050 is aligned with the global net zero target, but it has not yet published a Long Term Strategy (LTS) to achieve it.

To accomplish its climate goals, Brazil needs to further diversify its energy mix towards alternative renewables. In fact, renewable energy production in Brazil depends considerably on hydroelectric power plants and most of its total renewable energy consumption is generated by hydel (Annex F). Given its reliance on hydel, the higher volatility associated with it poses a problem to Brazil's energy capacity. As a matter of fact, alternative renewable energy resources such as solar and wind power haven't been fully explored due to financial constraints. In this context, the *Financing of Renewable Energy Projects* operation was approved by the NDB in partnership with the BNDES to enhance the capacity of Brazil's alternative renewable energy sector in wind and solar sources.

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Project Description:

Project name: Financing of Renewable Energy Projects
Financing mechanism: NDB-BNDES Renewable Energy partnership
NDB loan/investment: USD 300 million to BNDES
Target sector: Multiple (SDG 7 on Energy, 9 on sustainable infrastructure and 17 on partnerships)

As mentioned in the introduction of this chapter, this brief case study is based on the project description available in the NDB's website (NDB 2022b) and interviews done with the responsible staff for the *Financing of Renewable Energy Projects* operation. In short, the document approved in 2016 details that the NDB would concede a two-step loan for renewable energy projects and associated transmission projects to the Brazilian Development Bank (BNDES in its portuguese acronym) so the bank could on-lend into its own portfolio of renewable energy projects.

In line with the challenges for the transition in Brazil, the project's main objective was for the NDB to offer additional concessional finance for BNDES on renewable energy projects, co-financing the sub-projects along with other sources. In practice, this means that BNDES would serve as financial intermediaire to allocate the NDB's initial loan into its own renewable energy sub-projects.

Both the borrower without sovereign guarantees and the implementing agency, BNDES is the main financier for infrastructure projects in Brazil. It received a loan of USD 300 million to finance at least 5 sub-projects of its own portfolio to be disbursed by the NDB as the projects were approved. Complementing NDB's loan, BNDES also committed to invest at least another USD 300 million to implement these projects, mobilising its own capital, shareholders equity and green bonds.

As of 2022, three main projects had been approved, fully disbursed and implemented. Two of them in wind plants and one in solar, as illustrated in figures 3.1 and 3.2. As for ESG safeguards, the project followed NDB's country-systems approach. Thus, BNDES was responsible to comply with national legislation, but sub-projects were subject to NDB's assessment if categorised as ESG A.

All in all, the subprojects contributed to further diversifying Brazil's energy mix, reducing reliance on hydel towards other alternative renewable energy sources such as wind and solar. Hence, the project aligns with NDB's focus on sustainable infrastructure. By partnering up with consolidated DFIs such as BNDES to co-finance sustainable developmentit, it provides an important lesson for the NDB to position as a mission-oriented institution to finance Brazil's ecological transition.

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Figure 3.1 - The NDB co-financed solar power plants in Pirapora, Minas Gerais



Source: Loan agreement of the Financing of Renewable Energy Projects operation

Figure 3.2 - The NDB co-financed wind power plants in Araripe, Ceará



Source: Loan agreement of the Financing of Renewable Energy Projects operation

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3.2 Russia's energy mix diversification by 2060 via regional development banks

Country context and challenges for the ecological transition:

The world's largest country, the Russian Federation accounts for a big share of Eurasian Greenhouse gas (GHG) emissions, but it is also home to the world largest forest reserves - a global carbon sink (CAT 2022). After the economic collapse following the dissolution of the Soviet Union in 1991 and the Russian debt crisis in 1998, from the 2000s onwards the country managed to combine high growth rates and political stability that made it be considered as one of the fastest growing markets to join the BRICS. If Russia was hit by the GFC in 2008, its growth prospects have been way less bloomy since 2014, following the important geopolitical conflicts with its neighbour Ukraine - conflicts that evolved into the 2022 war. Facing important financial sanctions from NATO, internal and external political crises have hit Russia hard. In the context of these multiple crises, Russia faces important challenges for the agenda on the ecological transition (Godzimirski 2021).

The country's dependence on gas and oil shapes its accumulation regime both politically via its reliance on large SOEs such as Gazprom (Vercueil 2017) and economically via higher exports volatility implying external constraints (Grouez et al. 2021). Hence, diversifying Russia's energy mix is an imperative for its ecological transition. Even though the GND agenda is existent via climate activism by Greenpeace (2020), a more bottom-up agenda has been systematically blocked.

On the official agenda to diversify Russia's energy mix and increase energy security, the Federal Government introduced its Energy Sector Strategy in 2009. This plan was set to increase the share of renewable energies to 4.5% by 2024. It is also the bulk of Russia's National Determined Contributions (NDC) to lower GHG emissions by 30% by 2030 and 80% by 2050 relative to 1990 levels. Russia's Long Term Strategy (LTS) to implement the Paris Agreement goals was announced in 2021, achieving emissions neutrality by 2060 - 10 years after the global Paris Agreement goal.

Investment in renewable energy is essential to achieve these targets, as non-fossil fuel sources account for 3% of total energy consumption (IEA 2022). In areas where non-fossil energy capacity is low, power projects using renewable sources can increase the energy security and contribute to local sustainable development. This is the case in the northwestern Republic of Karelia, the region where the *Two Loans to EDB and IIB for Nord-Hydro* operation was approved by the NDB to facilitate renewable energy development projects and help diversify Russia's energy mix.

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Project Description:

Project name: Two Loans to EDB and IIB for Nord-Hydro
Financing mechanism: NDB-Regional Development banks partnership
NDB loan/investment: USD 100 million to EDB and IIB
Target sector: Multiple (SDG 7 on Energy, 9 on sustainable infrastructure and 17 on partnerships)

As mentioned in the introduction of this chapter, this brief case study is based on the project description available in the NDB's website (NDB 2022c) and interviews done with the responsible staff for the *Two Loans to EDB and IIB for Nord-Hydro* operation. In short, the document approved in 2016 details that the NDB would concede two loans to support Eurasian Development Bank (EDB) and International Investment Bank (IIB) to on-lend to the Nord-Hydroelectric project.

In line with the challenges for the transition in Russia, the project's main objective was to increase energy supply in the Karelia Republic. This would be accomplished by building a small dam, two hydroelectric power plants with a total installed capacity of 49.8 MW and a 10-km 220 kV power transmission line. The project was set to avoid 48,800 tons of carbon dioxide emissions per year.

The borrowers, the EDB and the IIB, are key regional financiers of infrastructure in Eastern Europe and Central Asia. In practice, they served as financial intermediaries to allocate NDB's loan into the project, which was fully guaranteed by the Russian government with a preferential status. Each MDB received a USD 50 million loan, adding up to a total project loan of USD 100 million. The total project cost was complemented by other bank loans and equity, totaling USD 161.9 million. It was fully implemented by Nord Hydro in 3 years from the disbursements and procurements.

This project also followed NDB's country-systems approach for its ESG. Thus, Nord Hydro was responsible to run environmental mitigation evaluations which were yearly supervised by the NDB. In particular, smaller dam dimensions were designed for this project to avoid resettlements and minimise its ecological impact by focusing on energy efficiency both in generation and distribution.

All in all, the project contributed to diversifying Russia's energy mix by reducing reliance on fossil fuels towards renewables, aligning with NDB's focus on sustainable investment. It illustrates how the NDB can finance energy mix diversification by partnering up with RDBs and governments to deliver sustainable development. Also, given the project's small scale, it illustrates that the BRICS ecological transitions implie multiple local bottom-up projects that are reproduced on a larger scale.

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Figure 3.3 - Memorandum of agreement NDB co-financed dam, Karelia Republic



Source: NDB's website (NDB 2016x)

Figure 3.4 - Footage of the NDB co-financed Nord-Hydro power plant, Karelia Republic



Source: NDB's website (2022)

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3.3 India's gradual phase-out from thermal by 2070 via commercial banks

Country context and challenges for the ecological transition:

The world's second most populous country, the Republic of India accounts for a big share of South Asia's investments and emissions (CAT 2022). In the six decades following its independence and partition in 1947, India's rise as an economic power is a defining feature of today's world (Sen 2009). Combining continuous growth and a consolidated democracy, India led the way for EMEs to integrate into the world economy. As it joined the BRICS, it also grew bigger than the bloc by following its own development model (Drèze and Sen 2013). With the goal of modernising the country, the Modi administration pledges to 'create a new India'. For that purpose, India still faces relevant challenges to articulate its ecological transition agenda (Roy and Schaffartzik 2021).

As with many Western notions, the Green New Deal agenda doesn't fully translate into India's political debate. This is the case since it adopts a different set of cultural principles and business practices that make the concept of a 'Deal' an state-level practice of policy making in India (Byrd 1990). Thus, the Indian version of a GND is reflected in the government's official sectoral plans.

On the official agenda to diversify India's energy mix, the Central Government introduced the 2018 National Electricity Plan (CAT). It details a gradual and multi-targeted agenda that was formalised in the country's NDCs: (i) To lower its emission intensity by 33-35 % by 2030 from 2005 levels; (ii) to achieve 40% of installed capacity from non fossil fuel sources by 2030 and; (iii) to create an additional forestry carbon sink of 2.5 to 3 billion tonnes of CO2 by 2030. Even if India is still to officially submit its LTS, Prime Minister Modi announced a 2070 GHG emissions net zero target to comply with the Goals of the Paris Agreement - 20 years after most countries and the global goal.

This 20 year lag is justified due to India's heavy reliance on thermal power for its power generation capacity. To gradually phase-out thermal sources, India's transition towards renewable energies is fundamental. Aiming at a more diversified energy mix, however, the Central Government is yet to work closer with state-level governments on social and economic policies for a just transition that take into account the inequality in access to electricity. In areas where energy supply is low, power projects using renewables can increase the energy security and contribute to local sustainable development. In this context, the *Canara Renewable Energy Financing Scheme* was approved by the NDB to support the nationalised Canara Bank in financing its own renewable sub-projects.

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Description:

Project name: Canara Renewable Energy financing
Financing mechanism: Financing scheme with the Canara Bank
NDB loan/investment: USD 250 million to Canara with sovereign Guarantee
Target sector: Multiple (SDG 7 on Energy, 9 on sustainable infrastructure and 17 on partnerships)

Contrary to previous operations, this case study is based only on the *Canara Renewable Energy financing* project description available in the NDB's website (NDB 2022d). It details that the NDB would provide a USD 250 million financing scheme for Canara Bank to on-lend to its own RE sub-projects. In 2021, however, the project appeared in the NDB's website as cancelled without further explanations[11]. The responsible staff for the project did not reply to the interview invitation.

In line with the challenges for the transition in India, the main objective of the scheme was for the NDB to co-finance existing initiatives in the renewable sector. According to the approved project document, this would be accomplished by capitalising the Canara Bank to scale up on-lendings in its renewables, but no further information is given on specific sub-projects or expected benefits.

Both as borrower and implementing agency, Canara Bank is India's third largest public bank. It is owned by the Ministry of Finance since its nationalisation in 1969. In the scheme, Canara was supposed to receive a USD 250 million loan from the NDB. Total project costs added up to USD 500 million when co-financed by Canara and other borrowers. The project benefited from support from the Ministry of New and Renewable Energy via a sovereign guarantee. As the implementing agency, Canara Bank was required to comply with NDBs' and country-system regulations. Since there were no explanations on the cancellation, it is not known on which side the issue happened.

Given the limitations of researching an operation that never materialised, the incompleteness of this study case sheds light on important limitations posed to NDB's business model. First, it illustrates the lack of transparency in the NDB's operations since several failed communication attempts were made to clarify the reasons for cancellation. Secondly, it highlights the importance of choosing the right partners to deliver sustainable development by focusing on public-value centred partnerships to avoid cancellations. All in all, it displays an insufficient fulfilment of the NDB's potential as a mission oriented institution to finance India's energy transition in a gloomy partnership context.

[11] The choice to keep the case study on this operation even if it was cancelled was made due to the fact that it illustrates two important issues in 'addressing the new' in the NDB which are made explicit in the last paragraph of the case study.

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Figure 3.5 - A branch of the Canara Bank in Bangalore, Karnataka



Source: Canara Bank's website

Figure 3.6 - The NDB's first president, the indian banker KV Kamath, Shanghai



Source: NDB's website (2022)

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3.4 China's exit from coal by 2060 via Panda bonds

Country context and challenges for the ecological transition:

The world's most populous country and second biggest economy, China accounts for a big share of its investment and GHG emissions (CAT 2022). In the four decades of unprecedented growth since the opening up and reform of its economy dating back to 1979, China's rise as a global power is a defining characteristic of the world economy (Nogueira et al. 2019). Combining continuous growth with political stability under the Chinese Comunist Party (CCP), China not only led the emerging markets' integration into the world economy but also grew bigger than the BRICS by following its own development model. Under Xi Jinping administration, the *Chinese Dream* is a modernization agenda for the country to become a 'fully developed' nation by 2049 - the CCP's 100th anniversary. To accomplish that, the CPP has taken climate action seriously in its Five Year Plans (FYP) for the ecological transition, with important consequences for the world economy (Vazquez 2022).

As it is the case with India, the Green New Deal agenda within China does not translate perfectly into China's political system. This is the case since it adopts a different set of cultural and philosophical principles defining State-Market relationships that render the concept of planning an intricate and top-down practice of policy making in China (Weber 2021). In a sense, the Chinese version of a GND is reflected in the CPP's official Five-Year Plans (Peoples World 2022).

In particular, the CCP's 14th FYP published in 2021 sets the tone for China's ecological transition strategy. It details a bold and multi-targeted NDCs: (i) to peak CO2 emissions by 2030; (ii) to lower its carbon intensity by 60% relative to the 2005 level; (iii) to increase the share of non-fossil fuels in primary energy consumption to 25%. For its LTS, China aims to reach a narrower goal of carbon emissions neutrality by 2060 - 10 years after the global net GHG emissions goal of 2050.

To decouple its growth from coal towards more sustainable developments, China's transition towards renewables takes place under green industrial policy. Aiming to further diversify its energy mix, the State considerably increased investments in solar and wind power. With the world's largest installed capacity for wind power, China actively explores inshore and offshore sites. In coastal areas, offshore projects can increase local energy supply and contribute to diversify the energy mix. This is the case in the Southeastern province of Fujian, where the *Putian Pinghai Bay Offshore Wind Power Project* operation was approved by the NDB to support China's exit from coal.

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Project Description:

Project name: Putian Pinghai Bay Offshore Wind Power Project
Financing mechanism: Panda bonds as tools for industrial policy
NDB loan/investment: 2 billion RMB loan to Fujian IDG
Target sector: Multiple (SDG 7 on Energy, 9 on sustainable infrastructure and 17 on partnerships)

As mentioned in the introduction, this brief case study is based on the project description available in the NDB's website (NDB 2022e) and interviews done with the staff for the *Putian Pinghai Bay Offshore Wind Power Project*. In short, the document approved in 2016 details that the NDB would concede a RMB 2 million loan to the People's Republic of China (PRC) via the Fujian Investment and Development Group (IDG) to finance a offshore wind power project.

In line with the challenges for the transition in China, the project's main objective was for the NDB to support an ongoing offshore wind project in the Pinghai Bay area of Fujian Province. This was accomplished by financing the project's second phase of ampliation, covering the cost of equipment and civil works. Consisting of three phases, the project aimed at adding a total capacity of 700 MW offshore wind power in Fujian, avoiding around 869,900 tons of carbon emissions per year.

The borrower was the PRC and the implementing agency, the Fujian IDG. In practice, the business group received a long-term RMB 2 million loan with a sovereign guarantee to allocate it directly into the project. It should be noted that this project was the bank's first to be fully funded by the bank's first green bond denominated in RMB, a panda bond (NDB 2016b) - satisfying one of the bank's claims of originality. Additionally, Chinese commercial banks contributed RMB 3 million to the total project cost, totaling RMB 5 million. It was fully implemented by Fujian IDG over 4 years.

As for its ESG safeguards, the project followed NDB's country-systems approach. Thus, Fujian IDG was responsible to run environmental mitigation assessments supervised by the NDB. It was the first project to be given an ESG score (B). In particular, the business group conducted regular assessments to protect the marine ecosystem, adapting work shifts to minimise construction noise.

All in all, the project contributed to diversifying China's exit from coal towards alternative REs. It also illustrates how the NDB has been able to innovate on the traditional MDB model by partnering up with the governments and local financial institutions such as business groups to issue panda bonds and contribute to local sustainable development. Since it kickstarted a green industrial cluster in Fujian, the case study also shows that green industrial policy is an essential part of the transition.

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Figure 3.7 - Construction of the NDB co-financed wind power plants in Pinghai Bay, Fujian



Source: NDB's website (2022)

Figure 3.8- The NDB co-financed wind power plants in Pinghai Bay, Fujian



Source: NDB's website (2022)

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3.5 South Africa's renewable energy transition by 2050 via Eskom

Country context and challenges for the ecological transition:

Africa's biggest economy, the Republic of South Africa (RSA) accounts for a big share of the continent's investment and GHG emissions. After the end of Apartheid in 1994, it faced enormous challenges to overcome its structural inequalities and build a free democratic society (Padayachee 2005). Following the 2000s continuous economic growth, South Africa joined the BRICS by positioning itself as the fastest EME in the continent. It should be noted, however, that the fiscally constrained State did not enact a redistributive developmental State (Francis and Webster 2019; Kollamparambil 2020). Hence, freedom did not mean the same to all South Africans. More specifically, when economic growth stopped by the mid-2010s, the country's development was halted, giving way for social unrest. In this light, the RSA still faces important challenges in articulating and implementing a just agenda for its ecological transition (Annecke and Wolpe 2022).

In particular, South Africa's dependence on coal imposes structural barriers to its development. This is the case both politically due to the extractivism focus of the Minerals-Energy Complex and economically given the common electricity shortages known as load shedding, heavily constraining energy supply. These features illustrate the shortcomings of Eskom - the giant state power utility (Baker and Phillips 2021). Hence, diversifying South Africa's energy mix via green industrial policy is an important component of its ecological transition. The GND agenda in the country is centred on the notion of a people's new deal on agriculture for land redistribution (Ngam 2022).

On the official agenda to advance on the ecological transition away from fossil fuels, the RSA introduced concrete ambitious plans. This is the case both internally in its 2019 Integrated Resource Plan and externally with the 2021 International Just Energy Transition Partnership. In its NDC, it committed to limit total GHG emissions to 398-510 Mt CO2-eq in 2025 and 350-420 MtCO2e in 2030. As for its LTS, the RSA aims to achieve GHG neutrality by 2050, aligned with the global net zero goal. To achieve the ambitious goals of securing energy supply while diversifying the energy mix, investment in the production of renewables is key. In areas where load sheddings are common and grid facilities are outdated, any circuit outage can down the entire network. This is the case of Soweto, a collective of townships in Johannesburg, where the NDB approved a Project Finance Facility (PFF) for Eskom to support the development of grid connection infrastructure.

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Project Description:

Project Name: Project Finance Facility for Eskom
Financing mechanism: NDB-Eskom memorandum of cooperation
NDB loan/investment: USD 180.0 million
Target sector: Multiple (SDG 7 on Energy, 9 on sustainable infrastructure and 17 on partnerships)

As with the previous loans, this case study is based on the NDB's project description available in its website (NDB 2022f) and interviews done with the staff for the *Project Finance Facility for Eskom*. The document details that the NDB would provide a Project Finance Facility (PFF) of USD 180 million for the Electricity Supply Commission (Eskom) to connect existing electrical infrastructure.

In line with the challenges for the transition in South Africa, the main objective of the PFF was for the NDB to support Eskom's transition towards the renewable energy sector, reducing the country's reliance on fossil fuels. This would be accomplished by financing seven sub-projects aiming at linking up independent RE producers in a wide grid connections infrastructure allowing for the expansion of Eskom's transmission network in the Soweto area, a township in Johannesburg. The project aimed to integrate 670 MW of RE to Eskom's grid - 10% of South Africa's NDC target.

Both the borrower and the implementing agency, Eskom is South Africa's electricity SOE. As mentioned, it plays an important role in the country's development strategy by managing the Minerals-Energy Complex. For the PFF, Eskom received a USD 180.0 mi loan from the NDB which was converted into 2.88 billion rands and then allocated into sub-projects. The total project cost was also fractionally financed by Eskom, adding up to 3.60 billion rands. As the project was given a sovereign guarantee by the Federal Government, its implementation was delayed by 2 years while the Parliament examined it, contradicting the claim of the NDB as a fast MDB.

As for its ESG safeguards, Eskom was responsible to run an environmental management plan to ensure minimal risk. However, since the PFF aimed at integrating independent RE producers into Eskom's grid, the loans went to the grid connections which are heavily coal-reliant. Thus, the FPP ensures that clean energy can get into a dirty grid, but it will not phase out SA's reliance on coal (Braga et al. 2021). Hence, it displays a partial fulfilment of the NDB's potential as a mission oriented institution to finance the ecological transition in the complex context of energy production in South Africa. All in all, even if the project aims to reduce South Africa's reliance on fossil fuels, it is simply trying to get the undesirable system to work in the first place instead of overcoming it.

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Figure 3.9 - The NDB co-financed wind power plants



Source: NDB's website (2022)

Figure 3.10 - Eskom's electricity grid network in Soweto, Gauteng



Source: NDB's website (2022)

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Chapter Conclusions:

This chapter's case studies on 5 selected NDB's projects point to the fact that during its first years of operation the bank succeeded in consolidating as a solid source of BRICS development finance. This was accomplished by establishing a business model that claims originality by focusing on sustainable infrastructure investment. However, the project case studies and the country-specific challenges of the ecological transition also illustrate important limitations of the NDB's corporate strategy. Summing up this chapter, these conclusions provide a few remarks on how to address the 'new in the NDB' so that the bank can consolidate as a full member of the development community.

It should be noticed that the task to position the NDB's as a mission oriented institution to finance the BRICS ecological transitions is an herculean one. Since the agendas for the transition in these five countries vary to a great extent, so do the sustainable development priorities. Making sense of this heterogeneity, figure 3.11 provides a comparison of the main challenges for the energy transition in the BRICS. As shown, they not only have different policy environments and energy mixes, but also different targets. More importantly, this translates into different notions of sustainable development and plans to achieve it, rendering one-size fits all strategies impossible.

In this sense, what the bank can effectively do is support its members to achieve their long term strategies to comply with climate action goals. To a certain extent, the case studies summarised in figure 3.12 show that current operations already do so. Focusing on renewable energy projects, the selected operations combine sustainable infrastructure investment with emission reduction by building public-value centred partnerships. However, as indicated in the assessment, their effectiveness depends to a great extent on the choice of partners to deliver sustainable development.

As illustrated in the case studies, the NDB needs to enhance its partnerships with local actors of the development community to tackle the country-specific challenges of the ecological transition. To achieve that, Figure 3.13 presents a roadmap towards positioning the NDB as a mission oriented institution to co-finance the BRICS ecological transitions. Building partnerships centred on public value (SDG 17), the bank should also commit to strong sustainability when mobilising different sectors and partners into its existing portfolio of projects. This illustrates the need for the bank to rethink its engagement with sustainability, addressing the 'new in the NDB' to consolidate it as a full member of the development community and help achieve fair and just transitions in the BRICS.

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Figure 3.11 - Main features of the country challenges for the Ecological transition

Country	Country context	Official transition agenda	Concrete plans for the transition (NDCs, LTS, Carbon neutrality)	Energy mix
Brazil	Multiple economic and political crisis since 2014	No official federal plan for the transition	NDC: -43% of emissions by 2035 LTS: Not submitted Net zero target: By 2050	Fossil fuels: 19% Renewables: 79%
Russia	Geopolitical tensions and war since 2014	Official 2009 Energy Sector Strategy, extended to 2035	NDC: -80% of emissions by 2050 LTS: Not submitted Net zero target: By 2060	Fossil fuels: 61% Renewables: 19%
India	Modi's consolidation, 'Building a new India'	Official 2018 National Electricity Plan	NDC: -35% emission intensity by 2035 LTS: Not submitted Net zero target: By 2070	Fossil fuels: 78% Renewables: 20%
China	Xi's consolidation, 'The Chinese dream'	Official CCP's 14th Five Year Plan	NDC: -60% emission intensity by 2035 LTS: Submitted Net zero target: By 2060, only carbon	Fossil fuels: 67% Renewables: 28%
South Africa	Multiple economic and political crisis since 2014	2008 Framework for Sustainable Development	NDC: GHG emissions cap of 420 MtCO2e by 2035 LTS: Submitted Net zero target: By 2050	Fossil fuels: 86% Renewables: 8%

Source: Author's own elaboration based on the case studies

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Figure 3.12 - Main features of the case studies

Country	Project	Objective	Partnerships	Financial Aspects	Mission assessment
Brazil	Financing of Renewable Energy (RE) Projects	Increase finance for BNDES RE projects	Brazilian Development Bank (BNDES) BNDES-NDB RE partnership	USD 300 million loan without guarantee, financial intermediation	Importance of partnering up with established NDBs on public value
Russia	Two Loans to EDB and IIB for Nord-Hydro	Increase hydel energy supply in Karelia Republic	NDB-RDBs partnership with Eurasian Development Bank (EDB) and International Investment Bank (IIB)	USD 100 million loan with sovereign guarantee	Ecological transition as multiple local and bottom-up solutions
India	Canara Renewable energy financing scheme	Enhance Canara Bank's capacity to scale up on-lending for renewables	Financing scheme with the Canara Bank	250 million to Canara with sovereign Guarantee	Cancellations and importance to choose the right partners
China	Putian Pinghai Bay Offshore Wind Project	Support an offshore wind project	PCR as the borrower, Fujian IDG as implementing agency Green bonds, panda bonds	2 billion RMB loan to Fujian IDG with sovereign guarantee	Green industrial policy to advance on the transition
South Africa	Project Finance Facility for Eskom	Support Eskom's transition into REs	Electricity Supply Commission (Eskom) NDB-Eskom memorandum of cooperation	USD 180.0 million with sovereign guarantee, financial intermediation	Partial fulfilment of NDB as a mission-oriented institution

Source: Author's own elaboration based on the case studies

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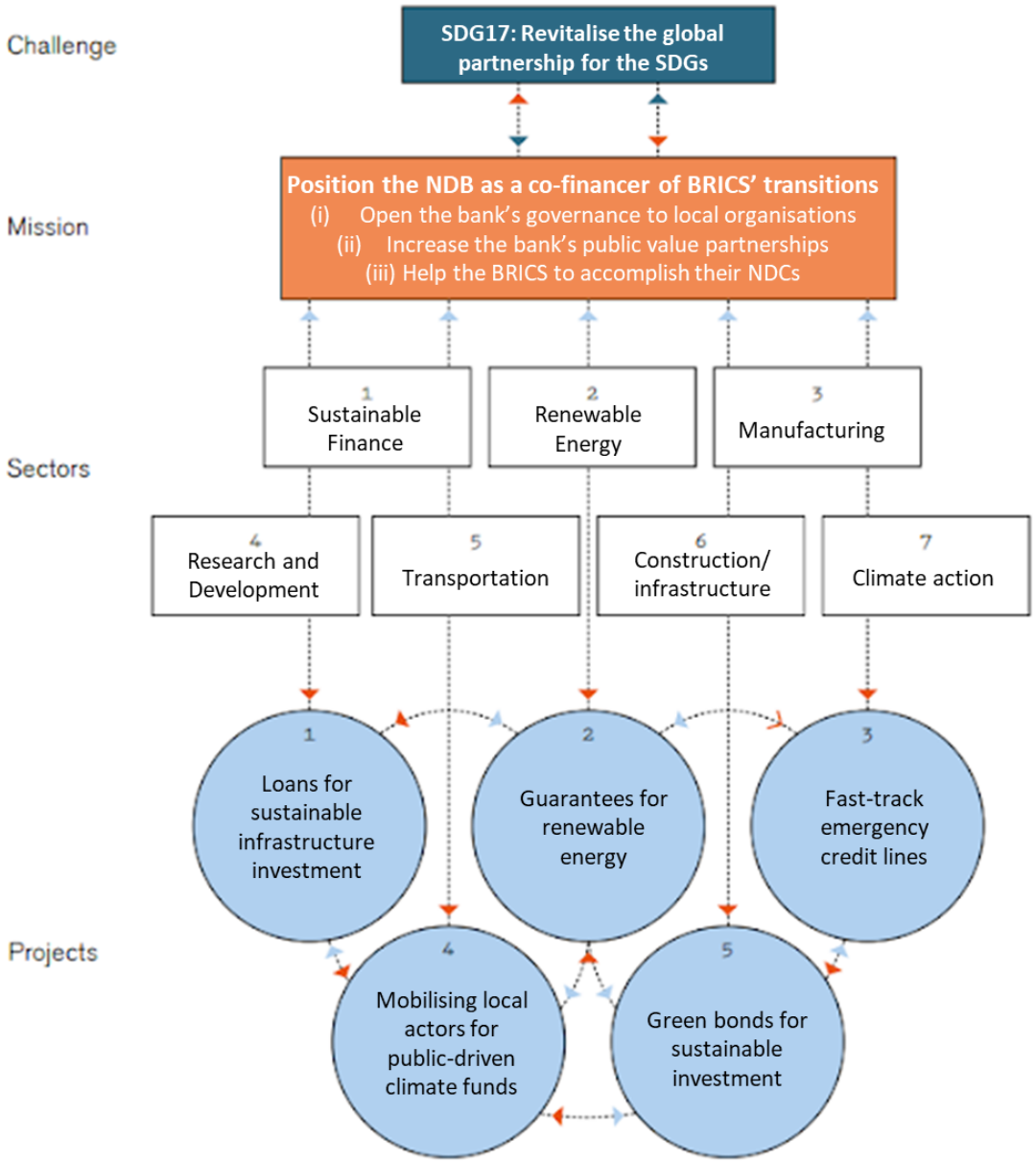
Figure 3.13 - A roadmap towards revitalising the BRICS partnership for the SDGs via the NDB as a mission-oriented institution to co-finance the BRICS ecological transitions



Source: Author's elaboration based on Mazzucato (2021) [12]

[12] The notion of a mission-oriented approach to societal challenges derives from the works of the Institute for Innovation and Public Purpose (IIPP) at the University College London (Mazzucatto and Ryan-Collins 2022; Mazzucatto 2021; Mazzucatto and Mcfarlane 2018). It points to the centrality of public value in articulating partnerships between different sectors, agents, stakeholders and institutions to find workable solutions for grand societal challenges. It also involves setting an ambitious but realistic roadmap with a clear direction for change and target goals which involve multiple sectors to come up with bottom-up solutions on how to achieve the mission. When applied to development banks as financiers of the ecological transition, it means that these institutions have a public mandate to implement and engage different actors of the development finance community and civil society organisations into the projects that will help achieve these missions.

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CONCLUSIONS

This thesis set out to address the 'new in the NDB'. To do so, it relied on developing an analytical framework to evaluate the bank's alleged claims of originality and suggest corporate strategy shifts for the bank to better position itself as a key co-financier of the ecological transitions in the BRICS countries. As argued, the NDB is a promising institution with *de facto* claims of originality. However, important challenges on the bank's engagement with sustainable development must be addressed for the NDB to consolidate as a fully established member of the development community.

In Chapter 1, a theoretical framework on the mission-oriented roles of development banks in financing sustainable development argued that a new development paradigm in DFIs is needed to finance the ecological transitions. Delving deeper into the BRICS platform of South-South cooperation, Chapter 2 assessed the NDB's claims of originality in financing sustainable infrastructure investment, arguing that the bank is indeed different from the traditional MDB model due to its unique mandate and niche, but also highlighted the limitations of its sustainability framework. Providing case studies on the NDB's operations, Chapter 3 qualitatively assessed the extent to which the bank's projects dialogue with the country-specific challenges of the transition. It argued that, if the NDB wants to consolidate as a full member of the development community, it needs to focus on developing projects centred on public-value partnerships to co-finance the BRICS ecological transitions by opening up to the extended BRICS development community (NDB 2022i).

All in all, development cooperation via the NDB has been the BRICS' preferred mechanism to challenge the architecture of development finance. Hence, successful BRICS cooperation via the NDB sheds light on cooperative development strategies beyond market forces to finance just ecological transitions. However, as argued, the bank's internal limitations must be continuously tackled to effectively address the 'new in the NDB'. To do so, the bank's next general strategy should adopt a mission-oriented approach to development finance by linking its focus on sustainable infrastructure investment with the country-specific challenges of the ecological transition via public-value centred partnerships. This would imply opening up its corporate strategy to the extended BRICS development community, but also further expanding membership towards other BRICS+ countries to become a truly global and sustainable development bank. If it continues to rise up to the challenges it was created to tackle, the NDB will be fully addressing its newness.

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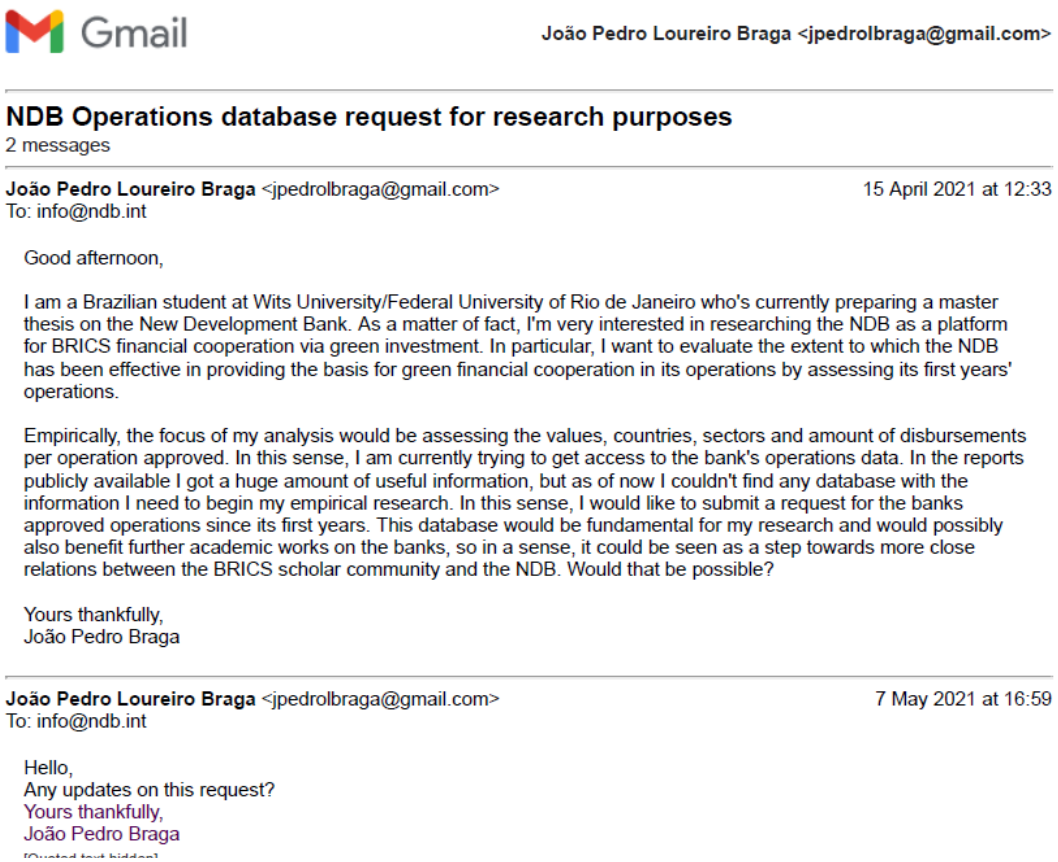
ANNEXES:

Annex A - Attempts to communicate with the NDB on its strategy and operations

Figure A.1 - First attempt on 15/04/2021[13]



Gmail — João Pedro Loureiro Braga <jpedrolbraga@gmail.com>

NDB Operations database request for research purposes
2 messages

João Pedro Loureiro Braga <jpedrolbraga@gmail.com> 15 April 2021 at 12:33
To: info@ndb.int

Good afternoon,

I am a Brazilian student at Wits University/Federal University of Rio de Janeiro who's currently preparing a master thesis on the New Development Bank. As a matter of fact, I'm very interested in researching the NDB as a platform for BRICS financial cooperation via green investment. In particular, I want to evaluate the extent to which the NDB has been effective in providing the basis for green financial cooperation in its operations by assessing its first years' operations.

Empirically, the focus of my analysis would be assessing the values, countries, sectors and amount of disbursements per operation approved. In this sense, I am currently trying to get access to the bank's operations data. In the reports publicly available I got a huge amount of useful information, but as of now I couldn't find any database with the information I need to begin my empirical research. In this sense, I would like to submit a request for the banks approved operations since its first years. This database would be fundamental for my research and would possibly also benefit further academic works on the banks, so in a sense, it could be seen as a step towards more close relations between the BRICS scholar community and the NDB. Would that be possible?

Yours thankfully,
João Pedro Braga

João Pedro Loureiro Braga <jpedrolbraga@gmail.com> 7 May 2021 at 16:59
To: info@ndb.int

Hello,
Any updates on this request?
Yours thankfully,
João Pedro Braga

Source: Author's email archive

[13] The email was sent to the NDB's contact email on the 15th April 2021 and was never answered.

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Figure A.2 -2nd attempt on 22/02/2022[14]

Permission to conduct research at the New Development Bank
1 message

João Pedro Loureiro Braga <jpedrolbraga@gmail.com> 22 February 2022 at 22:29
To: info@ndb.int

Dear Sir/Madam,

My name is João Pedro Loureiro Braga and I am a Brazilian Masters student in Economics at the University of the Witwatersrand, Johannesburg. As part of my Master Thesis, I am investigating the New Development Bank's sustainable finance framework under the supervision of Dr Uma Kollamparambil. The aim of this research project is to find out in which ways the bank has addressed its mission in providing sustainable infrastructure investment for the BRICS countries.

The research will entail conducing online semi-structured interviews with the bank staff in different areas of operations, both in its Shanghai headquarters and in its local offices in Brazil, Russia and South Africa. Therefore, I request permission to invite professionals from your organization currently working on the areas of strategy and operations to participate in this study. If they agree, they will be asked take part on semi-structured interviews with the goal to understand what are the challenges and opportunities for the banks sustainable finance framework. In the annex there is a compilation of the questions which will be asked. It should also be noted that the interviews will not be recorded.

Participants will be asked to give their written or verbal consent before the research begins. Individual privacy will be maintained in all published and written data resulting from the study. The results will be communicated in the Master Thesis research report. The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw their permission at any time and there are no foreseeable risks in participating in this study.

I therefore request permission in writing to conduct my research at your organisation. The permission letter should be on your organisation's headed paper, signed and dated, and specifically referring to myself by name and the title of my study.

Please let me know if you require any further information. I look forward to your response as soon as it is convenient.

Yours sincerely,

João Pedro Loureiro Braga

Permission letters.docx
87K

Source: Author's email archive

[14] The email was sent to the NDB's contact email on the 22nd of February 2021 and was never answered.

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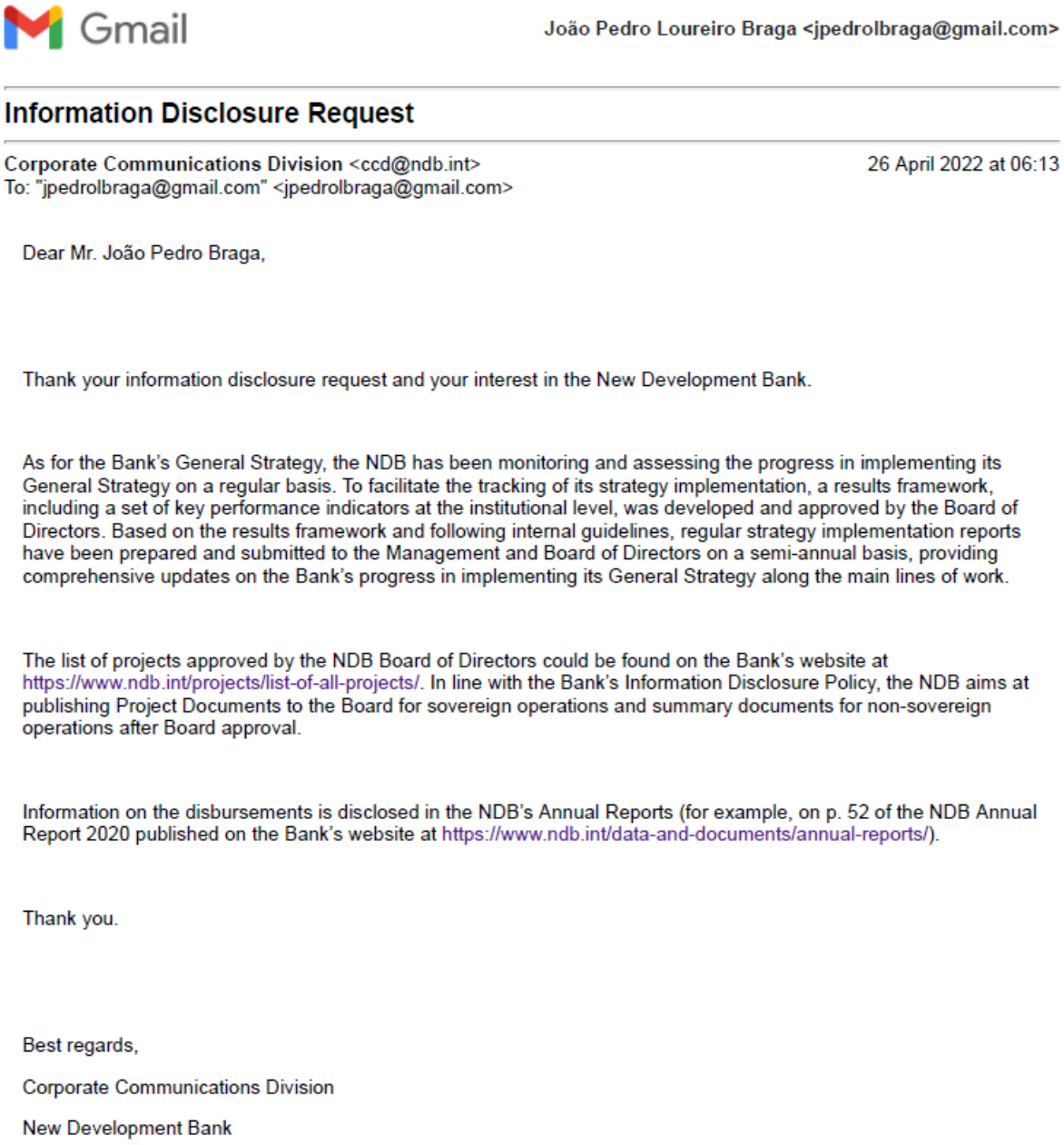
Figure A.3 - Attempt 3, partially Successful on 26/04/2022 [15]



Gmail João Pedro Loureiro Braga <jpedrolbraga@gmail.com>

Information Disclosure Request

Corporate Communications Division <ccd@ndb.int> 26 April 2022 at 06:13
To: "jpedrolbraga@gmail.com" <jpedrolbraga@gmail.com>

Dear Mr. João Pedro Braga,

Thank your information disclosure request and your interest in the New Development Bank.

As for the Bank's General Strategy, the NDB has been monitoring and assessing the progress in implementing its General Strategy on a regular basis. To facilitate the tracking of its strategy implementation, a results framework, including a set of key performance indicators at the institutional level, was developed and approved by the Board of Directors. Based on the results framework and following internal guidelines, regular strategy implementation reports have been prepared and submitted to the Management and Board of Directors on a semi-annual basis, providing comprehensive updates on the Bank's progress in implementing its General Strategy along the main lines of work.

The list of projects approved by the NDB Board of Directors could be found on the Bank's website at https://www.ndb.int/projects/list-of-all-projects/. In line with the Bank's Information Disclosure Policy, the NDB aims at publishing Project Documents to the Board for sovereign operations and summary documents for non-sovereign operations after Board approval.

Information on the disbursements is disclosed in the NDB's Annual Reports (for example, on p. 52 of the NDB Annual Report 2020 published on the Bank's website at https://www.ndb.int/data-and-documents/annual-reports/).

Thank you.

Best regards,

Corporate Communications Division

New Development Bank

Source: Author's email archive

[15] Following the success of the individual interviews with the bank's staff and successive email exchanges with professionals working in different regional offices of the bank, an evasive response finally came.

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Annex B: All NDB's operations database, 2016-2021 [16]

Number	Year	Country	PROJECT NAME	LOAN AMOUNT
2	2016	China	Lingang Distributed Solar Power Project	RMB 525 m (USD 81 m)
4	2016	South Africa	Project Finance Facility for Eskom	USD 180 m
3	2016	Brazil	Financing of Renewable Energy Projects and Associated Transmission (BNDES)	USD 300 m
5	2016	Russia	Two Loans to EDB and IIB for Nord-Hydro	USD 100 m
7	2016	China	Putian Pinghai Bay Offshore Wind Power Project	RMB 2 bn (USD 298 m)
6	2016	India	Madhya Pradesh Major District Roads Project	USD 350 m
10	2017	India	Madhya Pradesh Multi Village Water Supply Project	USD 470 m
9	2017	China	Jiangxi Industrial Low Carbon Restructuring and Green Development Pilot Project	USD 200 m
11	2017	Russia	Judicial System Support Project	USD 460 m
12	2017	India	Rajasthan Water Sector Restructuring Project	USD 345 m
17	2018	Brazil	Pará Sustainable Municipalities Project	USD 50 m
14	2018	Russia	Volga Water Supply and Sanitation Systems Project	USD 320 m
20	2018	India	Bihar Rural Roads Project	USD 350 m
15	2018	Russia	Small Historic Cities Development Project	USD 220 m
23	2018	Brazil	Environmental Protection Project	USD 200 m
22	2018	South Africa	Greenhouse Gas Emissions Reduction and Energy Sector Development Project	USD 300 m
21	2018	China	Luoyang Metro Project	USD 300 m
25	2018	India	Madhya Pradesh Major District Roads II Project	USD 350 m
24	2018	India	Madhya Pradesh Bridges Project	USD 175 m
26	2018	Russia	Sustainable infrastructure in relation to "ZapSibNefteKhim" Project	USD 300 m
27	2018	China	Guangdong Yudean Yangjiang Shapa Offshore Wind Power Project	RMB 2 bn
29	2018	China	Jiangxi Natural Gas Transmission System Development Project	USD 400 m
28	2018	China	Hohhot New Airport Project	RMB 4.2 bn
30	2018	India	Mumbai Metro Rail Project	USD 260 m
16	2018	South Africa	Durban Container Terminal Berth Reconstruction Project	USD 200 m
33	2019	South Africa	Lesotho Highlands Water Project Phase II	Rand 3.2 bn
35	2019	China	Zhejiang Green Urban Project – Shengzhou Urban and Rural Integrated Water Supply and Sanitation Project Phase II	RMB 825 m
34	2019	South Africa	Renewable Energy Sector Development Project	ZAR 1.15 bn
32	2019	South Africa	Environmental Protection Project For Medupi Thermal Power Plant	USD 480 m
31	2019	China	Chongzuo Water Resource Rehabilitation and Ecological Conservation Project	USD 300 m
38	2019	China	Lanzhou New Area Regional Hub Multimodal Logistics and Transport Infrastructure Demonstration Project	RMB 2,511.9 m
37	2019	China	Ningxia Yinchuan Integrated Green Transport Development Project	RMB 2,100 m
36	2019	India	Assam Bridge Project	USD 300 m
40	2019	Russia	Development of Renewable Energy Sector in Russia Project	USD 300 m
41	2019	South Africa	South African National Toll Roads Strengthening and Improvement Programme	ZAR 7.0 bn
39	2019	India	Andhra Pradesh Road Sector Project	USD 646 m
43	2019	India	REC Renewable Energy Sector Development Project	USD 300 m
44	2019	Brazil	North Region Transportation Infrastructure Improvement Project	USD 300 m
46	2019	India	Manipur Water Supply Project	USD 312 m
45	2019	China	Huangshi Modern Tram Project	RMB 2.76 bn
47	2019	India	Indore Metro Rail Project	USD 225 m
48	2019	Brazil	Patria Infrastructure Fund IV	Up to USD 100 million
42	2019	Brazil	Fundo Clima – Brazil National Climate Fund Project	USD 500 m
56	2020	India	National Investment and Infrastructure Fund: Fund of Funds – I	USD 100 million (EQUIVALENT IN INR)
81	2020	Russia	Locomotive Fleet Renewal Program	USD 550 million (approx.)
49	2020	Russia	Development of Educational Infrastructure for Highly Skilled Workforce	EUR loan equivalent to USD 500 million
54	2020	China	NDB Emergency Assistance Program in Combating COVID-19	RMB 7 billion
58	2020	South Africa	COVID-19 Emergency Program	USD 1 billion
83	2020	South Africa	COVID-19 Emergency Program Loan for Supporting South Africa's Economic Recovery from COVID-19	Up to USD 1 billion
59	2020	Brazil	Teresina Educational Infrastructure Program	USD 50 million
60	2020	South Africa	Battery Energy Storage Project	Up to ZAR 6,000 million (approx. USD 400 million)
61	2020	Russia	Small Historic Cities Development Project Phase II	EUR 205 million
63	2020	Brazil	Emergency Assistance Program in Combating COVID-19	USD 1 billion
66	2020	Russia	Water Supply and Sanitation Program in Russia	USD 100 million
64	2020	India	Mumbai Metro Rail II (Line 6 Project)	USD 241 million
68	2020	Russia	Russian Maritime Sector Support Program	EUR 100 million
67	2020	Russia	Toll Roads Program in Russia	USD 100 million
65	2020	India	Delhi-Ghaziabad-Meerut Regional Rapid Transit System Project	USD 500 million
72	2020	Brazil	Brazil Emergency Assistance Program for Economic Recovery	USD 1.0 billion
71	2020	Brazil	Curitiba's Bus Rapid Transit Rideability Improvement Project	USD 75.00 million
73	2020	India	COVID-19 Emergency Program Loan for Supporting India's Economic Recovery	USD 1.0 billion
84	2020	South Africa	The National Non-Toll Roads Management Program	USD 1 billion
74	2020	Brazil	BRDE Urban, Rural and Social Infrastructure Program to achieve the SDGs	Up to EUR 134.64 million equivalent
75	2020	Russia	Cellular Network and Cloud Services Expansion Project	USD 300 million
76	2020	China	Emergency Assistance Program in Supporting China's Economic Recovery from COVID-19	RMB 7 billion
77	2020	China	Beijing Gas Tianjin Nangang LNG Emergency Reserve Project	EUR 436 million (equivalent to RMB 3.4 billion)
82	2020	Russia	COVID-19 Emergency Program Loan for Supporting Russia's Healthcare Response	Up to USD 1 billion equivalent
78	2020	Brazil	PARA II – Transport Infrastructure for Regional Development	USD 153 million
57	2020	India	Emergency Assistance Program in Combating COVID-19	USD 1 billion
70	2020	Brazil	BNDES-NDB Sustainable Infrastructure Project	Up to USD 1.2 billion equivalent
	2021	Brazil	(Brazil) FONPLATA Sustainable Infrastructure Project	USD 62.5 million
85	2021	Brazil	BNDES Clima – Sustainable Financing to Support Global Climate Change Mitigation and Adaptation in Brazil	USD 500 million
86	2021	China	Anhui Green Roads Demonstration Project	EUR 340 million
87	2021	Brazil	Sorocaba Mobility and Urban Development Project	USD 40 million
88	2021	Russia	Affordable Housing and Urban Development Program	Up to USD 300 million
93	2021	India	Himachal Pradesh Rural Water Supply Project	USD 80 million
95	2021	China	Qingdao Metro Line Six (Phase I) Project	RMB 3,237 million
96	2021	Brazil	Desenvolve SP Sustainable Infrastructure Project	USD 90 million

Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

[16] The complete and detailed version of this database can be publicly accessed in in the following link: https://docs.google.com/spreadsheets/d/1-uA6g52RbY6osNhNr4Hd0PuzZHTNXw5ve2Hjj3lmbWY/edit?usp=sharing

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Annex C: Overview of the NDB's operations, 2016-2021

Overview of approvals and disbursements							
Overview							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Approved projects	7	6	17	22	18	14	84
Full cancellations	1	2	2	1	0	0	6
Active projects	6	4	15	21	18	14	78
Total approvals	1544	1851	4697	7192	10277	6928	32489
Portfolio of active projects	1280	1475	4400	6507	9874	6924	30460
Disbursements	-	24	601	915	5383	N/A	6931
Disbursements excluding Covid-19 facility	-	24	601	915	2313	N/A	3861
Approvals by target area of operation							
Number							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Clear energy	6	0	3	2	1	1	13
Water	0	1	1	3	1	1	7
Sustainable infrastructure	0	3	2	3	4	1	13
Transport	0	0	8	9	6	5	28
Emergency assistance	0	0	0	0	5	3	8
Multisector	0	0	1	4	1	3	9
Total	6	4	15	21	18	14	78
Volume							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Clear energy	1280	0	1015	376	400	530	3601
Water	0	345	320	742	100	80	1587
Sustainable infrastructure	0	1130	250	550	1723	1200	4853
Transport	0	0	2515	3659	2251	1374	9799
Emergency assistance	0	0	0	0	5100	3100	8200
Multisector	0	0	300	1180	300	640	2420
Total	1280	1475	4400	6507	9874	6924	30460
Approvals by type of operation							
Number							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Sovereign	4	4	11	14	13	10	56
Non-sovereign	2	0	4	7	5	4	22
Total	6	4	15	21	18	14	78
Volume							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Sovereign	880	1475	3400	5300	8666	6038	25759
Non-sovereign	400	0	1000	1726	685	890	4701
Total	1280	1475	4400	7026	9351	6928	30460
Approvals by country							
Number							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Brazil	1	0	2	3	5	6	17
Russia	1	1	3	3	5	2	15
India	1	2	4	6	3	2	18
China	2	1	4	5	1	4	17
South Africa	1	0	2	4	4	0	11
Total	6	4	15	21	18	14	78
Volume							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
Brazil	300	0	250	900	2275	2033	5758
Russia	100	460	840	1400	835	1300	4935
India	350	815	1135	1883	1741	1080	7004
China	350	200	1675	1588	1100	2515	7428
South Africa	180	0	500	1256	3400	0	5336
Total	1280	1475	4400	7027	9351	6928	30461
Approvals by currency							
Number							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
USD	4	4	13	13	12	9	55
EUR	0	0	0	1	3	1	5
RMB	2	0	2	4	1	3	12
ZAR	0	0	0	3	2	0	5
RUB	0	0	0	0	0	1	1
Total	6	4	15	21	18	14	78
Volume							
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2016-2021**
USD	930	1475	3425	4413	6366	3413	20022
EUR	0	0	0	550	485	373	1408
RMB	350	0	975	1288	1100	2142	5855
ZAR	0	0	0	776	1400	0	2176
RUB	0	0	0	0	0	1000	1
Total	1280	1475	4400	7027	9351	6928	30461

Source: Author's elaboration based on the NDB's website project directory (NDB 2022)

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Annex D: Institutional and individual communications with the NDB on the interviews

Figure D.1 - Request of institutional permission to conduct research in the organisation[17]

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

31/10/2021

Dear Sir/Madam,

Re: Permission to conduct research at the New Development Bank.

My name is João Pedro Loureiro Braga and I am a Brazilian Masters student in Economics at the University of the Witwatersrand, Johannesburg. As part of my Master Thesis, I am investigating the New Development Bank's sustainable finance framework under the supervision of Dr Uma Kollamparambil. The aim of this research project is to find out in which ways the bank has addressed its mission in providing sustainable infrastructure investment for the BRICS countries.

The research will entail conducing online semi-structured interviews with the bank staff in different areas of operations, both in its Shanghai headquarters and in its local offices in Brazil, Russia and South Africa. Therefore, I request permission to invite professionals from your organization currently working on the areas of strategy and operations to participate in this study. If they agree, they will be asked take part on semi-structured interviews with the goal to understand what are the challenges and opportunities for the banks sustainable finance framework. In the annex there is a compilation of the questions which will be asked. It should also be noted that the interviews will not be recorded.

Participants will be asked to give their written or verbal consent before the research begins. Individual privacy will be maintained in all published and written data resulting from the study. The results will be communicated in the Master Thesis research report. The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw their permission at any time and there are no foreseeable risks in participating in this study.

I therefore request permission in writing to conduct my research at your organisation. The permission letter should be on your organisation's headed paper, signed and dated, and specifically referring to myself by name and the title of my study.

Please let me know if you require any further information. I look forward to your response as soon as is convenient.

Yours sincerely,

João Pedro Loureiro Braga

[17] The letter was sent to the NDB's contact email on the 31st of October of 2021 and was never answered.

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Figure D.2 - Individual invitation letter for an academic interview on the NDB [18]

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Johannesburg, 1st of March, 2022

Dear Sir / Madam,

My name is João Pedro Loureiro Braga and I am a Brazilian Masters student in Economics at the University of the Witwatersrand, Johannesburg. As part of my studies, I am currently undertaking a research project to investigate the New Development Bank's sustainable finance framework under the supervision of Dr Uma Kollamparambil. The aim of this research project is to find out in which ways the bank has addressed its mission in providing sustainable infrastructure investment for the BRICS countries. The methodology consists of a quantitative analysis of the bank's operations and a qualitative assessment of specific operations via case studies of selected operations to understand the bank's success in financing the BRICS ecological transition.

As part of this project, I would like to invite you to take part in a semi-structured interview to shed light in particular aspects of the bank's strategy, operations and specific operations. This exchange would benefit my research to a great extent, getting a first-hand perspective from your expertise. This activity will involve the software Zoom and will take around 30-60 minutes, depending on your availability.

There will be no video nor audio record of the interview so that the conversations flow more naturally. There will be no personal costs to you if you participate in this project and of course no disadvantages or penalties arise if you do not choose to participate or if you withdraw from the study. You may withdraw at any time or not answer any question if you do not want to.

If you have any questions during or afterwards about this research, please answer this email so that we can coordinate a suitable way of arranging the interview. If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

Yours thankfully,
João Pedro Loureiro Braga

Researcher:
João Pedro Loureiro Braga, jpedrolbraga@gmail.com, +5521996991133

Supervisor:
Uma Kollamparambil, uma.Kollamparambil@wits.ac.za, +27 11 717 8082

[18] The letter was sent out to academics, practitioners and NDB professionals via their publicly available emails and Linkedin profiles on the first of March of 2022. Around 15 participants replied and 30-60 minutes interviews were scheduled to shape the case studies and this thesis' approach to the bank.

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Annexe E: A semi-structured questionnaire to be used for interviews with staff

Methodology for the interviews:

- Semi-structured Zoom interviews will serve to elaborate the qualitative assessment of the case studies to get closer to the bank perspective on sustainable development banking.
- Invitations will be sent by email to NDB staff professionals, BRICS scholars and development finance experts based on the principle of snowballing. (check below)
- Confidentiality will be agreed upon before the interview. The data will be used ethically.

General Interview structure:

- **Introduction and openings**
- **Questions regarding the regional office/area concerned:**
    1. What are the advantages of the NDB as a demand-driven borrower-led institution?
    2. How can the NDB foster private project financing and innovative financial instruments beyond sovereign backed guarantees to its loans?
    3. Regional offices help boost the bank's actions in member countries. How to understand the action of the offices in parallel with national development banks?

- **Questions regarding the bank's sustainable development framework:**
    1. How will the bank extend its green bonds strategy to other member currencies?
    2. Are country-level social and environmental safeguards enough to guarantee that the bank provides development opportunities in its members?
    3. How does the sustainability criteria adopted by the bank relate to the challenges of the BRICS countries ecological transition and the Paris Agenda?

- Questions regarding the case studies:
    a. Country context and project description
    b. What are the expected benefits?
    c. Who absorbs the risk? Financial intermediation and ESGs?
    d. Are country systems safeguards enough for this project?
    e. What is the current status of the project? How much has been disbursed?

- **Clarifications, wrapping up and acknowledgement**

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Annexe F: BRICS and the Energy transition towards Net Zero

Figure F.1 - Total GHG emissions [19]

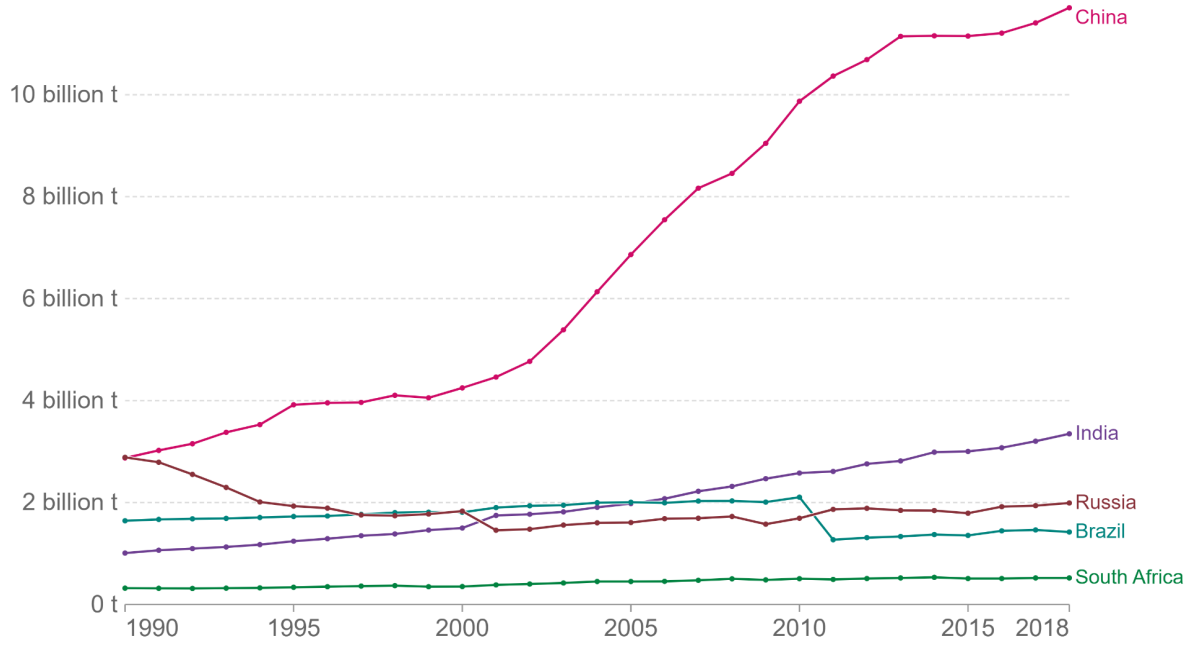
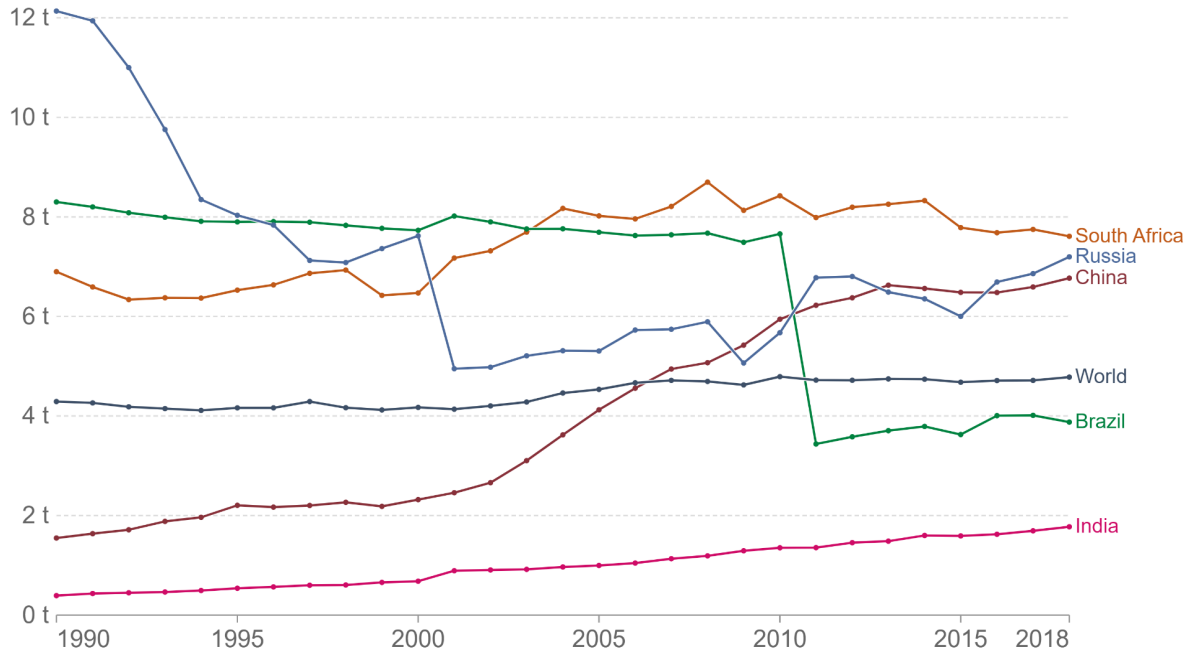


Figure F.2 - Per capita GHG emissions



Source: Our World in Data (2022)

[19] Greenhouse gas emissions – carbon dioxide, methane, nitrous oxide, and F-gases – are summed up and measured in tonnes of carbon-dioxide equivalents (CO_2e).

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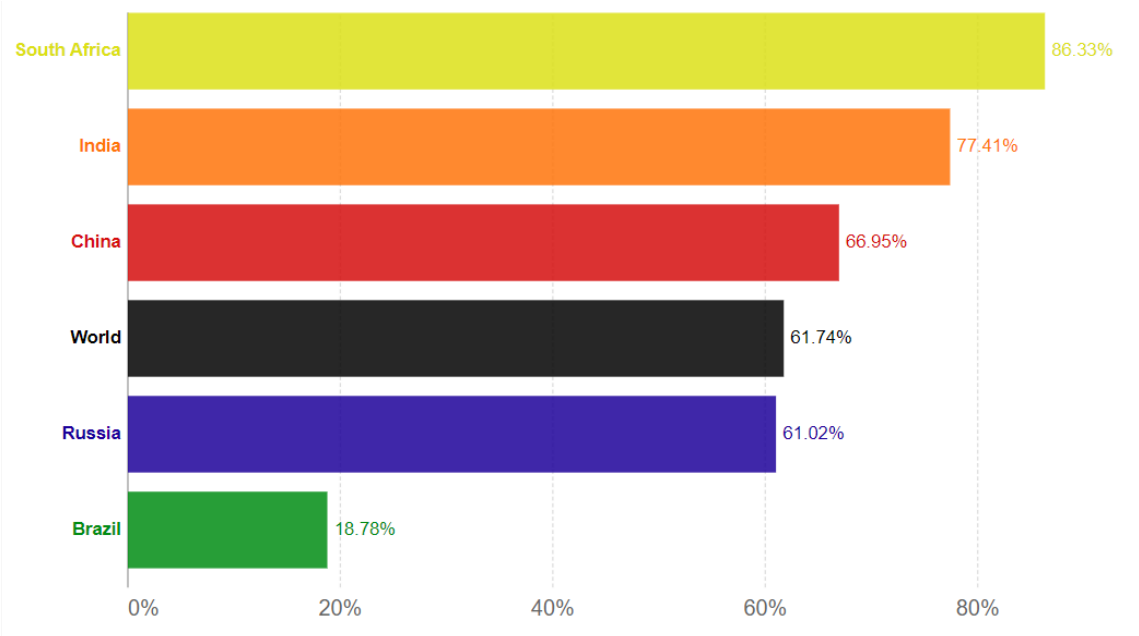
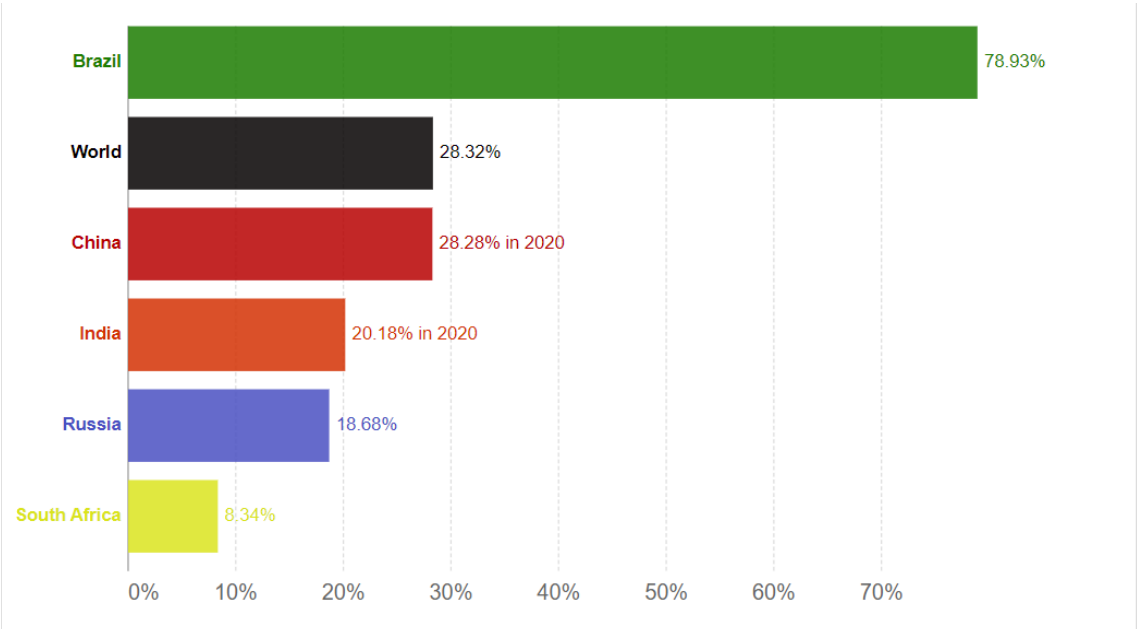
Share of primary energy from fossil fuels and RE, BRICS and the world

Figure F.3 -Share of electricity production from fossil fuels, 2021[20]



Source: Our World in Data (2022)

Figure F.4 -Share of electricity production from renewables, 2021[21]



Source: Our World in Data (2022)

[20] Fossil fuels are considered as the sum of coal, oil and gas - the largest source of CO2 emissions.
[21] Renewables include electricity production from hydropower, solar, wind, biomass & waste, geothermal, wave, and tidal sources.

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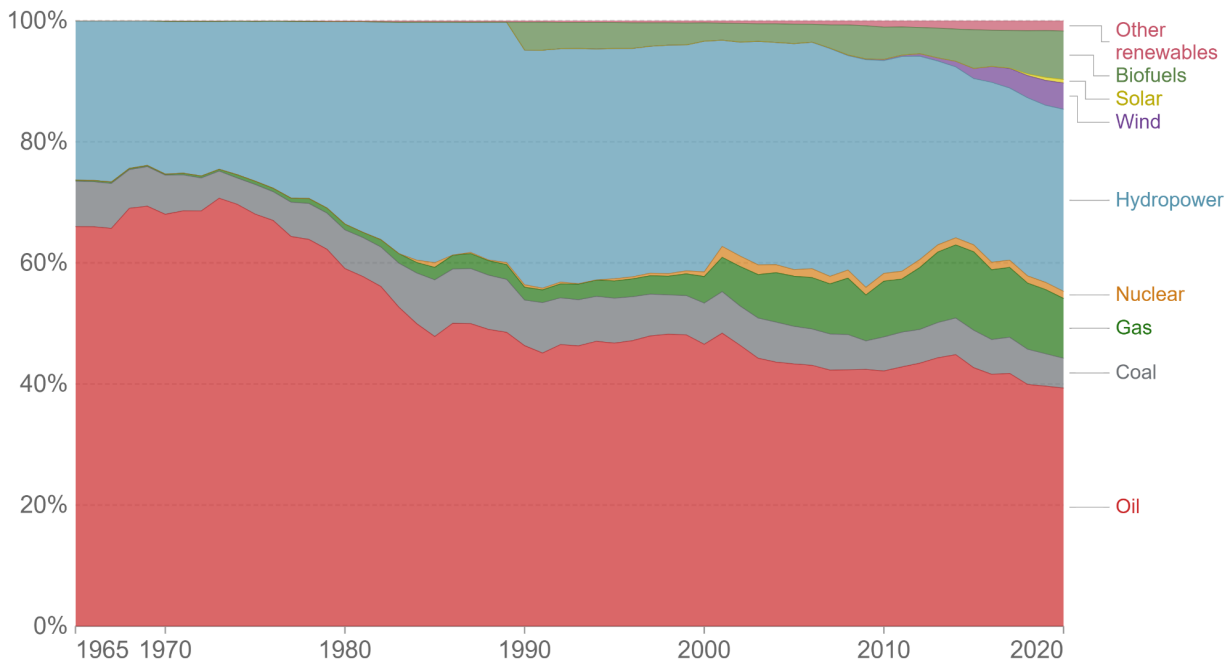
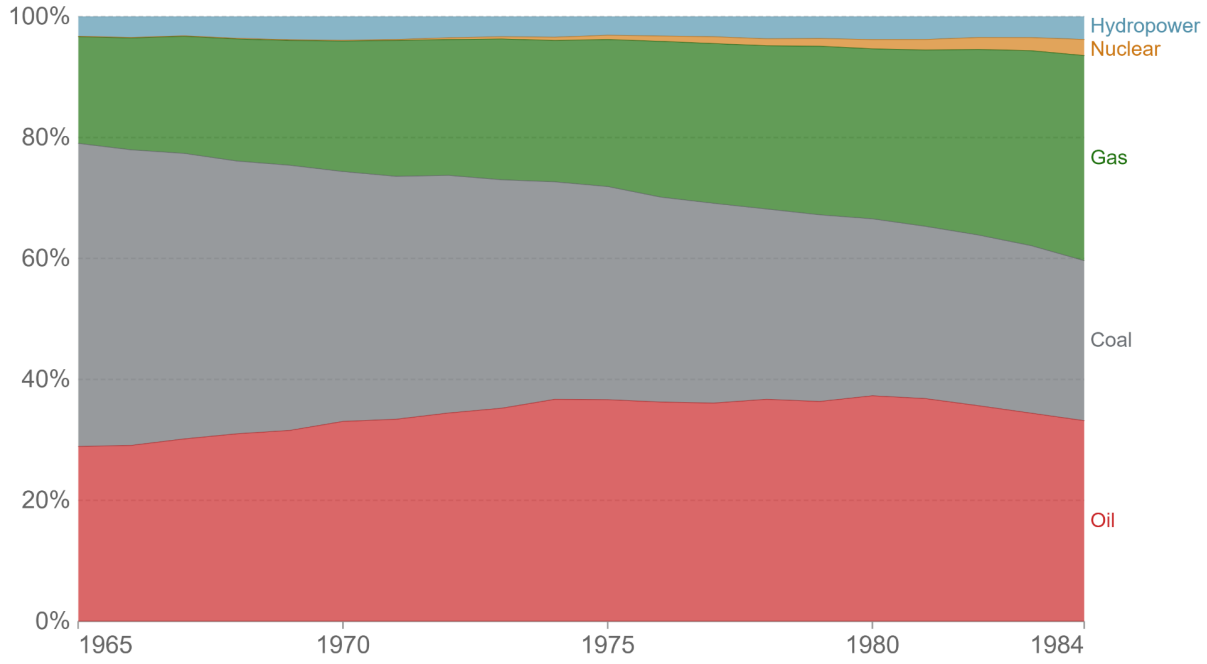
Energy mix or % consumption by source, BRICS and the world

Figure F.5 - Brazil's energy consumption mix



Source: Our World in Data (2022)

Figure F.6 - Russia's energy consumption mix



Source: Our World in Data (2022)

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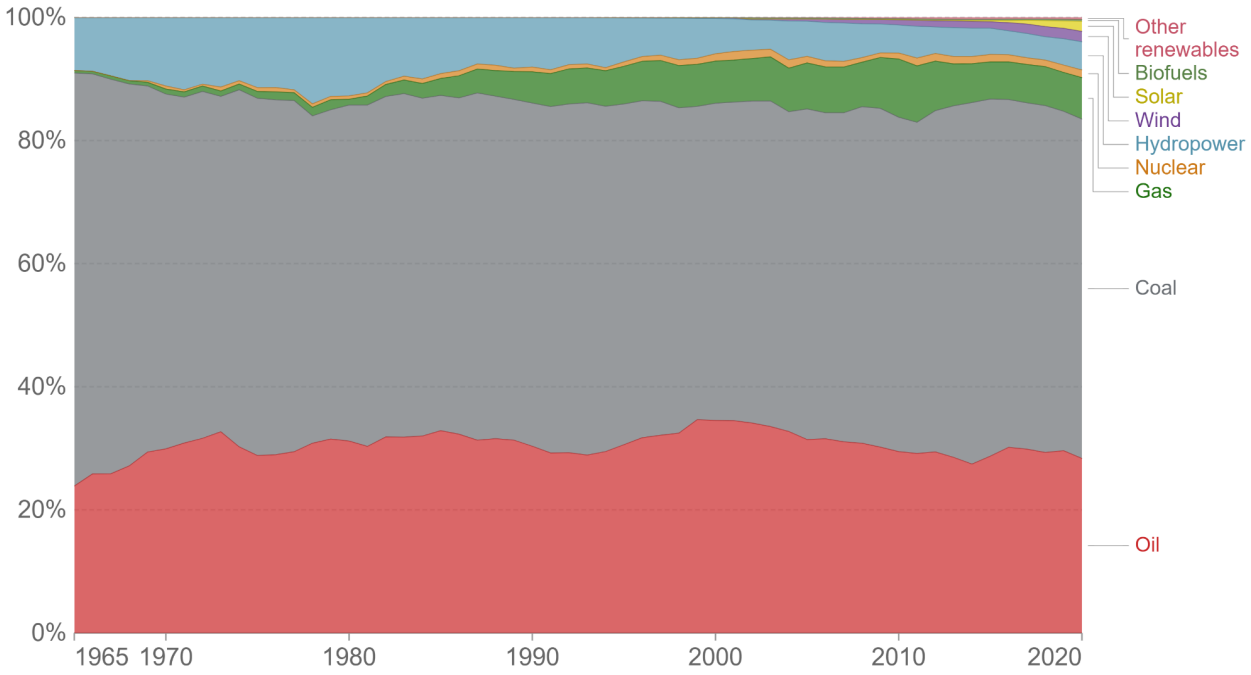
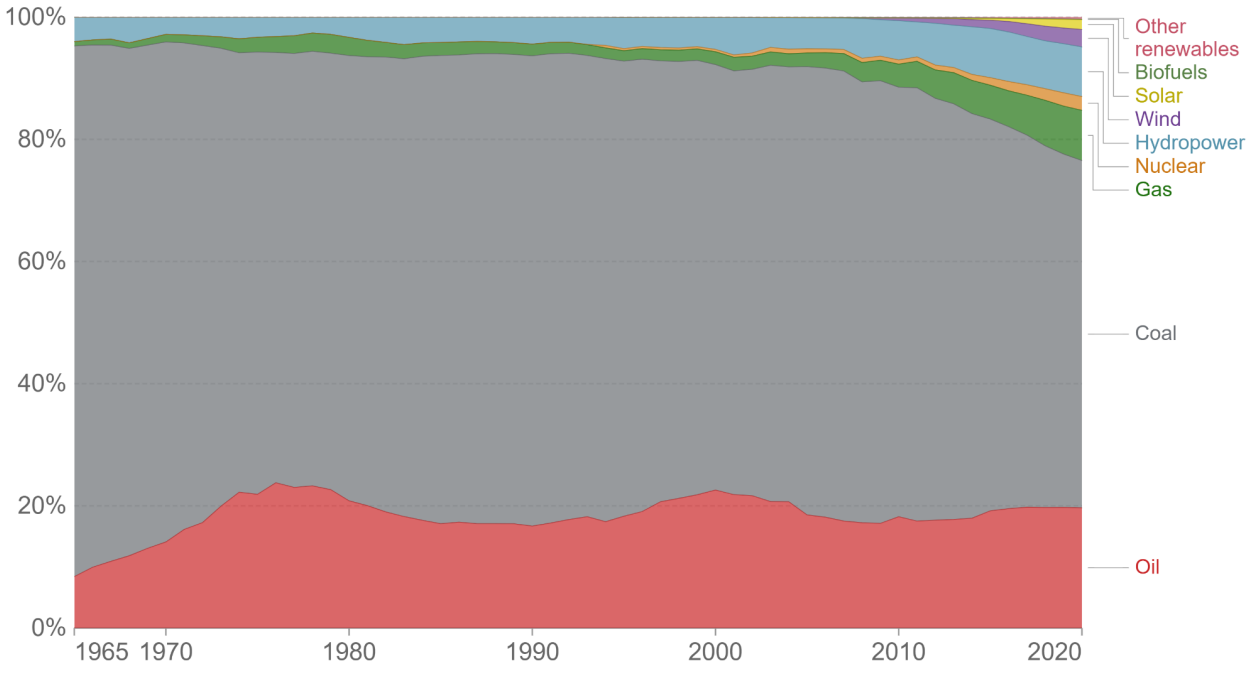
Energy mix or % consumption by source, BRICS and the world

Figure F.7 - India's energy consumption mix



Source: Our World in Data (2022)

Figure F.8 - China's energy consumption mix



Source: Our World in Data (2022)

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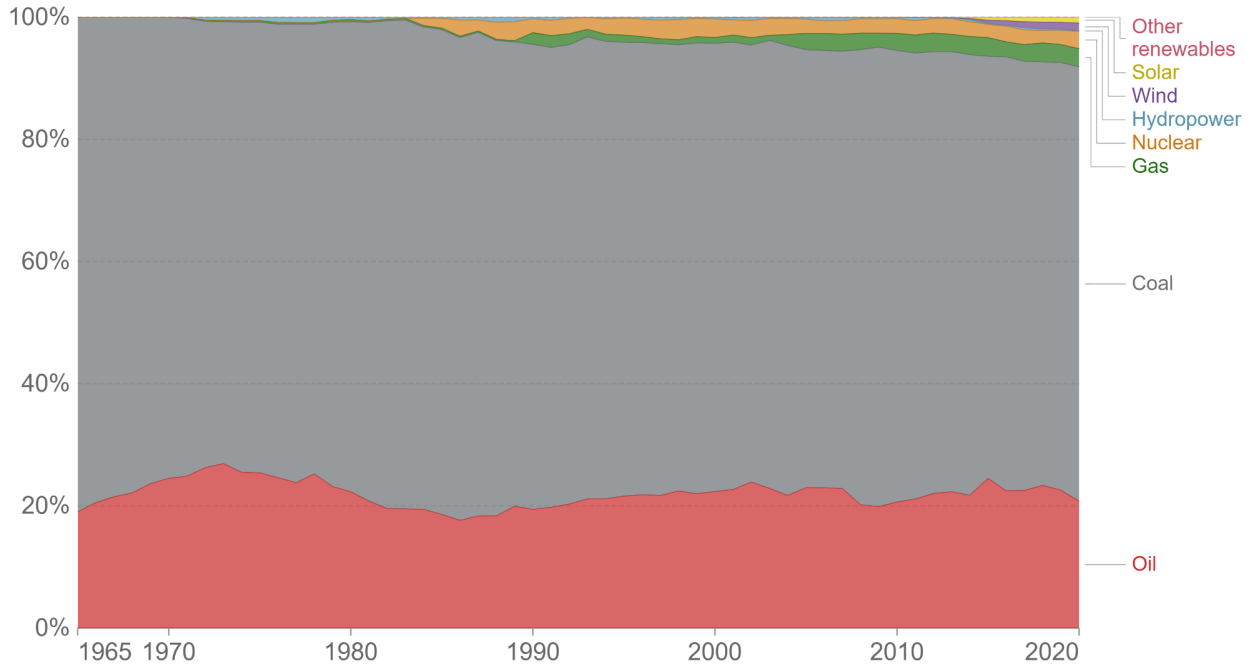
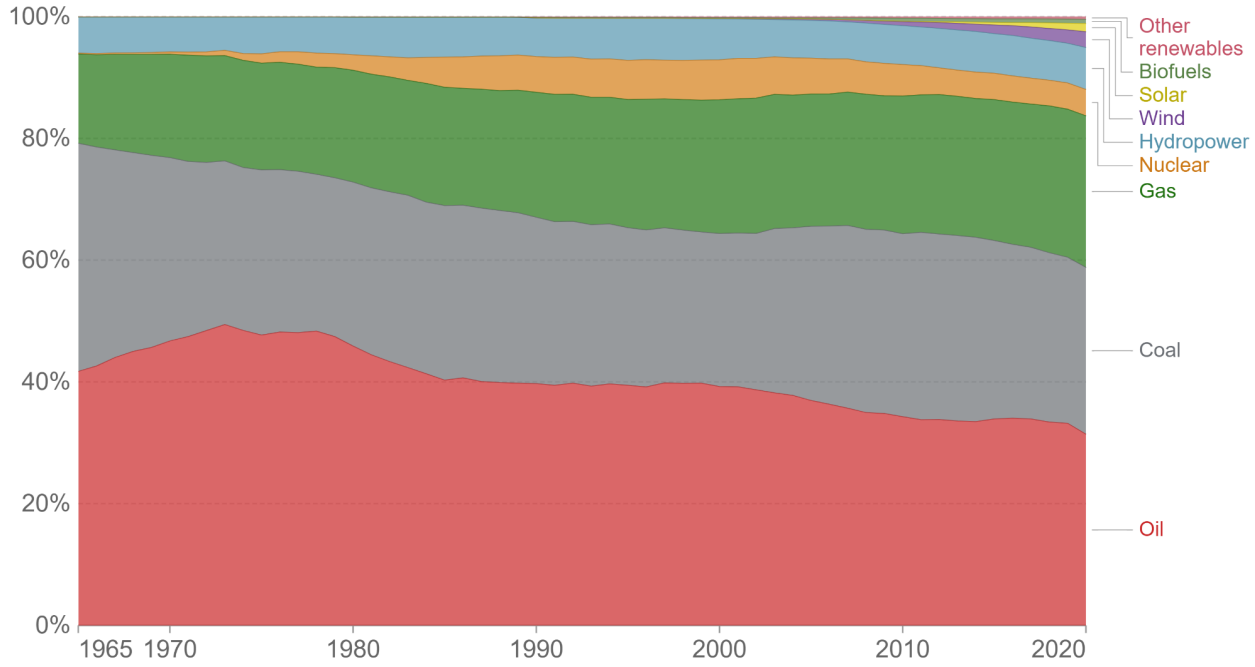
Energy mix or % consumption by source, BRICS and the world

Figure F.9 - South Africa's energy consumption mix



Source: Our World in Data (2022)

Figure F.10 - World average energy consumption mix



Source: Our World in Data (2022)

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