



FINANCING LOW CARBON INFRASTRUCTURE IN URBAN AREAS IN BRAZIL

**CONTEXT, BARRIERS AND OPPORTUNITIES FOR GREEN AND CLIMATE FINANCE
IN BRAZILIAN CITIES**

TECHNICAL DATA

This publication is the result of a partnership between the Ministry of Mines and Energy (MME), the German Cooperation for Sustainable Development, through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, within the framework of project Financing Energy for Low-carbon Investment - Cities Advisory Facility (FELICITY), financed by the International Climate Protection Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and implemented by GIZ in collaboration with the European Investment Bank (EIB).

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FOREWORD

Ministry of Mines and Energy

Energy efficiency is becoming increasingly important for achieving development, progress, and sustainability and resilience goals in Brazil and worldwide. In this context, cities are the most relevant locations for the energy transition. Urban centers concentrate the largest emissions of CO₂, and the greatest potential for the transition to a low carbon economy.

Investments in urban infrastructure are key to the cities' climate, economic and social trajectories in the coming decades, and, as such, they must be anchored in sustainable low-carbon strategies and initiatives. This study is an invitation to launch a new perspective on this issue, based on initiatives that promote climate resilience and mitigation in urban centers.

Promoting low-carbon infrastructure investments can contribute to economic recovery and sustainable job creation in the short term. Furthermore, it boosts urban development in low-carbon and resilient sectors, enabling cities to adapt to climate change in the long run.

Given the critical urgency of the energy agenda, and the importance of promoting energy efficiency projects in the urban context, the Ministry of Mines and Energy (MME), in partnership with the German Agency for International Cooperation (GIZ) and the WRI Brasil, launches this study to identify the opportunities and demands of green and climate finance for urban infrastructure in Brazilian cities, describing the existing challenges and barriers, and proposing recommendations to foster the development of policies and projects that will boost energy efficiency in Brazil in the coming years.

Carlos Alexandre Pires

Ministry of Mines and Energy

FOREWORD

GIZ

Urban areas concentrate most of the world's population and are important drivers of economic growth and job creation. They are also highly affected by climate change and, for that reason, human capacity to mitigate such changes will strongly impact the quality of urban life in the coming decades. It has never been more urgent to invest in low-carbon and resilient urban infrastructure sectors, such as energy efficiency in buildings and street lighting, electric mobility, promotion of green areas and urban biodiversity.

The decarbonization of urban energy systems will play a key role in the process of transitioning to a sustainable economy and meeting the commitments under the Paris Agreement. With the Agreement, subnational entities have gained relevance in the fight against climate change and in the access to sustainable finance instruments, such as international resources for climate action. Still, Brazilian municipalities lack institutional frameworks and know-how to develop projects that meet the requirements of international financiers.

In order to bridge this gap, the FELICITY project, Financing Energy for Low-carbon Investment - Cities Advisory Facility, was conceived, funded by the International Climate Protection Initiative (IKI) from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and implemented by GIZ in collaboration with the European Investment Bank (EIB). FELICITY aims to make low-carbon urban infrastructure projects in cities in Brazil, Ecuador, Mexico and Indonesia financially viable by providing technical assistance, especially for project developers and municipalities.

Hence, knowing that cities will have to take a leadership role in fighting climate change, FELICITY Brasil, in partnership with WRI Brasil, conducted a comprehensive study on financing low-carbon infrastructure in Brazil, in which opportunities are of great magnitude and, as estimated, with huge potential for climate investment, nevertheless facing several contextual barriers. Based on technical discussions and interviews with Brazilian urban finance actors, data analysis, and literature review, the study identified seven barriers to green and climate financing of urban infrastructure in Brazil.

The study addresses recommendations to support the overcoming of challenges, which consist of initial proposals and action fronts capable of finding applicable solutions to expand green and climate finance in Brazilian cities.

The FELICITY Program is proud to present, in partnership with WRI Brasil, the study "Financing Low Carbon Infrastructure in Urban Areas in Brazil". We believe in the importance of bringing light to the low carbon investment agenda in the Brazilian context. Small actions to overcome barriers to this investment can transform the development, implementation and financing of projects, which in turn can help us create a resilient, sustainable and livable world for future generations.

Michael Rosenauer

Director General of GIZ

FOREWORD

WRI Brasil

Brazilian cities face historical liabilities of infrastructure and urban services. In addition to that, the country has to face global challenges, such as the climate emergency and, more recently, the Covid-19 crisis. Cities are central to face these crises. According to the United Nations Secretary-General Antonio Guterres, it is in urban areas that the battle against climate change will be won or lost. If it is in these areas that the effects of climate change tend to be felt the most, it is also in them that a large part of Brazil's economic trajectory in the coming years will be determined.

Combining the provision of urban infrastructure with climate change mitigation and adaptation in cities is an opportunity for transformative change towards low-carbon, resilient and inclusive development. Choosing this path creates conditions to solve one of the main constraints faced by Brazilian cities: financing. The integration of climate mitigation and resilience aspects in the necessary urban investments opens doors to new flows of resources from the so-called green and climate finance, especially boosted from the Paris Agreement.

With this concern, WRI Brasil has been working on urban finance with a focus on sustainable infrastructure, in several initiatives and projects, since 2015. We coordinate the Network for Financing Sustainable Infrastructure in Cities (FISC Network), whose technical discussions, which are one of the sources of the knowledge contained in these pages, have helped bring cities closer to green and climate finance through development financial institutions. With the New Economy for Brazil initiative, we have demonstrated that

adopting a low-carbon trajectory, besides being better for the climate and the environment, it is the best choice for the people and the economy.

Brazil is fully capable to increase municipalities' access to the resources available for sustainable investments. The country is one of the main recipient countries of green and climate resources in the world and has a series of development financial institutions that can support cities in accessing these resources. There are, however, technical, fiscal, institutional, and regulatory barriers that need to be overcome, and overcoming them depends on the action of municipal governments, but also of several other actors, especially financing agents and the Federal Government.

This publication wants to contribute to this joint movement towards a more prosperous, inclusive, and resilient Brazil. In addition to identifying barriers, the following pages provide nine recommendations to support decision makers in the changes needed to unlock urban green and climate finance in Brazil and shape the future of Brazil's urban areas. It is also a call to action for these actors to take the next steps and drive the promotion of sustainable infrastructure in Brazilian cities.

Elizabeth Farina,

Executive Director of WRI Brasil

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EXECUTIVE SUMMARY

Urban areas concentrate most of the world's population and are also important drivers of economic growth and job creation¹. Concurrently, these areas are strongly affected by climate change, a trend that may worsen in the coming years. As such, investments in urban infrastructure – which will be a marker for the climate, economic and social trajectories of cities in the coming decades² – must be guided by low-carbon strategies.

Studies show that investing in low-carbon and resilient urban infrastructure sectors (such as energy efficiency in buildings and street lighting, electric mobility or the promotion of green areas and biodiversity) represents a great opportunity not only for cities, but also for countries and national governments³. Technically feasible and widely available mitigation measures capable of reducing greenhouse gas (GHG) emissions in cities by nearly 90% by 2050 can generate a global economic return of \$23.9 trillion⁴. In addition, it is estimated that over 70% of the world's resilient, low-carbon infrastructure that will need to be built in the next 15 years will be in urban areas⁵. Therefore, cities have all the requirements to lead the fight against climate change, thereby promoting economic prosperity and improving wellbeing around the world⁶.

In Brazil, this opportunity is of great magnitude. The country's climate investment potential is estimated at US\$ 1.3 trillion by 2030⁷, with urban infrastructure sectors accounting for most of this figure, including, for example, low-carbon transportation and sustainable housing and buildings. Besides supporting the improvement of the country's climate condition, low-carbon projects in cities can contribute to overcoming the historic deficit in the urban infrastructure services supply. Although there is no consolidated indicator on the size of the demand for urban infrastructure, data indicates that the amount is relevant. In the area of solid waste, for example, it is estimated that R\$ 11.6 billion are needed to universalize correct disposal by 2031⁸. In the urban mobility sector, in turn, the annual investment in the country's 15 largest metropolitan regions was 0.15% of the Gross Domestic Product (GDP) between 2016 and 2018. The percentage needed to reach satisfactory levels would be 0.4% of GDP, annually, between 2015 and 2027⁹.

Promoting the necessary investments in urban infrastructure through the implementation of low-carbon development strategies can also open the way to increase the level of financing and investment in urban areas. There are a number of financial institutions and vehicles, members of the so-called green and climate finance, which support the financial feasibility of sustainable projects and are active in Brazil. To better understand the recent landscape of green and climate finance and its channeling to Brazilian urban areas, this study provides an analysis of the finance trajectory of green and climate funds, multilateral and bilateral development banks, national and regional development financial institutions (DFIs), and green and climate bonds. This is a first exercise to identify the behavior of green and climate finance directed to Brazilian cities, nevertheless, future measurements and complementation are needed due to methodological and data limitations faced by the authors. This report suggests that among loans to public entities made by multilateral and bilateral development banks between 2017 and 2019, about US\$ 4.07 billion were directed to projects with a green and climate component aimed at predominantly urban sectors or with an urban purpose.

The resources from these vehicles and financial institutions, however, have not been reaching Brazilian urban areas assertively and efficiently, and there is significant room for expanding the flow of green and climate finance in order to enable low-carbon urban infrastructure. Therefore, based on a series of technical discussions and debates with key players in the Brazilian urban finance sector¹⁰, complemented by data analysis and qualitative literature review, this study has identified seven barriers to green and climate finance for urban infrastructure in Brazil, indicating nine recommendations to overcome them.

Among the barriers identified, in relation to the national institutional environment are (i) the low level of coordinated governance and integrated planning between federal, state and municipal governments and (ii) regulatory uncertainties related to unclear legal approaches of low-carbon projects. Within the scope of planning and project preparation at the local level, there are (iii) insufficient urban planning (due to the challenge of aligning projects with long-term development plans), (iv) difficulties in the preparation of high-quality investment projects and programs by

1 ONU (2019); Dobbs et al. (2011)

2 Floater et al. (2017)

3 Gulati (2020); Coalition for Urban Transitions (2019); Gouldson (2018)

4 Coalition for Urban Transitions (2019)

5 CCFLA (2015)

6 Coalition for Urban Transitions (2019)

7 IFC (2016) Amount based on the climate commitments assumed by Brazil in its Nationally Determined Contribution.

8 ABRELPE (2015)

9 Santos et al. (2015)

10 Input was collected through the structured discussions of the Network for Financing Sustainable Infrastructure in Cities (FISC Network). An initiative led by WRI Brazil that, between 2017 and 2020, held 10 meetings to discuss the financing of low-carbon urban infrastructure with representatives and urban financing experts from multilateral and bilateral banks, national and regional DFIs, as well as representatives from project facilities and local and federal governments.

the municipal technical staff. Regarding financing and resource mobilization, it is listed (v) the deficiency in directing resources to sustainable urban development (which is related to the difficulty in identifying the return on low carbon investments), (vi) the precarious municipal fiscal situation and (vii) the difficulties to overcome the financing processes of international, national and regional development banks.

To help overcome these challenges, this report suggests a set of nine major recommendations, aimed at all sectors of low-carbon infrastructure in cities¹¹. As part of these recommendations, some actions are suggested to deepen existing and new initiatives, which foresee the inclusion of different actors, including federal, state, and local governments, the private sector, and regulatory agencies. The nine recommendations consist of proposals for initial improvements and for the formation of debate fronts in order to find solutions to expand green and climate finance in Brazilian cities, and therefore do not aim to cover all the issues in the area. The proposals include:

1. Align national policies to enhance low-carbon urban development

Under the leadership of the national government, ensure long-term planning and coordination between the actions of national, state and municipal governments and their respective regulatory, fiscal and tax policies. To this end, it is suggested to develop and incorporate in the actions of competent bodies national commitments and targets for low carbon urban development in a transparent and clear manner, ensuring instances of coordinated governance to monitor progress on the agenda and the review of cohesion between existing national and local policies in relation to the commitments stipulated.

2. Implement strategies to improve the regulatory environment and drive projects in the urban infrastructure and low carbon sectors.

It includes the improvement of legislation, structuring and contracting of urban infrastructure projects to mitigate risks arising from regulatory and legal design. It includes the review and support to the elaboration of clear rules for risk allocation and guarantees for municipal consortia and/or other forms of cooperation for urban infrastructure projects, the creation of a committee and/or instance focused on the continuous improvement of regulations in low carbon sectors and to increase data transparency about the functioning of urban infrastructure (through a national program and specific funding line for capacity building and digitalization at the municipal level¹²).

3. Establish sub-national instances to improve urban planning and support management of low carbon investments in cities

It aims to ensure the alignment of low carbon infrastructure projects with plans, programs and

sector goals of the municipalities, through the creation of regional and/or state instances. These instances can verify the adequacy of the projects regarding city management documents and urban planning and support the connection between local governments and the sources of financial and technical support (either in project development or missing programs).

4. Implement a broad, continuous and integrated program of technical training and preparation for sustainable project preparation for local managers

Through a coordinated action between national, international, national and regional development financial institutions, project preparation facilities, universities and private consulting firms, it includes the creation of a continuous, comprehensive, nationwide program to build municipal and state capacity to formulate low-carbon projects, providing predictability to the private sector, harnessing the benefits of clean technologies and urban green spaces, digitalization of services, while promoting competition and innovation in the market, avoiding cost overruns and delays. Among the program's actions are the implementation of cooperation networks to identify complementarities and existing initiatives in the area, provision of online knowledge platforms, development of national events with technicians and municipal career servers, periodic public calls for technical improvement and financing of local sustainable projects, development of aggregation strategies (financial and project), the implementation of a fund aimed exclusively at municipal project preparation activities, and the development of identification, standardization, replication, and expansion strategies for low-carbon projects and initiatives in cities.

5. Deepen the incorporation of the urban climate agenda in the Brazilian financial system performance

Institutions that are part of the financial system, under the leadership of the Central Bank, can strengthen their ability to support the finance, investments and innovations needed for a low carbon transition in cities. Among the actions suggested are developing a joint definition of low carbon infrastructure investments in cities, furthering activities to understand, quantify and manage exposure to climate-related risks in investors' portfolios, and increasing support for thematic investments and/or those proven to be aligned with environmental issues¹³. Besides, it is suggested an increase in transparency and standardization of availability and methodologies of green and climate finance data at national level¹⁴.

6. Foster financial innovation and new investment models aligned with low carbon urban development

Financial system institutions and innovation initiatives in this sector can develop new financial instruments, adapt

11 This study did not conduct analysis of sectoral challenges and recommendations for scaling up green and climate finance in the country's urban areas.

12 OCDE (2018)

13 OECD World Bank and UN Environment (2018)

14 Knoch e Plasken (2020); CCFLA (2015)

existing instruments and increase access to models used internationally. To this end, it is suggested that institutions focus their efforts on low-carbon sectors in cities and scale up innovative instruments and new models that are aligned with green urban development. It is proposed that the Central Bank support the feasibility of initiatives aimed at financial innovation and the replication of innovative instruments and new investment models.

7. Improve the local fiscal environment to ensure financial resources for investments in low carbon projects in cities

It aims to ensure a favorable municipal fiscal environment to support low carbon urban infrastructure financing and the use of local fiscal systems in a strategic way, aiming to encourage the urban population to make sustainable investment decisions¹⁵. Other objectives, through the support of technical entities and governments, are to expand the use of land value capture instruments, to design and disseminate practices to secure public budgets via financial and urban planning instruments, and to develop documents that guide municipalities on how to use existing tools to access available funds. Entities and governments can also collaborate with partnerships and studies that generate or identify useful indicators for governance and spending.

8. Enhance access to financial resources for urban and low carbon infrastructure through the private sector

The goal is to increase private investments in urban and low carbon infrastructure and expand municipalities' indirect access to the green bonds market. Among the suggested actions are the creation of support units for Public Private Partnerships (PPPs) and concessions at the local level, the use of PPI (Programa de Parcerias de Investimentos – Investment Partnerships Program) as a starting point to enable a national management unit for PPPs and concessions focused on local low carbon projects, the standardization of processes for the implementation of PPPs and concessions, and the creation of technical committees and management unit at the state level.¹⁶ Means of payment and guarantee instruments may be expanded to support the mobilization of private capital. It is also recommended the development of criteria for prioritizing support for PPP projects and concessions that have green and climate bond emissions as a source of funds, and implementation of low-carbon urban PPP clustering strategies for green bond emissions

9. Develop tools, arrangements and incentives to facilitate access to national and international public loans for low carbon urban projects

It encompasses enabling a clearer and faster process for local governments to obtain loans from international, national and regional development financial institutions to enable urban and low carbon infrastructure projects. To this end, it is proposed that development financial institutions, in partnership with Painel da Comissão de Financiamento Externo (COFIEEX) representatives, facilitate access to information on financing opportunities and best practices for locally funded projects. These institutions can also develop information material that brings together instructions for accessing financing lines and overcoming the COFIEEX approval process, create fast tracking processes for the approval of loans for urban and low carbon infrastructure projects, increase triangular operations between international banks, national and regional banks and cities, and expand access to funds and partial guarantee instruments to cover the risks of credit operations in sustainable infrastructure projects in cities.

The recommendations and other information provided by this report aim to support the federal government, local governments, private sector and other actors to expand and catalyze green and climate finance for urban infrastructure in Brazil, which is particularly relevant in a context of widespread crisis due to the COVID-19 pandemic. Given the limitations of this study – especially regarding the existence and availability of data and information on the thematic scope – this document is but an initial stage of the long and important path towards the improvement of sustainable urban development strategies in the country. Nevertheless, the content presented here sheds light on the main issues related to green and climate finance, with a focus on the urban context, and contributes to subsidize new studies and future actions that seek to expand this type of finance in Brazilian cities.

¹⁵ Ahmad et al. (2019); CCFLA (2015)

¹⁶ ABDIB, 2016.



1 • INTRODUCTION

Cities are great determinants of the future of the planet. More than half of the global population (55%), or about 4 billion people, live in cities, and it is estimated to reach 68% by 2050 (UN, 2019). More than 80% of global Gross Domestic Product (GDP) is produced in cities (Dobbs et al., 2011). At the same time, they consume more than two thirds of the planet's energy and account for 70% of their global greenhouse gas (GHG) emissions (World Bank, 2010; UNFCCC, 2017). Cities are also severely affected by the impacts of climate change. It's in urban areas that most of the main global climate risks are concentrated, especially in low- and middle-income countries, where there are large concentrations of informal settlements in vulnerable areas (Revi et al., 2014). For example, in Latin America, the second most urbanized region on the planet (World Bank, 2020), it is estimated that a quarter of the region's urban population lives in slums (IDB, 2015). Worsening this scenario, the frequency and intensity of climate disasters, as well as their impacts on human (quality of) life tend to intensify (World Meteorological Organization, 2020).

For that matter, solutions to major global problems, such as fighting climate change, will be connected to the path chosen by urban areas. Climate change adaptation and mitigation will depend on the actions taken in cities (Revi et al., 2014) and, in particular, on how urban infrastructure and services will be provided to meet the current and future needs of its inhabitants. By providing basic services to the population, such as water and sanitation, energy and mobility (UN Habitat, 2012), urban infrastructure is the benchmark for the climate, as well as social and economic performance and trajectories of the coming decades (Floater et al., 2017). In particular, this is relevant for emerging markets, which comprise a large part of the areas that are expected to be urbanized by 2030 (IFC, 2018).

Evidences point out that searching for a low carbon and resilient growth brings several economic and social benefits. According to the New Climate Economy (2018), low carbon initiatives could generate US\$ 26 trillion in net economic benefits globally by 2030, when compared to the current development model, and could create 65 million jobs in low carbon related sectors in the same period. Specifically, in Brazil, it is estimated that low carbon investments would add \$ 2.8 trillion to the GDP by 2030 and an additional 2 million jobs would be generated in 2030 compared to the current development model, or business as usual (BAU) (Romeiro et al., 2020).

No wonder several countries have directed their recovery plans and packages in response to the health and economic crisis, caused by COVID-19 pandemic, to investments in strategic sectors to promote green recovery. Countries such as Germany and South Korea, for example, have announced packages of \$ 130 billion and \$ 61.9 billion, respectively, to generate jobs and boost the economy in low-carbon sectors (Walton and Jonker, 2020; Jaeger, 2020; Kyung-min, 2020; WRI Brazil, 2020). Likewise, the European Union has launched a EUR 750 billion recovery plan, with an estimated quarter of this

package focused on actions for the green economy (European Commission, 2020a; WRI Brasil, 2020).

Some urban infrastructure and low-carbon sectors have the greatest potential for income and job generation in the world. It is estimated that direct economic dividends of at least \$ 24 trillion could be unlocked by 2050 from investments in sustainable transportation systems, distributed energy systems based on renewable sources, the preservation and incorporation of natural capital into the urban landscape, and better management and retention of critical resources in local economies. With these measures, it would be possible to create at least 87 million jobs by 2030 and another 45 million jobs by 2050. (Gulati et al., 2020). Therefore, devote urban investments to low carbon and resilient sectors that adapt cities and mitigate climate change presents a double opportunity to, on the one hand, meet the demand for urban infrastructure and services deriving from the urbanization process, and, on the other hand, promote economic dynamism and generate jobs.

To finance such sectors, there are resources available, especially from climate and green finance, that can be accessed by reconciling investments to urban infrastructures and implementing low carbon development strategies. Such source refers to a financing flow of support to sustainable actions and/ or climate. It has presented an expansion process in recent decades (Stuart et al., 2020), opening a window of opportunity for cities to access. In climate and green finance, development financial institutions (FDIs) – whether international, national or regional – emerge as one of the critical actors in the operationalization of this flow of resources, especially in developing countries. They are established financiers of infrastructure in the region and take more decisively the climate issue in their mandates (OECD, World Bank and UN Environment, 2018).

Despite this opportunity, cities – especially those in developing countries, such as Brazil – face difficulties in financing and attracting sources of funds to implement low-carbon urban infrastructure and services. In Brazil where there are a set of bilateral and multilateral institutions and a consolidated and active national financial development system, there are some barriers that can be unlocked to improve and expand the access of cities to the flow of resources from these funders for their projects. They range from topics related to the technical quality of projects to regulatory issues. With the COVID-19 crisis and the need for urgent economic recovery, to understand and overcome these challenges is crucial to accelerate the implementation of sustainable urban investments and to catalyze existing climate and green finance, enhancing economic recovery and its stimulus packages.

Hence, the objective of this study is to identify opportunities, characteristics and demands of climate and green finance for urban infrastructure in Brazilian cities, aiming to provide potential recommendations

in order to boost these types of financing. The study was formulated to support actors from municipalities, development banks and federal ministries working on low-carbon urban infrastructure but is not limited to these.

BOX 1. KEY DEFINITIONS

Below you can find the definitions for some of the terms most commonly used in this study.

CLIMATE FINANCE

This study uses the definition of climate finance proposed by the Permanent Finance Committee of the United Nations Framework Convention on Climate Change (UNFCCC). According to it, "Climate finance refers to local, national or transnational funding – from public, private and alternative funding sources – that seeks to support mitigation and adaptation actions that address climate change. (UNFCCC, n.a.). Mitigation actions refer to actions that contribute "to reducing or avoiding greenhouse gas (GHG) emissions, or maintaining or improving GHG sinks and reservoirs. (CPI, 2019). Adaptation actions refer to means to "reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks by maintaining or increasing adaptive capacity and resilience" (CPI, 2019).

GREEN FINANCE

This study uses IDFC (2019) definition of green finance, according to which "green finance is a broad term that can refer to financial investments flowing into sustainable development projects and initiatives, environmental products, and policies that encourage the development of a more sustainable economy. IDFC continues: Green finance includes climate finance but is not limited to it. It also refers to a wider range of other environmental objectives, for example industrial pollution control, water sanitation, or biodiversity protection." (IDFC, 2019).

URBAN INFRASTRUCTURE

Refers to initiatives and projects contained within the physical boundaries of an urban area and designed to meet the needs of residents and industries in this area (CCFLA, 2015). The definition of predominantly urban sectors was used, which includes traditional assets from the sectors of energy, water and sanitation, urban mobility/transport, and non-traditional assets that support these sectors, including natural infrastructure¹ (based on Godfrey and Zhao, 2016; Bonilla and Zapparoli, 2017).

GREEN FINANCE LOW CARBON/SUSTAINABLE/ RESILIENT INFRASTRUCTURE

This study uses, to delimit these synonymous concepts, the IDB definition of sustainable infrastructure (2019), according to which the sustainable infrastructure entails infrastructure projects planned, designed, built, operated and in its life-cycle, removed (in the end of its life) in such a way as to ensure economic, financial, social, environmental and institutional sustainability during the complete life cycle of the project.

¹ – Natural infrastructure refers to the management, restoration or conservation of ecosystems that have the capacity to provide goods and services essential to material production, health and human well-being (Feltran-Barbieri et al., 2018), following the example of urban parks and squares.



2.

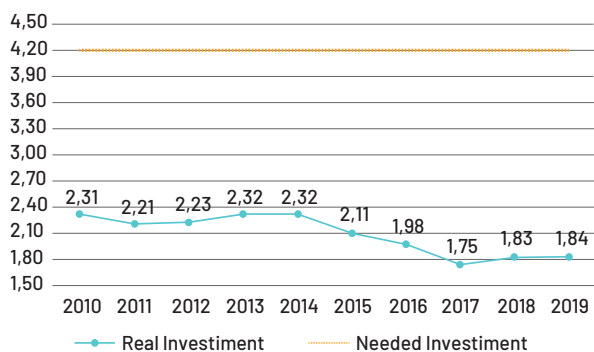
DEMAND AND OPPORTUNITIES FOR SUSTAINABLE INFRASTRUCTURE INVESTMENT IN BRAZILIAN CITIES

Brazil is an urban country. About 85% of its inhabitants, or 178 million people, live in urban areas (PNAD, 2015). The potential for growth and economic development of these regions is immense: only in the metropolises or large cities¹⁷, where 50% of the population lives, 63% of the GDP is produced (IPEA, 2016). In this sense, Brazilian urban areas are important catalysts for economic productivity and growth.

Despite this dynamism, Brazilian cities present challenges in providing infrastructure and basic urban services. Like most Latin American countries, Brazil's urbanization process was accelerated (IPEA, 2010a). This process, which occurred, in particular, during the 1970s and 1980s, led to the increase of the population and a rapid expansion of urban areas which, consequently, increased the demand for urban infrastructure (IPEA, 2010b), including energy, water and sanitation, transportation and housing. The speed with which the need for this type of infrastructure increased was not matched by a proportional response in its provision (Frishtack and Mourão, 2017; Costa, 2018).

One of the major gaps undermining infrastructure provision in Brazil is its financing and low level of investment. The average amount spent on infrastructure (urban and non-urban) over the decade from 2010 to 2019 was 2.1% of GDP, while the estimated figure for meeting needs is 4.2% over the next 20 years (Conceição, 2020).

Graph 1 - Infrastructure investment in Brazil between 2010 and 2019 (% GDP)



Source: Inter B. Consultoria (2018)¹⁸

This disparity has led to serious infrastructure service delivery problems, predominantly in urban sectors. Although there is no data to measure demand and magnitude of investments required for the provision of urban infrastructure in the country, there is evidence that the amount is relevant. Only in the urban mobility sector, it is estimated that the investment needed for the 15 largest metropolitan areas to reach satisfactory levels should be around 0.4% of GDP annually (R\$ 234 billion) between 2015 and 2027 (Santos et al., 2015). However, this percentage averaged 0.15% that is, less than half, between 2016 and

2018 (InterB, 2018). In regard to the solid waste sector, it is estimated that R\$ 11.6 billion is needed to universalize the correct disposal of solid waste by 2031 (ABRELPE, 2015).

This mismatch between infrastructure supply and demand may increase if financing and investment levels do not grow in coming years, due to Brazil's urban population growth, increase in per capita income and high growth potential of the consumer market. It is estimated that the investment gap in the energy sector could reach US\$ 109 billion by 2040, if the current investment trend continues (GI Hub, n.d.). In the water area under the same time horizon and due to the current investment trend in the sector, the gap could reach US\$ 6.7 billion (GI Hub, n.d.).

Although this is a persistent scenario and represents a complex challenge, there are strong reasons to amplify financing and investment in new infrastructure services or improvements to existing ones in cities, specifically low carbon and/or sustainable ones.

First, because on the path to the country's economic and social development, in a context of scarce resources, investment efficiency must be a priority. Investment in infrastructure has enormous potential because of its multiplier effect on the country's economy. An increase of 1% of GDP in public infrastructure stock has the potential to increase production of each Brazilian by 8.8% after 30 years (Ferreira and Araújo, 2007) and permanent investment growth equivalent to 1% of GDP can lead to a growth of Brazilian economy of 1.5% to 3% after a decade (Raiser et al., 2017).

Second, because the urban infrastructure that countries and cities build today will determine their economic, social and climate results for the next 30 to 100 years (Floater et al., 2017). Furthermore, sustainable infrastructure projects are more likely to generate social, environmental and economic benefits, in addition to having a better financial performance over time (WRI Brazil, 2020). Estimates show that, for example, building more resilient infrastructure in low-income and middle-income countries brings US\$ 4 in social and economic benefits for every US\$ 1 invested (Hallegatte et al.2019).

In this way, the urban needs should be seen as an opportunity for the country to implement long-term low carbon development strategies. As cities deal with these demands, they have the possibility to fill the gap with low carbon and resilient infrastructures, such as zero or low carbon transportation, sustainable housing, green infrastructure, among others, supporting even the implementation of Brazilian Nationally Determined Contribution (Contribuição Nacionalmente Determinada, NDC) – the country's goal in international negotiations on climate change. In conclusion, at the same time that local economic growth is improved, competitive advantages are increased, and climate risks are reduced for inhabitants, communities and companies.

17 São Paulo, Rio de Janeiro, Brasília, Manaus, Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Curitiba, Goiânia e Porto Alegre.

18 See <https://valor.globo.com/brasil/noticia/2020/01/15/investimento-em-infraestrutura-pode-voltar-a-23-do-pib.ghtml>.

The opportunity in the Brazilian context is of great magnitude. Based on the climate commitments made by Brazil in its NDC, the potential for Brazilian climate investment is estimated at US\$ 1.3 trillion by 2030, considering renewable energy, transportation, building, waste management and industrial energy efficiency sectors (IFC, 2016). Of this potential, the urban infrastructure sector stands out, especially the sub-sectors of low-carbon transportation and sustainable housing and buildings.

In the energy sector, for example, interventions in energy efficiency present two great opportunities¹⁹. On the one hand, actions aimed at promoting energy efficiency can lead to savings of approximately 16,5Mtoe in all sectors of the economy by 2024, with most of this total potential being concentrated in the industry and transport sector. On the other hand, expand the country's energy efficiency market to an average of 14% per year, with a rise from around R\$ 3.5 billion in 2015 to R\$ 22 billion by 2024²⁰.

Besides the implementation of climate mitigation and adaptation strategies and generation of dividends and income, investments in low carbon urban sectors also present a high potential for job creation in the country. In the energy efficiency sector, for the country to reach the goal assumed by its NDC in 2030, about 320 thousand new jobs will need to be created directly in the sector, which means increasing demand for qualified professionals in energy efficiency activities in an order of 5 to 6 times between 2018 and 2030 (Reimberg et al., 2019).

In the sanitation sector, from the approval of the New Sanitation Regulatory Framework (Novo Marco Regulatório do Saneamento), established by Federal Law no. 14,026/2020, the national government estimates that about 1 million jobs will be generated only in the next five years. This potential can be expanded if investments are directed towards the implementation of low carbon strategies in the sector. For example, while recycling, reuse and solid waste recovery actions have the potential to generate 3 to 20 jobs per 1,000 tons of treated waste, traditional landfill and incineration strategies generate only 0.1 jobs per 1,000 tons of treated waste²¹ (Gulati et al., 2020).

In addition, in low-carbon sectors, as urban mobility, including electric buses, active mobility, nature-based solutions in cities and buildings (or Near Zero Energy Building (NZEB) with zero energy balance²²), also

present strong potential for direct, indirect and induced employment generation²³ (Romeiro et al., 2020; Gulati et al., 2020; Veeder, 2019) in the country's urban areas. This is particularly relevant in a post-Pandemic context, since about 3.4 million Brazilians were off work due to social distancing and 27% of employed people got a lower income than that normally received²⁴ due to the health crisis (IBGE, n.d.).

Given this opportunity and the need for actions to help the country's recovery after the COVID-19 crisis, it is clear that investments in sustainable and low-carbon infrastructure are an efficient alternative with the potential to reconcile economic recovery and job creation needed in the short term and long-term development strategies. All this combined with the development of strategies to offer greater resilience to climate change effects in Brazilian cities.

To this end, urban infrastructure finance will need to be more assertive and efficient. Each available resource of international or national stimulus actions, and existing forms of climate/green finance, will have to be directed in such a way as to facilitate or enhance the flow of resources for the green urban recovery. The next section will focus on analyzing how and to what magnitude the flow of green and climate finance occurs in the Brazilian urban areas and the main sources of financing with potential to be considered as climate and/or green operating in the country, indicating improvement points to expand and accelerate the level of such resources to Brazilian cities.

19 (Carbon Trust, 2017).

20 To estimate the size of Brazil's energy efficiency market, figures were allocated for energy consumption and savings forecasts presented in Brazil's 10-year energy plan (EPE, 2017) with assumptions on the average useful life of energy savings interventions by sector to generate cost reduction numbers. Values in R\$/ktoe were allocated for fuel savings and R\$/MWh for electricity savings by sector based on current energy prices.

21 Estimate made for the United States, by the study More Jobs, Less Pollution: Growing the Recycling Economy in the U.S. Available at: <https://www.tellus.org/tellus/publication/more-jobs-less-pollution-growing-the-recycling-economy-in-the-u-s>. The variation in job generation concerns the difference in materials to be recycled, such as wood, textiles, paper, iron and steel manufacturing.

22 For more information about this type of initiative, we suggest accessing: <http://www.procelinfo.com.br/main.asp?View=%7B8D1AC2E8-F790-4B7E-8DDD-CAF4CDD2BC34%7D&Team=¶ms=itemID=%7B37A1E97B-5C1A-4D95-88E4-513B04FE0AA2%7D;&UIPartUID=%7BD90F22DB-05D4-4644-A8F2-FAD4803C8898%7D>.

23 No data on job creation potential in the country for these sectors were traced.

24 Data collected between 30/08 and 05/09/2020



3

GREEN AND CLIMATE FINANCE LANDSCAPE FOR LOW CARBON URBAN INFRASTRUCTURE IN BRAZIL

Introduction to measuring the supply of climate and green finance

There are a number of public, private, multilateral, bilateral, national and international revenue sources that can finance initiatives with climate and environmental impact (Flynn, 2011). This wide range of options, which have diversified significantly since the signing of the Paris Agreement in 2015 (UNCCC, n.d.b.), usually fall within the scope of so-called climate and green finance²⁵.

Several international organizations use these concepts²⁶ to differentiate them from other types of finance, taken into consideration the amount of global financial resources required for the transition to a global low carbon economy and the particular characteristics of financing in climate-related sectors (Gupta et al., 2014; WRI, 2019). Among some specificities of green and climate finance, which make them more complex, one can list the high costs and relative risks, given their innovative character, longer maturation time and/or diffuse returns and benefits²⁷ (NCE, 2016; WWF, 2015; Ahmad et al., 2019). To attract the interest of the private sector, which is lower under these conditions, discussions on climate and green finance give more prominence to the public sector as the main sector responsible for increasing investment returns, minimizing risks and encouraging the private sector on a larger scale (Samaniego and Schneider, 2019; Falconer and Stadelmann, 2014).

The measurement of climate and green finance flows has been carried out by several publications²⁸, which analyze, among others, the type of financing (loans, bonds, etc.), the source (public, private, etc.) and what is financed (LSE, 2018). Estimating climate and green finance not only promotes greater transparency for the actions of the institutions present in this flow, but also provides information that has the potential to leverage resources

in regions and sectors that need them most and improve their implementation (IDFC, 2019). According to CPI (2019), climate finance summed US\$ 546 billion in 2018 worldwide; of these, about \$ 31 billion came from the Latin America and Caribbean region. Also, according to the CCFLA (2015), international development banks²⁹ directed US\$ 19 billion in climate finance to urban areas.

Recent green and climate finance flow to Brazilian urban areas

According to CEPAL (2020)³⁰, climate finance flows in the country (urban and non-urban areas) summed in the country about US\$ 4.9 billion³¹ in 2018, or about 0.26% of Brazil's GDP in the same year. The country is also the largest recipient of this type of financing in the region, comprising almost 35% of the total flow assessed to Latin America.

To understand the main trends and recent characteristics of green and climate finance specifically in Brazilian urban areas, this study analyzed the recent trajectory of different revenue sources present in the country. This exercise was carried out in order to understand how the opportunity for green and climate finance translated into investments in Brazilian urban areas³².

There are several ways in which the flow of green and climate finance can be channeled to low carbon investments. (Figure 1). Despite the existence of conceptual and methodological controversies (Samaniego and Schneider, 2019), some sources usually appear in analyses of climate and green finance in a systematic way. These include international and national green and climate funds, bilateral and multilateral development banks, national public banks, and the private sector in general, with focus on the green bonds sector (CPI, 2019; Samaniego and Schneider, 2019; OECD, 2015b; Gupta et

25 See definitions in Box 1.

26 Despite the relevance the topic has taken in recent years (Zou and Ockenden, 2016), to date there is no single definition of what climate finance is (Gupta et al., 2014) and green finance (IDFC, 2019). Frequently used to describe financing flows from developed to developing countries (UNFCCC, n.d.b), many publications argue that the term climate finance refers to any and all financing flows aimed at implementing mitigation and adaptation strategies in the territory (Samaniego and Schneider, 2019; Gupta et al., 2014; CCFLA, 2015; Flynn, 2011).

27 According to the Global Commission on Adaptation (GCA), the benefits of climate and/or sustainable projects are usually divided into three areas: the first is the avoided costs, i.e. the investment ability to reduce future losses; the second is the positive economic benefits through risk reduction, increased productivity and by encouraging innovation through the need for adaptation, for example; the third is the social and environmental benefits (GCA, 2019).

28 These include, among others, the Climate Policy Initiative (annual Global Landscape of Climate Finance series); ECLAC (Report on Climate Change Financing in Latin America and the Caribbean series); and IDFC (IDFC Green Finance Mapping Report series); African Development Bank, Asian Development Bank, Asian Infrastructure Investment Bank, European Bank for Reconstruction and Development, European Investment Bank (EIB), Inter-American Development Bank Group (IDB), Islamic Development Bank and World Bank Group (annual Joint Report series on Multilateral Development Banks' Climate Finance).

29 Banco Africano de Desenvolvimento, BID, CAF, Banco Asiático de Desenvolvimento, Agência Francesa de Desenvolvimento, Grupo KfW, Grupo Banco Mundial e BEI.

30 Samaniego e Schneider (2020).

31 Sources of financing considered: Multilateral and Bilateral Development Banks, National Development Banks, Climate Bonds and other local resources (Samaniego e Schneider, 2020).

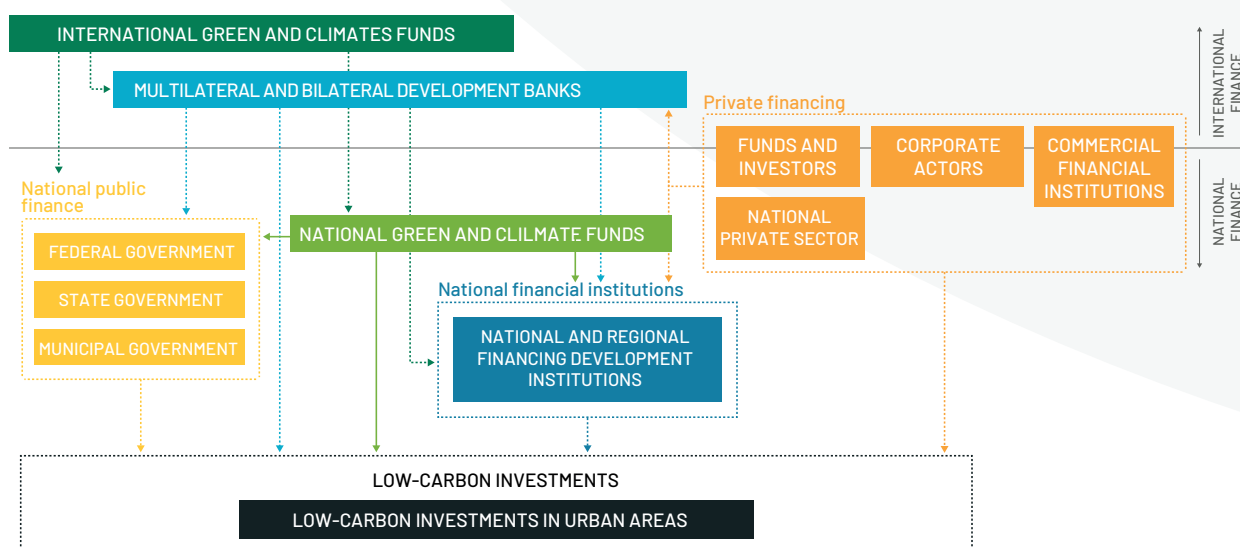
32 It should be noted that while the analysis focuses on monetary resource disbursements, green and climate financing may also include a range of technical support and the formulation of national and local policies not necessarily covered by the flows assessed here. This issue will be dealt with further in Section 5. In addition, the translation of monetary flows from green and climate financing into effective climate change projects and actions depends on political, institutional and regulatory conditions for their effectiveness (CCFLA, 2017), which will be addressed in Section 4 and 5 of this publication.

al., 2014; Flynn, 2011). For the analysis of climate and green finance in Brazilian cities, these were the same sources included in the analysis

In the midst of this architecture of sources operating in the country, green and climatic funds such as the Global Environment Facility³³ (GCF) and the National

they tend to incorporate sustainability components more intensely in their financing strategy. This characteristic is particularly beneficial for cities. When they choose to invest in sustainable infrastructure, they face relative disadvantages compared to the usual infrastructure (NCE, 2016), due to the inherent characteristics of climate

Figure 1 - Climate and green finance architecture for urban infrastructure: main sources, actors and channels



Source: Authors' elaboration

Climate Fund stand out. These mechanisms support the combination of climate funds from public, private, multilateral and bilateral sources to finance and leverage their actions (Margulis, 2017). Particularly for Brazil, such funds are relevant since (i) they usually support actions in developing countries, (ii) they provide, in addition to financial support, technical support for implementing climate impact solutions (Barnard, 2015), and (iii) Brazil is the second largest recipient of these funds' resources in the world (Climate Funds Update, n.d.). Furthermore, there is an indication of an increasing explicit focus of some funds on urban impacts, which suggests that cities are being greatly prioritized in the funds' agendas, and urban infrastructure can benefit from that. (Barnard, 2015).

The multilateral and bilateral development banks, such as the World Bank and the French Development Agency (FDA), are the main international implementing agencies in the country for green and climate funds (Samaniego and Schneider, 2020). In addition to this revenue source, they also carry support from governments and other international bodies (Bird et al., 2017). These organisms are major catalysts for sustainable urban projects in Brazil, as

and green finance, discussed above. By investing in this type of project at the local level, multilateral and bilateral development banks pave the way for the development of more consolidated business models, reducing market barriers and the technical and financial uncertainties of projects and potentially attract new, more risk-averse revenue sources, such as the private sector (Larsen et al., 2018).

In addition to public international finance, development financial institutions (DFI) are included in this analysis. National development banks such as the National Bank for Economic and Social Development (BNDES) and the Development Bank of Minas Gerais (BDMG) are responsible for operating both international and national green and climate funds (Samaniego and Schneider, 2019). Furthermore, these institutions have in their mandate prerogatives that allow them to act more incisively in sectors that are often less attractive to the private market, such as low carbon infrastructure. Still within the national context, regional development banks (DFI) have been included because they are increasingly seeking to incorporate sustainable assets into their portfolios, either through their own resources or through

33 Green Climate Fund.

external resources, and because they are able to provide greater capillarity to international and national climate finance, via, for example, triangular operations³⁴.

Finally, regarding the private sector, green and climate bonds, debt instruments capable of providing important resources for climate finance were included (World Bank, 2018). Although Brazilian cities can't issue bonds³⁵, there are different ways in which resources can be channeled to urban areas, such as via Public Private Partnerships (Parcerias Público Privadas, PPPs) and concessions, or via issuance of bonds by national and regional banks (CBI and IDB, 2018). This makes it possible to broaden the range of sources and factors that can support green and sustainable finance, making it more attractive.

There is no database that concentrates information about green and climate finance in Brazil, just as there is no standard methodology for the provision of data by the institutions and sources of funds mentioned above. Therefore, in order to identify the major trends in green and climate finance aimed at Brazilian urban areas, this study sought to distinguish, first, the flows aimed at projects, sectors and / or areas with green and climate impact. This was done through the institutions 'official reports and the authors' ad hoc analysis and classification. After that, areas and projects with an explicit urban purpose, or with an impact on sectors whose majority of demand comes from urban areas, were taken into consideration, including water and sanitation, urban transport and mobility, and energy efficiency (Godfrey and Zhao, 2016; Bonilla and Zapparoli, 2017) – called by this publication “predominantly urban sectors”^{36 37}.

Having considered these issues, this section aims to present major recent trends and the magnitude of green and climate finance resources in the country for Brazilian cities. This exercise is the first attempt to identify the behavior of green and climate finance directed to Brazilian cities, requiring future measurements and complementation³⁸.

Green and Climate Funds

Green and climate funds are public independent structures with a delimited and renewable purpose, financed with state funds or other funds and administered by, among others, governments, international, national or regional development banks or other organizations such as the United Nations (UN) (Samaniego and Schneider, 2019).

They can be divided between international or national and multilateral or bilateral funds (Watson and Schalatek, 2019; Samaniego and Schneider, 2019). Multilateral funds have revenues from different sources, such as the Global Environment Facility (GEF). There are also bilateral funds that receive revenues from one source only (e.g., Germany's International Climate Protection Initiative (IKI)). While the national funds are managed by the countries themselves (in the case of Brazil, it can be listed the Brazilian National Fund on Climate Change or Fundo Clima), international funds are usually managed by international organizations (for example, the Green Climate Fund (GCF), managed by the World Bank).

Although direct support from climate funds³⁹ represents a modest share of climate finance in Brazil – about 0.6% of the total annual amount (Samaniego and Schneider, 2020) – such source is quite relevant, as it is able to catalyze larger amounts of public or private funding and financing and help overcome market or policy barriers that prevent other actors from implementing mitigation or adaptation solutions (Barnard, 2015). This section includes analysis of the following funds: Amazon Fund, GEF, GCF, Forest Investment Program (FIP), Fundo Clima, and Nationally Appropriate Mitigation Action Facility (NAMA Facility) (Table 1). They were included for their international relevance and for the amount they contributed in the country recently. Bilateral funds were not included in the analysis.

34 Besides the municipalities themselves, private companies can also take out international and national loans in the form of Special Purpose Companies (Sociedade de Propósito Específico, SPE) for urban infrastructure services, depending on the regulations of the sectors (this is the case, for example, with public lighting). This is quite relevant since cities may have financial constraints on borrowing directly and increasing their level of indebtedness. Such arrangements, however, can be complex to develop and often include challenges regarding a clear risk allocation structure.

35 In the Brazilian case, sub-national entities are not authorized to issue debt securities under the Fiscal Responsibility Law (Complementary Law 101/2020).

36 All the data and information brought in this section were obtained through publications and databases of international and national organizations, government databases and annual reports of financial institutions present in the country. Finally, when necessary, direct contact was made with a representative of the institutions covered in this section. For further details on the data collection methodology used, see ANNEX A - Methodological Considerations.

37 These were not included in the case of initiatives targeting predominantly urban sectors, but with a clear rural focus.

38 Attention is drawn to the impossibility of adding up the financing provided by the different sources analyzed here, in order to avoid double counting.

39 Global Environment Fund.

Table 1 – Climate funds analyzed and basic characteristics

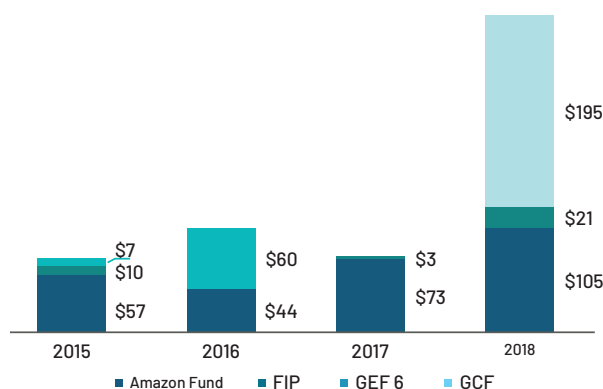
Fund	Type	Management	Focus
Amazon Fund	National and Multilateral	BNDES	Mitigation – REDD ⁴⁰
Global Environment Facility(GEF)	International and Multilateral	GEF	Mitigation - General and Adaptation
Green Climate Fund (GCF)	International and Multilateral	World Bank	Mitigation - General, Mitigation - REDD and Adaptation
Forest Investment Program (FIP)	International and Multilateral	World Bank	Mitigation – REDD
Brazilian National Fund on Climate Change	National and Multilateral	BNDES e MMA ⁴¹	Mitigation
NAMA Facility	International and Multilateral	KfW e GIZ ⁴²	Mitigation

Source: Author’s own elaboration with data from Climate Funds Update (updated February 2019), based on Samaniego and Schneider (2019).

Brazil is the second largest recipient of green and climate funds, having received more than US\$ 1.1 billion⁴³. It is only behind India, with US\$ 1.2 billion. An analysis of the projects approved by the Amazon Fund, GEF, GCF and FIP for exclusive projects in Brazil show that the contributions have varied substantially. In 2015, they totaled about US\$ 74 million. In 2016, they rose to US\$ 104 million, and in 2017 they dropped to around US\$ 75 million, and in 2018 the amount rose again and reached about US\$ 321 million. The total amount verified in the period was directed to climate mitigation actions, without contributions in the adaptation area. The fund with the largest participation was Amazon Fund (48%), followed by Green Climate Fund (34%). The Global Fund for the Environment and the Forest Investment Program totaled 12% and 6% of the amount, respectively

When analyzing the explicitly urban projects⁴⁴ (Barnard, 2015) with resources approved by these funds, only one Green Climate Fund initiative was found, and it accounted for 34% of the entire contribution of the period⁴⁵ (Graph 3).

Graph 2. Amount of resources approved by multilateral green and climate funds in Brazil between 2015 and 2018 (US\$ million)



Source: Authors’ own elaboration based on Climate Funds Update (updated in February 2019)

40 Reduction of Emissions from Deforestation and Forest Degradation.

41 Ministry of Environment.

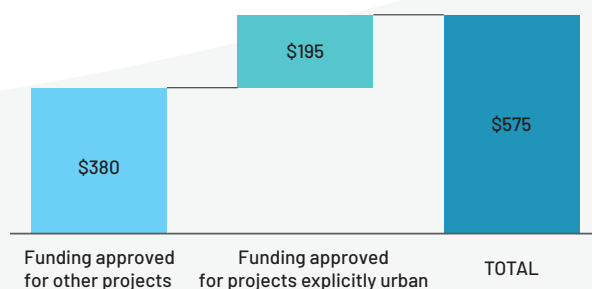
42 KfW Development Bank y Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

43 Data available at: <https://climatefundsupdate.org/data-dashboard/#1541245664232-8e27b692-05c8>. Data updated in February 2019.

44 Based on Barnard's methodology (2015), the projects were reviewed, including name, areas and objective to collect those with explicit goals with urban climate mitigation or adaptation.

45 Called "Financing Instruments for Brazil Energy Efficient Cities" (FinBRAZEEC), the initiative was focused on promoting climate mitigation through energy efficiency in municipal and industrial public lighting. The project was cancelled in April 2020.

Graph 3 - Amount of resources approved by multilateral green and climate funds in Brazil according to project type (explicitly urban or non-urban) between 2015 and 2018 (US\$ million)



Source: Author's own elaboration based on Barnard (2015) and data from the Climate Funds Update (Updated in February 2019)

Besides the climate funds previously evaluated, there are two other important initiatives present in Brazil, namely the Climate Fund, and NAMA Facility.

Created to be an instrument of the National Policy on Climate Change (Política Nacional sobre Mudança do Clima), the Climate Fund (Fundo Clima) makes its financing and investment actions in two ways: through reimbursable operations, managed by BNDES, and through non-reimbursable operations, managed by the Ministry of Environment (MMA) (Samaniego and Schneider, 2019). Within the scope of the Fund, the MMA carries out structuring actions of the National Policy, such as the development of information bases, (Taboulchanas et al., 2016). BNDES, in turn, has investment subprograms that are systematized into bank reimbursable financing lines within the Climate Fund Program (Taboulchanas et al., 2016). It is mainly through it that the Fund supports urban areas: among the sub-programs there are credit lines for projects in urban areas of urban mobility, sustainable cities and climate change and solid waste (BNDES, n.a.d)⁴⁶. In the years 2014, 2015 and 2016, the disbursements of the Climate Fund under the BNDES program totaled US\$ 2.4 million, US\$ 22.1 million and US\$ 10.7 million, respectively (Samaniego and Schneider, 2019). In 2017, contributions dropped dramatically, reaching \$ 110,000. In 2018, the volumes were similar to those of 2016, totaling US\$ 10.25 million (Samaniego and Schneider, 2020).

Finally, Brazil also counts on the support of NAMA Facility, created to provide financial support to emission reduction actions in developing countries (also called Nationally Appropriate Mitigation Actions), which should be developed through national development plans (NDC Partnership, n.d.). In Brazil, NAMA supports the project (i) Transformative

Investments for Industrial Energy Efficiency (TI4E), selected in 2020, and the (ii) Resource Efficiency Program for the Meat Supply Chain, selected by the fourth call in 2016. This project offers direct funding of EUR 11.25 million in grants (to generate a portfolio of investment projects in technologies and best practices) and EUR 4 million to create a first loss guarantee mechanism (to leverage EUR 40 million in loans from national banks).

Green and climate funds are important instruments of funding and technical assistance and have great potential to support Brazilian cities, through building local capacity, supporting the improvement of the regulatory environment, and providing financing on more favorable terms (Barnard, 2015). It should be noted that, in the case of international funds, the channeling of funds is primarily carried out by national governments (World Bank, 2009 APUD Margulis, 2017) therefore coordination and partnerships among public entities are paramount. In the period under review, the participation of funds revenues for urban sectors (particularly international funds where more complete data are available) were modest, which suggests a potential for increasing their contribution.

Multilateral and bilateral development banks

Multilateral and bilateral development banks are important drivers of climate change adaptation and mitigation initiatives in Brazil (Samaniego and Schneider, 2019). In general, these organizations support the country's transition to a low carbon economy both through the operationalization of international green and climate funds as previously analyzed, as well as through their own resources, providing relevant assistance for the implementation of NDC at the national level and financing of sustainable projects at a local level (Larsen, 2019).

Data for multilateral and bilateral development banks⁴⁷, financial operations (loans/projects) for national and sub-national public entities were collected in the Panel of the External Financing Commission (COFIEX)⁴⁸, for the years of 2017, 2018 and 2019. In addition, information provided directly through interviews by selected international financial institutions, and the collection of secondary data in publications and databases of the banks were added. This section includes the World Bank Group, Inter-American Development Bank (IDB), Latin American Development Bank (CAF), New Development Bank (NDB), European Investment Bank (EIB), French Development Agency (AFD), Financial Fund for the Development of the Silver Basin (FONPLATA) and KfW Banking Group.

46 Other subprograms: Efficient Machines and Equipment, Renewable Energies, Charcoal, Native Forests, Carbon Management and Services and Innovative Projects.

47 For further details on the data collection methodology used, see ANNEX A - Methodological Considerations..

48 COFIEX is within the Secretariat of International Affairs of the Ministry of Economy and is the federal agency that evaluates and approves all projects that require sovereign guarantee and involve financing with external resources from international development financial organizations. As most international banks require guarantees from the federal government for the approval of their projects to national and sub-national public entities, COFIEX Panel is a platform that brings together most of the projects under analysis, approved, being implemented or concluded, originated from international loans to public entities in the country. Source of information: <http://painel-cofiex.economia.gov.br/>

Considering the entire universe of projects (urban and non-urban), for the period between 2017 and 2019, the COFIE X Panel presented a total of 69 projects undergoing execution. By adding the projects of AFD and the EIB, institutions not covered by COFIE X database, 73 loans were approved between the years of 2017 and 2019, with a corresponding US\$ 7.89 billion-amount.

IDB was the largest provider of loans and of COFIE X approved projects in the period (32), followed by CAF's financial and project participation (22). The World Bank and EIB ranked third and fourth in terms of funds contributions, with 8 and 3 projects each, respectively, followed by FONPLATA, with 5 projects. Although FONPLATA had more projects approved than the EIB, the amount was considerably lower. AFD, NDB and KfW each supported one project in the period. Finally, the World Bank again appears as a supporter of 1 project managed under the Forest Investment Program (FIP), whose funds are contributed by the Strategic Climate Fund (SCF) (Graph 4).

After collecting data on loans' approvals from multilateral and bilateral development banks to national public entities by COFIE X, we analyzed the performance of these loans in regard to green and climate finance for predominantly urban sectors⁴⁹ or with explicitly urban purposes.

It was found that the climate and green component was not made explicit in projects aimed at areas not directly related to the climate, such as education, health and improving fiscal management⁵⁰. The latter was the case for 20 projects, that is, about 27% of the initiatives. After analyzing the projects with a green and/or climate component, which totaled 53 initiatives, we started to identify initiatives with an impact on urban areas and/or in predominantly urban sectors. In total, multilateral and bilateral banks contributed approximately \$ 4.07 billion to 44 projects that had a green and/or climate component and were aimed at predominantly urban sectors or had an explicitly urban impact/purpose in the period from 2017 to 2019. This represented 52% of the total amount contributed by these institutions in the country and 60% of the projects⁵¹ (Graph 5).

When analyzing borrowers of loans with a green and/or climate component and aimed at predominantly urban sectors or with an explicit impact on urban areas, it is clear that municipalities are the main promoters of this type of project, comprising 51% of the value of operations. They are followed by state companies of mixed economy, with 25% of the value, states, with 22% of the value, and regional development banks, with 2% of the value (Graph 6). Of the 44 loans for projects with a green and/or climatic

component aimed at predominantly urban sectors or with an impact on urban areas, municipalities were borrowers in 33 initiatives, followed by states, with 6 loans, a mixed economy state company, with 4 loans, and regional development bank, with 1 loan.

When analyzing the average contribution per project according to the type of borrower, it becomes clear the big difference in the individual size of loans (Graph 7). While loans to municipal borrowers averaged about US\$ 63 million per operation, contributions to the state mixed-capital companies were, on average, about US\$ 250 million. For states, the average loan amount reached US\$ 148 million, while for regional development banks the amount was around US\$ 95 million per loan.

A closer look at the cities that obtained loans to finance projects with a green and / or climate component aimed at predominantly urban sectors and / or with an impact on urban areas shows that, in all, 29 municipalities made international loans in the period. The cities with the highest number of approved projects were Fortaleza (CE), Salvador (BA), Joinville (SC) and Santo André (SP), all with 2 approvals. One project was approved in each of the other municipalities covered by these loans.

When checking the geographic, population and economic characteristics of the cities that carried out this type of operation, it is noted that the greatest beneficiaries in terms of contributions were (i) municipalities located in the Northeast and Southeast region, (ii) municipalities with more than 100 thousand inhabitants and, especially, those with more than 500 thousand inhabitants and (iii) municipalities that have a municipal per capita GDP between R\$ 20 thousand and R\$ 50 thousand (Graphs 8, 9 and 10). It should be noted that although greater support to local governments in the Northeast region represents a potential support for reducing regional disparities in Brazil, contributions are concentrated in municipalities whose characteristics are not systematically verified in the country: about 94% of Brazilian municipalities have less than 100,000 inhabitants and 60% have a per capita GDP less than R\$ 20 thousand.

Finally, the types of sectors predominantly urban and/or having an impact on urban areas covered by loans with a green and/or climate component in the period were also identified. First and foremost, contributions to projects in the multisector category stand out among others, and they account for 35% of the total value. In this category are initiatives whose impact occurs in more than one sector (usually described by financial institutions as, among others,

49 It should be noted that it was not possible to break down the amount contributed to actions aimed exclusively at climate mitigation, climate adaptation or other environmental products within each project/loan, due to the unavailability of disaggregated data and information on the initiatives. Several international public loans (as is the case of regional banks as borrowers) include contributions related not only to climate and environmental actions, but also to transaction costs, for example. Therefore, this section analyzed the green and/or climate contributions at the project level, accounting for them when they explicitly provide some sustainability and/or climate component. In this sense, the value presented in this section does not refer to the exact amount of funding for climate mitigation and adaptation actions or sustainable actions in cities. It rather refers to the indicative of urban areas and with green potential and/or covered by international loans coming from multilateral and bilateral development banks.

50 It is stressed that these areas, despite not being directly linked to climate mitigation and adaptation actions, are important to address the climate issue. Strengthening education, for example, is fundamental for future and current decision makers to be aware of the climate impacts and adhere to the solutions.

51 For more details about this classification, see ANNEX A - Methodological Considerations.

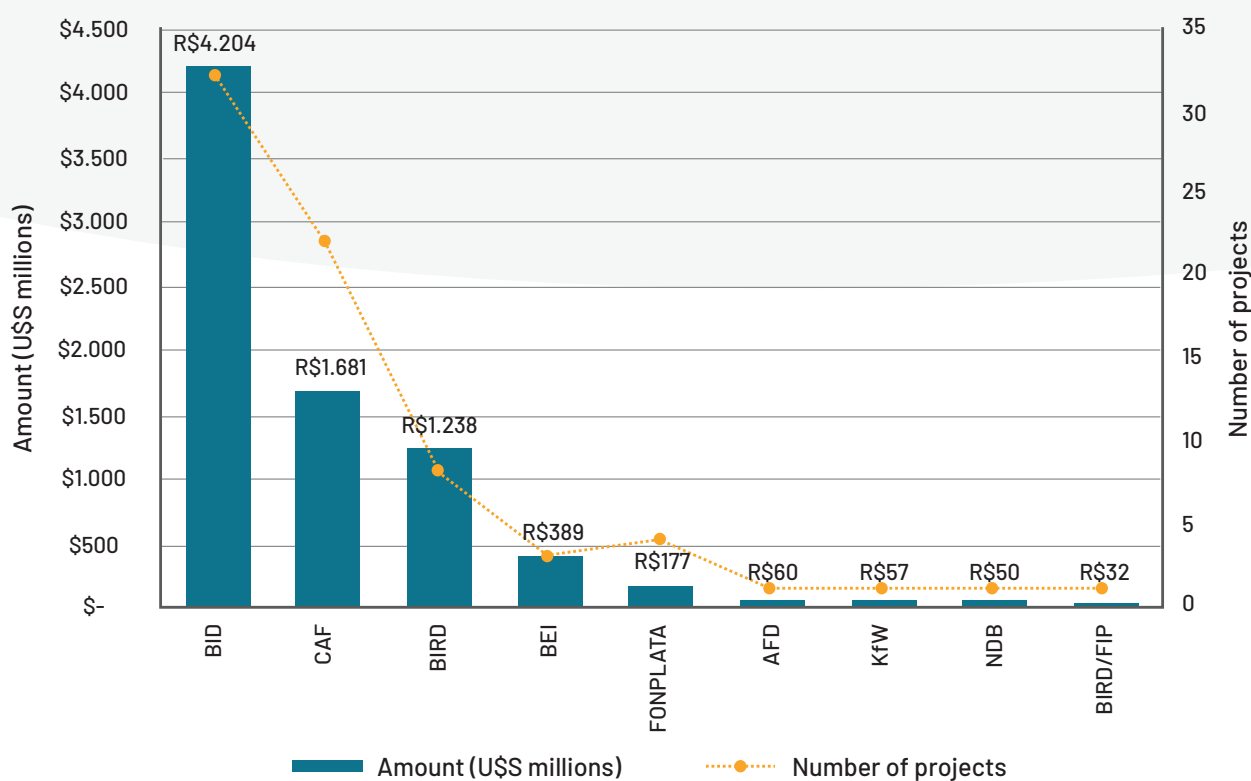
“urban development”, “sustainable urban development” and “urban infrastructure and sustainable development” projects). Next comes the support for initiatives in the area of water and sanitation, accounting for 31% of contributions. Another sector that stood out was transportation and/or urban mobility, with 18% of financing. Finally, the participation of the energy sectors was also surveyed, with 8%, urban facilities, with 6%, governance related to provision of urban infrastructure services (such as performance monitoring activities), with 3% (Graph 11).

As it can be noticed, the multilateral and bilateral development banks provided relevant support between 2017 and 2019 for projects with a green and/or climate component targeting predominantly urban sectors or those with an impact on

urban areas. Apart from reimbursable operations, these public international bodies also provide technical and funding support to local governments for project preparation.

Data indicates that the revenue sources mentioned here are limited, given the needs of Brazilian cities, which are the main borrowers of loans with a green and/or climate component and in predominantly urban sectors or those with an impact on urban areas. It is necessary to understand why so many municipalities are not accessing these sources of funds and to discuss the alternatives to catalyze funding and revenues coming from multilateral and bilateral development banks, either directly or indirectly, to implement low carbon strategies in Brazilian urban areas. The section on the challenges to green and climate finance seeks to explain the reasons for this.

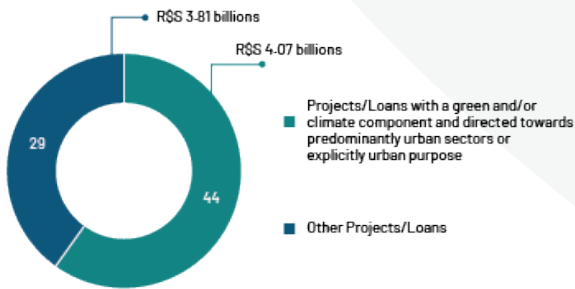
Graph 4 - Total volume of loans and number of projects approved by international development bank, in Brazil between 2017-2019 (US\$ million - current values)



Source: Authors’ own elaboration with data from COFIEX and institutions official websites.

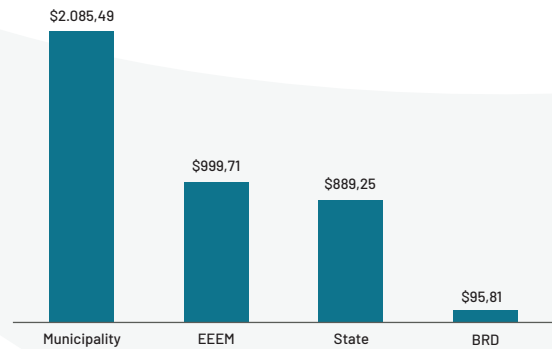
GREEN AND CLIMATE FINANCE LANDSCAPE FOR LOW CARBON URBAN INFRASTRUCTURE IN BRAZIL

Graph 5 - Number of projects with a green and/or climatic component aimed at predominantly urban sectors or with explicitly urban purposes in Brazil between 2017-2019 (US\$ billion - current values)



Source: Authors' own elaboration based on COFIEX Panel data from institutions official websites and direct contact with representatives.

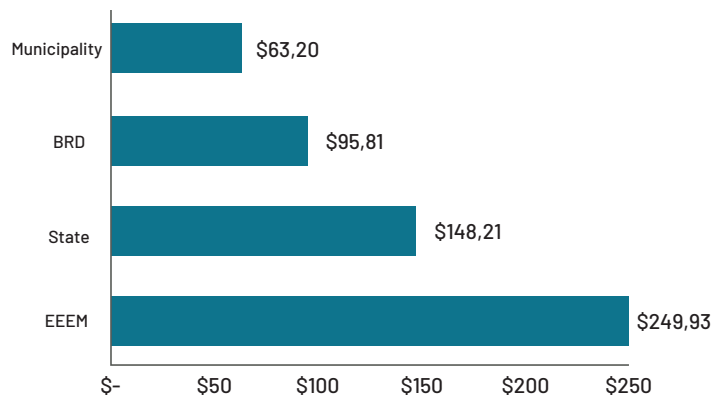
Graph 6- Borrowers of projects with a green and/or climate component aimed at predominantly urban sectors or with an explicitly urban purpose in Brazil between 2017 and 2019 (US\$ million - current values)



* EEEM = State mixed economy enterprise; and BRD: Regional development banks.

Source: Authors' own elaboration based on data from the COFIEX Panel and institutions official websites and direct contact with representatives.

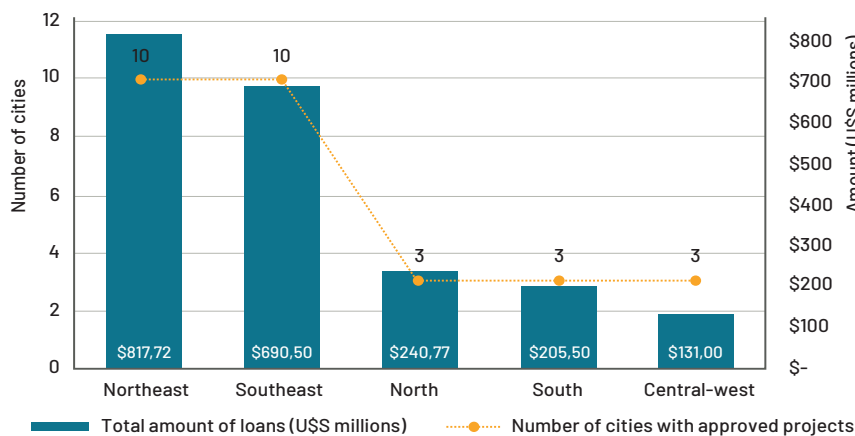
Graph 7 - Average contribution per loan/project by type of project borrower with a green and/or climate component aimed at predominantly urban sectors or with an explicitly urban purpose, in Brazil, between 2017 and 2019 (US\$ million - current values)



* EEEM = State company of mixed economy; and BRD = Regional development banks

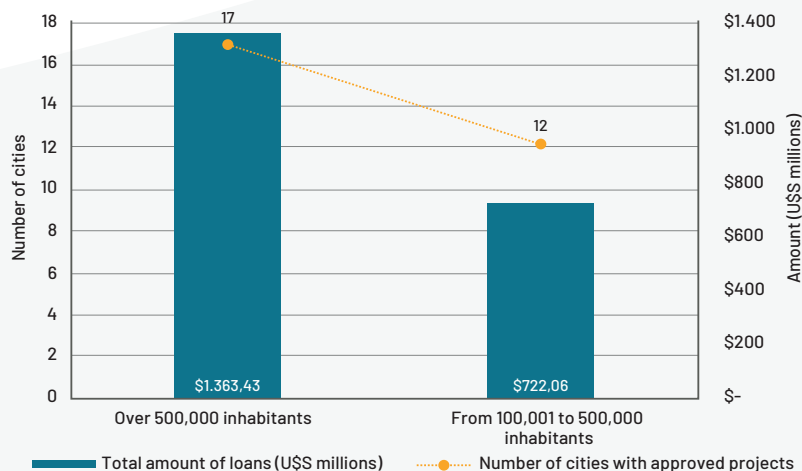
Source: Authors' own elaboration based on data from COFIEX Panel and institutions' official websites

Graph 8 - Distribution of the total amount of loans with a green and/or climatic component aimed at predominantly urban sectors or with an explicitly urban purpose and the number of cities covered according to the region, in Brazil, between 2017 and 2019 (US\$ millions - current values)



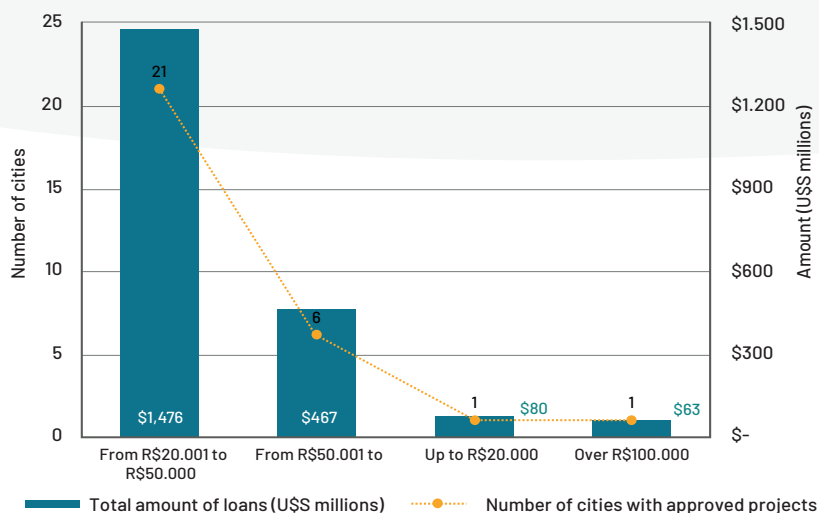
Source: Authors' own elaboration with data from COFIEX Panel.

Graph 9 – Distribution of the total value of loans with a green and/or climate component aimed at predominantly urban sectors or with an explicitly urban purpose and number of cities covered by population, in Brazil, between 2017 and 2019 (US\$ millions – current values)



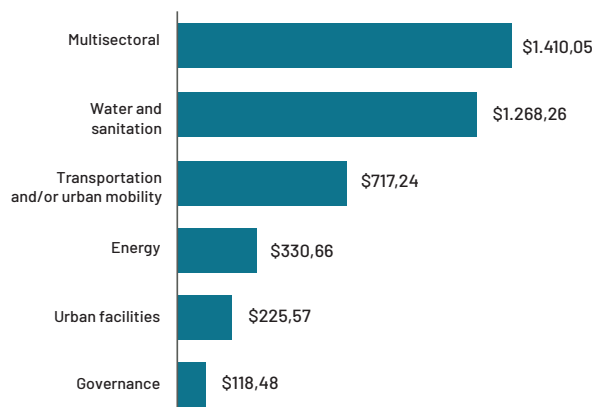
Source: Authors' own elaboration with data from COFIEX and IBGE (2020).

Graph 10 – Distribution of the total value of loans with a green and/or climatic component aimed at predominantly urban sectors or with explicitly urban purposes and number of cities covered according to municipal GDP per capita, in Brazil, between 2017 and 2019 (US\$ millions – current values)



Source: Authors' own elaboration with data from COFIEX Panel and IBGE (2020).

Graph 11 – Amount contributed by sector for projects with a green and/or climatic component aimed at predominantly urban sectors and/or with an impact on urban areas in Brazil, between 2017 and 2019 (US\$ million – current values)



Source: Authors' own elaboration based on COFIEX Panel data, institutions official websites and direct contact with representatives.

National and Regional Development Financial Institutions (FDIs)

National and regional FDIs are key to fostering low-carbon infrastructure in cities. They are uniquely positioned to support green and climate finance (Abramskiewh et al., 2017) due to the nature of their mandate. This mandate encompasses the promotion of socioeconomic development through direct financing of activities and through actions to encourage the expansion of private sector and financial sector participation in key sectors (Olloqui, 2013 APUD Samaniego and Schneider, 2019), such as urban infrastructure.

The FDI analyzed include a national development bank, namely the Economic and Social Development Bank (Banco de Desenvolvimento Econômico e Social, BNDES), two regional development banks, including the Development Bank of Minas Gerais (Banco de Desenvolvimento de Minas Gerais BDMG), and the Regional Development Bank of Further South (Banco Regional de Desenvolvimento do Extremo Sul, BRDE), and a financial institution in the form of a public company, namely the Caixa Econômica Federal (CAIXA)⁵².

For the first three, all the analyses contained in this section were based on the official reports and websites of the institutions dealing with disbursements under "green economy", "sustainability" and "sustainable production and consumption" nomenclature, respectively. For CAIXA, the data analyzed includes all the bank's contributions to infrastructure and sanitation, without discrimination to sustainable and/or climate operations, since the institution does not provide these data in a systematic and open manner for the period analyzed.

Unlike the analysis for multilateral and bilateral development banks, carried out at project level, FDIs' green and/or climate finance data were collected from sectoral data provided by the institutions⁵³ themselves. For the impact analysis in urban areas, the predominantly urban sectors were considered, including sectors and sub-sectors related to water and sanitation, urban transport/mobility and energy efficiency. As it is a sector analysis, it was not possible to verify the borrowers or the amount contributed for each loan/initiative of the institutions.

National and regional FDIs have different actions with regard to general green finance⁵⁴. BNDES and BRDE focus on the energy sector, including clean and renewable energy and energy efficiency. BNDES provides more intensive support to transport and urban mobility projects, while BRDE provides support to sustainable agriculture and

agribusiness projects. BDMG, in turn, prioritizes initiatives to reduce atmospheric and environmental pollution, as well as projects in the energy sectors, such as energy efficiency, renewable sources, and biofuels.

An analysis of green finance data⁵⁵, carried out for predominantly urban sectors by BNDES, BDMG and BRDE, shows that support to projects occurs more frequently in the areas of water and sanitation, transport and/or urban mobility, reduction of air and environmental pollution and, to a lesser extent, energy efficiency.

On its website, the BNDES reports disbursements of R\$ 26.6 billion in green economy in 2017 and 2018, which corresponds to 2% of the bank's gross portfolio in the period⁵⁶. About 16% of this amount, that is, R\$ 4.3 billion, was destined to areas of great urban impact (Graph 12), such as public passenger transportation, water and sewage management, solid waste management, and energy efficiency. BNDES is also one of the largest financing companies for infrastructure projects in the country (Conway et al. 2020), with about half of its financing portfolio focused on this area (BNDES, n.d.b.).

BDMG, the state bank of Minas Gerais, was the main credit provider to the municipalities of Minas Gerais, accounting for 71% of all operations to cities in 2019. The institution has been incorporating sustainability as a central element of its operations for some years and this characteristic intensified in 2019. Between 2017 and 2018, its contributions to sustainability totaled R\$ 255 million, which represents about 10% of the institution's disbursements in the period. About 64% of all green finance was directed to predominantly urban sectors that included reduction of environmental and air pollution, sanitation, water and waste, and urban mobility (Graph 13).

BRDE is the development bank that operates in the 3 southern states, namely Paraná, Santa Catarina and Rio Grande do Sul, and whose presence is verified in 91% of the region's municipalities (BRDE, 2019). The institution provides support to climate and sustainable sectors through its Development Programs and, more specifically, through BRDE PCS Program – Sustainable Production and Consumption (Programa BRDE PCS – Produção e Consumos Sustentáveis), created in 2015. In this context, between 2017 and 2018 alone, BRDE signed contracts worth approximately R\$ 826 million, which represented 18% of the institution's financing in the period. The portions destined to the sectors with the greatest impact in urban areas, namely clean and renewable energy and energy efficiency, rational and efficient use of water and waste management and recycling, accounted for 8% of this amount (Graph 14).

52 National and regional development financial institutions present in the Network for Financing of Sustainable Infrastructure in Cities (FISC Network).

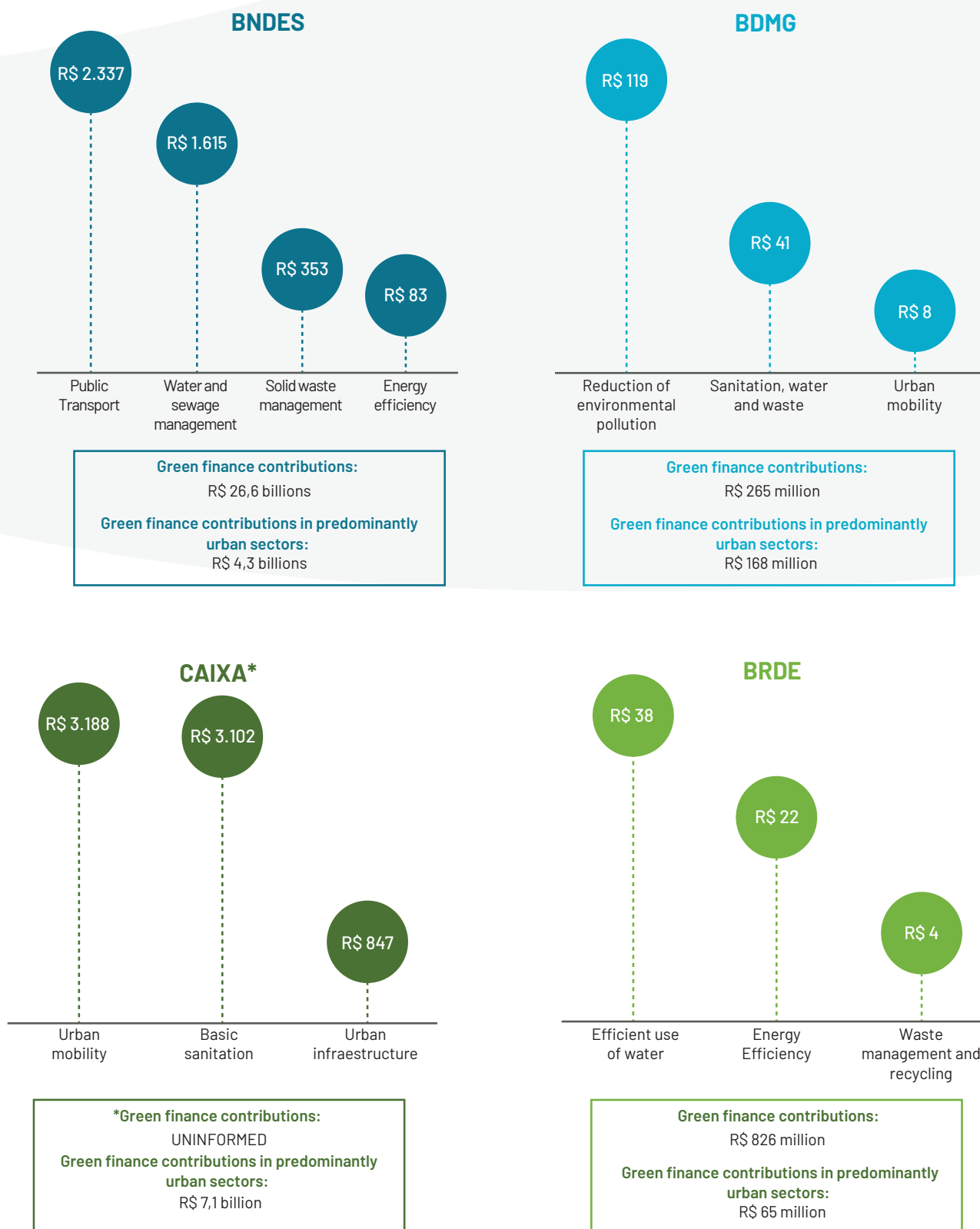
53 As in the case of multilateral and bilateral development banks, contact was made with representatives to submit questions.

54 This analysis was done by comparing sectoral investments in green economy, sustainable projects and climate-related sectors and reported by each institution, excluding CAIXA. For more information, see ANNEX A – Methodological considerations.

55 The institutions use different nomenclatures referring to their contributions to green and climate projects and sectors. It should be noted that to simplify the analysis, all are included under the nomenclature "green finance". For more details, see ANNEX A – Methodological Considerations.

56 <https://www.bndes.gov.br/wps/portal/site/home/quem-somos/responsabilidade-social-e-ambiental/nossos-resultados/desembolsos-economia-verde-desenvolvimento-social>.

Graphs 12, 13, 14 and 15 - National and Regional FDIs contributions for green finance in predominantly urban sectors (2017 and 2018)⁵⁷ (R\$ million - current values)



57 For more information on data collection, see ANNEX A - Methodological Considerations.

CAIXA reports disbursements to predominantly urban sectors through its annual Sustainability Reports, but does not systematically discriminate green and/or climate-related contributions⁵⁸. For infrastructure and sanitation areas, the bank invested R\$ 12,6 billion between 2017 and 2018, of which 56% went to urban sectors such as urban mobility, basic sanitation and urban infrastructure (Graph 14). As an Operating Agent for the Severance Premium Reserve Fund (Fundo de Garantia do Tempo de Serviço, FGTS), the bank is one of the largest financiers of projects in sectors related to urban infrastructure. In addition to operating this fund, it is the main operating agent of the Federal Government's actions for public policies in urban sectors, including areas such as basic sanitation and water resources management (CAIXA, 2019).

The national financial development system in Brazil has very consolidated and active institutions (Horn and Feil, 2019) in key sectors for the country, such as infrastructure (Samaniego and Schneider, 2019). This is the case of the national and regional development financial institutions (FDIs) included in this analysis. Such institutions have the potential to expand their operations more clearly to low-carbon sectors, particularly those focused on urban areas, and to be able to bring enormous benefits to cities, due to four important comparative advantages displayed (Conway et al. 2020): (i) greater knowledge of local reality, including sustainable development plans and priorities and barriers and opportunities for local investment; (ii) they can fund their activities through different sources of revenues, including international ones; (iii) the possibility of formulating financing packages that more strongly meet local demands; and (iv) the development of different financing structures, combining different sources of funds and fostering

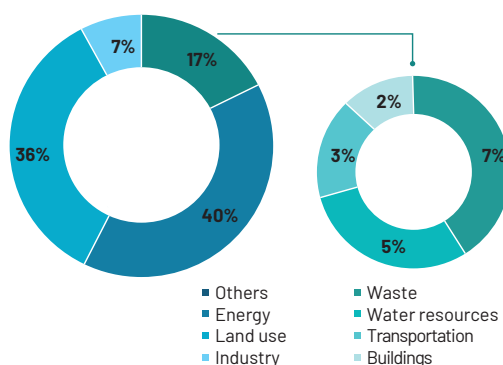
private sector participation. In addition to expanding their operations to green and climate portfolios, FDIs will need to diversify their type of support, for example, through the provision of partial loan or performance guarantees (IDB and WEF, 2019), in order to catalyze green and climate finance reaching Brazilian cities.

Green and Climate Bonds⁵⁹

Green bonds are fixed-income securities that operate in the same way as conventional bonds (Samaniego and Schneider, 2019), but have the specific purpose of financing projects and activities with environmental benefits and that facilitate the transition to a low-carbon economy (Kaminker, Majowski and Bonelli, 2017). They can be issued by governments, banks, municipalities and private entities (Almeida and Filkova, 2019) and have as one of their central pillars, the transparency and clarity of the environmental and climate purpose of activities by those who emit (Samaniego and Schneider, 2019)⁶⁰. According to the taxonomic definition of the Climate Bonds Initiative (CBI)⁶¹, green bonds can cover the sectors of energy, buildings, transportation, water, waste, land use, industry and ICTs⁶².

Between 2007 and July 2020, green bonds were issued globally in the amount of US\$754 billion (Almeida, 2020). In Brazil, the first green bond was issued in 2015⁶³, aimed at the international market, by the multinational food processing company BRF S.A. Since then, this market has been growing (CBI and IDB, 2019) and the country has already accumulated a total of US\$ 5.13 billion in 19 green bonds issued until 2019 (Almeida and Filkova, 2019). Although the sector has shrunk due to electoral uncertainties and the country's economic situation in 2018, the volume of green bonds issued in 2019 has

Graph 16 - Allocation of green bond funds in Brazil between June 2015 and July 2018



Source: CBI and IDB, 2018

58 Despite not presenting segregated climate and/or environmental input data in a systematic way for its operations, the bank intends to develop a methodology to identify the socio-environmental impacts on the products and services it operates until 2019 (CAIXA, 2018).

59 Nomenclature used in the publication "Debt securities and climate change - Market analysis 2017" (Títulos de dívida e mudanças climáticas - Análise de mercado 2017).

60 To date, August 2019, certification is done through the Climate Bonds Standard (CBS), the only internationally recognized green or climatic title certification scheme.

61 For more details, see <https://www.climatebonds.net/standard/taxonomy>.

62 Information and Communication Technologies

63 In Brazil, some of the financial instruments that can be classified as Green Titles are Quotas of Receivables Investment Funds (FIDC), Certificate of Agribusiness Receivables (CRA), Certificate of Real Estate Receivables (CRI), Debentures, Debentures encouraged infrastructure, Financial Bills and Promissory Notes (FEBRABAN and CEBDS, 2016).

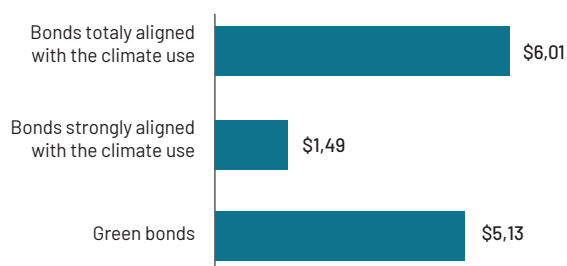
already resumed and is expected to continue to expand, particularly to finance the infrastructure gap in the country (Almeida and Filkova, 2019).

Among the main areas covered by green bonds issuance in Brazil, the first sector that stands out is energy (CBI and IDB, 2018) (Graph 16). Unlike other countries, however, issuances related to the land use and industry sectors represent almost 50% of total resource allocation, which can be explained by the Brazilian economic dynamics, strongly dependent on activities in agriculture and forestry sector (Almeida and Filkova, 2019), two of the sectors with the highest greenhouse gas emissions in the country (CBI and IDB, 2019). Sectors with a strong potential impact on urban environment, such as transportation, buildings and waste, account for only 12% of the green bonds resource allocations, a trend that is different from the rest of the world (Almeida and Filkova, 2019). In this scenario, there is a great opportunity to expand the financing of urban infrastructure through green bonds (CBI and IDB, 2018).

Most green bonds in Brazil are issued by non-financial companies. They were responsible for issuing 16 of the 19 green bonds issued in Brazil until 2019 (corresponding to approximately 70% of the total value issued). After the non-financial companies, there are development banks, represented solely by BNDES, government guaranteed entities and securitized securities (ABS) (Almeida, 2020).

In addition to the labelled green bonds, whose use of funds is defined and attested as green⁶⁴, there are non-labelled titles that seek to support climate and environmental purposes (Bouille, 2017). Several publications seek to identify and address their amount (Almeida, 2020; Samaniego and Schneider, 2019; Filkova et al., 2018; Bouille, 2017), since they present a representative portion of funds, particularly in the Brazilian case (Almeida, 2020) (Graph 17).

Graph 17 – Division between issuance of labelled green bonds and climate aligned bonds in Brazil, between 2015 and 2019 (R\$ billion – current values)



Source: Almeida and Filkova, 2019

Although Brazilian subnational governments cannot issue bonds in the national or international capital markets, they can take advantage of the opportunity brought by resources channeled via green and climate bonds through alternative financing structures, thus supporting the transition to low carbon infrastructure (FEBRABAN and CEDBS, 2016). The first alternative structure capable of channeling resources from green and climate bonds to urban infrastructure refers to private finance⁶⁵. Among the arrangements available for the viability of private capital, we can mention Public Private Partnerships and the implementation of concessions (Filkova et al., 2018). Such modalities are already widespread at the municipal level (Graph 18), particularly in the sectors of sanitation, public lighting and solid waste (Oliveira et al., 2017).

Due to PPPs and concessions relevance for financing and providing infrastructure in cities, the federal government, as well as national and international development financial institutions, have been providing increasing technical support to Brazilian municipalities to structure these kinds of projects. This is the case of Caixa's Project Structuring Fund (Fundo de Estruturação de Projetos, FEP), which supports municipalities in implementing PPPs in urban solid waste, public lighting and sewage sectors. This support can favor the use of resources from green and climate bonds in cities, as such a structure allows private companies selected for investment projects via PPPs and/or concessions in cities to borrow capital or issue a green and/or climate bond to support the volume of financing required for an urban infrastructure project (CBI and IDB, 2018).

The implementation of PPPs via the issuance of green bonds requires that initiatives include a relatively high amount of financing when compared to the financing value of municipal and state PPPs in Brazil. The average value of green bonds issued in 2019 in the world was US\$ 144 million (Almeida, 2020). Meanwhile, the minimum value for implementing a PPP in Brazil is R\$ 10 million (BRAZIL, 2017). Another issue to be considered is the fact that most green bonds are currently issued in euros and US dollars (Almeida, 2020), which also tends to make the arrangement difficult.

Another way to increase the directing of resources from labeled green bonds to cities is by increasing the participation of public banks, such as Caixa and Banco do Brasil, and private banks, such as Itaú (Almeida and Filkova, 2019) in this area. Local governments, private companies and others could benefit from loans. This is an

64 According to FEBRABAN and CEDBS (2016), "For a title to be labelled green, it is necessary to conduct external verification by a qualified third party, usually auditors [...]. The external certification is based on evaluation criteria, whose compliance analysis is performed by entities that have received qualification from the certifying body to audit the standard in question. At the moment, the only specific certification for Green Titles available on the market is the "Climate Bonds Standards". (FEBRABAN and CEDBS, 2016, pg. 19)

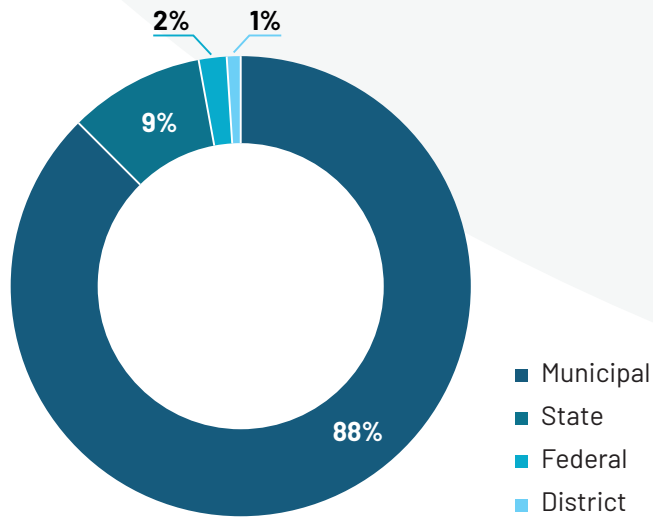
65 Although the private sector is increasingly involved in financing climate mitigation and adaptation projects, identifying data, information and trajectories about contributions to the environmental and climate area is still a challenge (Samaniego and Schneider, 2019). This challenge becomes even greater when one seeks to identify contributions to urban areas. Among the private financing options for low carbon urban infrastructure are, among others, privatization/investment actions, infrastructure investment funds, private risk mitigation and crowdfunding (Lindfield and Teipelke, 2017).

arrangement still under explored by national banks.

In 2020, the Federal Government took the first legal measure to encourage the issuance of green bonds in the country by issuing Decree 10,387/2020, which seeks to encourage, through the issuance of debentures, infrastructure projects with social and environmental benefits. Urban projects that cover the sectors of

urban mobility and non-motorized public transportation and low carbon public transportation systems, energy (including renewable technologies and small hydroelectric plants) and basic sanitation will be favored, which can greatly benefit Brazilian cities. (BRAZIL, 2020a).

Graph 18 - Government sphere responsible for PPPs between 2014 and 2016



Source: Oliveira et al., 2017

BOX 2. OTHER WAYS TO FINANCE LOW CARBON URBAN INFRASTRUCTURE IN BRAZIL

In addition to the traditional forms of green and climate finance analyzed in this section, there are also other sources of revenues that can be used jointly or isolated, by Brazilian cities to (i) indirectly finance (by unblocking sources of green and climate finance funds and by attracting the private sector) and to (ii) directly finance urban sustainable infrastructure projects. Due to difficulty in identifying data, information and trajectories of these sources regarding their financing in climate mitigation and adaptation actions in cities, a list of 13 available sources of financing for urban resilient infrastructure in the country is presented below. They have been divided into 4 categories that include general public budget, private sector, special purpose financial vehicles and credit support instruments

Table 1 – Other sources of funding for low carbon urban infrastructure projects in Brazil

Source	Description	Examples of channeling mechanisms
General public budget		
Intergovernmental transfers to states and municipalities	Transfers of fiscal resources from national government or state governments to states and/or municipalities	Municipal Participation Fund (FPM) and Industrialized Products Tax (IPI).
Non-reimbursable funds / non-repayable funds, donations	Transfer of monetary resources and/or other support without the need for reimbursement by the recipient. In the case of urban infrastructure projects, it usually involves small donations aimed at preparing technical studies, project preparation and training.	Project Structuring Fund (BNDES FEP) and Urban Mobility Program of the Federal Government.
Taxes	Collections and/or financial charges on the taxpayer from the generator fact. This includes municipal, state and federal taxes, which may support the financing of low carbon urban infrastructure projects.	IPTU (Property Tax and Urban Territorial Property Tax), IPVA (Tax on Motor Vehicle Property), intervention contribution in the economic domain (CIDE-fuels)
Direct charges/user fees	Collection directed to users of a certain good or service, through provision of service and/or use of urban infrastructure.	Contribution to Public Lighting Service Cost (Cosip), charging for water use and for rotating public parking.
Fines	Financial penalties for rule violations.	Environmental fines, such as environmental compensation and traffic fines.
Tax incentives and grants	Instruments and/or measures that reduce some kind of tax to encourage favorable behavior of individuals.	Green IPTU, concessions of constructive potential and cession or donation of land.
Land value capture	Mechanisms that allow recovery of real estate appreciation resulting from public action in a designated area	Contribution to improvement, sale of construction rights, such as Onerous Building Right Awards (OODC), and Certificates of Additional Construction Potential (CEPAC)

Private sector		
PPPs (Public-Private Partnerships)	Contracts between municipal, state and federal governments and the private sector for transfer of installments for implementation of service and/or public infrastructure projects to the private sector. Payment is made by the public sector, with other possible compensations.	In Brazil, the most common examples of PPPs that make urban infrastructure feasible include those for public lighting, such as the ones in Rio de Janeiro (RJ) city and Porto Alegre (RS) city.
Concessions	In addition to PPPs, they also include concessions where the tariff charged to the user and other service revenues are sufficient to remunerate the concessionaire (BNDES, 2016)	Public transportation concessions, such as in the city of Florianópolis (SC) and municipal, state and federal park concessions, as occurs in São Paulo (SP) city at Ibirapuera Park.
Debt	Acquisition of monetary funds from third parties. In addition to international, national and regional development financial institutions covered in this section, obtaining loans through commercial banks can be listed.	Financing through national and international private banks
Capital market	Besides green and climate titles, there are other mechanisms of the national financial system that can support low carbon urban infrastructure projects, as public debt investment (general or project-specific), equity investment in specific projects, investment in infrastructure system operators operating under a PPP or other operating authority (World Bank, 2018)	Government bonds, securities linked to the project, infrastructure debentures, incentive debentures and shares.
Special purpose financial vehicles		
Dedicated funds	In addition to national and international climate and green funds presented in this section, other funding mechanisms specialized in serving cities and/or combating climate change can be listed. They may be public and private funds.	Urban Development Fund (FUNDURB) of São Paulo City Hall (SP), Brazilian Fund for Biodiversity (FUNBIO) and National Environment Fund (FNMA)
Credit support instruments		
Credit assistance and guarantees	Arrangements and/or mechanisms capable of improving credibility of urban projects, reducing inherent risks attached and supporting access to better financing conditions. They may include, among others, insurance, revolving funds, guarantees and currency hedge funds.	Infrastructure Guarantee Fund (FGIE), Public-Private Partnership Guarantee Fund (FGP) and sovereign guarantees.

Source: Author's own elaboration based on Evers et al. (2018), World Bank (2018), Floater et al., (2017) and Lindfield and Teipelke



4.

CHALLENGES TO GREEN AND CLIMATE FINANCE FOR URBAN INFRASTRUCTURE IN BRAZIL

This section aims to address the main barriers in financing urban and sustainable infrastructure in the Brazilian context. Recommendations and guidelines for overcoming these obstacles will be offered in Section 5.

As noted in the previous section, green and climate finance are opportunities to unlock sustainable investments in infrastructure in cities, and Brazil has consolidated institutions and organizations that already channel the resources of these types of finance. Despite this, there is room to expand direct and indirect financial resources from climate and green finance in Brazilian cities.

In this regard, there is a lack of alignment and coordination between the federal and local governments regarding the National climate agenda for cities (Margulis, 2017). This makes it more difficult to extend the support coming from national and international climate and green sources to municipalities.

In addition, while there is low capillarity of multilateral and bilateral development banks lending to Brazilian municipalities, national and regional FDIs, which have greater capacity for local action, still need to intensify their support to low carbon urban infrastructure, as well as enhance alternative operations to support cities in raising revenues from other sources, such as private ones (Conway et al., 2020; FEM and IDB, 2019). Finally, Brazilian regulatory environment in low carbon sectors does not favor in its potential the participation of private capital, particularly through issuance of green and climate bonds (CBI and IDB, 2018).

The challenges to green and climate finance, of urban infrastructure in the country range from local issues related to financial and technical capacity gaps in cities, to issues that go beyond the scope of local government action, such as the regulatory environment, including clear climate action guidelines for cities and incentives for participation from different funding sources (Grin et al., 2018; Conway et al. 2020; PBMC, 2016; CCFLA, 2015).

The challenges presented in this section were collected through existing literature on the subject and through discussions held within the Network for Financing Sustainable Infrastructure in Cities (FISC Network⁶⁶), between December 2017 and August 2020. Representatives of international, national and regional financial institutions, as well as participants from national and international project preparation facilities (PPFs) and public entities, such as municipal technicians, federal government and state entities, attended these events⁶⁷.

The barriers presented are divided into three major areas:

• **Nation institutional environment:**

1. Low level of coordinated governance and integrated planning
2. Regulatory uncertainties

• **Planning and preparation of low carbon urban projects:**

3. Lack of urban planning.
4. Difficulties in project preparation activities at the local level.

• **Financing and resource mobilization:**

5. Deficiency in directing resources to sustainable urban development
6. Disability in directing funds to sustainable urban development and priority areas.
7. Precarious municipal fiscal situation.
8. Difficulties in overcoming the financing processes of international, national and regional development banks.

NATIONAL INSTITUTIONAL ENVIRONMENT

4.1 Low level of coordinated governance and integrated planning

A favorable institutional environment for investments in sustainable urban projects encompasses primarily the development of a defined mandate to promote policies, programs and projects aimed at fighting climate change in cities and promoting sustainable urban infrastructure. The lack of coordinated governance between the municipal, state and federal levels with regards to low-carbon development priorities in urban areas and the ways to achieve this is a major challenge in the country.

The role of local, state and national governments is central to carrying out actions that encourage increased investment and greater participation by different financing agents, particularly the private sector, given the characteristics of green and climate finance⁶⁸. These actions, however, must be planned and developed in a joint and aligned manner. Different initiatives to promote sustainable investment have been carried out, but in a case-by-case manner. This is the case of the tax exemption policy for Electric Energy Compensation System, initially provided for by ANEEL normative resolutions (482/2012 and 687/2015) and by

66 Network of development financial institutions (multilateral and bilateral, national and local development banks), cooperation agencies and other related institutions that work with urban infrastructure financing in Brazil. FISC Network aims, through the exchange of experiences and implementation of partnerships and joint actions, to unlock sustainable urban investments in Brazilian cities.

67 For more details on the FISC Network's activities, see ANNEX B –Report on the Network for Financing Sustainable Infrastructure in Cities (FISC Network) activities.

68 For more information, see "Introduction to measuring the supply of climate and green finance" in Section 3 of this study.

the ICMS Agreement 16/15 of the National Council of Finance Policy (CONFAZ), with later complementation by the states of Minas Gerais, through Law No. 549/2017, and of Rio de Janeiro, through Law 8922/2020, which provides exemption in the Tax on Circulation of Goods and Services (ICMS) for taxpayers who have small photovoltaic solar energy generators and who inject into the electric grid the production of solar plates that exceed their consumption.

The lack of clarity about low-carbon development priorities in cities and the low alignment between incentives makes it difficult to establish favorable market conditions and risk management (Nassiry et al., 2016), which tends to alienate private investors, commonly more risk-averse (Floater et al., 2017; Horn and Feil, 2019). Aligning political and economic priorities between the federal government, state governments and municipal governments is a basic condition to advance the sustainable urban agenda. In short, the development of sustainable projects in cities needs to be synchronized not only with the climate goals and priorities of these areas, but syndicated and incorporated between various agencies and actors in the national public sector (CCFLA, 2015).

4.2 Regulatory uncertainties

The creation of regulatory approaches capable of providing clarity of functions between actors and bringing transparency to the process of financing and implementing initiatives will determine the successful implementation of urban and low-carbon infrastructure in the country (Nassiry et al, 2016; World Bank and FGV / CERI, 2017).

Among several regulatory uncertainties that undermine the provision of low carbon services in cities are the low clarity and legal coverage regarding the specificities and innovations of green solutions. Often, these projects are inserted in sectors whose market structures are complex and still underdeveloped due to their innovative character, as is the case with electric mobility (Fontes, 2018). There is, for example, a lack of clarity on the best models for acquisition (or leasing) of electric buses or buses powered by biomethane and in the activities for controlling environmental risks, generating electricity or supplying the gas infrastructure. Lack of norm's standardization, particularly in innovative sectors, increase the potential for disagreements between contractors in urban infrastructure projects, paving the way for different decisions and interpretations (Ferraesi et al., 2018).

Another problem concerns the lack of clear regulations for the allocation of risks and guarantees related to financing and implementation of consortia or

groupings of municipalities to expand the scale of urban infrastructure projects. Many urban infrastructure projects are small scale, making it difficult, for example, to ensure international loans and develop PPPs⁶⁹ to make their implementation feasible, since transaction costs of such operations can be very high and thus not justify the project (CCFLA, 2015).

The implementation of intermunicipal consortia is a common practice in Brazil, which has been implemented in 73% of the cities (Jubé, 2020), and covers important sectors of urban infrastructure, such as sanitation via the development of urban landfills. But there is still a lack of clear rules on the role and responsibility of each entity in such arrangements, both in development and financing of joint projects. Among some regulatory gaps in this area, there are persisting difficulties in establishing sound political negotiations to ensure stability of consortia for an extended period (Dutra, Sampaio and Amorim, 2016) and lack of partial guarantee mechanisms designed to, for example, address issues such as non-reimbursement or performance risks of low carbon technologies. An efficient regulation could avoid moral hazard and market distortions for arrangements enabled by grouping.

Another relevant issue is the low level of transparency and systematization of information and data on sectors, projects and financial arrangements linked to urban infrastructure and low carbon initiatives. This deficiency tends to increase the degree of regulatory uncertainty of sustainable investments in cities, influencing actors' perception of risk, which makes investments potentially more expensive and less attractive. The low level of transparency is often related to lack of definition of roles among actors involved in the projects. At the municipal level, in particular, it is often linked to the low level of digitization of public services (OECD, 2018), which also generates slower processes, such as public procurement.

PROJECT PLANNING AND PREPARATION AT LOCAL LEVEL

4.3 Inefficient urban planning

It is essential to identify and develop sustainable urban infrastructure projects that are aligned with existing urban development plans (Bonilla and Zapparoli, 2017). Local governments that are willing to invest in low carbon infrastructure should do so in line with a long-term vision of sustainable development agreed between different actors and sectors of municipal government. Many Brazilian local governments are unable to align urban planning and the city's major development guidelines with short, medium and long-term investments and sector plans (Evers et al., 2018). The difficulty in carrying out strategic urban planning for sustainable

69 Until 2017, according to the old Law 11.079/2004, Public-Private Partnerships could only be celebrated if the contract had a minimum value of R\$ 20 million. Since Law 13.529/2017, this minimum value was changed to R\$ 10 million (BRAZIL, 2017).

development in Brazil makes access to resources more difficult, since (i) it makes it impossible to evaluate and choose the set of strategic investments that meet real local needs and have greater social and environmental cost-effectiveness; and (ii) it decreases the probability of project's completion, which may end up competing with other emergency projects, generating insecurity to financial institutions.

In addition, deficiencies in local planning practices can lead to inadequate budgeting and accounting forecasts for sustainable investments, lack of signals to economic agents about investment needs and intentions, and inadequate timing of projects (Dantas, 2012; Floater et al., 2017). Besides, infrastructure projects, whose investments have long implementation and maturation timelines, depend heavily on fiscal and technical planning for their execution.

Finally, it is relevant to provide the climate and sustainable finance market (Ahmad et al, 2019) signals of stability and clarity that are not dependent on election cycles. Several studies point out the strong influence of political cycles in fiscal management of Brazilian municipalities (Sakurai and Menezes Filho, 2008; Sakurai and Gremaud, 2015; Bartoluzzio and the Angels, 2020). Political discontinuity, including changes in fiscal management, governance and government priorities, combined with territories without development strategies hinder the promotion of sustainable projects. Such discontinuity does not allow sufficient time for the maturation process between the establishment of guidelines for urban planning and its translation into concrete actions in the territory

4.4 Difficulties in project preparation activities at the local level

Several publications point out that, differently from what is commonly believed, the main barrier to financing sustainable projects is not the lack of financial resources, but the lack of "bankable"⁷⁰ projects (Oberholzer et al. 2018; Nassiry et al., 2016; WWF, 2015). In other words, initiatives containing technical robustness, economic and financial viability and legal consistency.

The inability to develop and manage sustainable projects, whether projects financed via national or international loans, or PPPs, is a particularly frequent problem in Brazilian sub-national sector, especially in small and medium-sized municipalities. By failing to overcome this stage, municipalities end up undermining their capacity to raise funds and finance their initiatives.

The difficulty in structuring projects is due to, among others, deficient municipal technical capacity, lack of basic guidelines, low level of knowledge of the municipalities about the type of studies and processes needed to prepare low carbon financial investments and difficulty in coordinating different municipal areas, given that sustainable urban projects in general integrate several areas⁷¹.

Besides, there is still a lack of project coordination instances to create project pipelines, lack of support in structuring and cost-benefit analysis, and the need for greater centralization of knowledge about projects in a single instance and trained technical area. Often, even when successful pilot infrastructure projects (such as electric mobility, energy efficiency and public lighting, among others) are being carried out, municipalities do not present strategies and/or capabilities to replicate and scale up such initiatives.

Not only is technical capacity a challenge, but the very lack of resources and funding for project preparation actions can undermine the ability of municipalities to access loans and/or to partner with the private sector. Project preparation costs are estimated to be around 2.5% to 5% of total investment (Nassiry et al., 2016) worldwide. In developing countries, the estimate rises to up to 10% of costs (Schneider-Roos et al., 2014). Many times, Brazilian cities present a high degree of uncertainty in obtaining resources. In these cases, the risk of investing in projects that may not be implemented in the future ends up inhibiting investments. In this scenario, there is a lack of structures that share such types of costs with local governments or that provide greater incentives for the project preparation phase.

Local governments must carry out a series of complex activities from sustainable project conception to fundraising and to bankability to its sustainable projects. Among these actions are, accessing, generating, controlling and managing data and information on all types of infrastructure services, in order to provide quality to feasibility studies and greater confidence of financiers to invest in low carbon projects in cities. Many municipal projects fail to overcome the initial and intermediate stages of preparation, falling in a relative "valley of death" common for this type of initiative, that drastically reduces the potential implementation of sustainable urban solutions.

70 According to Nassiry et al. (2016), the bankability of a project depends on a number of factors, including the policy and regulatory environment, consultations with relevant stakeholders, the ability of counterparties to engage with investors, the quality of project documentation, and, at a fundamental level, economic development issues such as credit quality and willingness to pay. (Nassiry et al., 2016, pg. 6).

71 Information collected during the IV Meeting of the Financing Network for Sustainable Infrastructure in Cities (FISC Network).

FINANCING AND RESOURCE MOBILIZATION

4.5 Deficiency in directing resources to sustainable urban development

Almost half of the Brazilian cities invest only 3% of their total revenue in areas that generate well-being to the population (FIRJAN, 2019). Investment choices in cities are made without the necessary cost-benefit analysis of the initiatives and through incomplete information on the real return on investments in sustainable assets, which may be explained by the fact that this return is often not financial, but in the form of non-monetary social and climate benefits and co-benefits (Ahmad et al., 2019). This is particularly problematic for investment in low carbon urban infrastructure, as it can cost 5-10% or more in relation to other projects. Nevertheless, such investments offer non-monetary returns and benefits that are very important for the transition to a low-carbon economy (CCFLA, 2015).

The lack of local knowledge about the economic opportunities and benefits of low carbon investments, as well as the lack of data and information management capacity that can support this type of investment, are a

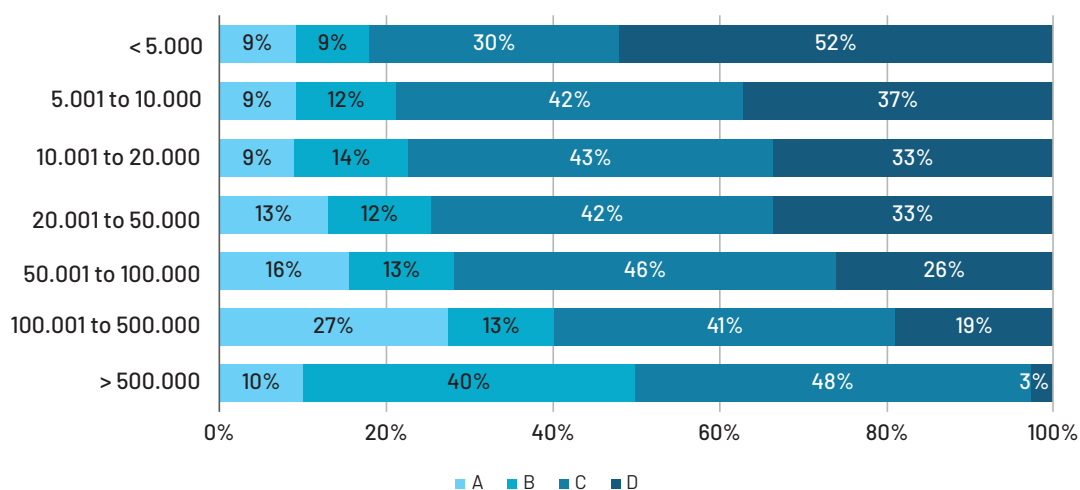
different knowledge and local sectors to develop projects with greater impact, to plan the direction of resources and monitor the effectiveness of spending already made in order to map investments with higher returns for replication in other areas⁷². Since the municipal budget is limited, without real identification of the return on sustainable investments, such initiatives are compromised.

4.6 Precarious municipal fiscal situation

About 73.9% of Brazilian municipalities are in a difficult or critical fiscal situation (FIRJAN, 2019). Hence, many cities face difficulties to raise resources to invest in sustainable urban development. For municipalities in this situation, low carbon projects end up competing with other initiatives considered more urgent, such as the need for paving, for example⁷³.

This reality becomes even more evident when cities seek loans from multilateral and bilateral development banks. To obtain international public financing, the federal government imposes a series of credibility requirements on local governments to provide sovereign guarantees⁷⁴. These requirements for adequacy of fiscal administration are evaluated by the National Treasury Secretariat (STN) and are

Graph 19 - Distribution of CAPAG score according to the population of Brazilian municipalities



Sources: Authors' own elaboration based on STN data (2019)

reality among Brazilian cities. Local governments also lack, in their technical staff, the ability to manage new business models for sustainable initiatives, to include sustainability criteria during the process investment choosing, to group

present in the Fiscal Responsibility Act or LRF (Lei de Responsabilidade Fiscal, LRF) (Complementary Law 101 of 2000), which establishes several guidelines for financial management by public

72 Information collected during the events of the Network for the Financing of Sustainable Infrastructure in Cities (Financiamento de Infraestrutura Sustentável em Cidades, FISC)

73 Information collected during Network events for the Financing of Sustainable Infrastructure in Cities (Network FISC)

74 Guarantee granted by the federal government only to subnational entities that comply with the selection process implemented by the External Financing Commission (Comissão de Financiamentos Externos) - COFIEEX.

agencies at all levels of government. In particular, the STN analyzes the fiscal situation of subnational entities that want to take out new loans with a guarantee from the Federal Government through the Payment Capacity Indicator, the so-called CAPAG⁷⁵.

CAPAG indicates the level of indebtedness, current savings and liquidity index to perform a diagnosis of the State or municipality fiscal health and assigns the concepts A, B, C, D and n.a. to each municipality. A is the best concept, and n.a. points to municipalities that had no evaluation of the corresponding index. Only cities with CAPAG A or B grades can take out international loans. From the total of 5,569 Brazilian municipalities, only 1,642, or 30% of the cities have enough CAPAG ratings to take out international loans (868 with grade A and 774 with grade B) (STN, 2019). The smaller the size of the cities, the more precarious are the relevant fiscal indicators for contracting international loans, which worsens the scenario even more. (Graph 19)

The low indebtedness capacity of the municipalities is related both to the pattern of public spending, as well as to limited revenues and restricted collection powers (Floater et al., 2017). As already mentioned, local revenues and budgets are able to cover only a portion of the amount of financing for sustainable infrastructure (NCE, 2016). The combination of different funding options, including local, national, international, and private, must be coherent and complementary among levels of government and supported by effective public administration and transparent information management (Ahmad et al., 2019). However, there is an underutilization of the possibilities of leveraging resources at the local level.

4.7 Difficulties in overcoming the financing processes of international, national and regional development banks

There are important limitations to obtaining international and national public funding, depending on the processes that the municipalities must go through, varying in complexity according to the type of development institution in question.

Regarding international public financing, the banks, in addition to meeting their internal requirements, also require the so-called sovereign guarantee. Sovereign guarantees are a kind of endorsement granted by the federal government only to subnational entities that comply with a rigorous selection process implemented by the Commission on External Financing (Comissão de Financiamentos Externos) – COFIEIX, an agency of the Ministry of Economy. From the perspective of local governments, in addition to having to go through COFIEIX's complex process, the internal process of international

financial institutions, which is seen as confusing and with various requirements, makes the option of international loans and support a less attractive alternative for financing sustainable projects⁷⁶.

In addition, these processes are considered too time consuming, with an average duration of 2 years, until the beginning of the projects' execution. This is a factor that ultimately influences access to this type of funding, given the four-year political cycle in Brazil. In short, access to this type of sources is discouraged because cities have to go through two complex processes: those of the institutions and those of COFIEIX.

The credit analysis process of national and regional development banks for municipalities also encompasses, as in multilateral, bilateral and development banks, the adequacy requirements of the tax administration present in LRF. However, it is relatively simpler than the process for international borrowing. In order to make loans via national and regional development banks, municipalities must contact the financial institution of interest (STN, 2020). This process usually requires the incorporation of a dedicated political agent within local governments, who conducts negotiations with representatives of national financial institutions.

Having dedicated and technically trained public or political agents – essential to perform matchmaking actions between the ambitions of the cities' projects and the rules and priorities of each international, national, and regional development bank – is a challenge for local governments. In addition, many municipalities are unclear about the range of financing options available to them, as well as the information on the criteria required by financing institutions. A common example is the minimum value of the project, which in international institutions in general are higher due to their higher transaction costs, leading to the exclusion of small projects.

75 Ordinance No. 501 of November 23, 2017 and Ordinance No. 882 from December 18, 2018, from the Ministry of Economy.

76 Information collected during FISC events (Network for Financing Sustainable Infrastructure in Cities).



5.

RECOMMENDATIONS TO UNLOCK CLIMATE AND GREEN FINANCE OF INFRASTRUCTURE IN BRAZILIAN CITIES

This section presents nine recommendations, which aim to help overcome the barriers presented in the previous section and to unlock green and climate finance for the provision of urban infrastructure in Brazilian cities.

The elaboration and systematization of these major guidelines was based on information and data collected from three sources. The first source of information includes considerations and suggestions derived from discussions held within the Network for Financing Sustainable Infrastructure in Cities (FISC Network)⁷⁷ between 2017 and 2020. Representatives and experts in urban financing from international, national and regional financial institutions, as well as representatives of project preparation facilities and local and federal governments discussed the ideas and recommendations provided in this section. The second category corresponds to the data analyses, information and debates that the authors conducted for the development of this report. Finally, the third source includes information from review of qualitative literature, and includes contributions from publications on the theme of green and climate finance in cities and urban infrastructure financing.

To overcome the obstacles to green and climate finance for urban infrastructure in Brazilian cities will require the support and commitment of different institutions and government levels. Therefore, the recommendations are directed at a variety of actors, including the federal government, state and municipal governments, financial institutions, public interest organizations in the climate sector and the private sector. In addition, they cover areas that touch local and national institutional environments, public budget, the financial system and the financial market in general (OECD, World Bank and UN Environment, 2018).

Each recommendation is presented taking into account its functioning and objective, a barrier which they have the potential to solve, its associated risks for implementation and key actors for its viability. The recommendations are as follows:

1. Align national level policies to enhance low-carbon urban development
2. To implement strategies to improve the regulatory environment and drive projects in urban infrastructure low carbon sectors
3. Establish sub-national entities to improve urban planning and support low the management of carbon investments in cities
4. Implement a broad, continuous and integrated program of technical training for sustainable project preparation for local managers
5. Deepen the incorporation of the urban climate agenda in the Brazilian financial system performance
6. Foster financial innovation and new investment models aligned with low carbon urban development

7. Improve the local fiscal environment to ensure financial resources for investments in low carbon projects in cities

8. Enhance access to financial resources for urban and low carbon infrastructure through the private sector

9. Develop tools, arrangements and incentives to facilitate access to national and international loans for low carbon urban projects

On table 3, at the end of this section, there is a summary of the barriers, recommendations, actions, potential actors and prospects for implementation to enhance green and climate finance for urban infrastructure.

5.1. Align national level policies to enhance low-carbon urban development

Linked barrier: Low level of coordinated governance and integrated planning

The first recommendation concerns the development of coordinated planning and actions between national, state and municipal governments and their respective regulatory, fiscal and tax policies in order to expand green and climate finance for urban infrastructure.

First, to direct financial flows to sustainable infrastructure in cities, it is important that there are commitments to low-carbon urban development defined and provided for in national policies (Broekhoff et al., 2018). Producing policies and plans in a coordinated manner and containing the main guidelines for a sustainable path in Brazilian cities in the coming years has the potential to expand the number of investments (Floater et al., 2017). A broad pact and engagement program, led by the national government, is recommended for the development and incorporation of national policies aimed at promoting low-carbon development in urban areas by state and municipal governments, public agencies, civil society organizations civil and other actors. This program can be developed in the medium and long term, requiring broad debate with different actors to ensure a participatory process, accompanied by transparent communication structures that allow for the engagement of civil society.

Besides formulating guidelines on low-carbon urban development in national policies, it is necessary to integrate sustainable priorities into other national and local policies, and into the operations of public agencies in general. It is therefore recommended the creation of a multi-level coordinating body or a revision of existing institutional structures, so that they include representatives of national, state, and municipal governments and their respective agencies and that can directly address critical problems and challenges on the agenda in an integrated manner.

This has the potential to ensure the advancement of the agenda and reduce the chances that concrete initiatives to implement urban climate guidelines and commitments are relegated to fragmented sectoral or territorial

⁷⁷ For more information, see Annex B – Report of Network Activities for Financing Sustainable Infrastructure in Cities (FISC NETWORK).

actions. Among the attributions of the proposed instance would be the definition of the best distribution of responsibilities among federal entities, identification and reduction of financial gaps, cooperation to expand the capacity of different governments and agencies, and improvement of participatory structures (Habitat III, 2017). This action can be carried out in the medium term and be led by the Ministry of Regional Development (Ministério do Desenvolvimento Regional - MDR). It should also rely on representatives of local governments, public financial institutions, regulatory agencies, such as the Federal Audit Court (Tribunal de Contas da União - TCU), and other public representatives that have influence on the development trajectory of cities.

Ensuring policy coherence between different sectors and levels of government requires looking at interactions between these entities and the level to which their policy priorities align or diverge (Floater et al., 2014). Plans, policies, subsidies, among others, that are not in line with the urban climate agenda developed should be reviewed. This is the case, for example, with the tax percentage (Tax on Industrialized Products - IPI) on the purchase of electric bicycles, which reaches 35% of the purchase value, while for individual conventional cars, the value drops to approximately 2% of the purchase value. Many cities have been seeking to expand their cycling network, but the incentive given at a national level via IPI is not aligned with this local effort.

The revision of plans, policies and grants requires time and may raise political risks to be implemented. As a first step, it is suggested that the national government create a technical committee to review fiscal, tax and legal or other incentives at different levels of government that are misaligned with each other or with national guidelines for low carbon development in cities. The revision is able to signal the new direction adopted by the national government and, in so doing, it may facilitate the revocation of unwanted measures in the long run.

Finally, it is noted that the national government traditionally influences policies and actions at the local level to ensure the country's development (CCFLA, 2015). It is the main agent responsible for developing climate investment guidelines in urban areas from policies, plans and actions, which are able to guide investment criteria by different actors such as development banks and local governments. Therefore, the measures proposed here require, in particular, the long-term commitment of the federal government to enable the implementation of the urban climate agenda in the country and its financial viability.

5.2. Implement strategies to improve the regulatory environment and drive projects in the urban infrastructure and low carbon sectors

Linked barrier: Regulatory uncertainties

Improving low-carbon urban infrastructure regulations and contractual arrangements can help target and allocate green and climate finance to cities (Floater et al., 2017). Changes in legislation, structuring, regulation and contracting models can mitigate the risks that arise from regulatory and legal design, providing more clarity and project stability (Ferraresi et al., 2018).

The first recommended action is the improvement of legal arrangements to expand the scale of projects in cities. It is recommended that the national government – in partnership with state and local governments, as well as national and international development financial institutions and institutions supporting the preparation of urban infrastructure projects – review the formulation of clear rules for risk allocation and guarantees for the development of consortia and/or other forms of cooperation between municipalities (see Box 3). As already mentioned, several Brazilian municipalities have already established some kind of consortia to provide public services (Oliveira et al., 2017). In the solid waste sector, for example, inter-municipal partnership is encouraged by the National Policy for Solid Waste (Política Nacional de Resíduos Sólidos, PNRS). Additionally, in 2020, COFIEIX issued Resolution 1/2020, which establishes certain criteria for external credit operations for public consortia (BRAZIL, 2020b).

Despite advances, there are still important measures to be taken. It is necessary to clarify, for example, the distribution of risks and responsibilities of consortium institutions for obtaining national and international loans. In addition, regulating incentives for state participation in the formation of consortia, and ensure financial support and guarantee instruments for inter-municipal projects would foster this type of arrangement and enable low carbon urban infrastructure projects in smaller municipalities. The development of consortia and other forms of cooperation between municipalities would also facilitate aggregation strategies, which have been widely discussed by international organizations as efficient ways to enable urban low carbon infrastructure projects (Shakya and Byrnes, 2017). This theme is discussed in the recommendation "implement a broad, continuous and integrated program of technical training for sustainable project preparation for local managers".

In addition, as low-carbon projects are often innovative initiatives, they lack clear rules and the development of contractual arrangements that delimit the roles of agents and establish clear structures for risk allocation with the public authorities. This is the case, for example, with innovative projects in the waste and electrical mobility sectors and, to a lesser extent, with energy

efficiency projects in buildings and public lighting. Such institutional and legal inertia makes it difficult to change investment patterns and to direct resources to innovative low carbon solutions in cities (Floater et al., 2017). There are important legal initiatives already being designed to deal with these issues, including, for example, the Bidding Law Bill (PL 1292/95).

Despite the existence of such initiatives, a coordinated effort at the national level to support low carbon projects in cities must be implemented. It is recommended the creation of a committee or instance focused on the continuous improvement of regulations and legal frameworks in these areas. It is important that this body is linked to the institutions for planning and governance of low-carbon infrastructure and development at the national level. Among the actors that may lead such an initiative are the national government, state and municipal governments and their respective public agencies responsible for bids, hiring or other types of action in the relevant sectors, in addition to representatives of the private sector and the Court of Auditors and the Public Prosecutor's Office. Such instances can develop, among others, joint dialogue to improve legislation, reviewing regulations that hinder the development of low-carbon projects in cities. They can also create a database of regulations and good practices in different low carbon urban sectors (Felsberg Advogados, 2018). The same body may also be responsible for verifying compliance with relevant laws and regulations. This initiative can be implemented in the short and medium term, based on the coordinating engagement between the institutions. In the long run it is expected that such a unit will be able to influence the development of new laws, decrees and other legal documents.

Another important recommendation concerns the improvement of data and information transparency on urban infrastructure services operations, as well as their financing. While transparency in services of public interest, such as infrastructure, is key to economic development, they also support compliance with laws and regulations, creating a business environment in which private investors are more likely to be attracted (OGP, 2018). To increase transparency in urban infrastructure sectors it is necessary to work on two fronts. First, improve data collection by local governments. And, secondly, compile information on complete and reliable platforms that are available and easily accessible to the population (UCLG and OGP, 2018).

For the former, it is recommended to create a national program aimed at improving transparency of urban infrastructure projects data performance, which allows, on the one hand, monitor information on the quality of urban services and, on the other hand, support the more accurate pricing of these services. The creation and dissemination of appropriate indicators are able to provide the basic benchmarks to the market and monitor the specific risks of projects, as well as evaluate companies during the bidding process (Wagner et al., 2014). This program – under the leadership of the national

government, in partnership with municipal and state governments, municipal and judicial entities, such as the Public Prosecutor's Office – could delimit responsibilities and sanctions related to data collection activities and availability of local information. The national program can also specify whose task it is to provide the information and to create incentives for it to be disseminated.

For the second front, it is suggested a partnership with regional and national development financial institutions for the creation of a specific line of funding to support the capacity building of the municipal framework for information collection, as well as to increase the level of digitalization of services in Brazilian cities (OECD, 2018). Limited digitalization in cities makes it impossible to make data available on a large scale. These actions can be carried out in the short and medium term and have the potential to ensure both monitoring of urban infrastructure performance and support the design of new projects.

BOX 3. BROADENING THE SCALE OF URBAN INFRASTRUCTURE PROJECTS: PROPOSITION OF LEGAL-INSTITUTIONAL MODEL LED BY BDMG

The State of Minas Gerais is composed of 853 municipalities, of which only 33 have a population of over 100,000.¹ In this scenario, there is a strong need to expand the scale of urban infrastructure projects to make their financing and implementation feasible. To deal with this issue, in the first half of 2020, BDMG, with support from IDB, proposed to Radar PPP² and Moyses & Pires³ office, the development of a legal, regulatory and business model, which allows access to a greater number of municipalities to the possibility of contracting services of modernization and operation of public lighting parks (Iluminação pública, IP) in the form of Public-Private Partnerships.

In this work, three agglutination alternatives were studied, including public consortium, cooperation agreement and public enterprise, and their characteristics, differences, advantages and disadvantages analyzed. In the end, the cooperation agreement was chosen as the most adherent model for simultaneous contracting by municipalities and private partners, since it allows for gains in scale by presenting a more flexible structure, absence of joint responsibility, flexibility in the inclusion of participants, legal security and absence of legal entity formation. From the choice of the cooperation agreement, the proposed regulatory legal model was detailed, containing an institutional framework, a legal link between the participants and the State Government, and an analysis of the economic feasibility and regulatory environment.

The cooperation agreement makes it possible to draw up a public notice with a single tender and standard contract for the development of public lighting concession projects for all municipalities,

with individualized annexes, considering the particularities of each city. This will enable agglutination of municipalities for the integrated contracting of public services for implementation, modernization, efficiency, expansion, operation and maintenance of public lighting network. Once municipal laws are uniform for collection of the Contribution to Public Lighting Service Cost (Custeio do Serviço de Iluminação Pública, Cosip), it will be necessary only one entity of regulation and inspection of the services, preferably State or inter-federative, which will also be the bidding organ, with structure and competence for regulation.

This model is expected to give legal security to private companies that will participate in concessions, by presenting regulatory logic centered on contracts, simplifying and exonerating attributions from municipalities as granting power and generating predictability and trust among participants. This scalable model is expected to help public lighting concessions to reach municipalities that today are below the viability cut-off line for such projects and that are the majority in the state of Minas Gerais.

With the inauguration of the new municipal managers in 2021, it will be possible to carry out the first public lighting IP project with the developed model. In addition, the solution could be replicated for other investment needs at the municipal level, including concessions and PPPs in the areas of sanitation, education, health, mobility and smart cities, for example. In short, the model provides rationality and efficiency to public resources in favor of society and encourages the expansion of private investments in infrastructure in the state of Minas Gerais.

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Notes: 1 – IBGE: population estimates for Brazilian municipalities and federation units, with reference date July 1, 2020. 2 – Private company that, among others, provides strategic consulting for the formulation of private investment contracts in infrastructure and public services; 3 – Office specialized in Public Law and in the structuring of Infrastructure Projects.

5.3 Establish sub-national entities to improve urban planning and support low the management of carbon investments in cities

Linked Barrier: Insufficient urban planning

Qualifying planning actions in Brazilian cities is a premise to catalyze effective financing and implementation of low carbon urban infrastructure and to achieve sustainable development strategies in urban areas (OECD, World Bank and UN Environment, 2018). As these are long-term investments (NCE, 2016), sustainable infrastructure projects in municipalities should be formulated in line with municipal plans, such as, among others, the Master Plan, and local sector plans, such as the Urban Mobility Plan and the Municipal Electric Power Management Plan. In addition, they must be included in the municipal multi-year plans and different public policy programs at the local level.

To ensure the alignment of resilient infrastructure projects with local sector plans, programs and targets, it is proposed to create or restructure public entities to support municipalities to make such a connection, following the example of the Financing System for Actions in the Municipalities of the State of Paraná (Sistema de Financiamento de Ações nos Municípios do Estado do Paraná – SFM) and PARANACIDADE (PARANACITY, see Box 4). Such instances can be designed or adapted to be subject to federal entities or subnational instances. Under any of these forms of governance, the development of such institutions and roles will require the commitment and support of different levels of government, including national, state and local governments. In addition, after the establishment of the instances and actions within instances, direct collaboration should be sought with public agencies, regional, national and international development financial institutions, research institutions and/or entities specialized in urban planning, to support municipal governments to implement planning and project management actions.

The entities will be responsible for verifying the local projects' alignment with the city management official documents and to determine the adherence of initiatives to the long-term local development plan. Thus, municipalities will only be able to advance projects aligned with the local development strategy outlined. This will allow the use of more precise criteria and parameterization to identify priority projects and those that will have the greatest economic, social and climate impacts. If municipalities lack, for example, local sector plans to verify the adherence of initiatives, the entities may also support the connection between local governments and fundraising options and/or some other type of financial and technical support to carry out the development of plans and programs. Regional and/or state levels may also associate themselves with specialized agencies, secretariats and national and regional FDIs to provide technical and financial support to municipalities in developing plans and programs. The Ministry of Regional Development, for example, has a support system for the elaboration of urban mobility plans,

through the provision of a guidet, which assists municipal managers with over 100,000 inhabitants in the elaboration of draft plans, with the minimum contents provided for by Law 12,587 (BRAZIL, 2019; BRAZIL, n.d.). The management bodies could, therefore, in a coordinated manner, make use of the existing materials and sectoral information to support municipalities.

In addition to ensuring the alignment of low carbon investments with local planning, such entities can also support long-term investments management. This has the potential to diminish the influence of political cycles and achieve more effective intra-sphere governance coordination (federal, state and municipal). As a demonstration of the potential for such action, the federal government's Investment Partnership Program (Programa de Parcerias de Investimentos, PPI) can be noted. PPI aims to expand interaction between the State, in its different spheres, and private initiative, through partnership contracts and other privatization measures. It performs, through its Board and Secretariat, the evaluation and recommendation of priority projects that will integrate the program, as well as ensures the coordination, monitoring, evaluation and supervision of actions and projects. Hence, it is suggested that the entities carry out monitoring, evaluation and supervision of the projects, following the example of PPI, to ensure the implementation of long-term investments for low carbon urban projects.

A third line of action that may be under the prerogative of regional and/or state entities of planning and management of low carbon investment in cities is the creation of platforms for storing information on municipal projects. It is suggested that this action be in line with the last action proposed in recommendation "implement strategies to improve the regulatory environment and drive projects in urban infrastructure and low-carbon sectors." The platforms proposed have the potential to support structuring and value-for-money analysis of new projects. Supporting municipalities in accessing, generating, controlling and managing data on low carbon infrastructure projects in cities has the potential to improve the services implemented and to ensure the quality of new feasibility studies, increasing confidence of financiers to invest in low carbon projects in the city.

BOX 4. COMBINING LONG-TERM INVESTMENTS WITH SUSTAINED URBAN DEVELOPMENT: SYSTEM FOR FINANCING ACTIONS IN THE MUNICIPALITIES OF THE STATE OF PARANÁ – SFM¹

The System for Financing Actions in the Municipalities of the State of Paraná (Financiamento de Ações nos Municípios do Estado do Paraná, SFM), supports Paraná's municipalities on urban and regional development through strategic financing actions to meet the population's demand for basic services, urban infrastructure and public goods and institutionally strengthen municipalities and regions in Paraná.

Financing that contributes for the implementation of climate mitigation and adaptation strategies, such as installation of municipal parks, drainage systems, collection and final disposal of solid waste and afforestation, among others, has been developed in the state since 1988, initially with the creation of the State Fund for Urban Development. On a rotating basis, the System's funds lent to municipalities, after being amortized, return to their capital to be reinvested in new financing.

The SFM was established by Decree in 2002. In 2013, it became governed by State Law No. 17,655, which shielded the allocation of funds from returns and interest on loans granted and the results obtained in financial investments mandatorily for future loans linked to the SFM, in order to ensure the perpetuity of financing to municipalities. This same law created the SFM Investment Committee, of a consultative, deliberative and propositional nature, with attributions to establish application goals, monitor investments and deliberate on contractual charges for the operationalization of financing, such as costs, interest, spreads, terms and guarantees, all in accordance with the National Financial System (SFN).

To achieve its objective, the SFM finances, based on the guidelines dictated by its Operational Regulation (Regulamento Operacional, ROG)², investments in basic urban and social infrastructure and support for small and micro producers, through the construction, expansion, rehabilitation or reform of public spaces and equipment. In addition, it supports the institutional strengthening of municipalities, with the

objective of improving territorial, administrative, tax and financial management capabilities, and human resources, and promotes the expansion and updating of technical support instruments, aimed at planning and offering public services and the acquisition of real state and personal property.

The SFM's organizational structure includes the State Secretariat for Urban Development and Public Works (Secretaria de Estado do Desenvolvimento Urbano e de Obras Públicas) – SEDU, accountable for the elaboration of the State's urban and regional development policies, which is responsible for the SFM's administration; the Autonomous Social Service PARANACIDADE, with the role of operational technical agent; the Paraná Development Agency S.A. – Fomento Paraná, with the role of financial agent; and the SFM Investment Committee. PARANACIDADE supports the municipalities in developing projects in compliance with the institutional, legal, technical, environmental, economic and financial criteria established in the ROG and carries out prior analysis of the documentation regarding the Request for Authorization to Contract Credit Operations, to be sent to Fomento Paraná or the National Treasury Secretariat (STN).

SFM is constantly being updated to meet the legal standards that guide financing of urban infrastructure. It innovates not only by including in its principles global, national and local agendas capable of guiding urban development in the pursue of making the cities of Paraná sustainable and inclusive, but also by configuring itself as a coordinating and managing body for long-term financing of urban development in Paraná. Currently, SFM has outstanding resources for the public sector summing up to R\$ 1.47 billion, and in the last five years, annual availability for new contracts totaling R\$ 276 million³.

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Notes: 1 – For more information, access PARANACIDADE; 2 – Resolution 007/2019, which approves the General Operational Regulation of PARANACITY (Regulamento Operacional Geral do PARANACIDADE). http://www.paranacidade.org.br/arquivos/File/ROG/Regulamento_operacional-versao-2019.pdf; 3 – Data from September 2020.

5.4 Implement a broad, continuous and integrated program of technical training for sustainable project preparation for local managers

Linked barrier: Difficulties in project preparation activities at the local level

In order to raise funds for urban infrastructure and low carbon projects, local governments need to develop high-quality projects, both conceptually and financially; that is, projects that are economically viable for cities, attractive to investors, and that provide environmental and social benefits (Oberholzer et al. 2018). There is, however, a chronic difficulty in Brazilian municipal public sector to create, prepare and implement project pipelines, including those for urban infrastructure. In addition to this scenario, low carbon infrastructure projects in cities usually present a certain degree of innovation, since they are not systematically implemented in the country, further increasing the difficulty of local governments in designing them.

Currently, there are important initiatives coming from national and international organizations, including project preparation facilities and other programs, aimed at training municipal managers and supporting the structuring of urban infrastructure projects in the country. This is the case with the FELICITY program, led by GIZ and the EIB, which aims to promote sustainable GHG mitigation projects in cities (see Box 5). These initiatives, however, are shaped separately, without a broader support structure to jointly enhance their actions.

Therefore, in order to advance the issues that permeate the development and technical quality of local low carbon projects, it is proposed the creation of a continuous, comprehensive and nationwide program to train municipalities and states' staff to formulate low carbon projects. Due to the size and scope of this activity, the program should be planned and implemented through the joint engagement of different institutions, including national government, international, national and regional financial institutions and project preparation facilities present in the country. Among the entities, it is suggested that multilateral and bilateral development banks present in the country, as leading organizations in financial support of low carbon projects, associate themselves with national and regional FDIs, as well as municipal entities, following the example of the National Confederation of Municipalities (CNM), to begin the process of implementing the program. This initiative can guarantee both the internalization and retention of training and technical qualification of local public managers and staff, as well as the feasibility of technical and financial support for the preparation of specific local projects.

As mentioned, there are national initiatives technically qualifying municipal managers, but not in a broad scope. The Program for Modernization of Tax Administration and Management of Basic Social Sectors (Programa de Modernização da Administração Tributária e da Gestão dos Setores Sociais Básicos, PMAT) from BNDES, for example, provides financing for strengthening managerial, regulatory, operational and technological capacities of municipal administration. To replicate PMAT program model and efforts in the light of the issue of technical capacity building for the promotion and elaboration of low carbon projects in cities, the first action recommended by this publication is the development of cooperation networks between municipalities, municipal entities and/or states and competence centers, such as universities and national and international entities, to identify complementarities and additions to the initiatives that are already in place. To this end, existing programs and the respective actors involved should be identified, and initiatives should be engaged in the broader program, based on a strategic structure that allows for the centralization of opportunities and information for municipalities.

Another relevant action is the development and availability of online knowledge platforms that provide specific tools to support the process of development and qualification of sustainable projects thus allowing greater autonomy to local entities to evaluate their projects. SOURCE initiative, for example, provides this type of support at international level and focuses on heavy infrastructure projects and PPPs. Developed by multilateral development banks⁷⁸ and the Sustainable Infrastructure Foundation (SIF), SOURCE consists of a knowledge platform that provides free support to national and sub-national governments in the preparation of infrastructure projects, through the provision of best practices in project preparation and collection and aggregation of standards and returns on experiences developed by public and private infrastructure professionals globally (SIF, n.d.). If institutions engaged on urban infrastructure financing, such as national and international development banks, were to develop jointly similar initiatives, but with a focus on low carbon projects and at the municipal level, it would have a high potential to support municipal governments in Brazil.

Coupled with the platform, national events with local staff could be implemented to disseminate the online platform and to exchange information. State actors should also be involved in this process to foster the capillarity of the knowledge acquired to support smaller municipalities and to generate technical capacities regionally. Another possible action within the program is to hold workshops and/or other types of meetings to exchange experiences between "champions" cities, i.e., municipalities that have raised green and climate resources and implemented

⁷⁸ Includes: African Development Bank, Asian Development Bank, World Bank Group, IDB, EIB and European Bank for Reconstruction and Development

low carbon infrastructure projects and cities seeking to unlock this type of funding. By exchanging successful experiences in municipal climate finance, other cities may be inspired.

In addition to local technical training, initiatives can be implemented to support low carbon projects preparation in cities more specifically. To this end, it is proposed, that periodic calls be made for local sustainable projects to receive technical support and financing. These calls may present sectoral focus and investment priorities (e.g. call for support in the preparation of green infrastructure projects and infrastructure projects for non-motorized transportation in cities), since the critical points and need for support in project preparation are usually related to specific areas. Due to the heterogeneity of Brazilian municipalities, it is important that the program includes criteria to ensure that a diverse range of cities can benefit from the initiative. Based on partnerships between financial institutions and municipal entities, the program can present specific parameters, such as the number of inhabitants, municipal GDP, and the region where the city is located.

Combined with the technical gap, municipalities also suffer from limited resources to develop their projects. To deal with the lack of sufficient funds for project preparation, it is suggested the implementation of a comprehensive fund exclusively focused on project preparation activities.

With this initiative, local project preparation costs would be shared between cities and, potentially, the federal government, project preparation facilities and international, national and regional development financial institutions. The fund could also raise revenues and join efforts with other international funds, such as the City Climate Finance Gap Fund. Launched in 2020, the Gap Fund was created by the World Bank and the EIB, in partnership with GIZ and with the support from different entities⁷⁹. It provides technical and advisory services to help local governments prioritize and prepare pre-feasibility studies and climate programs in early stages, with the aim of accelerating preparation, improving quality and ensuring projects' financing (City Climate Gap Fund, n.d.).

The cooperation of the national fund proposed here with other existing funds will enable not only a greater number of resources, but also an exchange of experiences. It should be noted that the fund can also be used strategically to generate incentives, via a reimbursement requirement if the municipalities are unable to make progress on the project. The fund can also foster, when possible,

standardization in the preparation and contracting of projects, the mobilization of private financing and the intelligent use of concessions (for example, through a revolving mechanism, such as reinvesting a fraction of the cost savings provided by low carbon projects). In addition to technical and financial support to projects, another important axis of action to be followed by the program is the insertion of a strategy to identify low carbon initiatives that have been successfully carried out by municipalities, in order to standardize, replicate, and scale up these models. Defining, standardizing and implementing replicable initiatives is less time consuming and less costly for all parties involved in the project, since investment in the project preparation phase can significantly decrease. If initiatives (supported by the program or other sources) are evaluated by a dedicated team to check standardization constraints, and replicate good practices, in the long run this will result in an expansion and qualification of low-carbon initiatives (Doren et al., 2016).

Another action to be developed by the program concerns the implementation of aggregation strategies, an area considered very promising by international development institutions, including CCFLA and the International Institute for Environment and Development (IIED). Aggregation can be done in three ways (Shakya and Byrnes, 2017): (i) financial aggregating, i.e., grouping financial products on a platform that offers diversified scale and risk to investors, (ii) aggregating demands, i.e., when cities come together to aggregate their demand and access to finance, following the example of consortia, and (iii) aggregating projects, i.e., a portfolio of projects that provide decentralized services in a given area or with similar business models.

Aggregation, in any of its three categories, will require a pipeline of projects of sufficient size, quality and common characteristics to be aggregated (Shakya and Byrnes, 2017). It is important that the team dedicated to identifying patterns and potential for project replication can also work, jointly with the national government, project preparation facilities and national and international funding institutions. This articulated work must seek the development of aggregation, sectoral and initiatives programs aimed at scaling up viability of urban infrastructure, as was the case with Monumenta Project⁸⁰, which enabled the recovery of historic buildings and requalification of historic sites in Brazilian cities.

Low carbon infrastructure projects are often complex and capital-intensive investments, requiring long maturation time. Therefore, technical knowledge and financial capacity are essential for elaboration and

79 City Climate Finance Gap Fund (Gap Fund) is supported by the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU), the Federal Ministry of Economic Cooperation and Development (BMZ), the Luxembourg Ministry of Environment, Climate and Sustainable Development, the Global Mayors' Pact (GCoM) and networks of cities, including Local Governments for Sustainability (ICLEI) and the Climate Leadership Group C40 Cities.

80 Monumenta Project, created in 1995, consists of an initiative of the Ministry of Culture aiming at requalification of historic urban centers in the country. The program was financed by the Ministry of Culture and IDB, and supported 26 Brazilian cities (IPHAN, 2009).

monitoring throughout the preparation cycle. In this context, addressing technical qualification of local government staff, including not only municipalities but also states, should be a priority. Given the coverage

and scope of this gap, the actions proposed here present a medium and long-term perspective of implementation.

BOX 5. SUPPORTING PREPARATION AND IMPLEMENTATION OF LOW CARBON INVESTMENTS IN BRAZIL: FINANCING ENERGY FOR LOW-CARBON INVESTMENT – CITIES ADVISORY FACILITY (FELICITY)

"Financing Energy for Low-Carbon Investment - Cities Advisory Facility" (FELICITY) program was launched by GIZ as a technical cooperation agent in partnership with EIB, European Union's financial arm and the largest multilateral climate action financier. The global program aims to promote sustainable GHG mitigation investments in cities in line with Nationally Determined Contributions (NDCs) to Paris Agreement, operating in Brazil, among other emerging and developing countries.

In order to achieve the program's objectives, FELICITY operates at different levels (local, regional, federal), cooperating with various actors using the following tools in particular: i) support in preparing low carbon investments; ii) training of project management units; iii) mobilization of international funding. By bringing together international experiences and good national practices, FELICITY seeks to reduce the barriers that sub-national governments face in developing financially viable and high-quality projects. By prioritizing the interests of cities, FELICITY supports preparation of low carbon investments in partnership with public banks, in order to understand and anticipate their criteria for access to financing lines, selecting projects that are ambitious and replicable.

In Brazil, FELICITY contributed to the establishment of a window of opportunity for financing low carbon urban investments in 80-million-euro credit line between EIB and BRDE (Banco Regional de Desenvolvimento do Extremo Sul). As a partner, BRDE helped to identify local initiatives to be assisted by FELICITY, which resulted in the approval of three low carbon projects in different sectors, one in each state of the South region. Paraná project is located in the city of Maringá and consists of modernizing and applying energy efficiency (EE) to the municipality entire public lighting system, which includes the replacement of light bulbs with LEDs (about 50,000 points) and integration of a remote management system. Santa Catarina project benefits the Metropolitan Region of Florianópolis (RMF) and proposes the insertion of low-carbon technology, a fleet of electric buses (eight to 29 buses) with recharge infrastructure, and integration of bus lines from eight municipalities in a network

of efficient public transport with new terminals. Rio Grande do Sul project, in turn, is located in the city of Porto Alegre and aims to expand installation of photovoltaic panels on rooftops and implement 10 EE measures identified in 99 municipal public schools. The electricity produced by the photovoltaic panels will be consumed in schools and surplus will be integrated into the electricity grid.

The three projects have significant socioeconomic benefits for the cities, in addition to environmental gains. Each of the projects has benefited from technical assistance from a multidisciplinary team and training related to planned investments in efficient management tools or low carbon technologies. With this, it sought to meet all requirements for access to financing. In addition, due to close cooperation with local actors of each project and great experience of the consultants involved, it was possible to elaborate projects attractive for investments and of considerable scale, allowing such projects to advance in their various stages of preparation.

At federal level, FELICITY cooperates with the Ministry of Mines and Energy (MME) in the continuous improvement of Brazilian energy efficiency public policy instruments relevant to cities. Based on the experience and results gathered from projects in the Southern region, the MME has published a Practical Guide for preparing EE and solar energy investments in public buildings which aims to standardize the design of such projects. 85 cities applied the Practical Guide to online training especially during COVID-19 pandemic period and 10 cities presented new EE and solar energy projects for public buildings taking advantage of the guidance given. At the same time, FELICITY provided recommendations to encourage more EE investments in cities, for example through a proposal to improve the Municipal Energy Management Plan (PLAMGE). It also performed an analysis of the barriers faced by municipal projects under ANEEL Energy Efficiency Program (PEE) and identified strategies to leverage public and private financing to increase EE in urban infrastructure.

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5.5 Deepen the incorporation of the urban climate agenda in the Brazilian financial system performance

Linked barrier: Deficiencies in directing funds to sustainable urban development.

In September 2020, Brazilian Central Bank acknowledged, through the launch of the Sustainability dimension of BC# Agenda, that the events brought about by climate change “are accompanied by changes in the main economic variables in the relevant horizon for monetary policy, in addition to bringing significant risks to the financial system”. (BCB, 2020). By acknowledging that environmental sustainability is an integral part of national financial progress and stability, Central Bank signals that institutions that make up Brazilian financial system will also have to take on responsibility for improvements in their capacity to support the financing, investments and innovations necessary for a low carbon transition (OECD, 2017). To further this strategy, this report proposes four actions, which can be taken by institutions that are part of the financial system and have the potential to reallocate relevant amounts of funding for long-term investments in low carbon infrastructure (OECD, World Bank and UN Environment, 2018) in cities. All actions included in this recommendation can be evaluated as medium and long term and will require the support of different types of actors present in the financial system.

The first recommended action suggests that the institutions of the financial system jointly develop a definition for the concept of low carbon infrastructure in cities, identifying the main characteristics of this type of investment. The European Commission, for example, put into force, in July 2020, its taxonomy of sustainable investments, to support investors, companies, project proponents and others in the transition to a low carbon economy, resilient and efficient in terms of funds use. The taxonomy defines performance standards for economic activities that contribute substantially to at least one of the six environmental objectives defined in the Regulation⁸¹, do not cause significant harm to any of the other five environmental objectives defined in the Regulation, and meet minimum safeguards (for example, OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights)(European Commission, 2020b).

On a national level, the Brazilian Federation of Banks (FEBRABAN) has been making efforts to develop a green taxonomy for the Brazilian banking sector, seeking, for example, to advance the green credit agenda in Brazil (FEBRABAN, 2020).

FISC Network has identified a preliminary concept, together with representatives of international, national and regional development banks, representatives of project preparation facility and the federal government. This can be a starting point for future discussions:

Physical and non-physical infrastructures designed, built and operated for the transformation of the territory in the sectors of energy, urban mobility, sanitation and housing, in favor of climate mitigation and adaptation, as well as the reduction of vulnerability of populations, through a holistic vision linked to long-term financial, economic and environmental planning and sustainability

The definition will have a dual purpose: first, it will facilitate the collection of data on investments output and performance in this area (OECD, World Bank and UN Environment, 2018); second, it will allow to recognize and ensure the inclusion of urban development the inclusion of sustainable urban development as a relevant pillar in the performance of the institutions of the Brazilian financial system in the fight against climate change.

The second recommended measure is strongly linked to the difficulty encountered by authors to gather data from international and national financial institutions on green and climate finance flow to Brazilian cities. On the one hand, multilateral and bilateral development banks carry out classification and analysis of their investments in green and climate investments at the global level, with no easily accessible data about their specific actions in the countries. On the other hand, national development financial institutions present different levels of information on this type of investment – some institutions do not make this data available; others provide it via reports, or sometimes through platforms on their official websites. Among the institutions included in Section 3 of this study, regional development banks have provided, through their annual reports, more precise data about their performance in relation to green and climate finance in cities. Increase transparency and standardize the availability and methodologies of green and climate finance data, as multilateral and bilateral banks do in the publication Joint Report on Multilateral Development Banks Climate Finance, is essential to enable performance analyses and improvements in the area. In Brazil, FEBRABAN has been compiling green finance data since 2014 through the publication “Measuring financial resources in green economy (Mensurando recursos financeiros na economia verde)⁸². This publication, however, does not provide the participation of each of the financial institutions included in the analysis.

Another recommended action proposes deeping activities for understanding, quantifying and managing exposure to climate-related risks in the risk management practices of investor portfolios (OECD, World Bank and UN Environment, 2018). Central Bank has already proposed

81 Environmental objectives foreseen by taxonomy: Climate change mitigation; climate change adaptation; sustainability and protection of water and marine resources; transition to a circular economy; pollution prevention and control; protection and restoration of biodiversity and ecosystems.

82 For more information, see: <https://portal.Febraban.org.br/pagina/3085/43/pt-br/estudos-sustentabilidade-2019>.

guidelines, through Resolution nº 4.327/2014, that must be observed in the establishment and implementation of the Socio-environmental Responsibility Policy (Política de Responsabilidade Socioambiental, PRSA) by financial institutions and other institutions authorized to operate (FEBRABAN, 2015). Despite this, there is still room for improvement in the practices of climate-risk considerations by Brazilian institutions. Many current models of asset evaluation and risk management do not take into account ESG risks⁸³ – environmental, social and governance – in an adequate manner (Sommer, 2020). To deal with this, it is proposed that Brazilian Central Bank, in partnership with financial institutions and financial system regulators, create a database that can support the assessment of Brazilian financial system's exposure to climate-related risks (Climate Finance Leadership Initiative, n.d.). This database can be incorporated and disseminated by relevant financial institutions. Although the database serves as a first indication of risks, requiring deeper analysis of portfolios by each financial institution, it has the potential to assist in the development of benchmarks to facilitate due diligence of climate risks associated with assets, as well as to increase efficiency, transparency and environmental responsibility in the financial sector (Sommer, 2020).

Finally, it is suggested to deepen the support for thematic and/or proven aligned environmental investments in bank portfolios or directly in assets (OECD, World Bank and UN Environment, 2018). A number of investment options of this type are already available to financial institutions present in Brazil, such as the issuance of green debentures (green bonds), bonds and loans with ESG analysis. Institutions can also take the lead and develop financial tools and arrangements that encourage climate investments in urban areas. In 2020, for example, the BDMG, with support from IDB and SITAWI⁸⁴, became the first national public bank to publish a framework for raising funds for sustainable bond issuance aligned with the United Nations Sustainable Development Goals (SDS) (BDMG, 2020). Among the categories of projects potentially eligible to receive bonds' resources are important low-carbon urban sectors such as renewable energy and energy efficiency, sanitation, clean transportation, pollution prevention and control, affordable basic infrastructure (inclusive and sustainable urbanization and access to essential services) and economic recovery after disasters.

5.6 Foster financial innovation and new investment models aligned with low carbon urban development

Linked barrier: Deficiency in directing resources to sustainable urban development.

The interest of private investors in low-carbon projects has significantly increased the number of innovative financial products in this sector (CBI and IDB, 2019). In this scenario, many institutions in the Brazilian financial market, in partnership with commercial companies, have sought to develop new green financial instruments (Knoch and Plasken, 2020), adapt existing instruments to finance low carbon infrastructure and increase access to instruments and models already existing in other locations (CCFLA, 2015). The Financial Innovation Lab initiative (LAB) is an example of this effort. It was developed by the Brazilian Development Association (ABDE), IDB and the Securities and Exchange Commission (CVM), in partnership with GIZ. The LAB consists of a multisectoral interaction forum that brings together representatives of government and society to create innovative financing solutions in order to expand private investments in projects aligned with social and/or environmental objectives and contribute to the alignment of Brazilian targets associated with SDGs⁸⁵ and commitments to address the risks of climate change. (LAB, n.d.).

To take advantage of the opportunity brought by the interest of different institutions to work actively to deal with climate issues and translate this into concrete actions in Brazilian urban territories in the short term, this recommendation proposes, first, that already existing initiatives, such as the Financial Innovation Laboratory and The Lab in Brazil⁸⁶, direct part of their efforts to generate and improve instruments for green finance focused specifically on low carbon urban infrastructure. Other possible actions include developing researches, surveys and publications about instruments and effective financing models that already exist in other countries and support the implementation of such practices in Brazil (CCFLA, 2015). To this end, a public database can be developed to compile innovative financial models that can support the implementation of low carbon urban infrastructure in cities. In addition, public calls can be made to identify innovative financial initiatives and support their implementation. To carry out such activities, initiatives may partner with national and international institutions focused on sustainable urban development. Channeling part of the efforts of existing initiatives to support cities financing will not only help municipalities, but enable initiatives to have greater impact, since Brazilian urban areas concentrate about 80% of Brazil's population.

83 ESG – Environmental, social and corporate governance.

84 SITAWI Finance for Good.

85 Sustainable Development Goals (Agenda 2030).

86 Launched in 2016, it is managed by the Climate Policy Initiative and financed by German Federal Ministry for the Environment, Nature Protection and Nuclear Safety (BMU), with support for the implementation of German Society for International Cooperation (GIZ) (The Lab, n.d.).

Another action with great potential impact includes Central Bank direct support to enable financial innovation initiatives to address climate issues in cities. Following the example of Laboratory of Financial and Technological Innovations (LIFT) – which consists of an innovation ecosystem and applied research laboratory focused on technology sector, coordinated by the Central Bank itself and by Fenabac (National Federation of Server Associations of the Central Bank) –, Central Bank can create a Laboratory focused on financial innovation in sectors relevant to low carbon urban infrastructure. This mechanism can carry out different calls to identify and support the implementation of initiatives.

Both actions described above can be carried out in the short term by the relevant entities listed. It is important to stress, however, that there should be an effort to focus support to enable financial innovations that will benefit cities, since there are specific challenges faced in financing low carbon infrastructure (CCFLA, 2015).

In the long term, but no less important, it is proposed the implementation of actions aimed at giving scale and expanding the replication of innovative instruments and new investment models aligned with low carbon urban development. To this end, it is important to engage relevant institutions in the area, including the Central Bank, national, regional and international development banks, existing Financial Innovation Laboratories, and others, and local governments, to ensure that institutional knowledge and skills gap does not become an obstacle to the implementation of instruments and models. Following the example of the recommendation “implement a broad, continuous and integrated program of technical training sustainable project preparation for local managers”, building Brazilian cities’ capacity in a broad, continuous and integrated manner is a precondition for the implementation of efficient and innovative financing strategies

5.7 Improve local fiscal environment to ensure funds for investments in low carbon projects

Linked barrier: Precarious municipal fiscal situation

The development of a local fiscal environment which enables sustainable development can support cities’ public revenues and thus improve local balance sheet, help reduce deficits and increase the credit capacity of municipalities (NCE, 2016). Additionally, the strategic use of fiscal systems, guided by the internalization of climate

externalities⁸⁷ has the potential to encourage sustainable investment decisions of the entire urban population (CCFLA, 2015, Ahmad et al., 2019). As mentioned, the fiscal situation of Brazilian municipalities is a major barrier to financing low carbon infrastructure. To overcome this barrier, reviewing the trajectory and making local spending and revenue more efficient are fundamental.

In terms of revenue, there are several sources and financing mechanisms available for cities to finance sustainable urban development. Whether through direct municipal budgeting or borrowing. These include, among others, user charges and fees, property taxes, revenues based on land value, and consumption and income taxes (UN, 2017). Taking advantage of these sources, however, depends heavily on local technical capacity. In Brazil, even when cities present space to implement new urbanistic and financing instruments, or combine existing ones, they are hindered by local technical availability. Under-utilization or misuse of instruments is a major problem.

Among the available local funds sources, the instruments linked to management and recovery of real estate valuation are one of the least used (Evers et al., 2018) despite presenting a wide potential to generate revenue for cities and to integrate spatial planning policies and urban investment strategies (Ahmad et al., 2019). The city of São Paulo (SP), for example, has been, since 2004, directing the funds obtained from the sale of Additional Construction Potential Certificates (Certificados de Potencial Adicional de Construção, CEPACs)⁸⁸ to a specific urban operation fund that can only be used in projects regulated by the City Statute⁸⁹ (Mahendra et al., 2020).

Another important tool for recovering real estate value that can support cities in increasing public revenue to finance low carbon urban infrastructure projects, is the Urban Land and Property Tax (Propriedade Predial e Territorial Urbana, IPTU). Of a tributary nature, IPTU is an important source of income for Brazilian municipalities. Its use, however, is only effective when based on the updated market value of the square meter in different regions of the city (Evers et al. 2018), which often does not occur.

Although implementation and management of such taxes, charges and fees are the responsibility of the municipalities, expanding their use and directing their resources to areas of urban and low carbon resilient infrastructure is not limited to actions at the local level. To ensure their best use, national, state, and local governments can work together with technical organizations supporting urban development and universities to identify good practices at the local level

87 Impacts from the activities of one entity that alter the well-being of another entity (Rosen and Gayer 2008), without the consent of the latter. An example of negative climate externality is the pollution emitted by private cars that affect the health of the population.

88 It consists of a form of charging for the additional construction potential of a pre-determined region linked to a Consortiated Urban Operation (Operação Urbana Consorciada – OUC), carried out through the issuance of bonds by the city government and negotiated in auctions on the stock exchange.

89 This is Federal Law 10.257/2001, which establishes the general guidelines for urban policy and seeks to help cities correct distortions of urban growth and their negative effects on the environment (BRAZIL, 2001).

(CCFLA, 2015) and disseminate them. It is also possible to provide technical training to public entities and develop informational materials for cities.

Moreover, to encourage the strengthening of public budget by good collection practices, such as the CEPACs in São Paulo, and to ensure the application of resources in sustainable initiatives (Qi et al., 2020), one can prioritize the allocation of national funds in the financing of low-carbon infrastructure projects in cities that use resources obtained by the mentioned practices (Floater et al., 2017).

Regarding local spending, it is suggested to deepen partnerships between representatives of TCU, state courts of auditors, municipal courts of auditors, universities and centers of technical competence in order to identify and generate indicators of governance and spending on urban infrastructure. These indicators may be disseminated periodically alongside with good practices and examples of urban infrastructure financing and provision. It is also possible to create scores or rankings for the cities that best use the resources and give them priority in the granting of loans and federal support. This action may be feasible in the short term.

5.8 Enhance access to financial resources for urban and low carbon infrastructure through the private sector

Linked barrier: Precarious municipal fiscal situation

Implementing alternative infrastructure public service delivery structures to attract private capital (CBI and IDB, 2018) and thus finance low carbon interventions in cities is essential. This recommendation seeks to expand the potential for indirect access of municipalities to green and climate bonds market, as well as to allow cities with less fiscal credibility to carry out sustainable projects without increasing their level of indebtedness and without making such projects compromise local public budget in other areas.

Green and climate bonds represent a huge potential for financing low-carbon urban infrastructure that can be better utilized in Brazil. The interest from private investors for investment opportunities directed at fighting climate change and focused on sustainable development has grown worldwide (CBI and IDB, 2018). In addition, there are initiatives by green bonds buyers that focus on emerging markets, such as Brazil, which are willing to accept higher risks for higher returns. Amundi Planet Emerging Green One (EGO), the largest green bond fund in the world, for example, plans to invest \$2 billion in green bonds in emerging markets by 2025 (Environmental Finance, 2019).

Among the main alternatives for accessing private resources for the provision of urban infrastructure in the

country, there are Public-Private Partnerships and service concessions. In fact, important urban infrastructure areas for Brazilian cities, such as sanitation, public lighting and solid waste, have been among those that have presented the most projects made possible by these financial mechanisms in the last two decades (Oliveira et al., 2017).

Although a common practice, infrastructure services provision through implementation of PPPs and concessions at the municipal level in Brazil has presented diverse performances (IFC, 2015). This variation is strongly linked to differences in identification activities, structuring, contractual arrangements and local government capacity to manage these mechanisms (Floater et al., 2017). There are different PPPs and concession models suitable for different projects and different stages of project life cycle (Ahmad et al., 2019). To deal with such a plurality of arrangements, it is important that there are support units of PPPs and concessions dedicated to helping local governments (Ahmad et al., 2019).

A relevant federal government initiative in this area is the already mentioned Investment Partnership Program (Programa de Parcerias de Investimentos, PPI). PPI has developed a new governance type that include selection, prioritization and monitoring of projects executed through concessions and PPPs. In its first 36 months of operation, it closed contracts amounting to R\$ 260.2 billion in investments (Romeiro et al., 2020). Despite being a very important initiative, PPI focuses on heavy infrastructure projects⁹⁰, with less emphasis on areas of urban and sustainable infrastructure. It can be an important starting point to enable a national PPP and concession management unit focused on low carbon urban infrastructure. Currently, the program provides support to subnational entities, including states and municipalities, in 24 projects that include drainage, sewage, public lighting, urban solid waste and basic sanitation (water, sewage and solid waste) sectors (PPI, n.d.) under FEP CAIXA program (see Box 6). Once implemented, the federal government could assign new sustainability criteria (Romeiro et al., 2020) and expand support to local governments from short to medium term. The association between different governmental instances that work directly with municipal governments, besides CAIXA, such as the Ministry of Regional Development, and international and national technical institutions can be developed to help the federal government identify the bottlenecks and needs of municipal PPPs and concessions focused on low carbon, in order to adapt the PPI to this end.

Among the measures aimed at urban infrastructure and low carbon sectors that PPI could take are the development of standardization process – through protocols to support feasibility studies, financial modeling and mitigation of social and environmental risks of PPPs and concessions

90 Railroads, waterways, airports, ports, electric power, mining and oil and gas sectors.

at state and municipal levels – that should be reviewed and updated periodically (IFC, 2015). It could also establish guidelines for feasibility analysis, acquisition, operations and transfers to different sectors (Ahmad et al., 2019).

This would reduce the complexity of implementation and bring clearer standards for structuring PPPs at the local level, supporting important low carbon sectors in cities, such as electricity in public lighting and buildings, and water and sanitation. These areas require national coordination and support because of the approval of PL 4.162/2019, that expands private sector participation. The standardization of processes and the development of templates have strong potential to assist in the contractual design of concessions and PPPs, which is particularly relevant, since all credit risk and default is usually linked to the project's future cash flows (without liability of companies or government balance sheets). This standardization will also allow for greater coordination and guidance on the work of public agencies (IFC, 2015) and private entities in the area, as well as the development of clear risk allocation structures for PPPs and concessions.

Besides expanding the scope of PPI, another possible action is the creation of technical and management committees (ABDIB, 2016) at the state level, which may be linked to PPI and which could be able to provide greater capillarity to actions of direct support to the structuring of PPP projects and concessions in cities. Such instances could not only provide technical and financial support to initiatives structuring, but also serve as a repository of information, contract templates and other relevant data to support municipalities (Ahmad et al., 2019).

Another possibility is to evaluate and implement payment and guarantee instruments, which can mobilize private capital. An important example is the Contribution to Public Lighting Service Cost (Custeio do Serviço de Iluminação Pública, Cosip), managed by energy concession companies and the municipalities. Given COSIP's annual revenue base, it is estimated that PPPs for public lighting have the potential to move about R\$ 9.2 billion per year (Coalition for Construction, 2018). In order to make viable and expand the use of such mechanisms, it is important that the federal government, local governments and international, national and regional financial institutions, in coordination with technical bodies such as regulatory agencies or other commissions, develop feasibility studies to support new forms of revenue collection at the local level and guarantee instruments for different sectors.

As in the case of guarantees via international and national public financial institutions, the national government, and particularly the international and national financial institutions, CAIXA and the Brazilian Agency of Guarantee Funds and Guarantees S.A. – ABGF, can work together to ensure the coverage of urban and sustainable infrastructure projects. This can be done through partial credit guarantees or based on the performance of low carbon technology, so that these instruments avoid moral hazard and market distortions

in sustainable sectors. Expand support for low-carbon urban projects through existing instruments, such as FEP CAIXA, Infrastructure Guarantee Fund (Fundo Garantidor de Infraestrutura) – FGIE and Public Private Partnership Guarantee Fund (Fundo Garantidor das Parcerias Públicas Privadas) is a starting point. Finally, ABGF and other technical bodies can identify initiatives already being used in other countries and adapt them to be used in the Brazilian context.

Another important area of action that PPI and/or state technical and management committees can incorporate is the provision of incentives for the issuance of green and climate bonds focused on low carbon urban infrastructure. The issuance of green and climate bonds presents a double opportunity (CBI and IDB, 2018). On the one hand, it makes room for a broader portfolio of foreign investment. On the other hand, it provides municipalities clear information on how the resources will be spent, due to the certifications. As mentioned, there is already an opportunity to finance low carbon urban infrastructure from Decree No. 10,387/20, which encourages the issuance of green bonds for sectors such as urban mobility, basic sanitation and energy. Despite this, there is still a high demand from private investors for green bonds, which often does not find sufficient supply (CBI and IDB, 2017).

Not only private companies, but financial institutions could benefit from these sources of funding to support cities. Criteria must be defined so that federal government programs, financial institutions, and project preparation facilities prioritize technical and financial support for PPPs and concessions that have green and climate bonds as a source of financing. To support this action, it is recommended the implementation of programs and strategies to group low-carbon urban PPPs into a single portfolio for green bond issuance, allowing state or municipal PPP projects with small costs compared to the average green bond issuance, to access this market.

BOX 6. QUALIFYING URBAN INFRASTRUCTURE CONCESSION AND PPP PROJECTS: CAIXA'S PROJECT STRUCTURING FUND (FEP CAIXA)

The Project Structuring Fund (FEP) of Caixa Econômica Federal (CAIXA) was established in 2017 by Law 13,529 and consists of a private fund aimed at funding structuring and development actions for concession projects and Public-Private Partnerships (PPPs) at the municipal, district, and state levels. Focused on public lighting, sanitary sewage, and urban solid waste projects, FEP is part of the federal government's Investment Partnerships Program (PPI), and its resources come from quotas paid in by the Union and from operating income from deposits of FEP CAIXA, which provides for the reimbursement of its support by public entities after the bidding for projects.

The projects, selected via public calls for proposals, receive support from FEP since their conception until the bidding process. This support includes assistance to the project's social communication issues, engineering evaluations, financial modeling, and contractual arrangements. It also provides guidance to ensure that the project meets environmental requirements, in order to enable it to be financed by green bonds, for example. FEP not only provides individualized support, but also training and knowledge dissemination actions within local governments, allowing internalization of knowledge from the development process of initiatives and the replication in other projects from the same municipality.

So far, FEP CAIXA has supported 25 projects, 64% of them in public lighting, 16% in urban solid waste, 12% in sanitary sewage, and 4% in sanitary sewage and solid waste¹. In addition, under the PPI, FEP has put in place cooperation agreements with multilateral organizations, including GIZ, IDB, International Finance Corporation (IFC) and AFD. These partnerships aim to increase resources' availability and to improve the practices and support given by the fund to subnational entities.

In short, the fund combines the development of quality projects with capacities and standards internalization (including project elaboration, contracting, and mobilization of private investments). Furthermore, it enables the replicability and scalability of initiatives within and outside the municipalities, through incentives for projects to reach the implementation phase, since the local governments must reimburse the fund if the initiatives are not implemented.

Although it includes important sustainable urban infrastructure sectors, FEP has the potential to expand its scope, reaching areas such as energy efficiency, photovoltaic solar energy in public buildings, biomethane generation and fleet conversion to electric buses. This would strengthen support for low-carbon urban infrastructure projects in cities.

Writing done by the authors of the study.

Sources: Caixa Econômica Federal (CAIXA), n.d.; *Fund to Support the Structuring of Concession and PPP Projects - FEP CAIXA* (available at: <https://fundosdegoverno.caixa.gov.br/sicfg/fundos/FEP%20CAIXA/detalhe/sobre/>); *III Encontro Online da Rede FISC - Oportunidades de Financiamento em Infraestrutura Urbana Sustentável*²

Notes: 1 - It was not possible to identify Nova Lima (MG) project; 2 - For further information, see "ANNEX B - Report on the Network for Financing Sustainable Infrastructure in Cities (FISC Network) activities".

5.9 Develop tools, arrangements and incentives to facilitate access to national and international public loans for low carbon urban projects

Linked barrier: Difficulties in overcoming the financing processes of international, national and regional development banks

Multilateral and bilateral development banks, as well as national and regional FDIs, are relevant supporters of low carbon infrastructure projects financing. They provide financing mechanisms aligned with sustainable development and local realities and help unlock private sector resources for these areas (OECD, World Bank and UN Environment, 2018).

There are five lines of action that can generate clearer and faster processes for cities to obtain loans from international, national and regional development financial institutions in order to enable local governments' sustainable urban projects.

These actions should be developed jointly within the financial institutions and, at the federal level, by the Secretariat for International Economic Affairs of the Ministry of Economy. All of them have been present in discussions within the FISC Network meetings, and were brought by representatives of financial institutions, federal government and cities.

A potential short-term measure would be to better clarify the low carbon urban infrastructure agendas of development financial institutions. To address this issue, it is proposed that international and national financial institutions provide, jointly or on their own websites, funding opportunities (including minimum conditions and types of projects expected for specific lines) and good practices of projects that have already been funded. This measure will provide greater clarity about the profile of urban projects covered by the institutions. Other possible action includes the identification of complementarities and joint alignment of international, national and regional development financial institutions

objectives towards low carbon urban projects. At national and regional levels, the Brazilian Development Association (ABDE) can be a relevant actor to carry out such actions. The alignment of financial institutions agendas can also be implemented with key actors such as urban planning secretariats and private entities.

A second short-term action is to increase transparency of information on the steps to be taken by municipalities to access loans, particularly international loans. Many cities are discouraged from raising international resources due to the obligation to go through two processes considered complex: that of international financial institutions and that of COFIEIX. Although there are explanatory manuals from financial institutions and the Federal government on such processes, the scope and language of these publications are not uniform and often not accessible for municipalities.

It is proposed that multilateral and bilateral development banks, the Secretariat for International Economic Affairs and institutions dedicated to providing direct support to cities come together to create a unique material, which will be made available in print and online formats. The resulting document must be in a comprehensive and homogeneous language, bringing together all the information on how to access financing from participating institutions and on how to meet the requirements of COFIEIX. Modifications in the process of accessing loans within international financial institutions are common and, therefore, the manual must be comprehensive and thorough, but with no information that change periodically.

In regard to medium and long-term actions, it is suggested the creation of fast-tracking processes for approval of national and international loan financing for low carbon urban infrastructure projects. These fast-tracking processes may include specific analysis premises and checklists by financial institutions, speeding up approval of such types of financing. Development financial institutions, in partnership with federal and local governments, can include these strategies in specific programs to support low carbon sectors for municipalities. The National Program for Efficient Public Lighting and Signaling (Procel Reluz), for example, carries out such action for the energy sector. It provides financing for actions to improve, expand and remodel Brazilian public lighting systems through financing processes for projects in a concise manner, reducing transaction costs and negotiation time to make financing viable. Development financial institutions can also jointly create a certification system for sustainable urban projects with accreditation prior to borrowing, which will speed up the process for obtaining financing. In order to carry out such action, these institutions should jointly list previously defined requirements for low carbon projects in cities and, after that, create an information system containing the projects applying for accreditation, in order to carry out application analyses.

Fast tracking can also be adopted in the international public finance reviews conducted at COFIEIX. To this end, it proposes

the development of a scoring system and the definition of sustainability criteria and alignment with the country's climate goals to prioritize the approval of low-carbon urban projects.

It is important to remember that the problem of access to international financing is mutual: not only do the cities present difficulties of access, but international financing agents have difficulties supporting different cities, given the heterogeneity of size, the type of demand for financing and payment capacity (CAPAG) of Brazilian municipalities. To overcome this problem, triangulated operations between multilateral and bilateral development banks, national and regional FDIs and cities can be deepened (see Box 7). The triangular operations present benefits for all involved. For multilateral and bilateral development banks, they provide the capillarity of resources, especially for smaller municipalities. For national and regional FDIs, they allow new credit operations, diversification of sources and greater support for low carbon initiatives. For cities, they mean more direct access to credit, since there is no longer a need for COFIEIX approval and the operation takes place in national currency. However, that transaction costs should be a point of attention. Triangulation usually raises costs of credit to municipalities in relation to what it would have in case of direct access. In particular, the exchange rate issue is a point of risk and an influence on costs. To deal with this issue, alternative guarantee structures can be implemented.

As mentioned, the budget of Brazilian cities is limited and many Brazilian municipalities face the dilemma between incurring in national and international loans for long-term urban low-carbon infrastructure projects or financing short-term initiatives to address urgent urban problems (Ferraresi et al., 2018). To make financial calculation and cost-benefit analysis of investments favorable to low carbon urban infrastructure projects (CCFLA, 2015) it is necessary to expand access to funds and partial guarantee instruments in credit operations. A first potential action is the adaptation of existing guarantee funds within the scope of the Brazilian Agency for Guarantee Funds and Guarantees (Agência Brasileira Gestora de Fundos Garantidores e Garantias, ABGF). The Agency is responsible for managing funds such as the Infrastructure Guarantee Fund (Fundo Garantidor de Infraestrutura, FGIE) (ABDIB, 2016), and providing guarantees for diluted risk operations in major economic and social areas such as infrastructure (ABGF, n.d.). Expanding the actions of this instance by adapting rules, mandates and criteria aimed at supporting local low carbon infrastructure projects is an important step. Another possibility is the creation of partial risk sharing funds and specific performance guarantees for low carbon projects, which will catalyze this type of investment, minimizing the specific risks inherent to this type of project and rewarding the best performing initiatives.

Another important support that can be given through guarantee instruments is the minimization of foreign exchange hedge risks of international loans to local governments. In addition to support from national funds within ABGF, in the short term, a relevant action is the expansion and improvement in access

to international solutions, such as The Currency Exchange Fund (TCX). Such fund was developed to mitigate exchange and interest rate risks to enable investments in developing countries and aligned with climate change mitigation and adaptation objectives. The Fund offers, among others, cross exchange rate swaps⁹¹.

As already discussed, there are short-term actions that can support transparency and ease of access for local governments to loans from international, national and

regional development financial institutions for low carbon projects. In the long term, there is a need for changes in the governance structure of national and, particularly, international financial institutions, promotion of greater speed and simplification of loans and COFIEX approval processes and significant expansion of access to alternative guarantees.

BOX 7. STRENGTHENING INTERNATIONAL CLIMATE FINANCE IN BRAZILIAN CITIES: RESILIENT SOUTH PROJECT – A PARTNERSHIP BETWEEN THE WORLD BANK AND BRDE TO FINANCE THE URBAN RESILIENCE AGENDA IN SMALL AND MEDIUM-SIZED MUNICIPALITIES IN SOUTHERN BRAZIL

Faced with the double challenge of the urgency of addressing risk issues (aggravated by climate change) and the difficulty of access to financing, the World Bank and BRDE established a partnership in 2020, made possible through a US\$ 125 million credit operation to promote the urban resilience agenda in municipalities in the states of Paraná, Rio Grande do Sul and Santa Catarina in southern Brazil.

Future borrowers of BRDE's Urban Resilience Credit Line (Resilient South Project) are expected to propose projects to manage and mitigate risks from disasters and extreme weather events such as flooding, inundations, landslides and coastal erosion processes.

The main innovation of this operation lies in intermediation in the relationship between the World Bank and municipalities by a public regional development bank, in this case BRDE, which has sufficient experience and capillarity to reach a broad spectrum of beneficiary municipalities, notably small and medium sized ones. This arrangement brings shared benefits among all stakeholders:

- **Municipalities:** The Urban Resilience Credit Line in Southern Brazil is a versatile and competitive financing option, with two loan options: in local or foreign currency. It also allows financing a combination of structural (resilient urban infrastructure works) and non-structural solutions (technical assistance for risk mapping, preparation of sector studies, purchase of equipment and team training) to respond in a customized manner to disaster risk problems identified and diagnosed in each municipality. The possibility

of financing executive engineering projects, whose elaboration requires specific technical capacity, which in most cases constitutes a major bottleneck especially for small and medium-sized municipalities, should be highlighted. Finally, it allows larger cities to advance with public funds in the implementation of strategic projects, duly supported by public policies that ensure the environment and effective conditions for complementary participation of the private sector in leveraging funds (in the medium and long term), through mechanisms for recovering real estate appreciation.

- **BRDE:** The credit line is an opportunity to diversify its sources of financing, reinforcing its market positioning for sustainable development financing in the public sector. Another advantage is that it benefits from institutional strengthening in the areas of risk management and urban resilience.

- **World Bank:** With the intermediation of BRDE, Credit Line allows the World Bank countless gains of scale and scope, since resources and technical assistance will be able to reach, as never before, small and medium sized municipalities that suffer recurrently from disasters.

With Resilient South Project, approximately 36 integrated municipal urban resilience projects are expected to be financed in the three southern states of Brazil. The resilient infrastructure works are estimated to benefit 250,000 people living in risk areas. In terms of institutional strengthening, the project plans to train 1,000 municipal employees and 100 BRDE employees.

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⁹¹ Exchange rate swaps are contracts to deliver currency in exchange for another. Cross exchange rate, in turn, is the implicit exchange rate between two currencies when both are quoted from a third currency (Jordan, 2013).

Table 3 – Summary of barriers, recommendations, actions, relevant actors—with emphasis on the actor(s) considered essential to the development of the action—and the timeframe for implementation

BARRIER	RECOMENDATION	ACTIONS	RELEVANT ACTORS	TIMEFRAME
Low level of coordinated governance and integrated planning	Align national level policies to enhance low-carbon urban development	Development of national commitments for the low carbon agenda in urban areas, based on a broad program with stakeholder engagement	National government, state governments, municipal governments, public development agencies, civil society organizations and others.	Long term
		Creation of a multi-level coordinating body or adapting an existing one to monitor actions and directly address critical issues and challenges to the urban low-carbon agenda in an integrated manner	National government, state governments, municipal governments, public financial institutions, regulatory agencies such as the Court of Auditors (TCU), and other public representatives that have influence over the development trajectory of cities.	Long term
		Creation of a technical committee to review fiscal, tax, legal and other incentives, at different governmental levels, that are misaligned with each other or misaligned with the low carbon and resilient trajectory in cities	National government	Medium term
Regulatory uncertainties	Implement strategies to improve the regulatory environment and drive projects in the urban infrastructure and low carbon sectors	Improvement of legal arrangements and norms to expand the scale of infrastructure projects in cities via the development of consortia and other forms of inter-municipal cooperation	National government, local governments and regional, national and international development financial institutions	Medium term
		Creation of a committee or a body dedicated to the continuous improvement of regulations and legal frameworks in innovative low-carbon areas in cities	National, state and municipal governments and their respective public agencies responsible for bidding, contracting or other types of action in the relevant sectors, the private sector, Court of Auditors (TCU) and the Public Prosecutor's Office	Medium term
		Creation of a national program and a credit line aimed at improving the transparency of financing data and the performance of urban infrastructure projects	National government, municipal and state governments, municipal and judicial entities, Public Prosecutor's Office and national and regional development financial institutions	Long term
Lack of urban planning	Establish sub-national entities to improve urban planning and support low the management of carbon investments in cities	Creation of regional and/or state entities to support municipalities in aligning resilient infrastructure projects with local plans, programs and sector goals.	National government, state and municipal governments	Medium and long term
		Verification of alignment of local project proposition with official city management documents.	National government, state and municipal governments, public agencies, research institutions and entities specialized in urban planning	Medium and long term
		Support for management, coordination, monitoring, evaluation and supervision of long-term investments in cities	National government, state and municipal governments, public agencies, national and international public financial institutions, research institutions and entities specialized in urban planning	Medium and long term
		Creation of platforms for storing information about municipal projects.	National government, state and municipal governments, public agencies, national and international public financial institutions, research institutions and entities specialized in urban planning	Medium and long term

BARRIER	RECOMENDATION	ACTIONS	RELEVANT ACTORS	TIMEFRAME
Difficulties in project preparation activities at the local level	Implement a broad, continuous and integrated program of technical training for sustainable project preparation for local managers	Creation of a continuous, comprehensive, nationwide program to build the capacity of municipalities and states to formulate low-carbon projects	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Long term
		Development of cooperation networks among municipalities, municipal entities, and/or states and competence centers to identify complementarities and increase the initiatives that already technically qualify municipal managers	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Short term
		Development of online knowledge platforms with specific tools to support the process of developing and qualifying sustainable projects in cities.	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Medium term
		National events with technicians and municipal career staff to disseminate knowledge and exchange information	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Medium term
		Implement periodic calls for local sustainable projects (with a sectoral focus and investment priority) to receive technical improvement and financing, with criteria that enable participation of different types of municipalities.	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Long term
		Implementation of a comprehensive fund dedicated exclusively to municipal project preparation activities.	Federal government, project facilities and/or international and national financial institutions	Long term
		Development of identification, standardization, replication and expansion strategies of low carbon projects and initiatives in cities that have been successfully carried out	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Long term
		Development of strategies for the aggregation and viability of sectorial programs or programs aimed at giving scale to the viability of urban infrastructure.	National government, state and municipal governments, regional, national and international development financial institutions, technical institutions, project facilities and municipal entities	Long term
Deficiency in directing resources to sustainable urban development.	Deepen incorporation of the urban climate agenda in the Brazilian financial system performance	Develop a joint definition among the institutions present in the financial system of a concept of low carbon infrastructure in cities, which identifies the main characteristics of this type of investment.	Central Bank, financial institutions present in Brazil and financial system regulatory bodies	Short term
		Increased transparency and standardization of the methodology for calculating green and climate finance flows in Brazil.	Financial institutions present in Brazil	Medium term
		Creation of a database to support assessment of Brazilian financial system's exposure to climate-related risks and to deepen activities to understand, quantify and manage exposure to climate-related risks in investor portfolio risk management practices.	Central Bank, financial institutions present in Brazil and financial system regulatory bodies	Long term
		Deepening support for thematic investments or investments proven to be aligned with environmental issues in banks' portfolios or directly in assets	Financial institutions present in Brazil	Medium and long term
Deficiency in directing resources to sustainable urban development	Foster financial innovation and new investment models aligned with low carbon urban development	Target the effort of existing initiatives aimed at financial innovation to support the financing of low-carbon urban infrastructure.	Financial institutions present in Brazil, existing financial innovation laboratories, Central Bank, national, state and municipal governments	Short term
		Direct support from Central Bank in enabling financial innovation initiatives to address climate issues in cities.	Central Bank	Short term
		Provide scale and expand replication of innovative instruments and new investment models aligned with low carbon urban development, through broad engagement among relevant institutions in the area.	Financial institutions present in Brazil, existing financial innovation laboratories, Central Bank, national and municipal governments	Long term

BARRIER	RECOMENDATION	ACTIONS	RELEVANT ACTORS	TIMEFRAME
Precarious municipal fiscal situation	Improve local fiscal environment to ensure financial resources for investments in low carbon projects	Expand the use of urban planning instruments and land value capture	Municipal Governments	Long term
		Design and disseminate good practices and documents that guide and support municipalities in implementing and managing fees, levies, taxes, financial instruments, and urban planning tools	National government, technical entities focused on support in cities, including project facilities.	Long term
		Encourage good practices for tax collection through prioritization criteria for allocation of national funds to support the financing of low-carbon infrastructure projects in cities	National government, technical entities focused on support in cities, including project facilities.	Medium term
		Development of governance and urban infrastructure spending indicators and creation of a ranking or scoring criteria for cities whose resource use is geared towards scaling up low-carbon urban development	TCU, state and municipal audit courts, universities and centers of technical competence, development financial institutions, national government	Short term
Precarious municipal fiscal situation	Enhance access to financial resources for urban and low carbon infrastructure through the private sector	Use PPI as a starting point to enable a national PPP and concession management unit focused on local low carbon projects	National government, municipal governments, CAIXA, Ministry of Regional Development, and international, national and regional development financial institutions	Medium term
		Standardize processes for the implementation of PPPs and concessions at state and municipal levels	National government, municipal governments, CAIXA, Ministry of Regional Development, and international, national and regional development financial institutions	Medium term
		Creation of technical and management committees at the state level to provide greater capillarity to actions that directly support the structuring of PPPs and concessions projects in cities	National and state governments	Long term
		Expansion of means of payment and guarantee instruments that can support the mobilization of private capital.	Municipal governments, international, national and regional development financial institutions, technical bodies, regulatory agencies or other committees	Long term
		Ensure coverage via partial credit guarantees and give priority to urban and sustainable infrastructure projects.	National government, international, national and regional development financial institutions, CAIXA and Brazilian Agency of Guarantee Funds and Guarantees S.A. (ABGF)	Long term
		Develop criteria to prioritize technical and financial support for PPP projects and concessions that have green and climate bonds as a source of funding and implement programs and/or strategies to group low-carbon urban PPPs into a single portfolio for green bonds.	Federal government, international, national and regional development financial institutions, project facilities	Long term
Difficulties in overcoming the financing processes of international, national and regional development banks	Develop tools, arrangements and incentives to facilitate access to national and international public loans for low carbon urban projects	Provision and centralization of information about funding and financing opportunities and best practices of locally funded low carbon projects	International, national and regional development financial institutions	Short term
		Development of an informative material, with homogeneous language, that clarifies, step by step, how to access funding and financing from participating institutions and how to overcome the COFIEX process	International development financial institutions, SEAIN, technical bodies supporting local governments, including project facilities.	Short term
		Creation of fast-tracking processes for the approval of national and international loan financing for urban and low carbon infrastructure projects	International, national and regional development financial institutions and national government (SEAIN)	Medium term
		Increase triangular operations between international banks, national and regional banks and cities for lines that include low carbon urban projects	International, national and regional development financial institutions	Medium term
		Expand access to partial guarantee funds and instruments for credit operations and minimization of exchange rate risk for sustainable infrastructure projects in cities	National government, international, national and regional development financial institutions, other international financial bodies	Long term

Source: Authors' own elaboration.



6. CLOSING REMARKS

Urban infrastructure supports economic growth, productivity and human well-being in cities (OECD, World Bank and UN Environment, 2018). At the same time, it determines the climate performance in the coming decades (Floater et al., 2017). In this sense, several studies point out that directing investments to low-carbon infrastructure brings several benefits that go beyond aspects of environmental sustainability, providing economic and social advantages. In the case of Brazilian cities, where there is a gap between existing infrastructure and the needs of the urban population, overcoming such mismatch through sustainable urban infrastructure and services, which will have their uses in the next 20 to 30 years, opens the opportunity for Brazilian cities to actively act in mitigating and adapting to climate change while promoting economic and social dynamism.

Given the recurring fiscal crises of recent decades, financing is one of the major impediments in overcoming the historic deficit in urban infrastructure and services by Brazilian cities. Directing the necessary urban investments to low-carbon solutions allows access to climate and green finance, thus increasing the availability of resources. Brazil is well positioned to take advantage of this type of finance, since, among other aspects, it has a number of development financial institutions with consolidated performance in infrastructure supply. These institutions are among the main implementing agents of such finance, especially in developing countries.

However, despite the opportunity, green and climate finance faces barriers that hinder cities' access to this type of finance and the execution of low-carbon urban projects. This study has mapped these barriers and

how they can be overcome in order to support Brazilian municipalities in accessing such funds opportunities. Through a series of interviews and discussions with the main stakeholders in Brazil, as well as analysis of national and international studies and research on the subject, seven major groups of barriers were identified to be mitigated.

While the need to address barriers to financing urban and resilient infrastructure in Brazilian municipalities was already significant, the recent COVID-19 pandemic has made even more latent the demand for improved capacity of local governments to plan, develop and implement low-carbon infrastructure projects to ensure local quality of life, income and employment. In this sense, nine major recommendations were provided with several practical actions to be implemented in the short, medium and long term, covering the various actors of Brazilian urban financing. It is expected that these actors, including national government, local governments, development financial institutions, among many others, will benefit from the data, analysis and recommendations provided in this publication; and that they will be able to deepen the support for actions that will increase the level of financing and investments in low carbon infrastructure in cities, bringing climate, economic and social benefits not only for urban areas, but for the entire country. By improving the circumstances of green and climate finance for urban infrastructure, Brazilian cities will be able to lead the implementation of sustainable projects in the country and enable, on a large scale, the transition to a low carbon economy in Brazil.

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ANNEX A. METHODOLOGICAL CONSIDERATIONS

As mentioned in section 3, the collection and calculation of data and information on climate and green finance flows are not free of controversy (Samaniego and Schneider, 2019). The research in this study also had to overcome another strong limitation: identifying projects and/or amounts directed to explicitly urban projects and/or in predominantly urban sectors, including water and sanitation, transportation and urban mobility, and energy efficiency.

Different procedures were carried out to collect data and information from multilateral and bilateral development banks and national and regional FDIs. In addition, different assumptions had to be developed by the authors in order to allow a deeper analysis of the performance of the different sources regarding climate finance. These processes are detailed below by type of source.

a. Data collection from multilateral and bilateral development banks

To carry out the analysis of the international flow of funds to Brazilian urban areas, the research was developed in four stages:

- **Phase 1:** Consultation of international reimbursable financial operations (loans) for subnational entities and public companies present at External Financing Commission Panel (COFIEP)⁹² for the years 2017, 2018 and 2019;
- **Phase 2:** Identification of projects with a climate or green component and explicitly urban, or containing predominantly urban sectors, via secondary data collection, through databases on the official websites of the banks;
- **Phase 3:** Contact the members of the Network for Financing of Sustainable Infrastructure in Cities (FISC Network) to clarify ambiguities;

The analysis for international public financial institutions differs from the analysis for national and regional FDIs. The period 2017 and 2019 was chosen in order to (i) present the recent context of international financial institutions' performances, (ii) guarantee that each institution's trajectory would not be confined to a year where performance may have been differentiated from the trend and, finally, (iii) match availability of time and team for data collection and analysis for publication. Although these years cover a relevant period, performance of multilateral bilateral and development banks in the country should not be summarized only to analyses in these periods.

1.1 Phase 1

COFIEP belongs to the Secretariat of International Affairs of the Ministry of Economy and is the federal agency that evaluates and approves all projects that require sovereign guarantee and involve financing with external resources from international development financial organizations. As most multilateral and bilateral development banks require guarantees from federal government for the approval of their projects to national and sub-national public entities⁹³, COFIEP Panel is a platform that brings together most of the projects under analysis, approved, under execution or concluded, that originate from international loans to public entities in the country.

COFIEP Panel data were collected in June 2020 and were selected from the following filters, present on the website:

- Financing: repayable financial operation
- Phase: In execution
- Borrower: N/A
- Sphere: N/A
- Signature year: 2017, 2018, 2019
- Last original disbursement year: N/A
- Last disbursement in force year: N/A
- Scope: N/A
- Region: N/A
- State: N/A

Regarding phase classifications present on the website, COFIEP Panel presents the following project phase options:

- **Analysis phase:** from receiving (via System) the Letter-Consultation to the analysis of COFIEP.
- **Preparation phase:** starts with project or program approval by COFIEP until the Federal Government receives draft contracts
- **Negotiation phase:** it starts with contract drafts receipt and ends with end of negotiations between the Federal Government, Borrower and Financing Agency
- **Awaiting signature:** it starts with finalization of draft contracts negotiations and ends with signing of contract.
- **Execution phase:** it starts with contract signature date, until the last disbursement date.

Only projects in the execution phase were chosen to be incorporated in order to eliminate as many changes as possible after the project was signed. This survey included the following international financial institutions: IBRD (World Bank), IDB, CAF, NDB, FONPLATA, KfW, IBRD/FIP. At this stage, 69 projects were added, which can be identified in the table below:

92 <http://painel-cofiex.economia.gov.br/>

93 Exceptions: except KfW, BEI, AFD and JICA.

ANNEX A. METHODOLOGICAL CONSIDERATIONS

Borrower	Project	Source	Year	Loan Value (US\$)
Federative Republic of Brazil	Environmental Regularization of Rural Properties in Cerrado - CAR/FIP	BIRD/FIP	2017	32.480.000
Municipality of Belém (PA)	Basic Sanitation Program of Estrada Nova Basin - PROMABEN II	BID	2017	125.000.000
State of Paraná	Paraná Seguro Program	BID	2017	67.200.000
Federative Republic of Brazil	National Program to Support Administrative and Fiscal Management of Brazilian Municipalities - 2nd Phase/2nd Stage	BID	2017	150.000.000
City of Joinville (SC)	Viva Cidade 2 Project - Urban and Environmental Revitalization of Joinville	BID	2017	70.000.000
State of Espírito Santo	Estado Presente Program (Citizen Security) - Espírito Santo State	BID	2017	56.000.000
Municipality of Campo Grande - MS	Integrated Development Program of Municipality of Campo Grande - Viva Campo Grande II	BID	2017	56.000.000
Municipality of Manaus (AM)	PROEMEM - Educational Expansion and Improvement Project for Manaus Municipal Public Network	BID	2017	52.000.000
State of Ceará	Expansion and Improvement Program for Specialized Health Care in the State of Ceará 2	BID	2017	123.000.000
Municipality of Fortaleza (CE)	Program to Strengthen Social Inclusion and Attention Networks - PROREDES Fortaleza	BID	2017	65.475.000
Municipality of Salvador (BA)	National Tourism Development Program in Salvador	BID	2017	52.512.340
Municipality of Caxias do Sul (RS)	Caxias do Sul II - PDI II Infrastructure and Basic Services Development Program	CAF	2017	33.000.000
Municipality of Taubaté (SP)	Taubaté Urban and Socio-Environmental Mobility Improvement Program	CAF	2017	60.000.000
Municipality of Corumbá (MS)	Corumbá Integrated Development Program	FON PLATA	2017	40.000.000
State of Paraná	Paraná IDB V Strategic Transport Infrastructure and Logistics Program	BID	2017	235.000.000
Municipality of São Bernardo do Campo (SP)	São Bernardo do Campo Urban Infrastructure Program	CAF	2017	125.000.000
National Bank for Economic and Social Development - BNDES	1st Program of the IDB-BNDES Conditional Credit Line Agreement for Financing Productive and Sustainable Investments	BID	2017	750.000.000
City of Sorocaba (SP)	Sorocaba Environmental and Road Optimization Program	CAF	2018	70.000.000
Municipality of Santo André (SP)	Santo André Sustainable Urban Mobility Program	BID	2018	25.000.000
Hortolândia City (SP)	Urban Infrastructure and Sustainable Development Program - Hortolândia/SP	CAF	2018	42.000.000
Municipality of João Pessoa (PB)	Integrated and Sustainable Urban Development Program of Municipality of João Pessoa	BID	2018	100.000.000

Borrower	Project	Source	Year	Loan Value (US\$)
Municipality of Fortaleza (CE)	Fortaleza Program – City with a Future	CAF	2018	83.250.000
Municipality of Maracanaú (CE)	Maracanaú Urban Transport and Logistics Program	BID	2018	31.784.500
Municipality of Salvador (BA)	Salvador Social - Phase I	BIRD	2018	125.000.000
Municipality of Maceió (AL)	Urban Revitalization Project in Maceió neighborhoods	CAF	2018	70.000.000
Municipality of Palmas (TO)	Urban Requalification Program Pakmas para o Futuro	CAF	2018	60.870.520
Municipality of Salvador (BA)	Novo Mané Dendê Project - Salvador	BID	2018	67.500.000
Municipality of Joinville (SC)	Linha Verde Eixo Ecologico Leste de Joinville Program	FON PLATA	2018	40.000.000
Celesc Distribuição S.A.	Celesc's Energy Infrastructure Investment Program - IDB	BID	2018	276.051.000
Municipality of Teresina (PI)	Integrated Urban Development Program - Teresina Sustentável	CAF	2018	45.982.659
Municipality of Salvador (BA)	Salvador Urban Requalification Program	CAF	2018	60.700.000
State of Ceará	Ceará State Tax Management Modernization Project - PROFISCO II - CE	BID	2018	70.000.000
Federative Republic of Brazil	Project to support the implementation of the New High School	BIRD	2018	250.000.000
Financier of Studies and Projects (FINEP)	Innovate as an Inducer of Brazilian Economic Growth in Strategic Sectors	BID	2018	600.000.000
Municipality of Caucaia (CE)	Caucaia Integrated Infrastructure Program (CE)	CAF	2018	80.000.000
Municipality of Sobral (CE)	Sobral's Socio-Environmental Development Program	CAF	2018	50.000.000
Municipality of Itajaí (SC)	Itajaí 2040 Program: Modern and Sustainable	FON PLATA	2018	62.500.000
State of Ceará	Sustainable Rural Development Project - São José III Project - 2nd Phase	BIRD	2019	100.000.000
State of Paraíba	Sustainable Rural Paraíba Project	BIRD	2019	50.000.000
Municipality of Aracaju (SE)	Urban Rehabilitation Program of Aracaju Western Region - Building for the Future	BID	2019	75.200.000
State of Ceará	Basic Sanitation Program for Rural Locations in the State of Ceará: Adapting to Climate Change	KfW	2019	56.705.050
Municipality of Contagem (MG)	Contagem Integrated Mobility System	CAF	2019	42.000.000
Municipality of Fortaleza (CE)	Sustainable City of Fortaleza	BIRD	2019	73.300.000
Municipality of Fortaleza (CE)	Infrastructure Program in Education and Sanitation of Fortaleza	CAF	2019	150.000.000
Municipality of Vitória (ES)	1st Stage of Sustainable Vitória Action Plan	BID	2019	100.000.000
Ministry of Agriculture, Livestock and Supply	Program for Modernization and Strengthening of Agricultural Defense	BID	2019	195.000.000

ANNEX A. METHODOLOGICAL CONSIDERATIONS

Borrower	Project	Source	Year	Loan Value (US\$)
State of Pará	Pará State Tax Management Modernization Project	BID	2019	35.100.000
State of Piauí	Piauí State Tax Management Modernization Project	BID	2019	44.935.000
State of Maranhão	Maranhão State Tax Management Modernization Project - PROFISCO II	BID	2019	35.000.000
Municipality of Araguaína (TO)	Araguaína Integrated Sanitation Project (TO)	CAF	2019	54.900.000
State of Pará	Sustainable Municipalities Program of Pará State	CAF	2019	50.000.000
State of Pará	Sustainable Municipalities Program of Pará State	NDB	2019	50.000.000
State of São Paulo	Program to Support Integration Management of Taxes in Brazil PROFISCO II SP	BID	2019	87.120.000
São Paulo State Basic Sanitation Company (SABESP)	Tietê River Clean-up Program - Stage IV	BID	2019	300.000.000
State of Paraná	State Program to Support Urban Development and Municipal Infrastructure Improvements - Paraná Urbano III	BID	2019	118.370.100
State of Mato Grosso do Sul	Project to Modernize Fiscal Management of Mato Grosso do Sul State	BID	2019	47.700.000
Municipality of Belo Horizonte (MG)	Project to Modernize and Improve Quality of Health Care Networks in Belo Horizonte	BID	2019	56.000.000
Municipality of Jacareí (SP)	Urban and Social Development Program of Municipality of JACAREÍ, (SP)	CAF	2019	60.000.000
São Paulo City (SP)	Restructuring and Qualification Project of São Paulo City Assistential Networks - Avança Saúde (SP)	BID	2019	100.000.000
State of Ceará	Project to Support Water Safety Improvement and Strengthen Intelligence in Public Management of Ceará State	BIRD	2019	139.880.000
Municipality of Vila Velha (ES)	Urban Requalification and Environmental Improvement Program in Vila Velha (ES)	FON PLATA	2019	34.000.000
State of São Paulo	São Paulo Metro Railroad Line 17 Gold Stretch 1 Jardim Aeroporto Congonhas Station to Morumbi Station CPTM Monorail System	CAF	2019	296.000.000
State of Mato Grosso	Development Policy Loan with Fiscal and Environmental Sustainability in Mato Grosso	BIRD	2019	250.000.000
State of Pernambuco	Pernambuco's Tax Management Improvement Project	BID	2019	37.000.000
São Paulo State Basic Sanitation Company (SABESP)	Program for Sustainability and Inclusion in Water Sanitation and Preservation Services for Public Supply in RMSP	BIRD	2019	250.000.000

Borrower	Project	Source	Year	Loan Value (US\$)
Municipality of Camaçari (BA)	Urban, Social and Environmental Integration and Development Program for Municipality of Camaçari (BA)	CAF	2019	80.000.000
Municipality of Santo André (SP)	Sanear Santo André Program	CAF	2019	50.000.000
Municipality of Aparecida de Goiânia (GO)	Road Restructuring Program in Santo Antônio de Aparecida de Goiânia Basin II	CAF	2019	35.000.000
Municipality of Belo Horizonte (MG)	Government and Participatory Budget Program	CAF	2019	82.500.000

Source: Authors' own elaboration based on COFIEX Panel.

For institutions that do not require a sovereign guarantee – AFD, EIB and JICA – a survey was conducted within the official websites. Through direct contact with JICA's representative, it was found that the latter did not carry out reimbursable financial operations for the period 2017-2019. For AFD the analysis included data from the official website and the project "Fostering sustainable projects in the southern states" (Fomentar projetos sustentáveis nos estados do sul), carried out in 2018, with an amount of 50 million euros and whose borrower is the Far South Development Bank (Banco de Desenvolvimento do Extremo Sul, BRDE). Conversion from euro to dollar was done according to euro to dollar exchange rate of 1.197625. The project totaled US\$59,881,262. For EIB, according official website, 3 projects were included, namely, "BRDE Climate Acion FL", with BRDE as borrower, "BDMG Climate Action FL II", with Development Bank of Minas Gerais (BDMG) as borrower, and "Copasa Water and Sanitation Programme" (Companhia de Saneamento de Minas Gerais as borrower). The projects received contributions of US\$ 95,810,019, US\$ 119,762,524, US\$ 173,655,660, respectively. EIB's contributions were converted at the same euro-dollar exchange rate as in the case of AFD.

1.2 Phase 2

After collecting projects and data via COFIEX Panel and official websites, research was carried out on the institutions official websites to generate prior classification to the projects and check the information available on each site. It was identified that only the World Bank provided information on financing amounts for mitigation, adaptation and other environmental actions in a disaggregated and public manner per project. It was found that, although financial institutions perform such a disaggregation, data and information are hardly available at the local level, i.e., country level, and it is necessary to go through a broad internal process and contact with different representatives to obtain them.

In this sense, the performance analysis of multilateral and bilateral development banks was carried out at the project level, i.e., the amounts and information regarding each

reimbursable financial operation for the period covered were analyzed. The loans were classified at the project level through two categories, based on the information on the institutions' official websites:

- Projects with potential climate/green impact: projects with clear potential for positive impact on mitigation, adaptation or green climate strategies and in line with the green and climate financing definitions in Box 1.
- Projects that are explicitly urban or in predominantly urban sectors: projects that have an impact on the urban environment or on sectors considered predominantly urban, that include water and sanitation, urban mobility and transport, and energy efficiency.

For the first category, we sought to identify the potential climate and green impact through the presence of nomenclatures such as "sustainable", "environmental", "climatic", "socio-environmental", "ecological", "environmental sustainability". These expressions were identified both in the names of the projects and in the details of the loan present on the institutions' website.

The second category was based on the definition of urban infrastructure and predominantly urban sectors from the publications of Godfrey and Zhao (2016) and Bonilla and Zapparoli (2017). According to the first, "Urban infrastructure [...] is designed to meet the needs of city dwellers and industry, including access to water, electricity, and heat, transport and disposal of waste (including the contributions proportionally)." While Bonilla and Zapparoli (2017), by estimating the demand for urban infrastructure based on a sample of 40 emerging mid-sized cities in Latin America and the Caribbean, identify that the largest gaps are centered in the urban mobility and transport sectors (about 37% of the total); (ii) Land Use, Planning and Zoning (about 18%); (iii) Sanitation and Drainage (about 14%); (iv) Vulnerability to natural disasters and Climate Change (about 8%); (v) Urban Inequality (about 7%); (vi) Water (about 5%) and (vii) Solid Waste Management (about 2%).

Based on the definition and data found for the demand for urban infrastructure in 40 Latin American and Caribbean cities, including 4 Brazilian cities, of these two

publications, it was identified that, in order to carry out a delimitation of projects whose urban component was not explicit, turning to sectors of urban transport and mobility, water and sanitation and energy efficiency could bring a more accurate calculation of the data.

Besides the projects that were identified according to the second classification, all projects that were evidently non-urban, such as those directed to the rural sector and agriculture, were excluded. When it was not possible to distinguish neither sector nor impact area of the project (such as urban), the initiative was not accounted for, adopting a conservative approach, as recommended by the IDFC (2015), according to which it is better to have sub-counting than over-counting investments.

1.3 Phase 3

Finally, when it was not possible to classify the projects through secondary information, direct contact was made with representatives of the institutions. CAF, IBRD, NDB, AFD and KfW were contacted. Table A2 identifies all sectors surveyed for projects with a climate or green component and in urban areas or in predominantly urban sectors.

When it was not possible to identify the sub-sector, the nomenclature "Unspecified" was added. The governance sector, although not directly linked to the provision of low carbon infrastructure in cities, was included because it was interpreted as a means to achieve better institutional capacities to foster the area. The "multi-sector" area, as well as its subsectors, represent projects, initiatives or areas of activity that encompass more than one sector of those considered previously.

2. Data collection from national and regional FDIs

There is no database, in light of COFIEX Panel, that consolidates information about the projects and borrowers of public banks' financial operations in the country. Therefore, the data collected for this section came from banks' annual reports and external publications from the FDIs. Information allows for the analysis of sectoral performance, but does not cover identification of borrowers or projects.

The financial institutions used different nomenclatures to refer to their performance in regards with green or climate impact and all of them were interpreted as belonging to the concept of green finance. BNDES uses the name "green economy", and BDMG uses "sustainability". For BRDE, data were collected from BRDE PCS Program - Produção e Consumo Sustentáveis (Sustainable Production and Consumption), confirmed by a representative of the bank as a good proxy for the institution's performance on green finance. It was not possible to obtain such types of data from CAIXA.

The period 2017 and 2018 was used for data collection. This period was chosen to provide comparability with the performance of multilateral and bilateral development banks. It was not possible to include the year 2019, because BNDES and CAIXA had not yet informed the pertinent data until the study completion.

The concept of predominantly urban sectors was used to identify the flow towards urban areas, as explained in the section on Phase 2 of data collection from multilateral and bilateral development banks.

Table A2 – Urban sectors and subsectors of projects with climatic or sustainable potential included in the analysis of multilateral and bilateral development banks performance

Sector	Subsector
Water and sanitation	Urban drainage
	Urban Sanitation
	Water supply
	Other water supply, sanitation and waste management
	Solid Waste Management
	Water in general, sanitation and flooding environmental protection sector
	Technical studies
	Water safety
	Unspecified
Transportation and urban mobility	Urban transport infrastructure
	Connectivity of transport networks
	Unspecified
Energy	Rehabilitation and efficiency of energy sector
Urban facilities	Urban revitalization and urban requalification
Governance	Public administration – Information and communication
	Public administration
	Unspecified
Multi-sector	Urban Development
	Urban development and housing
	Urban and social development
	Urban, social and environmental development
	Integrated development and integrated urban development
	Development of infrastructure and basic services
	Socio-environmental development
	Urban infrastructure
Urban infrastructure and sustainable development	

Source: Authors' own elaboration.

ANNEX B. REPORT ON THE NETWORK FOR FINANCING SUSTAINABLE INFRASTRUCTURE IN CITIES (FISCAL NETWORK) ACTIVITIES

The Network for Financing Sustainable Infrastructure in Cities (FISC Network) consists of a discussion group composed of leaders and specialists in urban financing in Brazil, whose main objective is to identify, disseminate and build actions to reduce the gap between the public sector and financing agents and unlock sustainable urban investment in Brazilian cities. FISC Network was developed in 2017 by WRI Brazil and, until the writing of this study, has 60 participants, and 10 meetings

Below are the details of the meetings:

BRAINSTORMING – INVESTMENT IN INFRASTRUCTURE FOR SUSTAINABLE CITIES: A PERSPECTIVE FROM THE BANKS

SPECIFICATIONS

Date: December 5, 2017

Participating institutions: CAIXA, CODATU, CAF, World Bank, British Embassy, FGV Projects, KPMG, PPIAF, Ministry of Foreign Affairs (MRE).

Number of participants: 11

OBJECTIVE

Discuss how to reduce the existing gap between public sector and financing agents, seeking to increase technical quality and economic-financial feasibility of urban infrastructure projects.

HIGHLIGHTS

The discussion was guided in two parts: (i) contextualization of infrastructure investments in Brazilian cities and presentation of a perception survey on the topic carried out with municipal managers; (ii) guided discussion with participants about banks' perspectives on infrastructure investments for sustainable cities.

I FACE-TO-FACE MEETING

SPECIFICATIONS

Date: March 21, 2018

Participating institutions: CAIXA, JICA, National Front of Mayors (FNP), CAF, EIB/GIZ, Ministry of Foreign Affairs (MRE), C40, Instituto Semeia, FGV Projetos, IDB, Ministry of Finance.

Number of participants: 14

OBJECTIVE

The meeting aimed to connect different international and national financial institutions to discuss actions that could bring financing agents and cities closer together and unlock investment for the provision of sustainable urban infrastructure.

HIGHLIGHTS

The discussion was divided in two stages: (i) Validation of Brainstorming results on infrastructure investment for sustainable cities (a perspective from the banks) and (ii) guided discussion on specific key issue on sustainable infrastructure in cities: municipal technical capacity.

II FACE-TO-FACE MEETING

SPECIFICATIONS

Date: May 8, 2018

Participating institutions: JICA, CAF, C40, BNDES, IDB, World Bank, EIB, CODATU, BRDE, FGV Projects, French Embassy in Brazil, AFD, Florianopolis City Hall (SC), National Front of Mayors (FNP), KPMG, Porto Alegre City Hall (RS), Volta Redonda City Hall (RJ), São Caetano do Sul City Hall (SP), Rio Grande do Sul State Government.

Number of participants: 21

OBJECTIVE

The meeting aimed to connect financial institutions and city representatives, continuing the debate on how to bring financing agents and cities closer together in order to unlock investment in sustainable urban infrastructure.

HIGHLIGHTS

The discussion took place in two stages: (i) Validation of the results from the 1st meeting, adding the perception of the cities and (ii) Construction of informative material for cities to guide access to funding of the selected financial institutions.

III FACE-TO-FACE MEETING

SPECIFICATIONS

Date: June 6, 2019.

Participating Institutions: BNDES, BRDE, C40, CAF, EIB, GIZ, National Front of Mayors (FNP), French Embassy, KPMG.

Number of participants: 10

OBJECTIVE

The meeting sought to reconnect the financial institutions and resume the discussion on how to leverage financing of sustainable urban infrastructure, and marked the beginning of the Network's activities in 2019-20 period.

HIGHLIGHTS

The discussion took place in two stages: (i) Presentation of diagnostic results of the three previous meetings and (ii) exercise of ideation of FISC Network actions.

IV FACE-TO-FACE MEETING

SPECIFICATIONS

Date: January 28, 2020

Participating institutions: BNDES, GIZ / EIB, GIZ / ANDUS, GIZ / FELICITY, AfD, Ministry of Foreign Affairs (MRE), GIZ / CFF, BDMG, KfW, Caixa Econômica Federal, IDB, National Front of Mayors (FNP)

Number of participants: 14

OBJECTIVE

The meeting closed the diagnosis phase of barriers to sustainable infrastructure finance in cities and opened space for the joint action phase.

HIGHLIGHTS

The discussion was divided into 3 stages: (i) Context of infrastructure financing in Brazil, (i) Technical discussion activity, (iii) Priorities of FISC Network 2020-2023

I ONLINE MEETING

SPECIFICATIONS

Date: September 26, 2019.

Participating Institutions: BNDES, CAIXA, JICA, BRDE, C40, CAF, EIB, GIZ, Porto Alegre City Hall (PMPA), National Mayors Front (FNP), FGV Projects.

Number of participants: 12

OBJECTIVE

It sought to promote exchange of good practices between regional, national and international financial institutions and cities and serve as an inspiration for the construction of FISC Network joint action plan.

HIGHLIGHTS

The meeting discussed the case of a triangular financial operation development carried out between the World Bank, Porto Alegre City Hall (PMPA) and BRDE. The new financial model based on triangulation between international and regional institutions will allow PMPA access to World Bank resources, which would not be possible through direct operation between the two institutions, since Porto Alegre did not present a fiscal indicator that would allow the city to obtain a sovereign guarantee from federal government for the loan

II ONLINE MEETING – INVESTMENT IN SUSTAINABLE INFRASTRUCTURE IN CITIES AND RECOVERY OF PRODUCT AND EMPLOYMENT: PERSPECTIVES AFTER COVID -19

SPECIFICATIONS

Date: April 14, 2020

Participating Institutions: BNDES, CDP, GIZ / EIB, C40, FGV Europe, FGV Projects, Caixa Econômica Federal, French Embassy in Brazil.

Number of participants: 9

Panelist: Rogério Studart - Senior Fellow of World Resources Institute

OBJECTIVE

In the midst of the COVID-19 pandemic, the central theme of the meeting was the short, medium and long-term perspectives for financing sustainable infrastructure in cities, in a context of widespread crisis in the country.

HIGHLIGHTS

The discussion focused on the great economic opportunity to invest in low carbon projects capable of generating economic, social and environmental development. The advantages of a low carbon strategy became more evident with COVID-19 crisis, as problems of lack of infrastructure in cities and inequalities of access were aggravated.

III ONLINE MEETING – URBAN SUSTAINABLE INFRASTRUCTURE FINANCING OPPORTUNITIES (Meeting held in partnership with CDP Latin America)

SPECIFICATIONS

Date: May 7, 2020

Participating Institutions: CDP, GIZ / EIB, BDMG, CAF, GIZ / CFF, FGV Europe, FGV Projects.

Number of participants (FISC Network): 7

Number of participants (external): 167

Speakers: Nabil Kadri, Head of the Environment Department and Amazon Fund at BNDES; Dario de Paula, National Manager of Destatization Management, Partnerships and Special Services of CAIXA; and Marília Lima, Secretary of Urbanism and Environment of Sobral Municipality.

OBJECTIVE

Discuss issues on financing sustainable urban projects from the perspective of FDIs and municipal managers.

HIGHLIGHTS

The Secretary of Environment and Urbanism of Sobral (CE) presented the innovative project of natural infrastructure, focused on recovery of springs and urban parks. Caixa

representatives presented opportunities for financing sustainable urban infrastructure within the bank's public-private partnership and concession program, which aims to assist municipalities in structuring concession contracts. Amazon Fund/BNDES representative informed that the bank seeks to include and foster integrated projects portfolio programs focused on mitigation and adaptation to climate change.

IV ONLINE MEETING - FINANCING SYSTEM FOR MUNICIPALITIES (SFM) AND PARANACIDADE

SPECIFICATIONS

Date: July 2, 2020

Participating Institutions: Bank of Brazil, CDP, BNDES, BDMG, JICA, C40, GIZ/CFF, FGV Projects, NDB, GIZ/FELICITY, FNP, KfW, PARANACIDADE.

Number of participants: 18

Speakers: Álvaro Caprini, PARANACIDADE Executive Superintendent.

OBJECTIVE

Focusing on the exchange of experiences, the meeting addressed the case of PARANACIDADE, an institution that was mentioned in several meetings of the Network as a good example of governance and financing of projects in the cities of Paraná.

HIGHLIGHTS

PARANACIDADE is a public agency established in 1996, whose shares are wholly owned by the state of Paraná. It seeks to foster the institutional regional urban development of the state's municipalities and administers public resources and financial funds for regional urban development. It is linked to the State Secretariat of Urban Development and Public Works (SEDU) and is part of the Municipal Financing System (SFM). PARANACIDADE is seeking to develop urban development indicators and create eligibility criteria to give preference to projects that cover environmental and climate issues. PARANACIDADE supports the implementation of Sustainable Development Goals (ODS).

V ONLINE MEETING - CONFRONTING VISIONS, CO-CREATING PATHS

SPECIFICATIONS

Date: September 30, 2020

Participating Institutions: BDMG, JICA, C40, NDB, GIZ/FELICITY, FNP, KfW, Paraná City, CAF, BRDE, ABDE (Brazilian Development Association), AFD, Teresina City Hall (PI), Curitiba City Hall (PR), KfW.

Number of participants: 14

Speakers: Ana Cristina Jayme, investment advisor at Curitiba (PR) research and urban planning institute (IPPUC); Erick Amorim, Director of Federal and International Affairs of Teresina (PI); José Rafael Neto, Senior Executive of CAF; Daniel Lage, Superintendent of Project and City Structuring at BDMG; and Luiz Noronha, Director of ABDE and President of BRDE.

OBJECTIVE

Present and discuss two visions of sustainable infrastructure financing in cities: on the one hand, the visions of those seeking financing (the cities); and, on the other, the visions of those offering funds (national and international development banks). From divergent perspectives and points in common, alternatives were sought jointly to unlock financing for sustainable infrastructure projects in Brazilian cities.

HIGHLIGHTS

The cities representatives presented four factors they see as key to enabling finance for urban and low carbon infrastructure viable: (i) fiscal responsibility, (ii) mobilization of internal funds (via, among others, improvement in efficiency of tax collection) (iii) qualified and motivated personnel for long-term projects, and (iv) knowledge of the rules of financing agents. On the banks' side, it was mentioned the need to develop standardized programs for municipalities and furthering support and technical assistance to cities.

