GEF-7 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND: GEFTF

PART I: PROJECT INFORMATION

Project Title: Promoting integrated metropolitan planning and innovative urban technology investments in Brazil			
Country(ies):	Brazil	GEF Project ID:	10465
GEF Agency(ies):	UNEP	GEF Agency Project ID:	01796
Project Executing Entity(s):	MCTI (lead), FUNBIO, CGEE and UNEP Brazil (co-executing partners)	Submission Date:	26 August 2021
GEF Focal Area (s):	Climate Change Mitigation, Biodiversity	Expected Implementation Start:	15 December 2021
		Expected Completion Date:	14 December 2025
Name of Parent Program	Sustainable Cities Impact Program (SCIP)	Parent Program ID:	10391

A. FOCAL/NON-FOCAL AREA ELEMENTS

Programming Directions	**Focal Area Outcomes**	**Trust Fund**	**(in $)**	
			GEF Project Financing	**Confirmed Co-financing**
IP SC	Transforming cities through integrated urban planning and investments in innovative sustainability solutions	GEF TF	12,552,440	184,689,243
	Total project costs		12,552,440	184,789,243

B. PROJECT DESCRIPTION SUMMARY

Project Objective: Brazilian metropolitan regions reduce greenhouse gas emissions, conserve biodiversity and achieve economic, social and environmental co-benefits through an integrated urban planning approach

Project Components/ Programs	**Type**	**Project Outcomes**	**Project Outputs**	***Trust Fund***	***($)***	
					GEF Project Financing	***Confirmed Co-financing***
Component 1. Governance and evidence-based integrated planning	TA	1: Governments of the Belém Metropolitan Region, the Florianópolis Metropolitan Region and the Greater Teresina RIDE adopt integrated plans, strengthen governance and use new planning tools for accelerating sustainable urban development	1.1: An integrated planning digital module, linked to the *System of Innovations and Solutions for Sustainable Urban Planning* (SIS+), is available to support integrated urban planning of the Belém Metropolitan Region by its municipalities 1.2: Integrated urban plans are developed as tools for the Belém Metropolitan Region to use in accelerating sustainable urban development 1.3: A proposal for updating complementary law 027/95 to enhance the governance and management of the Belém Metropolitan Region is developed and submitted for approval by the State Government of Pará 1.4: An integrated planning digital module, linked to SIS+, is available to support integrated urban planning of the Timon-Teresina Urban Agglomeration by the Teresina and Timon municipalities	GEF TF	4,780,528	9,163,459

Project Components/ Programs	Type	Project Outcomes	Project Outputs	Trust Fund	($)	
					GEF Project Financing	Confirmed Co-financing
			1.5: Integrated urban plans are developed as tools for the Greater Teresina RIDE municipalities to use in accelerating sustainable urban development 1.6: A proposal for local legislation to enhance the governance and management of the Timon-Teresina Urban Agglomeration is developed and submitted for approval by the Teresina and Timon municipalities 1.7: An integrated planning digital module, linked to SIS+, is available to support integrated urban planning of the Florianópolis Metropolitan Region by its municipalities 1.8: Integrated urban plans are developed as tools for the Florianópolis Metropolitan Region municipalities to use in accelerating sustainable urban development 1.9: Proposals on strengthened metropolitan governance arrangements and socio-environmental macrozoning guidelines are developed and submitted for approval by the Florianopolis Metropolitan Region Development Committee			
Component 2. Sustainable integrated low-emission and conservation investments	INV	2: The governments of the municipalities of Belém, Florianópolis and Teresina invest in science and evidence-based solutions for low-emission and biodiversity-conservation-centered urban development	2.1: Low-emission street pilot in the Belem City Center 2.2: Agroforestry production chains are developed or strengthened to enhance sustainable livelihood options for local communities in the Combú Island urban protected area in Belém 2.3: Low-emission city block pilot in the Teresina City Center 2.4: Low-emission district pilot on the mainland of the Florianopolis Municipality 2.5: Three pilot investment projects in the Pirajubae Marine Extractive Reserve and Carijós Ecological Station in Florianopolis are executed to demonstrate methodologies to measure urban protected area health and foster community-based conservation	GEF TF	3,879,279	30,073,668
Component 3. Innovative financing and scaling-up	TA	3: Metropolitan region and national actors initiate or strengthen innovative financing mechanisms for scaling-up sustainable urban solutions	3.1: Brazilian local governments have access to strengthened national financing mechanisms for low-emission sustainable urban development 3.2: Brazilian local governments enhance capacity to access financial mechanisms	GEF TF	1,188,782	95,200,000

Project Components/ Programs	Type	Project Outcomes	Project Outputs	Trust Fund	($)	
					GEF Project Financing	*Confirmed Co-financing*
			for financing low-emission sustainable urban development 3.3: An innovative financing mechanism in support of the conservation and ecosystem service-provision of the Utinga State Park benefits urban dwellers in the Belém Metropolitan Region			
Component 4. Knowledge exchange and capacity building	TA	4: Brazilian metropolitan region governments commit to greater ambition on sustainable urban development by drawing on new tools, enhanced access to good practices and strengthened capacity	4.1: A *System of Innovations and Solutions for Sustainable Urban Planning* (SIS+) for promoting sustainable urban development is available to Brazilian Federal, state and municipal governments 4.2: Brazilian city stakeholders strengthen their knowledge, through SIS+ and national networks, on good practices and public policies for achieving integrated sustainable urban development 4.3: Local, state and federal stakeholders strengthen their capacity to undertake integrated urban planning as a result of training activities, including those provided through the Global Program of the Sustainable Cities Impact Program	GEF TF	1,874,484	42,700,000
Component 5. Monitoring and evaluation	TA	5: Project is effectively monitored and evaluated	5.1: Monitoring and evaluation products are delivered (see section 9 and Annex J)	GEF TF	238,034	-
				Subtotal	GEF TF	11,961,106	177,137,127
				Project management cost (PMC)	GEF TF	591,334	7,652,116
				Total project costs	GEF TF	**12,552,440**	**184,789,243**

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here**: Not applicable.**

C. CONFIRMED SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount ($)
Recipient Country Government	Ministry of Science, Technology and Innovation (MCTI)	In-Kind	Recurrent expenditures	3,000,000
Recipient Country Government	Ministry of Science, Technology and Innovation (MCTI)	Public Investment	Investment mobilized	20,000,000
Recipient Country Government	Ministry of Regional Development (MDR)	Public Investment	Investment mobilized	29,000,000
Recipient Country Government	Funding Authority for Studies and Projects (FINEP)	Loan	Investment mobilized	40,000,000

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount ($)
Recipient Country Government	Brazilian Development Bank (BNDES)	Loan	Investment mobilized	55,000,000[1]
Donor Agency	Brazilian Biodiversity Fund (FUNBIO)	In-Kind	Recurrent expenditures	700,000
Civil Society Organization	Center for Management and Strategic Studies (CGEE)	In-Kind	Recurrent expenditures	1,000,000
Recipient Country Government	State Government of Pará	Public Investment	Investment mobilized	12,800,000
Recipient Country Government	State Government of Pará	In-Kind	Recurrent expenditures	200,000
Recipient Country Government	Belém Municipality	Public Investment	Investment mobilized	6,225,285
Recipient Country Government	Teresina Municipality	Public Investment	Investment mobilized	8,668,666
Recipient Country Government	Teresina Municipality	In-Kind	Recurrent expenditures	200,000
Recipient Country Government	State Government of Santa Catarina	Public Investment	Investment mobilized	1,103,459
Recipient Country Government	Florianópolis Municipality	In-Kind	Recurrent expenditures	454,000
Recipient Country Government	Florianópolis Municipality	Public Investment	Investment mobilized	4,533,000
Recipient Country Government	Chico Mendes Institute for Biodiversity Conservation (ICMBio)	In-Kind	Recurrent expenditures	1,854,833
Donor Agency	United Nations Environment Programme (UNEP)	In-Kind	Recurrent expenditures	50,000
Total Co-financing				184,789,243

Describe how any "Investment Mobilized" was identified:

Detailed descriptions of each co-financing commitment can be found in annex I-2, and the co-financing letters are in annex O. Investment mobilized was identified through discussions with different stakeholders, including local, regional and national government representatives, civil society stakeholders and organizations, and national public financing institutions:

- State of Pará. Investments were identified through conversations with the State Secretary of Planning and Administration, the Metropolitan Transport Management Unit (NGTM), the State Secretary of Environment (SEMAS), the State Secretary of Tourism (SETUR), and the Institute of Forest Development and Biodiversity of the State of Pará (IDEFLOR-Bio). These will include Pará State Government local and international public investments, including a loan from the Japan International Cooperation Agency (JICA) for the implementation of a bus rapid transit (BRT) system, tourist and sanitation investments on Combú Island and investments in enhanced planning and management of protected areas;
- Belém City Municipality. Mobilized investment was identified through discussions with secretaries of the Belém municipality. This includes public investments in urban mobility, innovation for urban solutions, protection of urban green areas, and environmental infrastructure.
- Teresina City Municipality. Investments were identified through conversations with Teresina municipal secretaries and data collected facilitated by Teresina Agenda 2030. Investments include Teresina local and international investments, state programs and the Development Bank of Latin America (CAF) projects on renewable energy, rehabilitation of urban parks, implementation of green corridors and biodiversity conservation measures, light-emitting diode (LED) public lighting, and bike and pedestrian lanes.;
- Florianopolis City Municipality. Investments were identified through conversations with the Florianopolis Municipal Secretariat of Urban Planning. Florianopolis local investments include on transport, innovation and seashore rehabilitation,

[1] In its co-financing letter, BNDES has committed a co-financing contribution of US$ 110,000,000, in the form of estimated future loans through credit lines related to the project activities over the 4 years of the project's implementation, starting late 2021. As BNDES notes that it cannot establish the exact amount of upfront investments due the nature of its disbursements, the project has conservatively estimated that 50% of this co-financing will concretely materialize, equal to US$ 55,000,000.

including extensive bicycle infrastructure;

- State of Santa Catarina. Investments were identified through conversations with the Superintendence of Development of the Metropolitan Region of Florianópolis (SUDERF). Investments will entail local investments from State Government of Santa Catarina for developing the Integrated Urban Development Plan for Florianopolis Metropolitan Region;
- Ministry of Regional Development (MDR). Investments were identified and facilitated through conversation with the MDR National Secretariat for Mobility and Regional and Urban Development. Investments will be in capacity building and extensive infrastructure for urban mobility and urban development made by the Ministry of Regional Development, including PRÓ-CIDADES program and other planned investments;
- Brazilian National Development Bank (BNDES). Investment identification were facilitated by the Public Management and Socio-Environmental Area within BNDES. Investment mobilized will entail loans from the green economy portfolio of Brazilian Development Bank (BNDES) for supporting regional and urban development infrastructure, urban mobility and water and sanitation projects;
- Ministry of Science, Technology and Innovations (MCTI). Investments were identified through discussions with Secretariat for Research and Scientific Training and its General Coordination for Science on Climate Change and Sustainability and its General Coordination for Science on Biodiversity. Investment mobilized includes investments in training, research and development, expansion and modernization of infrastructure, and promotion of R&D projects related to science, technology and innovation for sustainable urban development;
- Funding Authority for Studies and Projects (FINEP). Investments were identified through discussions with its sustainability, transport and international divisions, and will consist of credit lines for supporting innovation and technology development for sustainable urban development.

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, COUNTRY, FOCAL AREA AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country	Focal Area	Programming of Funds	(in $)		
					GEF Project Financing (a)	Agency Fee (b)	Total (c)=(a)+(b)
UNEP	GEF TF	Brazil	Climate change	CC STAR Allocation	5,806,374	522,574	6,328,948
UNEP	GEF TF	Brazil	Biodiversity	BD STAR Allocation	2,679,864	241,188	2,921,052
UNEP	GEF TF	Brazil	Multifocal Area	IP SC Set-Aside	4,066,202	365,958	4,432,160
Total GEF Resources					12,552,440	1,129,720	13,682,160

E. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT?

☐ Yes ☒ No

F. PROJECT'S TARGET CONTRIBUTIONS TO GEF 7 CORE INDICATORS

Project Core Indicators		Expected at
1	**Terrestrial protected areas** created or under improved management for conservation and sustainable use (Hectares)	16,355.7
2	**Marine protected areas** created or under improved management for conservation and sustainable use (Hectares)	1,687.0
3	Area of **land restored (**Hectares)	NA
4	Area of **landscapes under improved practices** (excluding protected areas) (Hectares)	27,861
5	Area of **marine habitat under improved practices** (excluding protected areas) (Hectares)	NA
	Total area under improved management (Hectares)	45,754
6	**Greenhouse Gas Emissions Mitigated** (metric tons of CO2e)	Direct: 5,611,683 Indirect: 18,937,180
11	Number of **direct beneficiaries disaggregated by gender** as co-benefit of GEF investment	Female: 1,200,000 Male: 1,160,000 Total: 2,360,000

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided.

The project will develop geo-referenced and multi-sectoral integrated plans for sustainable urban development, with a focus on low-emission development and biodiversity conservation, in three metropolitan regions (the project's sites): the Metropolitan Regions (RM) of Belém (in the Amazon region), of Florianópolis (in the south of the country and Atlantic Forest biome), and the Greater Teresina Integrated Development Region (RIDE) (in the confluence of the Cerrado and Caatinga biomes). It will also focus on replicating the experiences of these urban areas in cities through-out the country. From a geophysical and jurisdictional points of view, the metropolitan regions are composed of adjacent municipalities, in which local governments work together towards a common development purpose. The ones on focus in the project are including a total of 31 municipalities that are home to 4.8 million people, with a break-down as follows:

- ➔ 7 municipalities in RM Belém, home to 2.5 million people (52.2% women) and covering an area of approx. 356,600 hectares (~7.4% urbanized), of which some 20% are freshwater surface and riverine islands;
- ➔ 9 municipalities within RM Florianópolis, home to almost 1.1 million people (51.4% women) and covering an area of approx.276,300 hectares (~8% urbanized), of which some 14% are prime coastal areas and seascapes.
- ➔ 15 municipalities in Greater Teresina RIDE, home to more than 1 million people (53.0% women) and covering an area of approx. 1,100,000 hectares (~1.4% urbanized). The landscape includes some water surfaces (less than 1% of the total surface), noting that water is scarce and highly valued at the landscape level. Within the RIDE, 2 municipalities form the 'Timon-Teresina Urban Agglomeration', as a relevant sub-set of the RIDE, home to 1 million people and covering 317,000 hectares (~5% urbanized), with two locally important rivers crossing the urbanized areas (Parnaíba and Poti).

While the integrated plans, governmental arrangements and planning platforms to be developed under component 1 will aim to positively impact all residents of these metropolitan regions, the number of project beneficiaries was conservatively estimated as 2.36 million. A causality factor of approximately 50% was applied considering the risk of plans not having the full desired geographical or sectoral reach or impact. These figures include the users of the solutions provided by the project's pilots and the participants in capacity-building activities. In all cases, the numbers were generated from sex-disaggregated data from the last national census (IBGE, 2010). The official population growth rate, as estimated by IBGE, applied to 2010 population figures and current population estimate was then estimated at approx. 2.3 million people, 52% women. The project conservatively does not consider impact beyond the three pilot metropolitan areas.

G. PROJECT TAXONOMY

Level 1	Level 2	Level 3	Level 4
Influencing Models	Transform policy and regulatory environments Strengthen institutional capacity and decision-making Demonstrate innovative approaches Deploy innovative financial instruments		
Stakeholders	Private Sector Local Communities Civil Society Type of Engagement Communications	Information Dissemination Consultation Participation Awareness Raising	
Capacity, Knowledge and Research	Capacity Development Knowledge Generation Knowledge Exchange Innovation Learning		
Gender Equality	Gender mainstreaming	Beneficiaries Sex-disaggregated indicators Gender-sensitive indicators	
Focal Area	Biodiversity Climate change	Protected Areas and Landscapes Mainstreaming Biomes Climate Change Mitigation	Energy efficiency Terrestrial Protected Areas Coastal and Marine Protected Areas Tropical Rain Forests Tropical Dry Forests

Level 1	Level 2	Level 3	Level 4
			Energy Efficiency Sustainable Urban Systems and Transport Renewable Energy Financing
Integrated programs	Sustainable cities	Integrated urban planning Urban sustainability framework Transport and Mobility Municipal waste management Green space Urban Biodiversity Municipal Financing Global Platform for Sustainable Cities Infrastructure Energy efficiency Municipal waste management Buildings	
Rio Markers	Climate Change Mitigation 2 Climate Change Adaptation 1		

PART II: PROJECT JUSTIFICATION

1A. CHANGES IN PROJECT DESIGN

A summary of changes in the project's design is shown in table 1:

Component 1

Table 1 – Changes to component 1

Concept note	CEO document	Justification
Component 1	See Table B on pages 1-4	The outputs have been reorganized so that each output refers to a single city. As in the concept note, different outputs are defined for geo-referenced platforms and urban plans. Outputs were added to support the strengthening of local institutional arrangements for integrated planning. Separating the outputs by city has allowed for each output to be more catered to the city's circumstances. At the same time, the common general structure is preserved. The budget of component 1 has been increased by 37% compared to the concept note due to a greater project emphasis on promoting integrated urban planning, the creation of local planning platforms and local governance arrangements.
Outcome 1: Local and regional governments in Belem, Florianopolis and Teresina have enhanced information, processes and tools for undertaking evidence-based sustainable integrated planning	**Outcome 1:** Governments of the Belém Metropolitan Region, the Florianópolis Metropolitan Region and the Greater Teresina RIDE adopt integrated plans, strengthen governance and use new planning tools for accelerating sustainable urban development	The outcome has been updated slightly to align more closely with the global program results framework and project outputs. This has not resulted in a change in scope or ambition.
Output 1.1 Geo-referenced digital metropolitan plans, including urban green area policies, are completed for the Belém Metropolitan Region and uploaded to the monitoring system of Pará State. **Output 1.4** Geo-referenced digital metropolitan plans, including urban green area policies, and GHG inventories are completed for the Teresina metropolitan region and uploaded to the Teresina digital platform **Output 1.7.** Geo-referenced digital metropolitan and biodiversity plans, including urban green area policies, and GHG inventories are completed for Florianopolis and uploaded to the Florianopolis digital platform	**Output 1.2** – Integrated urban plans are developed as tools for the Belém Metropolitan Region to use in accelerating sustainable urban development **Output 1.5** – Integrated urban plans are developed as tools for the Greater Teresina RIDE municipalities to use in accelerating sustainable urban development **Output 1.8** – Integrated urban plans are developed as tools for the Florianópolis Metropolitan Region municipalities to use in accelerating sustainable urban development	The output titles were adjusted slightly. The numbering was changed (the log-frame now starts with the platforms; these are followed by the plans). The focus of the output remains unchanged.
Output 1.2 The monitoring system of Pará State is improved to facilitate integrated urban planning in that state **Output 1.3** An integrated metropolitan digital platform is available for Greater Teresina RIDE **Output 1.6** An integrated metropolitan digital platform is available for the Florianópolis Metropolitan Region	**Output 1.1** – An integrated planning digital module, linked to the System of Innovations and Solutions for Sustainable Urban Planning (SIS+), is available to support integrated urban planning of the Belém Metropolitan Region by its municipalities **Output 1.4** – An integrated planning digital module, linked to SIS+, is available to support integrated urban planning of the	The outputs continue to focus on developing online GIS platforms to facilitate integrated urban planning. The platform scope has been expanded to incorporate local modules of a nationally-connected solutions database which will support urban planners to identify and prioritize locally-relevant innovative sustainable solutions. In the case of Belém, the platform will continue to be developed building upon the Pará state monitoring system. In the case of Teresina, the platform will focus on the Timon-Teresina Urban Agglomeration, as the significant urban area of the RIDE (and home to 85% of the RIDE's population).

Concept note	CEO document	Justification
	Timon-Teresina Urban Agglomeration by the Teresina and Timon municipalities **Output 1.7** – An integrated planning digital module, linked to SIS+, is available to support integrated urban planning of the Florianópolis Metropolitan Region by its municipalities	
---	**Output 1.3** – A proposal for updating complementary law 027/95 to enhance the governance and management of the Belém Metropolitan Region is developed and submitted for approval by the State Government of Pará **Output 1.6** – A proposal for local legislation to enhance the governance and management of the Timon-Teresina Urban Agglomeration is developed and submitted for approval by the Teresina and Timon municipalities **Output 1.9** – Proposals on strengthened metropolitan governance arrangements and socio-environmental macrozoning guidelines are developed and submitted for approval by the Florianopolis Metropolitan Region Development Committee	Following detailed analysis during the PPG stage, outputs were added which focus directly on supporting the metropolitan regions to strengthen their governance and management as a basis for enhancing integrated (interjurisdictional) urban planning.
Output 1.5 Plans and policies for city-infilling and a low emission zone in Teresina are developed and uploaded to the Teresina digital platform	**Output 1.5** – Integrated urban plans are developed as tools for the Greater Teresina RIDE municipalities to use in accelerating sustainable urban development	This concept note output was merged into the endorsement document output containing all Greater Teresina RIDE plans. Focus on the low-emission zone plan continues. The city-infilling plan was completed with CAF financing and is thus no longer an activity of the project.
Output 1.8 A plan for the development of a BRT-connected Creative District Low-Emission Zone for the Florianópolis city center is made available and uploaded to the Florianópolis digital platform	**Output 1.8** – Integrated urban plans are developed as tools for the Florianópolis Metropolitan Region municipalities to use in accelerating sustainable urban development	This concept note output was merged into the endorsement document output containing all Florianopolis metropolitan region plans. Focus on the low-emission zone plan continues. Following analysis and discussion with the Florianopolis municipality, focus has shifted from the city center to the continental part of the municipality, as this area is experiencing social and urban integration challenges with other municipalities of the continent. The area builds upon investments in non-motorized transport and will be BRT-connected.

Component 2

Table 2 – Changes to component 2

Concept note	CEO document	Justification
Component 2	See Table B on pages 1-4	Mitigation pilots retain the focus of the child project. Some changes were made to strengthen these following stakeholder consultations during the PPG phase (see below descriptions of changes to outputs). For clarity, biodiversity pilots have been separated by city. This component's budget has decreased by 27%, due to a greater focus on integrated planning in component 1. This reduction does not affect this component's ambition or impact. Furthermore, project monitoring and evaluation activities that were initially

Concept note	CEO document	Justification
		included in the component have now been budgeted through a separate line.
Outcome 2: Investments in Belem, Florianopolis and Teresina demonstrate sustainable, low-carbon, and biodiversity-conservation centered urban development	**Outcome 2:** The governments of the municipalities of Belém, Florianópolis and Teresina invest in science and evidence-based solutions for low-emission and biodiversity-conservation centered urban development	The outcome text has been updated to focus on the desired behavioral change, with no change in scope.
Output 2.1 Sustainable urban investments in water, biodiversity conservation and public transport are piloted in the Belém metropolitan region	**Output 2.1** – Low-emission street pilot in the Belem City Center	The output title was revised following detailed consultations and analysis during the PPG phase. The output now focuses directly on mitigation, with the biodiversity element incorporated into output 2.2. It will consist of the piloting of a low-emission street in the Belém city center, thus continuing to focus on reducing transport emissions, as well as those from buildings and waste. The pilot will include a co-creation process which draws on solutions identified through the System of Innovations and Solutions for Sustainable Urban Planning (output 4.1).
Output 2.2 Pilot investments are made in a low-emission zone in Teresina, and a replication strategy is developed	**Output 2.3** – Low-emission city block pilot in the Teresina City Center	Output title has changed slightly but its focus remains unchanged, with a minor shift in focus from a low-emission zone to a low-emission city block. The block will be scaled up to a zone through a plan in output 1.5.
Output 2.3 Investments are made to pilot an urban living lab and full low-emission street in the Florianópolis low-emission zone	**Output 2.4** – Low-emission district pilot on the mainland of the Florianopolis Municipality	Output title has changed slightly but its focus remains unchanged, with a minor shift in focus from a low-emission street to a low-emission sustainable district (note that Florianopolis does not have an existing low-emission zone). The output will no longer pilot an urban living lab, instead piloting a co-creation process for identifying the sustainable district's solutions, drawing upon those identified through the System of Innovations and Solutions for Sustainable Urban Planning (output 4.1).
Output 2.4 Investments based on the integrated plans are made to recover urban green areas with native species in Belém, Teresina and Florianópolis.	**Output 2.2** – Agroforestry production chains are developed or strengthened to enhance sustainable livelihood options for local communities in the Combú Island urban protected area in Belém **Output 2.5** – Three pilot investment projects in the Pirajubae Marine Extractive Reserve and Carijós Ecological Station in Florianopolis are executed to demonstrate methodologies to measure urban protected area health and foster community-based conservation	In order to facilitate management, monitoring and impact measurement, one output per biodiversity pilot was adopted. An express decision was made not to have a biodiversity pilot in **Teresina** and to concentrate biodiversity resources on planning (Component 1, Output 1.5). While RIDE Teresina is located in the confluence of two extremely rich biomes (Cerrado and Caatinga) and is expected to boost globally significant biodiversity and be home to a number of endemic species, very little is known about biodiversity in the area. There is a general lack of biodiversity data, assessments and scientific studies. It follows, a decision was made to use GEF funds to produce a Local Biodiversity Strategy and Action Plan (LBSAP) for RIDE Teresina, which will design a vision, objectives and resource-mobilization strategy as well as generate basic data on fauna and flora species from which future biodiversity investments will be able to draw. In the case of **Belem**, the title has been changed to better describe the Output. Local communities will be the key protagonists in the process, as well as beneficiaries. The Combú Island Environmental Protection Area (APA) is one of the Protected Areas of the Belém Metropolitan Region and is under strong pressure from urbanization processes and human occupation, especially due to the growing development of its tourism potential. In addition to contributing to conservation, investing in local agroforestry production chains is expected to bring social and economic benefits to the local population and generate replicable urban PA management models.

Concept note	CEO document	Justification
		In the case of **Florianopolis**, the title has changed to better describe the Output. It is much more specific now on what the project will deliver, while previously, it was more generic. The investments in Pirajubaé Marine Extractive Reserve and Carijós Ecological Station are now defined and will build on solid baseline assessments, including the Management Effectiveness Tracking Tool (METT) that identify management gaps and areas that require improvement.

Component 3

Table 3 – Changes to component 3

Concept note	CEO document	Justification
Component 3	See Table B on pages 1-4	Outputs retain the focus of the child project. Output 3.1 has shifted to have a national focus (see explanation below). Output 3.2 of the concept note has been discontinued due to changes in national priorities (see explanation below). The component's budget has decreased by 27%, due to a greater focus on integrated planning in component 1. This reduction does not affect proposed project ambition in this component, as it will focus on providing technical assistance rather than fund capitalization. Furthermore, project monitoring and evaluation activities that were initially included in the component have now been budgeted through a separate line.
Outcome 3: Innovative financing solutions and business models are initiated for scaling up sustainable urban development in Brazilian metropolitan regions	**Outcome 3:** Metropolitan region and national actors initiate or strengthen innovative financing mechanisms for scaling-up sustainable urban solutions	The outcome text has been updated to focus on the desired behavioral change, with no change in scope.
Output 3.1 Financing mechanisms and recommendations are operationalized to attract sustainable urban investments in the Belém metropolitan region	**Output 3.1 –** Brazilian local governments have access to strengthened national financing mechanisms for low-emission sustainable urban development	The output's focus has shifted from the Belém metropolitan region to the national scale. This change was made to promote the acceleration of low-emission sustainable urban development in metropolitan regions through-out Brazil, building upon significant co-financing of two large national public financing institutions: the Brazilian Development Bank (BNDES) and the Funding Authority for Studies and Projects (FINEP). The focus on financial mechanisms related to the Belém Metropolitan Region is now taken up by output 3.3.
Output 3.2 Urban living labs and innovation centers are strengthened to generate urban solutions, technologies, business models and innovative investments	---	A focus on strengthening urban living labs and innovation centers was discontinued, with the project instead placing effort on strengthening financing for sustainable urban development (outputs 3.1-3.3) and the prioritization and contextualization of sustainable solutions (output 4.1).
Output 3.3 A portfolio of projects to accelerate urban sustainability in Brazilian metropolitan regions is developed (to be financed by public and private entities)	**Output 3.2** – Brazilian local governments enhance capacity to access financial mechanisms for financing low-emission sustainable urban development	The output was refocused to address root causes related to the development of low-emission project portfolios: the capacity of cities to develop such portfolios. The output continues to support portfolio development, but also with the aim of ensuring sustainable project development and financing over time.
Output 3.4 Financial mechanisms for payment for environmental services in urban green areas and incentives for the management of these areas are tested	**Output 3.3** – An innovative financing mechanism in support of the conservation and ecosystem service-provision of the Utinga State Park benefits urban dwellers in the Belém Metropolitan Region	The output was rewritten to specify the target area benefited and to better reflect the project's activities focused on financing instruments. More information on the concrete payment for environmental services is included in the output's description an in annex R.

Component 4

Table 4 – Changes to component 4

Concept note	CEO document	Justification
Component 4	See Table B on pages 1-4	The outputs retain the focus of child project. Concept note output 4.1 has been split into two outputs, with one focusing on the national knowledge platform and the other on the sharing of good practices. Concept note output 4.2 becomes output 4.3. The component's budget has increased by 20%, due to a greater focus on promoting scale-up and replication through the component's activities.
Outcome 4: Local, regional and national governments in Brazil use approaches developed by the project in their urban planning and development processes	**Outcome 4:** Brazilian metropolitan region governments commit to greater ambition on sustainable urban development by drawing on new tools, enhanced access to good practices and strengthened capacity	The outcome has been updated slightly to align more closely with the global program results framework and project outputs. This has not resulted in a change in scope or ambition.
Output 4.1 Good practices, lessons learned and policy recommendations for achieving integrated sustainable urban development in Brazilian metropolitan regions are presented through a national network of living laboratories and the strengthening of a national knowledge platform	**Output 4.1 –** A *System of Innovations and Solutions for Sustainable Urban Planning* (SIS+) for promoting sustainable urban development is available to Brazilian Federal, state and municipal governments **Output 4.2 –** Brazilian city stakeholders strengthen their knowledge, through SIS+ and national networks, on good practices and public policies for achieving integrated sustainable urban development	The original output has been split into two, with the original intention maintained through the two outputs. Output 4.1 focuses on strengthening the national knowledge platform, the GEF-6 Sustainable Cities Innovation Observatory (OISC), by transforming it into a federal system: The System of Innovations and Solutions for Sustainable Urban Planning (SIS+). This system will serve as a national instrument that supports local governments will identifying and prioritizing solutions for sustainable urban development. Output 4.2 continues the concept note focus on sharing good practices, lessons learned and policy recommendations through the national knowledge platform. Due to changes in national priorities, the output will no longer focus on sharing such findings through a national network of living laboratories. However, it will share findings through the recently created Ministry of Regional Development co-financed Sustainable Urban Development Network (ReDUS).
Output 4.2 Training in Sustainable Urban Planning and Financing in Metropolitan Regions is offered, including through the Global Platform for Sustainable Cities	**Output 4.3** – Local, state and federal stakeholders strengthen their capacity to undertake integrated urban planning as a result of training activities, including those provided through the Global Program of the Sustainable Cities Impact Program	Output focus is unchanged. Changes were made to wording to place emphasis on the beneficiary.

Core-indicators

Table 5 – Changes to GEF Core Indicators

Indicator – concept note	Indicator – CEO document	Explanation for the change
Indicator 1 Terrestrial protected areas created or under improved management for conservation and sustainable use (Hectares): 12,942	Indicator 1 Terrestrial protected areas created or under improved management for conservation and sustainable use (Hectares): 16,356.1 ha	The list of protected areas to be impacted by the project was updated and increased slightly. The selection of PAs was slightly revised with the consolidation of the project strategy and intervention logic. See Annex F, Indicators 1.2, for the revised set of PAs and Annex T: Biodiversity Strategy and related benefits
Indicator 2 Marine protected areas created or under improved management for conservation and sustainable use (Hectares) NA	Indicator 2 Marine protected areas created or under improved management for conservation and sustainable use (Hectares) 1,687.0 ha	There will be a single marine protected area that will be strengthened by the project, while at Concept Note, this was just a possibility, but no PA had been concretely selected. The current selection of PAs was confirmed with the consolidation of the project strategy. See Annex F, Indicator 2.2, for the revised information on MPAs.
Indicator 4	Indicator 4	The areas targeted were reconsidered and were recalculated in light of the consolidation of the project strategy. The present target landscapes for Indicator 4

Indicator – concept note	Indicator – CEO document	Explanation for the change
Area of landscapes under improved practices (excluding protected areas) (Hectares): 23,342 ha	Area of landscapes under improved practices (excluding protected areas) (Hectares): 27,711 ha	includes unprotected urban green Areas within all three RMs Baseline indicators for urban unprotected green areas were calculated using official government data from MapBiomas on land use coverage as of 2019, and protected area system's data (from CNUC database). See Annex T: Biodiversity Strategy and related benefits for further details.
Indicator 6 Total estimated greenhouse gas emission reductions: 24,659,742 tCO_2e. Estimated direct and indirect emission mitigations of 4,978,653 tCO_2e and 19,681,089 tCO_2e respectively.	Indicator 6 Total estimated greenhouse gas emission reductions: 24,548,863 tCO_2e. Estimated direct and indirect emission mitigations of: 5,611,683 and 18,937,180 tCO_2e and tCO_2e respectively.	The level of estimated emission reductions remain unchanged; with a minor reduction (0.46%) occurring due to the more accurate calculations undertaken in each sector during the project preparation (refer to annex M).
Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment Women: 1,122,000 Men: 1,039,000 Total: 2,161,000	Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment Women: 1,200,000 Men: 1,160,000 Total: 2,360,000	The number of beneficiaries has increased slightly. The methodology for deriving the number of direct beneficiaries disaggregated by gender is described in Part I, under Table F.

Co-financing

Table 6 – Changes to co-financing commitments

Co-finance partner	Estimated co-finance contribution as per the concept note (US$)	Committed co-finance at CEO endorsement (US$)	Explanation for the change (refer to annex I-2 for detailed descriptions of each co-financing contribution)
State Government of Pará	13,000,000	13,000,000	*(no change)*
Belém Municipality	27,000,000	6,225,285	Belem municipal co-financing has reduced due to a weakening exchange rate, changed government priorities and attribution of some investments to the state government.
Teresina Municipality	10,000,000	$8,868,666	The refinement of the scope of work, identification of current and planned projects and investments and conversations with local stakeholders allowed led to identification of co-financing similar to that identified during the project concept stage.
State Government of Santa Catarina	16,000,000	1,103,459	The political and economic situation required a reduced ambition on State of Santa Catarina's investments. Co-finance focuses on an investment for developing the Integrated Urban Development Plan of the Great Florianopolis that is directly aligned with the project's scope of work.
Florianópolis Municipality	-	4,987,000	While co-financing through the state government suffered a reduction, new co-financing was identified related to the Florianopolis Municipality. This co-financing is directly related to the pilot interventions in Component 2 in urban mobility, innovation, and environment, it also includes in-kind support for the management of the project.
Funding Authority for Studies and Projects (FINEP)	40,000,000	40,000,000	FINEP co-financing is unchanged. Refer to annex I-2 for a description of its commitment.
The Brazilian Development Bank (BNDES)	-	55,000,000	BNDES will provide significant co-financing related to the project's component 3. With large credit lines for cities related to urban

Co-finance partner	Estimated co-finance contribution as per the concept note (US$)	Committed co-finance at CEO endorsement (US$)	Explanation for the change (refer to annex I-2 for detailed descriptions of each co-financing contribution)
			mobility, sanitation and sustainable cities, amongst others.
Ministry of Science, Technology and Innovation (MCTI)	250,000	23,000,000	The MCTI co-financing contribution increased significantly due to identification of investment related to promoting sustainable urban development. Furthermore, in-kind co-financing was increased following further internal consideration.
Ministry of Regional Development (MDR)	-	29,000,000	The MDR will provide co-financing to the project related to ministry activities to promote integrated planning and enhance the capacity of local governments.
Center for Management and Strategic Studies (CGEE)	-	1,000,000	CGEE, co-executing agency, has committed in-kind co-financing to support the management of project activities.
Brazilian Biodiversity Fund (FUNBIO)	-	700,000	FUNBIO, co-executing agency, has committed in-kind co-financing to support the management of project activities.
State Government of Piauí	10,000,000	-	Due to a weakening economic situation, this state government was not able to commit co-financing to the project. However, investments in the Teresina-Timon agglomeration were committed as co-financing through the Teresina municipality.
Timon Municipality	2,000,000	-	Due to local elections, the Timon municipality was not able to commit co-financing to the project. However, investments in the Teresina-Timon agglomeration were committed as co-financing through the Teresina municipality.
BYD Auto. Co., Ltd	1,500,000	-	Due to changes in the scope of pilot interventions BYD was not identified as a key stakeholder for project implementation. BYD is an electric buses manufacturer that was key for some pilot interventions based on electric transportation in the concept note.
Chico Mendes Institute for Biodiversity Conservation (ICMBio)	-	1,854,833	The Ministry of Environment's ICMBio will play an important role in the execution of output 2.5 and has committed in-kind co-financing to this purpose.
Sustainable Cities Programme (SCP)	100,000	-	SCP will no longer commit co-financing to the project, but will be a key partner in the project, including through the use of its Sustainable Cities Development Index - Brazil (IDCS-BR).
United Nations Environment Programme (UNEP)	150,000	50,000	UNEP will continue to provide co-financing to the project, albeit with a slightly reduced amount.
Total	**120,000,000**	**184,789,243**	Overall co-financing has increased by more than 50%, primarily due to the participation of the national public financing institutions BNDES. See annex I-2 for detailed descriptions of each co-financing commitment.

1B. PROJECT DESCRIPTION

1) Global environmental problems, root causes and barriers that need to be addressed

Global Environmental Problem

Urbanization presents a unique set of challenges to global environmental sustainability. In a world of 7.5 billion people, over four billion reside in urban areas (United Nations, 2014; United Nations 2016). Despite occupying only 3% of the Earth's land surface, cities have an enormous global ecological footprint[2] and are indirectly responsible for negative environmental impacts across the wider landscape. They consume over two-thirds of global energy supply and are associated with over 70% of global carbon emissions (IPCC, 2015). Meeting the production and consumption needs of urban populations for food, energy, water, and transport requires large amounts of resources and significantly strains rural and urban ecosystems – locally, regionally and globally. Urban consumption patterns indirectly impact biodiversity, while the physical expansion of urban areas not only directly threatening biodiversity but also compromising the provision of vital ecosystem services. The consequences include fragmentation and conversion of habitats that are essential to sustaining biodiversity, as well as the loss of local areas for food production. Supporting cities towards a successful transition to sustainability is vital to achieving the 2030 agenda. This support can also make an important contribution to achieving the objectives of the Rio Conventions in the domains of climate change and biodiversity. Large cities also harbor major social inequalities – including gender inequalities – especially in developing countries. At the same time, cities are trendsetters, and many are a hotbed of new ideas, innovation, and solutions – including ideas that lead to greater social awareness and economic transformation. The growth model that cities adopt now and in the next 20 years will be crucial for global environmental health and for achieving the sustainable development goals.

In Brazil, a country of great contrasts and inequalities, this reality is no different. It is a megadiverse and primarily urban country, with more than 85% of its population living in cities. The urbanization process in Brazil has been based on a poorly planned and unsustainable growth model, characterized by a high degree of urban sprawl. This has significantly transformed vast tracts of land through a rapid proliferation of low-density and low-priced dwellings – developments that either spiral out or leapfrog outwardly from city centers. Besides generating a number of negative consequences for the environment, urban sprawl degrades the quality of urban life and makes urban governance more costly and complex. More specifically, urban development in Brazil has been characterized by: (i) mobility investments guided by a "car-centric" pattern in the transport sector, inspired by the North American model; and (ii) a generalized absence of spatial planning – which would otherwise guide physical expansion and socio-economic development in urbanized areas. This has led to trends of urban horizontal expansion which grow quicker than those of the population. For instance, in Florianópolis Metropolitan Region, the population grew by 65% between 1993 and 2013 while the urban area grew by a staggering 154%.[3]

The impact of urbanization on Brazil's greenhouse gas (GHG) emissions is clear. As Brazil has a relatively clean electricity generation matrix, emissions from the transport sub-sector and the waste sector, both closely linked to urban activities, account for 25% of total national emissions (not including LULUCF).[4] And this does not consider city electricity consumption, noting that electricity generation accounts for a further 7.4% of national emissions. In addition, the transport sector has consistently increased its share of GHG emissions in the energy sector over the last 26 years, more than doubling its share in that period.[5] Furthermore, Brazil displays one of the highest motorization rates in the whole of the LAC region (364 motor vehicles per 1,000 people).[6] A recent study highlighted not only that the transport sub-sector is the highest emitter within the Brazilian urban context, but also that GHG emissions from the transport sector are directly correlated with patterns of urban sprawl and automobile dependence.[7] Thus, by focusing on key urban sectors such as transport, buildings, solid waste and energy demand, Brazil can make significant progress on reducing urban GHG emissions, advancing sustainable urban development and contributing to global mitigation outcomes.

Brazil's urbanization process has also impacted the quality of land and the richness of biodiversity. Both the expansion of urban land uses coupled with localized demographic pressures from cities results in significant and direct pressures on natural systems and biodiversity. This pressure is felt in and around urban centers, and sometimes beyond. The direct and more tangible impacts of urbanization on biodiversity include habitat loss and fragmentation, in addition to significant loss of fertile land with otherwise

[2] https://www.thegef.org/sites/default/files/publications/GEF-7%20Programming%20Directions%20-%20GEF_R.7_19.pdf, page 98.
[3] Municipal Government of Florianópolis, 2015. Final Report. Study 3. Urban Growth. Available in Portuguese at: http://www.pmf.sc.gov.br/arquivos/arquivos/pdf/27_08_2015_9.30.19.2d57c5303b800097ab78796419b761af.pdf
[4] Brazil's fourth national communication to the UNFCCC (2020). See pages 96 and 118.
[5] Ibid, page 118.
[6] Brazil's motorization rate (motor vehicles per 1,000 people) is second only to that of Barbados (384), and way above those of Argentina (316), Mexico (297), Uruguay (280) and Chile (230). World Bank Data (2020).
[7] Baltar de Souza Leão, E. et al. 2020. Carbon accounting approaches and reporting gaps in urban emissions: An analysis of the Greenhouse Gas inventories and climate action plans in Brazilian cities. Journal of Cleaner Production, Volume No. 245, 1 February 2020, 118930.

agricultural or recreational potential. Habitat loss and fragmentation threaten not just ecosystems, but also rare species, in particular the populations of species with limited distribution ranges. Urbanization and environmental degradation equally affect the provision of ecosystem services. Within transformed landscapes, unplanned urbanization can create or exacerbate water stress. More specifically within the "urban bubble", additional effects and consequences of urbanization include noise, water, air and soil pollution, among other negative environmental impacts that, cumulatively, also degrade biodiversity.

*

The main problem addressed by this project is that Brazilian metropolitan areas are growing unsustainably, based on an inefficient development model characterized by a high degree of urban sprawl, which has several negative consequences for the environment, including high levels of GHG emissions, significant loss of biodiversity, habitat fragmentation and increased pressures on ecosystem services. This model also makes urban governance costly and complex, and ultimately degrades quality of life in urban areas.

To address the aforementioned global environmental problems that Brazil is experiencing in an urban context, this project aims to accelerate the sustainable development of Brazilian metropolitan regions, leading to reductions in greenhouse gas emissions and the conservation of biodiversity. To this end, the project will increase local, state and federal capacity to undertake integrated urban planning, catalyze sustainable investments and facilitate long-term and sustainable urban development. Ultimately, the project aims to contribute to a sustainable transformation of the country's urban system and its development pattern.

To ensure the achievement of its objective, this project will focus on three distinct but representative metropolitan regions in Brazil, in addition to focusing on replicating and scaling-up good practices at the national level. The three pilot metropolitan regions are (Figure 1):

(1) **Belém Metropolitan Region (RM Belém**), located in the State of Pará in the northern and Amazonian region of the country;

(2) **Greater Teresina Integrated Development Region (Greater Teresina RIDE),** in the northeast region in the states of Piauí and Maranhão. For most activities, the project will focus on the RIDE's primary urban area, the **Timon-Teresina Urban Agglomeration**; and,

(3) **Florianópolis Metropolitan Region (RM Florianópolis),** located in the State of Santa Catarina, in the southern region of the country.

Local governments in all three metropolitan regions are committed to either enhancing or launching integrated planning processes to address the aforementioned challenges. And these pilot areas are representative of Brazilian cities, as they struggle with common challenges that many Brazilian urban areas face. Furthermore, they are medium-sized metropolitan regions, which are those facing the biggest challenges in Brazil. On the one hand, because they are continuing to experience significant urban growth, much larger than the Brazilian metropolises such as Sao Paulo and Rio de Janeiro (see baseline section) and secondly because, as smaller metropolitan regions, they have less technical capacity to address urban challenges. These challenges will be described in detail in the sections that follow.

There are both commonalities in the mentioned challenges faced by the selected metropolitan regions, but also diversity among them, from a geographical, environmental (including bio-climatic), social and economic points of view. Both commonalities and diversity of challenges reinforce their representativeness within the context of Brazilian urban systems. More specifically, selected metropolitan regions have diversity in:

a) Their biogeography (respectively, rain forest areas, dry inland areas of the Northeast and coastal zone / island geography);

b) The major biomes that they represent (respectively, Amazon, Caatinga/Cerrado transition and Atlantic Forest,);

c) The predominant macroclimate (respectively, equatorial, tropical and subtropical);

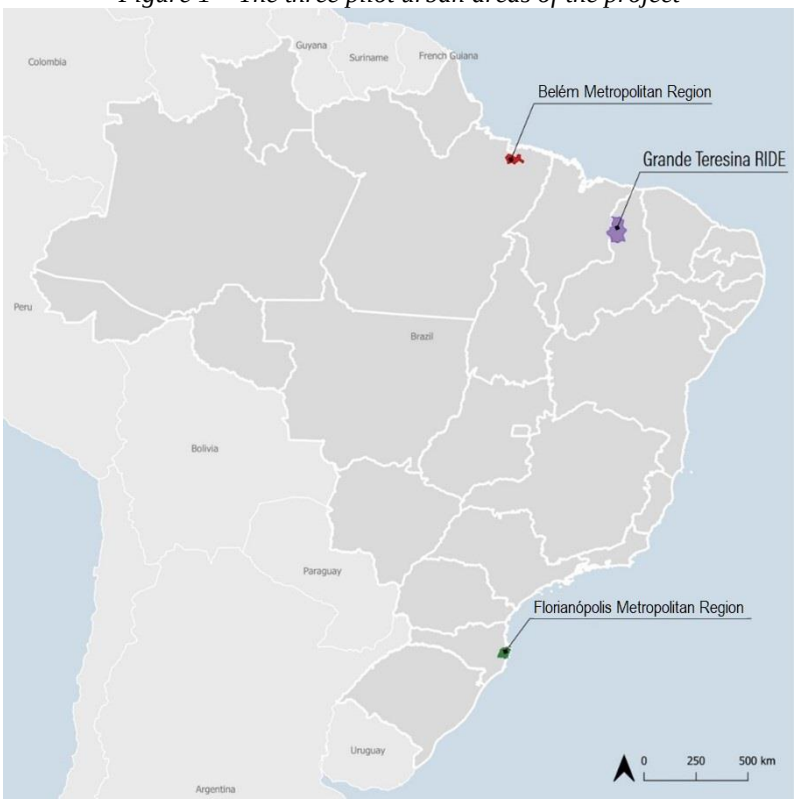
d) Their socio-economic conditions, ranging from some of the poorest areas of the country (Teresina and Timon) to areas with stronger local economies and centers of innovation (Florianopolis).

It may be noted that the GEF project focuses on the metropolitan region scale. It takes on this focus as these are urban development systems facing key challenges in Brazil. As will be described in the following sections, the achievement of sustainable urban development in Brazil is contingent upon these multi-jurisdictional entities successfully undertaking integrated urban planning. As it is these entities that truly face the "double-integration" challenge: a need to address urban challenges that cut across multiple sectors; and a need to address urban challenges that cut across multiple jurisdictions. The project in this way complements the GEF-6 integrated approach pilot child project in Brazil, which focused on supporting cities (i.e. single jurisdiction municipalities) to enhance integrated

planning. A broader discussion on how this GEF-7 project builds on GEF-6 may be found in the beginning of section 1.b.3 – alternative scenario.

Finally, in each of the RMs/RIDE, there are protected areas (PAs) that display low levels of management effectiveness, as measured through the sample application of Management Effectiveness Tracking Tools (METTs). PAs are an essential pillar of biodiversity conservation strategies across landscapes – and in urban landscapes this is no different. The project applies a landscape approach to conservation and considers within the selected metropolitan landscapes the importance of strengthening the management of biodiversity both within and outside PAs.

Figure 1 – The three pilot urban areas of the project



Root causes of the problem and barriers to change

In Brazil's prevailing urban development model, urban sprawl is considered the single most important cause driving cities' environmental footprint – from the point of view of climate change mitigation and biodiversity conservation outcomes. Sprawl is the long-term consequence of a complex set of interrelated socioeconomic and cultural forces. These include economic drivers along with social, political and demographic transformations that took decades to be consolidated. Sprawl is therefore a deep-seated pattern.

From a mitigation point of view, urban sprawl is the main reason behind lengthy commuting trips and the high intensity of traffic observed in several Brazilian cities. The latter is influenced by the high motorization rates, which are in turn driven by the need for individualized transportation in a sprawled city. All of these elements are responsible for the bulk of urban-based GHG emissions, in which the transport sub-sector features as the top emitter.

From a biodiversity point of view, urban sprawl is directly responsible for habitat loss fragmentation, which, on their turn, are direct drivers of biodiversity loss. In a gradient of ecosystems intactness, built-up areas are on the low-end extreme, in which natural habitats have been practically eliminated in favor of urban economic benefits. In other words, this is an accepted trade-off of urban development, meaning that there would be little expectation towards finding or conserving important biodiversity in urbanized areas. This is due to the souring opportunity cost of setting land aside for conservation in densely urbanized areas. Urban sprawl, however, implies built-up areas with a specific character, where this trade-off becomes less optimal. The common presence of low-density, single-family dwellings spread across large landscapes in city outskirts, and the uncontrolled and unplanned expansion of such areas, are both a sign of sprawl. Within the wider landscapes, the expected elimination of habitats driven by urbanization is spread over a much larger area. Also, the prevalence of low-density built-up areas within urban and peri-urban landscapes adds significant pressure to a suite of ecosystem services and natural systems and degrades them (including e.g. water, soil, green habitats, air, etc.). In summary,

the pressure on ecosystem services is significantly higher in sprawled cities than in dense ones. And this ultimately reflects negatively, not just on biodiversity, but also on the quality of urban life and on the costs of providing ecosystem supporting services.

The three main root causes of the prevalence of urban sprawl in Brazilian cities can be summarized through the points below:

(i) The main cause: Poorly managed urban expansion process

Urban sprawl is, by and large, the result of a poorly managed or unstructured process of urban expansion. The causal chain starts with poor public planning processes, accumulated over the years, and is complemented by inefficient and ineffective urban development projects. Beyond social and cultural traits that make up a city and its population, urban development patterns respond to market forces and public policies and regulations. Their interplay, coupled with the geophysical features of the landscape, are the key factors that shape sprawl patterns. A poorly managed urban expansion process means that cities grow in a chaotic way, hindered almost solely by physical landscape barriers and market forces. It also means that demographic processes and land-use trends are not adequately monitored, even though this would be important for decision-making in a city's development. In the geographical context of metropolitan regions in Brazil, monitoring of urban development processes and trends is equally inefficient, ineffective and, at times, non-existent.

Most large municipalities count on a basic physical expansion plan (enforced or not), and most of these plans are not spatially linked to sectoral development processes. Furthermore, they are not coordinated with the plans of neighboring municipalities. In the context of metropolitan regions (RMs), an integrated and comprehensive urban planning process is mandated by law (see section 2: baseline). Yet, most RMs have not formally conducted processes for preparing integrated urban development plans. A poorly managed urban expansion process contributes to exacerbating pre-existing social disparities, including of gender and class, which are often so conspicuous in Brazilian cities.

(ii) Limited public investments over the years in solutions that promote sustainable urban development

The gradual development of urban infrastructure drives growth processes in cities – both economical and physical. It does so by combining the efforts of both public and private sectors players. Public investments in urbanization, utilities and transport infrastructure are particularly important for providing an essential framework for residential, industrial and commercial developments in urban areas. In Brazil, public investment in urbanization has faced several constraints – and it still does – on the account of limited and fluctuating economic growth. In spite of these constraints, cities have physically grown and sprawled, pushed by strong demographic drivers, including migration and population growth. At least until the 1980s, migration to urban centers was a strong driver of urban population growth in Brazil. In the decades that followed, migration fluxes have slowed and changed character.

Regardless, public investments in urbanization have rarely been focused on sustainable solutions and private investment had limited incentives to add value to urban infrastructures. During the 1950s to the late 1980s, the early industrialized centers in the southeast (mainly São Paulo and Rio de Janeiro) were the preferred targets of significant rural-to-urban migrations. Yet, investments by both the public and private sector have failed to meet the demand for services posed by the incoming population in search for jobs, dwellings and affordable transportation – preferably not too far from work. In the 1990s, rural-to-urban migration continued, but it targeted other metropolitan areas: e.g. towards state capitals in the south and later also those in the northeast. In those mid-sized cities in Brazil, public investments aimed at creating minimum urbanization conditions in the periphery were modest and urban planning mostly absent. The private sector could hardly fill such investment gaps, as it depends on minimal enabling conditions based on urban planning. And those were not in place.

As a result, widespread informal processes of urban occupation have taken place in practically all Brazilian cities, including through squatter settlements, extensive low-cost land developments and massive unstructured growth in the poor peripheries. These processes not only reinforce urban sprawling trends, but they inevitably also deepen social disparities.

(iii) Prevailing price drivers for land and real estate (market forces)

Land value is often considered a major driver of urban development patterns. The price of real estate in urban areas is a ramification of land value dynamics that will, in turn, push private sector investments in construction and urban expansion. More specifically, market forces tend to ensure that land and real estate near the city center is highly valued, as opposed to the same assets in the city's outskirts. At the same time, policies that classify land as rural, urban, protected or unsafe for development also play a role in determining the behavior of these drivers. Studies and planning are needed for adequately developing policies for classifying land assets. In the absence of planning, regulation and enforcement, sprawl tends to occur, especially where property values are lower and, in particular, on the periphery of urban centers. In other words, market forces will drive physical expansion in the cities' outskirts, reinforcing urban sprawl trends – unless there are policies and regulations in place for structuring those developments.

In Brazil, the above-described root causes are complex and can be influenced by a number of factors. The following three are the most important:

(1) *Demographics and informality:* The combination of population growth and rural-to-urban migration in Brazil, as experienced in preceding decades, has clearly intensified sprawl through the mushrooming of informal settlements. In those areas, market forces drive some level of urbanization, although riddled by informality.

(2) *Social segmentation of the quality of urbanization:* As income rises, families tend to search for larger living spaces, wherever it is affordable for them. In Brazil, those dynamics push higher income families into areas with good urbanization infrastructure closer to business districts. In turn, lower income families are pushed to the periphery, where low quality dwellings proliferate, and urbanization is informal and at times unsafe.

(3) *The role of mobility in the formation of suburbs:* In theory, investments in transportation infrastructure would tend to decrease the individual's costs of commuting to work. Such investments can potentially create an incentive for families to move out of congested and densely populated urban areas. This may improve quality of life for these families, but at the landscape level it contributes to sprawl. In Brazil, investments in both transportation and residential infrastructures have been modest, considering the sprawled area. Therefore, the formation of suburbs has happened according to income level segments. Under the influence of those patterns, higher income city dwellers tend to live far, but not too far, from urban centers, as they search quality of life in larger dwellings, including in areas closer to nature. The transition from city life to life in the suburbs ends-up encouraging the use of individual motorized transport by these families. Lack of quality residential suburbs in central areas combined with the scarcity of green recreational areas contribute to this migration pattern. Because Brazil's income pyramid is steep, there are only a small number or relatively higher-income families that would seek to migrate out of the cities, but the sprawl that follows along has a high impact on the landscape and on the associated GHG emissions. In contrast, lower income city dwellers tend to find housing wherever it is available and affordable, even if unsafe and where tenure is often poorly regulated. These dwellers use public transportation and tend to work wherever it is possible to find jobs, often at the expense of their own time in commute. Long average commuting time are generally a sign of unsustainable mobility solutions, which can be a strong driver of GHG emissions from the transport sector.

In conclusion, sprawl is a result of various complex dynamics with a number of negative environmental consequences. In Brazil, the prevailing dynamics have also contributed to the aggravation of social disparities through the market-based formation of pockets of either rich or poor dwellings in urban areas and in city outskirts.

Barriers

Four main barriers (A, B, C and D) were identified through the project's theory of change (TOC) exercise. They impede Brazilian efforts to address the root causes of the global environmental problems that motivated the project's design. These barriers respectively relate to 'planning', 'evidence, 'finance' and 'capacity'. In Brazil's metropolitan regions, these barriers either prevent or hinder the adoption of integrated, low-emission urban planning, as well as the mainstreaming of biodiversity conservation into the management of urban landscapes. The Government of Brazil, including at the national, state, municipal, and metropolitan levels, requires support to overcome these barriers and implement long-term sustainable solutions. The project has been designed to address the identified barriers as a means of achieving its objective, as it will be shown through the TOC described further down (see section 3: alternative scenario).

BARRIER (A) Weak interjurisdictional and intersectoral coordination and planning

A key barrier to addressing the aforementioned problems is linked to the fact that many Brazilian cities struggle to undertake integrated urban planning in an interjurisdictional and intersectoral sense. Brazil is a federative republic, which implies shared sovereignty regarding decisions and responsibilities across the three constitutional spheres of autonomous governments: federal, states and municipalities. This allows federative entities to establish their own agendas and priorities and to be able to manage themselves, given their constitutional attributions. In accordance with articles 182 and 183 of the Federal Constitution, urban policy is the responsibility of the municipality. Coordination and planning that involves public entities at different interjurisdictional levels (vertical integration) is difficult because of this constitutional autonomy and separation of functions. This is further complicated by a misalignment between political cycles of the federal, state, and municipal governments. For instance, the election date for mayors is not aligned with election dates for state governors: the term of elected local governments at the municipal and state level share only a two-year overlap.

In additional to vertical coordination challenges, there are also horizontal coordination challenges: at the metropolitan level, intersectoral coordination and planning is difficult, given that multiple municipalities within the same RM have to collaborate together to address urban issues (horizontal integration) from a sectoral point of view. Different political alignments and a lack of capacity can greatly hinder such efforts. To address coordination issues, the Metropolis Statute, approved in 2015, established legal and policy guidelines for metropolitan region governance and management. It also establishes the need for the Brazilian metropolitan regions to develop Integrated Urban Development Plans (PDUI). However, the progress in implementing the Metropolis Statute has been much

slower than initially foreseen. In 2018, the policy incentive for the various municipalities within metropolitan regions[8] (RMs) to prepare PDUIs was weakened through a small but important change in the legislation which revoked the Statute's article 20. That article had prescribed a deadline for PDUI preparation and also foresaw sanctions for non-compliance with the deadline. With the weakened legislation, to date only a handful of RMs have developed their PDUIs or are in the process of doing so. There are more than 75 metropolitan regions in the country and, by the end of 2019, a total of 53 had not yet started their PDUI preparation processes, while only 2 had PDUIs approved by a state-level regulation called 'complementary law'. An approved PDUI, along with other metropolitan governance elements, are necessary pre-conditions for the so-called 'comprehensive metropolitan management' defined in the law.[9] Other elements are: (i) the formalization of metropolitan regions' boundaries and (ii) the establishment of an inter-federative governance structure. The fact that integrated planning at the cross-municipal level has gained little traction in Brazil means that municipal governments continue to work in an uncoordinated and unstructured fashion, in spite of the potential advantages that approved PDUIs and comprehensive metropolitan management would bring to them.

Another recurring problem in the context of integrated urban planning in Brazil is the lack of sectoral integration. While attempting to find solutions for a specific sector, local governments often do not consider the influence of policies and actions on other sectors. This leads to inefficient outcomes when dealing with complex urban development challenges. In addition, the level of enforcement of federal environmental policies and their mainstreaming into state and local policies is still weak, especially those aimed at urban GHG emission reduction and biodiversity. Difficulties linked to institutional coordination concerning environmental matters create system-level inefficiencies and slows down the implementation of broad environmental agendas enshrined in national policies. Ultimately, the process results in lack of coherence in public action and poor overall governance.

According to local stakeholders consulted during the PPG, coordinated action is hampered by three types of problems:

(i) Limited knowledge among institutional stakeholders of the benefits of integration (e.g. many fear that their institution will lose autonomy and influence in the design and implementation of urban policies at the metropolitan level or through cross-sectoral integrated processes);

(ii) Limited prospects for medium- and long-term investments from the Federal State, failing thereby to stimulate RMs to promote 'comprehensive metropolitan management' modalities[10] within the RMs and;

(iii) Lack of clarity on responsibilities of hierarchically equivalent bodies within public administration frameworks, resulting in uncertainties, delays and inefficiency in designing and implementation of plans and policies.

On a more positive note, an Institute for Applied Economic Research (IPEA) study[11] identified the involvement of civil society and the private sector as a key differential in the successful preparation of PDUIs at the metropolitan scale. Therefore, at the local level, it is important to involve non-governmental stakeholders (private and NGO) in the pursuit of metropolitan integration, in particular through active engagement in planning processes.

BARRIER (B) Evidence on the economic, social and environmental viability of sustainable urban projects is not sufficiently confirmed or widespread for realizing a low-emission and green agenda

A second barrier to addressing the problem's root causes is the lack of awareness that local governments have of the viability of sustainable urban solutions. To date, Brazilian cities have implemented innovative solutions in a piecemeal and non-integrated way. They have faced multiple challenges to ensuring successful implementation, including as related to long-term financial sustainability. Few local level stakeholders in Brazilian cities are sufficiently aware of the array of sustainable options being implemented around the world. Local technicians, decision-makers and other stakeholders have not had sufficient direct exposure to these solutions (evidence), through direct or indirect involvement ('learning by doing') in testing or demonstrating innovative solutions that are being put to practice elsewhere. The key challenges that stakeholders face are the following:

- Local governments struggle to identify and prioritize sustainable urban solutions. There are a large number of international and regional networks and platforms offering a myriad of solutions. The offer is so large that local governments often feel

[8] Including in the concept agglomerations, integrated development regions and conurbations.
[9] This is titled *'gestão plena'* in 2015 Metropolitan Statute and it implies among other things the establishment of a specific inter-federative entity for coalescing the various elements of metropolitan governance.
[10] Full management consists of the condition of a metropolitan region that implies: (i) the formalization and delimitation of the region through complementary state law, (ii) development of an inter-federative governance structure for the RM; and (iii) integrated urban development planning approved by state law.
[11] Costa, M.A. (2019). O Estatuto da Metrópole e o quadro metropolitano brasileiro: uma lei em implementação, uma revisão da norma e uma reflexão sobre cenários possíveis. Instituto de Pesquisa Econômica Aplicada (IPEA), Boletim Regional, Urbano E Ambiental, v. 21 (jul.-dez. 2019). Available at: http://repositorio.ipea.gov.br/bitstream/11058/9667/1/BRUA21_Ensaio11.pdf.

overwhelmed and confused; it is hard to know where to start and which methodology to use. Furthermore, selecting solutions that are tried and tested in Sweden, Delhi or Melbourne may not be immediately applicable or viable in the Brazilian local context. Solutions need to be tailored to the local reality. In this situation, local Brazilian governments struggle to identify sustainable urban solutions that will work in the local context. Furthermore, they struggle to understand if the solutions they are prioritizing align with local, state and federal policies and commitments. For instance, if the solutions chosen to be implemented will support the city, metropolitan region and federal government to achieve the 2030 Agenda, the goals of the Nationally Determined Contribution (NDC) and the Aichi Biodiversity Target reflected in the National Biodiversity Strategy and Action Plan (NBSAP);

- Limited experience by practitioners with the implementation of complex and integrated sustainable urban solutions, in particular those that target climate mitigation and biodiversity conservation outcomes. This can result in implementing only partial aspects of the measure (those sectoral aspects more familiar to those in charge of implementation), without benefiting from the solution's full potential. Local managers end up opting for solutions that have already been tested, but that are not necessarily the most efficient, sustainable, or the one that meet the needs of the beneficiary population. While such solutions have the backing of local stakeholders, these may be outdated or inefficient, or no longer environmentally, socially or economically sustainable;

- Risk-adverse behavior of local governments to test the unknown (especially when public budgets are limited), particularly when innovative and better-informed stakeholders, such as universities, advocacy groups and private sector players, are marginalized or not included effectively in planning processes;

- Limited data and limited evidence from practical demonstrations showing the effectiveness of an integrated approach in the local context (i.e. "no other Brazilian city has done this"). Experience in other countries and cities show the importance of introducing integrated solutions as demonstrative actions first, to build-up the factual evidence about their effectiveness. Skepticism from local stakeholders does not refer only to technical feasibility or expected results, but more decisively to the political and social feasibility of the implementation process. The exposure of Brazilian cities and their officials to these processes has been limited, thus far. As a result, municipalities and metropolitan regions are not fully aware of the wide array of actions and policies that have proven successful in other cities in Brazilian and abroad.

BARRIER (C) Difficulty in accessing finance for sustainable urban development due to limited mobilization capacity and limited finance availability

The third barrier that stands in the way of stakeholders addressing the problem's root causes is finance. In the Brazilian context, this barrier is split into two aspects. One is '*the demand side of finance*', driven by the municipal and the state governments and also the private sector. The other is the *'the supply side of finance'*, for which the agenda is driven by national and international financial institutions.

1. Lack of investment options for financing the implementation of integrated urban plans and actions *('the supply side')*

As explained in greater detail in section 2, local governments fund their operations and development through a combination of governmental transfers and local income. The main ones are: (1) tax collection (value-added taxes for states and service taxes for the municipalities);[12] (2) inter-governmental transfers and grants (noting that Brazil has a rather strong redistributive mechanism from the central to the decentralized levels); (3) loans by public and development finance institutions; and (4) financing through the international public sector (loans, grants and blended finance).[13]

At the municipal level, the first two sources of revenue mentioned (municipal tax collections and intergovernmental transfers), while making up the majority of municipal income, are also limited. The priority use of this revenue is for covering staff salaries and related social contributions, essential municipal services, and the maintenance of municipal infrastructures. Municipal governments also use their direct revenue to make payments on debt balances for existing infrastructure investments. Overall, however, municipalities are cash strapped and investing in GHG emissions reduction and conservation through these revenue sources is almost impossible.

[12] In turn, the federal government counts on income, payroll, and turnover taxes as an important source of revenue.
[13] Some municipalities and states also count in addition on oil and gas royalties as an important source of revenue (i.e. 'important' here meaning more than 10% of total revenue). This is currently not the case for any of the states and municipalities ones targeted by this project.

In this light, sustainable urban projects must be made possible through a combination of different sources of finance, including local, national and international. Currently, public investments in local development come primarily through national sources, in particular through loans by national development banks and other national funds. These entities, such as the National Bank for Economic and Social Development (BNDES) and the Funding Authority for Studies and Projects (FINEP), make available finance lines for supporting sustainable urban development at the local level. However, these are generally limited in scope and size, and they do not cater directly for needs for financing of integrated solutions or for addressing these needs at the metropolitan scale. BNDES has funding lines on energy efficiency, mobility and sustainable cities, but continues to face challenges in understanding the demand profiles of municipalities.[14] It does focus on integrated solutions,[15] but with a limited focus on sustainability and reduction of GHG emissions. Moving beyond traditional sectors such as energy, transport and housing, there are limited mechanisms available for leveraging private investments for urban conservation, e.g. the establishment of ecological corridors, urban tree planting, urban ecosystem restoration, and blue and green infrastructure.

Thus, green and low-emission public investment projects in Brazil continue to be the exception. From a funding supply point of view, this affects financiers' ability to structure financial products: *inter alia*, assessing risk, scoping pay-back periods, investment size and the assessing borrowers' financial capacity. Also, those elements are generally asymmetrical across municipalities within a metropolitan region. In other words, national public financiers often have limited understanding of municipal financing needs and challenges related to investing in sustainable urban development. Establishing a dialogue on those matters with between local stakeholders and financiers will play a key role in the development of financial instruments that respond to local governments' needs and limitations, especially at the metropolitan scale. For instance, project preparation costs are estimated to be in the range of 10% of the total project investment in developing countries.[16] In this context, national financial institutions have noted that they need to develop a greater understanding of the how local governments access finance and what their needs, priorities and challenges are in accessing such financing.[17]

Finally, by reducing investment risks of sustainability projects, they would become more attractive to private sector players, who are generally risk adverse when operating in urban settings.[18] The co-participation of public investment institutions in de-risking is therefore fundamental for stimulating private sector engagement in sustainability. Yet, de-risking financial instruments have rarely been used at the metropolitan or municipal scale, and much less so for sustainable projects.

2. Local governments have difficulty in accessing finance for sustainable urban development *('the demand side')*

In addition to a limited financial offer, local governments also have limited institutional and human capacity to take advantage of the finance that is available. This is due to multiple reasons.

- *Local governments struggle to strengthen their fiduciary capacity and creditworthiness*
  In terms of access to loans, a key challenge is that approximately 74% of Brazilian municipalities are in a difficult or critical fiscal situation.[19] This impacts their ability to access credit and absorb more debt. The low capacity of the municipalities for mobilizing investment finance through loans relates both to the patterns of public spending and to general limitations of their revenue sources.[20] It is also due to the low fiduciary management capacity of government entities, including lack of capacity to comply with national and global standards on financial transparency and management. For cities in this situation, low-emission and conservation projects end up competing with other initiatives considered more 'urgent' for cities, such as the need for infrastructure vital to cities' functioning. While inheriting long-standing debts from previous administrations is common in Brazil and can hardly be avoided, local governments can take steps to strengthen their creditworthiness by adopting good practices on financial management and fiduciary transparency. Such elements can increase the capacity of local governments for accessing financing in the future.

- *Difficulties in identifying sources of funds and in preparing sustainable urban project proposals*
  To raise funds, local governments need to develop quality proposals that are economically viable for cities. These proposals need to be sufficiently attractive to investors and, in the case of low-emissions and conservation projects, they also need to generate environmental benefits. Many local governments in Brazil are unable to present such projects, let alone to compose

[14] Interview with BNDES during the project preparation grant phase.
[15] https://www.bndes.gov.br/wps/portal/site/home/financiamento/produto/bndes-finem-pmi.
[16] Schneider-Roos, K., D. Wiener, R. Guldimann, M. Grossmann. 2014. Unleashing Private Capital Investments for Sustainable Infrastructure Greenfield Projects: Scoping Study regarding the Early-Stage Project Preparation Phase.
[17] Interview with BNDES during the project preparation grant phase.
[18] Fórum Econômico Mundial e Banco Interamericano de Desenvolvimento (BID). 2019. Improving infrastructure financing in Brazil.
[19] FIRJAN (Federação das Indústrias do Estado do Rio de Janeiro). 2019. Índice Firjan de Gestão Fiscal 2019. Rio de Janeiro: FIRJAN. Available at: https://www.firjan.com.br/ifgf/.
[20] Floater, G., Dowling, D., Chan, D., Ulterino, M., Braunstein, J., McMinn, T. 2017. Global Review of Finance For Sustainable Urban Infrastructure. Coalition for Urban Transitions. Londres, Reino Unido e Washington DC, EUA.

a portfolio of "bankable" projects on an ongoing basis to obtain finance.[21] Municipal civil servants are often not aware of the wide range of options for sustainable finance, and find the search for options time-consuming and confusing. Information on how to finance projects and how to access financing is asymmetric and challenging for non-specialists. More importantly, it is complex for local managers to have a good overview of fund availability, modalities for funding projects, and conditions of access. When they do find promising options, public managers often lack capacity for preparing 'bankable' projects that comply with the financiers' requirements. Common challenges include:

- Conceptualizing projects and complying with financiers' requirements. Local governments usually present projects with a poorly consolidated business model.[22] Project proponents find it difficult to assess risks, including financial risks associated with these projects;
- Meeting the complex financial architecture of sustainable urban projects. Even when the benefits of sustainability are recognized, the hurdles of project scoping, assessment studies and appraisal end up shying away both public and private sector investors;
- Achieving co-financing requirements. Environmental projects often require high commitments in terms of co-financing which are often not available in the public coffers;
- Calculating the environmental benefits in terms of public goods.[23,24] This is especially the case with biodiversity projects, making them rarely suited for investment initiative that need to generate monetary returns to the financier.

As a final point, municipalities and state governments encounter further challenges in developing sustainable urban projects at the metropolitan scale. To achieve this, the starting point must be the development of integrated urban plans which incorporate low-emission and biodiversity conservation principles (barrier 1 above). From there, such stakeholders would need to combine revenue towards a common goal and strategically use it for metropolitan level projects, from planning to execution.

BARRIER (D) Local governments have weak technical capacity and technical planning tools

The fourth and final key barrier to be overcoming for addressing the problem and its root cause relates to the technical preparedness of local governments for undertaking integrated planning.

Brazilian city governments have weak institutional and technical capacity to implement integrated, evidence-based planning. They also have a limited understanding of the inter-connectivity and inter-dependence of urban challenges, and of the need to apply an evidence-based, integrated planning approach. The capacity and awareness of town planners to understand the integrated nature of the challenges they face is diverse across Brazilian cities. For instance, decision-makers in larger cities, such as the São Paulo metropolitan region, are well aware of the interconnectivity of urban challenges and work together to develop integrated plans and interventions. However, this is more an exception to the rule. Most Brazilian metropolitan regions have a low understanding of the integrated nature of such challenges and continue to implement sectoral approaches with limited coordination within city administrations as well as with other municipalities or their state. Although town-planners are often familiar with the theoretical conceptualization of cities as complex systems, they lack the ability to put this concept at work into their daily analysis and practice.

Even when Brazilian city governments have a strong understanding of the need for integrated planning and have some form of coordination mechanisms, they often lack access to tools, information and data for supporting them in their planning and decision-making processes. Experiences from cities around the world highlights that planning platforms provide civil servants and decision makers with a wider perspective of urban challenges and facilitate intersectoral and multilevel dialogues, addressing coordination challenges. While some municipalities have these platforms, these are often limited in depth of data or width of sectoral coverage. For many cities, geographic information system (GIS) data is not widely developed, incorporated into planning platforms or connected to national data systems such as the National Infrastructure of Spatial Data (INDE).

[21] Oberholzer, B. et al. 2018. Summary of Good Practice of Successful Project Preparation Facilities; Nassiry, D., Nakhooda, S. 2016. Finding the pipeline: Project preparation for sustainable infrastructure; WWF (World Wide Fund for Nature). 2015. Financing the Transition: Sustainable Infrastructure in Cities.

[22] Floater et al. (2017).

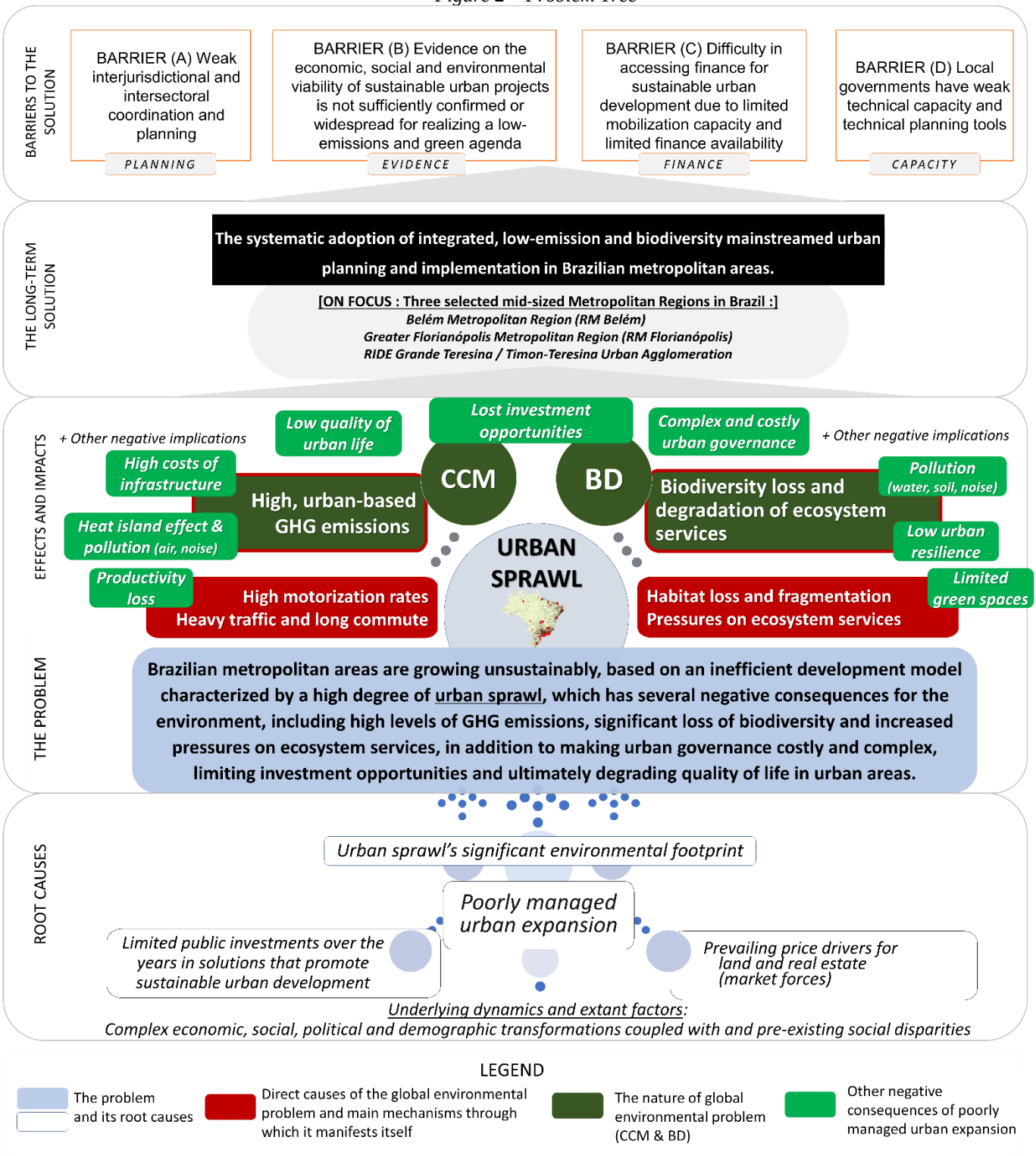
[23] According to the Global Commission on Adaptation (GCA), the benefits of climate and/or sustainable projects tend to be divided into three areas: the first refers to avoided costs, that is, the investment capacity to reduce future losses; the second is the positive economic benefits from risk reduction, increased productivity and incentive to innovation through the need for adaptation, for example; the third refers to social and environmental benefits. (GCA (Global Comission on Adaptation). 2019. Adapt Now: A Global Call for Leadership on Climate Resilience. World Resources Institute (WRI)).

[24] NCE. 2016. The Sustainable Infrastructure Imperative: financing for better growth and development. Global Commission on the Economy and Climate; WWF (World Wide Fund for Nature). 2015. Financing the Transition: Sustainable Infrastructure in Cities; Ahmad et al., 2019.

Problem tree

Figure 2 contains the project's problem tree. It summarizes the core problem faced by Brazilian cities, which the project proposes to address through its alternative scenario. The problem tree includes the root causes and the barriers that need to be overcome for achieving sustainable urban development of Brazilian's cities. The project's theory of change (TOC) is linked to the problem tree and is described in section 3. Both the problem tree and the TOC display in a visual manner how the project will address these root causes and overcome the identified barriers.

Figure 2 – Problem Tree



2) Baseline Scenario and associated Baseline Projects

2(i). The Constitution and delegation of urban authority

The 1988 Constitution determined the current administrative structure of Brazil, consolidating a federative system with three government tiers: federal, state and municipal. Consistent with this, Brazil's federal system is composed by a Federal District (Brasília), 26 states and 5,570 municipalities. A fundamental principle of this federal structure is the decentralization of power and delegation of autonomy to the states and municipalities. As the basic unit of the Federal system, municipalities hold certain administrative and legislative autonomy. Accompanying this autonomy, and in accordance with article 30 of the Constitution, municipalities also have certain responsibilities within their territories with regards to, *inter alia*, local legislation, public services including public transport, tax collection, land-use and spatial planning, education and health.

However, the decentralization of power through the Constitution was not systematically mainstreamed across all spheres of government, resulting in the municipalities having difficulties in exercising their autonomy and responsibilities. For instance, while municipalities were granted a series of responsibilities requiring technical capacity and significant financial resources, the autonomy granted to them was not accompanied by an equal fiscal and budgetary decentralization. This has led to municipalities being dependent on transfers from the Federal Government and investments from major national or state programs. Furthermore, municipal responsibilities are often impacted or mutually dependent on the actions of the state and other municipalities. For instance, in metropolitan regions, that is, urban areas of more than one municipality, municipal responsibilities related to the provision of public services, such as electricity, transport and waste, depend on cooperation with neighboring municipalities. Similarly, in the management of natural systems within urban contexts, such as water and the conservation of biodiversity, municipalities often face similar challenges, not least because these systems tend to affect areas beyond municipal boundaries. The mismatch between 'real life urban management' and the capacity of local governments has led to serious urban challenges as noted in section 1.

To encourage urban municipalities to coordinate on issues of common interest, from the 1970s the Federal Government began to create metropolitan regions (RM). The first RMs were those experiencing rapid growth, primarily due to internal migration: São Paulo, Belém, Belo Horizonte, Curitiba, Fortaleza, Porto Alegre, Recife, Rio de Janeiro and Salvador. With the enactment of the 1988 Constitution, opportunities open for creating new metropolitan regions and in this way integrate the organization, planning and execution of public functions of common interest. In addition to metropolitan regions and urban agglomerations, Integrated Development Regions (RIDEs) were also created, defined as administrative regions that cover different states (e.g. the Greater Teresina RIDE). The Federal Government is responsible for formally establishing RMs, RIDEs and formal urban agglomerations, especially in areas that comprise municipalities in more than one state or with the Federal District (Brasília). However, because integrated planning agendas have progressed so slowly (see e.g. barriers A and B in the previous section), the metropolitan region still lacks recognition as a key governance element within Brazilian urban landscapes.

2(ii). Brazil and urbanization

A country historically dependent on rural land-use, during the 20th century Brazil experienced intense urbanization. According to data from demographic censuses carried out by the Brazilian Institute of Geography and Statistics (IBGE), in 1950, Brazil had 51.9 million people. Of these, 32.2% lived in urban areas and 63.2% in rural areas. In 2010, the country had 190.7 million people with 84.3% in urban areas and 15.6% in rural areas. Since the early-1970s, Brazil has consolidated itself as an urban country, driven to a great extent by rural-to-urban migration. Urban areas in Brazil currently represent less than 1% of the national territory (0.31%) but concentrate more than 160 million people,[25] i.e. some 80% of the population.

Although not all of the urban population in Brazil lives in areas considered metropolitan, many of them do. Recent data from IBGE show that Brazil has 80+ metropolitan regions (including within this broad concept RMs, Urban Agglomerations and RIDEs, although there are technical differences among them). These RMs encompass 1,420 municipalities of varied sizes.[26] More than 120 million Brazilians live within these regions – that is, some 58% of the Brazilian population. The way this population is distributed according to the size of RMs and how the RMs are growing show some visible asymmetries (see Table 7 and Table 8, comparing data from 2016 and 2020).

[25] Farias, A. R.; Mingoti, R., Valle, L. B.; Spadotto, C. A.; Filho, E. L. Comunicado técnico 4: Identificação, mapeamento e quantificação das áreas urbanas do Brasil. Embrapa: Campinas, 2017. 5 pp

[26] IBGE. 2020. Composição das RMs, RIDEs e Aglomerações Urbanas 2020. Rio de Janeiro: IBGE. And also: https://agenciadenoticias.ibge.gov.br/agencia-sala-de-imprensa/2013-agencia-de-noticias/releases/29465-ibge-atualiza-a-lista-dos-municipios-que-integram-os-recortes-territoriais-brasileiros2.

Table 7 – Metropolitan Regions (RM): 2020 population cohorts and number of municipalities

Range	Number of RM	Population (2020)	% of the population	Number of municipalities
Up to 100 thousand	5	277,972	0.2%	23
101 thousand to 500 thousand	29	7,839,617	6.4%	475
501 thousand to 1 million	20	14,057,985	11.4%	316
1.001 million to 2 million	12	17,096,241	13.9%	219
2.001 million to 3 million	6	14,655,648	11.9%	114
3.001 million to 4 million	3	10,955,795	8.9%	62
4.001 million to 5 million	4	17,272,909	14.0%	101
More than 5 million	3	41,031,523	33.3%	111
Totals	**82**	**123,187,690**	**100.0%**	**1,421**

Source: Compilation based on IBGE, Regiões Metropolitanas (2016 and 2020) and IBGE, Population estimates per municipality (2020).
[*] For simplicity purposes, the concept of RM in this table encompasses RIDEs, urban agglomerations and other similar concepts with data published by IBGE every 6 months. See: https://www.ibge.gov.br/geociencias/organizacao-do-territorio/divisao-regional/18354-regioes-metropolitanas-aglomeracoes-urbanas-e-regioes-integradas-de-desenvolvimento.html?=&t=downloads

Table 8 – Metropolitan Regions (RM): Demographic trends from 2016-2020 for broad population size classes in RMs*

RMs size classes	Number of RMs	Population change from 2016 to 2020 (millions of inhabitants)	*Population trends from 2016 to 2020*
Small RMs *(< 0.5 million)*	34	-1.3	-14%
Medium-sized RMs *(≥ 0.5 million and < 4 million inhabitants)*	41	19.2	51%
Large RMs *(≥ 4 million and < 5 million inhabitants)*	4	-9.8	-36%
Mega RMs *(≥ 5 million inhabitants)*	3	2.2	6%
Totals	**82**	**10.3**	9%

Source: Same data as Table 4. Note: all three RMs on focus through the project (Belém RM, Florianópolis RM and Greater Teresina RIDE) belong to the size class 'Medium-sized RMs'.

Table 7 and Table 8 demonstrate different demographic patterns and trends observed in RMs in the last five years. In recent decades, the urbanization rate has begun to decelerate and change in character. In 2020, metropolitan regions still experience growth, however this is mostly concentrated in 'medium-sized RMs', as opposed to the 'mega RMs', such as São Paulo, Rio de Janeiro and Belo Horizonte (Table 8).

The rapid and intense urbanization process in Brazil demanded a reorientation in public policies and led to creation of new priority guidelines and policies for the country's development (see section 2(iii) further down). As discussed in section 1, this process faced a number of challenges and the prevailing patterns of urbanization were—and continue to be—characterized by urban sprawl. During Brazil's urbanization process, the gradual increases in population within metropolitan regions (and in cities more broadly) have invariably resulted in a low-density horizontal expansion of the cities' footprint, implying urban sprawl – which is basically a synonymous of unplanned urban growth. Patterns of disorganized, unstructured and unplanned growth were accentuated by factors such as job availability and demand for housing. Economic activity tends to be concentrated in city-centers, while housing price dynamics pushes low-income populations to the outskirts. As discussed in section 1, this scenario, was a consequence of ineffective and insufficient integrated planning and management, coupled with limited public investments in sustainable urbanization over the years.

Rapid urbanization led to Brazilian cities facing a series of pressing urban challenges. In the 1970s and 1980s, the most notable were the urban smog issues faced by São Paulo and other large cities. As this air contamination (somewhat) receded, it revealed pressing issues across a plethora of urban sectors. One of the key issues is housing. Metropolitan landscapes display significant swaths of low-income informal settlements, which sometimes straddle into environmentally sensitive areas, including among these areas formal protected areas. The estimated housing deficit in 2019 was of some 5.9 million homes, with 2.2 million pertaining to the primary RMs.[27] Urban land is generally expensive and the prevalence of informal settlements correlates directly with limited supply of well-located housing. An important driver of urbanization is directly linked to land dynamics and the suppressed demand for housing in Brazil. This could be solved, in part, by the promotion of compact urban growth. Yet, such transformation will require significant integrated planning and investment.

[27] http://novosite.fjp.mg.gov.br/wp-content/uploads/2020/12/04.03_Relatorio-Deficit-Habitacional-no-Brasil-2016-2019-v1.0_compressed.pdf.

Beyond housing, Brazilian urban areas usually lack complete infrastructure, in particular sanitation and others utilities of public interest. This deficit is more severe in the North and Northeast regions. In Brazil, 48% of the population still does not have sewage collection and 35 million people do not have access to treated water. Data shows that the investment needed to cover the urban infrastructure deficit corresponds to 5% of GDP per year.[28] Historically, however, public investments in water infrastructures have not exceeded 2%. Beyond increasing the size of investments, it is necessary to change the trajectory of urban development in Brazilian metropolitan regions, promoting a more compact and vertical development rather than a continuing horizontal expansion. This change in trajectory depends, to a large extent, on integrated planning at the metropolitan scale.

There are some positive developments. Curitiba and São Paulo are examples of cities that have innovated through systematic urban planning and with the aim of promoting a more compact urban development. Both cities gained global recognition on the account of their solutions. They focused on the provision of infrastructure that could potentially change conditions to a high number of commuters, especially through medium and high-capacity public transport. As transport conditions improved, so did commuters' productivity, and thereby also their income and quality of life. Such examples highlight how a relatively limited but strategic public investment in sustainable development can generate multiple benefits and significant media attention through positive stories.

URBAN AREAS AND GREENHOUSE GAS EMISSIONS

The rapid urbanization process experienced by Brazil, combined with the prevailing car-centric transport model, have also had important implications for urban-based GHG emissions. Total national GHG emissions in 2016 were 1,467.3 T CO2eq, equating to approximately 6.9 t CO2eq per capita. Brazil has a relatively clean electricity matrix (grid emission factor of 0.102 gCO2/kWh),[29] with LULUCF (land-use, land-use change and forestry) and agricultural emissions representing approximately 60% of total GHG emissions at the national level, and the rest directly or indirectly connected to urban areas (see Figure 3 and Figure 4).

Emissions from the transport sub-sector and from the waste sector are both closely linked to urban activities, accounting for 25% of total national emissions when not including LULUCF,[30] and almost 50% when not including LULUCF and Agriculture. And this does not consider city electricity consumption, with national electricity generation accounting for a further 7.4% of national emissions. It should be noted that the transport sub-sector has consistently increased its share of GHG emissions in the energy sector over the last 26 years, more than doubling its share in that period.[31] The peak in transport emissions was in 2014, with lower levels following due to an economic slowdown.

Furthermore, Brazil displays one of the highest motorization rates in the Latin America and the Caribbean region, with 364 motor vehicles per 1,000 people. It is second only to Barbados (384) and above Argentina (316), Mexico (297), Uruguay (280) and Chile (230).[32] A recent study that focused on urban GHG emissions in Brazil highlighted that the transport sub-sector is the highest emitter within the Brazilian urban context.[33] The same study directly correlated GHG emissions from the transport sector with patterns of urban sprawl and automobile dependence.

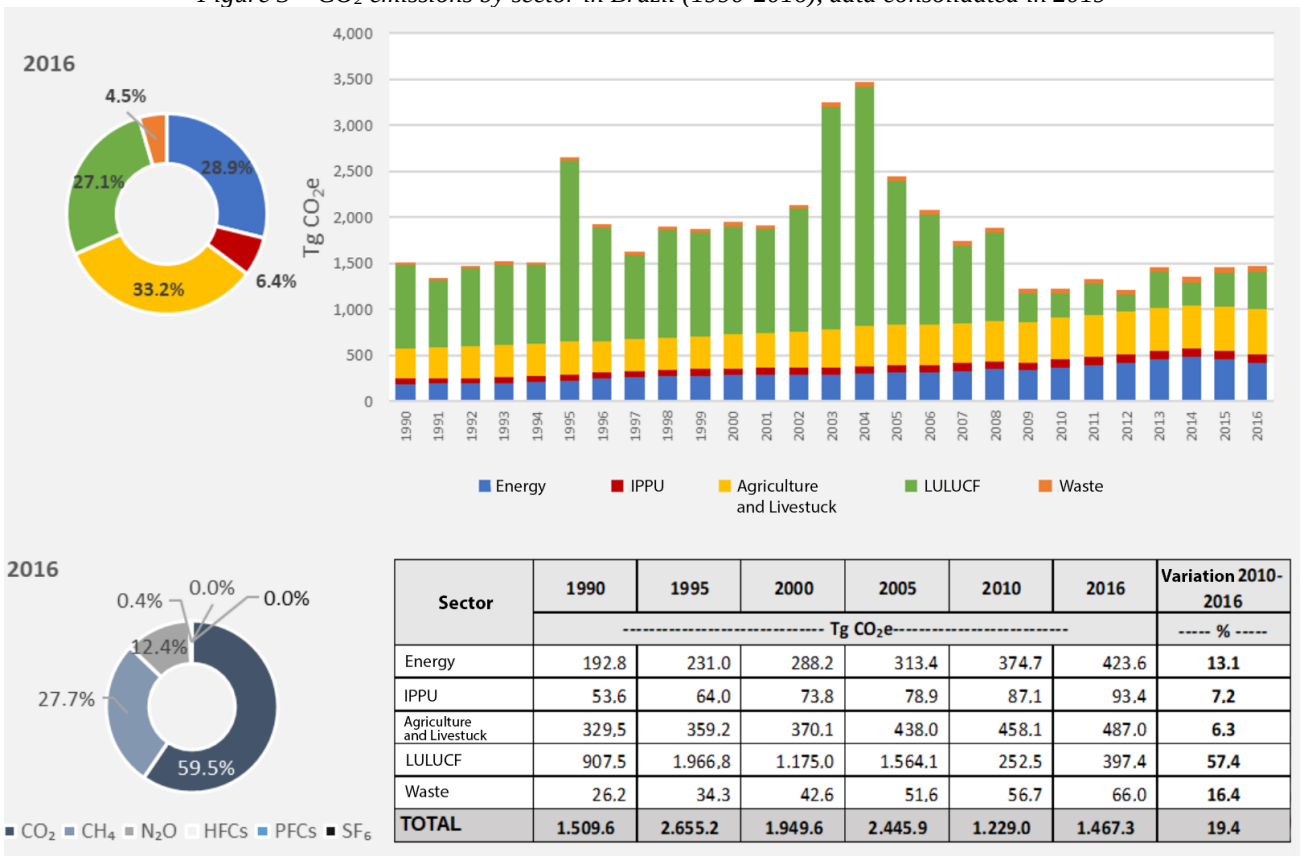
Current GHG mitigation targets for Brazil aim at reducing emissions in 2025 by 37% compared with 2005.[34] Additionally, Brazil has committed to reducing its emissions in 2030 by 43% compared with 2005 (see section 2(iii) below for further information on the NDC). In light of Brazil's clean electricity generation matrix, by focusing on key urban sectors (such as transport, buildings and solid waste) it is possible to make significant progress towards reducing GHG emissions, advancing towards sustainable urban development and contributing to global mitigation outcomes.

Without an important change to the prevailing model of urban development in Brazil, this situation will likely continue until 2050 and beyond. The Ten-Year Energy Plan (PDE, 2029 – see Figure 5), which is the most current plan for the Energy Sector in the country, includes the most recent data from 2018, along with forecasts. The plan was developed by the Federal Government through the Energy Research Company (EPE). According to that data from the plan, the transport sector accounts for 46% of total GHG emissions from energy production and consumption.[35] Over a ten-year horizon (which is the PDE's planning timeframe with

[28] IPEA, 2018.
[29] https://antigo.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html.
[30] Brazilian fourth national communication to the UNFCCC. See pages 96 and 118.
[31] Ibid, page 118.
[32] World Bank Data (2020).
[33] Baltar de Souza Leão, E. et al. 2020. Carbon accounting approaches and reporting gaps in urban emissions: An analysis of the Greenhouse Gas inventories and climate action plans in Brazilian cities. Journal of Cleaner Production, Volume No. 245, 1 February 2020, 118930.
[34] In accordance with the 2020 nationally determined contribution.
https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Brazil%20First/Brazil%20First%20NDC%20(Updated%20submission).pdf.
[35] *Ibid.*

consolidated projections), the transport sector will continue to be responsible for most of the emissions within the energy sector through to 2029 (Figure 5), *ceteris paribus*.[36]

Figure 3 – CO_2 emissions by sector in Brazil (1990-2016), data consolidated in 2019

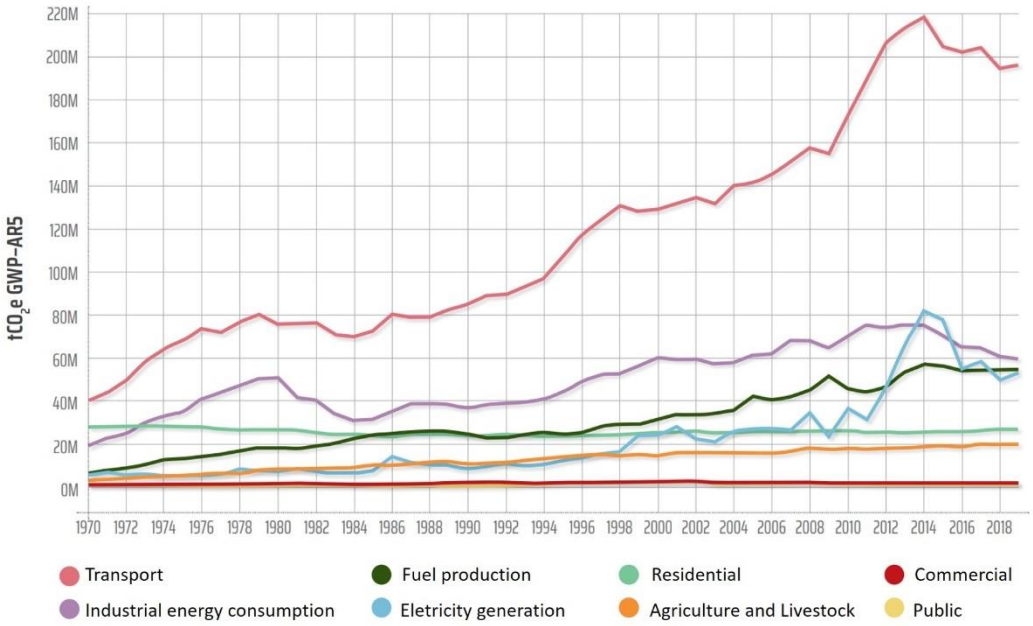


Sector	1990	1995	2000	2005	2010	2016	Variation 2010-2016
	---------- Tg CO_2e----------						----- % -----
Energy	192.8	231.0	288.2	313.4	374.7	423.6	**13.1**
IPPU	53.6	64.0	73.8	78.9	87.1	93.4	**7.2**
Agriculture and Livestuck	329.5	359.2	370.1	438.0	458.1	487.0	**6.3**
LULUCF	907.5	1.966.8	1.175.0	1.564.1	252.5	397.4	**57.4**
Waste	26.2	34.3	42.6	51.6	56.7	66.0	**16.4**
TOTAL	**1.509.6**	**2.655.2**	**1.949.6**	**2.445.9**	**1.229.0**	**1.467.3**	**19.4**

Source: MCTI, 2020.

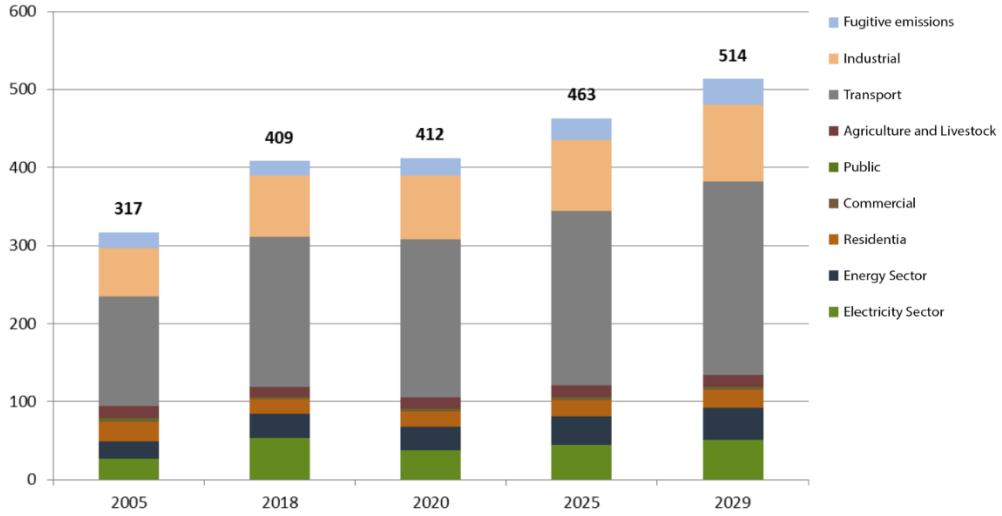
[36] *Ibid.*

Figure 4 – Historical series (1970-2019) of CO_{2e} emissions (t) by energy sector activities



Source: SEEG, 2020. Available at: https://seeg-br.s3.amazonaws.com/Documentos%20Analiticos/SEEG_8/SEEG8_DOC_ANALITICO_SINTESE_1990-2019.pdf

Figure 5 – Evolution of sectoral participation in GHG emissions from energy production and use



Source: EPE, 2020. Available at: https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf

URBAN AREAS AND BIODIVERSITY

In addition to the impacts related to GHG emissions, the urbanization process in Brazil also affects biodiversity and vital ecosystem services.[37]

As a result of urbanization processes, land is used for development of residential, commercial and industrial areas, as well as 'grey' infrastructure (e.g. paved roads or parking lots). Vegetation is widely removed, and soils are covered by impermeable surfaces. Riverbeds are heavily modified and channeled. Most urban watercourses become loaded with sewage, garbage and sediments. Pollution and habitat degradation also affect beaches in urban areas, in particular due to heavy beach visitation, as well as lakes and rivers. Beaches end up becoming non-viable breeding grounds for sensitive species (e.g. marine turtles that require dark and

[37] Pinto & Costa, 2019. Unidades de Conservação Municipais do Cerrado. Brasília: IEB Mil Folhas.

undisturbed sandy beaches for nesting). Overall, urbanization leads to a profound transformation of local habitats, including marine, terrestrial and freshwater habitats, which are present in the three RMs on focus.

The impacts have numerous direct causes and effects. Air, water, noise and soil pollution affect species and habitats. Trampling in green areas hinders the restoration of natural vegetation. Changes to micro-climate and luminosity, caused respectively by the heat island effect and night lights, affect sensitive species and both localized and in remote habitats. Furthermore, the general disruption to water bodies and to mountainous areas caused by urbanization results in more frequent and severe floods and landslides, destroying entire habitats, also posing a threat to human populations. Urbanization drives transformation of peri-urban areas, encroaching into agricultural lands and other green areas. Although not protected, many green areas can harbor important biodiversity and may have potential for recreation, improve air quality in polluted cities as well as for the generation of important ecosystem services. Most impacts of urbanization are exacerbated by climate change and by other pressures that affect biodiversity and ecosystem services in the countryside. In extreme situations, the extensive loss of biodiversity caused by urbanization may have implications for water and food security in the cities themselves.[38]

At the same time, studies from various urban centers around the world show that cities harbor up to 50% or more of the species that are found within surrounding biological communities.[39] This is an impressive indicator considering the intense transformation of natural environments that is driven by urbanization at the landscape level. In addition, species that survive in urban environments show resilience and adaptability. It may sound counter-intuitive, but conserving biodiversity by focusing on the urban subset of species and habitats makes good conservation sense, alongside other strategies. The establishment and improved management of urban protected areas (PAs) is a prime strategy in this regard. Urban PAs differ from rural ones to the extent that they tend to be under stronger pressure from visitation and various forms of pollution (air, water, light), in addition to threats to more incidents of poaching and vandalism.[40] Thus, urban PAs require a more intensive form of management.

It is therefore extremely important to flag the presence of globally important biodiversity in urban areas—inside and outside PAs—and to gather information about urban ecosystems, along with the services that they provide to society. Local stakeholders are best positioned to understand the complex socio-environmental system that urban areas represent and the stakes in question, in light of urban development.[41] Key approaches and tools to mainstreaming biodiversity into urban planning uses a variety of tools and instruments. The most important ones are spatial planning to manage competing and overlapping land uses, and the mainstreaming of PAs within urban landscapes (including tools such as participatory PA co-management, payments for ecosystems services, among others). Such tools are particularly useful in urban settings because the diversity in all taxa depends not only on the size of the area that enjoys protection, but also the effects of active management of land-use for conservation. Notwithstanding, current land use management policies and practices in Brazil have been inadequate for dealing with urban environment challenges. Additionally, little systematic attention has been paid to date to urban PAs in Brazil.

In Brazil, the impact of urbanization on biodiversity is exacerbated by the lack of an integrated view of the landscapes – or of the role that PAs play within these landscapes, in terms of conserving urban biodiversity and providing vital ecosystem services to city dwellers. Urban biodiversity is generally fragmented, so area-based conservation strategies in urban settings need to spatially consider how biodiversity corridors can counteract fragmentation and habitat loss. This requires coordination among government bodies at different scales, as well as the active engagement of stakeholders, among them, local dwellers, private sector and civil society.

Within metropolitan regions, there are, on the one hand, inter-jurisdictional challenges that make institutional coordination more difficult. On the other hand, some of the RMs are already on the forefront of a transition to sustainable practices across the metropolitan landscapes. One of them is the Metropolitan Region of Campinas (RMC), which stands out as a good example of integrated landscape level planning at the metropolitan scale. This is due to the role played by the municipality of Campinas in promoting integration through the *Reconecta* RMC Program. The program was made official by a Technical Cooperation Agreement, in which the 20 municipalities of RMC established an inter-jurisdictional cooperation framework for actions of mutual interest in the field of fauna and flora recovery and conservation.

As for the project sites, the management effectiveness of PAs targeted by the project, respectively in Belém RM, Florianópolis RM and in Greater Teresina RIDE, was assessed during the PPG using the Protected Areas' Management Effectiveness Tracking Tool (METT), which applied to nine individual PA sites. GEF projects that involve PAs (even within the context of landscape-level management) are required to prepare METT assessments, which is a rather useful tool for tracking and monitoring progress in PA

[38] Herzog & Rozado, 2019. The EU – Brazil Sector Dialogue on nature-based solutions. Contribution to a Brazilian roadmap on nature-based solutions for resilient cities. Luxembourg: Publications Office of the European Union, 136p.
[39] SCBD - Secretariat of the Convention on Biological Diversity. 2012. Panorama da Biodiversidade nas Cidades. Montreal: Secretariat of the Convention on Biological Diversity.
[40] Mcdonald, R.I et al. Urban effects, distance, and protected areas in an urbanizing world. Landscape and Urban Planning 93 (2009) 63–75
[41] Inspired by: Pinto & Costa, 2019. Unidades de Conservação Municipais do Cerrado. Brasília: IEB Mil Folhas.

management, in addition to being one of the most widespread tools for reporting on progress towards the CBD's first objective (conservation). See e.g. https://www.conservationgateway.org/ExternalLinks/Pages/mett-management-effective.aspx.

Of the nine PA sites covered by the METT Analysis, six are located within Belém RM, two in Florianópolis RM and in one in Greater Teresina RIDE. METT results are presented in Table 9 and analyzed in Box 1. METT scores in the baseline for most sites, and different aspects of the assessment discussed in Box 1, indicate that there is ample room for improvements in PA management effectiveness across sites.

For the complete set of METT questions, refer to this project's GEF-7 Biodiversity Protected Area Tracking Tool uploaded in the GEF Portal.

Table 9 – Management Effectiveness Tracking Tool (METT) Analysis: Data visualization in matrix format

METT Questions, grouped	***Q#***	**PAs in RM Belém**						**PAs in RM Florianópolis**		**PA in RIDE Teresina**
		APA Belém	**Utinga Park**	**Combú Island**	**REVIS Belém**	**Seringal Park**	**Danubio Park**	**RESEX Carijós**	**MPA Pirajubaé**	**FLONA Palmares**
[1] Legal Status	1	3	3	3	3	3	3	3	3	3
[2-4] Regulations, Law Enforcement	2	2	2	2	2	0	0	3	2	2
	3	2	2	2	2	2	1	2	2	2
	4	2	2	2	2	2	0	3	3	3
[5, 6] Boundary and design	5	2	2	2	2	3	2	2	2	0
	6	2	3	2	3	3	1	3	2	3
[7] Management planning	7	0	3	0	2	0	0	2	1	1
	7a*	1	1	1	1	0	0	0	1	1
	7b*	0	0	0	0	0	0	0	0	1
	7c*	1	1	0	0	0	0	1	0	1
[8-19] Plan implementation & operations, incl. financial resources for the purpose	8	2	2	1	1	0	1	2	2	2
	9	1	1	1	1	1	1	2	2	2
	10	1	2	1	1	1	0	2	1	3
	11	1	2	1	1	0	2	3	2	1
	12	1	1	1	1	0	1	2	1	2
	13	1	2	1	2	2	1	3	3	1
	14	2	3	2	2	2	2	3	2	2
	15	1	2	1	1	1	0	1	2	2
	16	1	2	2	2	0	0	1	2	3
	17	1	2	2	2	0	0	2	2	1
	18	0	2	0	2	1	0	2	2	2
	19	0	0	0	0	0	0	0	1	2
[20] Education and awareness	20	1	1	0	0	2	2	1	1	2
[21, 22] Landscape management	21	2	2	2	2	0	0	2	2	0
	21a*	1	1	1	1	0	0	0	0	1
	21b*	1	1	1	1	0	0	0	0	1
	21c*	1	0	1	0	0	0	0	0	1
[23-25] Indigenous peoples and local communities	22	2	2	2	2	1	0	1	2	1
	23	1	2	2	2	0	0	0	0	0
	24	2	2	2	2	0	0	0	2	1
	24a*	1	1	1	1	0	0	0	0	0
	24b*	1	1	1	1	1	1	0	0	1
	24c*	1	1	1	1	1	1	0	0	1
	25	2	2	2	2	1	1	0	2	1
[26] M&E	26	1	1	1	1	0	0	2	2	3
[27-29] Infrastructure, concessioning and park fee	27	0	2	2	2	1	0	1	0	3
	28	0	2	2	2	0	0	0	3	1
	29	1	2	1	1	1	0	2	1	1
[30] Biodiversity intactness	30	1	2	1	1	1	1	1	1	2
Total METT scores (max 99 points)		**46**	**65**	**50**	**55**	**30**	**21**	**52**	**54**	**60**

Table notes: The questions marked with '*' are 'yes-or-no' questions, where 'Yes' = 1 point and 'No' = 0.

Box 1 – Summary analysis of Management Effectiveness Tracking Tool (METT) for the seven PAs targeted by the project

WITH REFERENCE TO THE METT ANALYSIS MATRIX IN Table 9

- All PAs have a **secure legal status** *(METT Question 1)* and they seem to score well when it comes to demarcation *(METT Question 6),* regulations and law enforcement, with the exception of PAs in Ananindeua (Seringal and Antonio Danubio Parks) where activities are not fully regulated *(METT Question 2).* The latter PA has gaps in aligning management activities with the PA's objective, as well as gaps related to the availability of clearly defined boundaries as established by regulations *(METT Questions 2-4 + 6)*. There were nevertheless some gaps in **PA demarcation** for APA Belém, Combú Island and Pirajubaé. *(METT Question 6).* The boundaries and PA design of FLONA Palmares represent a constraint vis-à-vis its objective, while for Utinga, REVIS Belém and Carijós, this is not an issue. *(METT Questions 5-6).*
- The **PA management planning** process yielded mixed results. Utinga stands out with a management plan being implemented, as reported. In contrast, well established PAs such as APA Belém and Combú Island do not currently have an approved management plan. The process is, though, ongoing but still incipient for Pirajubaé and Palmares. PA management planning has not started for PAs in Ananindeua (Seringal and Antonio Danubio Parks) *(METT Questions 7, incl. 7a through 7c).*
- On the plus side, most PAs assessed have **participation of stakeholders** in their management planning process, with the exception of Carijós and the two PAs in Ananindeua (Seringal and Antonio Danubio Parks) *(METT Question 7a)*. Management planning has not, however, been a regular process across all PAs *(METT Question* 7c), with the exception of FLONA Palmares. In spite of gaps in management planning, PA implementation, including daily and strategic operations *(METT Questions 8-19)*, shows a general picture of a progress being made. There are visible gaps in terms of equipment across most PAs, and of equipment maintenance for most PAs *(METT Question 18-19)* – FLONA Palmares is an exception with respect to equipment, while for the PAs in RM Florianópolis the gaps apply mostly for the maintenance aspect.
- **Public education and awareness** *(METT Question 20)* have visible gaps across all PAs assessed, although the smaller PAs scored slightly better than the rest. The smaller PAs are Seringal, Danúbio and Palmares, noting that the first two areas have a surface of less 5 ha and the latter has an area of less than 200 ha. In light of the results reported in METT Data Sheet 1, the gaps in public education and awareness are particularly worrying for the following two PAs: (1) REVIS Belém, because of its role as a wildlife refuge, aimed at "[…] conserving part of the remaining 31% of Belém RM's primary forests"; and (2) Combú Island, because of its second management objective, which is "[p]romoting sustainable development by planning natural resources and improving the quality of life of the local community".
- The **management of landscapes**, including the management of land and water within these PAs, has positive points for most PAs *(METT Question 21, which includes 'yes or no' Questions 21a, 21b and 21c, and Question 22)*. There are though visible gaps for the following PAs: (1) the two small parks in Ananindeua, Belém RM (Seringal and Antonio Danubio); and (2) the two PAs in Florianópolis RM (because of their surface limitations); and (3) for Utinga State Park and REVIS Belém with respect to *METT Question 21c, concerning Land and water resource planning for ecosystem services and species conservation*. In fact, the zero scoring for Utinga State Park in METT Question 21c can be a reason for concern, since quality of water is an important management indicator in METT Data Sheet 2.
- In terms of considerations vis-à-vis **indigenous/traditional peoples and/or local communities** *(METT Questions 23, 24, including 24a through 24c, and 25)*, the picture is mixed. There seems to be meaningful engagement with local communities in APA Belém, Utinga Park, Combú Island and REVIS Belém. Also, both Seringal and Antonio Danúbio Parks reported that "[t]here are programs to improve the well-being of the community", although sporadic. There are, however, important gaps in FLONA Palmares, Carijós and Pirajubaé. PA managers in Carijós, which is an ecological research station (IUCN category I, and therefore a non-consumption PA), reported that community engagement was achieved through 'Tainhota Sentinela Project', which helped improve the PA's impact on the community. Local fishermen were hired to catch fish for research purposes in MPA Carijós' and they were thereafter invited to the presentation of biomonitoring results *(METT Questions 24, including 24a through 24c).* The same project is also implemented in Pirajubaé, which is a RESEX (an extractive reserve, IUCN category V). Differently from MPA Carijós, Pirajubaé's purpose primes the socio-economic development of local communities. RESEX Pirabubaé's score for METT *Question 23* indicate Local communities directly contribute to some relevant decisions relating to management, but their involvement could be improved. FLONA Palmares, in turn, reported zero concerning **open communication and trust** between local and/or indigenous people, stakeholders and protected area managers. *(METT Questions 24a)*
- The status of **infrastructures** also shows a mixed picture *(METT Questions 26-28)*, and so does the M&E aspect *(METT Question 26)*, including in areas under concessional management, such as APA Belém and Utinga. The issue of **park fee** has shown little progress across all PAs. *(METT Questions 29)*
- In terms of **biodiversity intactness**, as assessed by PA managers, in 7 out of 9 PAs, which completed METTs in connection with this project, conditions of biodiversity were reported to be 'partially degraded' (scoring = 1), while in the remainder 2 PAs (Utinga and Palmares) these conditions were reported as 'mostly intact' (scoring = 2). These results need to be put into perspective. All the areas are 'urban PAs' and located either near or within a metropolitan center. Not only the PAs themselves, but also the land-/seascapes that surround them are impacted by resource use and sometimes encroachment, among other threats that were mentioned in the complete METT questionnaires. The biodiversity harbored by these PAs may be quite threatened by human impact, but it can also be assumed resilient. METT results showed that PA managers are making efforts to monitor threat indicators, sometimes with rather limited means *(METT Data Sheets 2, 3 and 5)*. There is though room for improvement. Issues such as pollution and invasive alien species (IAS) should be "in the radar" of most urban PAs. Utinga e.g., appears to be fighting against an algae invasion in one of its lakes, an issue that will require investments and additional monitoring to be addressed.

- **Total METT scores** for all PAs also have room for general improvements (average METT score = 48.1, i.e. below 50%). Improvements to the scores induced by the project are viable, all according to needs and priorities.

FUTURE EXPECTED TRENDS ON URBANIZATION

In recent years, the urbanization process in Brazil have been subject to significant demographic drivers, in particular a steady drop in two important indicators since the 1960s: (i) annual population growth rate, which has been below 1% since 2008 and reaching 0.752% in 2019; and (ii) total fertility rate, which reached a level just below the substitution rate of 2.1 by 2003, while it was 1.73 births per woman in 2018.[42] From a demographic point of view, this means that the population can be expected to shrink within a generation or so.

Another key driver relates to the slowing down of internal cross-migration trends, in particular the cross-regional migrations and the rural-to-urban migration more generally. We also observe a few signs of urban-to-rural migration and migration from large and mega metropolis to medium-sized and smaller ones. Therefore, urban population is still growing in certain urban areas, but at a slower pace. For both for the small and large cohorts of RMs, this trend became evident from the last column of Table 8 further up.

The expected future trends for Brazil's urban population can be summarized through the content of a figure and a quote. Figure 6 shows (among other trends) that it is mostly the larger cities (capitals) that display population growth and that mid-sized cities in the interior are growing, but at a relatively slow pace. The quote is from a 2019 paper from the Population Association, and it refers to various internal migration patterns in Brazil:

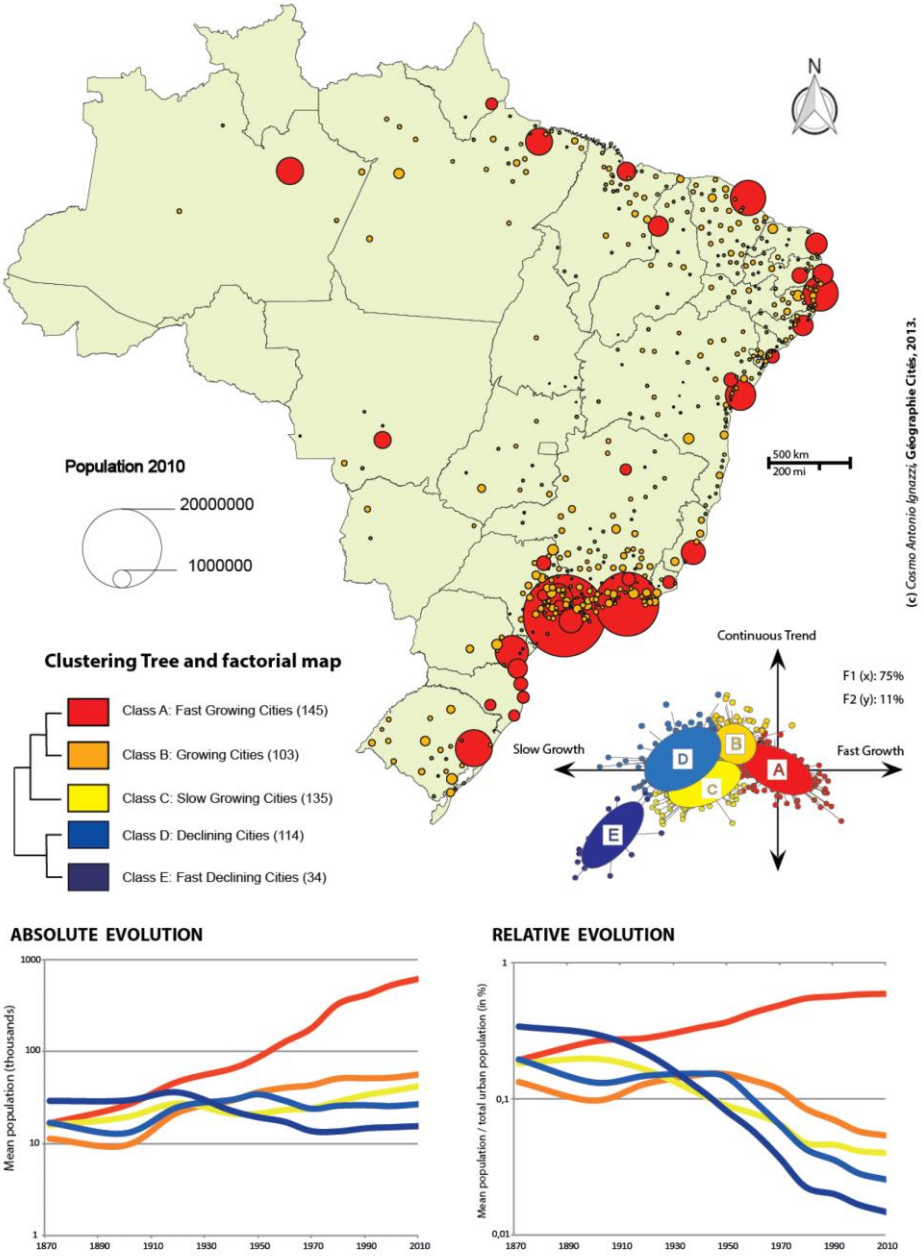
> *"[...] The country has experienced great economic transformations, such as trade liberalization, production integration (due to economic policies and state infrastructure) and the dispersion of industry towards smaller cities, elements that were decisive in the reformulation of the country's migratory pattern.*
>
> *At the same time there was an observed integration of the industrial economy, expanded geographic networks of various types, such as increasing the weight of so-called medium-sized cities and the emergence of a set of small towns, associated with the expansion of the* "new rural"*, thus offering spatial alternatives to the process of demographic deconcentrating and economic activities observed in the last decades."*[43]

A common conclusion from several demographic studies focusing on Brazil point out the presence of industry, jobs and economic growth being an important driver or urban transformation and innovation. In this context, the Greater São Paulo Metropolitan Region continues to be an unparalleled 'magnet' in Brazil. Most importantly for this project, urban growth in Brazil continues to follow the sprawling patterns referred to in the root cause analysis. Considering the comprehensive barrier and baseline analysis, the project will focus on how this can be done differently moving forward.

[42] Source: World Bank Data: Fertility rate, total (births per woman) – Brazil (https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=BR) and Population growth (annual %) – Brazil (https://data.worldbank.org/indicator/SP.POP.GROW?locations=BR), both accessed through WB data on 13 Apr 2012.

[43] Baptista, E. A. et al. (2019) Internal migration flows in Brazil using circular visualization. Population Association (Organization), accessed through http://paa2019.populationassociation.org/uploads/190435, on 13/04/21.

Figure 6 – Population and population growth trajectories: Brazilian cities from 1960 to 2010 (1800 cities covered)



THE COVID-19 PANDEMIC AND URBANIZATION IN BRAZIL

The COVID-19 pandemic is also an important externality upon urbanization in Brazil. In 2020 and 2021 the pandemic took a heavy toll on public health in Brazil and continues to do so, although mass vaccination is advancing. Still, a pre-existing economic recession trend was seriously aggravated. Together, these factors are negatively affecting jobs, income, mortality rates, life expectancy, public and private investment, social vulnerability, gender-bias[44] and several other development indicators. More recently, food insecurity alerts were also being issued by the UN and other bodies. Demographic trends and lifestyle trends are also gradually being shaped by the pandemic in different and interesting way: e.g. the emergence of home office and the fast digitalization of certain services are worth noting. Reduced mobility due to the COVID-19 pandemic in 2020 and 2021 will certainly result in a short-term reduction in urban-based GHG emissions. There were also reports of wildlife sighting in urban areas in the media and from places where wildlife

[44] https://portal.fiocruz.br/en/news/brazil-faces-worst-scenario-beginning-pandemic.

has not been seen for a while. However, those apparently 'positive effects' of the reduced mobility on the environment have already been considered as a temporary effect and not very significant. More broadly, the COVID-19 pandemic served to magnify and make more explicit pre-existing social disparities and urban management inefficiencies. It also accelerated trends that were already being consolidated. The pandemic enhanced the importance of polycentric urban territories and of self-sustaining neighborhoods. It also reinforced calls for availability of infrastructure and incentives for sustainable and clean mobility. Sustainable urban development is more than ever high on the agenda of urban managers throughout Brazilian cities. This only stresses the need for public policies to face the socioeconomic and health crisis. In this project, we assume that the COVID-19 pandemic offers an opportunity for cities to plan a green economic upturn in urban areas. The impact of COVID-19 on the project is further discussed in section 5.1.

2(iii). Baseline actions to address the identified problem

POLICIES, PLANS, REGULATIONS AND LEGISLATION ON SUSTAINABLE URBAN DEVELOPMENT

Brazil is implementing policies, regulations and legislation to address the aforementioned challenges to sustainable urbanization. Table 10 describes key government instruments in this regard. In the context of this project, there are two key documents. One is the Metropolis statute, which mandates by law that metropolitan regions develop integrated urban development plans. As noted in the problem analysis (section1), to date only two of the 74 metropolitan regions have finalized such plans. The other key document is the National Urban Development Policy (PNDU). Currently under development by the Ministry of Regional Development, once complete it serve as the country's guiding policy on integrated planning and sustainable urban development.

Table 10 – Policies plans and regulations and their relevance to the project

Policy framework	Description	Relevance to project
Metropolis Statute (Law No. 13,089 of January 12, 2015)	The Metropolis Statute is a fundamental milestone for the promotion of metropolitan planning in Brazil. It establishes general guidelines for planning, management and execution of public functions of common interest in metropolitan regions and urban agglomerations. It also contains general guidelines on the integrated urban development plan (PDUI) and other instruments of inter-federative governance. Notwithstanding it importance, an amendment created in 2018 removed the possibility of punishment for administrative improbity to governors who do not develop PDUIs in the RMs of their states. Thus, the Statute ended up losing the possibility of enforcement, and weakening the implementation of metropolitan region management.	Sets one of the key national sustainable urban development goals that the project aims to support the achievement of: the development of PDUIs by metropolitan regions.
City Statute (Law No. 10,257/2001).	The City Statute is the main legal framework for Brazilian urban development. It establishes a series of urban planning and management instruments, as well as the mandatory elaboration of Municipal Master Plans for Brazilian municipalities. The City Statute was fundamental for the advancement of urban planning in Brazil. However, since it was created prior to the Metropolis Statute, it ended up boosting disjointed municipal planning among neighboring municipalities, weakening metropolitan articulation. The Metropolis Statute seeks to address this through the development of PDUIs.	Establishes the main legal framework for urban development. The GEF-7 project is an opportunity to advance the implementation of the City Statute guidelines and instruments on the metropolitan scale.
Consortium Law (Law No. 11,107 of April 6, 2005)	Represents another important national landmark to leverage inter-municipal cooperation processes. Being directly influenced by the experience of the Greater ABC Consortium (Sao Paulo), it serves as a legal basis for strengthening the institutional framework for urban policy and consolidating the democratic management of cities in Brazil.	Will serve as basis for governance solutions in Component 1.
National Policy for Regional Development (PNDR) Decree No. 9,810 of May 30, 2019	The PNDR has the purpose of reducing intra- and inter-regional economic and social inequalities through the creation of development opportunities that result in economic growth, income generation and improved quality of life. The PNDR is based on the planned and articulated mobilization of federal, state, district and municipal, public and private action through which joint programs and investments stimulate and support regional development processes. The PNDR holds integrated planning as one of its eight strategies.	Synergies with regional planning and strengthening sustainable production chains (output 2.2).
National Urban Development Policy (PNDU)	Linked to the PNDR, the National Urban Development Policy (PNDU) is currently being developed under the guidance of the Ministry of Regional Development. Aligned with the Agenda 2030, the PNDU will bring the main guidelines for urban development in Brazil and can define important milestones in the trajectory of Brazilian urbanization. The PNDU offers the opportunity to include the metropolitan theme more forcefully in national politics, in line with the Metropolis Statute.	Policy still under development. Will serve as the defining guiding document for sustainable urban development in Brazil. Once published, all project activities will be aligned with it.

Policy framework	Description	Relevance to project
Nationally Determined Contribution (NDC) under the Paris Agreement	In December 2020, the federal government presented its updated NDC to the UNFCCC with the commitment to reduce total net greenhouse gas emissions by 37% by 2025 and 43% by 2030. The NDC also sets out the indicative objective of achieving climate neutrality by 2060.	Project climate mitigation action plans and pilots will be aligned with the NDC.
National Policy on Climate Change - PNMC (Law No. 12,187/2009)	The PNMC establishes sectoral plans for mitigating and adapting to climate change. The aim is to consolidate a low carbon consumption economy, including in the urban public transport sector and in the interstate cargo and passenger transport systems.	Project climate mitigation action plans and pilots will be aligned with it.
National Plan for Adaptation to Climate Change (2015)	Instrument developed by the federal government in collaboration with civil society, the private sector and state governments. It aims to reduce national vulnerability to climate change and to manage the risk associated with this phenomenon. The preparation of the PNA considered 11 sectors (including a cities sector), represented by competent governmental bodies. The implementation of the PNA by subnational governments is a necessity that will largely fall on metropolitan regions.	The PNA presents important guidelines for integrated planning at the metropolitan scale. These will be considered as part of the climate plans developed under component 1.
Sectorial Transport and Urban Mobility Plan for Mitigation and Adaptation to Climate Change (PSTM), Decree No. 7,390 of 2010	The PSTM aims to contribute to the mitigation of GHG emissions in the sector through initiatives that lead to the expansion of more energy efficient modes of cargo transportation and the mobility sector. In the latter, through an increasing in the use of efficient public passenger transport systems. The implementation of urban mobility action will largely depend on integrated planning and integrated projects at the metropolitan scale.	The project integrated plans and pilots will align with the PSTM.
Legal Framework for Basic Sanitation (LAW No. 14,026 of July 15, 2020)	Changes attributions to the forms of management and implementation of basic sanitation in the country. The aim is to increase investments, especially from the private sector, to accelerate the expansion of the provision of basic sanitation in Brazil. It further correlates with urban drainage and reduced vulnerability to extreme events such as floods and droughts.	Project climate plans will align with this framework.
National Biodiversity Policy (PNB) (Decree No. 4,339 of August 22, 2002)	The PNB includes topics such as the level of adequacy of Brazilian legislation to the CBD, the synthesis of the state of the art of knowledge on Brazilian biodiversity, the comparative analysis of national biodiversity strategies from 46 countries and the synthesis of records on traditional knowledge associated with biodiversity (MMA). Its principles are based on both the CBD and the Rio Declaration, both from 1992.	Biodiversity is a focal area addressed through this GEF project.
National Biodiversity Strategy and Action Plan (EPANB)	Within the scope of the biodiversity agenda, especially in relation to the country's obligations under the Convention on Biological Diversity (CBD) and the Aichi Goals, the federal government instituted the Brazil's National Biodiversity Strategy and Action Plan (EPANB) for the 2016-2020 period. The EPANB is an umbrella policy framework for biodiversity management that takes place at different levels and scales. It is also a tool for the strategic management of the Brazilian government and for institutional articulation to promote the conservation and sustainable use of biodiversity in the national territory while maintaining the alignment of these guidelines with the strategies of other CBD co-signatory countries.	Same as above.
National Environmental Policy Law (Law No. 6,938 of August 31, 1981)	The National Environmental Policy aims to preserve, improve and recover environmental quality conducive to life. It seeks to ensure conditions for socioeconomic development, national security interests and the protection of human dignity, and was published prior to the 1988 Constitution.	This law is one of the basic regulatory frameworks for all activities related to protected areas and environmental planning under the project.
Native Vegetation Protection Law (2012) - Forest Code (Law No. 12,651 of May 25, 2012)	Law No. 12.651 of May 25, 2012, also known as the new "Forest Code". Establishes general rules on the protection of native vegetation, including Permanent Preservation Areas (PPAs), Legal Reserves (LRs) and Restricted Use Areas (RUAs); forest exploitation; the supply of forest raw material; the control of the origin of forest products; the control and prevention of forest fires and the provision of economic and financial instruments to achieve its objectives. One of the innovations of the Law is the creation of the Rural Environmental Cadaster (CAR) and the Environmental Regularization Program (PRA). The CAR enables maintaining a database with the location of each rural property and its environmental suitability. The PRA, in turn, allows states to guide and accompany rural producers in the preparation and implementation of the necessary actions for the restoration of areas with environmental liabilities on their properties or rural possessions, whether in PPAs, LRs or RUAs.	This law contributes to the management of protected areas and establishes parameters for the implementation of land use management and payment for ecosystem services programs.
National System of Nature Conservation	Set of official guidelines and procedures that enable the federal, state and municipal government and the private sector to create, implement and manage protected areas	SNUC contributes for land use management and

Policy framework	Description	Relevance to project
Units Law (2000) (Law No. 9,985 of July 18, 2000)	(i.e. PAs, or "Conservation Units", as they are called in SNUC's law). This environmental preservation system consists of 12 categories of conservation units, whose specific objectives differ in terms of the form of protection and allowed uses in 2 types: Integral Protection Units, or units that need greater care due to their fragility and particularities; and Sustainable Use Units, those that can be sustainably used and preserved at the same time. The SNUC was designed to enhance the role of PAs so that they are planned and managed in an integrated manner with the others, ensuring that significant and ecologically viable samples from different populations, habitats and ecosystems are adequately represented throughout the national territory. Another concern of SNUC was to allow decision makers that PAs, in addition to preserving ecosystems and biodiversity, generate income, employment, sustainable development and effectively improve the quality of life of local populations and the country as a whole.	the creation of the mosaic of protected areas – including urban green areas - proposed in the scope of work of this project.
National Policy for Sustainable Development of Traditional Peoples and Communities (2007)	The PNPCT's main objective is to promote the sustainable development of Traditional Peoples and Communities, focusing on the recognition, strengthening and guarantee of their territorial, social, environmental, economic and cultural rights, with respect and appreciation for their identity, their forms of organization and their institutions. The National Commission for the Sustainable Development of Traditional Peoples and Communities - CNPCT, created by the Decree of July 13, 2006, is responsible for coordinating its implementation.	This policy brings inputs for the planning activities that contemplate traditional peoples and communities.
National Water Resources Policy (1997)	Established by law No. 9,433 of January 8, 1997, which became known as the Water Law, the National Water Resources Policy (PNRH) established instruments for the management of water resources in the federal domain (resources crossing or bordering states) and created the National Water Resources Management System (SINGREH). Known both for its decentralizing character (for creating a national system that integrates the Union and states) and for its participatory character (for innovating with the installation of river basin committees that unites public authorities in the three levels, users and civil society in the management of water resources), the PNRH created conditions to identify conflicts over the use of water, through water resources plans for river basins, and to arbitrate conflicts in the administrative sphere.	Synergies with planning and biodiversity outputs.
National Policy for Payment for Environmental Services (Law No. 14,119 of January 13, 2021)	The recently instituted Law defines concepts, objectives, guidelines, actions and criteria for implementing the National Policy for Payment for Environmental Services (PNPSA), institutes the National Register of Payment for Environmental Services (CNPSA) and the Federal Payment for Services Program (PFPSA).	Synergies with output 3.3 and all activities related to PES.

THE URBAN PLANNING PROCESS

Based on the aforementioned legislation, the urban planning process for municipalities and metropolitan regions may be summarized as follows.

Figure 7 – The Brazilian urban planning process[45]

Master plan

All Brazilian cities with more than 20,000 inhabitants are required to have a municipal Master Plan, which must be reviewed every 10 years. This is established in the Federal Constitution (Articles 182 and 183 - Urban Policy) and the City Statute (Law 10.257, of 2001). Often, this is called the Master Plan for Territorial Planning (PDOT, as per the acronym in Portuguese). The master plan is an instrument of municipal urban planning, which aims to organize the development of the city from an urban, economic and social point of view. It serves to regulate the occupation of urban spaces for the benefit of the collective good, establishing strategies to guarantee the quality of life of the population, making the social function of urban property (public and private) viable. All other sectorial plans developed by the municipalities must necessarily be compatible with their respective Master Plan.[46] The municipality's multi-annual plan, budget guidelines and annual budget must align with and incorporate guidelines and priorities contained with the master plan.

Sectoral urban plans

In addition to the master plan, cities are required by law to prepare sectoral plans in the areas of urban mobility, social interest housing,[47] basic sanitation plan, and solid waste. This must prepare such plans if they want to access federal resources for investments in such sectors. These sectoral plans must be aligned with the master plan, are aligned with the City Statute and are instruments for enacting national policies at the municipal level in different sectors. Municipalities have to update these at a minimum every 10 years.

Integrated urban development plans

When the municipality is part of a metropolitan region or urban agglomeration, the master plan is not sufficient to guarantee effective urban planning as there is a need to facilitate integrated planning, including interjurisdictional coordination. In this instance, municipalities of such regions are required to jointly prepare integrated urban development plans (PDUIs). The PDUI is an instrument established by the Metropolis Statute to outline urban development guidelines for Brazilian metropolitan regions and urban agglomerations. It establishes the bases for joint action between states and municipalities in these territories. By proposing an inter-federative governance, it establishes the shared management of public functions of common interest with the aim of making urban services more efficient and capable of serving more people. The Metropolis Statute notes that PDUIs should include:

[45] https://wribrasil.org.br/pt/blog/2018/09/engrenagem-urbana-brasileira.
[46] https://wribrasil.org.br/pt/blog/2018/09/engrenagem-urbana-brasileira.
[47] Not required by law, but cities that don't prepare this plan cannot access funds under the National Social Interest Housing Fund.

- Guidelines for public functions of common interest (FPICs), including strategic projects and priority actions for investments;
- The macrozoning of the urban territory;
- Guidelines on municipal coordination for the subdivision, use and inhabiting of urban land;
- Guidelines for the coordination of intersectoral public policies related to the urban territory;
- Delimitation of areas with restrictions on urbanization aiming at the protection of environmental or cultural heritage, as well as areas subject to special control by the risk of natural disasters, if any;
- An integrated system for resource allocation and accounting;
- Minimum guidelines for implementing effective public policies for urban land regularization.

The elaboration of an integrated development plan does not exempt municipalities from preparing their respective master plans. In addition, local master plans must necessarily be made compatible with the integrated development plan. The Metropolis Statute, which came into force in 2015, established a three-year deadline for each RM to prepare their PDUI. This deadline was then changed to 2021. A provisional measure published in 2018 postponed delivery deadlines and removed possible sanctions for administrative improbity of governors who did not take the appropriate measures to institute the plans.[48]

The development of PDUIs is time consuming and costly. To date five RMs (of the more than 80 RMs and urban agglomerations in Brazil) have developed or are developing these:

- São Paulo RM: prepared and approved by the metropolitan board. Not yet approved by state law. Estimated cost of USD $2,225,270 to develop it (2016);
- Rio de Janeiro RM: elaborated. Not yet approved by state law;
- Vitória RM: prepared and approved by state law;
- Belo Horizonte RM: elaborated and approved by the state council;
- Vale do Rio Cuiabá RM: prepared and approved by state law.

Other plans and alignment with other state and federal plans

Municipal plans must be aligned with the PDUIs, when they exist, according to the Metropolis Statute. There is no obligation for municipal master plans or PDUIs to be aligned with other state or federal plans (other than those noted above). There is no obligation for municipalities or metropolitan regions to develop local climate action plans. While many municipalities have developed such plans, for example, Curitiba, Salvador, Sao Paulo, Recife and Rio de Janeiro, only one metropolitan region has developed a climate action plan: the ABC Region of Sao Paulo.[49]

KEY INSTITUTIONS

Key actors promoting sustainable urban development in Brazil are:

- The **Ministry of Regional Development (MDR)** is the lead ministry for urban development. As the ministry also responsible for regional development, it coordinates a coherent vision on both urban and regional development which meets often at the nexus of the metropolitan region. Its competencies include elaborating and coordinating the urban development policy and sectorial policies on housing, environmental sanitation and urban mobility. Additionally, it defines the allocation of federal resources for these sectors. It is responsible for the national urban development program "*Pró-cidades"* which aims to support municipalities and states with undertaking integrated planning and development (see baseline finance section for more information). Its National Secretariat for Mobility and Regional and Urban Development (SNRDU) is responsible for promoting regional and urban development and supporting municipalities. It leads the coordination, revision, implementation and monitoring and evaluation of the National Urban Development Policy (PNDU), the National Policy of Spatial Planning (PNOT), the National Policy of Irrigation, and the National Policy on Urban Mobility.[50] As part of its work on the PNDU, it is leading the development of the Sustainable Urban Development Network (ReDUS), the ANDUS project (which is supporting the development of ReDUS, see the baseline project section) and fiscal incentives on public lighting.[51] It is currently leading the execution of a capacity-building programme on integrated urban planning processes that will be aligned with the PNDU. This is being executed with the support of the Federal Rural University of the Semi-Arid (UFERSA)[52] and the Sustainable Urban Development Network (ReDUS). MDR is also executing the National Programme for the Capacity-

[48] https://wribrasil.org.br/pt/blog/2018/09/engrenagem-urbana-brasileira.
[49] https://consorcioabc.sp.gov.br/imagens/noticia/Plano%20de%20Acao%20de%20Enfrentamento%20as%20Mudancas%20Climaticas%20do%20Grande%20ABC.pdf.
[50] https://www.gov.br/mdr/pt-br/composicao/secretarias-nacionais/secretaria-nacional-de-desenvolvimento-regional-e-urbano/competencias-smdru.
[51] https://www.gov.br/mdr/pt-br/assuntos/desenvolvimento-urbano.
[52] For example, see: https://assecom.ufersa.edu.br/2021/03/25/mdr-lanca-curso-ead-de-regularizacao-fundiaria-urbana-em-parceria-com-a-ufersa/.

Building of Cities (Capacidades), which has a series of online and presential courses and activities aimed at building the capacity of cities to execute their functions. MDR is also responsible for social-housing programmes through-out the country.

- The **Ministry of Science, Technology and Innovations (MCTI)** is the lead ministry for the development, planning and coordination of national policies and activities related to science, technology and innovation. Its vision is to facilitate national sustainable development through these three means. It is the lead ministry for the preparation of national GHG inventories and national communications for the UNFCCC, as well as developing evidence and science-based policies, technologies and solutions for promoting sustainable development. It is the lead ministry responsible for implementing the GEF-6 project (CITinova) on sustainable cities and all climate mitigation GEF projects. Through MCT Ordinance No. 292/2010, this Ministry also created the Thematic Program for Technologies for Sustainable Cities (TCS) in response to growing demand by cities for solutions to address urban challenges. It also facilitates the creation and consolidation of national sustainable city research and technological cooperation networks, involving national and international institutions as well as multilateral organizations. The ministry also created the Brazilian Global Climate Change Research Network (Rede Clima), as a research group dedicated to advanced research on climate change, including for the formulation of related public policy.

- **Joint MDR and MCTI collaboration on cities**. The two ministries collaborate on a series of initiatives to promote the development of sustainable cities. Through the *Carta Brasilieira para Cidades Inteligentes* (Brazilian letter on Smart Cities), developed with the support of GIZ, the two ministries established a technical cooperation agreement with the objective of elaborating a national strategy for the development of smart and sustainable cities. As part of that work, they coordinate the *Câmara das Cidades Inteligentes 4.0* (or Smart Cities Chamber 4.0). Launched in January 2020, the chamber is a technical coordination group which brings together stakeholders from the public and private sectors, academia, international organizations and civil society with the aim of debating public policy options and promoting the development of sustainable smart cities through-out Brazil.

- The **Ministry of Environment (MMA)** was created in 1992 with a mandate to implement national environmental public policies for sustainable development in an articulated and agreed manner with public actors and society. Biodiversity is one of the Ministry of Environment's areas of action; it focuses, therein, on the management of fauna and flora and the national genetic heritage. On what concerns cities and the urban agenda, it is important to note that the mandate to implement urban environmental policies resides with municipal and state environment secretaries. Setting national-level urban environmental policies remains, nonetheless, a priority area of action for the Ministry of Environment as demonstrated by its Urban Environmental Agenda. The Agenda is underpinned by the six priority actions aimed at improving the quality of life in urban centers: marine litter, solid waste management, urban green areas, management of polluted sites, air quality, and water quality and sanitation. The Greener Cities Programme was launched in 2020 under the Urban Environmental Agenda. The Programme's overarching objective is to improve the quality of life in cities by, among others, promoting urban green areas. It further creates an Urban Environmental Registry, which is intended to map and disseminate information about urban green areas across the country. This project's proposed focus on strengthening urban and unprotected green areas across metropolitan landscapes comes from the Ministry of Environment.

- Other ministries with policies which directly or indirectly impacts sustainable urban development include the **Ministry of Economy**, which is responsible for federal transfers to the states and municipalities. Major programmes that support the development of municipalities and states are administered through the Ministry of Regional Development (see above), with funds allocated by the Ministry of Economy. The **Ministry of Infrastructure**, which is responsible for infrastructure development through the country, primarily with regards to critical infrastructure connectivity between states and municipalities, rather than within their jurisdictions (especially for municipalities, which have constitutional responsibility for infrastructure within their territory). In addition, the **Ministry of Mines and Energy** is responsible for the provision of electricity through-out the country, including for Brazilian cities.

- **State and municipal governments** play an important role in the governance of the over 80 metropolitan regions and 5,000 Brazilian municipalities. Their aim, in the context of urbanization, is to facilitate local urban development, strengthen urban management and promote effective dialogue and coordination with the Federal Government and the National Congress. The three main entities (and non-governmental organizations) which represent municipalities are the:

    - The **Brazilian Association of Municipalities** (ABM), founded in 1946. The ABM aims to promote administrative and economic decentralization in accordance with the Constitution, in order to provide municipalities with financial, technical and administrative resources; and promote the improvement of the municipal administration.

    - The **National Confederation of Municipalities** (CNM) was founded in 1980 and is today one of the largest municipal entities in the world. CNM's objective is to consolidate the municipal movement and strengthen the autonomy of municipalities, based on political and technical initiatives aimed at excellence in management and the quality of life of the population.

- The **National Front of Mayors** (FNP) was created in 1989, at the initiative of a group of mayors of capitals, coordinated by the then mayor of São Paulo, Luiza Erundina. It is the only one of the 3 entities that is run exclusively by acting mayors. Despite being open to other cities, its priority is mayors of capitals and large cities. It aims to ensure the constitutional principle of municipal autonomy, aiming to guarantee the full and essential participation of the municipalities in the federative pact.

- **Non-governmental actors.** Other key actors, who are described in section 2 (stakeholders), include universities and research institutes, private companies, financial institutions (see also the following section), civil society organizations and agencies responsible for protected areas management, including federal, sub-national and local-level entities. Three key actors in this space in Brazil are the World Research Institute (WRI) Brazil, which has permanent offices in Brazil on, *inter alia*, sustainable urban development, sustainable transport and climate change, the Local Governments for Sustainability (ICLEI), which has its regional Latin American and Caribbean office located in Sao Paulo and has supported Brazilian cities with the development of local climate action plans, and C40, which works with the Brazilian cities of Curitiba, Rio de Janeiro, Salvador and Sao Paulo.

FINANCING URBAN DEVELOPMENT

In accordance with the 1988 Constitution, Brazilian municipalities and state governments draw on different funding sources and financing mechanisms for developing and managing their urban jurisdictions. Generally municipalities finance their operations through the national public sector, with minor contributions coming from the international public sector and the national and international private sector. In addition to this classification, resources can be categorized based on the way they are channeled to the municipalities. The four main channels are Table 11:

(i) Grants, transfers and donations, which are third party funds provided without requirement of payback by municipal governments;
(ii) Instruments that generate revenue, such as local municipal taxes, fees and royalties;
(iii) Credit mechanisms, which primarily consist of loans from public finance institutions; and,
(iv) Partnership mechanisms, which include shared management models between city halls and private entities.

Table 11 – Overview of the funding sources available to municipal governments

Source	Type	Description
National Public Sector		
Municipality	Revenue-generating instrument	Municipal tributes (taxes, fees, royalties and contributions), and other municipal-raised sources (urban instruments) based on assets and land (e.g. mining, nature, historical heritage, tourism, etc.)
State and Federal government	Governmental transfers	Funds directly transferred to city halls through the General Budget of the Union (OGU) and the General State Budget.
Public financial and development institutions	Credit mechanism	Resources obtained by city halls through loans obtained, for example, from BNDES, Caixa Econômica Federal, BRDE, FINEP, among others. It is worth noting that Caixa is the fourth largest banking institution in Latin America.
International Public Sector		
International development finance institutions	Credit mechanism	Resources obtained by city halls through loans obtained, for example, from the World Bank, IDB, GCF, the Development Bank of Latin America (CAF), among others.
International development finance institutions	Grant, transfer or donation	Resources from international development finance institutions and international public funds, such as the Global Environment Facility (GEF).
Private Sector		
Private sector entities	Partnership mechanism	Partnership mechanisms carried out by city halls, such as Public-Private Partnerships (PPP) and public infrastructure service concessions.
Private sector entities	Revenue-generating instrument	Privatizations: obtaining funds through the sale of local public assets.
Private sector entities	Credit mechanism	Loans by national and international commercial banks.
Private sector entities	Grants, transfers and donations	Transfer of funds from private entities, without municipal payback.

The following sections discuss the first three channels, as those of greatest contribution to local municipal coffers, and the overall fiscal situation of Brazilian municipalities. It also discusses opportunities for financing the sustainable urban development of municipalities and metropolitan regions.

Governmental transfers

The transfer of federal funds to municipalities is carried out through three different ways:

a) Constitutional transfers: Distribution of income and goods taxes to states and municipalities for supporting them to execute their function as defined in the constitution (see section 2(i)) and to promote socio-economic equality between municipalities. Quotas are calculated by the Federal Court of Auditors based on indicators such as population size and GDP.

b) Voluntary transfers: The delivery of capital resources from the federal government to a municipality in accordance with the Law of Fiscal Responsibility for reasons of economic cooperation, aid or emergency financial assistance.

c) Legal transfers; Federal transfers as regulated in specific laws. These laws determine the form of qualification, transfer, application of resources and accountability.

For many of the more 5000 municipalities, federal transfers constitute the primary source of income for municipalities. It is estimated that more than 60% of municipalities depend on these transfers for their operations. In 2019, the National Confederate of Municipalities (CNM) estimated that for 70% of Brazilian municipalities, these transfers constitute 80% of their expenditure income source.[53] The challenge that municipalities face is that it is generally accepted that federal transfers are less than that required for municipalities to fulfil their constitutional duties.[54]

Local revenue

Complementing national transfers is local revenue. Municipalities collect local revenue primarily through the following taxes: the ISS (Tax on Services), the IPTU (Property and Urban Territorial Tax), the ITBI (Tax on Transmission of Real Estate) and other fees related to, *inter alia*, garbage, water and sanitation. They may also have revenue from other innovative urban instruments and royalties due to mineral exploration. For most cities, this local income together with the federal transfers makes up the total municipal income. On a national scale, local revenue is estimated to make up just 24% of municipal income.[55] For most cities, local revenue does not serve to balance municipal books: many are dependent on federal transfers for survival.

Debt mechanisms

While federal transfers and local income revenue are crucial for municipalities, such funds are primarily used to cover annual municipal operations, including the provision of municipal services and staff salaries. Often, little is left over to facilitate and promote (sustainable) urban development. In this situation, many seek to expand their coffers through the acquisition of debt. However, there are restrictions to how much debt municipalities can take. The Law of Fiscal Responsibility (nº 101/2000) dictates that municipalities can acquire a maximum consolidated net debt of 120% of their income (which, as noted above, is primarily due to federal transfers and local revenue). Furthermore, states and municipalities in Brazil have limited options for obtaining debt. By law they are not permitted to emit municipal bonds,[56] and thus have three options: debt through the Federal government, debt with a federal government guarantee, and debt without a federal government guarantee (not permitted for external loans). As a consequence, credit operations represent just 0.9% of municipal funding on a whole.[57]

Fiscal situation of municipalities and metropolitan regions

As of 2019 it was estimated that 74% of Brazilian municipalities were in difficult or critical fiscal situations.[58] The fiscal situation of Brazilian municipalities is caused by a number of factors, in particular structural factors related to the tax structure defined by the Federative Pact (with municipalities receiving less tax revenue than is proportionate to their constitutional responsibilities); cyclical factors that reduce tax revenue, such as the low economic growth of the last few years; and management factors related to the quality and effectiveness of public spending at the local level. That is: federal transfers are limited and reduce in periods of economic crisis, local revenue in periods of economic crisis falls, and staff and operation costs and debt servicing repayments stay steady (or increase), causing a general decline in the local balance of payments, compounded over time. In particular, local fiscal management plays and important role in the success of municipal coffers. For example, staff costs are limited to 60% of municipal income by the Law of Fiscal Responsibility, but many municipalities exceed this. During times of low revenue collection, these costs may take on disproportionate weight on the local budget, resulting in a compounding of staff payments (and their pensions) over multiple years. In this context, municipalities have little fiscal space to make investments to promote and achieve sustainable urban development.

At the metropolitan level the situation is no different. The Metropolis Statute dictates that metropolitan regions should develop an integrated system for resource allocation and accounting. This would be developed through the pooling of metropolitan municipalities to finance investment of common interest. However, with most municipalities having fiscal difficulties, they have little interest in

[53] http://temas.folha.uol.com.br/remf/ranking-de-eficiencia-dos-municipios-folha/70-dos-municipios-dependem-em-mais-de-80-de-verbas-externas.shtml. Another study led to similar conclusions: https://www.clp.org.br/o-que-sao-e-para-que-servem-as-transferencias-de-recursos-para-os-municipios-ead2/.
[54] https://www.clp.org.br/o-que-sao-e-para-que-servem-as-transferencias-de-recursos-para-os-municipios-ead2/.
[55] https://multimidia.fnp.org.br/biblioteca/publicacoes/item/760-anuario-multi-cidades-ano-15-2020, page 20.
[56] https://garantias.tesouro.gov.br/dividas/.
[57] https://multimidia.fnp.org.br/biblioteca/publicacoes/item/760-anuario-multi-cidades-ano-15-2020, page 20.
[58] FIRJAN (Federação das Indústrias do Estado do Rio de Janeiro). 2019. Índice Firjan de Gestão Fiscal 2019. Rio de Janeiro: FIRJAN. Available at: https://www.firjan.com.br/ifgf/.

giving up (or committing to giving up) a portion of their local income. As a consequence, there has been little advancements in the developments of such systems, and such are operational in few RMs in the country.[59] Also, contributions are generally voluntary and within a rather loose collaborative framework.[60] Hence the mechanisms for sustainable finance at the metropolitan scale remain fragile and insufficient, especially in light of the need to fund large-scale projects and actions within the metropolitan urban space.

National and sub-national public banks as financiers of sustainable urban development

In the wake of the existing fiscal situation of Brazilian municipalities and states, national and sub-national banks and funds play a key role in supporting municipalities and metropolitan regions in undertaking sustainable urban development. These are the primary sources for such, providing municipalities and states with access to subsidized credit lines with special financing conditions. As national entities, they provide loans in local currency and in with conditions that are more catered to local economic and social conditions. These funds are made available through:

a) National development finance institutions, particularly through the Brazilian Development Bank BNDES, and to a lesser extent Caixa Econômica Federal;

b) Regional development financial institutions, such as Far South Regional Development Bank (BRDE);[61] and

c) Public institutions with financial support activities, such as Funding Authority for Studies and Projects (FINEP).

In general, these resources are available through sectoral credit lines, focused on, *inter alia*, urban mobility, sanitation and energy efficiency (see Table 12). There is no specific mechanism dedicated to funding sustainable urban development in Brazil, neither at the national level, nor at the level of metropolitan or municipal levels.

Table 12 – Main national programs and financing lines for sustainable urban development[62]

Institution	Program	Funding lines for cities	Description	Relevance for the project
Brazilian Development Bank (BNDES)	Biggest non-Asian development bank in the developing world and the seventh biggest development bank in the world.[63]			Will be a key project partner for promoting the scaling up and replication of sustainable urban investments through-out Brazil. With project support through output 3.1 it will create new and strengthen financial instruments with this aim. Will participate in the project's Committee for Supporting Access to Financing for Sustainable Urban Development (CODUS) (see output 3.1) and the Advisory Group of Specialists (AGS) (see institutional arrangements). Will contribute significant co-financing related to the aforementioned credit lines.
	FINEM (Enterprise Financing)	energy efficiency, urban mobility, electric buses, environment, municipal fiduciary management, integrated development of municipalities	Financing lines for investment projects with evaluation criteria that prioritize social benefits. The more the project is associated with the BNDES support priorities, the better the financial condition offered.	
	Avançar Cidades (Advancing Cities)	Sanitation	Investments foreseen in the Normative Instructions No. 29 of 07.11.2017 and No. 07 of 04.02.2018 of the Ministry of Regional Development, for the implantation, expansion and/or modernization of basic sanitation infrastructure.	
	Fundo Clima (Climate Fund)	urban mobility, sustainable cities and climate change, renewable energies, solid waste, native forests, carbon management and services, innovative projects	Invests the portion of repayable resources from the National Fund on Climate Change (Climate Fund). The Climate Fund is one of the instruments of the National Policy on Climate Change and constitutes an accounting fund linked to the Ministry of the Environment.	
Funding Authority for Studies and Projects (FINEP)[64]	Tecnologias 4.0 (Technologies 4.0)	Smart Cities (Urban Logistics 4.0 and Environmental Sanitation 4.0)	An institution of the Ministry of Science, Technology and Innovations, it is one of the biggest national funds in Brazil, and has a focus on promoting investment in science, technology and investment.	Will be a key project partner for promoting the scaling up and replication of sustainable urban investments through-out Brazil. With project support through output 3.1 it will create new and

[59] See Brasil metropolitano em foco: desafios à implementação do Estatuto da Metrópole / organizadores: Bárbara Oliveira Marguti, Marco Aurélio Costa, César Buno Favarão. – Brasília: Ipea, 2018.
[60] *Ibid.*
[61] Far South Regional Development Bank that operates in the states of Paraná, Rio Grande do Sul and Santa Catarina.
[62] Source: Prepared the PPG team.
[63] https://www.swfinstitute.org/fund-rankings/development-bank.
[64] See: http://download.finep.gov.br/matriz_programas.html

Institution	Program	Funding lines for cities	Description	Relevance for the project
			Aims to provide economic grant resources for the development of new or significantly improved products or processes, including their prototyping and demonstration in an operational environment, to improve urban infrastructure. Has national credit lines primarily available to macro, small and medium-sized enterprises for promoting sustainable urban development including as related to smart cities, sanitation and urban innovation.	strengthen financial instruments with this aim. Will participate in the project's CODUS and the AGS. Will contribute significant co-financing related to the aforementioned credit lines.
Caixa Econômica Federal	Pró-Cidades and Pró-Transporte (together with MDR), infrastructure, sanitation and mobility	Lighting, FINISA (Financing for Infrastructure and Sanitation), Pro-Housing, Pro-Transport, Sanitation for All.	The fourth biggest bank in Latin America, it is the operating entity of the multi-billion Brazilian real Pró-Cidades and Pró-Transporte programs (see baseline projects below). Through these programs, and other investment lines, it provides operates federal funds through credit lines to municipalities and states for urban investments.	Lessons learned in implementing Pró-Cidades and Pró-Transporte will be key to supporting the strengthening of financial mechanisms under 3.1. Will be invited to participate in the project's CODUS and the AGS. As part of its participation in CODUS, may also be supported to create and strengthen financial instruments for promoting sustainable urban development.
Far South Regional Development Bank (BRDE)	Municipalities	Urban mobility, sanitation, urban resilience, smart cities and sustainable projects, public management improvements	Financing lines for investment projects connected to specific topics mentioned in the previous column. The financing lines includes funds from the *Avançar Cidades Program* for sanitation.	Will be a key project partner for promoting the scaling up and replication of sustainable urban investments through-out Brazil. With project support through output 3.1 it may create new and strengthen financial instruments with this aim. May participate in the project's CODUS and the AGS.
Development Bank of Minas Gerais (BDMG)	Financing for municipalities	Urban infrastructure works, machinery acquisition, renewable energy projects, public buildings retrofit, sanitation and support to SDG related urban projects	Financing line for urban investment projects	Will be a key project partner for promoting the scaling up and replication of sustainable urban investments through-out Brazil. With project support through output 3.1 it may create new and strengthen financial instruments with this aim. May participate in the project's CODUS and the AGS.

While these financial institutions play a key role in national economic and sustainable development, Brazilian municipalities face two key challenges in accessing such funds:

First, the financing mechanisms and instruments available for channeling resources to Brazilian local governments tend not to systematically cover, in their conception and operation, the real needs on the ground. Among others, the funding institutions usually demand compliance with a long approval process, which overlaps political cycles, discouraging the search for financing. Another challenge faced by the cities is related to the capacity and dedication of technically qualified local public servants to carry out matchmaking actions between the ambitions of the projects, the initiatives of the cities and the rules and priorities of the funders. Furthermore, information about the available financing options is not provided to municipalities in a clear and uniform manner, as well as information about the criteria required by funders, reducing the ability of local governments to access the funds.

Second, to raise funds, local governments need to develop quality programs and projects, that is, economically viable initiatives. These initiatives must be attractive to investors and effective in providing environmental, economic and social benefits. However, many

Brazilian subnational governments are unable to prepare "bankable" initiatives on a continuous basis.[65] This is mainly due to reduced technical capacity in relation to planning and overall preparation of urban projects. Another contributing factor is the absence of innovative sustainable project examples, which demonstrate the viability of innovative solutions and also that of effective inter-jurisdictional and intersectoral coordination. Deficiencies related to preparation of local projects lead to inadequate use of budgetary resources, inaccurate accounting forecasts for investments in the area, and lack of effective signals to economic agents about the needs and intentions of investment.

The private sector as financiers of sustainable urban development

In this scenario of resource scarcity, alternatives such as credit operations and private sector participation become an alternative. Given the macroeconomic, institutional and regulatory complexities of private sector participation in public investments, the financing of urban development tends to focus on credit operations, as detailed below:

Private sector participation in sustainable urban investments in Brazil

Private sector participation in investments in the country has been historically hampered due, among other macroeconomic issues, to the country's poor quality of regulatory environment and political stability for investments that influence its perception of risk (IPEA, 2020). This perception of risk is enhanced in projects involving sustainability aspects, which are characterized as innovative, containing aspects that are often not yet incorporated into sectoral regulations. In addition, such projects do not have access to a risk-return history. Despite this difficulty, collaboration with the private sector, either through public-private partnerships (PPPs) or concessions, is one of the alternatives to enable new urban infrastructure or improvements to promote sustainable urban development. This solution has been tried by local governments with greater institutional capacity in the last years. According to a report by The Economist Intelligence Unit, the majority of PPPs in Brazil between 2006 and 2014 were concentrated at the subnational level, and municipalities accounted for 39% of total contracts. However, this movement is still timid given the legal complexities and political instability that permeate the contract structure between the public and private sectors, especially when it involves infrastructure investments that encompass metropolitan areas (and thus multiple municipalities. This challenge is accentuated for those that don't have a metropolitan governing body).

The role of private banks and the Brazilian development system for sustainable urban investments

By the same logic of the private sector, private banks in Brazil predominantly do not act in the financing of long-term investments, such as those interventions that required for sustainable urban development. The promotion of development has been a typical function of public banks included in the so-called national development financing system (national and regional development financial institutions), as well as external sources of international development financial institutions (IPEA, 2011). In recent years, with national public banks experiencing a reduction in resources, especially BNDES, they have been shifting their role to that of risk reducer, promoting actions that crowd-in private investments trough PPPs and concessions.

The financing of urban development in Brazil, therefore, still focuses especially on development banks. In addition to BNDES and CAIXA, the largest national banks, the regional development banks (local banks), such as the Far South Regional Development Bank (BRDE) and the Development Bank of Minas Gerais (BDMG), play a relevant role in financing urban investments. These institutions have less restrictive financing conditions and the possibility to work at the municipal level. In the future, such institutions have the potential to play an important role in supporting small and medium-sized municipalities. For example, in 2018, 42.2% of the total investments[66] of capital cities used credit operations, while this percentage in cities with up to 20,000 inhabitants was of 2,9%. However, this amount in cities of the same size in the states of Minas Gerais, Santa Catarina, Paraná and Rio Grande do Sul that have regional development financial institutions[67] was on average 6%. However, despite working closely with cities, such institutions still timidly incorporate in their operations actions that address mitigation and resilience to climate change (WRI Brasil, GIZ and MME, 2021).

While development banks still play the key role in faciliting sustainable urban development, this may change in the future, drawing upon experiences in other countries. As such banks move to promote more PPPs and as municipalities seek new and innovative sources of financing for such development, private banks may begin to take on a more direct role in supporting Brazilian cities with such aspirations. For instance, the Brazilian Federation of Banks (FEBRABAN), the principal entity of the Brazilian banking sector, has developed a sustainability policy and with regards to sustainability aims to:

[65] WRI Brazil: Desafios e recomendações para destravar o financiamento urbano sustentável (2020).

[66] Excluding São Paulo in order to avoid distortions in the analysis.

[67] BDMG works in Minas Gerais, while BRDE covers the states of Santa Catarina, Paraná and Rio Grande do Sul.

- Continuously improve the management of social, environmental and climate risks by the banking sector;
- Channel resources for green and inclusive businesses;
- Include environmental, social and governance issues in banks' business strategies;
- Disseminate the agenda with stakeholders.

As part of this work, FEBRABAN together with SITAWI developed a green taxonomy which identifies, for each nationally classified economic activity, the exposure to climate change, exposure to environmental risk and whether such an activity promotes the development of a green economy. While FEBRABAN is yet to focus directly on sustainable urband development, it is taking steps to prepare private local banks for participating in such investments and encouraging them to do so.

Finance and technical assistance through international and non-governmental organizations

In addition to national public finance, municipalities and states may take on loans through international organizations. But this is not easy. To undertake such a loan, municipalities have to receive approval and provision of a sovereign guarantee by the Federal Government. They also have to respect the 1.2 limit on municipal debt of the Law of Fiscal Responsibility (see above). Furthermore, to take on such loans, municipalities require a national credit rating (capacity of payment, CAPAG) of A or B. As few cities have such a rating due to their difficult fiscal situation, few are able to draw on these debt mechanisms. When they do so (and Teresina is an example, see city baseline section below), international finance for urban development generally comes through the Development Bank of Latin America (CAF), the International Bank for Reconstruction and Development (the World Bank) and the Inter-American Development Bank (IADB). There is also some financing through bilateral international sources, such as the German Agency for International Cooperation (GIZ). In the sector of urban development, CAF, World Bank and IADB loans are earmarked and have a strong focus on addressing housing deficits, with other projects often focusing on waste management, transport and social exclusion.

In addition, there are several initiatives by NGOs and international organizations that provide technical assistance or other innovative financing options for promoting sustainable development. A summary of these initiatives is provided in Table 13. These initiatives are an important development in supporting the acceleration of sustainable development in Brazil, however, are often of small scale, piecemeal in approach (single sector) or have low presence in the country (lack of local awareness).

Table 13 – Initiatives by non-governmental and international organizations to promote sustainable financing

Organization	Initiatives and description	Relevance to the project
ICLEI (Local Governments for Sustainability)	• **LEDS Lab:** aims to improve the capacity of municipalities to structure projects with climate criteria and seek financing. The initial focus is on energy efficiency projects. • **TAP - Transformative Actions Program:** aims to improve the preparation of projects and facilitate matchmaking with potential funders. • **ICLEI Innovation:** aims to emphasize sustainable urban development and entrepreneurship by supporting start-ups operating in the areas of innovation and sustainability for local public management.	In output 3.2, CODUS will draw upon the work of the ICLEI LEDS Lab in developing the electronic guide and capacity building activities that can support municipalities in preparing project proposals. In output 3.1, CODUS will draw on the work of ICLEI Innovation as it identifies good practices for financing innovation for acceleration urban development through FINEP.
Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation) - GIZ	• ***Finanças Brasileiras Sustentáveis*** **(Sustainable Brazilian Finance) - FiBraS:** aims to improve conditions for the development of the green financing market in Brazil. For that, the project considers increasing transparency (reducing information asymmetry) in the financial market and improving environmental, social and governance (ESG) risk management. The project also includes the creation of a technical assistance structure aimed at the design of green financial products and services with the potential for replicability, with a view to further increase the share of private investment.	In output 3.1, CODUS will draw upon the findings of FiBraS to identify ways that national funding institutions can strengthen the effectiveness of credit lines and other financial mechanisms. Will also draw on FiBraS work in output 3.2 as it identifies capacity building activities that can support municipalities to strengthen municipal financial management.
Laboratório de Inovação Financeira (Financial Innovation Laboratory) – LAB, financed through GIZ, the Brazilian Development Association (ABDE), the Inter-American Development Bank (IDB) and the Securities and Exchange Commission.	• ***GT Finanças Verdes*** **(Green Finance WG):** aims to promote green finance in the country, now with an expanded sectoral bias. Thereby, in addition to the energy segment, the initiative incorporates water, sanitation and waste; and sustainable agriculture and land use. • ***GT Instrumentos Financeiros e Investimentos de Impacto*** **(Financial Instruments and Impact Investments WG):** aims to contribute to the creation of alternative financial instruments for the financing of social impact investments.	In output 3.1, CODUS will draw upon the LAB's findings as it identifies ways that national funding institutions can strengthen the effectiveness of credit lines and other financial mechanisms.
SITAWI – Finanças do Bem (SITAWI – Finance for Good)	• **UK-Brazil Green Finance Program:** SITAWI has been supporting BNDES in the definition of environmental, social and governance guidelines for structuring infrastructure projects (especially in the water, sewage and solid waste sectors).	In output 3.1, CODUS will build upon developed SITAWI-BNDES guidelines to enhance credit lines for sustainable urban development. CODUS will draw on SITAWI's network for mapping potential investors in sustainable urban

Organization	Initiatives and description	Relevance to the project
	This support is provided through the "factory of projects", a BNDES initiative that supports federated entities in the development of concessions and partnerships. • **Network of contacts with investors:** SITAWI has a wide network of contacts that could possibly be interested in financially supporting the projects.	development for the output 3.2 electronic guide.
CDP (Carbon Disclosure Project)	• **Pipeline of projects in search of financing:** Collects information from states and municipalities about sustainable projects in search of financing. CDP has a pipeline of projects and project ideas. • **Matchmaking:** Organizes matchmaking meetings, called 'business rounds between cities and financiers'.	In output 3.1, CODUS will review these projects as possible inputs to the output 3.2 electronic guide for financing through mapped financial institutions.
CPI (Climate Policy Initiative)	• **Global Innovation Lab for Climate Finance (Lab):** local network of investors and leaders from the public and private sectors to identify, develop and launch transformative investment solutions that direct resources towards Brazilian climate priorities.	In output 3.1, CODUS will draw upon the Lab's findings as it identifies ways that national funding institutions can strengthen the effectiveness of credit lines and other financial mechanisms.

Summary

In a business-as-usual scenario, it is unlikely that municipalities will be able to dedicate significant financial resources to sustainable urban development. Municipalities do not have access to financial markets, and the taxes and fees under their competence have modest revenue-generating potential and for many do not cover local costs. Generally, municipalities are heavily dependent on federal transfers, and more than 70% of the over 5000 municipalities have difficult fiscal conditions. These leads to reduced access to international financial offer, as they are not able to meet national external debt requirements. The situation is further challenged by fiscal restraints incurred by the COVID pandemic.

In this context, there is a need for municipalities to enhance their fiscal capacity and develop tools that ensure that they are effectively managing the limited resources that they have at their disposal. Furthermore, there is a need for municipalities to effectively use nationally offered financing instruments which enable them to advance investments in sustainable urban development. This requires two key actions: building of city government capacity to identify financial offer and prepare proposals that respond to financing criteria, and 2) strengthening and creation of financing instruments that support investments in integrated urban solutions and cater to the fiduciary needs of local governments.

NATIONAL KNOWLEDGE PLATFORMS

The following table identifies key platforms serving to diffuse knowledge on sustainable urban development and integrated planning in Brazil.

Table 14 – key knowledge platforms

Platform	Description	Relevance for the project
Innovation Observatory for Sustainable Cities (OICS)	OICS, https://oics.cgee.org.br/, developed within the GEF-6 CITinova project, aims to mobilize public managers, civil society, the private sector, and academia in support of the urban agenda, co-creating alternatives for the transition of Brazilian cities towards sustainability. To achieve this, it disseminates knowledge in the form of solutions and case studies for the themes of mobility, energy, solutions based on nature, built environment, and the sanitation of solid waste and water. The solutions mapped are contextualized and georeferenced according to typologies, indicators, and geobiophysical data from Brazilian cities.	In GEF-7, OISC will be strengthened and transformed into a federal system called SIS+ (see output 4.1). As part of this, its solutions will be ranked and validated nationally and by Brazilian macro-regions in accordance with national priorities and sustainability criteria. Furthermore, SIS+ will permit the ranking of solutions at the local, municipal, level. The observatory will also be expanded to focus more directly on finance for sustainable urban development.
Sustainable Cities Platform (PCS), Sustainable Cities Institute	The Sustainable Cities Platform, https://www.cidadessustentaveis.org.br, enhanced significantly with the support of the GEF-6 CITinova project, is the web environment of the Sustainable Cities Program (PCS), a program created in 2012 and aligned with the United Nations' Sustainable Development Goals (SDGs). Through the platform, PCS seeks to mobilize Brazilian municipalities to commit politically to achieving urban development targets and indicators that aligned with the SDGs. Various topics are discussed on quality of life and urban management. Each city feeds the program with its data and information on quality of life; Belém and Teresina are already signatories to the Program. The platform is an open and free access system, offering content and tools articulated in a space for training, stimulation, mobilization, information and organization of activities involving civil society, public authorities, technical-scientific institutions and the private sector.	In GEF-7, the federal system SIS+ will incorporate the indicators of the Sustainable City Platform's Sustainable Cities Development Index - Brazil (IDCS-BR), an initiative it developed in partnership with the Sustainable Development Solution Network (SDSN) with the support of GEF-6 Project. These indicators will be used to support prioritization of the sustainable urban solutions (see output 4.1). Furthermore, each pilot city (Belém, Teresina and Florianopolis) will develop a local index of the IDCS-BR, allowing it to

Platform	Description	Relevance for the project
		track progress against the SDGs over time (see outputs 1.1, 1.4 and 1.7). Finally, Belém and Teresina are already signatories to the PCS and Florianopolis will be encouraged to join as part of its work to develop the module and sustainable integrated plans. Other municipalities of these metropolitan regions will also be encouraged to join as part of a commitment to the project and its objectives.
MDR ReDUS platform	Currently under development by the Ministry of Regional Development (no link available), the platform will serve as the host platform for the Network of Sustainable Urban Development (ReDUS). It aims to compile, integrate, structure and make available spatial information that aids in supporting municipalities to development sustainably. In this context, it aims to support the implementation of the National Urban Development Policy, considering the three levels of government and the participation of civil society. ReDUS is an initiative of the ANDUS project (see baseline projects below) that, together with other strategic partners, notably the National Front of Mayors (FNP) and the Alliance for Innovation and Sustainability, aims to build a knowledge network for facilitating discussions on sustainable urban development in Brazil.	Will be the key federal platform for supporting municipalities with general principles, guidelines and tools for undertaking integrated planning. The GEF-7 online system SIS+ (see output 4.1) will complement this, avoiding duplication and building synergies with it to provide local governments with a coherent national framework of online platforms.
MDR CapaCidades	Hosted and run by MDR, the platform, http://www.capacidades.gov.br/, is part of the National Programme of Capacity Building of Cities. It aims to facilitate institutional strengthening of municipalities for urban planning and management, through the training of managers and the improvement of public administration in the different spheres of government. It contains online courses, a calendar of events and online tools for building the capacity of municipal managers.	Project capacity-building activities will build upon this those offered through this platform and also link to this platform to build synergies and ensure complementariness.
National Infrastructure of Spatial Data (INDE)	While not a platform, the National Infrastructure of Spatial Data (INDE), https://www.inde.gov.br/, provides a framework for all public geospatial platforms, ensuring standardization with ISO19115 and the Brazil Geospatial Metadata Profile.[68]	Defines the national GIS institutional architecture with which the city online modules (outputs 1.1, 1.4 and 1.7) will align.
Metropolitan Governance in Brazil Platform (IPEA)	The platform (http://brasilmetropolitano.ipea.gov.br/) is part of the *Metropolitan Governance in Brazil* project, which brings together, through the Institute for Applied Economic Research (IPEA), research institutions, seeking to investigate the specificities and conditions of governance and metropolitan management of the main RMs in the country. Since 2015, the project in Brazil has focused its efforts on understanding the main challenges brought by the Statute of the Metropolis to the Brazilian Metropolitan Regions. The platform aims to systematize the trajectory of construction and adaptation of the governance and management structures of the Brazilian RMs, forming a complete framework of their experiences, of fundamental importance for evaluations and transformative propositions.	While IPEA's focus is academic, its results serve as key inputs to inform the design of the metropolitan governance arrangements of the Belém and Florianopolis RMs (outputs 1.3 and 1.9) and of the Timon-Teresina Urban Agglomeration (output 1.6).
Brazilian Biodiversity Information System (SiBBr)	Developed under the MCTI coordination, with technical support from UNEP and GEF financial support, the Brazilian Biodiversity Information System (SiBBr), https://www.sibbr.gov.br/, is the first national infrastructure for data and information on biodiversity. It aims to gather and give access to data and information to support public policies and conservation actions, and to promote knowledge of the Brazilian biodiversity. Its infrastructure is adapted to use the Atlas of Living Australia Platform, which facilitates data sharing with the international community and allows SiBBr to be the Brazilian node of the GBIF (Global Biodiversity Information Facility), a multilateral initiative that gathers data on the biodiversity of approximately 60 participating countries.	Will provide key inputs into the development of biodiversity interventions of the project.
Public Policies Observatory	The Public Policies Observatory, https://www.odsobservatorio.com.br/, is a platform of the Brazilian Association of Municipalities (ABM) financed by the European Union. It offers a repository of municipal experiences and public policy practices linked to the SDGs and to the New Urban Agenda.	This non-governmental platform will serve to provide key inputs for the development of the good practices guide under output 4.2 and capacity-building activities under 4.3. It will

[68] https://www.inde.gov.br/pdf/Perfil_MGB_homologado_nov2009_v1.pdf, see page 127.

Platform	Description	Relevance for the project
	Information can be made available by the municipalities themselves; it is made public on the platform once analyzed by its strategic advisory council.	also provide key inputs for the SIS+ national database of solutions.
MobiliCampus	MobiliCampus, http://mobilicampus.org.br/, offers videos/classes to disseminate the principles of Development Oriented to Sustainable Transport (DOTS). Despite the specificity of the topics covered (urban development, mobility, public transport), the target audience is very diverse, covering from managers and technicians of public agencies and members of the transport sector company to undergraduate and graduate students and teachers.	This non-governmental platform will serve to provide key inputs for the development of the good practices guide under output 4.2 and capacity-building activities under 4.3. It will also provide key inputs for the SIS+ national database of solutions.
QualiÔnibus	QualiÔnibus, https://qualionibus.com.br/, is a closed network for exchanging experiences between member cities that use standardized indicators to collect data and information about their public bus systems.	This non-governmental platform will serve to provide key inputs for the development of the good practices guide under output 4.2 and capacity-building activities under 4.3. It will also provide key inputs for the SIS+ national database of solutions.

The MDR ReDUS platform, to be developed over the following years, will play an important role in providing municipalities with tools and information for facilitating integrated planning in accordance with the National Urban Development Policy and the Metropolis Statute. The Sustainable Cities Platform, strengthened through GEF-6, will continue to play a key role in supporting municipalities to scale-up up ambition to achieve the sustainable development goals (SDGs) and track their progress to achieve local targets aligned with the SDGs. With these two platforms, on i) information on integrated urban planning and ii) ambition, the final key element of a national knowledge management architecture is iii) the provision of sustainable urban solutions for achieving the goals of integrated plans aligned with heightened ambition. The primary platform fulfilling that role is the GEF-6 created Sustainable Cities Innovation Observatory (OICS), however these solutions are not ranked and prioritized at the city level. OICS has broadscale cities typologies, but these do not provide sufficient granularity to be considered solutions contextualized to specific individual city circumstances. There are also other platforms in this space, but these are piecemeal in their approach, focusing on a limited gambit of sectors and are not institutionalized with federal ministry programs and supporting architecture. In Brazil, there is an absence of a governmental platform which may support local governments to identify and prioritize evidence- and science-based solutions that are aligned with national priorities, local ambition and context, and city integrated plans. Furthermore, there is an absence of a governmental platform which may support local governments to facilitate the implementation of those solutions through national financial mechanisms.

BASELINE PROJECTS AND BASELINE FINANCE

Key national projects currently under execution of relevance to sustainable urban development are the following (projects specific to the five target cities are listed in Annex Q):

Table 15 – Baseline finance projects and relevance to the GEF-7 project

Program / Project	Ministry	Objective / Description	Duration	Baseline estimate (in USD million)	Relevance and how the GEF project will build upon the baseline project
CITinova I (GEF-6)	MCTI	CITinova is a multilateral project led by MCTI to promote sustainability in Brazilian cities through innovative technologies and integrated urban planning. Financed by the GEF, this project is implemented by the UNEP and carried out in partnership with the Recife Agency for Innovation and Strategy (ARIES) and Porto Digital, Center for Management and Strategic Studies (CGEE), Sustainable Cities Program (PCS) and Secretariat for the Environment (SEMA / GDF). The main objectives are to develop innovative technological solutions and offer integrated urban planning methodologies and tools to support public managers, encourage social participation and promote fairer and more sustainable cities. The project consists of three major action fronts: (i) Integrated Urban Planning for municipalities, (ii) Investments in Innovative Technologies, (iii) Platforms for Sustainable Cities.	2018-2022	USD 22.6 M (in GEF funds)	All components. See specific table on this project's relevance as part of the introduction to section 3 (alternative scenario).
ANDUS	MDR	ANDUS project, of technical cooperation, carried out by the Ministry of Regional Development (MDR) and	2017-2022	$ 4.9 M	The principal outcomes of the ANDUS project, PNDU and

Program / Project	Ministry	Objective / Description	Duration	Baseline estimate (in USD million)	Relevance and how the GEF project will build upon the baseline project
		the Ministry of the Environment (MMA) in partnership with the German Ministry of the Environment, Nature Protection and Nuclear Safety (BMU, acronym in German), supported by the German Ministry of the Interior for Construction and Homeland (BMI, acronym in German) and implemented through *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH. The ANDUS Project emerged as a way to support the Brazilian government in improving policies for sustainable urban development in Brazil from the conception, diffusion and implementation of a new approach based on the 2030 Agenda, the New Urban Agenda and the Paris Agreement on climate change. As part of ANDUS, MDR is currently developing a Sustainable Urban Development Network (ReDUS), that will bring together actors and other existing networks, concentrating efforts to provide a knowledge network on the theme of sustainable urban development.[69]		(6.0 million Euros)	ReDUS, will serve as key guiding elements of the this GEF-7 project. This project will build upon the PNDU, ensuring that all project elements (and particularly developed integrated plans), align with this national policy. Furthermore, the project will build upon the work to be undertaken by MDR's ReDUS and its platform on capacity-building (outputs 3.2 and 4.3), work on good practices (output 4.2), integrated planning practices (outputs 1.2, 1.5 and 1.8) and GIS platforms (outputs 1.1, 1.4 and 1.7).
Pró-Cidades (Pro-Cities) Program	MDR	Public credit program made available by the Federal Government and managed by the Ministry of Regional Development (MDR) and operated by Caixa Econômica Federal. The objective of Pró-Cidades is to support states and municipalities in financing integrated investments for improving a previously defined urban perimeter, and, thus, ensuring greater effectiveness of the city's social function and its urban property, prioritizing the democratic occupation of consolidated urban areas. It consists of the financing of structural interventions, based on the qualification of the public space; democratizing access to urban equipment and furniture; encouraging the use of empty and idle properties primarily for social housing; and the use of technologies for smart cities, reversing the process of emptying and urban degradation, in addition to promoting the expansion of the supply of well-located housing. It has two financing areas: 1. Urban area rehabilitation 2. Urban technology modernization	2019-2022	$ 800 M (4 billion BRL converted)	The GEF-7 project will build upon this program by supporting Brazilian cities and metropolitan regions to develop integrated plans which contain investments that are eligible through Pró-Cidades. Furthermore, the project will build upon the Caixa Econômica Federal and MDR's lessons learned in implementing this program when strengthening financial instruments for promoting sustainable urban development and identifying good practices for sustainable urban development.
Pró-Transporte (Pro-Transport) Program	MDR	The Transport Infrastructure and Urban Mobility Program aims to promote improvements to urban mobility, universal access to means of mobility, quality assurance and access to basic services and social facilities in Brazilian cities. Financially operated by Caixa Econômica Federal, it provides credit lines available to municipalities, states and the private sector for investments in the following areas: 1. Public transport systems 2. Roads and road infrastructure 3. Non-motorized transport 4. Transport studies and project design 5. Urban mobility plans (in accordance with Law No. 12,587 / 2012) 6. Institutional development	2020-2023	$ 3,200 M (16 billion BRL converted)	The GEF-7 project will build upon Pró-transporte in promoting the development of low-emission streets, city-blocks and neighborhoods in its component 2. Furthermore, the project will build upon the Caixa Econômica Federal and MDR's lessons learned in implementing this program when strengthening financial instruments for promoting sustainable urban development and identifying good practices for sustainable urban development.
Cidades+ Verdes (Greener	MMA	One of the axes of the national Urban Environmental Agenda, has the following objectives: (i) Creating, expanding, recovering and integrating urban green	2020-(on-going)	$ 34.4 M	The baseline in question relates primarily to components 1 and 4. The GEF-7 project will build

[69] https://www.gov.br/mdr/pt-br/assuntos/desenvolvimento-urbano/rede-de-desenvolvimento-urbano-sustentavel.

Program / Project	Ministry	Objective / Description	Duration	Baseline estimate (in USD million)	Relevance and how the GEF project will build upon the baseline project
Cities) Program		areas; (ii) Improving urban environmental management through tools for mapping and monitoring urban green areas; (iii) Establishing guidelines, indicators, categories and typologies for the planning, implementation and monitoring of urban green areas; and (iv) Improving the quality of life in cities, valuing the provision of ecosystem services in these areas. In this context, the Urban Environmental Register (CAU) is a tool developed and made available by the MMA for mapping and providing information on urban green areas.		(approx. 5% of the total public budgetary allocation to MMA in 2021, converted)	on MMA's program on urban protected areas titled *Cidades+Verdes*. It also relates to MMA's general efforts towards land use planning in close collaboration with other institutions, which includes important elements of capacity building – hence, the linkages to component 4.
Estimated total baseline in at the national level				**$ 4,045.7 M**	
Baseline estimates for C1				*$ 16.7 M*	
Baseline estimates for C2				*$ 3,605.7 M*	
Baseline estimates for C3				*$ 408.1 M*	
Baseline estimates for C4				*$ 14.3 M*	

2(iv). Project city baselines

Three selected metropolitan regions serve as project pilot sites (Belém RM, Greater Teresina RIDE and Florianópolis RM), covering 1.7 million hectares within the jurisdiction of 31 municipalities and four federal states.

BELÉM METROPOLITAN REGION

Introduction

Located in the Brazilian north in the Amazon rainforest, the Belém Metropolitan Region (Belém RM) is the 11th largest urban area in Brazil with 2.5 million inhabitants and one of the two largest economic centers of the Brazilian Amazon. Consisting of seven municipalities, it contains a conurbation comprising the municipalities of Belém and Ananindeua, with another conurbation being formed around the Marituba municipality. Located at the mouth of the Pará river (part of the Greater Araguaia basin) the metropolitan landscape is crossed by several water courses and has a slightly rugged relief, with gentle slopes and slight unevenness.[70] Considered the gateway to the Amazon, Belém has experienced a sharp population increase since the middle of the 20th century. Urban expansion in the region correlates directly with the construction of the BR-316 Highway (Belém-Brasília), which started in the late 1960s and was completed in the 1970s and resulted in significant deforestation to the rural areas of Pará state.[71] Between 1950 and 1990, the metropolitan region population grew by more than 400%. In addition, between 2000 and 2010 the Belém RM experienced a population increase of 15%, reaching a total population of more than 2 million people and an increase of almost 100% in the number of cars. Belém RM has also experience one of the highest growth rates in Brazil on the number of motorcycles, with an increase of more than 250% between 2008 and 2018.[72]

Key challenges to sustainable urban development

The aforementioned rapid urban growth, without sufficient urban planning, is resulting in systematic degradation of the Amazon rainforest, an area of rich and fragile biodiversity. At the same time, there is a generally high degree of formal biodiversity protection in Belém RM through PAs. There are also various mitigation initiatives that counteract the negative environmental impacts on the RM, see baseline finance in annex Q.

The absence of integrated urban planning is responsible for high rates of motorization, which is 16.1 car per 100 inhabitants for Belém RM.[73] Those rates correlate directly with investments in infrastructure for individual motorized transport (roads, parking lots, etc.) and insufficient investments in public transportation and infrastructure for pedestrians and cyclists. Weak urban planning in Belém

[70] CARMO and COSTA. A expressão Metropolitana da Região Metropolitana de Belém: ainda há a cidade Primaz?. 2017. Available at: http://anpur.org.br/xviienanpur/principal/publicacoes/XVII.ENANPUR_Anais/ST_Sessoes_Tematicas/ST%201/ST%201.7/ST%201.7-03.pdf.
[71] IBGE. 2020. Biblioteca – Catálogo. Available at: https://biblioteca.ibge.gov.br/biblioteca-catalogo.html?view=detalhes&id=443994.
[72] Observatório das Metrópoles. 2019. Mapa da motorização individual no Brasil. Available at: https://www.observatoriodasmetropoles.net.br/wp-content/uploads/2019/09/mapa_moto2019v2.pdf
[73] According to the Observatório das Metrópoles (2019), Belém, has the lowest motorization rate among all metropolitan regions. However, this rate has increased considerably from 10 cars / 100 inhabitants, in 2008, to 16.1 cars / 100 inhabitats in 2018.

RM has also resulted in a monocentric, car-centered urban configuration, with more than 200,000 people travelling daily to the city center for work and study. This weak urban planning in a densely populated and impoverished city with a growing population and an increasing motorization rates are leading to a traffic-congestion and high GHG emissions, in addition to air pollution due to transport. The sustainability of Belém RM is further challenged by a lack of effective waste treatment, including solid and liquid waste. Only 6% of Belém's sewage is collected and treated, meaning that in many of the metropolitan region's streets sewage flows untreated in open street channels. This presents significant health risks to the local population that became more recently exacerbated by the COVID-19 pandemic. Solid waste management is also ineffective, with little treatment or recycling taking place, resulting in large quantities of waste being managed through deposition into land-fill facilities. As the population continues to grow quickly, this results in the growing need for further landfill sites, often resulting in reduction of protected areas and contamination of solid waste derivatives into nearby protected areas and freshwater sites.[74]

Furthermore, because Belém's peninsula is situated in a hot and humid climate, people make extensive use of air conditioning. One of the oldest cities in Brazil, many buildings in Belém are historical and have insufficient insulation. The metropolitan region's low-income populations also face insulation challenges in informal and densely packed housing located in underprivileged areas of the city. In general, energy efficiency of buildings is low, leading to emissions from buildings and appliance use. While there is no official GHG inventory of Belém RM, non-governmental organizations estimate that the three areas of transport, waste and buildings make up close to 90% of Belém RM's emissions, with the first two making up more than 80%.[75]

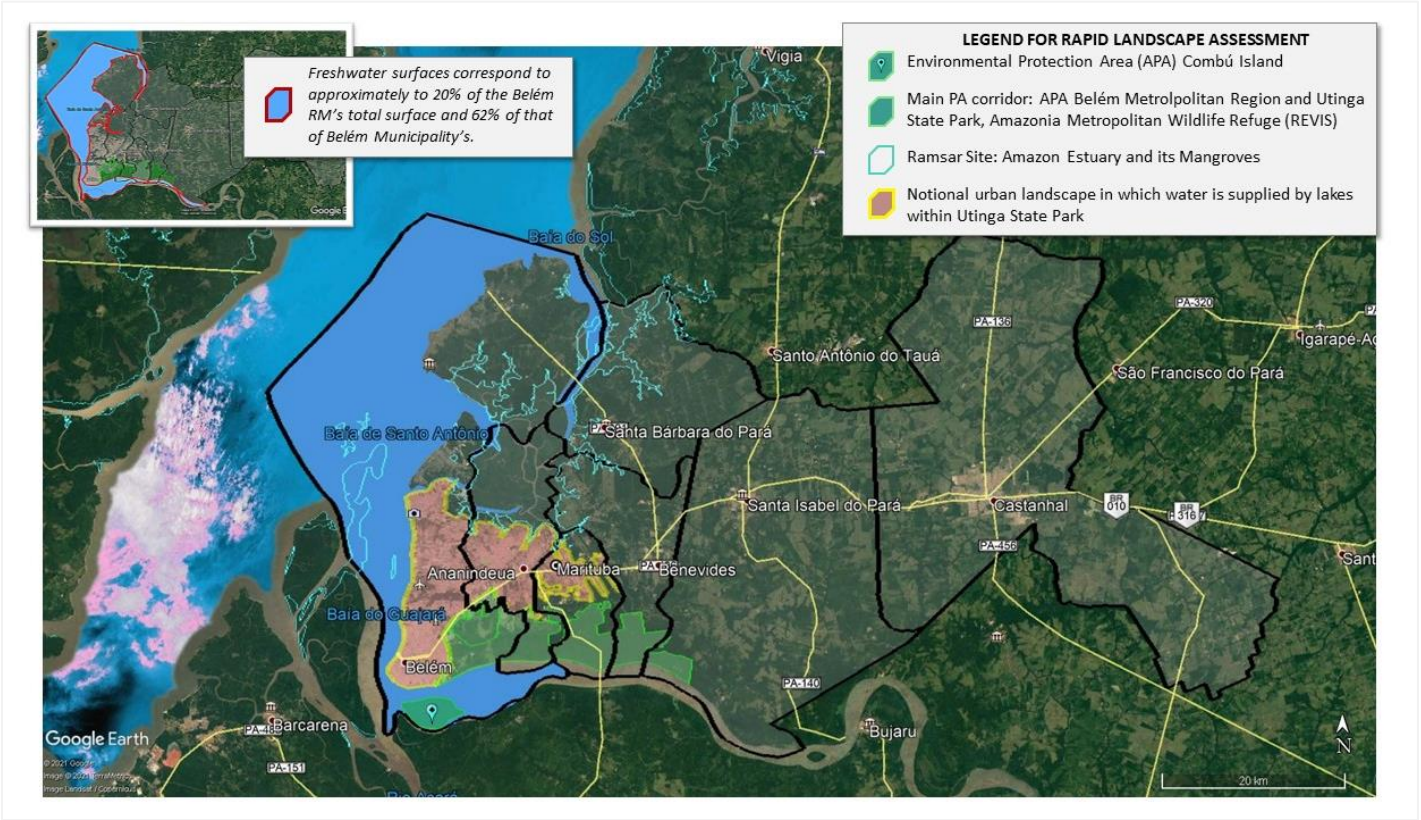
The quality of freshwater systems is also threatened as due to the fact that 94% of sewage is untreated and disposed in the river. Furthermore, almost all river transport depends on diesel and much of the city's electricity rely on thermopower plants. Belém RM's physical characteristics, combined with the absence of adequate land use policies, housing provisions and high poverty rates, have a detrimental effect on the local population's life quality. A high percentage of people live in precarious housing conditions, lacking basic infrastructure and often settling on topographically lower areas and wetlands, subjected to regular flooding.[76]

From a biodiversity point of view, it is not excessive to stress that the Amazon is the most diverse tropical rain forest in the world. Recent data compilations indicate that it harbors at least 40,000 species of plants, 427 species of mammals, 1,294 species of birds, 378 species of reptiles, 427 species of amphibians and approximately 3,000 species of fish. Urban forests, such as those in the urbanized areas of Belém RM or under the region's influence face threats such as cumulative deforestation and habitat loss, various forms of pollution and negative impacts of climate change. In freshwater ecosystems, pollution from sewage, overexploitation of fish resources and invasive alien species (IAS) are active present threats. Some of the mentioned threats are mutually reinforcing. There is e.g. active mining within one of the PAs within Belém RM in spite of PA management efforts. There is active deforestation linked to urban expansion is happening in different green areas that remain unprotected,

The cities within the conurbation area surrounding Belém, part of Ananindeua and evolving towards Marituba are located in a peninsula that is geographically constrained by rivers, islands and the Guajará Bay that surround it. Urban expansion is also limited by a corridor of protected areas in both the south (harboring riverine rain forests) and in the north (mangroves) (Figure 8 see also Box 2). Hence, any outward urban expansion has only been possible along the east-northeast arch – or vertically.

[74] http://www.ibeas.org.br/conresol/conresol2018/IV-001.pdf.
[75] http://plataforma.seeg.eco.br/cities/statistics.
[76] IPEA. 2015. Governança Metropolitana no Brasil: Relatório de Pesquisa. 2015. Available at: ttps://www.ipea.gov.br/redeipea/images/pdfs/governanca_metropolitana/rel_1_1_rm_Belém.pdf.

Figure 8 – Important biodiversity and ecosystem services features of the Belém Metropolitan Region's landscapes[77]



Because of the aforementioned geographical constraints, the level of urban sprawl in Belém RM is not as high as in Florianópolis RM or Teresina RM, in this order. Population increases resulted mostly in increases in population density in the core of Belém. Nominally, this density is 1,315 inhabitants per sq km in Belém municipality, according to IBGE as of 2010.[78] In reality, the 'official' demographic indicator density is misleading. because some 60% of the municipality's territory is covered by freshwater and this was not considered in the calculus. The figure is at least 2.8 times higher, placing Belém among the 40 most densely populated municipalities in Brazil. Still, urban development processes associated with the pollution of lakes and river basins due to the lack of effective waste management policies and actions as well as urban tourism do present quite material threats to biodiversity and urban green spaces.

Biodiversity is an important element within the metropolitan landscape in Belém RM. The State of Pará has its own List of Endangered Species and an innovative Zero Extinction Programme. Important terrestrial plant species that are threatened in upland habitats are found within the metropolitan area. They include e.g. the leguminous trees acapu (*Vouacapoua americana*), angelim (*Zygia racemosa*), Spanish cedar (*Cedrela odorata*) and Brazil nut tree (*Bertholletia excelsa*). From floodplain habitats of Guamá and Uriboca rivers, threatened plant species include sumaúmas (*Ceiba pentandra*) and a white ucuhuba (*Virola surinamensis*). The latter is also found in upland areas. As for Amazonian faunal species, most of the species assemblages have been impacted by reduced habitats and other proximal threats linked to urbanization. Although there is paucity of data on urbanized Amazonian species, relevant samples of threatened species include the red-necked aracari (*Pteroglossus bitorquatus*), white-shouldered antshrike bird (*Thamnophilus aethiops incertus*), the black-spotted bare-eye (*Phlegopsis nigromaculata*), the white-chinned woodcreeper (*Dendrocincla merula*), the Parma climbing salamander (*Bolitoglossa paraensis*). The latter is noted in the national red list of threatened species. All of the listed species of fauna and flora have special interest for conservation in Pará state and should be closely monitored. There are, in addition, records of 16 species of Nearctic birds that reproduce in North America and spend part of their life cycle in the Neotropical region. There has been sighting of those species in secondary forests within Belém municipality[79], which stresses the importance of urban biodiversity conservation, in particular in areas such as Belém RM.

[77] See also Box 2 for all features of the metropolitan region.
[78] Data from IBGE (2010): https://www.ibge.gov.br/cidades-e-estados/pa/Belém.html, accessed on 11/05/21.
[79] Silva, J.M.C. 2011b. Belém. In: Valente, R.; Silva, J.M.C.; Straube, F.C. & Nascimento, J.L.X. (Orgs.). Conservação de aves migratórias neárticas no Brasil. Belém, Pa, Conservation International. p. 82 84.

Featured PAs in Figure 8 form a green corridor in the south-southeastern part of the Belém RM peninsula. They include primarily Belém Metropolitan Region's Environmental Protection Area (APA Met Belém), Utinga State Park and the Amazonia Metropolitan Wildlife Refuge (REVIS Amazonia). Together these PAs form a 'protective shield' against the impacts of urbanization with more 15,000 ha vis-à-vis the local terrestrial biodiversity and the associated freshwater habitats. Other smaller PAs within the metropolitan landscape that are classified as areas of relevant ecological interest (ARIEs) also show potential for contributing urban-based conservation in Belém RM. They are the ARIE Museum Seringal Park Municipal and ARIE Antônio Danúbio Botanic Garden Municipal Park, both are located in Ananindeua. In addition to the formal PAs, there are other areas of effective area-based protection that contribute the formation of ecological corridors within the cities and its surroundings, such as the Extractive Settlement Projects (PAEs) Murutucu Island, Great Island of Belém and Combú Island (which is a formal PA), in addition to and Abacatal, Guajará Miri and Itacuamiri Quilombos. PAEs and Quilombos are home to traditional communities, who live and collectively exploit their site through low-impact natural resource extraction techniques. There are also important ex-situ collections maintained in at least two zoo-botanical gardens.

In terms of ecosystem services, lakes within the Utinga State Park are responsible for supplying some 63% of the water supply within Belém RM, reaching as far as Castanhal through underground pipes. Recreation is another important ecosystem service provided by urban biodiversity. Combú Island (1,597 ha) e.g. is just a 1.5 km river crossing from Belém. It is a preferred weekend getaway place for urbanites. Combú Island's habitats remain relatively intact and are also known to produce much of the *açaí* fruit consumed in Belém. A recent study on Combú Island and its resident population showed the importance of sustainable natural resource use and tourism by the Combú igarapé community and included gender aspects.[80] According to the study women resident on Combú Island are significant players in the local economy and major bread-winners within their households. Many are single mothers, and yet their role in the home front continues to be dictated by traditional pre-conceptions. Such studies stress the importance of addressing gender inequality as an integral part of the environmental interventions at the metropolitan scale.

Across Belém RM, the absence of integrated urban planning and effective land and housing management policies has led to encroachment into PAs. APA Met Belém and REVIS both have resident populations living within the limits of the PAs, from even before the PA was established. PA enforcement in urban areas is complicated by the threat level and the pressures on ecosystem services. The encroachment into these areas causes degradation and loss of vegetation fragments that are otherwise important for the establishment of biological corridors.

Box 2 – Belém Metropolitan Region: Demography, economic aspects and general information

Belém Metropolitan Region

See complete set of indicators in https://fnembrasil.org/regiao-metropolitana-de-Belém-pa/

Belém RM is located within Amazonian biome and within the tropical rainforest climate zone (Köppen classification: Af). The metropolitan landscape harbors forests that are typical of eastern Amazonia, displaying a tight river mesh and large areas of floodplain (várzea). Most rivers carry a heavy sediment load and some of them navigable. The rivenine Guajará Bay is a key feature where urbanized areas of Belém are located following a river bend. There is also the formation of small islands near the river mouths and various freshwater beaches.

State

Pará

Metropolitan region municipalities

Ananindeua, Belém, Benevides, Castanhal, Marituba, Santa Bárbara do Pará, and Santa Izabel do Pará

[80] Silva, Adrielly Albuquerque da; Steward, Angela May. A valorização do trabalho das mulheres na comunidade do Igarapé Combú, Ilha do Combú-Pará. Agricultura Familiar: Pesquisa, Formação e Desenvolvimento, [S.l.], v. 13, n. 2, p. 208-229, maio 2020. ISSN 2675-7710. Available at: doi: http://dx.doi.org/10.18542/raf.v13i2.8716.

Belém Metropolitan Region

See complete set of indicators in https://fnembrasil.org/regiao-metropolitana-de-Belém-pa/

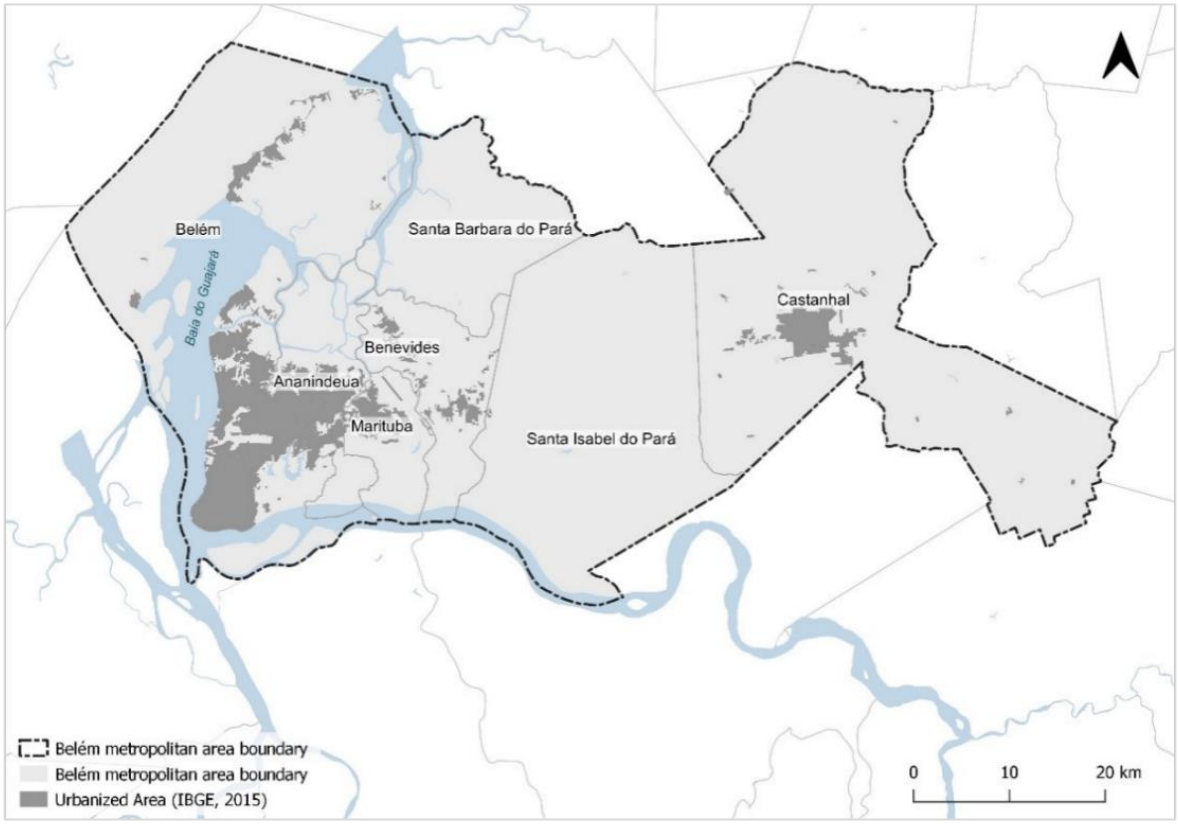
Combined area, including freshwater surfaces within municipal jurisdiction:
3,566.2 sq km

Population (IBGE 2018)
2,491,052 (2018)
Note: 1/3 of the state's population located in 1% of the state's area

Demographic density (Atlas Brasil, UNDP)
638.01 inhabitants per sq km

Population growth rate (FNEM)
1.14 (2010 - 2018)

Human development index (MHDI) (Atlas Brasil, UNDP)
0.729 (2010)



GDP per capita (IBGE 2015)
3,139.34 USD

Gini Index (2010 Census)
0.59

Credit rating (CAPAG)
Belém (grade C), Ananindeua (grade C), Benedives (grade N/A), Castanhal (grade N/A), Marituba (grade N/A), Santa Bárbara do Pará (grade C), Santa Izabel do Pará (grade C)

Greenhouse gas emissions
Unknown (no official sources)

Committed to achieve the SDGs through the Sustainable Cities Programme?
Belém (other municipalities of the metropolitan region are not yet signatories)

Social Vulnerability Index (IPEA, 2015)
Human Capital 0.461 (2000) - 0.340 (2010)
Urban Infrastructure 0.437 (2000) - 0.380 (2010)
Income and Work 0.470 (2000) - 0.333 (2010)

Laws that instituted the Metropolitan Region
Federal Complementary Law No. 14/1973: established the metropolitan region with the municipalities of Belém and Ananindeua
State Law No. 27/1995: included the municipalities of Benevides, Santa Bárbara do Pará and Marituba
State Law No. 72/2010: included Santa Izabel do Pará
State Law No. 76/2011: included the municipality of Castanhal

Key metropolitan institutional arrangements and planning instruments

The following table summarizes the arrangements for Belém RM with regards to conformity with the Metropolis Statute.

Table 16 – Belém Metropolitan Region conformity with the Metropolis Statute

Minimum elements for full management according to the Metropolis Statute	Situation of the Belém Metropolitan Region		
Formalization and delimitation through a complementary law	State Law No. 76/2011		✓
Inter-federative Governance Structure	Executive body with representatives of the Executive Branch of the federative entities	--	⊘
	Deliberative collegiate body with representation from civil society	Metropolitan Council (without civil society) - inactive	✓
	Public organization with technical advisory functions	--	⊘
	Integrated system for resource allocation and accounting	RMB Development Fund foreseen by law, not implemented	⊘
Approved PDUI	Terms of reference was prepared, but the plan is subject to state law and has not been developed		⊘

Legal framework and institutional arrangements

In terms of coordination and planning, the State of Pará and the municipalities that compose Belém RM have struggled to institutionalize the necessary governance at level of the metropolitan region. The Metropolitan Council created under State Law No. 76/2011 was never established, nor are there any ongoing process that will lead to integrated urban planning (Table 16).

Planning

As a first step towards developing the Integrated Urban Development Plan (PDUI), in 2018 the State Secretariat for Urban Development and Public Works (SEDOP) carried out a study on public functions of common interest, in accordance with the Metropolis Statute, identifying issues of common interest in areas such as urban development, sanitation, biodiversity, transport and mobility. The secretariat also began work to elaborate the PDUI, but both works were discontinued. This discontinuity was due to multiple factors, including national and state elections at the end of 2018, which resulted in changing alliances and coordination challenges between the state and the municipalities, and the economic crisis which started in 2014 and affected municipal and state coffers. Furthermore, the federal level removal of the sanction for failing to comply with the Metropolis Statute has also acted as a significant disincentive.

Belém RM does not have any integrated urban plans. It also does not have a climate action plan or GHG inventory. In 2020, the state sanctioned the Pará State Policy on Climate Change (law Nº 9048) which defines a series of principles and actions for adapting and mitigation GHG emissions for the state and its municipalities. It does not define a mitigation target but stipulates a process to determine it. Social-environmental safeguards are an integral part of the 2020 Pará State Policy on Climate Change, namely because of the importance of REDD+ and other related programs in the processes of mobilizing climate finance. The focus on forests linked to climate would certainly have implications for biodiversity, given that forest protection is known cost-effective mechanism carbon sequestration within REDD+ strategies. It is however difficult to assess at this stage the implications for Belém RM, including unprotected green areas within it. There are otherwise no plans or policies related to biodiversity conservation within the jurisdictional realm of Belém RM.

On a sectoral level, actions related to urban transport and mobility are concentrated in different state agencies: the Metropolitan Transport Management Center (NGTM), which executes the BRT project (see baseline projects in annex Q); SEDOP, which performs urban mobility works; the State Secretariat for Transport (SETRAN), responsible for the maintenance of the metropolitan highway network; and finally, the State Secretariat for Economic Development, Mining and Energy (SEDEME), which is working on improving the access to central business district. There are no integrated metropolitan plans for sanitation, solid waste or buildings.

At the municipal level, the Belém municipality has developed a series of sectoral urban plans to comply with federal laws including: the Municipal Urban Mobility Plan (2016); the Integrated Solid Waste Management Plan of the Municipality of Belém (Law No. 8899/2011); and the Municipal Basic Sanitation Plan for Water Supply and Sewage in Belém (2014). Its current Master Plan dates to 2008. Considering that federal law stipulates that municipalities should update their master plans every 10 years, the Belém municipality started a process to update its plan in 2019. However, this process was put on hold in 2020 due to the COVID-19

pandemic.[81] The municipality's Development and Administration Company of the Metropolitan Area of Belém (CODEM), while having a name focused on the metropolitan area, is actually a body with municipal responsibilities, focusing on land regularization of the city and performs specialized technical services to public agencies and citizens in general, such as: property evaluation, georeferenced topographic surveys, land research and the real estate registration of new housing units.

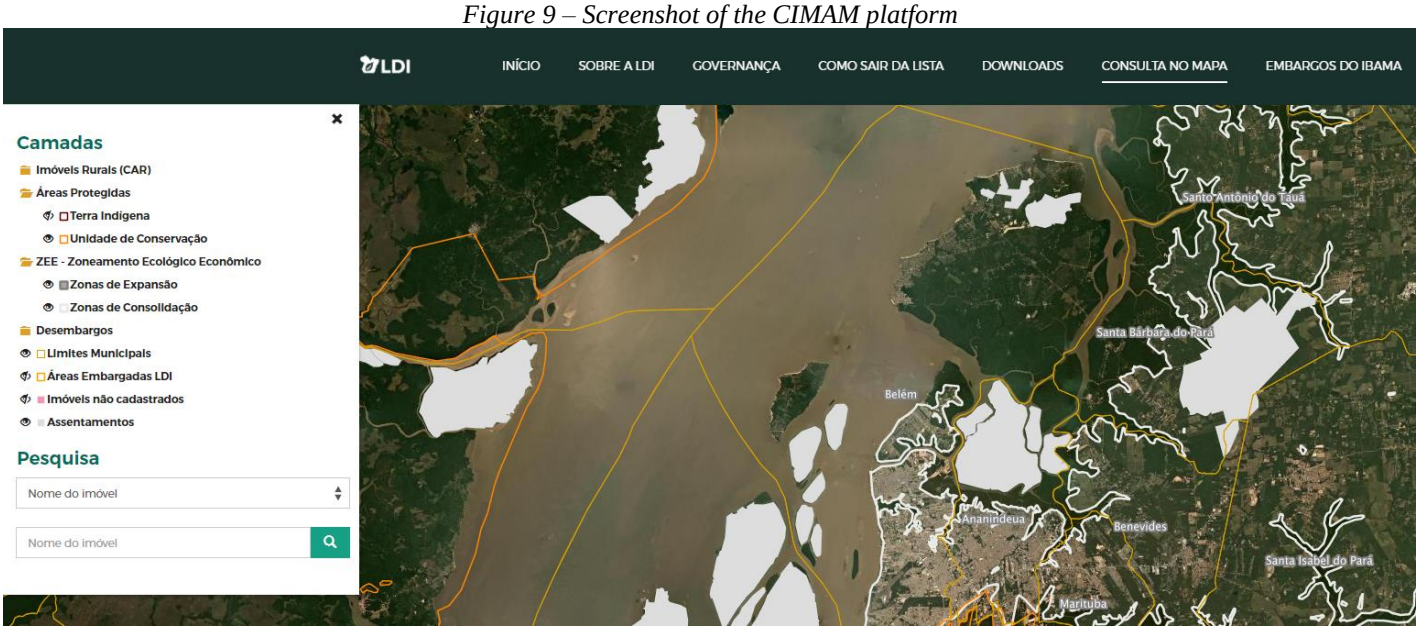
Integrated planning platforms

Belém RM does not have an integrated planning platform, nor do any of its municipalities. However, the State of Pará does have a powerful geospatial platform, managed by its Integrated Environmental Monitoring Center (CIMAM), for monitoring deforestation. CIMAM is a management, transparency and control center which supports governmental activities related to environmental licensing, environmental monitoring and the containment of deforestation throughout the State of Pará (Figure 9). Through CIMAM, the Government of the State of Para manages a series of GIS platforms that support environmental management, including:

- https://monitoramento.semas.pa.gov.br/ldi/consultaMapa/mapa;
- https://monitoramento.semas.pa.gov.br/simlam/index.htm, and;
- http://car.semas.pa.gov.br/#/consulta/mapa.

The current system is developed and has a series of layers related to environmental issues (unregistered property, settlements, protected areas, embargoed areas, areas of expansion, etc.). However, it does not yet have layers relevant to urban development, such as transport and urban green spaces.

Figure 9 – Screenshot of the CIMAM platform



Finance and key baseline projects

Refer to annex Q for a list of the key baseline projects related to the sustainable urban development of Belém RM.

In a region where the needs and potential benefits of investments in sustainable urban infrastructure are so significant, the resources for these actions are limited. Most of the resources provided for in the Pluri-annual Plan of Pará State for the Guajará region (which includes the municipalities of Belém, Ananindeua, Benevides, Marituba and Santa Bárbara do Pará), are destined for thematic areas such as basic education, public governance and health care. At the municipal level, there is great difficulty in financing integrated and sustainable projects.

While complementary law 27/1995 established a Belém Metropolitan Region development fund, this has never been operationalized. More recently up until 2018, the State Government of Pará was developing together with the support of UN Habitat an Ecosystem of Funds. The aim was for the ecosystem to provide a coherent framework for financing the state's sustainable economic development, drawing on public, private and innovate sources. On the latter, conceptual design of the ecosystem explored the use of funds acquired through payment of environment infractions for urban development. With the change of state government at the end of 2018 work on the ecosystem as discontinued. The state government continues to develop a fund that will draw on environmental payments, however

[81] https://www2.mppa.mp.br/noticias/mppa-recomenda-suspensao-temporaria-de-revisao-do-plano-diretor-de-Belém.htm.

the new Environmental Compensation Fund (FCA) will focus on directing these resources to the conservation of state protected areas. More recently, in 2019 the State Government established a new fund, the Eastern Amazon Fund (FAO), to support state economic development. The fund has thirteen axes of action, including axis 9 on promoting the quality of the state's cities, particularly with regards to sanitation and solid waste.[82] To date the institutional framework and funding sources for this have not been defined.

GREATER FLORIANÓPOLIS METROPOLITAN REGION (FLORIANÓPOLIS RM)

Introduction

Located on the coast of south-eastern Brazil and within the Atlantic Forest, the Metropolitan Region of Greater Florianópolis (Florianópolis RM) is composed of nine municipalities. With a population of 1.2 million in habitants, it is the 21st largest metropolitan region in the country, and one of the fastest growing RM from an economic point of view, fueled by the presence of industry within the region complemented by an increasingly specialized service-based economy centered in Florianópolis City, which is known as "Brazil's Silicon Valley". This is also thanks to a strong presence of universities, incubators and think-tanks that promote technological innovation, especially in the IT sector and side-by-side with industry. Santa Catarina Island, where Florianópolis is located, is also an important touristic destination in the country for both national and international tourists.

The geographical configuration of Florianópolis RM naturally pushes development towards the coast and into Santa Catarina Island, to the extent that the terrain in rugged and dominated by mountains, especially in the southern flank, with the presence of Serra do Tabuleiro mountain chains (IBA, KBA and AZE site), which are to a great extent protected. Even Santa Catarina Island displays escarpments that reach up to 500m and equally pushes development towards low lying areas and the coast. Several protected areas (PAs) are also present on the Island. All these elements create physically constrained conditions for urban development and make integrated spatial planning a necessity for the RM as a whole. Albeit this constraints, urban sprawl is a reality in Florianópolis RM and a central challenge for local governments.

Key challenges to sustainable urban development

Florianópolis RM's most significant sustainable urban challenges are representative of Brazilian mid-sized metropolitan areas. They are primarily linked to rapid and poorly managed population growth combined with insufficient integrated urban planning, especially in environmentally-sensitive area, namely the Atlantic Forest and in an island setting. Between 1993 and 2013, the population of Florianópolis RM grew by 166% and urban areas land use soared to by an astonishing 218%. This means that the urbanized area within Florianópolis RM area has grown at an average rate of more than 3% per year since 1990, consolidating urban sprawl trends.[83] Such trends place serious pressures on natural, in particular on the fragile ecosystem of Santa Catarina Island, where Florianópolis is located and on the adjacent coastal zones, leading to environmental biodiversity degradation in the Atlantic Biome.

One of the key factors contributing to the urban sprawl is the monocentric nature of Florianópolis city. A significant proportion of the innovation, IT and service sectors are located on the island, and almost all tourism is also located there. Industry, in turn, is mostly located in the continent, along Highway BR-101. Economic opportunities for different social segments are quite widespread across the RM's territory, but due to complex market settings, housing preferences still point out to the island, fueling land speculation. In fact, the spread of urban sprawl within the RM happens both on the island and on the continent. There may be fewer informal low-income settlements in Florianópolis RM than in other Brazilian cities, but the poorly planned spread of low-lying housing developments across the landscape clearly characterize sprawl (Figure 10).

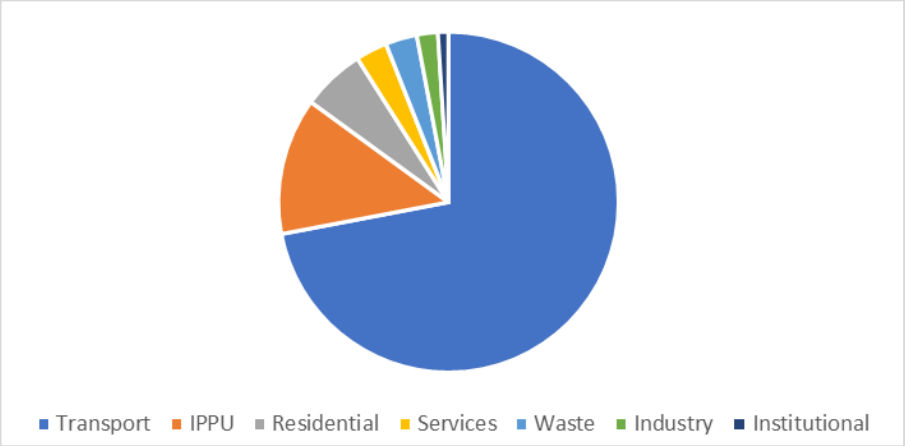
[82] http://www.ioepa.com.br/pages/2019/2019.10.16.DOE.pdf, page 4.
[83] Atlas of Urban Expansion

Figure 10 – Visual assessment of urban sprawl in Florianópolis RM (1985-2020) and of a traffic bottleneck

There are just two bridges from the mainland to the island, and almost all public transport passes through the island as it journeys from the continent's north to south and vice-versa. It is estimated that 89,000 vehicles journey to the island each day from the mainland.[84] This represents almost a fifth of Florianópolis RM's population. The monocentric nature of the city and the significant vehicle flow within a small area (as in the bottleneck shown in Figure 10) leads to traffic jams and consequently significant GHG gas emissions and air contaminants.

Florianópolis RM's emission profile reflects this situation (Figure 11). A GHG inventory was prepared in 2015 at the level of the metropolitan region (base year 2013) within the scope of the Emerging and Sustainable Cities Initiative (ICES), financed by the IADB and Caixa Econômica Federal. The inventory highlighted that the transport sector is the largest emitter (72%) within the RM, mainly due to the consumption of gasoline by the road fleet, followed by the IPPU sector (industrial processes and use of products) (13%) and the residential sector (6%).[85]

Figure 11 – GHG Emissions profile of Florianópolis Metropolitan Region (2013)



From a biodiversity point of view, it is worth noting that Florianópolis RM is located near the southern limits of the Atlantic Forest's distribution. One of the six biomes of Brazil, the Atlantic Forest is home to approximately 72% of the Brazilian population. It provides invaluable ecosystem services, despite the fact that most of its coverage has almost completely disappeared with only 8% to 12.4% of forest fragments remaining. In 2000, the Atlantic Forest was recognized as a biodiversity hotspot. It extends for more than 3,000 km along the Brazilian coast and only 30 ° degrees of latitude. The Atlantic Forest presents the most significant latitudinal variation of all ecoregions in Brazil. Added to the fact that Santa Catarina Island is one of the few islands along the Brazilian coast, biodiversity significance of Florianopolis RM cannot be understated, neither can the level of threat that this biodiversity is under.

[84] https://www.nsctotal.com.br/noticias/sensores-mostram-que-89-mil-veiculos-entram-na-ilha-de-sc-por-dia.
[85] https://www.pmf.sc.gov.br/arquivos/arquivos/pdf/27_08_2015_9.27.58.f256adc2f8bf21d6481e39eb1b350a0d.pdf.

Santa Catarina state maintains its own record of endangered species for fauna and flora that was first published in 2011. The list included 71 species considered critically endangered (CR), 68 species endangered (EN) and 122 considered (VU), totaling 261 threatened species in the state. In addition to these 261 species that are at risk of threat, 8 other species were considered extinct regionally (RE), meaning that there have been any sightings of them within the state for a while. An updated and 'Official List of Species of Flora Threatened with Extinction in the State of Santa Catarina' was published in 2014. It contains 269 species distributed in the following categories: extinct in nature or presumably extinct (126), critically endangered (13), endangered (7) and vulnerable (123). Hence, from these accounts, the level of threat to biodiversity is in the increase.

The impacts on biodiversity of habitats conversion and fragmentation resulting from urban expansion are visible (e.g. Figure 10). These threats lead to decline of species' populations and the isolation and reduction of their habitats, reduction of gene flow, increasing the vulnerability of species. Also, not all homes in Florianópolis RM have treated sewage and much of it ends up spill into watercourses and the sea. Combined with water pollution from industry, this causes hypoxia in aquatic environments. Mass tourism impacts beaches, including nesting sites for marine turtles. Forest fires are also frequent.

Nationally and globally important and threatened species of mammals are found in the forests and seascapes within Florianópolis RM, including the some that are red-listed, among them the South American tapir (*Tapirus terrestris*), the white-lipped peccary (*Tayassu pecari*), both of which are classified as vulnerable by IUCN. Among species of cetaceans it is worth mentioning the La Plata river dolphin (*Pontoporia blainvillei*), the *Eubalaena australis*, *Balaenoptera borealis* classified as endangered by IUCN. Other terrestrial species are considered 'vulnerable' according to national red lists: the primate brown howler (*Alouatta guarib*a), wild cats such as the southern tigrine (*Leopardus guttulus*) and the margay (*Leopardus wiedii*), the ongulates pygmy brocket (*Mazama nana*) and the pampas deer (*Ozotoceros bezoarticus*), in addition to apex predators such as the sperm whale (*Physeter macrocephalus*), the cougar *Puma concolor* and the jaguarundi (*Puma yagouaroundi*). Also, a few species bird that are endemic to Atlantic forest find habitat in the forests of the southern part of region which make up the limits of their distribution: the east Brazilian pygmy owl (*Glaucidium minutissimum*), the crescent-chested puffbird (*Malacoptila striata*), the pin-tailed manakin *Ilicura militaris* (tangarazinho) and the brassy-breasted tanager (*Tangara desmaresti*).

At the same time, Florianópolis RM harbors a number of important Protected Areas (PAs), including the Environmental Protection Area (APA) Baleia Franca (a marine PA with over 15,000 ha), Tabuleiro Mountains State Park (with 83,908 ha, straddling some of the municipalities in the southern part of the RM), Carijós Ecological Station (a strict nature reserve with 759.3 ha located in two small bays on the northern part of Santa Catarina Island), Pirajubaé Marine Extractive Reserve (1,687.0 ha), Rio Vermelho State Park (1,540 ha), APA Anhatomirim (a coastal-marine area with 4,437 ha), in addition to several private PAs, natural monuments, among others. Tabuleiro Mountains have already been recognized internationally for its importance as an important bird area (IBA), a key biodiversity area (KBA) and an Alliance for Zero Extinction (AZE) site.

The PA Carijós Ecological Station is particularly relevant due to its global environmental importance and location within the city perimeter. The PA was created in 1987 to protect a significant part of the remaining mangrove ecosystems on Santa Catarina Island and its genetic diversity. The Reserve and its buffer zone are a part of the Atlantic Forest biome and comprise marshes, *restinga* forests (i.e. on a sand bank), coastal vegetation, as well as two large areas of mangroves within the mentioned small bays (Ratones and Saco Grande). These areas that serve as breeding sites for numerous marine species. Pirajubaé Marine Extractive Reserve was established in 1992 upon request from local fishermen/women as a sustainable resources use PA. Both Carijós and Pirajubaé PAs provide invaluable ecosystem services for Florianópolis RM, based on the areas' biodiversity and the legal protection accorded to them. Artisanal production of fish and crustaceans that takes place within the areas is also important for the broader sustainability agenda.

While PAs in RM of Florianópolis certainly play an important role in both conservation and in shaping urban land uses and developments, the role unprotected green areas still need to be better established. The lack of reliable spatial data beyond the PAs is a clear impediment to the expansion of conservation measures. This is particularly important, when not all PAs have management plans and require innovative approaches to fight habitat fragmentation.

Box 3 – Greater Florianópolis RM: Demography, economic aspects and general information

Florianópolis Metropolitan Region

See complete set of indicators in https://fnembrasil.org/regiao-metropolitana-de-florianopolis-sc/

RM is located on the southern coastal of Brazil and, more specifically, at near the southern limit of the Atlantic Forest biome and part of the coastal Atlantic forest ecoregion. The climate is humid subtropical (Köppen classification: Cfa). The metropolitan land- and seascapes includes an important Atlantic island (Florianópolis), peninsulas, bays, coves and a large number of beaches that are with high recreational values. The inland areas are heavily urbanized, with an important presence of industries and wholesale trade businesses, and it is cut across by a major national transport artery (highway BR-101).

Florianópolis Metropolitan Region

See complete set of indicators in https://fnembrasil.org/regiao-metropolitana-de-florianopolis-sc/

State
Santa Catarina

Metropolitan region municipalities[86]
Águas Mornas, Antônio Carlos, Biguaçu, Florianópolis, Palhoça, Santo Amaro da Imperatriz, São José, São Pedro de Alcântara and Governador Celso Ramos.

Combined area, including seascape surfaces within municipal jurisdiction:
2,762.1 sq km

Population (IBGE, 2016)
1,152,115
Demographic density (Atlas Brasil)
374.16 inhabitants/km²
Population growth rate (Atlas Brasil)
2.07% per year between 2000 and 2010

Human development index - HDI (IBGE, 2010)
0.815
GDP per capita (IBGE, 2015)
7,086.32 USD
Gini Index (2010 Census)
0.52

Credit rating (CAPAG)
Florianópolis (note C), São José (grade N/A), Palhoça (note A), Biguaçu (note A), Santo Amaro da Imperatriz (grade N/A), Governor Celso Ramos (note C), Antônio Carlos (note A), Águas Mornas (grade N/A), São Pedro de Alcântara (note A), Demerval Lobão (note C)

Greenhouse gas emissions (2013)[87]
2,045,841 t CO2e, 2.17 tCO2e per capita

Committed to achieve the SDGs through the Sustainable Cities Programme?
Municipalities of the Florianopolis metropolitan region are yet to become signatories.

Laws that instituted the Metropolitan Region
State Complementary Law No. 495/2010
Redefined by Complementary Law No. 636/2014

Key metropolitan institutional arrangements and planning instruments

[86] Florianópolis RM is in the process of expanding its geographical scope, as per data from the National Forum for Metropolitan Regions (FNEM). See https://fnembrasil.org/. For the purposes of this project, we are considering only the core nucleus in the RM.
[87] https://www.pmf.sc.gov.br/arquivos/arquivos/pdf/27_08_2015_9.27.58.f256adc2f8bf21d6481e39eb1b350a0d.pdf.

The following table summarizes Florianópolis RM's metropolitan arrangements with regards to conformity with the Metropolis Statute.

Table 17 – Greater Florianopolis Metropolitan Region conformity with the Metropolis Statute

Minimum elements for full management according to the Metropolis Statute	Situation of the Metropolitan Region of Florianópolis		
Formalization and delimitation through Complementary Law	Complementary Law No. 636/2014		✓
Inter-federative Governance Structure	Executive body with representatives of the Executive Branch of the Federative Entities	Superior College	✓
	Deliberative collegiate body with representation from civil society	CODERF	✓
	Public organization with technical advisory functions	SUDERF	✓
	Integrated system for resource allocation and accounting	--	⊘
Approved PDUI	Terms of reference were prepared, but development of the plan is subject to state law		⊘

Legal framework and institutional arrangements

The Metropolitan Region of Florianopolis has made some advances in conforming with the Metropolis Statute to promote effective metropolitan management, operations and planning. In 2014, by complementary law no. 636/2014 it was designated a metropolitan region comprising the current nine municipalities. That law also defined the 'Superior College', a body comprising the mayors of each municipality and the state governor, the Greater Florianópolis Metropolitan Region Development Committee (CODERF) and the Superintendence of Development of the Metropolitan Region of Greater Florianópolis (SUDERF). All three are in operation. On the latter two, CODERF is the normative and deliberative body of the metropolitan region, comprising three representatives of the state of Santa Catarina, three representatives of civil society and one representative of each of the nine municipalities. SUDERF is the metropolitan body with administrative, budgetary, financial and patrimonial autonomy responsible for coordinating the implementation of state policies for regional and urban development.

While RMF has made advances in metropolitan governance, these institutions still struggle to execute their functions effectively. SUDERF, the operational arm, currently has insufficient human, technical and financial resources for facilitating integrated urban planning and management. There is also weak political interest in integration within the region, combined with insufficient knowledge about the benefits of integrated planning for promoting urban development. Despite the presence of initiatives at the metropolitan scale such as the PLAMUS (see next section), most urban development plans and actions are implemented at the municipal level. Coordination between municipalities, and between municipalities and the state government continues to be difficult, in part due to different political alignments and also due to a reluctance of municipalities to give up part of their limited budget for metropolitan activities.

Planning

Florianópolis RM, under SUDERF's guidance, has advanced metropolitan integrated planning. In 2015 a public tender was launched to establish the PDUI of the Greater Florianópolis Metropolitan Region (PDUIGF). However, the winning bid selection process has not yet advanced. As of September 2015 the estimate to undertake the plan was approximately USD 1,300,000 (based on exchange rates of the time). The PDUI will align with the State of Catarina's SC 2030 Plan: State Development Plan for 2018-2030, which outlines objectives, indicators, targets and strategic actions aimed at reducing inequalities and promoting social equity through sustainable regional development.

While development of the PDUI has not progressed, metropolitan planning has advanced on mobility. In 2015 the Sustainable Urban Mobility Plan (PLAMUS) was finalized. PLAMUS is considered the first Florianópolis metropolitan project and was developed with the support of BNDES. It aims to facilitate the development and implementation of solutions for urban mobility in the Greater Florianópolis area. It also served as a reference for each municipality to develop its own mobility plan (in accordance with federal law). In connection with the PLAMUS, the Federal University of Santa Catarina (UFSC) created the Urban Mobility Observatory with the mission of monitoring the evolution of public policies on urban mobility in Florianópolis RM. In the same year, a GHG inventory was also elaborated for the metropolitan region (as described above). However, Florianópolis RM does not have a climate action plan.

At the municipal level, the Florianopolis Municipality has developed several plans on issues related to sustainability, environment, innovation and mobility:

- 2021 revision of its master plan. While the Florianopolis municipality has master plan in place (complementary municipal law 482/2014), in 2021 it has begun a process to update its master plan.[88]
- Sustainable Florianópolis Action Plan (2015), which also consists of a climate action plan, was developed through the Emerging and Sustainable Cities Initiative (ICES) of the Inter-American Development Bank (IDB) in partnership with Caixa Econômica Federal;
- Municipal Plan for the Recovery and Conservation of the Atlantic Forest (PMMA) (2020), which aims to identify Atlantic Forest fragments in the municipal territory and promote conditions for its conservation and recovery;
- Living Lab Florianópolis (2018), created through the Florianópolis Innovation Network and which aims to facilitate the implementation of innovative solutions in Florianopolis for the smart urban development of the city;
- Smart Floripa (2019), a strategy for transforming Florianópolis into a smart and sustainable city;
- Floripa Efficient City Program, launched in November 2019 together with the Brazilian Council of Sustainable Construction, for promoting effective energy consumption management and energy efficiency of the city's buildings.

Integrated planning platforms

At the metropolitan level there is no integrated platform that allows access to data, maps and information for decision making. At the local level the Municipalities of Florianopolis and Antonio Carlos have limited geospatial platforms:

- Florianopolis Municipality: http://geo.pmf.sc.gov.br/ and GEOFLORIPA http://geoportal.pmf.sc.gov.br/article/geofloripa;
- Antonio Carlos Municipality of: http://geo.antoniocarlos.sc.gov.br:8888/geo_ac/.

Finance and key baseline projects

Refer to annex Q for a list of the key baseline projects related to the sustainable urban development of Florianópolis RM.

While the development of PLAMUS was a key advance on metropolitan planning, one of the key challenges that Florianópolis RM has faced since the plan's completion is to finance its actions. It has advanced, including with the support of the GIZ FELICITY project, in undertaking detailed life-cycle cost analysis for the introduction of electric buses in accordance with PLAMUS.[89] However it has not yet identified investment for an electric bus project. Florianópolis RM has struggled to identify funds for investing in issues of common public interest. Part of the challenge links back to the aforementioned coordination challenges and the economic situation of the municipalities, leading to reluctance to give up part of their public coffers for pooling funds to address issues of common interest. Furthermore, low technical capacity and limited human resources of SUDERF has affected the structuring of projects that might be of interest to municipalities and potential national and international financiers.

GREATER TERESINA RIDE – TIMON-TERESINA URBAN AGGLOMERATION

Introduction

Located in one of the poorest and warmest regions of Brazil, with temperatures regularly above 40 °C, the Greater Teresina Integrated Development Region (RIDE) has a population of almost 1.2 million habitants[90] and is composed of 15 municipalities. Almost 11,000 km^2 in size,[91] it consists of an urban agglomeration containing Timon, of the Maranhão State, and Teresina, Capital of the State of Piauí. In addition to this agglomeration, Greater Teresina RIDE includes municipalities with small urban areas, peri-urban areas and rural areas. The Timon-Teresina urban agglomeration, with a population of more than one million inhabitants, is an economic center for the Brazilian north-east, with Teresina alone representing approximately 25% of its state's GDP. Since the 1960s the agglomeration has experienced rapid growth, with rates of over 4.5% a year in the 1970s and 1980s and over 2% since then.[92] This population growth is also combined with poverty: by GDP per capita, the States of Piauí and Maranhão are the two poorest in the country.[93] Together, the two contribute to just 2.1% of Brazil's GDP.[94]

[88] http://ipuf.pmf.sc.gov.br/plano-diretor/plc2021/.
[89] https://www.giz.de/en/downloads/giz2019-felicity-transport-brazil.pdf.
[90] https://www.ibge.gov.br/estatisticas/sociais/populacao/9103-estimativas-de-populacao.html?=&t=downloads.
[91] https://antigo.mdr.gov.br/images/stories/ArquivosSNSA/Arquivos_PDF/Diagn%C3%B3stico_do_Saneamento_B%C3%A1sico_da_Regi%C3%A3o_Integrada_de_Desenvolvimento_RIDE_Polo_Grande_Teresina-PI.pdf, page 14.
[92] https://semplan.pmt.pi.gov.br/teresina-em-numeros/.
[93] https://biblioteca.ibge.gov.br/visualizacao/livros/liv101765_informativo.pdf.
[94] https://censo2021.ibge.gov.br/2012-agencia-de-noticias/noticias/29447-quinze-estados-tem-pib-acima-da-media-nacional-em-2018-sergipe-e-o-unico-com-queda.html.

Key challenges to sustainable urban development

The challenges faced by Greater Teresina RIDE and in particular the Timon-Teresina agglomeration are typical of cities in Brazilian's the north-east. It is these 'middle-sized' urban areas that are continuing to experience growth (see section 2(i)), however, they have little financial or human capacity to plan and manage the urban and environmental pressures that come with this. The combination of population growth, primarily of poor rural migrants, low municipal incomes (due to the state financial situations), low municipal capacity, coordination challenges of managing an agglomeration across two federal states, as well as a hot harsh climate, have led to multiple urban challenges for the Timon-Teresina agglomeration. The agglomeration is growing with a focus on monocentric model that prioritizes individual motorized transport. This has led to a polluted and somewhat chaotic urban center that skirts out into horizontal urban expansions, with low density housing that extend the urban peripheries. The expansion of the outskirts of the city has resulted in the creation of poverty clusters deprived of basic infrastructure, public services and economic opportunities. This is because investments in planned urbanization did not follow the same pace as the demand for housing at a time with the cities – especially Timon and Teresina – were receiving large relatively high fluxes of migrants from rural areas.

Since 2014, the number of passengers of the public transport system has decreased by 17%, while in the last nine years the vehicle fleet has increased by 216%.[95] Individual motor vehicles are a prevailing means of transportation in the agglomeration. Additionally, a large part of the Teresina city dwellers has migrated to the suburbs, reducing the functions of the city center to commerce and services. The central area remains empty during nights and weekends raising security concerns. Revitalizing the city center poses a challenge to the Teresina government: considering that many work in Teresina but lives in Timon due to lower property prices, the challenge of revitalizing the city center can only be solved in a coordinated manner. While there is no official GHG inventory of the Timon-Teresina Urban Agglomeration, non-governmental organizations estimate that the three areas of transport, waste and buildings make up close to 80% of its emissions.[96]

On biodiversity, the Timon-Teresina Urban Agglomeration has a privileged location in a transition area between two biomes (Caatinga and Cerrado), rich in biodiversity. However, the municipalities expanded chaotically as a result of urban sprawl over areas of environmental significance. This contributes to creating not only social but also climatic and environmental vulnerabilities. Poorly managed urban expansion resulted in various environmental problems, including the exacerbation of the heat island effect, deforestation, reduced water retention, floods etc. From a biodiversity significance point of view, both Cerrado and Caatinga are important biomes. The latter is an exclusively Brazilian biome that spreads into an area of 912,529 km2 into the interior drylands of northeastern Brazil.

Caatinga is considered a rich and complex socio-ecological system that still harbors a unique natural and cultural heritage of global importance. It is considered the largest and the most seasonally diverse dry tropical forest in the New World. Endemic species ranges from 6% in mammals to a surprising 52.9% in fish. These figures are very impressive for a semi-arid region, but they are not definitive, as Caatinga is not well studied, and new species can still be found.

Cerrado is, in turn, a neotropical savanna ecosystem that occupies about 2 million km2, or 22% of the Brazilian territory, and is located in the heart of South America. This biome, which hosts biological diversity comparable to humid forests such as the Amazon and the Atlantic, has suffered intense degradation of its habitats and is therefore considered one of the 35 biodiversity hotspots in the world. There are more than 12,070 known flora species, of which 44% are endemic. Cerrado's flora includes 645 species that are threatened with extinction, which represents more than 30% of the species present in the red list of Brazil.

Both Caatinga and Cerrado are sub-humid biomes and share some ecological characteristics that include a long dry season and occurrences of dense forests are interspersed with grasslands (herbaceous cover). Within the transition zone between Cerrado and Caatinga, specific habitats can be noted, including of paleontological interest. An update to the national conservation gap analysis carried out in 2016 pointed out that, as a transition zone between two major biomes, the area where Greater Teresina RIDE constitutes a very high priority for conservation.[97] However, very little has been done and the level of biodiversity protected accorded to habitats is considered low. Only a single official PA registered in the National Protected Area System (SNUC), 170 hectares in size, is found within the metropolitan landscape which straddles 1.1 million hectares – the National Forest "FLONA" Palmares. Furthermore, FLONA Palmares does not have a management plan. It should also be stressed that, similar to other FLONAs, Palmares is considered a 'production forest', meaning that conservation is not its primary purpose, but secondary. Greater Teresina RIDE harbors otherwise two private reserves, one in the municipality of Teresina and the other in Altos. They were created respectively in 1999 and 1998. Together their surfaces add up to 265 hectares, but with no publicly available information on their conservation and implementation status.

[95] Denatran, 2010-2019
[96] http://plataforma.seeg.eco.br/cities/statistics.
[97] MMA (2016). Áreas Prioritárias para a Conservação, Utilização Sustentável e Repartição dos Benefícios da Biodiversidade

As for urban green areas, Teresina has 271 squares and 34 'environmental parks' that together add up to an area of 226.8 hectares. In addition, the city is home to the Zoobotanic Foundation, which reports to the state government. The Foundation manage an area of 137 hectares, the Agricultural Sciences Center of the Federal University of Piauí (UFPI), with 63 hectares, an area of 400 hectares belonging to the Brazilian Agricultural Research Corporation – EMBRAPA. There are in addition the Botanical Garden managed by the municipal government of Teresina and with an area of 38 hectares that can present value for biodiversity and ecosystem connectivity vis-à-vis other urban green areas. There is also has a reserve of public areas within the urban polygon, with approximately 1,000 hectares. Those urban green areas can add value for conservation and have been mapped as part of the Agenda Teresina 2030. Some of them can come under consideration for PA proclamation with the help of the project.

Box 4 – Greater Teresina RIDE: Demography, economic aspects and general information

Grande Teresina Integrated Development Region (RIDE) and focus on the Urban Agglomeration Timon-Teresina within it

See complete set of indicators in https://fnembrasil.org/regiao-administrativa-integrada-de-desenvolvimento-do-polo-grande-teresina-ma/

The Greater Teresina RIDE is located at the transition between the Caatinga and Cerrado biomes, in a relatively dry inland region of the Northeast. The climate is a tropical wet and dry (Köppen classification: Aw). The metropolitan landscape is cut across by Parnaíba river that provides natural green corridors, interrupted along the banks by the urbanized areas the compose the urban agglomeration Timon-Teresina.

State(s)
Piauí and Maranhão
RIDE's municipalities
15 municipalities, 14 located in the State of Piauí and 1 in the State of Maranhão: Altos, Beneditinos, Coivaras, Curralinho, Demerval Lobão, José de Freitas, Lagoa Alegre, Lagoa do Piauí, Miguel Leão, Monsenhor Gil, Nazária, Pau d'arco, Timon (Maranhão), União and Teresina (capital of Piauí).

Combined area:
11,072.5 sq km

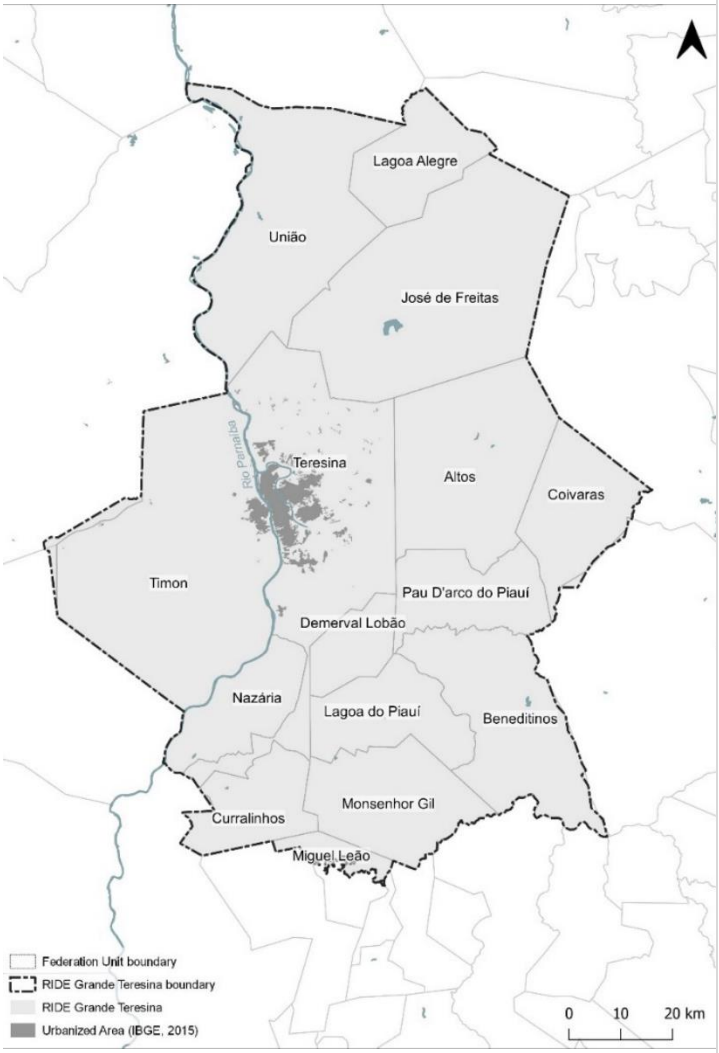
Population (IBGE, 2016)
1,154,716
Demographic density (Atlas Brasil)
100.53 inhabitants/Km²
Population growth rate (Atlas Brasil)
1.33% per year between 2000 and 2010

Human development index - HDI (IPEA, 2017)
0.750
GDP per capita - Municipality of Teresina (IBGE 2010)
4,035.54 USD
GDP per capita - Municipality of Timon (IBGE 2010)
1,717.35 USD
Gini Index (2010 Census)
0.5273 (calculated from the average sum of municipalities)

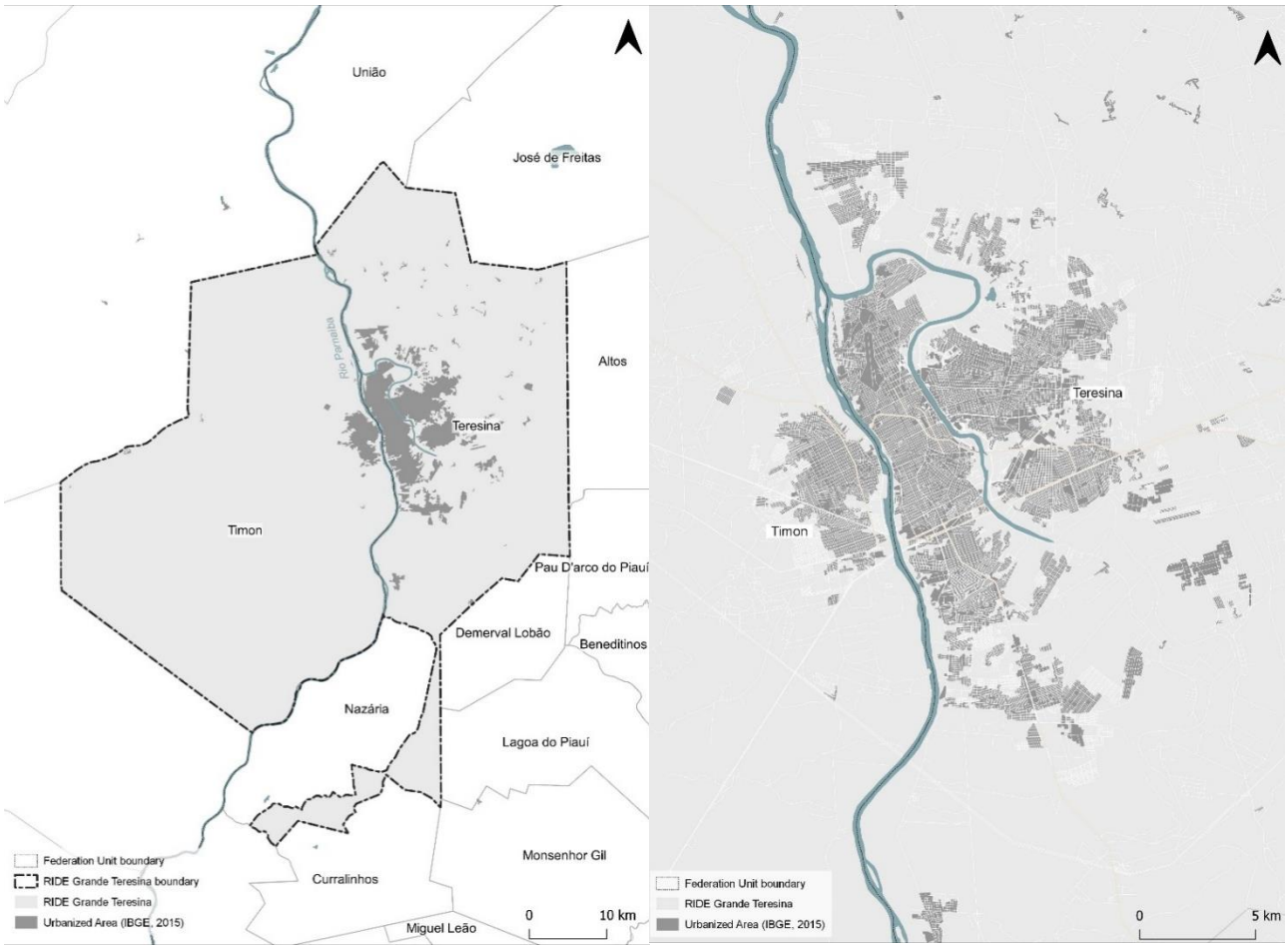
Credit rating (CAPAG)
Teresina (grade B), Benedictines (grade C), Coivaras (grade C), Curralinhos (grade N/A), José de Freitas (grade B), Lagoa Alegre (grade N/A), Lagoa do Piauí (grade C), Miguel Leão (grade B), Monsignor Gil (grade N/A), Nazária (note C), Pau D'Arco do Piauí (grade N/A), União (grade N/A), Timon (note C)

Greenhouse gas emissions
Unknown (no official sources)

Committed to achieve the SDGs through the Sustainable Cities Programme?
Teresina (other municipalities of the RIDE are not yet signatories)



Map of the Timon-Teresina Urban Agglomeration - details



Law that instituted the RIDE
Complementary Law No. 112, of September 19, 2001, regulated by Decree No. 4,367, of September 9, 2002, which was revoked and replaced by Decree No. 10.129 of November 25, 2019

Key metropolitan institutional arrangements and planning instruments

Legal framework and institutional arrangements

One of most significant institutional challenges that the municipalities of Timon-Teresina Urban agglomeration face is related to coordinating across federal state boundaries. Although they are practically the same city and people cross between the cities with ease, from a jurisdictional point of view Teresina is located in the State of Piauí and Timon in the State of Maranhão. The Federal Government's creation of Greater Teresina RIDE as a legal entity was created exactly to support state and municipal governments in addressing this challenge. The main objective of Greater Teresina RIDE is to promote regional development through joint efforts in the areas of infrastructure, job creation and capacity building. To facilitate coordination, stakeholders within the RIDE require an active participation of the Ministry of Regional Development (MDR). The Ministry's Executive Secretary is designated as President of the RIDE's council, the COARIDE, as a standard procedure for each RIDE being consolidated. Unfortunately, the bureaucratic and political structure, involving the Federal Government, two states and multiple municipalities leads to a complicated and heavy institutional structure. In the case of Greater Teresina RIDE, the institutional arrangements determined by decree have not been operationalized in practice. Additionally, many municipalities within the RIDE are located far away from each other and they are essentially rural, meaning that they do not display metropolitan (or urban agglomeration) dynamics. For those other municipalities (besides Timon and Teresina), the integrated efforts may not be justified or necessary, especially as they may require municipal financial contributions.

As a special regional development area with peri-urban and rural areas, Greater Teresina RIDE does not have to conform to the Metropolis Statute. Technically, however, the Timon-Teresina urban agglomeration does have to comply, as it comprises a significant inter-jurisdictional urban area (more than one million inhabitants). However, to date the agglomeration has not established any

arrangements that would conform with the Metropolis Statute. At the level of the RIDE, decree 10.129/2019 established the Administrative Council of the Greater Teresina Integrated Development Region (the Greater Teresina COARIDE), consistent with the National Policy for Regional Development (PNDR), decree 9.810/2019. The main goal of the Administrative Council for the Greater Teresina Integrated Development Region is planning, monitoring and evaluation of activities to be developed at the level of Integrated Economic Development Region (RIDE) Grande Teresina. Unfortunately, the principles of the Council have not yet been put into practice.

Table 18 – Timon-Teresina Urban Agglomeration's conformity with the Metropolis Statute

Minimum elements for full management according to the Metropolis Statute	Situation of the Timon-Teresina Urban Agglomeration		
Formalization and delimitation through Complementary Law	Complementary Law 112/2001 and decree No. 10.129/2019 (for the RIDE).		✓
Inter-federative Governance Structure	Executive body with representatives of the Executive Branch of the Federative Entities	Administrative Council of the Greater Teresina Integrated Development Region (the Greater Teresina COARIDE)	✓
	Deliberative collegiate body with representation from civil society	--	⊘
	Public organization with technical advisory functions	--	⊘
	Integrated system for resource allocation and accounting	--	⊘
Approved PDUI	--		⊘

Notwithstanding the institutional and political challenges, coordinated urban development in Teresina and Timon agglomeration is already taking place thanks to collaboration between these municipalities. The municipalities have not established a formal cooperation structure for integrated urban planning; however, they have advanced such a body for transport, one of their key urban issues. The Intermunicipal Consortium for Urban Mobility, established in 2016, manages a collective public transport line that connects the two cities and explores transport issues of common public issue. This is a positive beginning but the need for a wider coordination is urgent. While the broader RIDE institutional issues may be challenging to overcome in the short- to medium-term, cooperation at the Timon-Teresina agglomeration level is more feasible.

Planning

In 2014 the Federal Government developed an action plan for Greater Teresina RIDE, which identified strategic lines of common public interest in areas such as sanitation, infrastructure, local economic development and environmental management. Unfortunately, there have not been signs that the plan has been implemented, primarily due to a lack of interest of the municipalities. This is the only regional or metropolitan plan developed to date: the Timon-Teresina agglomeration has not developed any integrated plans. There are no integrated plans on climate change, no GHG inventories, no metropolitan plans on environmental management or biodiversity conservation.

At the municipal level, Teresina has been active in undertaking urban planning and promoting sustainable urban development. A key focus is on revitalizing (urban infilling) of the city center and on addressing the significant traffic congestion challenges that are shared with Timon. In general, the city of Teresina has an extensive collection of high-quality plans covering various social, economic and environmental areas. Many of these plans include detailed management and monitoring actions, demonstrating willingness among decision-makers to improve the status quo. Over the past years the city has struggled to implement these series of urban development plans. However, in the last two years this is starting to be addressed (although the COVID pandemic is now negatively affecting this), including through CAF and AFD investments (see finance section below). Key plans developed by Teresina:

- Master Plan for Territorial Planning, PDOT (2019), decree 5.481/2019 for the Teresina municipality, which covers more broadly a number of topics of environmental interest, including mitigation, resilience and also biodiversity;
- New Center Action Plan (2019), decree 18.913/2019. Plan developed identifying a series of interventions to promote the regeneration of the city center, including as related to paving of sidewalks, promotion and prioritization of non-motorized and public transport, and beautification and restauration of green spaces;
- Sustainable Urban Mobility Plan (PDMUS), Currently under development, the plan aims to develop a vision for sustainable urban transport systems aligned with the PDOT.
- Local climate action plan, including municipal GHG inventory and vulnerability and risk assessment. Currently under development with the support of CAF.

The municipality of Timon does not currently have any significant municipal plans.

FLONA Palmares is the only PA within Greater Teresina RIDE and the area itself does not yet have a management plan. There are few *ad hoc* initiatives, such as the Project for creating a paleontological park on Poti river in Teresina[98], and the new environmental education initiative titled Climate Observatory of Teresina. The latter is aimed training annually more than 3,000 children and youth.

At the same time, the PDOT includes clear prescriptive guidance on biodiversity, in particular on the need for mapping and demarcating all the Permanent Preservation Areas (APP) found within the municipality, proclaiming them as protected areas, whether they are covered or not by native vegetation. The PDOT recognizes that these APPs have the environmental function of conserving water resources, the landscape, maintaining geological stability and biodiversity. Still, the implementation of this guidance will take time.

Integrated planning platforms

No integrated urban planning platforms exist at the RIDE or Timon-Teresina Urban Agglomeration levels. At the municipal level, Teresina has advanced with a series of urban service and support platforms. Key platforms are:

- Agenda 2030 Teresina. A pilot platform for facilitating civil society awareness of urban behavior and supporting integrated planning. It uses an open-source platform and data and is currently used for local government and civil society testing. It contains 46 maps and 140 datasets, however many of these are test maps: https://agenda2030.carto.com/me.

- The Mobility Observatory. Financed through a EUR 500,000 Euroclima contribution and being implemented by AfD, the observatory will use blockchain technology to serve as a public transport information platform for the Municipality. It aims to improve the city's public transport services, including by providing reliable transport information to the public and reducing GHG emissions. The information will include information on, inter alia, timetables, delays, travel time, and number of passengers. While the project started in 2019, the observatory is not yet online for public use.

Finance and key baseline projects

Refer to annex Q for a list of the key baseline projects related to the sustainable urban development of the Greater Teresina RIDE.

No integrated investments have been financed at Greater Teresina RIDE and Timon-Teresina Agglomeration levels. At the municipal level, Teresina has been successful in obtaining national and international financing for a series of sustainable urban investments. However, none of the projects implemented to date was coordinated with the municipality of Timon, limiting the positive impacts of these investments. Key projects:

- Sustainable Teresina Program. Financed by the Development Bank of Latin America (CAF)[99] with a loan of up to USD 45 million,[100] the program aims to contribute to the economic, social and environmental development of Teresina through interventions in urban mobility, low-income housing, urban-environmental requalification and in improving municipal management;

- Teresina 2030. Discussion is underway with the French Agency for Development (AfD) with regards to a EUR 36 million loan for implementing a series of sustainable development actions in Teresina, including implementation of green corridors, housing improvement works, construction of rain galleries and pavements, renovation of City Park, a public policy innovation lab.

[98] See e.g. https://www.inaturalist.org/projects/biodiversidade-da-floresta-fossil-do-rio-poty-teresina-pi-brasil.
[99] See more information at: https://semplan.teresina.pi.gov.br/programa-teresina-sustentavel-caf/
[100] http://semplan.teresina.pi.gov.br/wp-content/uploads/sites/39/2018/10/Publicacao_1199318_DMF_Mun._de_Teresina_PI_x_CAF___Teresina_Sustentavel___17944.102108_2017_35-1.pdf.

Figure 12 – CAF investments on sustainable transport in the center of Teresina

Green = Improved pavements; blue lines = improved pavements and bike lanes; red lines = bike lanes.

3) Proposed alternative scenario with a description of project components, outcomes, outputs and deliverables

Introduction

The baseline section has sought to highlight that many problems that Brazilian cities face, such as urban sprawl, polluted car-centric city-centers and limited urban green spaces, are due to a lack of integrated urban planning. Without such planning, urban development in Brazil will continue to follow an unsustainable model that results in a suite of environmental problems, including excessive and growing GHG emissions and negative impacts on biodiversity. The baseline also highlighted that it is the middle-sized metropolitan regions that are growing the most significantly and are the most ill-equipped for responding to these challenges.

Responding to this baseline, this project aims to support Brazilian metropolitan regions to undertake integrated urban planning to accelerate sustainable urban development, leading to global environmental benefits and social, economic and environmental co-benefits for city inhabitants. In the context of Brazilian law, the integrated urban development plan (PDUI) is the key planning document that all Brazilian metropolitan regions should aspire to develop. However, to date few RMs have developed these. PDUIs are ambitious and far-reaching planning documents and are thus costly, multi-million affairs. For many RMs, going from a local environment of no integrated plans to the development of a PDUI is a jump too far, as they have had little positive experiences in metropolitan coordination and planning. Attempts to start a PDUI process, when existing collaborative conditions are not significantly mature, leads to an absence of action. It can in fact lead to a setback, as municipalities and the state note the failure and focus on single jurisdictional approaches, leading to a regression in advances to undertake integrated approaches.

In this context, this project aims to take a stepwise approach to strengthening metropolitan region integrated planning in Brazil. In its first two components it focuses on three distinct but representative urban areas of Brazil: the metropolitan regions of Belém and Florianopolis, and the Greater Teresina RIDE. They are representative of Brazilian urban development challenges as they are middle-sized metropolitan regions, precisely those experiencing the greatest ongoing growth. Furthermore, as middle-sized they are not imbued with enormous municipal financial coffers or strong technical capacity. They are also typical Brazilian RMs that face all the challenges of urban metropolitan development: urban sprawl, monocentrism, lack of human capacity, coordination challenges, and lack of financial resources. By focusing on these three representative RMs, the project aims to build local evidence, experiences and solutions for other Brazilian metropolitan regions. Components 3 and 4 then focus on this scale up. Ultimately the aim is that all metropolitan regions development sustainably, and the outputs of these components will be available for all RMs. Notwithstanding this, in these components the project more concretely focuses on building the capacity of an additional 7 metropolitan regions, to be identified through the project, representing 10% of all Brazilian metropolitan regions. Together with the pilot RMs, these components will thus support the building of a critical mass on sustainable urban development across the country, leading to significant estimated global environmental benefits.

In **Component 1**, the stepwise approach proposed for each of the three RMs is as follows:

- Strengthen coordination among the RM's municipalities through the development of integrated planning platforms that support them to visualize issues of common public interest and identify innovative sustainable solutions for addressing these, as a stepping stone to undertaking integrated interjurisdictional and intersectoral urban planning.

- Strengthen coordination and build momentum amongst the RM's municipalities for undertaking integrated urban planning, through the development of integrated urban plans which focus directly on GEF global environmental benefits related to climate mitigation and biodiversity conservation mainstreaming. These integrated urban plans will be the first to be developed in each of these metropolitan regions,[101] may be later consumed within a broader PDUI, and will support metropolitan region municipalities to develop shared goals on key global environmental issues, as a starting point for the development of broader integrated plans, PDUIs, in the future.

- Strengthen metropolitan region coordination and management through the development of metropolitan governmental arrangements that take into account political realities faced by the pilot RMs but at the same time strengthen their ties to address issues of common interest.

The project's **Component 2** aims to complement actions of component 1 by enabling the three target urban areas to gain awareness and demonstrate to other Brazilian cities the social, economic and environmental viability of integrated sustainable urban solutions for addressing city development challenges. Through these pilot interventions, these cities will develop experiences, good practices and lessons learned on piloting integrated approaches which are aligned with the planning efforts undertaken in parallel in component 1 and those undertaken prior to the project. On climate mitigation, low-emission zones will be developed at different scales in the three cities (street, city block, district) through participatory process of co-creation. These zones, the first of their kind in Brazil, will present evidence of their viability and positive impact in a South American context. On biodiversity conservation, innovative solutions will strengthen the management of urban protected areas and urban green areas and pilot the commercial viability of urban agroforestry production chains, as a blueprint for future scale-up and replication through-out the country.

Component 3 addresses a key challenge to sustainable urban development for metropolitan regions across Brazil: financing. The Metropolis Statute prescribes that each metropolitan region shall create an integrated system for resource allocation and accounting but does not identify how these resources would be sourced or generated. While the pooling of RM municipal funds for financing issues of common public interest theoretically makes sense, municipalities are reluctant to do so due to limited municipal funds and a lack of positive metropolitan coordination experiences. Creating individual funds for each of the more than 70 metropolitan regions, whatever the source of such funds, may also not be viable or efficient long-term solution (and that is not necessary what the Statute is suggesting). In this context, the project focuses on supporting established national financial institutions, including BNDES, one of the largest development banks in the world, to create and strengthen financial instruments that can enable RMs to invest in integrated urban solutions. The component focuses on facilitating financial efficiency and economies of scale by partnering with capitalized national financial institutions that have significant experience in investing in Brazilian municipalities. The component has a national scale, focusing on how to support metropolitan regions across Brazil to address this challenge. In addition, and concretely, the instruments strengthened through the project will be tested with the three pilot RMs, supporting them to invest in the scale up of solutions demonstrated in component 2 which are aligned with their component 1 integrated plans.

A focus will also be placed on building the capacity of metropolitan region local governments for accessing finance and building the capacity of the financial community for providing it. The Sustainable Cities Impact Program, as well as key local actors, will play a key role in supporting these capacity-building efforts. While the aforementioned actions have a national focus, this project component will also facilitate the design of a Payments for Ecosystem Services (PES) scheme in the Utinga State Park urban protected area with benefits to be derived at a metropolitan scale in Belém. The aim of this innovative financing instrument is to enhance the quality and quantity of water provision services for the Metropolitan Region of Belém while supporting the conservation of this urban protected area.

Finally, **Component 4** aims also has a national focus and aims to support other Brazilian metropolitan regions to accelerate sustainable urban development. Building on the experiences, best practices and lessons learned through components 1 to 3, the project will support the design of a national-level sustainable urban development knowledge system. This system, which is an evolution of the GEF-6 Sustainable Cities Innovation Observatory, will provide city-planners with a database of tried and tested evidence-based sustainable urban solutions which are validated and prioritized in local contexts. It will also harbor all knowledge developed through the project, as well as serve as conduit to good practices from around the world through connection to the global SCIP platform. Furthermore, the component will build the capacity of key stakeholders in the national and local urban planning space, in complement to existing such efforts led by federal actors.

[101] With the exception of the PLAMUS plan in Florianopolis.

In this project, the notion of 'integration' as a key to successful sustainable urban development has a double connotation. On the one hand the project focuses on promoting integrated (multi-sectoral) planning that considers the interconnectedness of urban challenges. On the other hand, it focuses on promoting integrated (multi-jurisdictional) coordination, between a metropolitan region's municipalities and between such municipalities and state and federal governments.

Sustainable integrated urban development and undertaking integrated urban planning is a long-term process. As goes the famous saying, one entirely relevant to this context, Rome was not made in a day. Through this project, the aim is support cities to develop strong, stable and mature conditions for undertaking integrated urban planning. The aim is to avoid planning setbacks, to ensure that these cities become "Romes" and not "Pompeiis".

Building on the GEF-6 project

This project builds directly upon the GEF-6 integrated approach pilot child project in Brazil which is currently under execution (see section 2(iii) for a description of that project). It has been designed to build upon that project's experiences, good practices and lessons learned, including as captured through the recently concluded mid-term review (MTR). Effort has been made to catalyze the GEF-6 project's results and to address other areas within the Brazilian urban space which require attention and are not directly addressed by that project. In particular, differentiating from GEF-6, this GEF-7 project focuses on metropolitan regions, as urban spaces with large populations and significant interjurisdictional coordination challenges, and finance, as a key factor for supporting replication and scale-up through-out the country. Table 19 provides an overview of how the GEF-7 project builds upon GEF-6.

Table 19 – Building upon the GEF-6 Brazil project

Element	GEF-6	GEF-7	Comment
Integrated planning	At the municipal level	At the metropolitan level	GEF-7 builds upon GEF-6 integrated planning experiences to address further integration challenges at the metropolitan region level (project wide focus, see particularly component 1)
Creation of evidence (project pilots)	Pilots to create evidence of sustainable solutions in Brasilia and Recife	Pilots to create evidence of sustainable solutions in Belém, Florianopolis and Teresina	GEF-7 will build upon the GEF-6 pilots to demonstrate sustainable solutions in three cities that are climatically and socio-economically different to those of GEF-6. Furthermore, GEF-7 pilots will focus on different solutions, with a greater emphasis on biodiversity.
Finance	Not directly addressed	Directly addressed	GEF-7 focuses directly on scaling up and replicating sustainable urban development interventions through strengthened financial instruments operated by national financing institutions and strengthened local capacity (see component 3)
Knowledge management	PCS and OISC	Institutionalization of OISC as a Federal Government tool, as a way of strengthening knowledge validation. Incorporation of new functions, including PSC sustainability indicators. A greater focus on establishing pacts and protocols for data sharing and usage at the local and with the national level.	Building on GEF-6 experiences and MTR recommendations. See outputs 1.1, 1.4, 1.7 and 4.1 for further information.
Creation of capacity on integrated urban planning	Focus on NGOs as promoters of ambition and capacity	Focus on inter-ministerial collaboration, together with key national universities, as well as NGOs, as capacitators	Building on GEF-6 experiences and MTR recommendations, a focus has been placed on governmental cooperation on capacity-building
Local ownership	Local advisory groups created organically	Local advisory groups created as part of project management structure	Building on GEF-6 experiences and good practices and MTR recommendations, local advisory groups have now become part of project institutional arrangements.
Federal government coordination	Organic coordination between government ministries	Incorporation of key ministries into project steering committee and creation of a special advisory group containing ministries, key national financing institutions, universities, the private sector and local government representative groups.	Building on GEF-6 experiences and good practices and MTR recommendations, project institutional arrangements will facilitate more streamlined coordination between key national actors on urban development.
Lead governmental ministry	Ministry of Science, Technology and Innovations	Ministry of Science, Technology and Innovations	The same ministry, MCTI, will lead both GEF-6 and the GEF-7 projects. Thus facilitating coherence and incorporation of lessons learned from the GEF-6 project into the GEF-7 project.

Theory of change

The diagram in figure 13 summarizes the project's Theory of Change (TOC). The TOC highlights the 'ROOT CAUSES' and 'BARRIERS' that the project seeks to address, and which were described in sections 1 and 2. Elements linked to the core problem, the problem's causes and root causes can be visualized in the project's PROBLEM TREE diagram (Figure 2), along with the BARRIERS. The latter feature appears again in the TOC diagram in Figure 7. The project will build upon a series of past and on-going baseline actions to address these BARRIERS. Baseline actions are described in section 2 but not visualized in the ToC diagram. The BARRIERS represent the synthesis of the project's core problem. The core themes covered by BARRIERS A, B, C AND D relate respectively to: *'Planning', 'Evidence, 'Finance' and 'Capacity'*. The PROJECT'S OBJECTIVE is thus stated, and its meaning resonates in TOC elements such as the 'INTERMEDIATE STATE', 'LONG-TERM OUTCOME' and 'IMPACT':

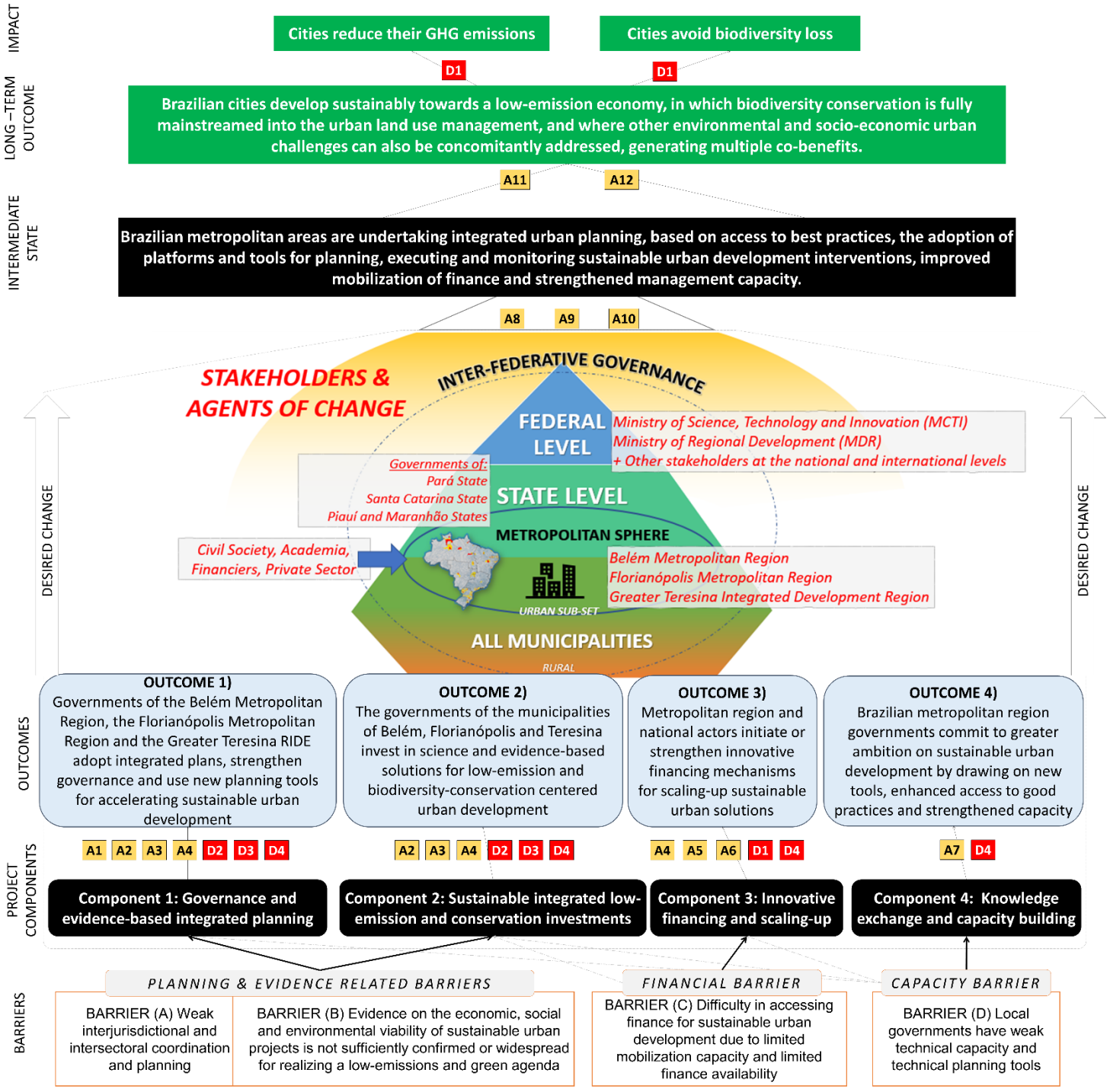
PROJECT OBJECTIVE: Brazilian metropolitan regions reduce greenhouse gas emissions, conserve biodiversity and achieve economic, social and environmental co-benefits through an integrated urban planning approach.

The achievement of the PROJECT'S OBJECTIVE depends directly on the achievement of its four OUTCOMES, which are described in detail in the sub-sections that follow in line with relevant project COMPONENTS. Identified barriers correlate to components and outcomes as represented in the TOC diagram. The TOC rationale is informed by various influencing elements, connected by different causal relationships. These are grouped in the TOC diagram as 'KEY ASSUMPTIONS' and 'IMPACT DRIVERS'. These two elements appear throughout the TOC figure and are numbered and cross-referenced in Box 5 – respectively as "A" for assumptions, and "D" for drivers. Through 'KEY ASSUMPTION' statements, the ToC details the necessary pre-conditions for the achievement of the project's objective. A summary of these assumptions are also part and parcel of the project's Results Framework in annex A, as follows:

- Local government support and project plans are adopted and implemented.
- Local government support ensures all project plans and pilots are fully executed.
- Public finance institutions have political will to strengthen or create new innovative financial mechanisms for sustainable urban development.
- Brazilian cities have access to finance and technical support which leads them to enhancing ambition.
- Cities are supportive of sharing their experiences with other countries

In Box 5 the same meaning behind the above summary assumptions is reflected, but 'unfolded' and with more details on stakeholders, agents of change and on specific conditions that apply to certain causal relationships reflected in the TOC diagram. The accuracy and validity of the statements representing the KEY ASSUMPTIONS are derived from current circumstances and baseline analysis. The non-realization of assumptions represents a risk to the project. Project RISKS have been identified through a precautionary approach in anticipation of scenarios in which the validity of one or more KEY ASSUMPTION may turn out not to be sustained. These risks are currently considered manageable, as outlined in the project's risk section. They will be monitored throughout project implementation. As for IMPACT DRIVERS, they represent long-term trends that will influence THE PROJECT'S SYSTEM but that are external to it. Drivers can either favor the achievement of project objectives or make it more difficult, and the same driver (e.g. economic recession) may have different effects on biodiversity loss or GHG emissions. Drivers will anyway be monitored, as adverse changes in them vis-à-vis the project objective may turn them into project risks. The veracity of KEY ASSUMPTIONS and the evolution of IMPACT DRIVERS will be tested and reconfirmed during project implementation, in particular during the inception phase, steering committee meetings and mid-term review. The influence of STAKEHOLDERS & KEY AGENTS OF CHANGE are also part and parcel of the TOC.

Figure 13 – Theory of Change (TOC)



Box 5 – Reference to key elements in the Theory of Change (TOC)

TOC ELEMENTS: Cross Reference to KEY ASSUMPTIONS	
A1	Platforms for integrated planning are updated and used.
A2	Local and state level agents adopt measures proposed for strengthening inter-jurisdictional governance.
A3	Integrated urban planning with a long-term vision is embraced in the three pilot urban regions, and plans are adopted, pilots are fully implemented /executed, and progress is monitored and evaluated.
A4	The adopted legal framework for integrated long-term urban planning results in the three pilot areas effectively undertaking integrated planning.
A5	Financial instruments are effective, catered to local needs and capacities and are capitalized for implementing sustainable urban projects – implying that public finance institutions have political will to strengthen or create new innovative financial mechanisms for sustainable urban development.
A6	Local managers in Brazilian cities are able to access to finance and technical support which leads them to enhancing ambition and make use of urban development financing instruments for promoting sustainability.
A7	Governments find useful the knowledge management platforms and capacity development initiatives effectively build their capacity.
A8	The three pilot urban areas develop broad-reaching integrated urban development plans.
A9	The project's pilots and overall experience with integrated planning effectively generate evidence and serve as models for replication in the three urban areas and throughout Brazil, and cities are supportive of sharing their experiences with other countries.
A10	Brazilian metropolitan areas develop bankable sustainable projects that respond to the criteria of national financing institutions and apply innovative financial instruments, attracting sustainable and green investments.
A11	The COVID-19 pandemic offers an opportunity for cities to plan a green economic upturn in urban areas.
A12	Metropolitan regions through-out Brazil develop broad-reaching integrated urban development plans.
TOC ELEMENTS: Cross Reference to IMPACT DRIVERS	
D1	Economic recession
D2	Urban dweller's search for quality of life drives demand for housing in metropolitan regions and contributes to urban sprawl.
D3	Informal urban occupation is a strong driver of land use change and can potentially enhance sprawling trends.
D4	New disruptive technologies accelerate change in urban settings towards a low-carbon, biodiversity-friendly economy

Component 1: Governance and evidence-based integrated planning

This component will support three diverse but representative Brazilian urban areas – the Belém Metropolitan Region, the Florianopolis Metropolitan Region and the Timon-Teresina Urban Agglomeration – to develop the necessary conditions to undertake integrated urban planning that privileges low-emission development and biodiversity conservation. It aims to lead to a behavioral change for these areas, where they undertake on an on-going basis evidence-based sustainable integrated urban planning, including by developing their integrated urban development plans (PDUIs) in accordance with Brazilian law. Ultimately, this aims to address the identified root causes by promoting integrated urban planning which address urban sprawl through the planning of sustainable urban development. Beyond these three metropolitan regions, the output aims to generate experiences, good practices and lessons-learned for promoting integrated urban planning in Brazilian metropolitan regions through-out the country. Integrated with the other project components, the component's outputs will serve as a reference for other metropolitan regions.

Currently, these three urban areas do not have sufficient coordination (at the political or technical levels), tools and instruments, resources or capacity for developing their PDUIs. This component will address the first two elements, with resources addressed through component 3 and capacity through components 3 and 4. In each of the three urban areas, this component will support local and state governments to:

- **Develop integrated planning platforms, providing town-planners with GIS data and sustainable solutions for undertaking integrated planning.** The platforms (called modules) will support city planners in visualizing integrated urban challenges, developing and tracking plan implementation through open data, and identifying and prioritizing low-emission and biodiversity conservation solutions for achieving the plan goals. The modules will be linked to the national System of

Innovations and Solutions for Sustainable Urban Planning (SIS+),[102] allowing town planners to access a national database of evidence-based and nationally validated solutions;

- **Generate integrated urban plans on climate mitigation action and biodiversity conservation, as steps towards broader sustainable urban development.** These integrated plans will serve to support these urban areas in achieving a low-emission and biodiversity-conservation-centered paradigm as well as to mainstream biodiversity into urban planning. The plans, as well as the interjurisdictional coordination established through the development of these, will serve to create a foundation for future development of the broader and more resource intensive PDUI;

- **Strengthen metropolitan or urban agglomeration governance arrangements, as a necessary condition for effective and long-term integrated urban planning**. The project will support the strengthening of metropolitan region or urban agglomeration governance arrangements in each of the three urban areas, drawing on international good practices and aligning with the Brazilian legal planning framework (primarily the Metropolis Statute). This will be undertaken to support these areas in developing solid and sustainable institutional arrangements and effective coordination between municipalities and with the state, with the aim of establishing the conditions for plan implementation, monitoring and control, as well as continuity of plans beyond political cycles.

The component builds upon co-financing of SUDERF supporting the development of the Florianopolis Metropolitan Region's PDUI, Teresina Municipality investments to develop a new municipal urban mobility masterplan and work on biodiversity, State of Pará co-financing on planning and management of protected areas in the Belém Metropolitan Region, the MCTI's work on digital platforms and MDR co-financing to support metropolitan region integrated planning processes. The project aims to achieve the following outcome through this component:

Outcome 1: Governments of the Belém Metropolitan Region, the Florianópolis Metropolitan Region and the Greater Teresina RIDE adopt integrated plans, strengthen governance and use new planning tools for accelerating sustainable urban development

Component 1 consists of nine outputs:

- Outputs 1.1 (platform), 1.2 (integrated plans) and 1.3 (governance) focus on the Belém Metropolitan Region;
- Outputs 1.4 (platform), 1.5 (integrated plans) and 1.6 (governance) focus on the Greater Teresina RIDE and Timon-Teresina Urban Agglomeration;
- Outputs 1.7 (platform), 1.8 (integrated plans) and 1.9 (governance) focus on the Florianópolis Metropolitan Region.

Output 1.1 – An integrated planning digital module, linked to the System of Innovations and Solutions for Sustainable Urban Planning (SIS+), is available to support integrated urban planning of the Belém Metropolitan Region by its municipalities

This output refers to the development of a web-based planning platform, called an integrated planning digital module, that will be made available to municipalities of the Belém Metropolitan Region (RMB) with the aim of supporting them in undertaking integrated urban planning. As noted in the baseline, the municipalities do not have a metropolitan platform for undertaking integrated planning, mainstreaming biodiversity into urban planning or identifying low-carbon and biodiversity-conservation solutions to urban challenges. The digital module will be linked to the national SIS+ to facilitate such planning and evidence- and science-based decision-making. It will also be available to civil society for consultation and monitoring. The module will contain three primary functions:

1. Facilitate integrated urban planning through a geospatial information system. The module will support RM Belem municipalities and other key stakeholders to visualize spatial changes in the governed territory, identify key areas for interventions and monitor and observe the impact of implemented plans, policies, regulations and solutions. Decision-making through visual assessments of geo-spatial data will not only fast track problem identification and assessment processes, but also foster cooperation among municipal secretariats, between municipalities and with the state government. They will develop a shared understanding of the interconnectedness of sectoral urban challenges and identify opportunities to work together for successfully addressing such common challenges. The module will support the monitoring of integrated urban plans developed under output 1.2. These plans will be uploaded to the module and progress on their implementation will be monitored through a series of GIS and non-GIS indicators aligned with the indicators of SIS+. The geospatial platform will be developed building upon the system of the Integrated Monitoring Center of the State of Pará (CIMAM). It will build upon

[102] See output 4.1

the maps and layers and the infrastructure developed through CIMAM to facilitate GIS visualization and urban planning of the Belém Metropolitan Region.

Module element	Description
Geospatial data	Geospatial data will be stored in a web repository in layer format (points, lines, polygons and raster data) and databases (geodatabase). The data will be accessible through a web GIS platform, guaranteeing users the manipulation of geographic data through operations such as: visualizations; the downloading of layers; downloading of satellite images; searching for geospatial data; and superimposing layers on an interactive map. The platform will enable users (local technicians and managers) to share and edit geospatial information using open standards (interoperability). This will allow decision makers to generate area-specific projects based on spatial interests, through the composition and superposition of layers of information generated by different public institutions. Where possible, data layers will disaggregate by gender.
Build upon existing platform?	It will build upon the existing spatial data infrastructure of the State of Pará (CIMAM).
Geospatial data layers, geographic information and priority analyses to be developed	Public transit access and connectivity, public and non-motorized transport usage, waste management flows, energy usage, GHG emission density, urban protected areas, urban green areas, distribution of native flora and fauna, inner-city and nearby protected areas, land degradation patterns and distribution of agroecological pilots within it.
Plans and indicators	The platform will incorporate integrated plans developed under Outputs 1.2 and a series of gender-sensitive urban sustainability indicators which will enable stakeholders to monitor and evaluate, through a dashboard, the implementation of city integrated plans. The indicators will be aligned with those of SIS+ (Component 4). The platform will also incorporate municipal master plans and related sectoral plans, and other relevant municipal and metropolitan region plans.
Multipurpose Technical Registry (MPC)	MPC is an official and systematic territorial inventory of municipality. It is a multi-purpose alphanumeric and cartographic registration system that stores information from the urban space for tax, legal and territorial planning purposes, building from the unified land registry databank. By mapping accurately the municipal and metropolitan territory, it facilitates accurate control of urban expansion and development.[103] The Belém municipality has developed a MPC but this only covers the municipal territory. Data-entry into the digital module system aims at making available existing information and expanding cadaster services to other municipalities in the metropolitan region, having as reference the methodology used for Belém city.
Local managing partner:	State of Pará (once the metropolitan region arrangements are operationalized, see output 1.3, the metropolitan region will become the managing partner)
Used by:	Belém Metropolitan Region municipalities and the State of Pará. The project will develop protocols for platform governance, data sharing and usage by the municipalities and their secretariats, development of additional GIS applications, and integration of additional data. Such protocols will follow the guidelines already available at the national level within the National Infrastructure of Spatial Data (INDE).
Data standardization and connection:	The module will align with planning guidelines and any data and data standards made available through the MDR ReDUS platform (currently being developed). Where possible, the module's geospatial data will be connected to and catalogued in accordance with national standards of INDE, ensuring standardization with ISO19115 and the Brazil Geospatial Metadata Profile.[104]
Public facing interface?	Yes, the platform will contain a user-friendly interface tailored to civil society, providing clear and transparent information on the municipality's efforts to advance sustainable urban development. The information will be made available in an open data portal and will connect to existing municipal service websites such as: http://www.Belém.pa.gov.br/.

2. Identification and prioritization of sustainable urban solutions. The module will also support Belém Metropolitan Region municipalities with identifying and prioritizing locally-relevant solutions that facilitate low-emission and biodiversity-sensitive urban development. It will be integrated within SIS+ (output 4.1), which will contain a national database of low-emission and biodiversity-mainstreamed solutions that have been validated and prioritized at the national and Brazilian region levels by national stakeholders. City planners will then be able to identify and rank these solutions on their relevance and applicability at the local level through the local module. The platform will achieve this by incorporating local data (e.g. climatic, socio-economic, etc.), and a local weighting of indicators that prioritize the solutions. The city planners will provide this weighting and the system will then identify a suite of possible solutions that respond to local conditions. Based on this

[103] Lincoln Institute of Land Policy (2016): Making land legible: cadastres for urban planning and development in Latin America. https://www.lincolninst.edu/publications/policy-focus-reports/making-land-legible.
[104] https://www.inde.gov.br/pdf/Perfil_MGB_homologado_nov2009_v1.pdf, see page 127.

identification, local managers will have the option to refine this process or take forward these solutions for broader stakeholder consultation and then detailed development.

3. Tracking of progress to implement the Sustainable Development Goals (SDGs). Through the module the Belém Metropolitan Region municipalities will be able to track their progress in implementing the SDGs through application at the local level of the Sustainable City Program's (SCP) Sustainable Cities Development Index - Brazil (IDCS-BR) (see section 2(iii) for a description of the index). The project will support the development of a local IDCS-BR index for the metropolitan region and each RM municipality. The local indexes will support cities to identify challenges related to implementing the 17 SDGs. Cities will be classified according to each SDG (low, medium, high and very-high) and will be encouraged to make progress in addressing all goals, especially those of lowest rating, including by implementing solutions identified through the SIS+ connected module. Municipalities will be encouraged to commit to the SDGs through the PCS platform[105] and update their indexes annually. Through this annual updating, municipalities will monitor and evaluate developments over time, giving them encouragement to continue improving their position in the index. Cities that make substantial progress in implementing the 2030 Agenda will receive recognition through the SCP annual award ceremony, serving as a reference for other municipalities and creating a local SDG race to the top.

The development of the web-based planning platform for the Belém Metropolitan Region will draw on support from the Global Project under the Sustainable Cities Impact Program (SCIP) for carrying out geospatial analysis. The SCIP Global Project will establish globally applicable, locally customizable geospatial analysis methods on themes of relevance to multiple SCIP cities, and the module where possible will draw upon these. Once the development of the web-based planning platform is sufficiently advanced, its functionalities and additional data availability will be communicated to key stakeholders. Local government officials will also receive training to use the platform. This will include on how to use the module for identifying and prioritizing solutions, updating geospatial data and how it can facilitate and encourage intra-municipal coordination and integrated planning. Once the module is finalized, a technical cooperation agreement will be signed between the Ministry of Science, Technology, and Innovations (MCTI) and the State of Pará for the module's ongoing operation post-project, including with regards to its management and updating the system. This will align with the results of output 1.3. The documenting of experiences, good practices and lessons learned through the output will be captured through output 4.2.

Key stakeholders: Pará State Government, including the Secretariat for the Environment and Sustainability (SEMAS) and the Secretariat for Urban Development and Public Works (SEDOP), the Belém municipality's Development and Administration Company of the Metropolitan Area (CODEM), Belém Metropolitan Region municipalities, National Infrastructure of Spatial Data (INDE), and the MCTI (coordination with SIS+), National Teaching and Investigation Network (RNP), and Rede Clima.

#	Deliverables
1.1.1	Detailed design, including technical needs and requirements, of the integrated planning digital module of SIS+
1.1.2	Prototype for testing the integrated planning digital module (Proof of Concept)
1.1.3	Georeferenced data, maps and urban sustainability indicators to be incorporated into the integrated planning digital module
1.1.4	Operationalization of the integrated planning digital module (containing the three primary functions as per the output description), including user experience survey and incorporation of improvements, development of system documentation and usage protocols
1.1.5	Training and dissemination activities for system users
1.1.6	Technical cooperation agreement for institutionalizing, managing and updating the system

Output 1.2 – Integrated urban plans are developed as tools for the Belém Metropolitan Region to use in accelerating sustainable urban development

The Belém Metropolitan Region does not have any integrated urban plans for facilitating the region's sustainable urban development. This output consists of a series of integrated urban plans which provide the State of Pará and the metropolitan area's municipalities with an important first step in this direction and serve as key inputs into the metropolitan region's future development of its PDUI. Work under the output consists of the development of three integrated metropolitan-level plans and one integrated plan for the Municipality of Belém. Together, these plans complement each other and provide the region with key integrated urban plans on climate and biodiversity as first steps towards the eventual development of the PDUI:

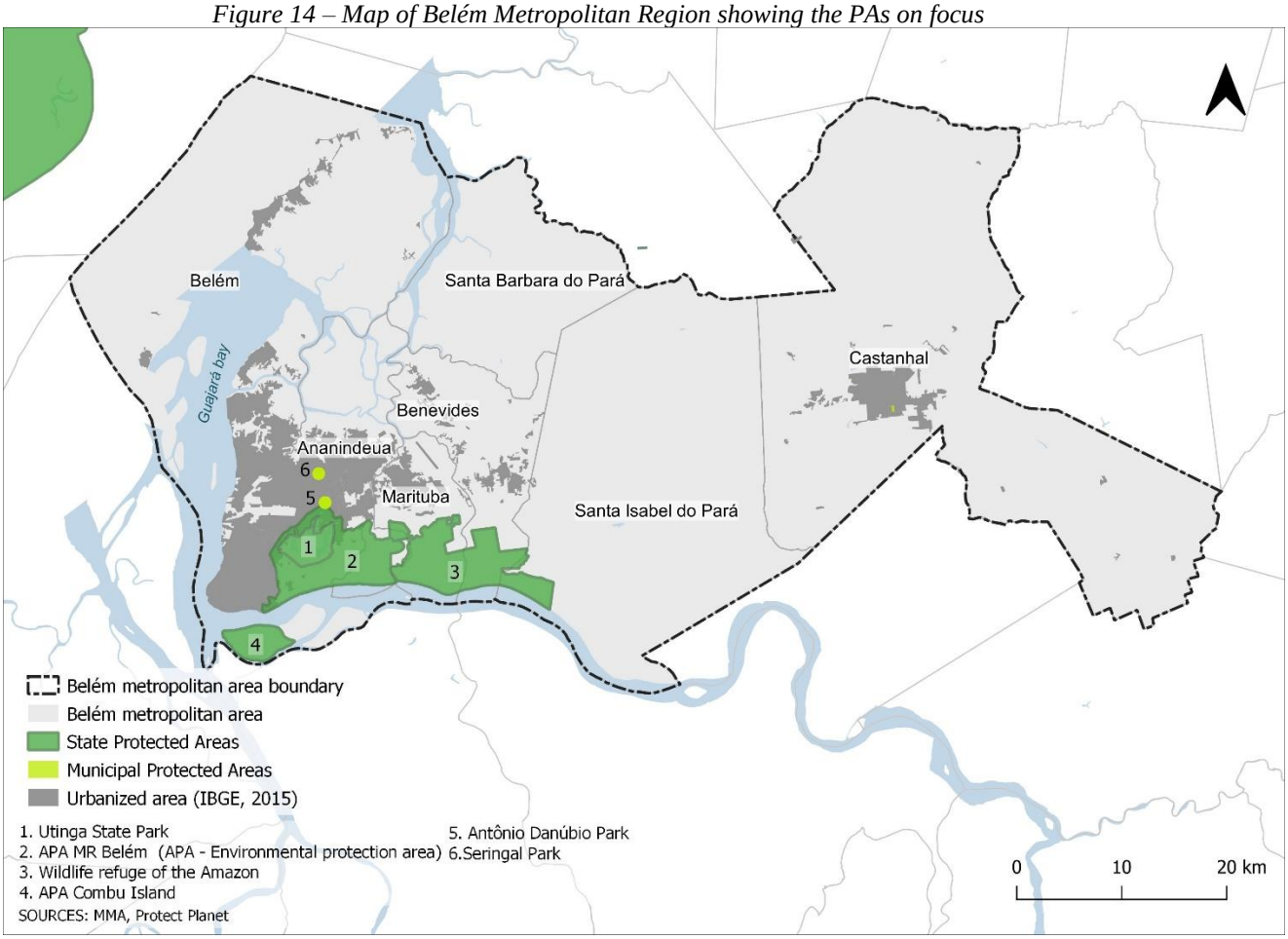
[105] Belém is already a signatory. Further information: https://www.cidadessustentaveis.org.br/pagina/adesao_pcs.

1. Climate Mitigation and Low-Emission Technology Action Plan for the Belém Metropolitan Region. This two-pronged plan will consist on the one hand of a climate mitigation action plan for the metropolitan area, developing an integrated low-emission development plan, including a project pipeline, for reducing GHG emissions and facilitating sustainable urban development. Aligned with the NDC and the Pará State Policy on Climate Change, the plan will draw upon C40's climate action planning frameworks[106] that supports cities to develop climate action plans that are aligned with the Paris Agreement, including its key components of: emissions reductions; stakeholder inclusion and benefits; and governance and collaboration. The latter is particularly important for describing how the plan will build from and aligns with other plans and policies – i.e. ensuring integration. It will also draw on ICLEI's methodology recently used to support Recife in developing a local climate action plan.[107]As part of the elaboration of the plan, a detailed identification of the metropolitan area's emission baseline profile will be prepared, building on national and state inventories prepared under the guidance of MCTI. This will ensure that the plan has a clear emission baseline as a basis for promoting low-emission development in key urban emitting sectors (considered to be transport, waste and buildings). The other key element of the two-pronged plan will be a climate technology action plan. This plan will identify low-emission technologies, and key plan elements such as actions, activities, an implementation schedule, a stakeholder engagement plan, costs assessment, and a risk assessment matrix for achieving the short, medium and long-term goals of the climate mitigation action plan. Technologies will be identified with support of the integrated planning digital module (Output 1.4) and build upon MCTI and UNFCCC/UNEP/GEF methodologies to undertake technology needs assessments and prepare climate technology action plans. Finally, the plan will contain guidelines on how it will be incorporated into each of the municipalities' planning processes and serve as a sub-plan or input for the PDUI. The plan will be gender-sensitive, considering the implications for women and men of the planned actions.

2. Integrated Management Plan for Protected Areas (PAs) and Urban Green Areas. RMB comprises an important ecological corridor formed by 6 PAs governed by different jurisdictions (at state and municipal levels) (Figure 14): Combú Island Environmental Protected Area (EPA), Belém Metropolitan Region EPA, Utinga State Park, Amazon Metropolis Wildlife Refuge, Museum Seringal Park Municipal Area of Relevant Ecological Interest (ARIE), and Antônio Danúbio Botanic Garden Municipal Park ARIE; as well as other urban green areas totaling more than 17,000 hectares. Out of the 6 target PAs, 4 have state-level jurisdiction and are managed by IDEFLOR-bio[108] - namely, Combú Island EPA, Belém Metropolitan Region EPA, Utinga State Park, and the Amazon Metropolis Wildlife Refuge. Although IDEFLOR-bio has consolidated the management of all its Belém Metropolitan Region-based PAs under a single administrative unit - its Belém Administrative Region branch, integrated planning methods or landscape level biodiversity mainstreaming have not been pursued. The 2 additional target PAs, Seringal Park ARIE and Antonio Danubio Botanic Garden ARIE, are both under the jurisdiction of the municipality of Ananindeua, in the greater Belém Metropolitan Region. The Integrated Management Plan for Protected Areas (PAs) and Urban Green Areas foresees the development of an integrated management strategy that goes beyond PAs, aligning planning, management and monitoring and surveillance efforts, not only at the State of Pará government level, but equally at the level of relevant municipal administrations. With the exception of Utinga State Park and REVIS Belém, none of the target PAs in the state of Pará have finalized and approved management plans or any other legally binding management tool. The proposed integration process aims to develop coordinated management strategies and to strengthen the technical and financial capacities for the conservation of these PAs and green areas. Moreover, the Integrated Management Plan will incorporate viable fragments of vegetation cover into an urban green area network. This network will play an important role in connecting PAs and addressing habitat fragmentation, which is one of the key causes of biodiversity loss in urban areas. The Integrated Management Plan for Protected Areas (PAs) and Urban Green Areas will also outline clear guidelines to be incorporated into PAs and green areas management planning that privilege an ecosystems approach, both at the state and municipal levels. The design of the Plan will be based on multi-stakeholder and gender-sensitive consultation processes while attaching special value to local community knowledge of urban ecosystems.

[106] See e.g. https://resourcecenter.c40.org/climate-action-planning-framework-home The Climate Action Planning Framework was developed to support cities in developing climate action plans that are aligned with the objectives of the Paris Agreement.
[107] https://americadosul.iclei.org/wp-content/uploads/sites/78/2020/12/20-recife-acaoclimat-1.pdf.
[108] See: https://ideflorbio.pa.gov.br/ . IDEFLOR-bio stands for Pará State Institute for Forest Development and Biodiversity. IDEFLOR-bio has autarky status under Brazilian law, meaning it is a parastatal that has state-level attributions and spatial jurisdiction, while holding technical, financial and administrative independence from the State of Pará.

Figure 14 – Map of Belém Metropolitan Region showing the PAs on focus



3. Integrated solid waste management plan for the Belém Metropolitan Region. This development of an integrated plan for solid waste plan will provide these stakeholders with a long-term strategy for inter-municipal cooperation to facilitate the effective management of the metropolitan area's solid waste. Building upon the Belém municipality's Integrated Solid Waste Management Plan (Law No. 8899/2011), the plan will draw on the application of circular economy principles, including applying principles for reducing waste volumes through waste segregation at the source, composting, reuse, repair and recycling. The integrated waste management plan will be aligned with the climate mitigation and low-emission technology action plan and, where possible, it will draw on SIS+ for the identification of viable solutions, costing exercises and other relevant information. While the integrated solid waste management plan for RMB will focus on a single sector, which the World Bank and the GEF have noted is important in certain instances,[109] it will be a geographically integrated plan that facilitates horizontal (interjurisdictional) integration amongst multiple municipal governments for addressing a key challenge at the metropolitan scale.

4. Plan for a low-emission Belém city-center. This plan, for a low-emission Belém city-center, will support the Municipal Government to develop a roadmap for replicating and scaling-up output 2.1 pilot interventions through-out the Belém city-center (see map in output 2.1). The plan will be aligned with the Climate Mitigation and Low-Emission Technology Action Plan for the Belém Metropolitan Region and it may be considered a sub-plan of this aforementioned larger plan. The plan will focus on the key elements of reducing GHG emissions (and other air contaminants) and heat-island effect in the city-center. The plan, in addition to containing a roadmap, will also contain proposals on regulatory changes for achieving the desired transformation. Such draft regulations, as with the entire plan, will be included after having gone through participatory consultation processes. By focusing on the sustainable development of the center, Belém will address key urban challenges in highly central areas and produce a blueprint for broader replication into the wider area of RMB. Development of the plan will consider, *inter alia*, how to promote and incentivize the uptake of:

[109] http://documents1.worldbank.org/curated/en/799601589271548870/pdf/A-Review-of-Integrated-Urban-Planning-Tools-for-Greenhouse-Gas-Mitigation-Linking-Land-Use-Infrastructure-Transition-Technology-and-Behavioral-Change-Technical-Paper.pdf. See page 8.

a. Sustainable urban mobility, by prioritizing non-motorized (pedestrianization and bicycles) and public transport and deprioritizing individual vehicle flows, including through new infrastructure, traffic management and multimodal trip planning;

b. Energy efficiency in buildings and urban infrastructure, through *inter alia* sustainable building codes, more sustainable building construction and materials, district cooling, energy efficient technologies;

c. Sustainable urban resource management, including enhancing waste management through the use of circular economy principles (aligned with the Integrated solid waste management plan for the Belém Metropolitan Region);

d. Green infrastructure, including through the development and restoration of urban green spaces and ecological connectivity, (e.g. by planting native trees, and installing green facades and green roofs);

e. Densification and rezoning to promote multiusage and transport-oriented development.

The four above listed plans will be aligned with and build upon the principles of the PNDU and developed through participative and gender-sensitive processes involving all key stakeholders (see list below) and led by the project-financed local advisory group (see section 6 on institutional arrangements). Once the plans are finalized, they will be submitted to the relevant legislative bodies (municipalities of the Belém Metropolitan Region, and the State of Pará) for adoption and incorporation into local legislation. The plans will also draw on the experiences, good practices and lessons-learned that are gained as the Component 2 pilots are concurrently implemented. The planning process will utilize geospatial information and datasets available in beta versions of the digital module of Output 1.1. Each plan will have a framework for monitoring, review and evaluation with SMART goals and clear indicators. All plans, including their monitoring frameworks, will be uploaded to the digital module (output 1.1). The presentation of valid experiences, ideas, best practices and lessons-learned emanating from the implementation of this output will be captured through Output 4.2

Key stakeholders: State of Pará, SEMAS, SEDOP, IDEFLOR, Belém Metropolitan Region municipalities, Rede Clima, Biotec, Museum Paraense Emílio Goeldi, local private sector and civil society, including marginalized groups.

#	**Deliverables**
1.2.1	Detailed workplan for the planning process (including plan adoption) and implementation of enabling and participatory planning activities to ensure that the planning process is participative, gender-sensitive, based on national and international good practices, and facilitates coherency and alignment between the plans
1.2.2	Climate Mitigation and Low-Emission Technology Action Plan for the Belém Metropolitan Region
1.2.3	Integrated Management Plan for Protected Areas (PAs) and Urban Green Areas
1.2.4	Integrated solid waste management plan for the Belém Metropolitan Region
1.2.5	Plan for a low-emission Belém city-center aligned with plan 1.2.2

Output 1.3 – A proposal for updating complementary law 027/95 to enhance the governance and management of the Belém Metropolitan Region is developed and submitted for approval by the State Government of Pará

Work under this output consists of developing a proposal for updating Complementary Law No. 027/95 to facilitate effective governance and management of the metropolitan area, as a necessary condition for institutionalizing sustainable and integrated planning practices. The proposal will consist of a management model and governance system for the Belém Metropolitan Region. It will be developed on the basis of a participatory development process led by the project's Local Advisory Group (see chapter 6: institutional arrangements) and involving the State of Pará, the metropolitan area's municipalities, academia, private sector and civil society.

The process of drafting an update to the Complementary Law (CL) No. 027/95 will build upon a detailed review of existing studies and other proposed legislation, including the study of delimitation of the Belém metropolitan region prepared in 2016 by the Secretariat for Urban Development and Public Works (SEDOP). The enhanced governance and management arrangements will align with the PNDU and the basic governance structure established by the Metropolis Statute, Federal Law No. 10.257, which notes that metropolitan region management structures should include:

i. An executive body consisting of representatives of the Executive Branch of federative entities;
ii. A deliberative collegiate body with representatives from the civil society;
iii. A public organization with technical and advisory functions;
iv. An integrated system of resource allocation and accountability.

The proposal for updating the complementary law will be gender sensitive and include an action plan with integrated short, medium, and long-term actions, as well as an estimate of resources and financial sources and assignment of responsibilities. It will also include a roadmap for developing the PDUI. Once the draft legislation is developed, and after due public consultation, it will be presented to the state and municipal governments for their consideration for adoption. The project will provide technical assistance to these stakeholders in their decision-making processes to adopt the updated law. The recording of experiences, good practices and lessons learned through the output will be captured through output 4.2. The development of this output will draw upon the work under the *Metropolitan Governance in Brazil* project led by the Institute for Applied Economic Research (IPEA).

Key stakeholders: State of Pará, SEMAS, SEDOP, Belém Metropolitan Region municipalities and civil society, IPEA (through its work on the metropolitan governance project).

#	**Deliverables**
1.3.1	Technical study of good governance structures for facilitating integrated planning and sustainable urban development of metropolitan regions and urban agglomerations, building on existing studies and national and international good practices
1.3.2	Targeted training activities for municipal and state government stakeholders for undertaking integrated urban planning
1.3.3	Principles and guidelines for new governance and management arrangements of the Belém Metropolitan Region
1.3.4	Proposal for new gender-sensitive governance and management arrangements for the Belém Metropolitan Region as an update to Complementary Law 027/95, including roadmap for PDUI development, shared with the State of Pará and the metropolitan area municipalities for consideration, revision and finalization
1.3.5	Presentation of the proposal for updating Complementary Law 027/95 to the State of Pará for adoption
1.3.6	Technical assistance to support the adoption of 1.3.5.

Output 1.4 – An integrated planning digital module, linked to SIS+, is available to support integrated urban planning of the Timon-Teresina Urban Agglomeration by the Teresina and Timon municipalities

This output refers to the development of an integrated planning digital module, similar to that described in output 1.1, that will be made available to the Teresina and Timon municipalities with the aim of supporting them in undertaking integrated urban planning. As noted in the baseline, the municipalities currently do not have access to a common platform for undertaking integrated planning or identifying low-carbon and biodiversity-conservation solutions to urban challenges. The digital module will be linked to the national SIS+ to facilitate such planning and evidence- and science-based decision-making. It will also be available to civil society for consultation and monitoring. The module will contain three main functions:

1. Facilitate integrated urban planning through a geospatial information system (see description of output 1.1).

Module element	Description
Geospatial data	Geospatial data will be stored in a web repository in layer format (points, lines, polygons and raster data) and databases (geodatabase). The data will be accessible through a web GIS platform, guaranteeing users the manipulation of geographic data through operations such as: visualizations; the downloading of layers; downloading of satellite images; searching for geospatial data; and superimposing layers on an interactive map. The platform will enable users (local technicians and managers) to share and edit geospatial information using open standards (interoperability). This will allow decision makers to generate locally-specific projects based on spatial interests, through the composition and superposition of layers of information generated by different public institutions. Where possible, data layers will disaggregate by gender.
Build upon existing platform?	Yes, the Teresina 2030 Agenda pilot platform: https://agenda2030.carto.com/.
Geospatial data layers, geographic information and priority analyses to be developed	Heat island effect (temperature density), public and non-motorized transport connectivity, private, public and non-motorized transport usage, GHG emission density, urban green areas, distribution of native flora and fauna, inner-city and nearby protected area and land degradation patterns.
Plans and indicators	The platform will incorporate integrated plans developed under outputs 1.5 and a series of gender-sensitive urban sustainability indicators which will enable stakeholders to monitor and evaluate, through a dashboard, the implementation of city integrated plans. The indicators used will build upon the sustainability indicators Teresina developed with the Teresina 2030 Agenda initiative (which are aligned with the SDGs). The indicators will also be aligned with those of SIS+ (component 4). The platform will also incorporate Teresina and Timon master plans and related sectoral plans.
Multipurpose Technical Registry (MPC)	Neither Teresina nor Timon have multi-purpose alphanumeric and cartographic registration systems of their territory. A MPC will be established for the urban agglomeration, also sub-dividing it into municipal territories.

Module element	Description
Local managing partner:	Municipalities of Teresina and Timon (once the urban agglomeration arrangements are operationalized, see output 1.5, these entity of these arrangements will become the managing partner)
Used by:	Municipalities of Teresina and Timon. The project will develop protocols for platform governance, data sharing and usage by the municipalities and their secretariats, development of additional GIS applications and integration of additional data. Such protocols will follow the guidelines already available at the national level within INDE. Other entities of the Greater Teresina RIDE will also be invited to use the platform.
Data standardization and connection:	The module will align with the guidelines and any data and data standards made available through the MDR ReDUS platform (currently being developed). Where possible, the module's geospatial data will be connected to and catalogued in accordance with INDE national standards, ensuring standardization with ISO19115 and the Brazil Geospatial Metadata Profile.[110]
Public facing interface?	Yes, the platform will contain a user-friendly interface tailored to civil society, providing clear and transparent information on the municipality's efforts to advance sustainable urban development. The information will be made available in an open data portal and will connect to existing municipal service websites such as: https://pmt.pi.gov.br/ and http://timon.ma.gov.br/site/.

2. Identification and prioritization of sustainable solutions. The module will also provide the Timon-Teresina Urban Agglomeration municipalities with a system that supports them with identifying and prioritizing locally-relevant solutions that facilitate low-emission and biodiversity-sensitive urban development. For further details, refer to output 1.1.

3. Tracking of progress to implement the Sustainable Development Goals (SDGs). Through the module the Teresina and Timon municipalities will also be able to track their progress in implementing the SDGs through application at the local level of the SCP's IDCS-BR. The project will support the development of a local IDCS-BR index for each municipality. In the case of Teresina, which is already a PCS signatory, this index will build upon the significant work that the city has already undertaken in this area, including the development of a local observatory (ObservaTHE) and local indicators. For further details on the development of the local index refer to output 1.1.

Similar to output 1.1, the development of the web-based planning platform will draw on support from the SCIP-GP for carrying out geospatial analysis that use globally available datasets. Once the development of the web-based planning platform is sufficiently advanced, its functionalities and additional data availability will be communicated to key stakeholders. Local government officials will also receive training to use the platform. This will include on how to use the module for identifying and prioritizing solutions, updating geospatial data and how it can facilitate and encourage intra-municipal coordination and integrated planning. Once the module is finalized, a technical cooperation agreement will be signed between the Ministry of Science, Technology, and Innovations (MCTI) and the municipalities of Teresina and Timon for the module's ongoing operation post-project, including with regards to its management and updating the system. This will align with the results of output 1.6. The documenting of experiences, good practices and lessons learned through the output will be captured through output 4.2.

Key stakeholders: Municipal governments of Teresina, Municipal government of Timon, National Infrastructure of Spatial Data (INDE), MCTI (coordination with SIS+), National Teaching and Investigation Network (RNP), and Rede Clima.

#	**Deliverables**
1.4.1	Detailed design, including technical needs and requirements, of the integrated planning digital module of SIS+
1.4.2	Prototype for testing the integrated planning digital module (Proof of Concept)
1.4.3	Georeferenced data, maps and urban sustainability indicators to be incorporated into the integrated planning digital module
1.4.4	Operationalization of the integrated planning digital module (containing the three primary functions as per the output description), including user experience survey and incorporation of improvements, development of system documentation and usage protocols
1.4.5	Training and dissemination activities for system users
1.4.6	Technical cooperation agreement for institutionalizing, managing and updating the system

Output 1.5 – Integrated urban plans are developed as tools for the Greater Teresina RIDE municipalities to use in accelerating sustainable urban development

[110] https://www.inde.gov.br/pdf/Perfil_MGB_homologado_nov2009_v1.pdf, see page 127.

Neither the Timon-Teresina Agglomeration nor Greater Teresina RIDE have integrated urban plans for facilitating sustainable urban development. This output consists of a series of integrated urban plans which provide these actors with steps in this direction and serve as key inputs into the future development of a PDUI. Work under the output consists of the development of one integrated urban plan for Timon-Teresina Urban agglomeration and one integrated plan for the Greater Teresina RIDE. Together, these plans complement each other, build upon existing plans and provide the agglomeration and Greater Teresina RIDE with a strategic roadmap for achieving sustainable urban development:

1) Climate Mitigation and Low-Emission Technology Action Plan for the Timon-Teresina Urban agglomeration. This two-pronged plan focuses on the Timon-Teresina agglomeration as the primary urban area of Greater Teresina RIDE (other RIDE municipalities have disconnected urban areas of tiny populations). The plan will consist, on the one hand, of a climate mitigation action plan for the urban agglomeration, developing an integrated low-emission development plan, including a project pipeline, for reducing GHG emissions and facilitating sustainable urban development. The plan will align with the NDC and build upon and expand the climate action plan (including GHG inventory) that the Teresina Municipality is currently developing with the support of the Development Bank of Latin America (CAF).[111] Work under this output will build upon that plan to develop an integrated plan that encompasses the entire urban agglomeration and considers multisectoral solutions to reduce emissions in the key emitting sectors of transport, buildings and waste. Development of the plan will also draw upon methodologies for developing local action plans developed by C40 and ICLEI. As part of the elaboration of the plan, a detailed identification of the urban agglomeration's emission profile will be prepared, building on the Teresina GHG inventory and on national and state inventories prepared under the guidance of MCTI. The other key element of the two-pronged plan will be a climate technology action plan. This plan will identify low-emission technologies, and key plan elements such as actions, activities, an implementation schedule, a stakeholder engagement plan, costs assessment, and a risk assessment matrix for achieving the short, medium and long-term goals of the climate mitigation action plan. Technologies will be identified with support of the integrated planning digital module (Output 1.4) and build upon MCTI and UNFCCC/UNEP/GEF methodologies to undertake technology needs assessments and prepare climate technology action plans. Finally, the plan will contain guidelines on how it will be incorporated into each of the municipalities' planning processes and serve as a sub-plan or input for a PDUI. The plan will be gender-sensitive, considering the implications for women and men of the planned actions.

2) Integrated Sustainable Mobility Plan for the Timon-Teresina Urban Agglomeration. A sub-plan of the climate mitigation action plan, this interjurisdictional plan aims to address an issue of common interest and one of the key challenges of the agglomeration. The plan will include a strategy for promoting sustainable mobility across the entire agglomeration, including by prioritizing non-motorized (pedestrianization and bicycles) and public transport, and deprioritizing individual vehicle flows, including through new infrastructure, traffic management and multimodal trip planning. This plan will serve to guide and coordinate future investments in this area. Development of the plan will be undertaken under the guidance of the Agglomeration's Consortium for Urban Mobility (CIMU);

3) Plan for a low-emission Teresina city-center. Under output 2.3, the project will demonstrate the social, economic and environmental viability of a low-emission street block in the center of Teresina (see map in output 2.3). This plan, a sub-plan of the climate mitigation plan, for a low-emission Teresina city-center, will support the Municipal Government to develop a roadmap for replicating and scaling-up the pilot interventions through-out the Teresina city-center, supporting the municipality in the long-term to develop a sustainable and low-emission central urban space. The plan will focus on reducing GHG emissions (and other air contaminants) and heat-island effect and city-infilling in the city-center. The plan will serve to guide and coordinate existing and future investments in the city center, such as those provided by CAF and AfD, providing an overarching framework and strategy for low-emission city center development. The plan, in addition to containing a roadmap, will also contain proposals on regulatory changes for achieving the desired transformation. Such draft regulations, as with the entire plan, will be included after having gone through participatory consultation processes.

4) Local Biodiversity Strategy and Action Plan (LBSAP) for Greater Teresina RIDE. The Greater Teresina Integrated Economic Development Region (RIDE) is located in an area of fundamental ecological importance in the transition between two extremely rich biomes: Cerrado and Caatinga. However, there is a general lack of data and information on the area's biodiversity and ecosystem services as well as the specific threats to biodiversity associated with urbanization processes. This reality prevents an effective assessment of the role urban landscapes in question can play in conservation more broadly. In this context, GEF funds will finance a Local Biodiversity Strategy and Action Plan (LBSAP) for Greater Teresina RIDE. This spatial focus is intentionally broader than the Timon-Teresina Urban Agglomeration spatial target observed across this project. The rationale for this relies on favoring an ecosystems approach that captures important urban and peri-urban biodiversity areas across the RIDE, including the only protected area in the Greater Teresina Area registered in the National

[111] https://pmt.pi.gov.br/2020/01/29/prefeitura-faz-licitacao-para-elaboracao-do-plano-de-acao-climatica-para-teresina/.

System of Protected Areas (SNUC) of Brazil – the Palmares National Forest (FLONA). FLONA Palmares is located in the Altos Municipality, 15 km away from the Teresina city center and falls within Greater Teresina RIDE. The Greater Teresina RIDE LBSAP will seek to set the general principles for the management of local biodiversity, ecosystems and ecosystem services, and detail a vision for integrating biodiversity and ecosystem services in urban plans and ensure they become cross-cutting themes taken up by relevant jurisdictions and spheres of government LBSAP.[112] The Greater Teresina RIDE Biodiversity Strategy will outline principles, priorities, short, medium and long-term objectives for biodiversity conservation and management with specific targets to guide implementation. The Greater Teresina RIDE Biodiversity Action Plan will identify priority actions and clearly articulate how these will be implemented by which specific actors, timeframes and resource-mobilization strategies. To this end, the following general steps and context-specific objectives will be pursued:

a. Collection and assessment of existing data and information
b. Institutional analysis and policy, law and regulatory assessment
c. Assessment and mapping of key biodiversity, ecosystem services and functioning, threats and opportunities in urban, peri-urban areas and rural areas across Greater Teresina RIDE
d. Identification of land use patterns, resident population, existing and potential economic activities and occupation patterns in these areas
e. Assessment of the need for and feasibility of establishing additional protected areas and/ or other relevant area-based conservation measures
f. Mapping of urban green areas and feasibility analysis for the establishment of a network of urban green gardens. The feasibility analysis will assess possible conservation gains to be derived from a network of urban green gardens and opportunities to embed a strong community-based focus in this type of policy. Current urban green garden experiences in Teresina are mobilized by grass-roots female leadership figures. It follows the knowledge and vision of these women will be critical to this assessment and options for promoting woman empowerment through a possible network of urban green gardens will equally be assessed.
g. Design of Greater Teresina RIDE LBSAP (includes temporal targets and resource-mobilization strategy)
h. FLONA Palmares management plan: since FLONA Palmares is the only PA formally recognized in the SNUC across Greater Teresina RIDE area, the design of its management plan will figure as an Appendix to the LBSAP
i. Development of georeferenced maps
j. Inclusion of relevant data in the Timon-Teresina Urban Agglomeration integrated planning digital module, linked to SIS+, and, where possible, in the Brazilian Biodiversity Information System (SiBBr)
k. A dedicated capacity-building programme on mainstreaming biodiversity into urban planning, including a focus on the different methodological aspects associated with the design of the LBSAP and well as on resource-mobilization. The core target audience will be local managers and technicians, but also local community leaders within Greater Teresina RIDE.

The above listed plans will be aligned with and build upon the principles of the PNDU. The plans will be developed through participative and gender-sensitive processes led by the project-financed local advisory group (see section 6 on institutional arrangements) and involving the states of Maranhão and Piaui, Greater Teresina RIDE municipal governments, academia, civil-society organizations and private sector stakeholders. Once the plans are finalized, they will be submitted to the relevant legislative bodies (states of Maranhão and Piaui, Greater Teresina RIDE municipal government) for adoption and incorporation into local legislation. The plans will also draw on the experiences, good practices and lessons-learned that are gained as the Component 2 pilot is concurrently implemented. The planning process will utilize geospatial information and datasets of beta versions of the digital module. Each plan will have a framework for monitoring, review and evaluation with SMART goals and clear indicators. All plans, including their monitoring frameworks, will be uploaded to the digital module. Experiences, good practices and lessons-learned emanating from the implementation of this output will be captured through Output 4.2.

Key stakeholders: State Government of Piauí, State Government of Maranhão, municipal governments within Greater Teresina RIDE, ICMbio, Managing Council of FLONA Palmares, local private sector and civil society, including marginalized groups.

#	Deliverables
1.5.1	Detailed workplan for the planning process (including plan adoption) and implementation of enabling and participatory planning activities to ensure that the planning process is participative, gender-sensitive, based on national and international good practices, and facilitates coherency and alignment between the plans
1.5.2	Climate Mitigation and Low-Emission Technology Action Plan for the Timon-Teresina Urban Agglomeration

[112] Refer to ICLEI, UNU-IAS, SCBD. 2012. Local Biodiversity Strategy and Action Plan Guidelines: an aid to municipal planning and biodiversity conservation. Research Gate. DOI:10.13140/RG.2.2.28707.45607

1.5.3	Integrated Sustainable Mobility Plan for the Timon-Teresina Urban Agglomeration
1.5.4	Plan for a low-emission Teresina city-center aligned with plan 1.5.2
1.5.5	LBSAP for RIDE Teresina, including a management plan for FLONA Palmares, feasibility assessments for PA and other area-based conservation measures, feasibility analysis of urban green gardens network and relevant capacity-building efforts.

Output 1.6 – A proposal for local legislation to enhance the governance and management of the Timon-Teresina Urban Agglomeration is developed and submitted for approval by the Teresina and Timon municipalities

This output consists of governance and management arrangements for the Timon-Teresina Urban agglomeration, as a necessary condition for institutionalizing sustainable and integrated planning practices and as a first step in supporting the Greater Teresina RIDE to enact existing Federal provisions on such arrangements for the RIDE. Improving existing coordination will serve as a foundation for strengthening inter-jurisdictional cooperation and integration within Greater Teresina RIDE. Without a clear management arrangement for the agglomeration, the Timon and Teresina municipalities will continue to struggle to advance sustainable urban development that effectively addresses inter-municipal challenges. The need for the two governments to develop such arrangements is fundamental for ensuring effective integrated planning of this urban area and for scaling up of sustainable urban development actions.

The arrangements will be developed through a participatory process led by the project's Local Advisory Group and involving two states, the two municipalities, academia, private sector and civil society. The arrangement's drafting will build upon the inter-municipal experience that currently exists through the operation of the Intermunicipal Consortium for Urban Mobility (CIMU) and progress to operationalize the Greater Teresina RIDE. It will also build upon an analysis of good practices for governance and management models from around the world. Efforts will also be made to explore how the draft legislation may align with the basic governance structure established by the Metropolis Statute and the PNDU. The proposal will be gender sensitive and include an action plan with integrated short, medium, and long-term actions, as well as an estimate of resources and financial sources and assignment of responsibilities. It will also include a roadmap for developing a PDUI. It shall further consider how the arrangements could be scaled up to Greater Teresina RIDE in the medium to long-term. Once the draft proposal is developed, and after due public consultations, it will be presented to the municipal governments for their consideration for adoption. The project will provide technical assistance to these stakeholders in their decision-making processes to adopt the proposal. Experiences, good practices and lessons-learned derived from the implementation of this output will be captured through Output 4.2. The development of this output will draw upon the work under the *Metropolitan Governance in Brazil* project led by IPEA.

Key stakeholders: State governments of Maranhão and Piauí, Municipal governments of Teresina and Timon, local academia, private sector and civil society, IPEA (through its work on the metropolitan governance project).

#	Deliverables
1.6.1	Technical study of good governance structures for facilitating integrated planning and sustainable urban development of metropolitan regions and urban agglomerations, building on existing studies and national and international good practices
1.6.2	Study of identification of public functions of common interest and justification of the inter-federal arrangement
1.6.3	Targeted training activities for municipal and state government stakeholders for undertaking integrated urban planning
1.6.4	Proposal for gender-sensitive intermunicipal governance and management arrangements, including roadmaps for PDUI development and to operationalize the Greater Teresina RIDE, shared with municipalities of Teresina and Timon and the States of Piauí and Maranhão for consideration, revision and finalization
1.6.5	Presentation of the proposal formalizing the intermunicipal governance and management arrangements is presented to the municipalities of Teresina and Timon for adoption
1.6.6	Technical assistance to support the adoption of 1.6.5

Output 1.7 – An integrated planning digital module, linked to SIS+, is available to support integrated urban planning of the Florianópolis Metropolitan Region by its municipalities

This output refers to the development of an integrated planning digital module, that will be made available to SUDERF and the Florianópolis Metropolitan region municipalities with the aim of supporting them in undertaking integrated urban planning. . As noted in the baseline, the municipalities do not have a metropolitan platform for undertaking integrated planning or identifying low-carbon and biodiversity-conservation solutions to urban challenges. The digital module will be linked to the national SIS+ to facilitate such planning and evidence- and science-based decision-making. It will also be available to civil society for consultation and monitoring. The module will contain three main functions:

1. Facilitate integrated urban planning through a geospatial information system (see description of output 1.1).

Module element	Description
Geospatial data	Geospatial data will be stored in a web repository in layer format (points, lines, polygons and raster data) and databases (geodatabase). The data will be accessible through a web GIS platform, guaranteeing users the manipulation of geographic data through operations such as: visualizations; the downloading of layers; downloading of satellite images; searching for geospatial data; and superimposing layers on an interactive map. The platform will enable users (local technicians and managers) to share and edit geospatial information using open standards (interoperability). This will allow decision makers to generate area-specific projects based on spatial interests, through the composition and superposition of layers of information generated by different public institutions. Where possible, data layers will disaggregate by gender.
Build upon existing platform?	Yes, of the State of Santa Catarina: http://sigsc.sds.sc.gov.br/ (not currently active), and municipal platforms of the Florianopolis Municipality: http://geo.pmf.sc.gov.br/ and GEOFLORIPA http://geoportal.pmf.sc.gov.br/article/geofloripa, and the Municipality of Antonio Carlos: http://geo.antoniocarlos.sc.gov.br:8888/geo_ac/ .
Geospatial data layers, geographic information and priority analyses to be developed	Public and non-motorized transport connectivity, private, public and non-motorized transport flows and density, GHG emission density, urban green areas, distribution of native flora and fauna, inner-city and nearby protected area, urban expansion and land degradation patterns.
Plans and indicators	The platform will incorporate integrated plans developed under outputs 1.8 and a series of gender-sensitive urban sustainability indicators which will enable stakeholders to monitor and evaluate, through a dashboard, the implementation of city integrated plans. The indicators developed will also build upon and align with the indicators of the Santa Catarina 2030 plan and the 121 indicators of the Sustainable Florianopolis Action plan. The platform will also incorporate municipal master plans and related sectoral plans, and other relevant municipal and metropolitan region plans.
Multipurpose Technical Registry (MPC)	The Florianopolis Metropolitan Region does not have a multi-purpose alphanumeric and cartographic registration system of its territory (or the municipalities within). A MPC will be established for the RMF, also sub-dividing it into municipal territories.
Local managing partner:	SUDERF
Used by:	SUDERF and Florianopolis Metropolitan Region municipalities. The project will develop protocols for platform governance, data sharing and usage by the municipalities and their secretariats, development of additional GIS applications and integration of additional data. Such protocols will follow the guidelines already available at the national level within INDE.
Data standardization and connection:	The module will align with the guidelines and any data and data standards made available through the MDR ReDUS platform (currently being developed). Where possible, the module's geospatial data will be connected to and catalogued in accordance with INDE national standards, ensuring standardization with ISO19115 and the Brazil Geospatial Metadata Profile.[113]
Public facing interface?	Yes, the platform will contain a user-friendly interface tailored to civil society, providing clear and transparent information on the municipality's efforts to advance sustainable urban development. The information will be made available in an open data portal and will connect to existing State and municipal service websites such as: https://www.pmf.sc.gov.br/.

2. Identification and prioritization of sustainable solutions (see description of output 1.1).

3. Tracking of progress to implement the Sustainable Development Goals (SDGs) (see description of output 1.1).

Similar to output 1.1, the development of the web-based planning platform will draw on support from the SCIP-GP for carrying out geospatial analysis. Once the development of the web-based planning platform is sufficiently advanced, its functionalities and additional data availability will be communicated to key stakeholders. Furthermore, local government officials will receive training to use the platform. This will include training on how to use the module for identifying and prioritizing solutions, updating geospatial data and how it can facilitate and encourage intra-municipal coordination and integrated planning. Once the module is finalized, a technical cooperation agreement will be signed between the Ministry of Science, Technology, and Innovations (MCTI) and SUDERF for the module's ongoing operation post-project, including with regards to its management and updating the system. This will align with the results of output 1.9. The documenting of experiences, good practices and lessons learned through the output will be captured through output 4.2.

[113] https://www.inde.gov.br/pdf/Perfil_MGB_homologado_nov2009_v1.pdf, see page 127.

Key stakeholders: SUDERF (Development Superintendence of the Florianópolis metropolitan region), CODERF (Development Committee of the Greater Florianópolis Metropolitan Region), RMF municipal governments, the National Infrastructure of Spatial Data (INDE), MCTI (coordination with SIS+), National Teaching and Investigation Network (RNP), and Rede Clima.

#	Deliverables
1.7.1	Detailed design, including technical needs and requirements, of the integrated planning digital module of SIS+
1.7.2	Prototype for testing the integrated planning digital module (Proof of Concept)
1.7.3	Georeferenced data, maps and urban sustainability indicators to be incorporated into the integrated planning digital module
1.7.4	Operationalization of the integrated planning digital module (containing the three primary functions as per the output description), including user experience survey and incorporation of improvements, development of system documentation and usage protocols
1.7.5	Training and dissemination activities for system users
1.7.6	Technical cooperation agreement for institutionalizing, managing and updating the system

Output 1.8 – Integrated urban plans are developed as tools for the Florianópolis Metropolitan Region municipalities to use in accelerating sustainable urban development

This output consists of a series of RMF integrated plans which will build upon existing metropolitan planning efforts and serve as key inputs into the metropolitan region's PDUI. Work through this output aims to strengthen interjurisdictional coordination on sustainable planning, necessary for the effective elaboration of the PDUI. Under this output, integrated urban plans that bring together low-emission development, biodiversity consideration and sustainable urban development will be developed as key sub-plans for the broader and more comprehensive PDUI.

1. Climate Mitigation and Low-Emission Technology Action Plan for the Metropolitan Region of Florianópolis. This plan will align with the NDC and build upon the Florianopolis municipality's existing *Florianópolis Sustainable Action Plan*, and the metropolitan region's 2015 GHG emission inventory and PLAMUS to develop a climate mitigation action plan for the metropolitan region. It will consist of an integrated low-emission development plan, including a project pipeline, for reducing GHG emissions and facilitating sustainable urban development. Development of the plan will draw upon methodologies for developing local action plans developed by C40 and ICLEI and identify goals and strategies for promoting integrated low-emission urban development and the reduction of GHG emissions in each of Florianópolis RM's key emitting sectors (primarily transport and IPPU). As part of the plan's elaboration the existing GHG inventory will be updated, building on national and state inventories prepared under MCTI guidance. The plan will also contain guidelines on how it will be incorporated into each of the municipalities' planning processes and serve as a sub-plan or input for the PDUI. It will also consist of a climate technology action plan, which identifies integrated low-emission solutions and technologies for achieving the short, medium and long-term climate goals of the climate mitigation action plan. The solutions and technologies will be identified through a local prioritization process based on the database of the integrated planning digital module connected to SIS+ (Output 1.7). The plan will also consist of costed roadmaps for implementing these solutions and technologies. The development of the climate technology action plan will build upon methodologies used by the MCTI in its GEF readiness TNA Brazil project[114] and those of the UNFCCC/UNEP/GEF global technology needs assessment project.[115] The plan will be gender-sensitive, considering the implications for women and men of the planned actions.

2. Sustainable development strategy for the Florianopolis municipality mainland. Through this plan, the Florianópolis Municipality will build upon early experiences of the output 2.4 sustainable district pilot to develop an integrated strategy for scaling up the pilot and transforming the mainland municipal area into a sustainable urban district. Aligned with the Climate Mitigation and Low-Emission Action Plan above, the municipal masterplan and the PLASMUS guidelines, the strategy focus on transforming the district into a more sustainable concept of a city neighborhood aligned with the GEF-World Bank 5D framework, particularly: **d**esigned on a multi-modal and human scale; has limited **d**istances to transit points; and has reduced travel times to **d**estination points.[116] This will include consideration of incentives and actions to:
    a. Densify and rezone land-use (where possible in the context of or as exemptions to the city masterplan) along key transport arteries and close to public and non-motorized transport stations (primarily along the Governador Ivo Silveira Avenue and the BR-282 highway);

[114] *Technological Needs Assessment project for the Implementation of Climate Action Plans in Brazil* (the TNA Brazil Project). For more information see: https://antigo.mctic.gov.br/mctic/export/sites/institucional/ciencia/SEPED/clima/arquivos/tna_brazil/Sintese-das-atividades-do-projeto.pdf.
[115] https://tech-action.unepdtu.org/.
[116] GEF, World Bank, GPSC: *A Review of Integrated Urban Planning Tools for Greenhouse Gas Mitigation* (2021).

b. Promote rejuvenation and development of idle lands in the district, including with a focus on promoting housing development for and the continued presence of low-income populations (avoiding gentrification and land-speculation due to the district's increased investment and sustainable focus);
c. Promote the development and rejuvenation of public spaces and green areas;
d. Encourage the take-up of sustainable transport (integrate private and public spaces in favor of the pedestrian, promote public and non-motorized transport, discouraging of individual car usage);

The strategy will include the following three main components:

a. A district urban planning (masterplan), with an intervention program, implementation phases, urban parameters, and environmental management instruments;
b. Economic model of the masterplan, defining the financing mechanisms and sources of required resources;
c. Management model for plan implementation, including indicators and instruments for monitoring and evaluation;
d. Proposals on regulatory changes for achieving the desired transformation. Such draft regulations, as with the entire plan, will be included after having gone through participatory consultation processes.

3. Socio-environmental macro-zoning of the Florianópolis metropolitan region. Urban sprawl and associated pressures on the natural environment are the main causes of GHG emissions and habitat loss, as well as of several adverse socioeconomic impacts, in the Florianopolis metropolitan region. It follows it is a matter of urgent priority to design a metropolitan region-wide integrated territorial development strategy that contemplates different land uses and enables effective urban sprawl management. The Socio-Environmental Macro-zoning of the Florianópolis metropolitan region is the third proposed activity under Output 1.8 and will mobilize project biodiversity funds. The socio-environmental macro-zoning will include a comprehensive assessment of the current situation and identify likely trends for the physical, socioeconomic, and infrastructure environments. On this premise, future scenarios will be modelled based on the physical and natural, rural and urban environments across the metropolitan region taking full consideration of guidelines proposed by the Climate Mitigation and Technology Action Plan. In addition, guidelines established under existing government plans and studies will also have to be compiled and renegotiated to inform the socio-environmental microzoning design process; namely: sustainable transport as an inducer of land uses; strengthening and promotion of new centralities with the purpose of distributing employment opportunities and access to goods and services; protection and recovery of water resources and biodiversity conservation; control of urban sprawl and reduction of pressures on green, rural, and environmentally protected areas. Finally, an effort to cost the implementation of different scenarios identified by the socio-environmental macro-zoning will also be undertaken. This will be strategically coupled with an outreach and awareness-raising strategy targeted at a wide-array of relevant public authorities and stakeholders. Such a strategy will be key to ensure uptake of the socio-environmental microzoning and use of cost estimates in processes such as environmental licensing and environmental offsetting negotiations. The overarching objective is that the macro-zoning becomes a central piece to future planning efforts, thus guiding the management of spatial development in the metropolitan region and municipal urban policies while facilitating biodiversity mainstreaming into urban planning.

The four above listed plans will be aligned with and build upon the principles of the PNDU. The plans will be developed through participative and gender-sensitive processes led by the project-financed local advisory group (see section 6 on institutional arrangements) and involving SUDERF, CODERF, academia, civil-society organizations and private sector stakeholders. Once the plans are finalized, they will be submitted to the relevant legislative bodies (SUDERF and Florianópolis Metropolitan Region municipalities) for adoption and incorporation into local legislation. The plans will also draw on the experiences, good practices and lessons-learned that gained through the Component 2 pilots that will be implemented in parallel. The planning process will utilize geospatial information and datasets to be made available in beta versions of the digital module. Each plan will have a framework for monitoring, review and evaluation with SMART goals and clear indicators. All plans, including their monitoring frameworks, will be uploaded to the digital module. The presentation of valid experiences, ideas, best practices and lessons-learned derived from the implementation of this output will be captured through output 4.2.

Key stakeholders: SUDERF, CODERF (including representatives from all RMF municipalities), Florianopolis Municipal Government, particularly the Secretariat for Mobility and Urban Planning (SMPU) and the Florianópolis Urban Planning Institute (IPUF), academia, private sector and civil society, including marginalized groups.

#	Deliverables
1.8.1	Detailed workplan for the planning process (including plan adoption) and implementation of enabling and participatory planning activities to ensure that the planning process is participative, gender-sensitive, based on national and international good practices, and facilitates coherency and alignment between the plans
1.8.2	Climate Mitigation and Low-Emission Technology Action Plan for the Florianópolis Metropolitan Region
1.8.3	Sustainable development strategy for the Florianópolis municipality mainland area aligned with plan 1.8.2

1.8.4	Socio-environmental macrozoning of the Florianópolis Metropolitan Region focused on governance of urban sprawl

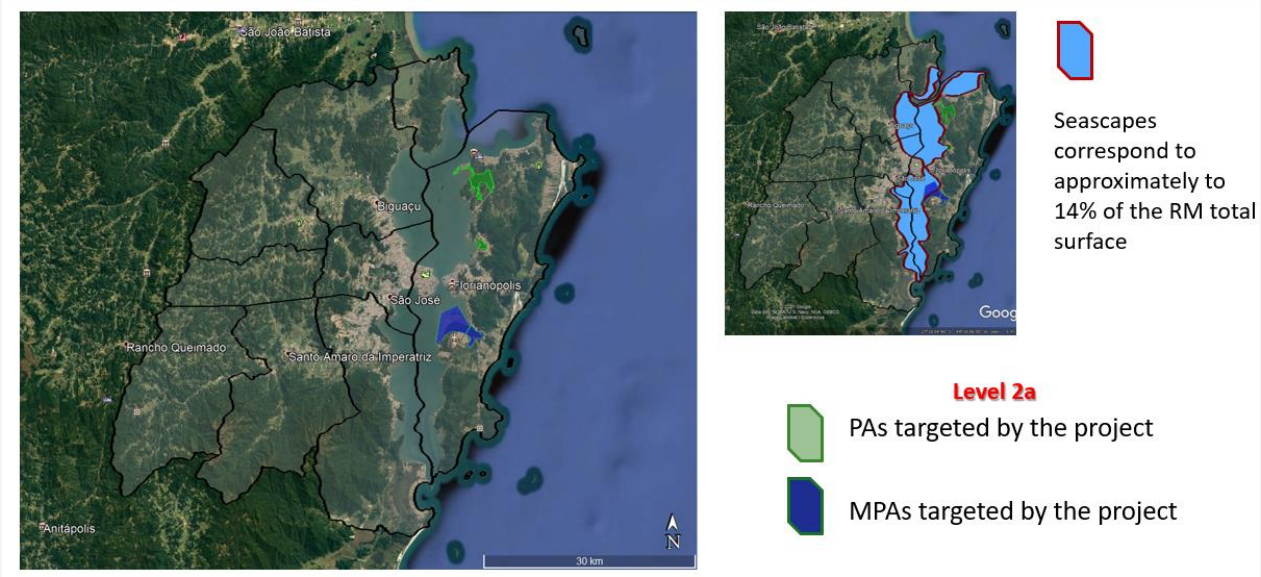
Output 1.9 – Proposals on strengthened metropolitan governance arrangements and socio-environmental macrozoning guidelines are developed and submitted for approval by the Florianopolis Metropolitan Region Development Committee

Through this output, governance and management arrangements for undertaking integrated urban planning and promoting sustainable urban development in Florianópolis Metropolitan Region (RM) will be strengthened. The output will lead to strengthened enabling conditions and effective coordination within Florianópolis RM for conducting such planning, including for developing its PDUI. The strengthened arrangements will build upon the significant institutions that already exist through Florianópolis RM's interjurisdictional superintendency (SUDERF) and its representative committee CODERF. While the existing experience and knowledge are significant, Florianópolis RM still faces challenges in interjurisdictional coordination, having developed to date only a metropolitan transport plan (PLASMUS).

The focus of this output is two-fold. On the one hand, a focus will be placed on developing a gender-sensitive strategy to strengthen the governance (i.e. CODERF) and management (i.e. SUDERF) within the existing institutional arrangements, in order to promote greater coordination as a necessary condition for the effective development of the PDUI. Aligned with the PNDU and the Metropolitan Statute, the strategy will, inter alia, identify key opportunities for coordination of integrated challenges, targeting low-hanging fruits as catalysts for strengthening inter-municipal cooperation. It will also include a roadmap for developing the PDUI. Targeted training will also be conducted to build greater understanding of the benefits of integrated metropolitan region planning among municipal officers. The main objective of those activities is building inter-municipal technical understanding and cooperation that is less susceptible to fluctuations in political alignments.

One the other hand, the output will strengthen integrated planning through the development of a metropolitan region technical cooperation agreement on socio-environmental macro-zoning, in accordance with the Output 1.8 plan. Refer to that output for a detailed description of macro-zoning work foreseen in the region. See also Figure 15. The development of this output will draw upon the work under the *Metropolitan Governance in Brazil* project led by IPEA.

Figure 15 – Metropolitan Landscape of Florianópolis showing the targeted area for the microzoning



Key stakeholders: SUDERF, CODERF (including representatives from all RMF municipalities), academia, private sector and civil society, IPEA (through its work on the metropolitan governance project).

#	Deliverables
1.9.1	Technical study of good governance structures for facilitating integrated planning and sustainable urban development of metropolitan regions and urban agglomerations, building on existing studies and national and international good practices
1.9.2	Targeted training activities for municipal and state government stakeholders on undertaking integrated urban planning
1.9.3	Gender-sensitive strategy for strengthening Florianópolis RM governance structure and management arrangements, including roadmap for PDUI development, is presented to CODERF for adoption

1.9.4	Technical cooperation agreement for implementing the socio-environmental macro-zoning is presented to CODERF for adoption
1.9.5	Technical assistance to CODERF to support the adoption of 1.9.3 and 1.9.4

Component 2: Sustainable integrated low-emission and conservation investments

Component 2 will support local and state governments, academia, the private sector and civil society to develop evidence and awareness on the social, economic and environmental viability of sustainable integrated urban solutions in the Brazilian context. It aims to address project root causes by highlighting the viability of investments in sustainable urban development. In the three metropolitan regions, local and state governments will use GEF funds to pilot innovative integrated investments that demonstrate proposed sustainable urban solutions and lead to the achievement of global environmental benefits by reducing GHG emissions and conserving biodiversity. For the mitigation pilots (outputs 2.1, 2.3 and 2.4), low-emission zones will be piloted in three different intervention sizes (Belém = street, Teresina = city block, Florianópolis = neighborhood) and in three different but representative Brazilian cities. This approach is taken to build awareness of the viability of low-emission zones through-out the country, not only in metropolises but also in middle-sized cities. The pilots, at these different scales, also aim to support national stakeholders in garnering experiences, good practices and lessons learned on implementing these in three climatically and socio-economically diverse but representative Brazilian cities. Through these different geographical scales, the project will support such actors to learn of the social, environmental and economic viability of low-emission zones and the solutions used in these, as a starting point for replication through-out the country. The development of these low-emission zones, which seek to have significant co-benefits in reducing air contamination (and thus improving health), reducing ambient temperatures, and promoting a people-orientated space, thus aim to address the root causes of urban sprawl by promoting city-infilling and highlighting a high quality of life within the existing urban space.

Biodiversity conservation pilots in Belém and Florianópolis will seek to demonstrate replicable urban protected area management approaches that directly address threats associated with urban development processes. It is worthwhile noting that there will expressly not be a biodiversity pilot in Teresina where biodiversity resources will be mostly concentrated on planning (Output 1.5). Since very little is known about biodiversity in the RIDE Teresina due to a general lack of biodiversity data, assessments and scientific studies, GEF funds will focus in generating this information through the Local Biodiversity Strategy and Action Plan (LBSAP) for RIDE Teresina. The demonstrations will pilot goals and principles emanating from Component 1 planning processes and, to a large extent, benefit from financial instruments developed under component 3. All experiences from the demonstrations will be captured in the component 1 modules and the component 4 SIS+ to support replication and scaling up through-out the country. The component builds upon co-financing of the Teresina Municipality in investing in the revitalization of the city-center's streets as well as other related urbanizations, the Florianopolis Municipality investments in urban mobility, especially the connectivity of the cycling system and sidewalk improvements, and in infrastructure promoting environmental protection and rehabilitation. It also builds upon Belém Municipality co-financing public investments on sustainable urban mobility and green infrastructure, and State of Para co-financing through public investments to implement a bus-rapid transit system in the Belém Metropolitan Region and touristic and sanitation investments on Combú Island. The project aims to achieve the following outcome through this component:

Outcome 2: The governments of the municipalities of Belém, Florianópolis and Teresina invest in science and evidence-based solutions for low-emission and biodiversity-conservation centered urban development

The component consists of five outputs:

- Outputs 2.1 (low-emission street) and 2.2 (biodiversity conservation) focus on Belém;
- Output 2.3 (low-emission zone) focuses on Teresina;
- Outputs 2.4 (low-emission district) and 2.5 (biodiversity conservation) focus on Florianópolis.

Outputs:

Output 2.1 – Low-emission street pilot in the Belem City Center

This output consists of a pilot low-emission street demonstrated in the Belém city center. Through this output, the project aims to create awareness among the municipality, the local private sector and civil society of the social, economic and environmental viability of integrated solutions for a street that has low GHG and air contaminant emissions, fulfills sustainable urban development objectives, and continues to provide expected urban services. The pilot intervention aims to generate evidence for these stakeholders on the feasibility of establishing low-emission streets in the center of Belém for addressing urban challenges faced by the city: congested

transport, which result in high levels of GHG emission and air pollution (PM10, PM2.5, NOx and NO2), heat island effect and underdeveloped waste management processes (both solid and liquid).

Building upon existing municipal plans[117] and the state's climate change policy, the pilot will serve as a starting point for the broader sustainable transformation of the city center, with the street to be replicated and scaled-up through the plan for a low-emission Belém city-center (output 1.2). It will also support the broader transformation of the metropolitan area as an investment that will contribute to the goals of the metropolitan level climate mitigation and low-emission technology action plan (output 1.2). As the pilot initiative will be undertaken in parallel with the development of these plans, it will serve as a test case for actions being considered in these planning processes. It will also provide feedback on action effectiveness for these plans and in view of supporting their finalization. The pilot intervention will further provide experience for local administrators on costing and procurement of low-emission solutions. It will additionally help to create private sector supply channels and markets for scaling up low-emission solutions through the plans, including through the support of financial mechanisms strengthened and created in output 3.1.

The pilot intervention will be implemented in the Almirante Barroso avenue where the São Brás bus rapid transit (BRT) terminal is located (see map below). This location was chosen with the Belém Municipality based on the following considerations:

a) the possibility of building upon existing investments that promote urban sustainability, to enhance sustainability efforts and reductions of GHG emissions, including the BRT (the JICA-funded Belém Metropolitan Trunk Bus System Project (II)) and investments to improve the city's sewerage system (PROMABEN);[118]

b) the avenue's importance and high profile in serving as a connecting link between the city center and the metropolitan area (through the BRT and the bus terminal);

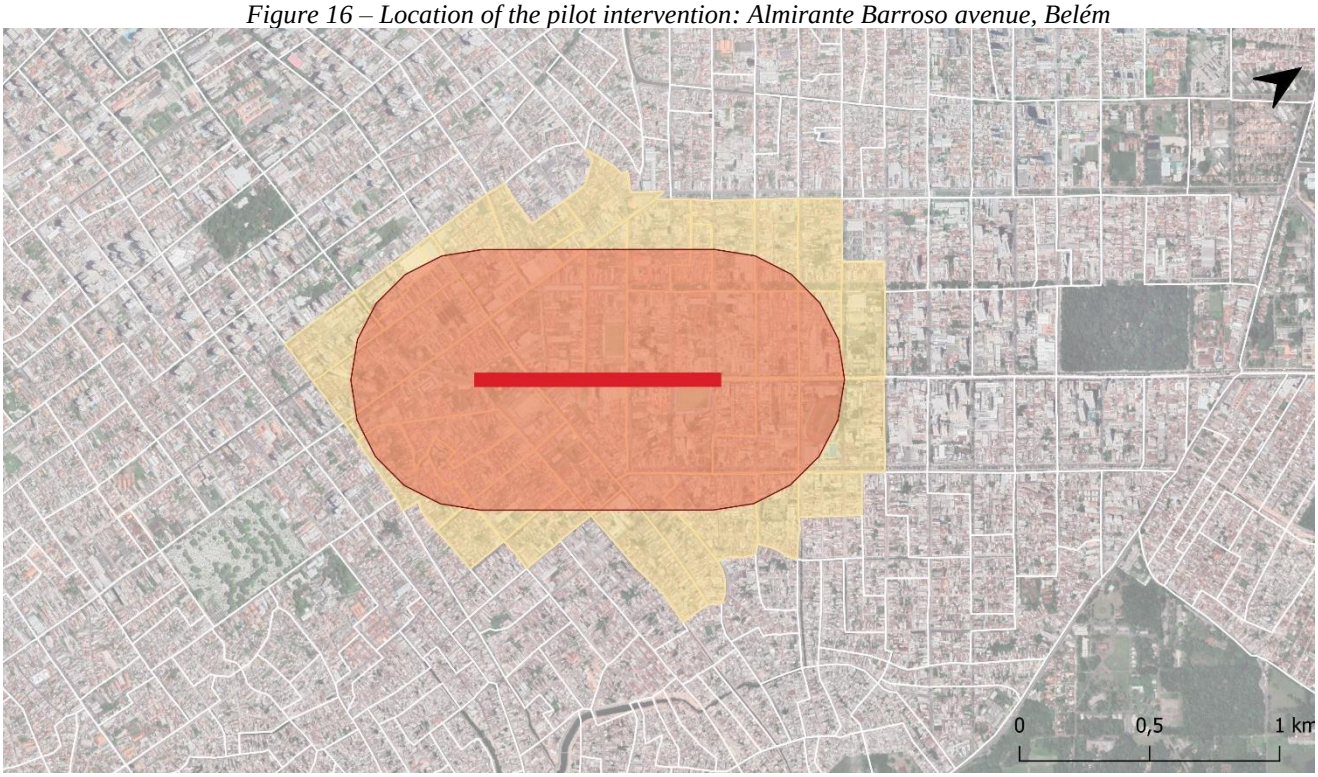
c) its high transport usage (and thus high emissions) due to it being a connecting node of the city. It will thus serve as a pilot of low-emission solutions for a street that is representative of Brazilian urban city-centers: streets that have continual and heavy vehicle and pedestrian flows;

d) exposure to GHG emissions and air contaminants of the local community who live in Almirante Barroso avenue and its vicinity, including through the presence of a school and two sports stadiums in the avenue.

The selection of this location meets the C40's proposed criteria for selecting low-emission zones, based on the requirements that they should be areas of high activity, high pollution, or high population density.[119] In this case, as noted above, Almirante Barroso avenue meets all three criteria.

[117] In particular the Municipal Urban Mobility Plan (2016) and the Integrated Solid Waste Management Plan of the Municipality of Belém (Law No. 8899/2011).
[118] See annex Q for more information.
[119] https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone?language=en_US

Figure 16 – Location of the pilot intervention: Almirante Barroso avenue, Belém



[a] General overview of the street's location in Belém and approximate location of Almirante Barroso avenue.

[b] Satellite view of the pilot location, including major buildings and services

Process for pilot co-creation, detailed design, execution and monitoring

To ensure that the low-emission pilot intervention responds to local social needs and has the support of the local community and private sector, the identification and development of the pilot intervention's integrated solutions will be undertaken through a process of co-creation. The same methodology will be applied for the three mitigation pilots of component 2 (outputs 2.1, 2.3 and 2.4) to support national stakeholders in comparing the impact of similar approaches for three different intervention sizes (Belém = street, Teresina = block, Florianópolis = neighborhood) and in three different but representative Brazilian cities. The process will also build upon international good practices for low-emission zones and processes of co-creation and the development of low-emission zones

(such as those of C40).[120] The co-creation process will be led by the project's local advisory group (LAG),[121] as the coalition of local supporters for the pilot.[122] The process will observe the following steps:

1. Firstly, a detailed assessment will be undertaken of the pilot intervention area initial state. This will include a detailed analysis of the pilot area (in the case of Belem a street), as to its density, population, socio-economic status, etc. It will also consist of an estimate of the area's sources and levels of GHG emissions, including as related to:[123]
    - Transport:
        - Estimates of vehicle composition (vehicle type and age, fuel type, efficiency, etc.), traffic quantities, flow and congestion (spatial distribution), and estimated level of GHG emissions and contaminants (PM10, PM2.5, NOx and NO2) based on the analysis of the traffic composition;
    - Liquid and solid waste composition:
        - Estimates of any methane (CH4) emissions generated due to sewage produced within the pilot area and processed in sewage treatment plants located outside of the pilot area;
        - Status of solid waste management infrastructure and processes in the pilot area, and estimates of any GHG emissions generated due to solid waste generated within the pilot area and treated by plants located outside the pilot area.
    - Urban infrastructure and buildings:
        - Electricity demands and efficiency of urban infrastructure, such as lighting and buildings (air-conditioning usage, insulation, building efficiency, etc.), to determine an estimate of GHG emissions generated externally to the pilot area to produce the electricity used within the pilot area, and drainage capacity;
        - Safety for pedestrians and bikes
        - Presence of green spaces and nature (trees, parks, etc.)
        - Presence of public facilities and appliances
    - Ambient (externalities that cannot be controlled through the pilot's interventions):
        - Meteorology (humidity, rainfall, etc.);
        - Background air pollution due to metropolitan region contributions and other sources such as agriculture, industrial processes and product use, and land-use, land-use change and forestry.
    - Pedestrians and safety
        - Flow of pedestrians in the public space during the day and the night
        - Mapping of people's activities in the public space
        - Do people feel safe in this street (women walking alone at night, etc.)

2. Secondly, the LAG will identify a short-list of integrated low-emission and evidence-based solutions[124] to address the defined challenges (step 1), through a beta version of the local integrated planning digital module (output 1.1). This will ensure that the identified solutions are aligned with national, regional and local priorities. Through the local prioritization process undertaken in output 1.1, it will be ensured that locally prioritized solutions are aligned with city and state plans and priorities. It will also be ensured that the identified solutions meet criteria such as innovativeness, cost-benefit impact to reduce GHG emissions, scalability and replicability, bankability, market-readiness, gender-sensitivity, and are of an integrated nature. The solutions' impact on the city beyond the street will also be considered, to ensure that it leads to a net reduction in GHG emissions and a positive social impact (i.e. avoiding a situation where traffic simply takes a different route, leading to no net reduction in emissions);

3. In step 3, a series of structured gender-sensitive stakeholder consultations will be undertaken under the LAG's guidance to refine the solutions for their application in the specific street location with the aim of ensuring their cost-effectiveness and viability. This will include consultations with international experts and national, state and local representatives of academia, the private sector and civil society. It will also consist of a mapping of and consultation with key local actors, such as residents and main interest groups (local traders, community groups, women groups and marginalized groups), located both within and beyond the intervention area, which will be critical to ensuring successful implementation of the solutions (for example,

[120] Building upon C40 recommendations as per: https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone.
[121] Refer to chapter 6: institutional arrangements, for a detailed description of the group's constitution and functions.
[122] Building upon C40 recommendations as per: https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone.
[123] Data not available at the pilot level, such as fuel efficiency, can be drawn on that available at the minimum geographic scale (e.g. city, state, federal, etc.). Etimates are required to create a sufficient baseline for determining the impact of the pilot in changing the baseline.
[124] https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone?language=en_US.

local businesses and think-tanks). Emphasis will be placed on ensuring that the consultations reflect a diversity of views from stakeholders of different sectoral expertise, age, race, gender and social class;

4. Fourthly, a procurement process or processes will be undertaken for the detailed design of the integrated solutions by, inter alia, architectural and engineering firms. Robust local consultation[125] will also be a requirement of the design processes.

5. Fifthly, entities will be contracted to supply materials, construct and operationalize the solutions in accordance with the detailed designs. The LAG will provide support to facilitate the obtaining of municipal and state permits and permissions where required. Solutions implemented may build upon a tactical urbanism approach[126] and include interventions such as traffic calming, pedestrianization, bike paths and bike stations, energy-efficient lighting, green infrastructure (such as green facades and roofs), retrofitting of public buildings, testing of building codes to enhance energy efficiency, circular economic interventions, and the use of sustainable materials with high thermal inertia. The project may also include nature-based solutions to address liquid waste and urban drainage and decrease the heat island effect. Other solutions may include the testing of re-zoning incentives that incentivize mixed-use of buildings.

6. In step 6, the monitoring of the effectiveness of the solutions and the overall pilot will be undertaken. The pilot will aim for a percentage reduction in GHG emissions generated in the street (e.g. transport) or through usage in the street (e.g. lighting as a demand on electricity generation, waste management leading to landfill methane emissions).[127] That is, controllable emissions (as opposed to background emissions generated outside of the street). To monitor this reduction, periodic measurement of changes in the emission sources due to the pilot will observed and compared with the street's initial state (as recorded in step 1). For instance, reductions in GHG emissions could be estimated through an observed reduction in number of transiting vehicles, or substitution of street lighting for LED, etc. The recording of experiences, good practices and lessons learned from the pilot will be captured through output 4.2 and uploaded to the integrated planning digital module (and through extension to SIS+). Such inputs will also support the refining of the applied solutions contained in the SIS+ database;

7. Finally, effort will be made to scale up the solutions throughout the city through plans, technical assistance and investments:
    - Plans: low-emission Belém city-center (output 1.2) and the metropolitan climate mitigation and low-emission technology action plan (output 1.2);
    - Technical assistance and investments: capacity-building and technical assistance through output 3.2 for supporting the development of 7 projects, including at least one project in the Belém metropolitan region and its submission to a public or private financing entity. The entity may finance this through the new and enhanced financial mechanisms developed through output 3.1.

The pilot intervention will draw on communication and gender-sensitive social participation activities to promote the local community's understanding of the functioning of the low-emission street pilot area and its benefits, as well as to understand and address public concerns. For instance, such activities include consulting residents and local businesses on proposed changes to traffic flows that may occur due to the pilot works.[128] The communication activities will also highlight the results obtained as a basis for building local community support for the continuation of the pilot's solutions and scale-up post project.

Key stakeholders: Municipal government of Belém, Executive Superintendence of Urban Mobility of Belém (SEMOB), Municipal Secretariat of General Coordination of Planning and Management (SEGEP), Municipal Secretariat of Environment (SEMMA), universities, think tanks, research networks, local private sector and local civil society, including marginalized groups.

#	Deliverables
2.1.1	Communication and gender-sensitive social participation plan and execution of plan activities
2.1.2	Detailed assessment of the pilot intervention area's initial state (step 1)

[125] Ibid.
[126] Tactical urbanism consists of small-scale, short-term interventions meant to inspire long-term change. It has five characteristics: 1) A deliberate, phased approach to instigating change; 2) An offering of local ideas for local planning challenges; 3) Short-term commitment and realistic expectations; 4) Low-risks, with possibly a high reward; and; 5) The development of social capital between citizens, and the building of organizational capacity between public/private institutions, non-profit/ NGOs, and their constituents. See: Lydon, Mike, Dan Bartman, Ronald Woudstra and Aurash Khawarzad, Tactical Urbanism: Short-term action, long-term change (Vol. 1) (New York City: The Street Plans Collaborative, 2011).
[127] See annex A for the defined percentage, as the key indicator for this output.
[128] Building upon C40 recommendations as per: https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone?language=en_US.

2.1.3	Shortlist of solutions (identified through SIS+ and refined through stakeholder consultation) (steps 2 and 3)
2.1.4	Detailed design of the integrated solutions (step 4)
2.1.5	Execution of the integrated solutions (step 5) *(obtaining a minimum 10% reduction in pilot area GHG emissions by project closure compared to estimated area emissions at start of project)*[129]
2.1.6	Periodic monitoring and evaluation of pilot effectiveness (at least quarterly), including recording of data in the local integrated planning module and SIS+ (step 6)

Output 2.2 – Agroforestry production chains are developed or strengthened to enhance sustainable livelihood options for local communities in the Combú Island urban protected area in Belém

Under Output 1.2, an Integrated Management Plan for Protected Areas (PAs) and Urban Green Areas will be designed to strengthen the ecological corridor formed by 6 urban PAs and facilitate the mainstreaming of protected area and urban green area management into urban planning. In line with the logical flow proposed by this project, Output 2.2 will seek to pilot actions that respond to the vision outlined under Output 1.2 and have strong replicability potential. A pilot investment in the Environmental Protection Area (EPA) of Combú Island is proposed to strengthen community management and development of agroforestry production chains in the cacao and açaí value chains.

The Combú Island spans across an area of 15,972 km², located 1.5 km south of the city and its 1,500 island inhabitants live mainly of fishing and forest resource extraction. The EPA of Combú Island also stands out for its açaí and cocoa production. Most of the açaí consumed in the country is produced in the state of Pará and a large part of it comes from the EPA of Combú Island. The local cocoa production has been gaining notoriety for being native to the area and produced in floodplains. Female leadership in organizing local cocoa production is a further notable attribute. While the EPA does not officially count with a management plan, USAID is supposed to start supporting the development of one in the second half of 2021. In addition, the EPA of Combú Island is turning into an ever more sought-after day-tourism destination. Increased urbanization has been leading to a tourism development pathway that is not necessarily sustainable and represents a threat to the PA. This context is aggravated by the lack of coordination and definition of attributions between the different state and municipal bodies that operate in the region and its surroundings. It follows that ensuring natural resource extraction is sustainable and that local communities can derive sustainable livelihoods from the activities in which they have been historically engaged in is a conservation priority.

A socio-biodiversity approach that privileges sustainable natural resource use, community engagement, promotion of local female leadership and additional income generation will be observed. The socio-biodiversity approach will place community knowledge of the ecosystem and balanced gender outcomes at the core of sustainable value-chain development and management. The pilot will seek to build on previous capacity building efforts (i.e.: the Agrovarzea project on rural extension services in Belém PAs that has been frozen) to deliver technical assistance and extension services, pilot agroforestry production, and develop market-access strategies to enable commercialization of production that is widely acknowledged as sustainable. The strengthening of the production chain aims to create a pilot model for this type of natural resource use, manufacturing, and trade in the Metropolitan Region (RM) that could be replicable to other urban PAs in the region and beyond. The pilot will be implemented in parallel to the management plan development process and will seek to influence the latter by ensuring adequate information on the socio-biodiversity approach to sustainable value chain management is duly integrated in the management plan.

Finally, this GEF investment will also seek to support on-going discussions on a possible recategorization of the PA from its EPA status to the category of Sustainable Development Reserve (SDR). GEF funds will support a rigorous analysis of the pros and cons as well as technical and political implications of such an approach and the deployment of an active stakeholder engagement and awareness-raising strategy to ensure study results are taken forward. The PA recategorization debate stems from the fact that Combú Island's characteristics related to sustainable use of forest resources and community management may suit more accurately the SDR category. SDRs take a more restrictive outlook on options for combining natural resource extraction with conservation approaches. The recategorization process could contribute enormously to a better ordering of activities from the perspective of long-term sustainability and conservation of biodiversity. Ideflor-bio is the management authority in charge of the PA. They will have a central

[129] Measure of the GHG emission reduction may be obtained by identifying change in profile of GHG sources compared to pilot area initial state, as a proxy for estimating GHG emission reduction. For instance, if individual vehicle use is estimated to contribute to 50% of the street's emissions, and the pilot reduces individual vehicle use by 20%, the estimated overall decrease in street GHG emissions would be 10%. The percentage reduction for the pilot is based on experience on experiences of low-emission zones in Europe: https://urbanaccessregulations.eu/low-emission-zones-main/impact-of-low-emission-zones.

role in the delivery of this output alongside local communities, research institutions and relevant municipal and state-level government agencies with a mandate on tourism and local economic development.

Key stakeholders: SEMAS, Ideflor, EPA of Combú Island Council, SETUR, and Emilio Goeldi Museum

Deliverable #	Description
2.2.1	Work plan and responsibilities matrix prepared and validated by a committee with state and municipal representatives
2.2.2	Assessment of the current state of the production value chains from Combú Island
2.2.3	Co-created agroforestry solutions to be implemented on Combú Island
2.2.4	Proposed development of sustainable economic alternatives
2.2.5	Project for the adoption of agroforestry solutions and sustainable economic alternatives focused on market access and financing
2.2.6	Impact monitoring and evaluation strategy (MRV) validated and implemented
2.2.7	Project of solutions and sustainable economic alternatives executed
2.2.8	Monitoring and impact evaluation data recorded in the Innovation and Solutions System for Sustainable Urban Planning and the Brazilian Biodiversity Information System (SiBBr)
2.2.9	Studies to support the planning and management of the area (support to USAID-financed management plan)
2.2.10	Proposal to recategorize the environmental protection area of Combú Island

Output 2.3 – Low-emission city block pilot in the Teresina City Center

This output consists of a pilot low-emission city block demonstrated in the Teresina city center. Through this output, the project aims to create awareness among the municipality, the local private sector and civil society of the social, economic and environmental viability of integrated solutions for a city block that has low GHG and air contaminant emissions, fulfills sustainable urban development objectives, and continues to provide expected urban services. The pilot intervention aims to generate evidence for these stakeholders on the feasibility of establishing low-emission city blocks throughout the Teresina city center that build upon other investments and provide integrated solutions to addressing urban challenges that the city faces: congested transport, which result in high levels of GHG emission and air pollution (PM10, PM2.5, NOx and NO2), heat island effect, desertification of the city center (resulting in urban sprawl and city traffic congestion), and underdeveloped solid waste management processes.

As noted in the baseline, Teresina is successfully advancing with the sustainable development of the city center, obtaining investments through CAF and AfD (amongst others) to address key transport issues, including interventions to prioritize public transport, facilitate traffic calming and promotion of non-motorized interventions (and bike lanes). However, the city has had limited impact in addressing urban issues in the city center that go beyond transport. This pilot aims to build upon these interventions to demonstrate the viability of integrated urban solutions that consider a more holistic approach to addressing urban challenges. The notion of a low-emission city block aims to demonstrate an alternative and sustainable concept of the city center, promoting a more livable and people-focused space. This integrated approach aims to reduce GHG emissions as well as promote city infilling and revitalize the city center as a health and safe place to live. Focus will be placed on designing the city block as a place for people, rather than as a transport thoroughfare.[130] While the integrated solutions to be piloted through the low-emission city block will be developed during project execution through a co-creation process (see section below), these may build upon a tactical urbanism approach and include installation of pedestrianized streets, bike paths and stations, energy efficient lighting, shading (to mitigate the high city temperatures), green infrastructure (such as green facades and roofs) and retrofitting of public buildings and testing of building codes to enhance energy efficiency. Solutions may also be related to promoting a sustainable waste management, such as the installation of green waste collection points and informative signs.

Aligned with existing municipal plans,[131] the low-emission city block pilot will serve to demonstrate a modular approach that can be replicated through-out the city center and beyond. The output 1.5 plan for a low-emission Teresina city-center will chart the course

[130] Where possible drawing on UNEP Integrated Guidelines for Sustainable Neighborhood Design (https://www.neighbourhoodguidelines.org/. A related online training module (including in Portuguese) with be developed by UNEP under the Sustainable Cities Impact Programme.
[131] In particular the Master Plan for Territorial Planning, PDOT (2019), the New Center Action Plan (2019), decree 18.913/2019, the Sustainable Urban Mobility Plan (PDMUS) and the local climate action plan.

for the pilot city block's replication and scale-up through-out the city center. The low-emission city block pilot will also support the broader transformation of the Timon-Teresina Urban Agglomeration, as it will serve as an investment that contributes to the goals of the agglomeration's climate mitigation and low-emission technology action plan (output 1.5). As the pilot initiative will be undertaken in parallel with the development of these plans, it will serve as a test case for actions being considered in their planning processes. It will also provide feedback on action effectiveness for these plans and in view of supporting their finalization. The pilot intervention will further generate experiences for local administrators on costing and procuring low-carbon solutions. It will additionally help to create private sector supply channels and markets for scaling up low-emission solutions through the plans, including through the support of financial mechanisms strengthened and created in output 3.1.

The pilot intervention will be implemented in the Teresina city center in a space of six city blocks framed by the 24 of January, Paissandu, 13 of May and Álvaro Mendes streets and the Frei Serafim avenue (see map below). It encompasses two blocks of the Antonio Freire avenue, one of the primary roads for entering the city center. This location was chosen with the Teresina Municipality based on the following considerations:

a) the possibility of building upon existing investments that promote urban sustainability, to increase sustainability efforts and reductions of GHG emissions. These include:

    a. Building upon CAF investments on sustainable transport in streets of the city block and in nearby streets, including bike lanes and improved pavements in parts of the Paissandu, 24 January and Senador Teodoro Pacheco streets, with the latter a continuation of the Antonio Freire avenue;

    b. Building upon federal government investments (Caixa Econômica Federal) to build a dedicated three-kilometer bike lane and bus lane connecting route along Antonio Freire avenue from the Liberty Square to the Joquei neighborhood on the east of the Poti River.

b) its importance as the entrance portal to the city center for commuters from the city's east (Antonio Freire avenue) and south (24 of January street) and from Timon through the south (24 of January street). The Liberty Square, located within the city block, is one of the city's primary entrance points into the city center;

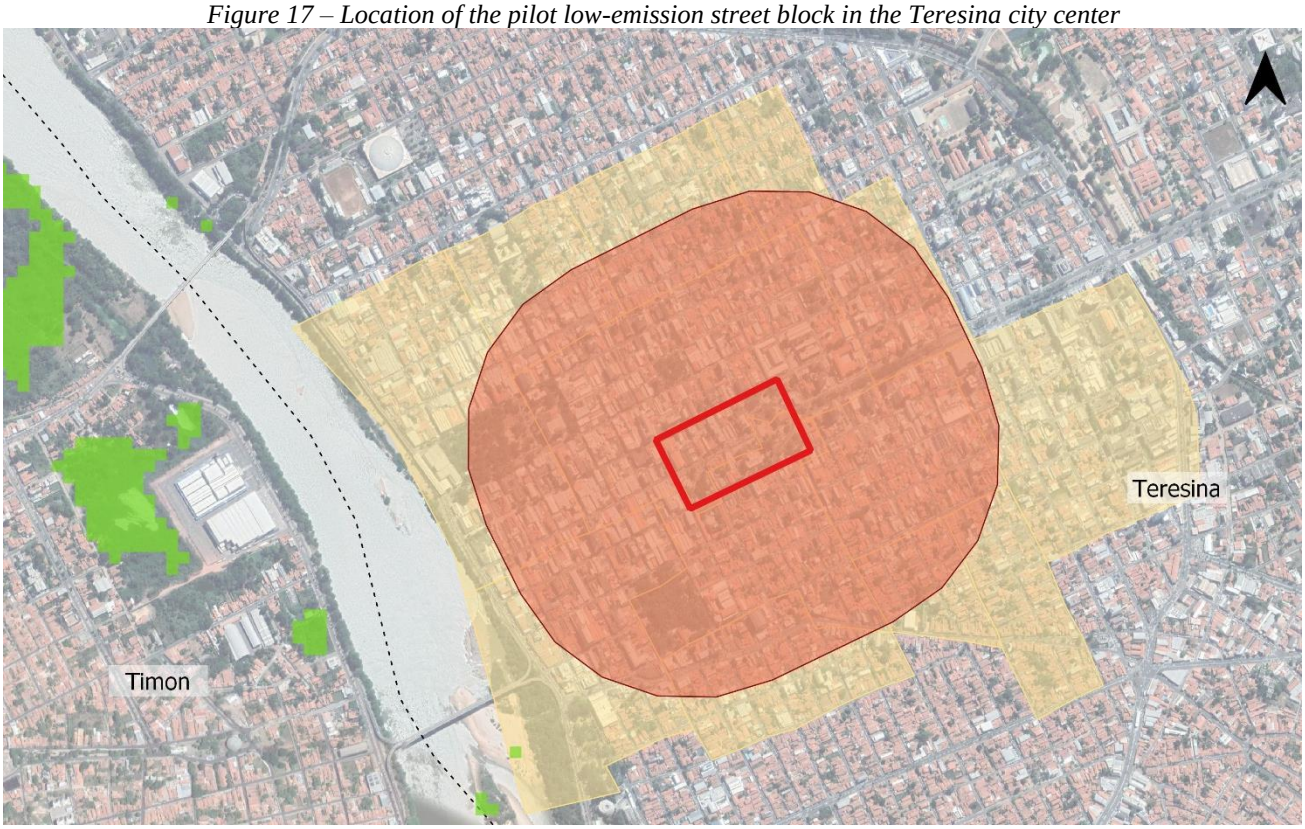
c) its high transport usage (and thus high emissions) due to its role as a primary entrance to the city center. It will thus serve as a pilot of low-emission solutions for a block that is representative of Brazilian urban city centers: blocks with continual and heavy vehicle and pedestrian flows;

d) its high profile and visibility as the city's historical and cultural center. The city block contains the Liberty Square, the Pedro II Square, the São Benedito Parish, the Karnak Palace (the State of Piauí's official head office), two theatres and multiple government offices.

The selection of this location meets the C40's proposed criteria for selecting low-emission zones, based on the requirements that they should be areas of high activity, high pollution, or high population density.[132] In this case the city block meets all three criteria.

[132] https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone?language=en_US

Figure 17 – Location of the pilot low-emission street block in the Teresina city center



[a] General overview of the Teresina city center and the location of the low-emission city block

[b] Satellite view of the pilot location

Process for pilot co-creation, detailed design, execution and monitoring

The pilot will be elaborated through a process of co-creation using the same methodology as outputs 2.1 and 2.4, to support national stakeholders in comparing the impact of similar approaches for three different intervention sizes (Belém = street, Teresina = block, Florianópolis = neighborhood) and in three different but representative Brazilian urban centers. It will be led by the project's local advisory group (LAG), as the coalition of local supporters for the pilot. The co-creation process will observe the same seven steps, *mutatis mutandis*, as output 2.1. Refer to that output for further information.

Key stakeholders: Municipal government of Teresina, in particular the Municipal Secretary of Planning and Urbanism (SEPLAM), and the Secretary of Mobility (SEMOB), State Government of Piauí, local private sector and local civil society, including marginalized groups.

#	Deliverables
2.3.1	Communication and gender-sensitive social participation plan and execution of plan activities
2.3.2	Detailed assessment of the pilot intervention area's initial state (step 1)
2.3.3	Shortlist of solutions (identified through SIS+ and refined through stakeholder consultation) (steps 2 and 3)
2.3.4	Detailed design of the integrated solutions (step 4)
2.3.5	Execution of the integrated solutions (step 5) *(obtaining a minimum 10% reduction in pilot area GHG emissions by project closure compared to estimated area emissions at start of project)*[133]
2.3.6	Periodic monitoring and evaluation of pilot effectiveness (at least quarterly), including recording of data in the local integrated planning module and SIS+ (step 6)

Output 2.4 – Low-emission district pilot on the mainland of the Florianopolis Municipality

This output completes the series of three pilot outputs which aim to demonstrate low-emission integrated solutions at different geographical scales and in diverse but representative Brazilian cities. It consists of a pilot low-emission district[134] demonstrated on the mainland part of the Florianopolis Municipality. Through this output, the project aims to create awareness among the metropolitan region's municipalities (especially Florianopolis and the neighboring municipality of São José), the local private sector and civil society of the viability of a neighborhood that has low GHG and air contaminant emissions, fulfills sustainable urban development objectives, and continues to provide expected urban services. The pilot intervention aims to generate evidence for these stakeholders as to the feasibility of establishing low-emission and sustainable neighborhoods throughout the Metropolitan Region of Florianopolis.

As noted in the baseline, neighborhoods in Florianópolis RM face significant urban challenges. These include having:

- Single modal transport systems not designed on a human scale, with long distances to transit points and long travel times to commercial, employment and city service areas;
- Single-use zoning with historical separation between residential and employment areas, compounding and reinforcing transport demand and encouraging urban sprawl into protected areas (as citizens seek to reside closer to employment opportunities);
- Low energy efficient buildings and low-tech solid waste treatment processes, leading to low resource efficiency, higher resource demand and costs, and increased GHG emissions.

Brought together, these challenges result in high volumes and congested transport, leading to high levels of GHG emission and air pollution (PM10, PM2.5, NOx and NO2), urban sprawl into protected areas, and high resource usage.

This pilot aims to demonstrate low-emission and sustainable solutions that address these challenges and thus promote the development of sustainable low-emission districts. As noted in annex Q, Florianopolis has made progress in advancing with sustainable development of the municipality, with the establishment of bike lanes and pedestrian-friendly sidewalks along primary commuting channels. Furthermore, in December 2019 the municipality reopened the refurbished Hercílio Luz bridge with a prioritization of public and non-motorized transport, enhancing low-emission connectivity between the island and the mainland. On the continental side, while the municipality has made some advances in promoting sustainable transport, it has not advanced with low-emission solutions that go beyond this.

[133] See footnote to deliverable 2.1.5.
[134] Municipalities in Brazil are sub-divided into districts. In English this could also be called a neighborhood.

This pilot aims to build upon these existing interventions to demonstrate the viability of integrated urban solutions that consider a holistic approach to addressing urban challenges. While the integrated solutions to be piloted will be developed during project execution through a co-creation process (see section below), these may build upon a tactical urbanism approach and include installation of pedestrianized streets, bike paths and stations, energy efficient lighting, green infrastructure (such as green facades and roofs) and retrofitting of public buildings and testing of building codes to enhance energy efficiency. Solutions may also be related to promoting sustainable waste management, such as the installation of green waste collection points and informative signs. Other solutions may include the testing of re-zoning incentives that incentivize mixed-use of buildings in the neighborhood, supporting multi-nodal development which reduces resident need to travel to the island.

A complete transformation to a low-emission district requires resources beyond those available through this GEF project. Thus, work through this output aims to demonstrate solutions that generate evidence and viability for their replication and scale-up for achieving such a transformation. The controlled implementation of actions to facilitate this will be identified through output 1.8, in which a plan will be elaborated for a fully sustainable and low-emission district. The pilot will also support the broader low-emission transformation of the Florianópolis Metropolitan Region, as it will serve to create evidence and solutions that contribute to the goals of the metropolitan climate mitigation and technology action plan (output 1.8). As the pilot initiative will be undertaken in parallel with the development of these plans, it will serve as a test case for actions being considered in their planning processes. It will also provide feedback on action effectiveness for these plans and in view of supporting their finalization. The pilot intervention will further generate experiences for local administrators on costing and procuring low-carbon solutions. It will additionally help to create private sector supply channels and markets for scaling up low-emission solutions through the plans, including through the support of financial mechanisms strengthened and created in output 3.1.

The pilot will be implemented in the continental part of the Florianopolis municipality in the district of Capoeiras, in the area bound by the Governador Ivo Silveira Avenue and the BR-282 highway (see maps below). This location was chosen with the Florianópolis Municipality based on the following considerations:

a) The possibility of building upon existing investments to promote sustainable transport and compound reductions of GHG emissions. These include existing investments by the Florianopolis Municipality with the support of Caixa Econômica Federal, the Ministry of Tourism and Catarina Water and Sanitation Company[135] that led to the construction along the Governador Ivo Silveira Avenue of bike lanes and public bike rental stations, refurbishment of bus stations and introduction of street markings and signage to prioritize public and non-motorized transport;

b) The Governador Ivo Silveira Avenue's importance for facilitating public and non-motorized transport connectivity between the continent and the island, as the primary serving artery connecting such transport to the Hercílio Luz bridge (one of only two bridges to the island) and on to the island's public transport and non-motorized transport connectors;

c) Its proximity to new technology innovation centers arising on the continent, such as the SOHO Technological Innovation Center and Digitro, and also to the Santa Catarina State Electric Company (which powers the state through 16 hydroelectric plants). These are actors conducive to the piloting of low-emission solutions in the district and are significant economical presences for promoting and reinforcing multizonal planning. The presence of innovators and entrepreneurs on the continent is a relatively new development, building on the city's reputation as the Brazilian Silicon Valley but in a different location to the traditional innovation hub on the island;

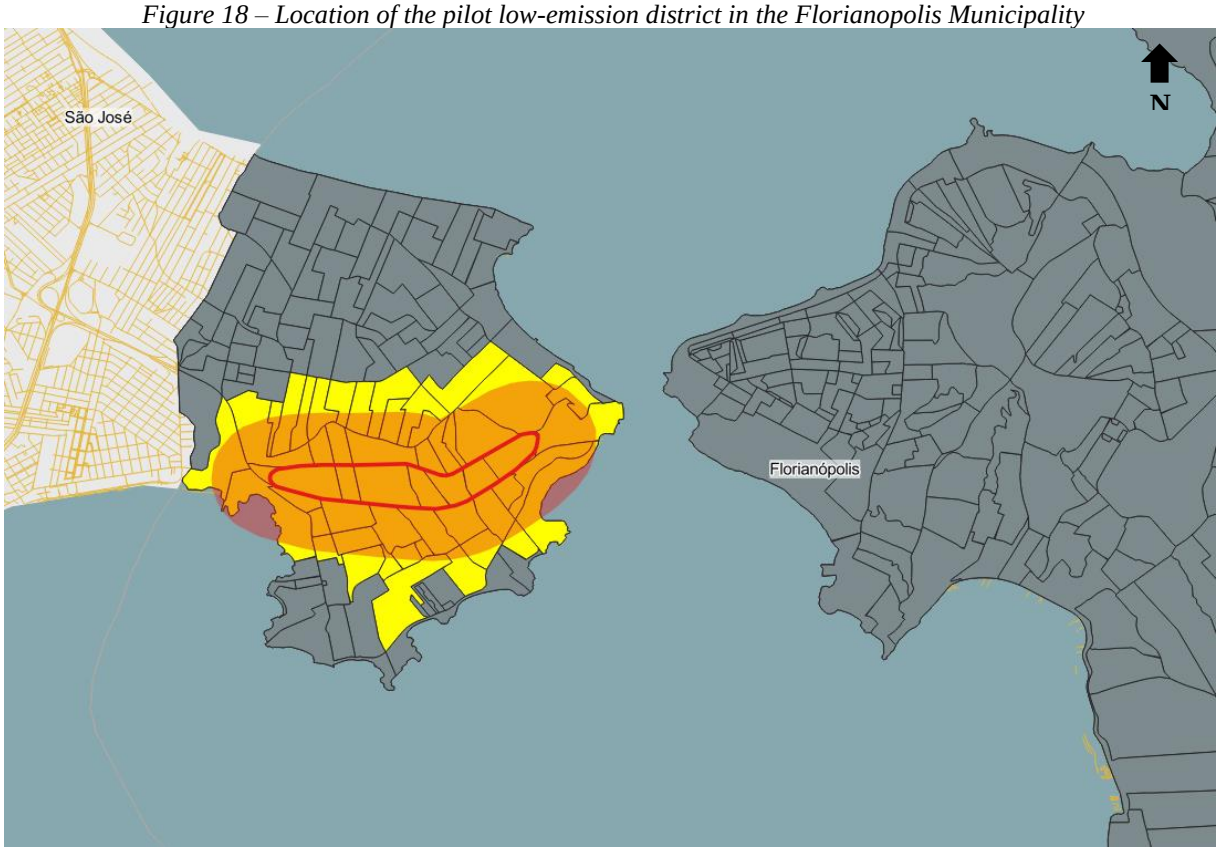
d) Its potential to promote socio-economic development through its proximity to the Vila Aparecida slum and the Catarinense Foundation of Social Assistance.

e) Its representativity as a district facing challenges common to the majority of the Metropolitan Region and the country's districts regarding traffic, social issues, single-use zoning and resource efficiency (as described above).

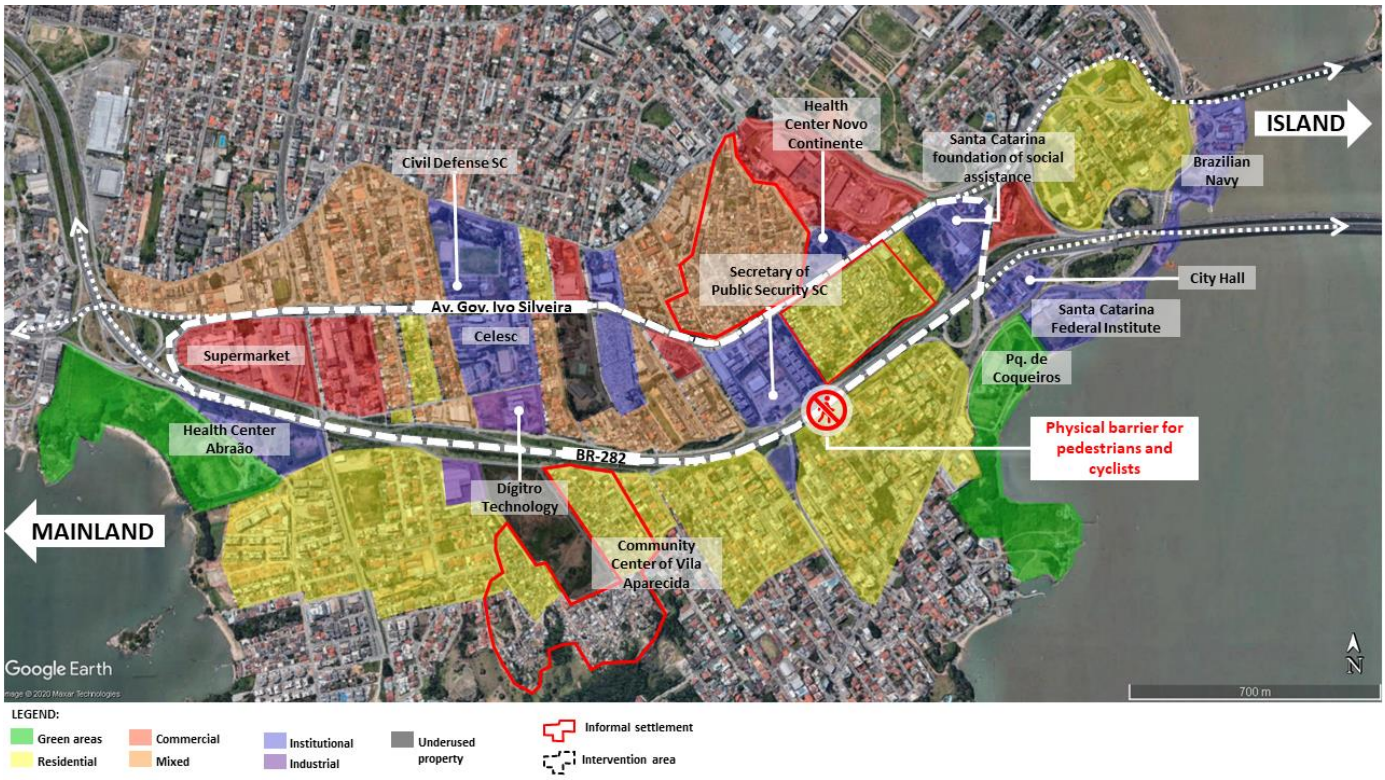
The selection of this location meets the C40's proposed criteria for selecting low-emission zones, based on the requirements that they should be areas of high activity, high pollution, or high population density.[136] In this case, as noted above, the district meets all three criteria.

[135] http://www.pmf.sc.gov.br/mobile/index.php?pagina=notpagina&noti=19783.
[136] https://www.c40knowledgehub.org/s/article/How-to-design-and-implement-a-clean-air-or-low-emission-zone?language=en_US

Figure 18 – Location of the pilot low-emission district in the Florianopolis Municipality



[a] General overview of the pilot location in the Florianopolis Municipality



[b] Satellite view of the pilot location and key landmarks

Process for pilot co-creation, detailed design, execution and monitoring

The pilot will be elaborated through a process of co-creation using the same methodology as outputs 2.1 and 2.3, to support national stakeholders in comparing the impact of similar approaches for three different intervention sizes (Belém = street, Teresina = block, Florianópolis = neighborhood) and in three different but representative Brazilian urban centers. It will be led by the project's local advisory group (LAG), as the coalition of local supporters for the pilot. The co-creation process will observe the same seven steps, *mutatis mutandis*, as output 2.1. Refer to that output for further information.

Key stakeholders: SUDERF, Florianópolis municipal government, the Federal University of Santa Catarina (UFSC), and local private sector and local civil society of the continental part of the Florianópolis municipality, including marginalized groups.

#	Deliverable
2.4.1	Communication and gender-sensitive social participation plan and execution of plan activities
2.4.2	Detailed assessment of the pilot intervention area's initial state (step 1)
2.4.3	Shortlist of solutions (identified through SIS+ and refined through stakeholder consultation) (steps 2 and 3)
2.4.4	Detailed design of the integrated solutions (step 4)
2.4.5	Execution of the integrated solutions (step 5) *(obtaining a minimum 5% reduction in pilot area GHG emissions by project closure compared to estimated area emissions at start of project)*[137]
2.4.6	Periodic monitoring and evaluation of pilot effectiveness (at least quarterly), including recording of data in the local integrated planning module and SIS+ (step 6)

Output 2.5 – Three pilot investment projects in the Pirajubae Marine Extractive Reserve and Carijós Ecological Station in Florianopolis are executed to demonstrate methodologies to measure urban protected area health and foster community-based conservation

Output 2.5 aligns with this project's overall strategy to address threats to biodiversity associated with urban development by strengthening urban protected area and urban green area management through replicable solutions. It will seek to pilot solutions that respond to the broader vision of the metropolitan region-wide socio-environmental macro-zoning (Output 1.8) at the scale of two urban protected areas highly threatened by urbanization: the Pirajubae Marine Extractive Reserve and the Carijós Ecological Station. The purpose of this activity is to strengthen the main pillars for the effective management of these PAs, namely, management, conservation, and research activities.

The Carijós Ecological Station (EE) is a federal conservation unit created in 1987 to protect the mangroves of Ratones and Saco Grande, located in the northwest of the Santa Catarina Island. The Pirajubaé Marine Extractive Reserve was created in 1992 and is the 1st Brazilian marine extractive reserve (RESEX). It encompasses 744 ha of mangroves and 700 ha of bay. One of its main purposes is to facilitate sustainable fishing of the mollusk popularly known as berbigão (Anomalocardia brasiliana), which is the main resource exploited in the area. These are both federal protected areas managed by ICMBIO's Integrated Management Unit (NGI).

The Carijós Ecological Station and the Pirajubaé RESEX have important transitional environments between mangrove and urbanized areas. These areas include several aquatic species associated with estuarine and mangrove environments, such as the Cocoi heron, spoonbills, garganeys, sandpipers, large and small white herons, and the little blue heron (Egretta caerulea), which is endemic to mangroves, similar to the bicolored conebill (Conirostrum bicolor)–considered near-threatened (NT) by the IUCN and vulnerable (VU) by the Santa Catarina State. Terns represent significant bird species found in the area; Thalasseus maximus and Sterna hirundinacea are considered EN and VU, respectively, in Brazil's list of threatened species, and their protection is addressed in the National Action Plan for the Conservation of Species Threatened with Extinction. Besides, mangroves are home to nests and mixed dormitories of ardeids, which aggregate many birds associated with fishing and artisanal fishermen. Together with bare- and white-faced ibises, these birds fly daily in large and organized groups, especially in the late afternoon in Florianópolis. In open sandbank environments, bird species such as Tangara peruviana (EN in Santa Catarina State and VU in Brazil) and Ramphocelus bresilius (VU in Santa Catarina State) are prominent; these species are of interest for conservation because of their rarity and color and also because they attract the interest of the public and bird watchers. The two PAs constitute strategic stops for the rest and feeding of migratory birds, of which the buff-breasted sandpiper Calidris subruficollis (VU), registered at the Pirajubaé RESEX, and the red knot Calidris canutus (CR), registered at the Carijós Ecological Station, are prominent. The set of species, nests, and assemblages of birds impart special scenic value to these PAs.

[137] See footnote to deliverable 2.1.5. This deliverable has a more conservative emission reduction target as the intervention area is significantly larger.

These large green areas are located next to densely urbanized areas in the Florianópolis municipality, only a few kilometers from the city centre (Figure 19). These areas face significant threats of environmental degradation that hold negative social and economic repercussions in the short, medium, and long terms. In this context, the following pilots are proposed:

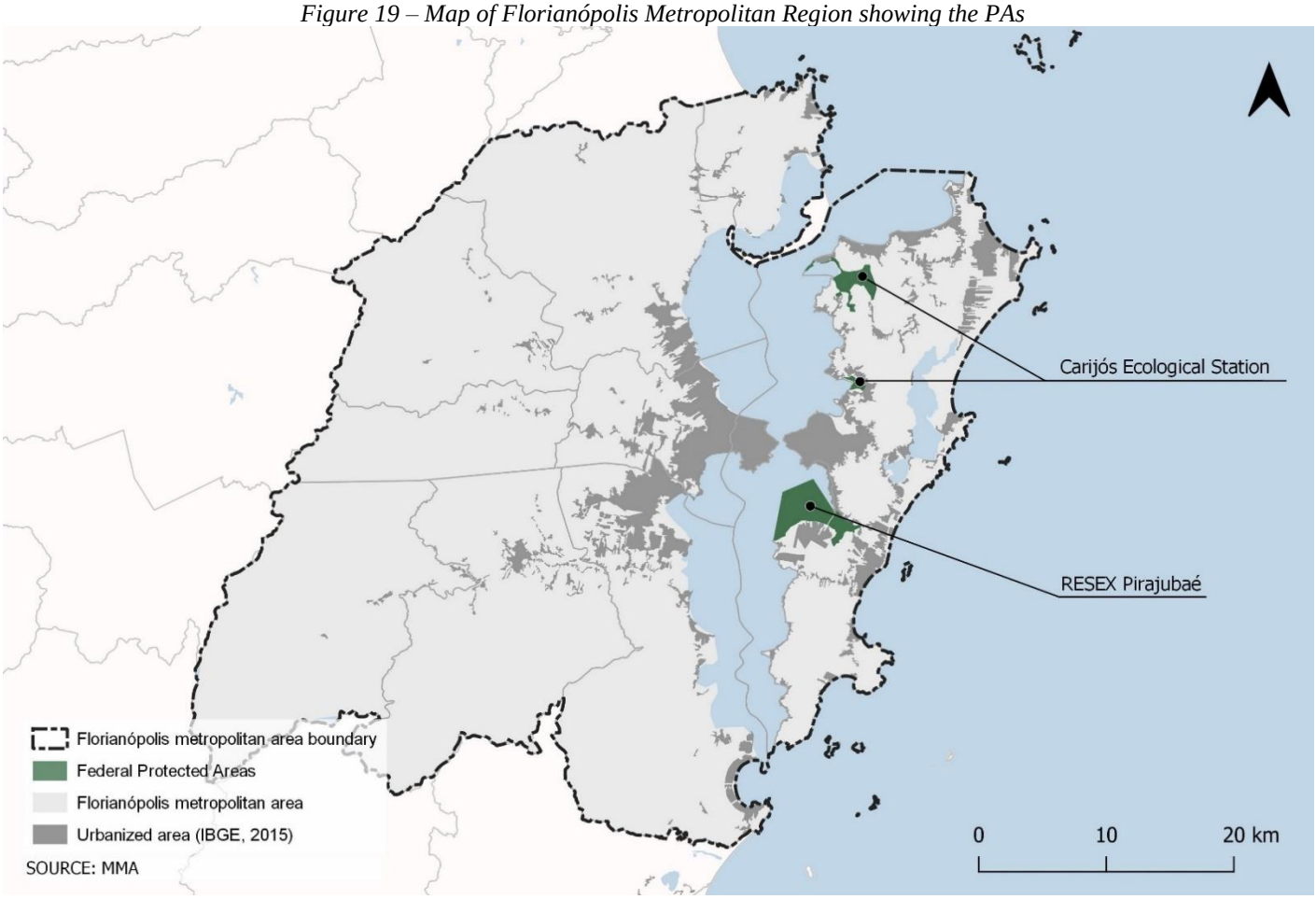
1. Carijós Ecological Station Water Monitoring Pilot: the Carijós Ecological Station's management plan identifies water pollution risks as a priority and establishes water monitoring in the Ratones and Saco Grande River basins as a vital activity. To respond to this priority, the Carijós Ecological Station Water Analysis Laboratory (LAA) was created in 2005. LAA has conducted numerous research and inspection activities in areas with polluted water. Over the past 16 years, the LAA has produced data of essential importance to the Carijós Ecological station as well as to other PAs in the metropolitan region and the country at large. However, the laboratory has been facing serious constraints due to a lack of adequate equipment. Output 2.5 will support LAA's restructuring through equipment purchases and the resumption of ten water-quality monitoring points across the main water bodies within the PA. In addition, GEF funds will support the implementation of an environmental quality biomonitoring programme to evaluate the impacts of urbanization and sanitation on water quality and their reflexes on the PA's associated biota. Biomonitoring efforts will be centered on the use of blood biomarkers in a mullet fish species (Mugil liza) and collect data on both water quality and fish organism responses to changes associated with different types of pollution and sanitation trends. Mullet blood biomarkers should be able to provide quite accurate assessment of environmental stressors to the PA. This pilot will be undertaken in partnership with the Federal University of Santa Catarina (UFSC)'s Departments of Ecology, Oceanography and Environmental and Sanitary Engineering.

2. RESEX Pirajubae and Carijós Ecological Station Bird Monitoring Pilot: monitoring migratory birds and large bird aggregations displaced from PAs is also important in an urban context. Birds are good indicators of the quality of tropical environments and their decline can have numerous cascading effects on the ecosystem. This is especially the case for RESEX Pirajubaé given its close proximity (approximately 11 km) to Hercílio Luz international airport and the fact that the PA's air space is largely engaged in airport activities. Although bird communities in these PAs are greatly impacted by unplanned urban development, they still harbor species dependent on mangroves and threatened with extinction (see immediately above). In this context, monitoring of terrestrial and aquatic birds is a matter of priority. A bird monitoring programme will be established based on the design and improvement of protocols for standardized execution that allow for temporal and spatial comparisons of data at different scales. The project will use protocols from International Shorebird Surveys (ISS) and the Neotropical Census of Waterfowl (CNAA), adopted by the National Center for Research and Conservation of Wild Birds (CEMAVE / ICMBio). GEF-financed bird monitoring efforts under this output will provide invaluable evidence to enable accurate assessments of target protected areas' health and effectiveness in conserving biodiversity. In addition, this activity will equally promote gender-sensitive environmental education efforts (communication and knowledge materials) and enhance the conservation tourism offering in these PAs by supporting bird-watching tourism (interpretive plates, guides and field cards with information on the main bird species as well as threatened and flagship species in each PA).

3. RESEX Pirajubae Community-Based Tourism Pilot: urbanization threats to RESEX Pirajubae affect the functionality of estuarine and mangrove ecosystems and pose direct threats to the survival of traditional local communities that have historically depended upon artisanal fishing and collection of mollusks. A pilot project on experience-based tourism in RESEX Pirajubaé has been on-going since 2015. This is a community-based initiative that has been systematically backstopped by the RESEX Deliberative Council's Working Group on Tourism (WG). Community-based tourism (CBT) in RESEX Pirajubaé is a sustainable activity that is complementary to artisanal fishing, thus providing an important alternative income stream to local communities that does not uproot them from their central activity. CBT takes a fresh and distinctive look at the territory, promotes traditional local culture, and raises awareness about the importance of a functional protected area to local communities. This is the only CBT experience documented in the Florianopolis Metropolitan Region; it has shown strong replication potential and emerged as an innovative action in an urban PA. Output 2.5 aims to strengthen on-going efforts and support their long-term sustainably by financing visitation infrastructure, gender-sensitive communication/dissemination activities to persuade more local community members to engage in this type of activity and train interested community members, and experience exchange to enable replication in other PAs in the metropolitan region. Activities of this nature are of relevance in terms of promoting a post-pandemic blue and green recovery.

Key stakeholders: NGI-ICMBIO, Florianópolis municipal government, the Federal University of Santa Catarina (UFSC), local communities in Carijós Ecological Reserve and RESEX Pirajubae, Carijós Ecological Reserve and RESEX Pirajubae Governing Bodies

Figure 19 – Map of Florianópolis Metropolitan Region showing the PAs



Deliverable #	Description
2.5.1	Work plan and responsibility matrix prepared and validated by the committee with representatives from academia, society, and federal conservation units of Florianópolis.
2.5.2	Impact monitoring and evaluation (MRV) strategy developed, validated, and implemented.
2.5.3	Pilot 1: Water Analysis Laboratory of the Carijós Ecological Station restructured.
2.5.4	Pilot 1: Environmental quality of urban river basins evaluated using blood biomarkers in mullet fish species
2.5.5	Pilot 2: Avifauna monitoring protocols implemented.
2.5.6	Pilot 3: Strengthening activities toward community-based tourism at the RESEX of Pirajubaé and its municipal integration.
2.5.7	Monitoring and impact evaluation data recorded in the Innovation and Solutions System for Sustainable Urban Planning and the Brazilian Biodiversity Information System (SiBBr)

Component 3: Innovative financing and scaling-up

Component 3 aims to support Brazilian metropolitan regions and municipalities to access finance for implementing their integrated urban plans. With the development of metropolitan region funds for each of more than 70 metropolitan regions not viable, including due to limited municipal fiscal coffers, this component aims to build economies of scale by supporting leading national development banks with developing and strengthening financial instruments for financing sustainable urban development. It aims to address the project root causes related to a lack of urban investment in sustainable solutions. The component has a national focus, not limited to the three participating cities, and thus aims to support metropolitan regions and cities through-out Brazilian with obtaining enhanced access to finance for investing in sustainable urban development. The component will address challenges faced by local and national

actors from both the perspective of supply (Output 3.1) and demand (Outputs 3.2 and 3.3).[138] Although output 3.2 focuses on metropolitan regions beyond those of components 1 and 2, its output 3.2 also aims to support the three pilot metropolitan regions to implement their integrated urban plans developed in component 1 and scale up the integrated solutions demonstrated in component 2. The component builds upon co-financing of BNDES and FINEP through credit-lines promoting sustainable urban development. It also builds upon State of Pará co-financing in the form of public investments to enhance the management of protected areas in the Belem Metropolitan Region. The project aims to achieve the following outcome through this component:

Outcome 3: Metropolitan region and national actors initiate or strengthen innovative financing mechanisms for scaling-up sustainable urban solutions

The component consists of three outputs:

- Output 3.1 focuses on strengthening financial mechanisms for low-emission sustainable urban development at the national scale
- Output 3.2 focuses on enhancing local technical capacities to develop low-emission sustainable bankable projects and increase access to financing opportunities
- Output 3.3 focuses on the development and implementation of an innovative financial instrument for biodiversity at the local scale (Belém Metropolitan Region)

Output 3.1 – Brazilian local governments have access to strengthened national financing mechanisms for low-emission sustainable urban development

As noted in the baseline, one of the key challenges that Brazilian local governments face is the lack of access to financial instruments that respond to their local needs and requirements and fully embrace low-emission sustainable urban development criteria. In this output, the project will work with key national financial institutions to create and enhance the effectiveness of financial instruments for low-emission sustainable urban development (i.e. strengthening the 'supply side'). Through this, Brazilian municipal and metropolitan governments will have increased access to finance for investing in the implementation of their integrated plans. Key partners in the output will be the Brazilian Development Bank (BNDES), one of the largest national development bank in the world, and the Funding Authority for Studies and Projects (FINEP), a large national public fund. The project will work with these financial institutions to create or strengthen financial instruments that respond to local Brazilian government needs and align with the principles of the Paris Agreement.

To facilitate the strengthening and development of financial mechanisms through a process involving key national actors, a Committee for Supporting Access to Financing for Sustainable Urban Development (CODUS) will be created within the scope of the existing MCTI-MDR Inter-Ministerial City Chamber 4.0 (*Câmara das Cidades 4.0*). CODUS will be led by the MCTI and will include representatives from MDR, Brazilian cities – through ABM, CNM, and FNP –, and national financing institutions, including BNDES, FINEP, the Association of Development Banks (ABDE), the Brazilian Federation of Banks (FEBRABAN – representing the interests of private banks), and others, for instance Caixa Economica Federal. CODUS will aim to have gender balance and will build upon the work of other initiatives as described in the baseline (see section 2(iii) on finance). The committee will meet on a minimum quarterly basis through-out project execution and provide strategic guidance for the development and creation of financial products to promote sustainable urban development in Brazilian cities. This will oversee an analysis of the following:

a) City and metropolitan region demand profiles (identified during the PPG stage as a key need of the financial institutions);

b) The existing supply of national sources of finance, including financier typologies (including through private sector financing such as local banks) and the effectiveness of their instruments (a key need of the cities);

c) International good practices for financing low-emission sustainable urban development, including through private sector financing such as local banks, including criteria for sustainable and green financing, building upon international work in this

[138] Outputs 3.1 and 3.2 align with the recommendations contained in the WRI Brazil paper: Desafios e recomendações para destravar o financiamento urbano sustentável (2020). This document was prepared based on a series of debates held between 2017 and 2020 by the Network for Financing of Sustainable Infrastructure (Rede FISC).

area (such as green and climate bonds by the International Capital Market Association and the Climate Bonds Initiative)[139] (a need of both financiers and cities);

d) Possible national funding criteria for cities and RMs to access finance. Building on international and national[140] good practices, this may include whether cities and metropolitan regions have integrated urban plans or climate mitigation and technology action plans, consider diversity and gender, and identify potential for private sector engagement (a need of the federal government).

Based on this analysis and considering the different types of financial institutions present in the national financial system, the committee will provide recommendations on financing mechanisms for sustainable low-emission urban development that are appropriate for the Brazilian urban reality. This will draw on the experiences and work of, *inter alia*, BNDES, FINEP, Caixa Econômica Federal in implementing Pró-Cidades and Pró-Transporte, the GIZ-funded Sustainable Brazilian Finance (FiBraS), SITAWI, and the GIZ-IADB Financial Innovation Laboratory (LAB).[141] The CODUS recommendations will serve as inputs for BNDES, FINEP, and other public and private financial institutions to create and strengthen financial instruments for sustainable urban development. Once the financial institutions have created or strengthened financial instruments, CODUS will work with the institutions to facilitate the availability of funds through these. To promote the financial instruments and ensure that metropolitan region governments are aware of these, CODUS will execute a communication plan and related activities. This will include a high-level event with leading representatives of the organizations constituting CODUS, possibly as part of the project's second national dialogue (see output 4.3), to launch and promote these new mechanisms.

To support such financial institutions in undertaking such work, the project will also provide key representatives of these entities with training to enhance their understanding of international good practices on public and private financing for sustainable urban development, and how these good practices could be applied in the Brazilian context considering its specificities. This will include on: sustainability criteria, the nature of such investments (e.g., payback periods and financing structures), green and climate bond principles (including taxonomies and standards),[142] and innovative financial instruments (bonds, trust funds, blended financing and business models). Applying this to the Brazilian context is important as there are some instruments that local governments are unable to use by law, such as bonds issuance (green, non-green, any type). They will also be supported to gain a better understanding of the needs and challenges of Brazilian local governments in financing local urban development.

On the creation and/or strengthening of financial instruments, for BNDES focus will be placed on strengthening financial instruments for access by municipalities and metropolitan regions (i.e. primarily public finance). This will include:

i. Undertaking studies to evaluate the effectiveness of BNDES FINEM credit lines on sustainable transport, energy efficiency, municipal management, and integrated municipal development, and the BNDES Climate Fund credit line on sustainable cities;

ii. Deeper identification of the demand profile for these credit lines;

iii. Enhancement of these credit lines, and where required creation of new ones, to increase financing impact with regards to, *inter alia*, contribution to sustainable urban development, cost-benefit, GHG reduction and alignment with the Metropolis Statute, including urban integrated plans. This will build upon work by SITAWI which has been supporting BNDES in the definition of environmental, social and governance guidelines for structuring infrastructure projects (especially in the water, sewerage and solid waste sectors). Whether strengthened or new, BNDES products may include pooled financing mechanisms (including credit enhancements such as a debt service fund) that account for RM municipal debt holding restrictions and pool together the investment needs of multiple municipalities in a metropolitan region). Products may also include longer payback periods for sustainable urban development for sectors that require more investor patience, such as transport and waste management. A focus will also be placed, through the existing BNDES municipal management credit line, on understanding how this line could support the development of PDUIs and in particular the Metropolis Statute requirement for RMs to develop integrated systems for resource allocation and accounting. Furthermore, attention will be placed as to how public-private partnerships with private local banks can increase private sector financing for sustainable urban development;

[139] International Capital Market Association: https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf, the standards of the Climate Bonds Initiative: https://www.climatebonds.net/climate-bonds-standard-v3.
[140] SITAWI has been supporting BNDES in the definition of environmental, social and governance guidelines for structuring infrastructure projects (especially in the water, sewage and solid waste sectors).
[141] See baseline section for further information.
[142] For instance, aligned with the standards of the Climate Bonds Initiative: https://www.climatebonds.net/climate-bonds-standard-v3.

For FINEP, focus will be placed on enhancing access to finance by micro-, small-, and medium-sized enterprises (MSMEs) (i.e. primarily private finance) for the development and commercialization of innovative solutions for sustainable urban development. CODUS will support FINEP in analyzing the effectiveness of existing public financing calls, such as Technology 4.0, Innovative Women, and Investment in Innovative Startups, and identify opportunities to strengthen such and develop new calls to support sustainable urban development. Another opportunity in this context will be with regards to supporting a green economic recovery in Brazilian cities from COVID-19 by supporting the strengthening of existing FINEP COVID-19 innovative calls for innovative urban solutions to address the pandemic.[143]

Key stakeholders: BNDES, FINEP, MCTI, MDR, ABDE, FEBRABAN (representing private banks), ABM, and FNP.

#	Deliverable
3.1.1	Committee for Supporting Access to Financing for Sustainable Urban Development (CODUS) created and in operation (*including detailed terms of reference, workplan, minimum quarterly meetings and post-project sustainability plan*)
3.1.2	Gender-sensitive communication plan developed and implemented, including dissemination of all activities of outputs 3.1 and 3.2, including high-level event launching the improved and new financial mechanisms
3.1.3	Analysis report of local government financial demand profiles, national financial sources and the effectiveness of existing financial instruments, and good international practices and criteria for financing sustainable urban development
3.1.4	Training activities on financing sustainable urban development for actors in the public and private financial sector
3.1.5	Recommendations on financing models and criteria for sustainable urban development suited to the Brazilian urban reality and the different types of financial institutions and preliminary design of minimum 2 mechanisms
3.1.6	Improved or new financial mechanisms developed (*minimum 2 of*), including availability of minimum USD $75 million through these,[144] sustainability plans and resource leveraging where necessary

Output 3.2 – Brazilian local governments enhance capacity to access financial mechanisms for financing low-emission sustainable urban development

While the previous output 3.1 aimed at strengthening 'the supply side' of finance for sustainable urban development, Output 3.2 targets 'the demand side'. The goal is to strengthen the capacity of metropolitan region municipalities to access finance for undertaking low-emission sustainable urban projects. More specifically, this output addresses three key challenges that most local governments in Brazil recurrently face: (1) difficulties in identifying sources of funds[145] (especially for medium-sized and smaller RMs and cities); (2) difficulties in preparing project proposals; and (3) a lack of capacity to strengthen their creditworthiness.

In order to address these challenges, an *Electronic Guide for Facilitating Access to Finance for Sustainable Urban Development* will be developed. Incorporated into the MCTI-hosted SIS+ (output 4.1), the guide will contain a live dashboard of financial offer available to local governments for low-emission integrated and sustainable urban development. It will also provide information in clear language on the processes and criteria required for accessing such offer. Furthermore, it will contain an interface through which city and metropolitan region managers will be able to insert data from their project ideas. After doing so, the guide will scan all available financial offer and provide managers with a list of applicable financing options for their concepts. Upon the managers choosing an option and providing further data, the guide will develop elements of the project proposal in the template of the financial institution. In cases where a project could be funded by several sources (national, local, public and private investors), such as in the case of urban infrastructure projects, it will be explored as to whether the system may be able to facilitate the development of project proposals that operate with a pool of resources. i.e. Where possible through facilitating the development of sub-proposals for each financial source, in accordance with their due diligence process, and then compiling these into a single project. It will also draw upon the SIS+ low-emission solution database to support municipal and metropolitan region officers in developing proposals that build upon innovative sustainable solutions that are contextualized at the local level. The guide will be developed under the guidance of the CODUS committee (output 3.1) to ensure that it draws on good practices, knowledge and experiences of key actors in the urban financing space.[146] It will also build upon a MCTI guide developed as part of the Green Climate Fund readiness activity: *Technological Needs Assessment project for the Implementation of Climate Action Plans in Brazil (TNA Brazil)*,[147] which identifies financing mechanisms for low-carbon technologies prioritized by the project.[148] To facilitate the use of the electronic guide, a communication plan and

[143] Including building on those that already exist: http://www.finep.gov.br/chamadas-publicas/chamadapublica/642.
[144] In accordance with the BNDES and FINEP co-financing commitments and the results framework (annex A), indicator 3B.
[145] Building upon a recommendation of WRI Brazil and GIZ in the document: Financiamento de Infraestrutura de Baixo Carbono nas Áreas Urbanas no Brasil: contexto, barreiras e oportunidades para o fluxo de financiamento verde e climático nas cidades brasileiras.
[146] For instance, building where possible on the experiences in developing the https://ndcpartnership.org/climate-finance-explorer.
[147] For information on the project, see: https://antigo.mctic.gov.br/mctic/export/sites/institucional/ciencia/SEPED/clima/arquivos/tna_brazil/Sintese-das-atividades-do-projeto.pdf
[148] See Electronic guide to financing options for prioritized technologies.

related activities will be undertaken to reach out to cities through key multipliers: the Ministry of Regional Development (MDR) and its ReDUS, the Sustainable Cities Programme, and the three principal city associations: the Brazilian Association of Municipalities (ABM), the National Confederation of Municipalities (CNM) and the National Front of Mayors (FNP). Under the guidance of CODUS, the project will strive for communication activities to be undertaken in collaboration with these partners, as well as other key organizations working on sustainable financing in Brazil, such as financial institutions (e.g. BNDES and FINEP), the private sector (and local banks), and non-governmental organizations including SITAWI, the Financial Innovation Laboratory (GIZ, ABDE, IDB), ICLEI and WRI. In particular, through SIS+ the electronic guide will connect to the MDR's CapaCidades platform, to ensure that capacity-building activities through both platforms are complementary and mutually reinforcing.

In addition to the guide, a gender-sensitive training package will be developed that builds the capacity of metropolitan region municipal governments for accessing available financial offer. Focus will be placed on building capacity on two aspects. On the one hand, capacity-building will focus on supporting such actors to enhance the creditworthiness of their jurisdictions for securing public and private investment to finance climate-smart infrastructure and services. While creditworthiness does depend on existing debt-servicing, the strengthening of financial management and fiduciary transparency practices can also strengthen municipal access to credit. This includes improving: the control of compliance with tax obligations; understanding of the tax system; developing fiscal management models; and strengthening capacities to prepare municipal budgets. An example of this is the efforts of the State of Espírito Santo.[149] This will build upon work of BNDES, through its credit line on municipal financial management.[150] As part of the capacity-building activities, the baseline federal credit ratings of each participating municipality, called "Payment Capacity" (CAPAG), will be noted. Through the training activities, the CAPAG rating will then be reviewed at the end of the project to ascertain progress in improving the credit rating. In addition, capacity-building activities will aim to build local government capacity for developing project proposals that respond to the needs of public and private national and international financiers, including those new (or enhanced) mechanisms developed by BNDES and FINEP. This will build upon work undertaken by others in this field, especially through the ICLEI LEDS Lab.

The package's methodology, materials and activities will draw upon international good practices and will build upon and be aligned with the electronic guide and the solutions database of SIS+. All materials will also be uploaded to SIS+. As with the guide, the CODUS committee will play a key role in the package's design to ensure it builds upon the needs, experiences and knowledge of key actors in this space. The package's development will also be undertaken in consultation with the Ministry of Regional Development (MDR) which together with the Federal Rural University of the Semi-Arid (UFERSA)[151] and the MDR Sustainable Urban Development Network (ReDUS)[152] is undertaking activities and courses to build the capacity of municipalities. Collaboration with these actors will also be undertaken to identify the sustainability of the package post-project, including through the UFERSA or ReDUS. The training package will also be developed in consultation with the Sustainable Cities Impact Program (SCIP) team, to be able to build upon well-developed methodologies elaborated globally through WRI, ICLEI, C40 and others. It will also be gender-sensitive, ensuring that the training activities and materials take into account the different needs of women and men.

In order to test the effectiveness of the guide and the training package, a national call for project development support will be made, open to municipalities and metropolitan regions through-out Brazil. A minimum of 7 low-emission sustainable urban development concepts will be selected, including at least one from each of the Metropolitan Regions of Belém and Florianópolis and the Greater Teresina RIDE (or the Timon-Teresina Urban Agglomeration). Selected municipalities or RMs will: use the electronic guide; participate in the activities of the training package; and then receive additional project-financed technical assistance as required to successful submit the proposals to financing institutions. After this, the electronic guide and training package will be revised and improved drawing upon these experiences. For the three pilot metropolitan regions (Belem, Teresina, Florianopolis), this additional technical assistance will include that provided through the SCIP global program, including:

- Finance Modules (part of SCIP City Academy Curriculum): Led by ICLEI, this training module helps and empowers local governments to develop innovative and bankable projects and access finance for their low carbon and climate resilient development. ICLEI will deliver one regional training in Latin America, and by participating the three pilot RMs will be able to advance the development of projects for submission to financing institutions.

- C40 Finance Academies: Building on the C40-led Financing Sustainable Cities Initiative (FSCI), the SCIP global program will support cities through the Finance Academies. The C40 Finance Academies will focus on accelerating and scaling up infrastructure investments for urban solutions that deliver global environmental benefits. The C40 Finance Academies will

[149] https://www.economist.com/the-americas/2019/08/08/one-brazilian-state-stands-out-as-a-model-of-efficiency.
[150] https://www.bndes.gov.br/wps/portal/site/home/financiamento/produto/bndes-finem-pmat.
[151] For example, see: https://assecom.ufersa.edu.br/2021/03/25/mdr-lanca-curso-ead-de-regularizacao-fundiaria-urbana-em-parceria-com-a-ufersa/.
[152] Initiative under the leadership of the MDR that reunites actors and other existing networks, concentrating efforts to provide a Knowledge Network on the theme of Sustainable Urban Development. For more information, see: https://www.gov.br/mdr/pt-br/assuntos/desenvolvimento-urbano/rede-de-desenvolvimento-urbano-sustentavel

be intensive three-day workshops (or virtual depending on covid-related conditions) convened at the regional level, which will bring together city officials, technical experts (in-house, partners and consultants), private sector and financial institutions to address financing challenges preventing implementation of a particular type of sustainable infrastructure project. If the 3 RMs focus on infrastructure, they will be able to draw on these academies for support in project development.

- Light-touch Technical Assistance: The SCIP GP will offer cities that participate in the C40 Finance Academies the opportunity to apply for light-touch technical assistance support. This support will be allocated to help unlock access to finance and accelerate or scale up progress in projects which SCIP cities are working on, in addition to the current child projects.

- Early-stage pipeline screening: ICLEI's TAP: SCIP cities seeking finance for sustainable infrastructure projects will have the option to submit their projects to ICLEI's Transformative Actions Program (TAP) project pipeline and get these projects screened for basic quality.

- High-level Investment Roundtables: In order to advance project development process from project definition to pre-feasibility, the GP will roll out High-Level Investment Roundtables for projects that have met a certain level of maturity in their conceptualization defined by the GP (e.g. TAP Seal projects, projects that have received Light Touch Technical Assistance).

Key stakeholders: MDR, Sustainable Cities Integrated Program team, BNDES, FINEP, ABDE, ABM, FEBRABAN (representing private banks), CNM and FNP, Special Secretariat of Finance through the National Support Program for Administrative and Fiscal Management of Brazilian Municipalities – PNAFM, Climate Network.

#	Deliverable
3.2.1	Report on international good practices on training municipal and metropolitan region governments to access finance for low-emission sustainable urban development and identification of key Brazilian local government needs in this space
3.2.2	Electronic Guide for Facilitating Access to Finance for Sustainable Urban Development (connected to SIS+)
3.2.3	Training package for metropolitan region governments for accessing financial offer for low-emission sustainable urban development, developed and undertaken with the support of the Global Platform of the Sustainable Cities Impact Program and the Ministry of Regional Development, including identification of minimum 14 metropolitan regions as potential targets for the capacity-building activities[153] and a minimum of 7 receiving support, and an action plan for the long-term implementation of the package
3.2.4	Gender-sensitive communication and dissemination activities on the electronic guide, training package and the call of technical assistance
3.2.5	Technical assistance for supporting the development of minimum 7 low-emission project proposals and their submission to financing agents, including at least one project in the metropolitan regions of Belém and Florianópolis and Greater Teresina RIDE (or Timon-Teresina Urban Agglomeration)
3.2.6	Participation in global SCIP activities on financing:[154] - Finance Modules (part of SCIP City Academy Curriculum) - C40 Finance Academies - Light-touch Technical Assistance - Early-stage pipeline screening: ICLEI's TAP - High-level Investment Roundtables

Output 3.3 – An innovative financing mechanism in support of conservation and ecosystem service-provision in the Utinga State Park benefits urban dwellers in the Belém Metropolitan Area

Output 3.3 will seek to deliver an innovative financing mechanism to address urbanization threats to the Utinga State Park (PEUt) and its surroundings, while enhancing its management effectiveness by mobilizing additional PA financing. Refer to Figure 8, in which PAs featured form a green corridor in the south-southeastern part of the Belém RM peninsula. They include primarily Belém Metropolitan Region's Environmental Protection Area (APA Met Belém), Utinga State Park and the Amazonia Metropolitan Wildlife Refuge (REVIS Amazonia).In particular, a payment for environmental services (PES) scheme will be designed and initial

[153] Identification will be undertaken together with deliverable 4.3.1, with the same 14 metropolitan regions identified and the same minimum 7 metropolitan regions receiving the targeted support. The 7 metropolitan regions will not include Belém, Florianópolis and Teresina.
[154] Participation in global program SCIP activities is budgeted through output 4.3.

implementation efforts supported to conserve the Utinga State Park and enhance critical water provision ecosystem services.[155] The ultimate goal of this mechanism is therefore to mobilize long-term resources to finance activities that will strengthen the quality and quantity of water provided by PEUt. Output 3.3 very much supports the delivery of the integrated management plan for urban protected areas and urban green areas in the Belem Metropolitan Region (Output 1.2). Besides, and in line with the rationale systematically proposed by this project, the expectation is that such an innovative financing scheme can be picked up and replicated by other urban PAs in Belém and beyond.

PEUt is responsible for approximately 2/3 of the water supplied to the metropolitan region as it hosts the headwaters of the Agua Preta and Bolonha lakes. Managed by Ideflor-bio and located in the urban continental area of the Belem municipality, this 1,400 ha PA harbors rich and abundant biodiversity, encompassing areas of upland and *igapó* forests, and attracts national and international tourists throughout the year. The PA is confronted with direct threats associated with urban development trends. PEUt is surrounded by all kinds of business and housing developments, including irregular low-income housing where vulnerable populations do not have adequate access to solid waste collection and sewage disposal services. The runoff of wastewater resulting from these developments lead to increasing pollution of the lakes. PA management authorities often need to remove macroalgae generated by this waste, which impairs water supply and quality. The proposed PES scheme responds directly to provisions under the PEUt management plan,[156] which foresees the establishment of an Environmental Services Subprogram aimed at raising funds to sustain environmental services provided by this urban PA. GEF funds will be deployed to design the most effective resource transfer mechanism to ensure adequate quality and quantity of water supply. The PES scheme is expected to support activities such as forest recovery in lake margins, measures to support macroalgae management and awareness-raising on environmental sanitation with neighboring communities through gender-sensitive approaches.

This output will be implemented through four areas of action: i) assessments (years 1 and 2); ii) planning (year 3); iii) implementation (year 4); and iv) cross-cutting stakeholder engagement activities: (years 1, 2, 3, and 4). During the assessment phase, a multistakeholder Working Group (WG) will be formed including key local actors to guide all stages of PES design and execution. This stage is set to ensure the mechanism effectively responds to local circumstances and has the conditions to secure stable financing streams over time. It will include the following steps: i) identification of ecosystem and environmental services provided by PEUt, ii) stakeholder mapping and socioeconomic analysis of the Belem Metropolitan Region to identify environmental service users and providers; iii) identification of park management alternatives, environmental service valuation, and conservation finance mechanisms; and iv) identification of technical, financial, legal, and political aspects underpinning the PES scheme. In addition, a study will be conducted to specify how the project can support dynamics in the surroundings of the park that are leading to environmental degradation. The study will examine cost-effective options to support correct disposal of solid waste, environmental sanitation, and gender-sensitive engagement with the low-income local communities surrounding the park.

Building on these initial assessments and analyses, the second action pillar relates to planning and will unfold as per the following steps: identification of the financing mechanism underpinning the PES scheme, design of a strategic action plan outlining institutional and governance arrangements, validation of the PES mechanism among a broad range of relevant stakeholders and civil society. The third action pillar pertains to implementation and will see initial execution efforts embedded in active monitoring and evaluation frameworks to facilitate adaptive management. While there is a chronological flow between the first 3 areas of action, the 4th one will be cross-cutting and extend over the entire duration of the project. This cross-cutting action pillar will focus on gender-sensitive consultations, awareness-raising among local communities focused on the importance of adequate waste management, and capacity-building targeted at PA managers and civil servants on innovative financial instruments and experience-sharing on PES (link with Component 4 and SIS+). Aside from Ideflor-bio and the State of Pará, the Pará State Sanitation Company (Companhia de Saneamento do Pará - COSANPA), responsible for water distribution across the metropolitan region, has been identified as key actor to be actively engaged from the assessment stage onwards.

Annex R below provides further details on how the PEUt PES mechanism is likely to work.

Key stakeholders: Institute of Forest Development and Biodiversity of the State of Pará (Ideflor-Bio), the State Secretariat of Environment and Sustainability (SEMAS) of the government of Pará, the Pará State Sanitation Company (Companhia de Saneamento do Pará - COSANPA), local communities surrounding the PA

#	Deliverable
3.3.1	Creation and operationalization of a Working Group (WG) with key local actors.

[155] Direct or indirect services provided by ecosystems, for example, climate regulation, water supply, and pollination.
[156] http://ideflorbio.pa.gov.br/utinga/wp-content/uploads/2018/03/PMUtinga_26out2013.pdf

3.3.2	Feasibility study for the design and implementation of a PES mechanism in the Utinga State Park (PEUt).
3.3.3	Study on cost-effective options to support correct disposal of solid waste, environmental sanitation, and gender-sensitive engagement with low-income local communities surrounding the park.
3.3.4	Definition of the PES financing mechanism
3.3.5	Strategic action plan for detailing, structuring, and implementing the PES Program as well as performing its monitoring and evaluation.
3.3.6	Structuring the institutional arrangement and governance model for planning and implementing the PES.
3.3.7	Socialization and validation of the PES with key actors and civil society.
3.3.8	PES implementation
3.3.9	Monitoring and evaluation of actions of the PES.
3.3.10	Communication and public consultations for the development of the PES with civil society.
3.3.11	Civil servant capacity-building on financial instruments for conservation, including PES (in line with Component 4 and SIS+ of the GEF7).

Component 4: Knowledge exchange and capacity building

This component aims to promote the scale-up of integrated planning practices in other Brazilian metropolitan regions through targeted knowledge sharing and capacity-building. Ultimately, it aims to address the root cause of urban sprawl by promoting a broader up-take and implementation of integrated planning processes by metropolitan regions across Brazil. Building on the experiences, good practices and lessons learned through components 1, 2 and 3, the project will support the development of a federal ministry-hosted System of Innovations and Solutions for Sustainable Urban Planning (SIS+) to promote integrated sustainable urban development. The system, which is an evolution of the GEF-6 Innovation Observatory for Sustainable Cities, will serve to provide town-planners with a database of validated and evidence-based sustainable solutions prioritized to local contexts. It will also harbor all knowledge gleaned through-out the project, as well as serve as conduit to knowledge available on the global SCIP platform. Furthermore, the component will support the building of the capacity of key stakeholders in the national and local urban planning space, including by drawing upon global SCIP support. The component builds upon co-financing of MDR, through capacity building and technical assistance investments to support urban planning processes. It also builds upon MCTI co-financing investments on scientific and technological R&D for sustainable urban development, and CGEE in-kind co-financing gathering technical elements to guide the formulation of public policies in thematic dimensions that affect the economic, social and environmental development of large metropolitan regions in Brazil. The project aims to achieve the following outcome through this component:

Outcome 4: Brazilian metropolitan region governments commit to greater ambition on sustainable urban development by drawing on new tools, enhanced access to good practices and strengthened capacity

The component consists of three outputs:

- Output 4.1 focuses on the development of a national system for supporting local and metropolitan governments to identify and prioritized integrated sustainable urban solutions and access knowledge on good practices;
- Output 4.2 focuses on compiling experiences, good practices and lessons learned from the project to support Brazilian city officials in replicating and scaling-up sustainable urban development;
- Output 4.3 focuses on supporting municipal and metropolitan region governments to build capacity for undertaking integrated urban planning.

Output 4.1 – A *System of Innovations and Solutions for Sustainable Urban Planning* (SIS+) for promoting sustainable urban development is available to Brazilian Federal, state and municipal governments

In GEF-7, the GEF-6 Innovation Observatory for Sustainable Cities (OICS) will be strengthened to become the National System of Innovations and Solutions for Sustainable Urban Planning (SIS+); a federal government online system that will support city public managers and technicians in identifying and prioritizing sustainable urban solutions aligned with their integrated urban plans and in harnessing financial offer for implementing these. Through work in this output, the GEF-6 OICS will be transformed from an observatory of a non-governmental organization into a national online system embedded within the Ministry of Science, Technology and Innovations.

The strengthening of the existing OICS platform aims to address a key gap in the national knowledge management space on sustainable urban development. The Ministry of Regional Development is currently constructing a ReDUS platform to provide municipalities with tools and information on good practices for undertaking integrated urban planning processes. Another key

platform, the Sustainable Cities Platform, supports municipalities in scaling up ambition to achieve the SDGs and track their progress to achieve local targets aligned with these. Other smaller-scale platforms exist which provide rich information on related sustainable urban topics but are piecemeal in their approach (focusing on a limited gambit of sectors and without an integrated approach) and are not institutionalized within federal ministry programs and supporting architecture. In Brazil, there is an absence of a governmental platform which may support local governments to identify and prioritize evidence- and science-based validated solutions that are aligned with national priorities, local ambition and context, and city integrated plans. Furthermore, there is an absence of a governmental platform which may support local governments to implement those solutions through national financial mechanisms. SIS+ aims to fill these gaps: it will be a federal government instrument which supports municipal, state and federal actors in elaborating and implementing projects and public policies for sustainable urban development.

As noted in the baseline, OICS is limited to disseminating sustainable urban solutions. It does not have a formal process for assessing the validity of proposed solutions for local conditions.[157] It is also without a tool that supports local governments to rank and prioritize sustainable solutions and technologies at the local level. In addition, OICS does not focus on the financing aspects of sustainable urban development and thus does not provide public city managers with knowledge and tools for assessing financial offer, for instance on how to strengthen municipal creditworthiness and prepare project proposals. Finally, as an observatory, OICS is not a governmental mechanism directly used for the elaboration of public policies by the federal, state, and local governments.

Through this output, SIS+ will be created through a transformation and strengthening of the OICS.[158] SIS+ will:

1. Be a national online system of the federal government, serving as an instrument that directly supports governmental actors at the local, state and federal level in elaborating science- and evidence-based public policies. At the national level, SIS+ will consist, *inter alia*, of a national database of sustainable urban solutions (*the national module*) that are validated, prioritized and ranked at the national level according to a series of indicators. These indicators will support these stakeholders to rank and validate[159] the solutions according to criteria including as related to climate, socio-economic factors and sustainability, as well as with regards to alignment with and potential contribution to achieving the NDC, biodiversity targets, the SDGs and other national priorities. The indicators will be aligned with and build upon those of the Sustainable City Program's Development Index - Brazil (IDCS-BR). Through application of this index, SIS+ will contain a national overview of challenges to achieve the SDGs at the urban level, supporting identification of key areas to be addressed, as a basis for the development of public policy and the prioritizing of SIS+ solutions. SIS+ will also contain macro-region modules, as intermediate levels to support the contextualization of the national database at the local level. These will be developed at the Brazilian macro-regional level (south, southeast, mid-west, north and northeast). The national and regional modules will be managed by MCTI;

2. The system will also contain *local modules*, which connect cities and metropolitan regions to the national and macro-region ones. In the local modules, city town-planners will prioritize the national database's solutions based on a local-weighting of the system's indicators. Some of the indicators will be weighted automatically (for instance, using nationally compiled data on climate (e.g. hours of sun per year) and socio-economic statistics (GDP per capita). Others will be weighted manually by local town planners in accordance with local priorities. Through this weighting, the local SIS+ module will present town-planners with a locally-contextualized database of sustainable urban solutions. They may then choose from these solutions to support their integrated planning processes, knowing that they are drawing upon evidence- and science-based solutions that have been validated at the national level. SIS+ will complement the MDR ReDUS platform's focus on the integrated planning process by providing city managers with the tools to prioritize sustainable solutions for implementing the integrated plans they develop with the support of ReDUS and this GEF-7 project. Through this local-regional-national system interconnectivity, SIS+ will promote an on-going cross-fertilization of solutions and a dynamic sharing of experiences, good practices and lessons learned between stakeholders at the local, state and national levels. As local stakeholders prioritize SIS+ solutions at the local level, information on this prioritization will serve to inform updating of national and regional solution-ranking processes and inform other municipalities and metropolitan regions of solutions prioritized and implemented in other jurisdictions. Ultimately, the tool will support town planners to quantify the benefits of different

[157] This was noted by the mid-term review of the GEF-6 project, which recommended (recommendation #6): *establish(ing) a compliance and validation system for the knowledge platform*.
[158] In GEF-7, the GEF-6 observatory will be transformed into SIS+.
[159] This functionality builds upon recommendation #6 of the mid-term review of the GEF-6 Brazil city project: "*establish a compliance and validation system for the knowledge platform*."

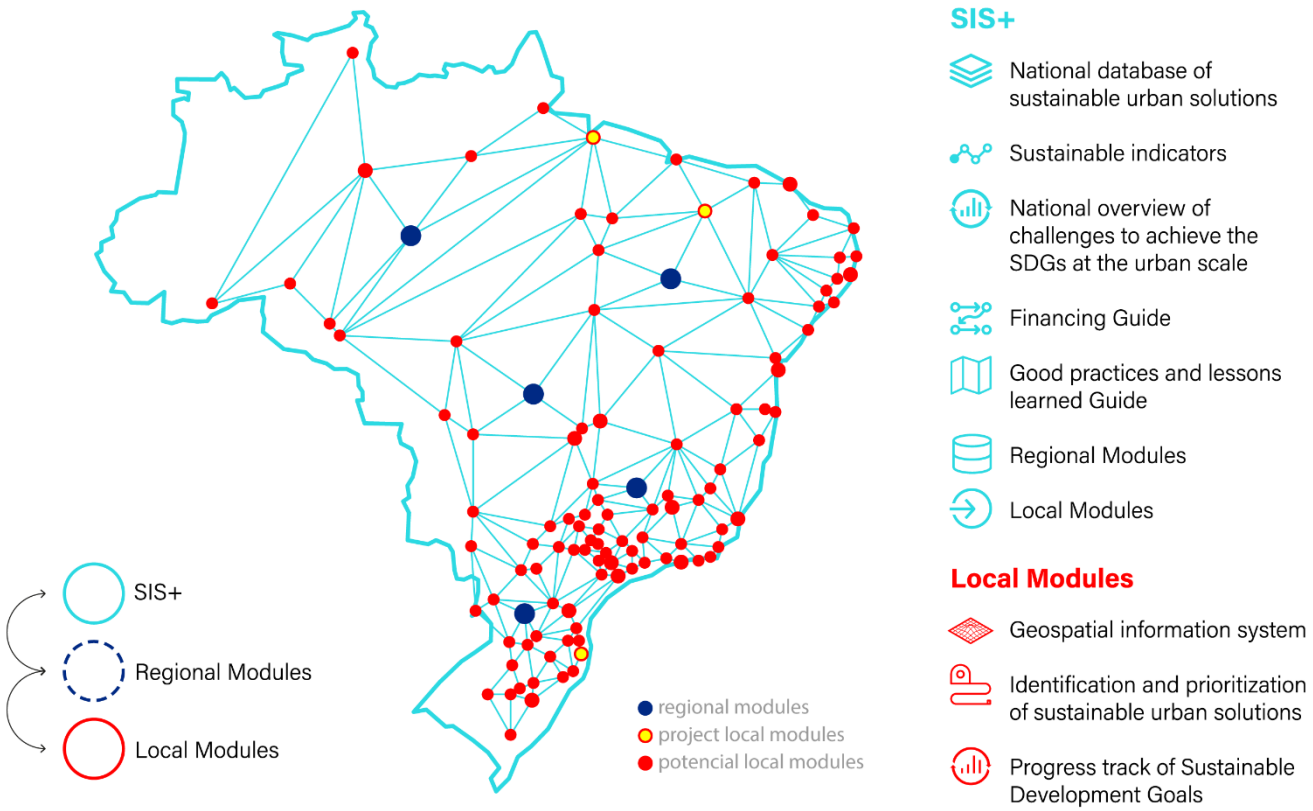
technological, behavioral, and political urban solutions to mitigate GHG emissions and conserve biodiversity, and through this process take decisions on solution selection, execution and investment.

After its testing through the pilot urban areas (of component 1), the local module will be enhanced to be available for adoption by other Brazilian cities and metropolitan regions. The project will develop a local module 'package', containing an open-source generic basic IT structure of the module, which cities can adapt to incorporate as part of an existing local platform (as in the case of Belém) or set up as a new platform in a Brazilian city. The package will also contain a guide for installation and usage, an explanation of its key features, and draft protocols for local usage and agreement with MCTI for on-going management and connectivity with the central and regional SIS+ modules. States and municipal governments will have ownership of the local modules and be responsible for their on-going operation, based on an agreement with MCTI.

3. Support local government stakeholders to connect these solutions and integrated plans with financial offer through its *Electronic Guide for Facilitating Access to Finance for Sustainable Urban Development* (see output 3.2);

4. Make available and share with Brazilian city managers information on experiences, good practices and lessons learned of other cities in undertaking integrated urban planning, including those of this GEF project and from around the world (through connecting to the SCIP platform) (see output 4.2). This builds upon a recommendation of the recent mid-term review (MTR) of the GEF-6 Brazil cities project.[160]

Figure 20 - Overview of SIS+ modules



[160] Recommendation #7: *"establish a system to capture lessons learned."*

SIS+ will also have a central role in supporting execution of other project outputs. For the low-emission pilots (outputs 2.1, 2.3 and 2.4), the system will serve to support local stakeholders in identifying solutions for demonstrating in the low-emission zones based on those ranked and locally-prioritized through a beta-version of the local module. The beta-version will also serve to inform the development of the integrated urban plans (outputs 1.2, 1.5 and 1.8). These experiences will serve to support the enhancement of SIS+ for its effective use by other jurisdictions.

Key to the success of SIS+ will be its usage by Brazilian cities and metropolitan regions. As noted through-out this document, key multiplying agents in Brazil in the sustainable city space are the Ministry of Regional Development (MDR) and its ReDUS, the Sustainable Cities Programme, and the three principal city associations: the Brazilian Association of Municipalities (ABM), the National Confederation of Municipalities (CNM) and the National Front of Mayors (FNP). To ensure that SIS+ responds to city needs and is complementary to other initiatives, its development will be undertaken in close coordination with these five partners. These partners will be consulted on the system's design and functionalities on a periodic basis from the beginning of its design and development stages. These partners will also be invited to periodically test beta versions and provide feedback.

To ensure that cities and metropolitan region governments are aware of SIS+ and seek to use it, a gender-sensitive SIS+ outreach and engagement strategy will be developed and implemented in collaboration with these five partners. Through this, the project will draw on the significant city networks of these partners to share information and engage city governments on SIS+, highlighting its value in supporting integrated urban planning and its complementarity with the ReDUS platform and other platforms. A key focus will be on promoting the local module 'packages', encouraging their usage and adoption by Brazilian cities, based on the experiences of Belém, Florianópolis and Teresina. In particular, focus will be placed on encouraging the 7 metropolitan regions that receive capacity-building support in outputs 3.2 and 4.3 to implement local modules. The strategy will also include activities such as a SCIP National Dialogue to launch and promote SIS+ (through deliverable 4.3.4), a possible dedicated workshop on SIS+ held through the MCTI-MDR Chamber 4.0 (*Câmara das Cidades 4.0*), SIS+ promotion at key national events on cities, SIS+ events in different macro-regions, and communication products (social media, videos, brochures, etc.). As part of the strategy, it will also be explored with these partners the possibility of linking SIS+ with their websites and platforms. In this way, cities accessing for example the MDR ReDUS and CapaCidade platforms and PCS's sustainable cities platform would also be able to access SIS+ and vice-versa. Ultimately, the strategy may lead to agreements between these partners and MCTI (as the host of SIS+) for on-going collaboration to continually enhance SIS+ and facilitate its usage by local governments. The strategy will be implemented together with SIS+ training activities, which will build the capacity of local actors to use the system. This deliverable builds upon a recommendation of the mid-term review of GEF-6 Brazil cities project,[161] which highlighted the importance and centrality of an effective outreach strategy for the GEF-6 knowledge platform.

Finally, to ensure the long-term sustainability of SIS+, a formal instrument for managing and updating the system will be determined and agreed. SIS+ will be designed on an open-source platform, thus ensuring a secure cost-effective solution that will be built using flexible and agile technologies and may be easily incorporated into local systems by metropolitan region governments.

Key stakeholders: MCTI, MDR (and ReDUS), PCS, ABM, CNM, FNP and local governments.

#	Deliverable
4.1.1	SIS+ detailed design, including system needs and requirements
4.1.2	Prototype for system tests (proof of concept) – beta version, tested by MDR/ReDUS, PCS, ABM, CNM and FNP
4.1.3	SIS+ system developed, validated, made fully operational, and improved through the piloting of component 1 local modules in the project urban areas (*1 national system (including GEF-7 project website), 5 macro-region modules, 3 local modules*)
4.1.4	Open source local module package developed and available for use by other cities,[162] including protocols for management and updating
4.1.5	Gender-sensitive SIS+ outreach and engagement strategy, and implementation of its activities, undertaken in collaboration with MDR/ReDUS, PCS, ABM, CNM and FNP
4.1.6	Training plan and related activities for federal, state, and municipal governments to use, update and manage SIS+ and its modules
4.1.7	Formalization instrument for managing and updating SIS+

Output 4.2 – Brazilian city stakeholders strengthen their knowledge, through SIS+ and national networks, on good practices and public policies for achieving integrated sustainable urban development

[161] Recommendation #5: "*prepare and implement an outreach strategy for the knowledge platform*."
[162] i.e. not the three pilot metropolitan regions of the GEF-7 project.

This output aims to ensure that metropolitan region governments throughout Brazil may learn from the experiences, good practices and lessons-learned garnered through this GEF-7 project, the Sustainable Cities Impact Program Global Platform (SCIP-GP) and other GEF-7 national projects. This is undertaken with the aim of supporting such governments to draw on good practices demonstrated through the GEF SCIP and avoid repeating mistakes. Ultimately, the intention of this output is to facilitate an effective knowledge transfer so that local stakeholders can promote the replication and scale-up of good practices on integrated urban planning and sustainable urban development throughout Brazil.

The capturing of experiences, good practices and lessons learned from all project outputs has been centralized through this output. Quarterly monitoring of progress in executing project outputs will be undertaken. Progress will be captured on all project elements, including on the undertaking of planning processes, the execution of pilot investments and the development of SIS+ and its local modules. For each of the pilots, case studies will be developed, consisting of documents that summarize the experiences, good practices and lessons learned in its designing and execution. These will serve as concrete policy examples for reference and scale-up by other Brazilian metropolitan regions. The recorded experiences, good practices and lessons learned (including the case studies) will be uploaded to SIS+ to ensure that all local governments may learn from these experiences.

Based on this monitoring and knowledge management, a gender-sensitive policy brief on experiences, good practices and lessons-learned in undertaking sustainable integrated urban planning will be developed in consultation with the Ministry of Regional Development. Intended primarily for local government town-planners and written in Portuguese in clear and easy to read language, this online document will serve as a key reference for Brazilian city planners seeking to understand how to promote integrated urban planning and identify solutions for achieving plan goals. The brief will disseminate recommendations on good practices contextualized to Brazilian metropolitan regions, particularly those of medium and small size, and provide findings on lessons learned. These will be developed based on experiences from integrated and sustainable metropolitan planning initiatives nationally and internationally, including those of the GEF-6 national project, those developed by the GEF-7 project and the Sustainable Cities Impact Program Global Platform (SCIP-GP), and those of MDR ReDUS (including those gleaned through existing and ongoing MDR capacity-building activities). The brief will be aligned with the PNDU and gender-sensitive, both in terms of the content and in terms of its layout and structure, to cater to the specific needs of women and men in promoting sustainable urban planning and development.

To ensure that the brief's key messages reach the key audience of local governments, information will be disseminated through tailored communication activities, SIS+, as the project's central knowledge management tool, and other key networks in the space, including the MDR ReDUS platform, the Sustainable Cities Platform (SCP), the CNM, the FNP and the ABM. In addition, local governments will have access through SIS+ to the SCIP-GP's library of solutions, a rich database of experiences, good practices and lessons learned.

Key stakeholders: MCTI, MDR, local governments (including through the AMB Public Policies Observatory) and SCIP-GP.

#	Deliverable
4.2.1	Gender-sensitive communication plan for informing city stakeholders of good practices, lessons learned and policy recommendations for undertaking integrated planning, and execution of plan activities
4.2.2	Quarterly monitoring of progress in executing all project outputs, including in the three project metropolitan regions, and quarterly registering of related experiences, good practices and lessons-learned in SIS+
4.2.3	Gender-sensitive policy brief on experiences, good practices and lessons-learned (including 5 case studies, one on each of the pilots) in undertaking sustainable integrated urban planning, including policy recommendations, developed in consultation with MDR, validated by MCTI and MDR, and made available on SIS+ and through other national networks and platforms (ReDUS, PCS, CNM, FNP, ABM)
4.2.4	SCIP-GP good practices and lessons-learned (library of solutions and regional city academy curriculum) made available on SIS+ and GEF-7 Brazil project good practices and lessons-learned shared with SCIP-GP

Output 4.3 – Local, state and federal stakeholders strengthen their capacity to undertake integrated urban planning as a result of training activities, including those provided through the Global Program of the Sustainable Cities Impact Program

As noted in the baseline, the Ministry of Regional Development (MDR) is supporting local Brazilian governments to build capacity on undertaking integrated urban planning through a series of targeted training courses offered by different institutions, including the Federal Rural University of the Semi-arid Region (UFERSA) and the Sustainable Urban Development Network (ReDUS).[163] Work through this output, to be developed and executed in partnership with MDR, aims to complement and build synergies with MDR existing initiatives and those of the SCIP global program. It will provide additional training opportunities to local governments of 7

[163] Initiative under the leadership of the MDR that reunites actors and other existing networks, concentrating efforts to provide a Knowledge Network on the theme of Sustainable Urban Development. For more information, see: https://www.gov.br/mdr/pt-br/assuntos/desenvolvimento-urbano/rede-de-desenvolvimento-urbano-sustentavel

metropolitan regions additional to the three project pilot RMs for supporting them to build capacity on undertaking integrated urban planning. Ultimately, through this output the intention is that such local governments increase their capacity to undertake integrated urban planning, enabling them to promote the replication and scale-up of good practices on integrated urban planning and sustainable urban development throughout Brazil. This output also builds upon a recommendation of the recent mid-term review (MTR) of the GEF-6 Brazil cities project.[164]

Two key target groups were identified as the primary recipients of the output's targeted capacity-building activities: (i) political representatives in executive positions of metropolitan region municipal governments and (ii) technicians from metropolitan region municipalities and agencies. Together with MDR, four areas for building the capacity of these target groups were identified as priority and would build upon and complement existing capacity-building activities: metropolitan governance, preparing PDUIs, environmental management, and data management (see table below for further information). The area of finance was also identified and is addressed through output 3.2.

Through the development of a training plan, an initial list of minimum 14 metropolitan regions will be identified as potential targets for the capacity-building activities.[165] Focus will be placed on RMs of medium-size and that demonstrate interest in increasing ambition on integrated urban planning. Based on this list, a minimum of 7 RMs will receive support for the capacity building activities, which will be online. These will consist of online self-instructive classes with live interactive discussion forums. There will be a series of themes (see below) and also a short test at the end of each online theme. The online course will be hosted on an existing platform, such as the MDR Capacidades, using open source IT infrastructure. Representatives of these RMs will also be invited to participate in SCIP activities which are open to representatives of beyond the pilot cities, such as the SCIP National Dialogues. Through the training provided, the aim is that these 7 metropolitan regions strengthen their capacity, leading them to commit to the development and implementation of an integrated urban plan.

In developing and executing the training content, to be led by the project team in partnership with MDR, a key focus will be placed on working with partners operating in the sustainable urban development space in Brazil, to build upon their expertise and to achieve a multiplier effect through the strengthening of an informal capacity-building network. In this context, the MDR Sustainable Urban Development Network (ReDUS), will serve as the starting point for coordinating key partner contributions. Such partners will provide input into the development of training content and may also conduct output capacity-building activities in areas of their knowledge. Working with such partners aims to lead to a multiplying effect in extending the reach and depth of the training activities. It also aims to ensure the long-term sustainability of the training plan by building partner capacity (train-the-trainer) to continue providing such training, as well as identifying with them strategies for the long-term implementation of training activities.

The training plan, content and its activities will be designed based on international good practices and will build upon and be complementary to the services provided through the Global Sustainable Cities Impact Program that the pilot cities will participate in (see section 1d: Child Project for further information). This will include as follows:

- **SCIP national dialogues:** National dialogues aim to strengthen system-wide national enabling conditions to support cities in undertaking integrated planning and investments. The SCIP global project aims to organize two national dialogues in each child project country. These dialogues will include relevant national authorities and cities, including those beyond the pilot cities. Through these dialogues, Brazilian metropolitan regions will benefit from the knowledge and experience of the global project partners - UNEP, WRI, ICLEI and C40 - to address key national challenges to sustainable urban development. This output's training plan, content and activities will align with and build upon these national dialogues. For instance, the first national dialogue may be used to launch and create awareness on the project's national activities, for instance the financial mechanisms (output 3.1), SIS+ (output 4.1), the availability of good practices (output 4.2) and capacity building activities (output 3.2 on finance and 4.3 more broadly). The first national dialogue may also support identification of key needs of metropolitan regions with regards to capacity-building, financing, knowledge and good practices, thus providing inputs into the design and execution of project outputs of national scope.

- **SCIP Capacity Building:** The SCIP global project will offer a wide variety of capacity building and training activities for representatives of the pilot metropolitan regions, including SCIP Labs, City Academies, Peer Exchanges and Finance Academies. These will be organized by the SCIP global project in coordination with local authorities of the pilot cities. The capacity building activities of this output and output 3.2 will build upon the SCIP

[164] Recommendation #4: establish a national capacity building partnership for sustainable cities.
[165] Identification will be undertaken together with deliverable 3.2.3, with the same 14 metropolitan regions identified and the same minimum 7 metropolitan regions receiving the targeted support. The 7 metropolitan regions will not include Belém, Florianópolis and Teresina.

activities. For instance, results from the city academies focused on the pilot metropolitan regions will be captured in SIS+, the report on good practices and the global SCIP platform. Project capacity-building activities through output 3.2 and this output will also draw upon the city academy methodology and training material.

The key way in which the SCIP and capacity-building efforts under output 3.2 and this output complement each other is on the scale and beneficiaries. While the SCIP activities primarily focus on the pilot cities, project capacity-building activities will focus on other beneficiaries, targeting the building of capacity of other metropolitan regions. It will do this by building upon and expanding the global program activities. In addition, the project training activities may have expanded scope, with additional training materials to respond to the specific needs of metropolitan region municipal governments, if these differ from those identified and focused upon through the SCIP programme. Consistent with those of the SCIP, this output's training plan and activities will be gender-sensitive, taking into account the needs of women and men with regards to the content and the modalities for participation and learning.

Table 20 – Key training areas and possible partners

#	Areas	Description	Key partners
1	Metropolitan governance	Focus on structuring metropolitan region governance structures which comply with the Metropolis Statute. Some RMs have governance structures that were adopted prior to the Statute and hence do not meet the requirements of the law.	ReDUS, IPEA, WRI Brazil, Metropolis Observatory, School of Architecture and Urbanism of the University of Sao Paulo (FAU/USP), Cities Alliance, SCIP-GP, Climate Network, MDR, FNP, CNM, ABM, CGEE, Federal University of Santa Catarina (UFSC)
2	Preparing the Integrated Urban Development Plan (PDUI)	Focus on building capacity of metropolitan region municipalities and the state for elaborating the PDUI. May include on minimum content, methodologies for assessment and forecasting, the action plan for implementation, and the relationship with municipal master plans and sector plans. May also consider specific focus in the action plan on biodiversity-conservation, mitigation of GHG emissions and catalyzing investments.	ReDUS, IPEA, Polis Institute, WRI Brazil, Metropolis Observatory, FAU/USP, Cities Alliance, SCIP, Climate Network, MDR, FNP, CNM, ABM, CGEE, UFSC.
3	Municipal environmental management and integrated environmental planning	Focus on state and municipal roles in environmental management; integration between urban and rural policies; management of urban green areas and protected areas.	ReDUS, ICLEI, SCIP, Climate Network, MDR, FNP, CNM, ABM, CGEE, UFSC.
4	Data management	Focus on data collection, data governance and intelligent data management for municipalities and metropolitan regions.	ReDUS, ENAP, SCIP, Climate Network, MDR, FNP, CNM, ABM, CGEE, UFSC.

Key stakeholders: MCTI, MDR, local governments, SCIP-GP and possible partners listed above.

#	Deliverable
4.3.1	Gender-sensitive training activities plan and content for building the capacity of local governments to undertake integrated urban planning, including strategy for its long-term implementation and identification of minimum 14 metropolitan regions as potential targets for the capacity-building activities[166] and a minimum of 7 receiving support
4.3.2	Gender-sensitive communication plan to disseminate information on the training activities, and execution of plan activities with the support of and through existing city networks of MDR/ReDUS, PCS, ABM, CNM and FNP
4.3.3	Gender-sensitive training activities for building the capacity of local governments for undertaking integrated urban planning
4.3.4	Participation in global SCIP activities:[167] - SCIP City academies - SCIP Regional forum - SCIP Global peer-to-peer exchanges - SCIP Labs - SCIP National dialogues - SCIP Lessons learned

[166] Identification will be undertaken together with deliverable 3.2.3, with the same 14 metropolitan regions identified and the same minimum 7 metropolitan regions receiving the targeted support. The 7 metropolitan regions will not include Belém, Florianópolis and Teresina.
[167] The budget of this deliverable includes for participation in SCIP global program activities related to financing as described in output 3.2.

4) Alignment with GEF Focal Area and/or Impact Program strategies

The project responds to and reflects the principles and theory of change of the GEF-7 Sustainable Cities Impact Program (SCIP). Activities and interventions under the SCIP address key urbanization environmental challenges faced by cities throughout the world by fostering sustainable transformational change in urban economic systems. The project will facilitate integrated and sustainable urban development through the implementation of evidence-based spatial planning tools and build deep urban resilience with low-carbon technologies in energy, buildings, transport and management of municipal solid waste. Measures will also be implemented to promote conservation and regeneration of green spaces and globally important biodiversity in urban landscapes. Good practices and lessons learned resulting from the project will be shared with the sustainable cities impact program to strengthen knowledge exchanges around the globe. The project is aligned with the GEF impact program strategy for sustainable cities and the following focal areas:

- Climate Change Mitigation: CCM-2-5: Demonstrate mitigation options with systemic impacts for sustainable cities impact program;
- Biodiversity: BD-1-1: Mainstream biodiversity across sectors as well as landscapes and seascapes through biodiversity mainstreaming in priority sectors.

5) Incremental cost reasoning

The incremental cost reasoning for this project implies that GEF funds will build upon national and local investments and on a suite of existing interventions, at the national, state and metropolitan scale. Also, GEF funds will be used strategically for overcoming the barriers that have been identified for this project through an iterative project design process. This is described in Section 1 (*Global environmental and/or adaptation problems, root causes and barriers that need to be addressed*).

The incremental cost of interventions focus on demonstrating how Brazilian metropolitan regions can reduce greenhouse gas emissions, conserve biodiversity and achieve economic, social and environmental co-benefits through an integrated urban planning approach. Through each of the four components of the project gradual transformations in the way metropolitan regions are managed will be introduced, overcoming the project's barriers, whether they are planning, execution, financial or capacity barriers.

In spite of the important progress that has been made in urban planning in Brazil for the past few decades, examples of integrated urban planning and sustainability are still scarce. This is particularly true at the metropolitan scale, which bear some inherent challenges but also opportunities. The 2015 Metropolis Statute includes few incentives from the federal government for the advancement of the metropolitan agenda in Brazil. These incentives were conceived with the spirit of making it easier and more attractive for municipalities within a given metropolitan region to tap into the opportunities and overcome the coordination barriers. Unfortunately, as noted in the baseline section, few metropolitan regions have developed PDUIs and comply with the articles of the Metropolis Statute, meaning that the majority of Brazilian metropolitan regions still do not undertake integrated urban planning. GEF investment is needed for supporting integrated planning and implementation through pilot demonstrations are needed. GEF financing will build upon these advances to support Brazilian metropolitan region municipalities and states to overcome barriers related to metropolitan coordination, evidence of sustainable urban solutions, financing for sustainable urban development and knowledge management. These investments, in building upon the substantial project baseline, may thus be considered incremental. Within the SCIP, GEF resources assigned to this project will help open up opportunities for collaboration and exchanges among stakeholders, and scaling-up of project activities through-out the country.

Table 21 – Incremental Cost Reasoning

Current Baseline (B)	Alternative (A)
In the baseline, metropolitan regions face numerous barriers to sustainable development and integrated planning. Cities in Brazil display high levels of urban sprawl, which not only result in high levels of GHG emissions, but also in the loss of biodiversity and the degradation of ecosystem services driven by the poorly planning urbanization processes. Barriers to overcoming this include as related to integrated planning, generating evidence of sustainable urban solutions, accessing finance, and identifying locally relevant sustainable solutions. The project baseline finance was estimated at more than $4 billion, most of it through public funds, and with investment patterns that are not able to overcome the aforementioned barriers, that sustain the status quo of unsustainable urban development in Brazil.	The project aims to support Brazilian metropolitan regions to address the aforementioned barriers, undertaking integrated urban planning for accelerating sustainable urban development, leading to global environmental benefits and social, economic and environmental co-benefits for city inhabitants. It will demonstrate how Brazilian metropolitan regions can reduce greenhouse gas emissions, conserve biodiversity and achieve economic, social and environmental co-benefits through an integrated urban planning approach. Four outcomes are foreseen, each one of them addressing the core barriers through the following themes: (1) Governance and evidence-based integrated planning; (2) Sustainable integrated low-emission and conservation investments; (3) Innovative financing and scaling-up; and (4) Knowledge exchange and capacity building. GEF funds will build upon national and local investments and on a suite of existing interventions, at the national, state and metropolitan scale, including

Current Baseline (B)	Alternative (A)
	locally within the municipalities that compose metropolitan regions. A total of 2.3 million urban people will at least indirectly benefit from the interventions, with 52% women. The GEF alternative scenario builds on the large baseline finance in the order of billions of dollars, combined with GEF funds at $12.5M and more than $120M in co-financing. Much of the co-financing comes in the form of investments mobilized.
The incremental cost reasoning for this project implies that GEF funds will be used strategically for overcoming the barriers that have been identified for this project through an iterative project design process. The baseline situation and barriers are described in section 1 (*Global environmental and/or adaptation problems, root causes and barriers that need to be addressed*). The global environmental benefits generated contribute directly to the objectives of the Rio Conventions, in particular the UNFCCC and the CBD.	

6) Global environmental benefits (GEFTF)

Mitigation Benefits

Project information • Project duration: 4 years. Starting late 2021 and ending late 2025. • Time frame for calculating emission reductions: 20 years, starting 2025 and ending 2044.	
Total estimated project emission reductions (tons CO_2eq)	24,548,863
Total estimated direct emission reductions (tons CO_2eq), consisting of: • Project demonstrations • Investments supported by regulatory interventions (including plans)	5,611,683
Total estimated indirect emission reductions (tons CO_2eq)	18,937,180

Estimates are based on actions and investments undertaken by the three metropolitan regions (components 1, 2 and 3), and replication and scaling up in other Brazilian metropolitan regions (due to financial mechanisms, capacity-building and knowledge-management in components 3 and 4). Refer to Annex M for a detailed description of the methodology used to estimate the emission reductions.

Table 22 – Overview of project direct and indirect emissions due to the project components

GEF EMISSIONS CATEGORY	COMPONENT	ACTION POTENTIAL
DIRECT EMISSIONS	COMPONENT 1	Reduction of emissions through the development and implementation of integrated metropolitan plans which support the metropolitan region and its municipalities to, inter alia: - Scale-up low-emission sustainable transport (public and non-motorized); - Facilitate urban development that leads to a compact city aligned with the principles of transit-oriented development and the GEF-World Bank 5D framework,[168] thus reducing urban sprawl; - Enhance the management and treatment of solid waste (including by reducing waste volumes); - Achieve a more efficient use of resources (energy, environmental, financial, and human).
	COMPONENT 2	Reduction of emissions through the implementation of innovative pilot investments in low-emission zones.
DIRECT AND INDIRECT EMISSIONS	COMPONENT 3	Reduction of emissions through increased financial offer for Brazilian metropolitan regions to invest in sustainable urban development, leading to an increased quantity and impact of low-emission projects. Relevant to the three metropolitan regions of the project and those through-out Brazil.
INDIRECT EMISSIONS	COMPONENT 4:	Reduction of emissions through efforts of other Brazilian metropolitan regions which, by being recipients of project capacity-building activities and having access to sustainable innovative solutions (SIS+), are able to accelerate integrated planning processes and sustainable low-emission urban development in their jurisdictions.

Direct GHG emission reductions from project demonstrations were estimated based on project interventions in the low-emission zones leading to:

- Changes in mobility patterns. Increased use of sustainable transport, public transport and non-motorized transport, including through bus lanes, bicycle lanes, pedestrianization and tactical urbanism.
- Improvements in the energy efficiency of urban infrastructure (e.g. LED streetlamps) and buildings.
- Promotion of integrated waste management practices. Reduction in waste transported to and processed in waste facilities through promotion of increased recycling and reusage practices.

Direct GHG emission reductions from the project's regulatory and finance interventions, including the policies and plans implemented in component 1 and the financial mechanisms implemented in component 3, are estimated through a top-down approach. Firstly, an estimate of the business as usual GHG scenario for the three pilot metropolitan regions was calculated for a 20-year period. This was primarily based on a GHG inventory and emissions projection prepared for the Florianopolis Metropolitan Region in 2015 with the support of the Inter-American Development Bank.[169] The Belém Metropolitan Region and the Teresina-Timon Urban agglomeration do not possess GHG inventories or projections, neither at the municipal nor the metropolitan level, so projections of business as usual GHG emissions were estimated by adapting, *mutatus mutandis*, the Florianopolis inventory and projection. Following this, a mitigation scenario was calculated, based on previously estimated reductions in the transport, energy and waste sectors for the Florianopolis Municipality, made in accordance with the Florianopolis mitigation strategy developed in 2015 on the basis of the GHG inventory.[170] This scenario aligns with the project regulatory and finance interventions, which aim to promote low-emission urban development of the three metropolitan regions through the development of integrated urban plans and financial mechanisms. The same level of ambition was applied to the two other two metropolitan regions which, as aforementioned, do not possess such information. Such calculations were made by calculating Florianopolis projections per capita and then estimating for the other two metropolitan regions in accordance with IBGE data on their population size and estimates of population growth over the following

[168] GEF, World Bank, GPSC: *A Review of Integrated Urban Planning Tools for Greenhouse Gas Mitigation* (2021).
[169] https://www.pmf.sc.gov.br/arquivos/arquivos/pdf/27_08_2015_9.27.58.f256adc2f8bf21d6481e39eb1b350a0d.pdf.
[170] Ibid.

20 years. Causality factors were then applied to estimate the contribution of the GEF-funded project, complementary to other baseline scenario activities (if existing). The direct GHG emission reductions were then verified through a complementary bottom-up estimation. This was estimated by considering a scaling-up of the pilots through-out the municipalities and metropolitan regions, based on plans developed through the project with this aim (for instance, the plan for a low-emission Belém city-center, see output 1.2) and the supporting financial mechanisms (output 3.1).

Indirect GHG emission reductions were estimated based on the estimated project impact in other Brazilian metropolitan regions due to the project-supported financial mechanisms (output 3.1), capacity-building activities (outputs 3.2 and 4.3) and the knowledge management system (outputs 3.2, 4.1 and 4.2). These project elements focus directly on replicating project activities in other jurisdictions and scaling-up low-emission urban development through-out the country. Estimates were made of the reductions in GHG emissions in those sectors which are to be addressed by the GEF project (waste, transport and energy). Conservatively, it was assumed that the project causality in affecting the low-emission development of these metropolitan regions was low. Indirect emission reductions were calculated based on this perceived impact for only the 10 largest metropolitan regions in the country, thus conservatively not considering positive spill-overs for the other more than 70 metropolitan regions in Brazil. Those considered in the indirect calculations were the metropolitan regions of (listed in order of size, largest first): São Paulo, Rio de Janeiro, Belo Horizonte, the Brasilia Federal District RIDE, Porto Alegre, Fortaleza, Recife, Salvador, Curitiba and Campinas.

Biodiversity Benefits

All of the three metropolitan regions targeted by the project (RM Belém, RM Florianópolis and Greater Teresina RIDE) harbor globally significant biodiversity, as noted in section 2(iv). Project city baselines, under section '2) Baseline Scenario and associated Baseline Projects'. They are respectively located in three different Brazilian biomes and display varied biological and conservation status, as follows:

RM Belém is part of Belém Endemism Center, considered the biogeographic region most impacted by modern human occupation in the Amazon, with only about one third of its area covered by forests. Its fragmented landscapes result from BR Belém's location in the oldest deforestation frontier of the Amazon Biome (Silva et al., 2005). In response to urban development threats, the project will help RM Belém consolidate an important ecological corridor formed by a cluster of 6 protected areas with an approximate surface of 17,000 hectares through the integrated management plan of urban protected areas and urban green areas. Target PAs in Belém RM have a great potential to contribute to the conservation of endangered species in eastern Amazonia, such as primates ("cairara" or "caiarara" - *Cebus kaapori* - and "cuxiú-preto" - *Chiropotes satanás*), in addition to plant species, such as acapu (*Vouacapoua americana)*, angelim (*Zygia racemosa*), cedar (*Cedrela odorata*), Brazil nut (*Bertholletia excelsa*) and white ucuúba (*Virola surinamensis*) as established by the State of Pará's very own List of Endangered Species. Important freshwater ecosystems represent some 20% of the RM's surface and 62% of the surface of Belém municipality. Freshwater provision ecosystem services, recreation and the provision of varied forest products are some of the direct environmental benefits provided by PAs in the metropolitan region, some of which can be more adequately monetized. Utinga State Park harbors two important freshwater lakes (Bolônia and Agua Preta) that supply water to the some 63% of the residential and industrial water consumed within Belém RM and are under increased threats due to waste water pollution linked to urban development. The project proposes to design a water PES scheme in the Utinga State Park as an innovative financing mechanism to support the PA's conservation while ensuring the quality and quantity of water provision as prescribed in management plan. As for tourism and natural resource extraction in the Amazon, the project will enhance sustainable livelihood options of local communities in Combú Island supporting them through strengthened management and development of agroforestry production chains

RM Florianópolis harbors almost 290 thousand hectares of protected areas, including state, municipal park, ecological station, environmental protection areas, marine protected areas, three Indigenous Lands, and a significant number of private reserves (RPPNs) – up to nine. Some of these protected areas are also part of the core area of the Atlantic Forest Biosphere Reserve, whose area was recognized by UNESCO. The RM Florianópolis hosts the only category Ia (IUCN) PA targeted by the project, namely Carijós Ecological Station. It has high importance for the conservation of threatened marine mammals and birds. The state has its own assessment of threatened species, which was published in 2011 and 2014, respectively for fauna and flora. The RM presents a series of environments and elements of forests, sandbanks, mangroves, lowlands. Habitat diversity adds to the region's conservation value and it also confers to the area high rates of endemism. The critically endangered cavy occurs in the RM (*Cavia intermedia*). There are an immense diversity of endangered and endemic flocking birds, including: *Thalasseus maximus, Sterna hirundinacea, Conirostrum bicolor, Calidris canutus, Calidris subruficollis* and *Egretta coerulea*.

Greater Teresina RIDE is within an important biological diversity region, in the transition zone between Caatinga and Cerrado biomes. These biome transition zones are known for biodiversity richness and facilitating the occurrence of endemism. Although important, much of the area enjoys very little formal protection and it has not been sufficiently studied. Greater Teresina RIDE has only one public PA, and two private reserves. The state of Piauí does not have its own assessment

of threatened species, and information on threatened species is scarce. Beyond that, within Greater Teresina RIDE there a series of public squares, environmental parks, and public domain reserves of high value for biodiversity. The material lack of biodiversity data and low level of protection constitutes a conservation opportunity for the project to make a difference in the region, which is by far the largest of all three and the most intact. The RIDE Teresina LBSAP will very much focus on these benefits.

Together, the three metropolitan landscapes of RM Belém, RM Florianópolis and Greater Teresina RIDE cover 1.7 million hectares, corresponding to the total surface of the municipalities that compose the respective RMs. Biodiversity benefits to be generated by this project build on the following assumptions:

- Wide urban landscapes (including seascapes) can potentially harbor globally important biodiversity and they can therefore play an important role in conservation.
- Urban landscapes can also provide essential ecosystem services to the urban population and beyond, in particular, habitat for adaptable species, air filtration, micro-climate regulation, noise reduction, rainwater drainage, sewage treatment, and recreational and cultural values. Some of these services also translate into climate change adaptation benefits.
- Several cities harbor a network of protected areas of varied categories, green spaces and other areas with reasonable vegetation cover that can help reduce the ecosystem fragmentation effect caused by urbanization.
- Numerous urban dwellers already attribute value to urban biodiversity and enjoy the fruits of a suite of ecosystem services. They can be willing protagonists in strengthening conservation across urban landscapes, including and payment for ecosystem services.
- Finally, well conserved peri-urban landscapes, in particular, play is an essential role in water provision, noting that most of the water supply to Brazilian cities comes from surface water. This is a highly valued ecosystem service with a defined market based on demand for clean water in the cities.

There are two main biodiversity strategies for this project: (1) Mainstreaming Strategies and Enhancement of Ecosystem Services Benefits; and (2) Protected Area Management Strengthening. There are in addition, joint CCM-BD benefits that will also be considered further down. These strategies and the biodiversity benefits they entail are outlined in further detail under Annex T below.

Adaptation and resilience benefits

Also, climate change adaptation benefits will result from the implementation of the project. As a coastal city, Florianopolis is threatened by sea-level rise, with the majority of its population in low-lying areas near the coast. Furthermore, more intense rainfalls are leading to greater risks of landslide for precarious settlements located on the island's hills. Belem is surrounded by some of the most expressive water bodies in the world and is located in extremely humid area with a constant threat of flooding. Teresina is one of the hottest cities in Brazil and seen a significant average temperature rise in recent years. Heat island effect in Teresina is a threat for public health considering the already high temperatures. This city also suffer with concentrated rain periods and an insufficient drainage system.

The GEF project, through its interventions in component 1 and 2, will contribute directly to increasing the resilience and supporting the adaptation of the metropolitan regions of Belem, Florianopolis and Teresina. On the one hand, the integrated planning platforms will support metropolitan actors to visualize key geospatial data, including layers related to geographical and physical attributes of the city's environment. Through these platforms and such visualization, the cities will be able to plan more effectively for building resilience, for instance with regards to managing coastline development to avoid erosion and increased possibility of flooding in Belem and Florianopolis. Furthermore, the integrated plans that the cities develop in component 1 will take into account risk matrices, ensuring that new developments incorporate considerations of urban resilience. For instance, in Teresina, the climate mitigation and low-emission technology plan may also focus on nature based solutions and other interventions to reduce the urban heat island (UHI) effect, one of the key challenges in the city. In this way, through natural and low-emission cooling measures, the plan will support the city to reduce GHG emissions generated through air conditioning, as well as increase the city's resilience to temperature rise.

Component 2 also contributes directly to climate adaptation and resilience benefits. While the exact solutions will be determined during project execution, the integrated low emission street, block and district in Belem, Teresina and Florianópolis (Ouputs 2.1, 2.3 and 2.4) may include nature-based solutions that reduce UHI effect, but also serve to support storm-water runoff management and reduce flood impacts. This may also include solutions related to green infrastructure (such as green façades and roofs). The low-emission zones may also pilot solutions such as the retrofitting of public buildings and the use of sustainable materials with high thermal inertia to address UHI effects, increasing local resilience to increased temperatures in all three cities. Furthermore, the agroforestry production chain in Combu Island (Output 2.2) aims to provide benefits for climate resilience by reducing the vulnerability to extreme events both with regards to agriculture productivity and for the families that rely on the income from such agriculture. In synthesis, project interventions aim to reduce the vulnerability of communities directly involved in the areas of intervention by the implementation of integrated and climate-resilient solutions.

7) Innovativeness, sustainability and potential for scaling up

Innovativeness

The project will provide innovative technological, financial and governance solutions that are relevant and applicable in the Brazilian context and can be replicated in other parts of the country and abroad where there is commitment to achieving integrated sustainable urban development. More specifically, these solutions include:

- Digital modules to support urban planning and management:

  The project will support the Ministry of Science, Technology and Innovations to develop a national online system that supports local governments to identify and prioritize locally-specific and evidence-based solutions that build upon a validated database of successful sustainable urban development experiences at national scale. This highly innovative system, not known to have been used in Brazil or Latin America before, will support local town planners in identifying trusted solutions among the plethora of online systems that currently disseminate sustainable urban development solutions. Town planners will be able to draw upon this system knowing that the solutions are relevant for their jurisdiction, as well as validated by national entities as contributing to achieving the Brazilian NDC and biodiversity goals.

- Development of climate mitigation and technology action plans:

  While some Brazilian cities have developed local climate action plans (see the baseline section), only one Brazilian metropolitan area (the Sao Paulo ABC) has developed such a plan. This project will be innovative in supporting three metropolitan regions to develop such plans. In another innovation, these plans will include technology action plans, as well as climate mitigation action plans, drawing on the Brazilian government's experience in preparing these for more sectoral-wide approaches with the support of a GCF readiness project, as well-established GEF and UNFCCC methodologies for preparing these.

- Mainstreaming biodiversity into urban planning:

  A number of Brazilian cities and metropolitan areas (i.e.: Curitiba and Campinas Metropolitan Region) have developed urban biodiversity indicators and urban biodiversity plans. Yet, this project is still innovative in that biodiversity mainstreaming into urban planning at metropolitan region scale is facilitated by the inclusion of biodiversity data, indicators and geospatial information in metropolitan scale digital platforms that facilitate coordinated monitoring of urban sustainability indicators pertaining to different sectors. In addition, best practices on mainstreaming biodiversity into urban planning will also be disseminated and amplified through SIS+, a national level platform that will work as a go-to data hub on sustainable urban development. While there are national level efforts of this nature involving the emerging Nature-based solutions agenda, they tend to focus on resilience pilot actions and not specifically on the integration of biodiversity into urban planning.

- Development of new, supra-municipal governance arrangements:

  While the development of metropolitan governance models is required by law, few metropolitan regions have achieved this. Well-functioning arrangements is especially a challenge for middle-sized Brazilian metropolitan regions that face a lack of capacity to makes these happen. It is therefore essential for the successful implementation of this project to define new governance models in the RMs. The project will adopt innovative management models and facilitate the development of governance agreements between the municipalities. This will help ensuring transparency among the governing bodies, civil society participation and democratic decision-making, facilitating the transformation into new governance models for successful implementation of project activities on the ground. This approach can be further replicated in other RMs in Brazil.

- Promoting the involvement of local communities in urban planning and design:

  Bottom-up initiatives, originating from communities themselves, are important case studies for evaluating the feasibility of solutions vis-à-vis the local context. Following this approach, the solutions proposed under Component 2 of this project will be developed through participatory gender-sensitive co-creation processes that will allow the exchange of ideas and provide the space for participation of different members of the community. Making use of local knowledge and creativity will help incorporate diversity into urban design processes and lead to accelerating innovation and developing of solutions that respond to a broader range of societal needs.

- Promoting low-emission zones with innovative solutions:

  While low-emission zones are becoming commonplace in Europe and the United States, the notion of such a zone in South America, let alone Brazil, is more of a theory than a reality. Through this project, low-emission zones will be tested through pilots in cities of Teresina, Belém and Florianópolis, creating evidence for a paradigm shift in the way that South American city-centers

are conceived. Being innovative to South America and Brazil, the low-emission zones will implement a suite of innovative low-emission solutions in areas such as sustainable transport, tactical urbanism, energy efficiency and waste management, developed through a process of co-creation (see previous point).

- Promoting integrated management of protected areas and non-protected urban green areas

  Urban protected areas tend to be relatively overlooked and ineffectively managed. There is growing interest in urban green areas, most notably in view of the recreational, air quality and resilience benefits they can provide. Still, there is an overall lack of systems data on the spatial distribution of urban green areas in cities, the biodiversity benefits they can derive and the ecological connectivity potential they may hold in terms of enhancing ecosystem service provision in urban settings. Despite markedly different urban biodiversity management contexts in the three-metropolitan regions at stake, the aforementioned gaps, most notably as they relate to urban green areas particularly hold. This project is innovative in that it will not only map and establish conservation benefits of urban green areas, but that it strives to promote an overall integrated outlook on urban green space management through its planning component.

- Innovative financing instruments for urban development:

  Furthermore, the project will implement innovative financing mechanisms and tools that will contribute to overcoming finance-related barriers faced by local governments. It will also develop an innovative online financial guide that will support local governments to prepare project proposals by automating various parts of the project preparation process.

Sustainability

The sustainability and exit strategy are based on the project's ability to support the cities to develop robust integrated urban plans, that provide a sustainable city vision and a sound roadmap for achieving that vision in each participating metropolitan area. By developing and adopting sustainable integrated urban plans through participatory approaches, the cities are committing themselves to the sustainability of an integrated planning approach in the medium- to long-term. The digital modules associated with urban planning equally contribute to the sustainability of project efforts in that they will act as a go-to knowledge and data repository on sustainable urban planning that can be consulted beyond project duration. Furthermore, the financial mechanisms and business models developed under component 3 will play a key role in supporting the sustainability of the project's impact, by enhancing financial offer available to cities through-out Brazil for implementing integrated urban plans and sustainable urban development actions.

On the GEF investments in component 2, it can be expected that the various investments foreseen during the project will remain operational after the project conclusion, as they are aligned with the priorities of the local authorities, the created integrated plans and national policies. It can be expected that the relevant jurisdictions will undertake additional investments similar to those tested during the project considering the trends towards a reduction in the costs of such investments. This will occur due to evidence gained and increased experience and confidence by actors, leading to such investments becoming increasingly competitive compared with business-as-usual practices. This trend will be facilitated by the evidence in other cities (and in the project) about their high performance and acceptance and their alignment with the public's increasing interest in local sustainable urban development. The project will aim to demonstrate the cost effectiveness of these investments as a way of encouraging continuing green investment, including by demonstrating non-market benefits. Furthermore, the national system (SIS+) will continue operating post-project as this will be a federal instrument embedded within the Ministry of Science, Technology and Innovations. The ministry is fully committed to its ongoing operation.

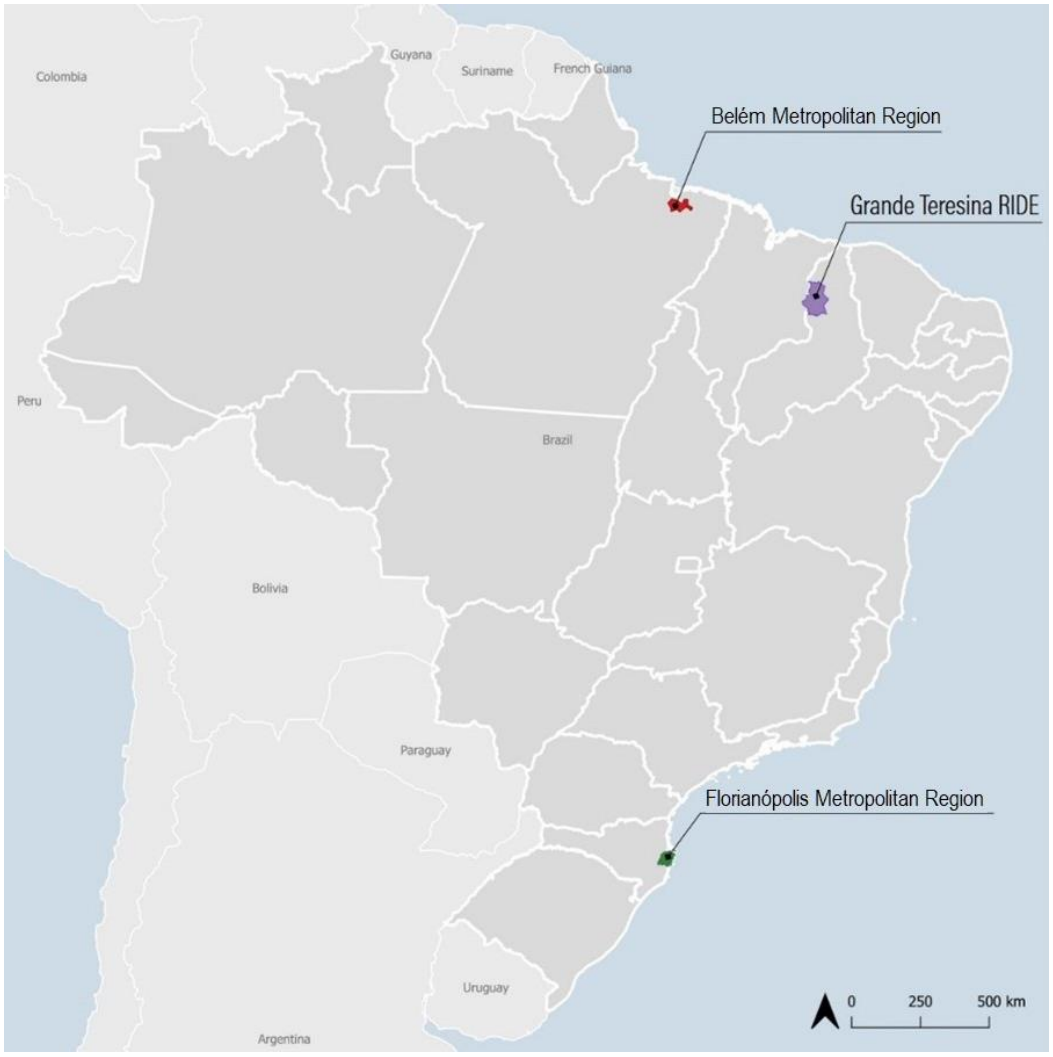
Potential for scaling-up:

Scaling-up will occur at the national and local levels. At the local level, each of the metropolitan regions will develop plans that are directly connected to supporting the scaling-up of the pilot interventions. For instance, the Belém Municipality will develop a plan for a low-emission Belém city-center (see output 1.2) to facilitate the scaling up of the pilot low-emission street to be implemented in its city-center (see output 2.2). This scaling up will be further facilitated through the development or enhancing of national financial mechanisms operated by BNDES and FINEP, among others (see output 3.1). As part of this, the project, through output 3.2, will provide technical assistance to the three pilot metropolitan regions to support them in developing project proposals for scaling up that are accepted for financing by national public financing institutions. From the biodiversity conservation angle, all urban protected area pilots under Component 2 focus on scalable and replicable solutions such as the water and bird monitoring methodologies and community-based tourism approach in Florianopolis (Output 2.5), and the agroforestry production chain pilot at Ilha do Combú in Belem (output 2.2). It is hoped that the resource mobilization and costing strategy being developed under the socioenvironmental macro-zoning for the Florianopolis metropolitan region (output 1.8) can at least identify funding options, most notably as they relate to environmental offsetting to continue supporting the scaling-up of methodologies developed under the 3 urban PAs to other PAs in the metropolitan region. In the case of the Combú Island agroforestry pilot, it is hoped that market-access strategies for community-managed sustainable value chains can eventually facilitate access to additional revenue streams that will enable scalability.

At the national level, components 3 and 4 focus directly on scaling-up sustainable urban development through-out Brazil. One key element of this is the System of Innovations and Solutions for Sustainable Urban Planning (SIS+) (output 4.1). SIS+ will play a key role in scaling-up the project by supporting Brazilian local governments in identifying locally-contextual evidence-based solutions for sustainable urban development that have been validated at the national level. The aforementioned strengthened financial mechanisms will also play a key role in scaling up sustainable urban development in Brazil, as these instruments will be available for the use of all Brazilian local governments (output 3.1). Thus, these actors will be able to more easily identify relevant local solutions and then finance these through such financial instruments. Furthermore, the project will support the scale-up by building the capacity of local governments to undertake integrated urban planning, access finance for sustainable urban development and identify relevant local solutions.

1C. PROJECT MAP AND GEO-COORDINATES

Project map



Cities / Subnational jurisdictions	Latitude	Longitude
Florianópolis	-27.5969	-48.5495
Teresina	-5.08921	-42.8016
Belém	-1.45502	-48.5024

1D. CHILD PROJECT

The Sustainable Cities Impact Program has a two-pronged approach, bringing together investments for more integrated sustainable cities (child projects at the national level, such as the one in Brazil), with a knowledge sharing and learning platform at the global level (the SCIP Global Platform, for which the CEO Endorsement Document was approved in August 2020**).** The aim of this impact program is to build momentum, raise ambitions, secure commitments and implement integrated solutions on the ground that lead to positive behavioral change of key actors in the urban space. Through these two tracks, a virtuous and reinforcing circle emerges, where capacity development informs the implementation of more innovative, inclusive, gender-sensitive, sustainable and integrated projects, which in turn set an example for replication within the city, country and beyond, serving as an inspiration for others, and an outlet for knowledge and further capacity building in its wake.

The table below shows the key four components and outcomes of the Sustainable Cities Impact Program as well as the indicators of the impact program monitoring framework that aim to track progress at the program level. This Brazil child project will contribute to the following programme indicators (see also annex A):

- Project Component 1 will contribute to Programme Outcome 1, Indicators 1 and 2
- Project Component 2 will contribute to Programme Outcome 2, Indicators 3 and 4
- Project Component 3 will contribute to Programme Outcome 3, Indicator 6
- Project Component 4 will contribute to Programme Outcome 4, Indicators 8 and 11

Component 1 Sustainable and integrated urban planning & policy reform	**Component 2** Sustainable integrated low carbon, resilient, conservation or land restoration investments in cities	**Component 3** Innovative financing and scaling-up	**Component 4** Advocacy, Knowledge Exchange, Capacity Building, and Partnerships
Outcome 1 Local and/or national governments have strengthened governance, institutions, processes, and capacities to undertake evidence-based, sustainable, inclusive, integrated planning and policy reform	**Outcome 2** Local and national governments have undertaken sustainable integrated low carbon, resilient, conservation or land restoration investments in cities	**Outcome 3** Local and national governments initiate innovative financing and business models for scaling-up sustainable urban solutions	**Outcome 4** Policy making, and action are influenced at local, regional and national levels to promote sustainable and inclusive cities
Indicator 1 # of countries that improve enabling framing conditions to support multi-level integration and policy reform	Indicator 3 $ USD of sustainable integrated low carbon, resilient, conservation or land restoration demonstrations and/or investments [including leveraged]	Indicator 5 # of cities with enhanced access to financing for scaling-up sustainable urban solutions	Indicator 8 # of resolutions and/or commitments to advance urban sustainability and inclusiveness in high-level policy making events
Indicator 2 # of cities with improved evidence-based sustainable, inclusive integrated plans and processes	Indicator 4 # of cities with sustainable integrated low carbon, resilient, conservation or land restoration investment plans or project pipelines	Indicator 6 # of cities and countries that have initiated innovative financial mechanisms and/or business models for scaling-up sustainable urban solutions	Indicator 9 # urban practitioners that used the knowledge acquired from the training or materials from the SCIP GP (gender disaggregated)
		Indicator 7 $ USD leveraged through the innovative financial mechanisms and business models for scaling-up sustainable urban solutions	Indicator 10 # of cities that have more ambitious environmental targets for their sustainable and inclusive integrated plans
			Indicator 11 # of cities that have shared their good practices and lessons learned with the SCIP GP

The global project will report against this framework on an annual basis, using global level data and country level data provided by each country project during their annual project implementation review (PIR process).

The participation of Brazil in the impact programme will be mutually beneficial for both the country and the global programme (and, by extension, other countries participating in the programme), including through the following:

- **Focal Points:** Brazil will nominate a focal point for each of its participating cities and one at the national level. Ideally, the appointment of the city focal point will be agreed or appointed by the Mayor. This will allow for a strong local commitment and higher profile of the program at the city level, and a deep understanding of the local strategic priorities. The focal points will engage in the global project activities in coordination with MCTI. Such participation will support these focal points to share experiences, good practices and lessons learned garnered at the local level with other participating cities around the world. It will also allow these representatives to garner such information for enriching activities being undertaken in their city.

- **Communication Protocols**: To facilitate such exchanges, Brazil, through MCTI will agree on a communications protocol between the SCIP global project and the country, including who should be included in all communications from the SCIP global project to the local and national focal points. This is will allow for smooth implementation in the activities to be implemented by the SCIP global project.
- **National dialogues:** National dialogues aim to strengthen system-wide national enabling conditions to support cities in undertaking integrated planning and investments. The SCIP global project aims to organize two national dialogues in each child project country. These dialogues will include relevant national authorities and cities, including those beyond the pilot cities. The country will co-chair these two events with the support of the SCIP global project (represented by ICLEI); and promote women leaders to participate in these dialogues. Effort will also be made to include discussions on minority and vulnerable groups' needs. Through these dialogues, Brazil will benefit from the knowledge and experience of the global project partners, UNEP, WRI, ICLEI and C40, to address key national challenges to sustainable urban development.
- **Capacity Building:** The SCIP global project will offer a wide variety of capacity building and training activities for specific local and national level target audiences. Brazil will benefit from these capacity building activities (including SCIP Labs, City Academies, Peer Exchanges, Finance Academies) organized by the SCIP global project in coordination with local authorities, including in connection with outputs 3.1 (finance academies) and 4.2 (other SCIP activities). By providing these activities in country, the SCIP global project team will also benefit by developing more cultured knowledge of the challenges experienced at the local level, serving as an important feedback loop to support the revising and improving of training material for application in other countries, especially those of the region (Argentina and Costa Rica).
- **Knowledge exchange:** As noted in output 4.1 and section 8 (knowledge management), a key focus of the programme and the child project will be on ensuring a fluid exchange of experiences, good practices and lessons learned between the global project's platform and the Brazil SIS+. The two platforms will be connected together, so that interested local stakeholders can access knowledge and data stored on the global platform and international stakeholders can similarly access knowledge and data on local experiences. Through this connectivity, knowledge exchanges will be enhanced, supporting accelerated learning and an enhancement in the effectivity of local and international actions.

2. STAKEHOLDERS

1) Stakeholder engagement during project execution

Stakeholders will be engaged in project execution on a fluid constant basis through-out project execution. At the local level, the aforementioned local advisory groups (LAGs) will play a central role in engaging local stakeholders in project activities. Refer to the LAG terms of reference in the section for further information. Furthermore, the development of each of the project plans and pilots will be undertaken through participatory processes, with dedicated deliverables and budget lines created to ensure that these occur (see section 1b.3 – Alternative scenario and annex I-1). In addition, the development of the low-emission zone pilots (outputs 2.1, 2.3 and 2.4) will be undertaken through co-creation processes involving a wide range of stakeholders. Refer to the descriptions of these outputs for further information.

At the national level, the project Steering Committee, together with the AGS, will play a central role in facilitating effective participation of national level stakeholders. See their descriptions and the AGS terms of reference in the previous section for further information. For certain themes, coordination will be enhanced by actions beyond these mechanisms. For instance, to ensure coordination on financing, through output 3.1 the Committee for Supporting Access to Financing for Sustainable Urban Development (CODUS) will be created within the scope of the existing Inter-Ministerial City Chamber 4.0 (*Câmara das Cidades 4.0*). CODUS will be led by the MCTI and will include representatives of all key stakeholders in this space. See output 3.1 for further information. Both AGS and CODUS have dedicated funding to ensure effective engagement of stakeholders in the project. See the aforementioned sections and annex I-1 for further information. Furthermore, the project will have a dedicated *Communication and Gender Advisor*, who will play a key role in ensuring that stakeholders are informed and engaged in the project.

Select what role civil society will play in the project:
☐Consulted only;
☒Member of Advisory Body; contractor;
☒Co-financier;
☒Member of project steering committee or equivalent decision-making body;
☒Executor or co-executor;
☐Other (Please explain)

The following table identifies key stakeholders, their relevance for the project, and identified contribution to project activities.

Table 23 – Key project stakeholders

Category	Stakeholder	Relevance for the project	Contribution to the project
Government (federal)	Ministry of Science, Technology and innovation (MCTI)	National entity responsible for the federal government innovation agenda and leading the implementation of this project. The MCTI aims to develop science-based technological solutions to facilitate sustainable urban development in the country and is responsible for executing the GEF-6 project on sustainable cities, CITinova.	Project executing agency. Host of SIS+ (C.4).
	Ministry of Regional Development (MDR)	The Ministry is responsible for urban development portfolio of the federal government. The Ministry will serve as a project partner for capacity building activities.	Coordination on capacity-building C.3. and C.4 and member of the project steering committee and CODUS (C.3).
	Ministry of Environment (MMA)	Responsible for the biodiversity and environment agenda of the federal government	Member of the project Advisory Group of Specialists.
Local government associations	Brazilian Association of Municipalities (ABM)	Offers a repository of experiences and practices of municipal public policies focused on the SDGs and the New Urban Agenda. Potential partner for training and knowledge dissemination.	SIS+ and Capacity-building (C.4.) Member of the project Advisory Group of Specialists.
	National Front of Mayors (FNP)	Potential partner for training and capacity building activities.	SIS+ and Capacity-building (C.4.) Member of the project Advisory Group of Specialists.
	National Confederation of Municipalities (CNM)	The National Confederation of Municipalities (CNM) was founded in 1980 and is today one of the largest municipal entities in the world. CNM's objective is to consolidate the municipal movement and strengthen the autonomy of municipalities, based on political and technical initiatives aimed at excellence in management and the quality of life of the population.	SIS+ and Capacity-building (C.4.) Member of the project Advisory Group of Specialists.

Category	Stakeholder	Relevance for the project	Contribution to the project
Financial institutions	FUNBIO (Brazilian Biodiversity Fund)	Private and non-profit financial mechanism which works in partnership with the government, private sectors, and civil society with the objective of allocating the strategic financial resources to effective initiatives for biodiversity conservation. It has the potential to directly support the establishment of operational and fundraising bases for functioning of the Eastern Amazon Fund (EAF), support fundraising for the fund, and support the dissemination of the EAF at national level.	Project co-executing agency.
	FINEP	The FINEP is an important financer of studies and projects focused on innovation. Besides providing direct financial support, it launches calls for project proposals. Brazilian public company promoting science, technology and innovation in companies, universities, technological institutes, and other public or private institutions. It will act as a project partner.	Direct project recipient for output 3.1. Member of CODUS (C.3).
	The Brazilian Development Bank (BNDES)	The most important financial institution for development in Brazil, having a recognized role in financing initiatives relevant for cities and sustainability in general. The Bank operationalizes some of the main environmental funds, such as the Amazon Fund.	Direct project recipient for output 3.1. Member of CODUS (C.3).
	CAIXA (Federal Savings Bank)	Financial institution in the form of a public company with its own assets and administrative autonomy. It is one of the main financers of urban projects in the country. It has the potential to be a partner to implement a line of action to enable the financing of sustainable urban projects.	Potential project recipient for output 3.1. Member of CODUS (C.3).
	Development Bank of Latin America (CAF)	Financial institution for international development with good presence at municipal level. The initiatives of CAF include several credit operations (in progress) in the host cities of the target RMs of the project. In addition, it is one of the institutions that interacts with global climate funds.	Support to component 3 on financing (C.3). Potential member of CODUS.
	ABDE (Brazilian Association of Development Banks)	It brings together Development Financial Institutions (DFIs) spread across the country - federal public banks, development banks controlled by states, cooperative banks, state commercial public banks with development portfolios, and development agencies - besides Finep and Sebrae. ABDE defines strategies and execute actions that induce the strengthening of the national development system (SNF). It can support the development of a line of action to support the financing of sustainable urban projects and interactions with financial institutions and proponents of sustainable urban projects.	Support to component 3 on financing (C.3). Potential member of CODUS.
	Fomento Paraná	Financial institution operating in the state of Paraná that conducts the financial intermediation of various products, manages financing funds specific for the development of the state, executes special funding programs under the responsibility of the state, and provides financing with its own resources for programs and projects aimed at sectors that are considered promoters of development credit in Paraná State. It can support the implementation of the Eastern Amazon Fund (EAF) through knowledge exchange.	Support to component 3 on financing (C.3). Potential member of CODUS.
	IDB (Inter-American Development Bank)	International financial institution that supports initiatives in Latin American countries to reduce poverty and promote equity in order to foster regional integration and sustainable development. It can, among others, support the development of national events and matchmaking actions between financial institutions and/or private companies and proponents of sustainable urban projects.	Support to component 3 on financing (C.3). Potential member of CODUS.
	World Bank	International financial institution that, among others, provides loans to developing countries. It is the largest and best-known development bank in the world. It can, among others, support the implementation of activities and matchmaking actions between financial institutions and/or private companies and proponents of sustainable urban projects.	Support to component 3 on financing (C.3). Potential member of CODUS.
	FEBRABAN (Brazilian Federation of Banks)	Main representative entity of the Brazilian banking sector. It has the potential to support matchmaking actions between financial institutions and proponents of sustainable urban projects.	Support to component 3 on financing (C.3). Potential member of CODUS.
	Far South Regional Development Bank (BRDE)	Regional financial institution for development that acts in the states of Rio Grande do Sul, Santa Catarina and Paraná with the purpose of supporting the south of Brazil to prosper. The bank has credit operations specific for financing cities. It also operationalizes some	Direct project recipient for output 3.1. Potential member of CODUS (C.3).

Category	Stakeholder	Relevance for the project	Contribution to the project
		programs from BNDES and international financial institutions, such as AfD and World Bank.	
	Development Bank of Minas Gerais (BDMG)	Regional financial institution for development that promotes the development for the Minas Gerais state. The bank has credit operations specific for financing cities and technical support for urban public private partnerships. It has several initiatives concerning SDG implementation through its operations, mainly to small and micro enterprises.	Direct project recipient for output 3.1. Potential member of CODUS (C.3).
Academia	Federal University of Rio de Janeiro, Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering (COPPE-UFRJ)	One of the largest engineering education and research centers in Latin America. It hosts Urban Living Labs, providing support the MCTI. COPPE-RJ will be involved in project implementation and was consulted during project development.	Support to modules (C.1) and SIS+ C.4). Support to pilot co-creation and execution processes (C.2.)
	FGVces (Fundação Getulio Vargas Center for Sustainability Studies)	FGVces works on the development of strategies, policies, and tools of public and business management for sustainability at local, national, and international levels. The organization has experience and potential to provide support in the area of green and climate finance and financial structuring of sustainable projects.	Support to component 3 on financing (C.3). Potential member of CODUS.
	IPEA (Brazilian Metropolitan Network)	Metropolitan planning research group that has an online platform with information and data from the Brazilian metropolitan regions. It can identify the needs of Metropolitan Regions, help develop training content and increase the scale of capacity building.	Potential support to planning, modules and institutional arrangements (C.1.).
	University of Sao Paulo, Faculty of Arquitecture and Urbanism	Potential partner to support the development of training content, especially for Integrated Planning (PDUI) and metropolitan governance.	Potential support to planning, modules and institutional arrangements (C.1.).
Non-governmental organizations	Sustainable Cities Program	Responsible for the sustainable cities' platform within the scope of the CITinova project. It also contributes to the strengthening of training and knowledge dissemination actions. Its sustainable cities index will be incorporated into the local and national SIS+ modules	Modules (C.1) and SIS+ (C.4).
	CGEE	Social organization supervised by the MCTI. It aims to support decision-making on topics related to science, technology and innovation. Responsible for the Observatory of Innovation for Sustainable Cities. Within the scope of the CITinova project, it contributes to the strengthening of training and knowledge dissemination actions	Project co-executing agency.
	WRI Brazil	Responsible for the design of the project in the PPG stage.	Potential support to planning, modules and institutional arrangements (C.1.). Potential support to financing (C.3) and capacity-building (C.3 and C.4).
	ICLEI	Manages networks and actions in numerous Brazilian cities related to the Climate, Biodiversity, and Urban Planning agendas	Potential support to planning, modules and institutional arrangements (C.1.). Potential support to financing (C.3) and capacity-building (C.3 and C.4).
	C40	International network of megacities committed to combating climate change. The C40 supports effective collaboration of the cities, knowledge sharing, and promotes meaningful, measurable, and sustainable actions on climate change. It can support the development of activities to identify priority urban actions and projects to be supported by the Eastern Amazon Fund (EAF) and support the identification of project preparation facilities to support the task force in output 3.2.	Potential support to planning, modules and institutional arrangements (C.1.). Potential support to financing (C.3) and capacity-building (C.3 and C.4).
	CDP Latin America	The organization aims to mobilize investors, companies, and governments to build and accelerate actions for low-emission transition. It is responsible for several initiatives relevant for Brazilian cities,	Support to component 3 on financing (C.3).

Category	Stakeholder	Relevance for the project	Contribution to the project
		including the Matchmaker program, which since 2015 seeks to unite low-carbon urban projects with potential funders. Potential partner for the implementation of actions to promote the financing of sustainable infrastructure projects.	
	The Nature Conservancy	It is a non-governmental organization that works on a global scale for environment conservation. It can support project implementation and works with innovative finance, especially Payment for Environmental Services.	Biodiversity aspects and capacity-building (C3 and C4).
	SITAWI	SITAWI promotes the development of financial solutions for social impacts of various institutions and conducts research on their socio-environmental performance. Among its initiatives are Environmental Impact Bonds (EIB) developed through the management of Territorial Programs, Philanthropic Funds (PF), and Revolving Socioenvironmental Funds (RSF). The SITAWI also provides credit to institutions that issue green bonds. It has the potential to directly support the execution of the project by designing the financing instruments in relation to some of project's activities.	Support to component 3 on financing (C.3). Potential member of CODUS.
	Climate Policy Initiative (CPI)	The CPI supports governments, companies, and financial institutions in actions promoting economic development and combating climate change. One of its main initiatives is The Lab, which supports ideas related to innovative financing instruments for sustainable projects in the country. It has the potential to directly, or through its network of associated institutions, support the design of innovative instruments related to project activities.	Support to component 3 on financing (C.3).
	Laboratory for Financial Innovation (LAB)	It is a multisectoral forum created by the Brazilian Association of Development Banks (ABDE), the Inter-American Development Bank (IDB), and the Securities and Exchange Commission (SEC) in partnership with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, which brings together government and society representatives to promote sustainable finance in the country. The LAB can support activities engaging the Eastern Amazon Fund (EAF) and support the interactions with financial institutions as well as proponents of sustainable urban projects.	Support to component 3 on financing (C.3). Potential member of CODUS.
Non-governmental organizations (continued)	Green Finance for Latin America and the Caribbean (GFL)	Platform for knowledge exchange between National Development Banks, financial institutions in the private sector, and various actors in the financial market to share information and knowledge on green financing. It can support the implementation of project activities.	Support to component 3 on financing (C.3).
	Ethos Institute	The institute is a Civil Society Organization of Public Interest whose mission is to mobilize, raise awareness, and help companies manage their businesses in a socially responsible manner, building a partnership for a fair and sustainable society. It has the potential to support the selection of sustainable urban projects to be supported by Component 3.	Support to component 3 on financing (C.3).
	Boticario Group Foundation for Nature Protection	Non-profit organization maintained by Boticário Group, whose mission is to promote activities for nature conservation. It has extensive experience in designing nature-based solutions in cities and can support the call for projects in Component 3.	Biodiversity aspects and capacity-building (C3 and C4).
	CFF (Cities Finance Facility)	Project facility related to the C40 that supports cities in the preparation and execution of climate change projects. It can be one of the project preparation facilities present in output 3.2.	Support to component 3 on financing (C.3).
	TAP-ICLEI (Transformative Actions Program – Local Governments for Sustainability).	Project portfolio and project preparation facility developed by ICLEI and partners - acts as an incubator that supports local and regional governments by catalyzing capital flows for low or no emission and climate-resilient development. It can be one of the project preparation facilities present in output 3.2.	Support to component 3 on financing (C.3).
	The Lab in Brazil	Global Innovation Lab for Climate Finance (LAB) has established a local network of investors and public and private leaders to identify, develop, and launch transformative investment solutions that can generate funds for the national climate priorities of Brazil. It can support matchmaking actions between financial institutions and proponents of sustainable urban projects.	Support to component 3 on financing (C.3).
	Cities Climate Finance Leadership Alliance (C CFLA)	Potential partner to support the development of training content, especially for structuring sustainable projects.	Support to component 3 on financing (C.3).

Category	Stakeholder	Relevance for the project	Contribution to the project
	Lincoln Institute for Land Policy	Potential partner to support the development of training content on different themes.	Capacity-building (C3 and C4).
	Polis Institute	The Polis Institute manages the Global platform for the Right to the City, whose objective is to contribute to the adoption of commitments, public policies, projects, and actions aimed at just, democratic, sustainable, and inclusive development of the cities. It can be an important partner not only for formulation of training content and scaling-up of the training itself, but also for the national platform to be strengthened.	Capacity-building (C3 and C4).
	Metropolis Observatory	Formed by researchers in different research centers, the Observatory focuses on challenges specific to metropolitan regions. Relevant partner for the development and implementation of capacity building activities.	Capacity-building (C3 and C4).
	Cities Alliance	Potential partner to support and disseminate capacity building content, especially for Integrated Planning (PDUI) and metropolitan governance.	Capacity-building (C3 and C4).
	Institute for Transportation and Development Policy (ITDP)	The mission of the Institute is to promote environmentally sustainable and equitable transport. Potential partner to support the development of training content, especially on themes related to transport planning and urban development.	Capacity-building (C3 and C4).
International organizations	United Nations Economic Commission for Latin America and the Caribbean (CEPAL) Brasilia	Potential partner to support the development of training content, especially related to structuring sustainable projects.	Capacity-building (C3 and C4).
	UN-HABITAT, Rio de Janeiro	Potential partner to support the development of training content on different themes.	Capacity-building (C3 and C4).

Florianópolis Metropolitan Region			
Government	Municipal Secretariat for Mobility and Urban Planning	Project focal point.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Florianópolis Urban Planning Institute - IPUF	Project focal point.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Municipal Environment Foundation - FLORAM	Responsible for actions related to the Biodiversity agenda in the municipality of Florianópolis.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Superintendence for the Development of the Metropolitan Region of Greater Florianópolis - SUDERF	Focal point - responsible for metropolitan management in Florianópolis RM.	Module, plans and governance arrangements (C.1).
	SEMA – Executive Secretariat for the Environment of the State Government of Santa Catarina	Focal point - responsible for actions on the Climate and Biodiversity agenda in Santa Catarina State, including Florianópolis RM.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Association of Municipalities of the Greater Florianópolis Region (Granfpolis)	Responsible for engaging municipalities of the RM, especially those of smaller size or with less technical capacity.	Module, plans and governance arrangements (C.1).
	NGI-ICMBIO	Management authority in charge of the two federal targeted urban protected areas in Florianópolis. Will act as technical leads for activities in these PAs.	Design and implementation of pilots (C.2).
	Florianopolis Municipality Women's Municipal	Promotes public policies on gender in Florianopolis.	Module, plans and governance arrangements (C.1). Design and

	Coordination of Public Policies		implementation of pilots (C.2).
Academia	Santa Catarina Federal University (UFSC): VIA Estação de Conhecimento Laboratory	Research group linked to the Federal University of Santa Catarina, specialized in innovation habitat. Provides technical support in the definition of methodology and management of the urban innovation laboratory.	Design and implementation of pilots (C.2).
	Santa Catarina Federal University (UFSC): Departments of Ecology, Oceanography and Environmental and Sanitary Engineering.	Scientific backstopping and technical support to urban protected area management activities in Florianópolis	Design and implementation of pilots (C.2).
NGO	Floripa Sustainable	Multi-stakeholder group promoting the sustainable development of Florianopolis. Will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Floripamanhã Association	Group of concerned residents which will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	SDG National Movement Santa Catarina	NGO promoting the incorporation of the SDGs into daily life of the state. Will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	CERTI Foundation	Technology-based innovation centre may provide inputs into the design of the low-emission zone.	Design and implementation of pilots (C.2).
	Observatório Social de Florianópolis	Group of concerned local stakeholders which will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
Greater Teresina RIDE			
Government	Secretariat of Municipal Planning and Coordination – SEMPLAN (Teresina)	Responsible for planning and coordination actions with other municipal actors.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Municipal Superintendence of Transport and Traffic - STRANS (Teresina)	Responsible for the management of public transport in Teresina.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Municipal Secretariat of Public Policies for Women (Teresina)	Promotes public policies on gender in Teresina.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Municipal Secretariat for the Environment and Water Resources (Teresina)	The mission of the Secretariat is to promote the sustainable use of natural resources in Teresina.	Module, plans and governance arrangements (C.1).
	Municipal Secretariat of Planning, Budget, and Management – SEMPLAN (Timon)	The Secretariat is responsible for municipal planning and management, in coordination with Teresina.	Module, plans and governance arrangements (C.1).
	Municipal Secretariat of Public Works and	Provide municipal coordination on the development of public works and infrastructure. Will be an important actor for the development of the integrated plans.	Module, plans and governance arrangements (C.1).

	Infrastructure – SEINFRA (Timon)		
	State Secretariat of Planning - SEPLAN (Piauí)	Among its responsibilities is strategic and territorial planning of Piauí State.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Embrapa	Public research enterprise focused on agriculture and livestock management and associated to the Ministry of Agriculture.	Module, plans and governance arrangements (C.1).
Academia	Piauí Council of Architecture and Urbanism	Provide inputs into spatial planning and local urban policy development	Module, plans and governance arrangements (C.1).
	Federal Institute of Education, Science and Technology of Piauí	Provide inputs into spatial planning and local urban policy development	Module, plans and governance arrangements (C.1).
NGO	IN.SURGE	Informal group promoting the social and cultural development of the Teresina city centre.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Environmental Preservation Centre (TCV)	Will provide inputs into the design of the integrated plans, especially on biodiversity.	Plans (C.1).
	Piauiense Association of Cycling and Cycloturism	Will provide inputs into the design of the sustainable transport plan and design of the low-emission city-block.	Plans (C.1). Design and implementation of pilots (C.2).
Belém Metropolitan Region			
Government	SEMAS – Pará State Secretariat for the Environment and Sustainability	State Secretariat responsible for integrated environmental management.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	SEDOP – Pará State Secretariat for Urban Development and Public Works	The Secretariat is responsible for planning and management of urban development in Pará State.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Secretariat for Management and Planning - SEGEP (Belém)	Responsible for planning, management and coordination with other municipal actors.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Metropolitan Transporte Management Centre (NGTM), State of Pará	Responsible for coordination of metropolitan transport infrastructure.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Municipal Secretariat of Environment (Belém)	Responsible for planning, coordinating, supervising, executing and monitoring activities related to conservation, protection, and restoration of the environment, more specifically in public green areas of the municipality of Belém and neighboring areas.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Municipal Secretariat of Urbanism - SEURB (Belém)	Responsible for urban planning, licensing and inspection of various works in urban areas.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	SDG Network Brazil	The organization is responsible for promoting the implementation of the UN Development Agendas in the country, with local presence in Belém MR.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).

	Institute of Forest Development and Biodiversity of the State of Pará (Ideflor-Bio)	State body responsible for planning and management of protected areas in the state.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2). Financial mechanism (C.3).
	Belém Women's Coordination created by Decree No. 63.033 of March 8, 2010	Promotes public policies on gender in Belem.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
NGO	Instituto Casa da Gente	Social institute focusing on local community needs in Ananindeua	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Pará Sanitation Company (COSANPA)	Water supply and basic sanitation provider in Pará state. Role in the project: engagement of actors for implementation of financing and management instruments for Utinga Park.	Financial mechanism (C.3).
	City Laboratory	NGO promoting the sustainable development of Belém. Will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	EngajaBelem	Youth group with focus on environment. Will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
	Rede Nossa Belém	NGO part of the Sustainable City Programme network, will play an important role in supporting the design and execution of project activities.	Module, plans and governance arrangements (C.1). Design and implementation of pilots (C.2).
Academia	Federal University of Pará	Provide inputs into spatial planning and local urban policy development	Module, plans and governance arrangements (C.1).
	University of Amazonia	Provide inputs into spatial planning and local urban policy development	Module, plans and governance arrangements (C.1).
	Emilio Goeldi Paraense Museum	Provide inputs into planning and pilots related to biodiversity	Plans (C.1). Design and implementation of pilots (C.2).

2) Stakeholder consultations undertaken during the project preparation grant phase

Refer to annex S for a list of stakeholders consulted during project preparation grant phase.

3. GENDER EQUALITY AND WOMEN'S EMPOWERMENT

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women's empowerment?

☒Yes

If possible, indicate in which results area(s) the project is expected to contribute to gender equality:

☐ closing gender gaps in access to and control over natural resources;
☒ improving women's participation and decision making; and or
☐ generating socio-economic benefits or services for women.

Does the project's results framework or logical framework include gender-sensitive indicators?

☒Yes
☐ No

1) Gender analysis

Brazilian panorama: legislation and international agreements

Brazil is a signatory to several international conventions and agreements in support of women's rights, which provide an international framework for women's rights in the country. Noteworthy are the Convention on the Elimination of All Forms of Discrimination against Women - CEDAW (1979), the Inter-American Commission of Women, the Inter-American Convention to Prevent, Punish and Eradicate Violence Against Women - "Convention of Belém do Pará " (1994), IV World Conference on Women (Beijing, 1995) and Agenda 2030 and the United Nations Sustainable Development Goals (2015). Brazil also participates in subregional and regional forums for the promotion and defense of women's rights, promoting commitments made in Beijing (and at the Cairo Conference on Population and Development).

At the national level, the main milestones and structures of the Brazilian government in promoting gender equality and empowering women involve the institutionalization of gender issues in public policies through the creation of the Special Secretariat for Policies for Women in 2003, and its promotion to the Ministry level in 2009. Among its main policies are the National Policy for Integral Attention to Women's Health, the National Policy Plan for Women, the Gender Equality Program, the National Policy for the Comprehensive Health of the Populations do Campo and Floresta, among other programs and policies articulated between ministries (Zannata et al., 2016).

With regard to combating violence, systems for reporting violence against women are implemented, the Maria da Penha Law (2006), the National Policy and Pact to Combat Violence against Women (2007), and a law on feminicide (2015). With regard to political participation, Brazilian law has indicated since 1997 that each party or coalition must fill, in the proportional elections, a minimum of 30% and a maximum of 70% for candidacies of each sex.

In an effort to compile statistical data recommended by the United Nations Statistical Commission, named the Minimum Set of Gender Indicators (CMIG), since 2013 the Brazilian Institute of Geography and Statistics (IBGE) organizes and disseminates a large part of these indicators on Brazil, thus contributing to fill an important gap in the production of gender statistics. The National Gender Information System - SNIG (IBGE, 2014) is part of a project to structure a broad Gender Statistics Program at IBGE and disseminates its results through compiled reports and also a country database.

Brazilian panorama: gender data

On gender indices, Brazil has a marking of 0.993 for the 2020 UNDP Gender development index (GDI), which puts them in the first and highest group of being gender equitable, and a Gender Inequality Index (GII) of 0.408, which ranks it 95th. On the 2020 World Economic Forum GGGI, Brazil ranked 92nd with a marker of 0.691. In 2017, women constituted 51.7% of the Brazilian population, with a majority in all Brazilian regions (IBGE, 2018; BRASIL, 2020). The schooling of women grew at all levels of education, and in the 2000s they became the majority of enrolled and also graduates both in Elementary and Secondary Education and in Higher Education.

The Global Gender Gap Report 2020 (World Economic Forum, 2020) indicates gender parity in the literacy rate (100%) and primary education (99%), and a higher proportion of women than men enrolled in both secondary and higher education, where there are 140

female students for every 100 male students. The country has closed the gender gap in education and health, where women can expect to live five years longer than men in good health. The economic gender gap remains large, but has narrowed in recent years (score of 69.1%, 92º). The low rate of female participation in the workforce, combined with the persistence of wage and income inequalities, weighs on the country's performance in this sub-index, but the employment gap is much smaller. Brazil is among the 70 countries in the world that have achieved parity between women and men for technical and professional positions. Despite this, only 37% of leadership positions (managers, senior officials, legislators), on average, are held by women in all regions of the country. Of these positions, black or brown women have even less representation (36%). Women over 50 years old are the least in management positions in the country, with women over 60 years old only 21%. Inequality between men and women directly impacts income and career aspects.

Political empowerment, or lack of it, represents the biggest obstacle to Brazil's overall performance; with a score of 13.3%, the country ranks 104th in the world. In June 2019, only two positions in the 22-member cabinet were held by women (122nd) and women represent only 15% of members of parliament (114th). Brazil is still one of the countries with the least advances in affirmative policies in Latin America. In the lowest representativeness ranking, the country occupies the third place (Inter-Parliamentary Union), reflecting little progress of public institutions towards a scenario of inclusion of women in decision-making tables. Usually women are relegated to councils, secretariats and positions that imply care (such as Social Assistance and Education) and are excluded from important decisions such as Budget and Public Safety. Of the occupations, they are the majority in education (81%), health and well-being (74%), humanities and arts (65%). In a scenario where 51% of voters are women, the fact that they are not represented among strategic political actors directly impacts the construction of policies that consider gender issues. In 2016, only 10% of mayors and 13.5% of councilors were women in the entire country (Source: Agência Câmara de Notícias). As of June 2019, only two positions in the 22-member cabinet were held by women and women represent only 15% of members of parliament.

The 2010 Census shows that the percentage of women aged 25 or over who had a college degree doubled in a decade (Araújo & Facchini, 2018). This increasing schooling of women contributed to the constant increase of their insertion in paid work. Their participation in the labor market increased by 85% between 1976 and 2007 and grew by 33.9% between 2001 and 2013, while that of men grew by 28.1%. In addition, women have entered more and more work niches that were previously considered to be male and the more educated have increased their participation in positions of leadership and management. However, their presence remains the majority, mainly in the services sector, in domestic employment and in the traditionally "female" areas of knowledge, such as education (81% women), health and well-being (74%), humanities and arts (65 %). The number of women engaged in paid domestic work, 17.1%, in 2009, remains significantly higher than the total number of men: 1.0% in the same year. Another important data presented in this block is the proportion of domestic workers without their own income in Brazil: 0.5% in 2009. What this indicator suggests is that more than 30 thousand women across the country have been working, today, in conditions analogous to slave labor (Source: IPEA, 2011). Another important indicator of the Brazilian demographic pattern is family organization, with an emphasis on the increasingly common incidence of households headed by women.

Black women are at a disadvantage compared to white women and white men in all indicators, according to IPEA. They represent the least socially protected, with 56.0% of social security coverage (against 70% of coverage among white men). Among women, the evolution of the proportion of the number of white and black elderly women occurs unevenly. Between 1995 and 2009, white women aged 60 and over grew by 4% (from 10% to 14%). Black women, on the other hand, had only 0.9% of variation in their longevity. The average income of a family headed by a white man is R $ 997, while in a family headed by a black woman it is only R $ 491. In 2009 , black workers earned, on average, R $ 364.80, and white workers, R $ 421.60. Of the households that receive the Bolsa Família benefit, 70% are from black families. In 2009, 65.5% of employed women, aged 16 or over, had at least 9 years of study, compared to only 48.7% of black women. The enrollment rate of white women in higher education is 23.8%, while, among black women, this rate is only 9.9% (Source: IPEA, 2011). In this sense, there is a gap to be bridged that combines gender, race and formal education.

The Human Development Report of the United Nations Development Program (UNDP, 2019) records that, in Brazil, women receive up to 25% less than men doing similar jobs and that the maternal mortality rate is 44 deaths per 100 thousand live births (Norway, the first place in the ranking, has 5 deaths for every 100 thousand). With regard to violence, assistance to women victims of sexual, physical or psychological violence in units of the Unified Health System (SUS) adds up to 147,691 records per year - 405 per day, or one every four minutes. Female deaths from aggression went from 2.3 / 100,000 to 4.8 / 100,000 between 1980-2013, representing an increase of more than 100% in the period. In 2016, more than one million cases related to domestic violence against women were processed in the country's courts, which corresponds, on average, to 1 case for every 100 Brazilian women. In a decade, between the edition of the Maria da Penha Law, in 2006, until December 2017, the number of exclusive courts and courts in domestic and family violence increased from 5 to 111 (Araújo & Facchini, 2018). According to the 11th Brazilian Public Security Yearbook, a woman was murdered every two hours in Brazil in 2016, totaling 4,657 deaths. But only 533 cases were classified as feminine, even after the 2015 law obliged such registration for the deaths of women within their homes, with domestic violence and for gender reasons.

Brazilian panorama: Gender and Cities

The panorama of the resident population by situation of household and sex follows the same trend of urbanization rate in both genders. In other words, Brazil has the majority of its population in urban areas (over 84%, except for the North and Northeast regions with 73%) and urban men and women follow this same trend. The metropolitan regions that are the focus of this study have urban population rates higher than those of their respective states. Both in the RMs of Belém and Florianópolis, as well as in the Greater Teresina RIDE, women are predominantly in the urban context. It is also observed that the Metropolitan Region of Belém has a high rate of urbanization in relation to the state of Pará and Brazil, with 97% of women living in an urban household, while in the state the average is 68% and in Brazil is 84%.[171][172]

An IPEA survey in 2017 points to an increase in the proportion of households headed by women throughout the historical series between the years 1995 and 2015. This phenomenon, markedly urban, shows that in 20 years, the heads of increased from 25% to 40%, and in the cities there was an increase of approximately 18 percentage points in the period.[173]

When it comes to urban mobility, the gender difference is quite significant. The vast majority of first-level municipality public offices related to transport and mobility in Brazil are held by men. Among the 34 leaders of municipal departments and municipalities in the capitals whose responsibilities are associated with urban mobility, there are only five women, less than 15% of the total. The gender and number survey with municipal bodies was carried out between February and March 2017[174] and reveals a lack of female representativeness, which contributes to transport systems that are much less welcoming to women than they could be. Men tend to occupy almost 100% of the areas of planning and structure, reflecting the fact that engineering in Brazil is still a predominantly male field.

Women face greater challenges in exercising the right to the city and accessing public services in urban spaces. Inequalities in the division of domestic work imply a greater burden for women (while women dedicate an average of about 25 hours a week, men dedicate 10 hours), which accumulate functions such as dropping off and picking up children at school and health care, care for elderly members and family patients, going shopping, and collecting social benefits, among others, which largely determines travel to multiple destinations and with predominant use of public transport and walking.

Despite the fact that women are the main users of municipal services, there is a gap in the production of data with gender intersections and in the development of actions that provide better access for women to the city within the scope of urban planning. This is despite the existence of the National Urban Development Policy which holds as a guiding principle the fight against socio-territorial, racial and gender inequality. While this is the case, municipal policies on women focus mainly on promoting financial autonomy and the fight against violence and feminicide.

Regarding the three territories of this project, the overview of the planning instruments indicates the presence of a mobility plan in the three capitals, but with an absence of gender disaggregated data, with the exception of Teresina. And these data indicate that women mostly use public transport and on foot, with the immobility rate being higher among women than men.

In fact, metropolitan transport in Brazil is used mostly by women, corresponding to 80% of bus users. In Minas Gerais, there are surveys indicating the preferential use of women by public transport. According to Svab (2016),[175] the finding is similar in São Paulo, where historically women are the majority among bus users. By subway, they started to be majority from 1997. Another important fact is that women travel more on foot than men. A mobility survey of the metropolitan region of São Paulo, conducted by Metrô, in addition to corroborating with the data above, attests that the percentage of men who travel as drivers in individual transport is 26%, against only 14% of women. This data reflects a pattern of urban mobility in Brazil, which tends to favor cars, mostly used by men, to the detriment of pedestrian paths, occupied more by women.

[171]IBGE. 2018. Gender Statistics: Social indicators of women in Brazil. ISBN: 978-85-240-4448-9. Available at: https://www.ibge.gov.br/estatisticas/multidominio/genero/20163?=&t=o-que-e.
[172]BRAZIL. 2020. RASEAM- Annual Socioeconomic Report of Women 2017 / 2018. Ministry of Women, Family and Human Rights, National Secretariat of Policies for Women, Brazil Observatory for Gender Equality. Brasilia
[173]Souto, ALS 2017. Gender and Cities: violence, harassment and exclusion. In: Right to the City: another gender view. Brazilian Institute of Urban Law - IBDU. Sao Paulo: IBDU
[174]Bastos, M. 2017. Majority in public transport, women are on the margins of mobility policies. Gender and Number. Available at: www.generonumero.media/maioria-no-transporte-publico-mulheres-estao-a-margem-das-politicas-de-mobilidade/.
[175]Svab, H. 2016. Evolution of displacement patterns in the metropolitan region of São Paulo: the need for a gender analysis. 2016. Dissertation (Master in Transport Engineering) - Polytechnic School, University of São Paulo, São Paulo, 2016. doi: 10.11606 / D.3.2016.tde-30092016-142308

The fact that public transport is not thought of from the perspective of women results in greater circulation difficulties when compared to men, and restrictions on access to the city as a whole.[176] From the point of view of women's mobility, it is necessary that public policies are designed, implemented and evaluated with some sensitivity in relation to gender. Brazil is still shyly reflecting on the inclusion of a gender focus in mobility policies. Municipal policies focused on making the city more walkable and prioritizing buses will be policies that advance the path of gender equity.[177]

In practical terms, the initiatives that attract the most attention are the pink carriage (intended for the exclusive use of women in subways) and the possibility of getting off in locations not at a bus stop in a few cities, which started only in the last seven years. Belo Horizonte is one of the Brazilian cities in which it is possible, according to the law, to alight a bus outside of a bus stop after 10 pm to ensure the safety of the woman who does not want to travel dark stretches to get home. The so-called Safe Stop Law has also been implemented in São Paulo, Caruaru and Porto Alegre, and the pink carriages take place in the cities of Rio de Janeiro, Recife and the Federal District.

In addition to policies aimed at an immediate solution to the issue of security against harassment of women, there is an urgent need for effective social participation, incorporating diversity of gender, race and experiences diverse in the different spaces of governance and in the management of public policies.

Brazilian panorama: Gender and Environment

In 2012, women's movements and organizations from Brazil and other countries in the global south met during the People's Summit in Rio de Janeiro to strengthen and expand the struggle that, twenty years earlier, in that same city, had gained enormous visibility. That is how the 2012 Global Women's Territory revisited the 1992 Female Planet, recovering and updating twenty years of women's struggles for environmental sustainability with social justice. This coordination between women's rights and environmental sustainability, which in these two moments are fundamental milestones, resulted from the persistent and sustained demand from feminist and women's movements for a vision of the environment that include the perspectives of different peoples and communities.[178]

Thinking about women and the environment in Brazil necessarily involves thinking about land and territories. The 1988 Federal Constitution was an important milestone in the process of recognizing and enforcing rights for women in the countryside and the forest. It is recognized in the Constitution's article 189, the rural women's right to land. Almost 30 years later, the National Institute of Colonization and Agrarian Reform (INCRA), published Ordinance No. 981/2003, which determines joint title for men and women married or in a stable relationship, and Normative No. 38/2007, which adjusts mechanisms for enrolling candidates in the National Agrarian Reform Program - PNRA[179]. Only then, women passed from 12.6% holders of agrarian reform lots[180] to 48% between 2008 and 2010.

In 2004, the National Policy for Women set policy guidelines for action, emphasizing sustainable development in rural areas and urban areas, with guarantees of environmental justice, sovereignty and food security[181]. In its first version, from 2004, the PNPM included rural workers across its chapters. The II National Policy Plan for Women - II PNPM[182]reaffirmed the space of women from the countryside and the forest in the field of Brazilian public policies. From this second version of the document, it dialogues more directly with the objectives of the chapter on women and the environment of the Beijing Platform for Action, through chapter 6, *Sustainable development with economic and social equality*, and 7, *Right to land with equality for rural and rural forest women*.

From the middle of the first decade of the 2000s, by incorporating the struggle for sustainable development, rural women's movements and the Brazilian State itself opened space for the recognition and strengthening of some forms of production and productive organization in the field historically adopted by rural workers: agroecology, family farming and collectivized work in associations

[176]Correia, A .; Coelho, C; Salles, L. 2018. Intersectional city: the right to the city from the perspective of gender and race. National Urban Reform Forum (FNRU): Observatory of the Metropolises. Available at: https://www.observatoriodasmetropoles.net.br/o-direito-cidade-nas-perspectivas-de-genero-e-raca/.

[177] Svab, 2016

[178]Madsen, N. 2015. Brazilian women in the struggle for sustainable development with social justice. In: Ipea. Portraits of gender and race inequalities. 27pp

[179]Cintrão, R. & Siliprandi, E. 2011. The progress of rural women. In: Barsted, LL & Pitanguy, J. The Progress of Women in Brazil 2003–2010. Rio de Janeiro: CEPIA; Brasília: UN Women. 436p.

[180]Agrarian Reform Census. 1997. Advanced Studies, 11 (31), 7-36. https://dx.doi.org/10.1590/S0103-40141997000300002

[181]Menicucci, E. 2012. Sustainability and public policies for gender equality towards Rio +20. In: Brazil. Presidency of the Republic. Secretariat for Policies for Women. Special Edition of the Revista do Observatório Brasil da Gender Equality. 1st impression. Brasília: Secretariat of Policies for Women. 112p.

182BRAZIL. 2008. II National Policy Plan for Women

and cooperatives.[183] The relationship between gender and agroecology has started to gain strength more recently, with emphasis on the specificity of women's work in sustainable management and conservation of biodiversity.

The Federal Government has made progress in establishing different types of settlement projects, evading the perspective of a single model. So-called "environmental projects" multiplied, especially in the north of the country: Flonas - National Forests, Agroextractive Projects, Forest Settlement, Sustainable Development, Extractive Reserves and Sustainable Development Reserves. Surveys carried out by the Federal Government's Special Advisory on Gender, Race and Ethnicity (Aegre) between 2005 and 2009 identified 920 productive groups of rural women in virtually all states in the country. In 2008, the Program was created at the federal level *Productive Organization of Rural Women*, made up of bodies from six different Federal Ministries. Its objective is to support these initiatives.

A recent report produced on gender and forests in the Amazon[184] brings to light the lack of data on this topic, which makes it difficult to establish strategies to reduce gender inequalities in the management of natural resources. In addition to indigenous peoples, communities of rubber tappers and Brazil nut collectors and processors, the Amazon is home to diverse social groups, each with its own history, identity, ways of earning a living and political presence, whose experiences challenge generalization. Little systematic information is available on gender relations and livelihood strategies among these diverse populations. A study of more than 1000 rural women in the Amazon found that 57% cited forest extraction as their main economic activity; a third also worked outside the field.[185] An increasing number of rural inhabitants in the Amazon are moving their homes, at least partially, to cities, to gain access to education and employment (such as Brazil nut processing). Non-Timber Forest Products - NTFPs play an essential role in the livelihood strategies of the periurban residents of the Amazon, whose rural-urban migration can be seen as a response to changes in extractive economies.[186] Often, male heads of households remain in rural areas, while their wives and children move to the city to continue their studies. More research is needed to understand the impacts on the forest and the livelihoods of this growing "multi-local" livelihood strategy[187].

The economic empowerment of rural women in Brazil still faces many challenges: most of them work predominantly for self-consumption and without earning monetary income - in a job that is essential for food security and that generates unaccounted wealth. They are primarily responsible for the preservation of natural assets and guardians of traditional knowledge, but remain in the minority in access to land, technical assistance and rural assistance services, credits and financing and other productive resources.[188]

Regional Panorama: Metropolitan Regions of Belém, Florianópolis and Integrated Development Region of Teresina

In order to compare gender inequality between the federative units of Brazil, in a similar way to that the Global Gender Gap Index (GGI) calculates and compares gender inequality between countries, the National Index of Gender Inequality (INDG) was elaborated. The INDG is composed of four dimensions - economics, education, politics and health - and was elaborated from the collection of online government data and microdata from the National Household Sample Survey (PNAD) of 2009.

Final result of the National Gender Inequality Index (NGII)

Federative Unit	Economic index	Education index	Political index	Health index	**NGII**
Rio Grande do Norte	0,721	0,992	0,405	1,000	0,780
Roraima	0,870	0,999	0,237	0,998	0,776
Maranhão	0,762	1,000	0,313	1,000	0,769
Amapá	0,782	0,998	0,228	1,000	0,752
Sergipe	0,827	1,000	0,140	1,000	0,742
Acre	0,807	0,994	0,157	1,000	0,740

[183] Madsen, 2015
[184]Schmink M. & García MAG 2015. Under the canopy: Gender and forests in Amazonia. Occasional Paper 121.Bogor, Indonesia: CIFOR.
[185]Guedes MEF; Costa, MG and Mourão, P. 2001. Women and work in the Amazon of Pará: Elements for the construction of the Articulated Movement of Women of the Amazon (MAMA). In Álvares MLM and Maneschy MCA, Gender and work: Amazonian dimensions. Belém: Federal University of Pará, Center for High Amazon Studies (NAEA), Book of Abstracts of the MEGAM Project, Anais III. 223–226
[186] Schmink & Garcia, 2015
[187]Padoch, C .; Brondizio, E .; Back.; Pinedo-Vasquez, M .; Sears, RR and Siqueira, A. 2008. Urban forest and rural cities: multi-sited households, consumption patterns, and forest resources in Amazonia. Ecology and Society 13 (2): 2.
[188] Menicucci, 2012

Rio Grande do Sul	0,727	0,999	0,299	1,000	0,739
Paraíba	0,837	0,995	0,120	0,998	0,738
Amazonas	0,724	1,000	0,207	1,000	0,733
Rio de Janeiro	0,716	1,000	0,195	1,000	0,728
Alagoas	0,831	1,000	0,078	1,000	0,727
Espírito Santo	0,738	1,000	0,168	1,000	0,726
Tocatins	0,786	0,997	0,123	0,990	0,726
Pará	0,739	1,000	0,161	1,000	0,725
Piauí	0,775	0,999	0,120	1,000	0,724
Bahia	0,799	0,997	0,096	1,000	0,723
Rondônia	0,729	0,999	0,160	1,000	0,722
Mato Grosso do Sul	0,722	0,999	0,162	1,000	0,721
São Paulo	0,728	1,000	0,143	1,000	0,718
Distrito Federal	0,756	1,000	0,108	1,000	0,716
Minas Gerais	0,734	1,000	0,119	1,000	0,713
BRASIL	**0,738**	**1,000**	**0,102**	**1,000**	**0,710**
Pernambuco	0,754	1,000	0,075	1,000	0,707
Ceará	0,722	0,998	0,055	1,000	0,706
Goiás	0,693	0,996	0,098	1,000	0,697
Mato Grosso	0,714	1,000	0,059	0,998	0,693
Paraná	0,691	0,996	0,045	1,000	0,683
Santa Catarina	0,670	1,000	0,036	1,000	0,676

In the ranking, it stands out that, with regards to this project and particularly the pilot metropolitan regions:

1. Santa Catarina, the state of the Florianopolis Metropolitan Region, is the most unequal state between men and women.
2. The two variables that really impact are economic and political.
3. Pará and Piauí, the states of the Belem Metropolitan Region and the Greater Teresina RIDE respectively, have very close contexts of gender inequality.

It is also important to highlight some points about the dimensions that characterize women within the urban space in each of the regions of this project. Regarding economic issues, the average monthly income of women is 23% lower than that of men if we consider the data for Brazil, whereas in RM Belém this difference is smaller (18%), but in RM Florianópolis and RIDE Teresina, it reaches 30% and 32% according to IBGE-PNAD 2020 data (Table 24).

Table 24 – Gender pay gap measure through the average monthly income (BRL)

Average real income from the main job, usually earned monthly, by persons aged 14 years old and over employed in the week of reference with labor income	Women	% of difference	Men
RIDE of Teresina	R$1,366.00	32.24%	R$2,016.00
MR of Belem	R$1,885.00	17.58%	R$2,287.00
MR of Florianopolis	R$2,665.00	29.46%	R$3,778.00
Brazil	**R$2,003.00**	**22.51%**	**R$2,585.00**

Source: IBGE- Rolling National Household Sample Survey (1st quarter of 2020)

Regarding education, according to the 2010 census data in Florianópolis, most women (and men) have high school and higher education certifications. Women with no education or who had not finished elementary school represented the same number of women who finished higher education, 10% at each end. Women represented 45% of the employees, with schooling directly impacting their

occupation. Of the employed women, 61% had completed at least high school or higher education. Most women with no education are employed as house-cleaners or self-employed. Of those who are employers, most have completed higher education.

In Belém, most women had finished high school (35%), although the rate of women with no education is equally relevant (32%). In general, men have worse schooling indicators than women, except the group of those who completed elementary school but not secondary education. Women represented 43% of the employees, with schooling impacting their occupation. Women who completed secondary education or higher education represented 58% of the total number, and they represent 58% of the total self-employed and 79% of house-cleaners. Education has different weights in both rural and urban contexts. In the urban context, schooled women represented 76% of employees, while in the rural context, schooled women represented 52% of the employees. All women employers (100%) were in urban areas.

In Teresina, most of the population (men and women) has no education or has not finished elementary school, and, in general, women are more educated than men. Women represented 44% of employees, with schooling impacting their occupation. Women with secondary education or more represented 53% of the total self-employed and 59% of the house-cleaners. In the rural context, 63% of women had no education, compared to 27% of women in urban areas. In addition, 76% of women in the urban areas are in the category of employees, while 100% of female employers are in urban areas.

The existence of secretariats, plans, and/or councils for women was analyzed in terms of the political dimension and planning of territories. The following observations were made with respect to the three GEF-7 territories chosen for intervention (Table 25):

- In the Greater Teresina RIDE, only two municipalities in the RM (including the capital) have a women's secretariat or targeted policies for women; only three municipalities have a women's municipal council; the percentage of representation of women in the Teresina city council is 14%, which amounts to four women among 28 seats.[189]
- In the Florianópolis RM, only the capital has a women's secretariat and specific plans; only three municipalities have a women's municipal council; two municipalities (Palhoça and Biguaçu) have specific policies to combat violence against women; the percentage of representation of women in the city council of Florianópolis is 4%, with only one woman among 23 seats.[190]
- In the Belém RM, three municipalities have a women's secretariat (42%); only one municipality has a specific policy plan for women; 60% of the municipalities (four) have women's councils; the percentage of representation of women in the city council of Belém is 11%, with four among 35 seats.[191]

Table 25 – Data on women's municipal secretariats, municipal plans and women's municipal council for all municipalities that are members of the RMs

Territory	Municipality	Does it have a Women's municipal secretariat?	Does it have a Women's municipal plan?	Does it have a Women's municipal council?
Florianópolis RM	São José (SC)	No	No	No
	Palhoça (SC)	No	No	Municipal Council for Women's Rights (COMDIM) 2014
	Florianópolis (SC)	Women's Municipal Coordination of Public Policies	Yes	Municipal Council for Women's Rights – COMDIM
	Governador Celso Ramos (SC)	No	No	No
	Biguaçu (SC)	No	No	No
	Santo Amaro da Imperatriz (SC)	No	No	Yes - 2018
	São Pedro de Alcântara (SC)	No	No	No
	Águas Mornas (SC)	No	No	No
	Antônio Carlos (SC)	No	No	No
Belém RM	Ananindeua (PA)	Women's Coordination of Public Policies– CMPPM/Ananindeua	No	Women's Defense Municipal Council (2020)
	Belém (PA)	Belém Women's Coordination created by Decree No. 63.033 of March 8, 2010	Women's policy plan (2014)	Women's Rights Municipal Council (1986)

[189] Source: compilation by Tewa from www.teresina.pi.leg.br/vereadores.
[190] Source: compilation by Tewa from www.cmf.sc.gov.br/vereadores.
[191] Source: compilation by Tewa from www.cmb.pa.gov.br/category/vereadores

Territory	Municipality	Does it have a Women's municipal secretariat?	Does it have a Women's municipal plan?	Does it have a Women's municipal council?
	Marituba (PA)	No	No	No
	Castanhal (PA)	No	No	Women's Rights Municipal Council of Castanhal
	Santa Izabel do Pará (PA)	No	No	No
	Benevides (PA)	No	No	Women's Rights Municipal Council (2019)
	Santa Bárbara do Pará (PA)	Women's Coordination of Public Policies in the municipality (bill n ° 105/2019)	No	No
RIDE Teresina	Teresina (PI)	Women's Rights Municipal Council	I Municipal Plan for Women's Public Policies (2015)	Yes
	Timon (MA)	Women's Municipal Secretariat of Timon (2014)	Municipal Plan for Women's Policies 2013/2015	Yes
	Demerval Lobão (PI)	No	No	No
	Altos (PI)	No	No	Yes
	Miguel Leão (PI)	No	No	No
	Beneditinos (PI)	No	No	No
	José de Freitas (PI)	No	No	No
	Monsenhor Gil (PI)	No	No	No
	União (PI)	No	No	No
	Lagoa do Piauí (PI)	No	No	No
	Lagoa Alegre (PI)	No	No	No
	Curralinhos (PI)	No	No	No
	Coivaras (PI)	No	No	No
	Pau D'Arco do Piauí (PI)	No	No	No

Specific needs of women in the intervention areas of the project

In addition to the absence of policies directed toward women, women are more vulnerable to disordered urban growth and form the majority of the population that is most susceptible to environmental impacts. Women are a minority in the political representation space, which results in a lack of recognition of their specific needs. Aspects of concern are as follows:

- Women are economically more vulnerable, with an average income 30% lower than that of men. Work without a formal link is performed mainly by black women.
- Women are underrepresented in the political sphere, with minorities in leadership positions representing 1% or less of employers.
- Studies on women as the main users of municipal public services (education, health, public security, mobility, and housing) are lacking, which directly impacts the understanding of the role of women as service users and affects women's access to alerts on specific protocols (for example, violence).
- Inequalities in the division of domestic work imply a greater burden for women, who undertake functions as caregivers and connectors, largely determining displacement to multiple destinations and with the predominant use of public transport and

walking. Although women are the main users of municipal services, women are only considered in politics when the subject involves combating violence against them.

- There is an absence of municipal data disaggregated by gender. This is both a national and local challenge.
- The gender theme was not found in any of the three territories in terms of the three primary instruments of urban planning: the master plan, urban mobility plan and municipal basic sanitation plan.
- There are currently limited gender considerations in planning, investment and management in cities
- Men and women experience cities differently.
- A city's urban form such as urban sprawl, a common challenge with sustainable urban settlements, and weak public transportation networks expose women to more risks.
- There is a clear need for improved governance and inclusive integrated planning processes.
- Public policies could burden disproportionately and impact negatively vulnerable groups such as women

Considering the challenges imposed by the COVID-19 pandemic, a consultation process with women in the metropolitan regions of interest was conducted as follows:

- Bilateral internet meetings with public managers in the areas of metropolitan integration and management of protected areas and natural resources;
- Workshops with the project coordination and development team (MCTI, UNEP, WRI, and Brazilian Biodiversity Fund - Funbio) supported by a consultant and the Tewa institution to conduct a SWOT analysis of the project and identify the strengths, opportunities, weaknesses, and threats of the project regarding gender;
- A workshop to validate the results of this analysis with public managers and actors from the RMs of Florianópolis and Belém and RIDE of Teresina.

2) Gender Action Plan

This gender action plan describes the gender response measures that will be implemented through the project to address gender issues, mitigate negative impacts and risks, and take advantage of opportunities to promote women's empowerment. To achieve a holistic approach to project implementation, a gender perspective will be incorporated into relevant activities, results, and products of the project rather than including isolated gender-oriented activities in different components. In this sense, the following activities with a gender perspective are proposed:

1. *Promotion of equitable governance*: Ensure that the decision-making process can promote a participatory approach and offer opportunities to include women and girls in decision-making processes for planning and implementing integrated actions and defining budgets.

2. *Institutionalization of gender perspective*: Evaluate and improve planning and budgeting processes to foster gender equity through regulatory and legal frameworks, programs, and plans.

3. *Promotion of peer-to-peer and inter-institutional exchanges involving decision-making bodies* with relevance for gender, environment and urban affairs (e.g. municipal councils, gender working groups, and research groups, among others) and Women's Municipal Secretariats/Coordination in activities predicted by the project, especially in the preparation of municipal plans, integrated planning, and women's training and leadership processes. Depending on the theme of the group, women's secretariat/coordination can act as a mediator and not just as a participant, with cases being evaluated individually.

4. *Sex-disaggregated data generation and/or analysis*: Ensure that all project data are collected in a sex-disaggregated manner where possible, are shared with the local advisory groups and are used to ensure gender perspectives in the final products.

5. *Consultation processes and participatory approach:* Recognize men and women from different social backgrounds as stakeholders and maintain broad consultations to identify and understand their challenges and needs in the context of specific interventions including the possible risks that those interventions may create. Publication of sociodemographic, economic, and political information on gender in an open format and allowing its download from the Internet for consultation.

6. *Promotion of women's financial autonomy*: In the case of programs involving payment for environmental services or funds, allocate a percentage to reduce gender vulnerabilities. For example, the Bolsa Floresta Program by the government of Amazonas State (Secretariat of Environment and Sustainable Development of the Amazonas State - SDS) and the Amazonas Sustainable Foundation (FAS). The latter program has a specific component among the four components for the payment of

women who commit toward not deforesting primary forests, participating in management workshops and measures to prevent fires, and ensuring the presence of children in school.

7. *Calls for proposals through the project incorporating gender perspective*: Notices issued for the selection of projects and/or solutions (e.g., Labs) must be structured to ensure the participation and selection of women proposal leaders with the goal of ensuring a minimum number of women in the composition of project teams.

8. *Promotion of communication, dissemination, and production of environmental education materials with a gender perspective*: When applicable, ensure that all communication, dissemination, and environmental education materials are produced incorporating a non-discriminatory gender perspective.

9. *Promotion of training actions and exchange of experiences with gender perspective*: Design actions, training programs, and exchange of knowledge from a gender perspective, including themes of business models and management for female leaders. Programs and training should be designed with a gender perspective, considering different interests, learning focus, and development of skills in men and women. Training actions shall also seek gender parity in the participation of the target audience and promote actions that enable the participation of caregivers (e.g., alternative times and room to receive children with caregivers).

The gender actions are summarized in Table 26. As sex-disaggregated social and economic data are not available in the territories, it is difficult to establish a baseline that anchors goals that can reflect reality. Thus, it is recommended that activities that generate gender data shall serve as a basis for reviewing the established goals, which shall be done periodically during project monitoring. The gender action plan will be tracked by the Project Management Team member: Communication and Gender Advisor.

Table 26 – Gender Action Plan

Project Outcomes	Outcome level Indicators	Baseline	End of project target	Responsibility	Means of Verification	Risks
Outcome 1						
Outputs 1.1, 1.4, 1.7 Ensure that digital platforms include gender-sensitive indicators, that measure gender-related changes in society over time. i.e. pointing to changes in the status and roles of women and men over time, and therefore to measure whether gender equity is being achieved.	# of digital modules incorporating gender-sensitive urban sustainability indicators	0 (no modules exist)	3 (modules fully operational) with gender-sensitive urban sustainability indicators	Local Advisory Group (LAG) with oversight of the PMT Communication and Gender Advisor	Website address of the platform and all pages, including spatial datasets, are fully functional	#2 Lack of local political support for developing the modules, plans and implementing the pilots reduces project impact #7 Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive
Outputs 1.2, 1.5, 1.8 Ensure that gender is mainstreamed into the developed integrated plans, so that such plans assess the implications for women and men of the planned actions, and that the planning process ensures that women's concerns and experiences, as well as men's, are an integral dimension of the plan's design, implementation and monitoring and evaluation.	# of integrated plans that assess the implications for women and men in the planned action and develops strategies to make women and men's concerns an integral dimension of the plan design and proposed processes for implementation and M&E	0	3 integrated plans that are gender-sensitive		Government records	
Outcome 2						
Output 2.1, 2.3, 2.4	% women engaged in the co-creation processes	0	50% women	Local Advisory Group (LAG) with oversight of the PMT Communication and Gender Advisor	Project records (communication activities and events reports with attendance list)	#7 Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive #4 Local communities and citizens resist participating in the interventions as they

Project Outcomes	Outcome level Indicators	Baseline	End of project target	Responsibility	Means of Verification	Risks
						do not find them useful or have concerns about their social, economic or environmental impact, leading to slower project execution and reduced impact
Output 2.2	# beneficiaries of the agroforestry production chain broken down by gender % min women	t.b.d.	At least 50% women	Local Advisory Group (LAG) with oversight of the PMT Communication and Gender Advisor	Project records and Protected area authority records	#2 Lack of local political support for developing the modules, plans and implementing the pilots reduces project impact #7 Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive
Output 2.5	# of implemented projects to improve management considering a differential gender role in them	0	3		Project records and Protected area authority records	
Outcome 3						
Output 3.1 Ensure financial mechanisms developed take into account the needs of women and men and ensure that women's as well as men's concerns and experiences are an integral dimension of the design, implementation, and monitoring and evaluation	# of gender-sensitive strengthened or developed financial mechanisms	0	1	CODUS, BNDES, FINEP, PMT Communication and Gender Advisor	Report of proposals submitted to national development banks	#5 Public and private financing institutions and private sector actors fail to engage in project activities, leading to reduced project impact #7 Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive
Output 3.3	% of women mobilized in consultations, awareness-raising activities among local communities and capacity-building efforts targeted at civil servants	0	50%	Local Advisory Group (LAG) with oversight of the PMT Communication and Gender Advisor	Project records and Protected area authority records	#7 Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive #4 Local communities and citizens resist participating in the interventions as they do not find them useful or

Project Outcomes	Outcome level Indicators	Baseline	End of project target	Responsibility	Means of Verification	Risks
						have concerns about their social, economic or environmental impact, leading to slower project execution and reduced impact
Outcome 4						
Output 4.3	% of women trained in topics related to integrated metropolitan planning, including through the Global Platform.	0	50%	PMT Communication and Gender Advisor	Attendance lists and training reports; training agenda; questionnaire to assess the skills acquired by training participants, number of accesses to the digital module.	#7 Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive

4. PRIVATE SECTOR ENGAGEMENT

The private sector is key partner in project implementation:

- For outputs 1.1, 1.4 and 1.7, the private sector will be a key partner, including as specialized consultants to be engaged for supplying software and developing the digital platform (the SIS+ system for all three metropolitan regions);
- For outputs 1.2, 1.5 and 1.8, the private sector will play a role in supporting the development of integrated and sectoral plans (climate mitigation plans, biodiversity plans, solid waste plan, among others) through specialized consultancy companies. These will undertake robust assessments and studies on the specific themes in connection with each plans to be implemented. More broadly, the local private sector will be an important voice in the development of these plans, ensuring that such plans take into account the needs of the local economy and may also respond to the availability of local skilled labor. It will be consulted throughout the participatory local planning processes.
- For outputs 2.1, 2.3 and 2.4, there will be numerous opportunities for the involvement of the private sector. For the pilot projects, co-creation workshops will be held in which the private sector will be invited to provide inputs into the identification and refining for execution of the pilot solutions. The private sector will also be a key actor in the provision and execution of the sustainable solutions in the pilot location, especially companies specialized in low-carbon urban solutions and sustainable building materials.
- For outputs 3.1 and 3.2, private financial institutions will participate in CODUS's work to strengthen and create financial instruments for accelerating sustainable urban development. In particular, the SMEs will play an important role in providing feedback on mechanisms that FINEP may create or strengthen, as FINEP focuses primarily on providing incentives for such private sector actors to participate in processes of innovation. Furthermore, on private sector banks, these will be play a key role in scaling up project interventions and will be involved through the Brazilian Federation of Banks (FEBRABAN). This is the main representative entity of the Brazilian banking sector, and will facilitate the participation of private sector local banks in project activities, including those of the states of Maranhão, Piauí, Pará, and Santa Catarina, and the cities of Belém, Florianópolis, Teresina and Timon. In particular, FERBRABAN will play a key role with regards to matchmaking actions between private financial institutions and proponents of sustainable urban projects (including through output 3.2). It will play a key role in the undertaking of output 3.1, as a member of CODUS.
- For output 3.3, the project will actively explore a collaboration pathway with COSANPA, the public-private sanitation company at Pará State to assess the feasibility of its engagement in the Utinga State Park financing mechanism.
- For output 4.1, the private sector may play a role in supporting the validation and identification at the local level of relevant sustainable urban solutions, including those that are commercially mature and thus ripe for scale-up. Private sector entities will also support training activities under output 4.3 in areas such as green finance and financial management.
- Furthermore, the private sector will be invited to participate in the local advisory groups (LAGs) and the Advisory Group of Specialists (AGS). See section 6 for further information.

5. RISKS

Risk is defined as the effect of uncertainty on project objectives. It is formulated in terms of "future events". Risks have been identified during project design through detailed stakeholder consultations and tools such as the UNEP Safeguard Risk Identification Form (SRIF), the gender analysis and the theory of change. A qualitative 1-5 scale has been used to characterize the likelihood (probability of occurrence: 1 = not likely, 5 = expected) and the negative impact on the achievement of project objectives (1 = negligible; 5 = extreme) associated to each risk. In accordance with the combination of likelihood and impact, each risk is assessed as low (green), moderate (yellow), substantial (orange) or high (red) as follows:

Table 27 – Risk Categorization

		Likelihood				
		1	2	3	4	5
Impact	5					
	4					
	3					
	2					
	1					

Climate and COVID risks are identified and discussed in the sections following this table.

Table 28 – Table of Project's Risks

#	Risk description	Main category	Risk level rating - probability	Risk level rating - impact	Risk mitigation Strategy and Safeguards	By Whom / When?
1	Weak inter-jurisdictional coordination and governance, including insufficient alignment of priorities, approaches and activities between various levels of actors, leads to ineffective execution of project activities and a reduced project impact	Institutional	Medium	Medium-high	To mitigate this risk during project implementation, a number of mitigation measures will be undertaken to promote and facilitate intra- and inter-jurisdictional integration. These include: 1. Creation of multi-stakeholder local advisory groups in each metropolitan region (see terms of reference in the section on institutional arrangements) 2. Creation of an advisory group of specialists (AGS) consisting of key national actors in the sustainable urban development space (see terms of reference in the section on institutional arrangements) 3. Specific outputs aimed at strengthening coordination 1.3, 1.6 and 1.9, on metropolitan region coordination, output 3.1 on national coordination on finance 4. Development of outputs which will be executed in consultation with different ministries and other national actors: outputs 3.1 and 4.3.	Project management team (PMT)
2	Lack of local political support for developing the plans and implementing the pilots reduces project impact	Political	3	4	Project design involved a detailed process of consultation with local governments, to ensure that project activities respond to their needs and to obtain local political buy-in. Local governments are fully supportive of the proposed project interventions. To mitigate this risk during project implementation, a LAG will be created to ensure local actor buy-in. The PMT will also work closely with the local governments, including by locating a project officer in each city. This person will have the function of maintaining close relationship with the local government and keeping it informed of project progress as well as keeping PMT informed of any possible changes in political priorities. Through this conduit and information, PMT will apply adaptive management to ensure local political support is maintained. Furthermore, PMT will highlight to the cities the international dimension of the project and its potential to raise the international profile of the cities as they cope with their commitments.	PMT, local governments
3	National elections in 2022 and municipal elections in 2024 result in some of the project's institutional stakeholders changing their priorities, leading to less institutional support for project interventions	Political	3	4	To mitigate this risk during project implementation, the PMT will establish local advisory groups (LAGs) and undertake highly participatory processes for project execution. These groups, which will consist of representatives of the local and provincial governments, academia and civil society (see executing arrangements), will build strong local identity and support for the project, ensuring it is protected against change political priorities. At the time of such elections, the PMT and UNEP Task Managers will also meet with the elected governments to ensure their buy-in of the project.	PMT, LAG, AGS, UNEP Task Managers.

#	Risk description	Main category	Risk level rating - probability	Risk level rating - impact	Risk mitigation Strategy and Safeguards	By Whom / When?
					At the national level it is envisioned that cities will continue to be of national priority. The AGS will serve to mitigate risks in changing priorities by preserving the project's identity and direction among governmental and non-governmental national actors.	
4	Local communities and citizens resist participating in the interventions as they do not find them useful or have concerns about their social, economic or environmental impact, leading to slower project execution and reduced impact	Social	1	4	The project is embedding strategies to associate local citizens in the design and implementation of the new urban services from the beginning of project execution. To mitigate this risk the project will undertake participatory and co-design processes for all local interventions, through the LAG. Furthermore, the PMT will monitor public's acceptance during pilots' design, and assess early results, and adjust with the local government the pilot design and incentives.	Project management team (PMT), local governments
5	A national financial or economic crisis affects national, provincial and local budgets and those of public financial institutions, leading to reduced co-financing, changing priorities and reduced investment	Economic	3	4	The project has been designed to draw on existing and planned investments and co-financing in each city. To mitigate this risk during project implementation, the PMT will regularly monitor the materialization of the expected co-financing, and will develop contingency plans in case of significant deviations. Furthermore, the CODUS will consider issues of resource mobilization, including as these may be affected by national economic crises, in its work to strengthen financial instruments for sustainable urban development.	Project management team (PMT), local governments
6	Public and private financing institutions and private sector actors fail to engage in project activities, leading to reduced project impact	Economic	2	2	The project has been designed to incorporate private sector directly in project activities (for instance, the pilots of outputs 2.1, 2.3 and 2.4, and CODUS in output 3.1). To mitigate this risk during project implementation, the PMT will undertake participatory processes for project design (co-creation) and execution, to ensure that private sector interests are taken into consideration.	Project management team (PMT)
7	Women do not participate effectively in project activities, leading to project outputs that are not gender-sensitive	Social	2	5	To mitigate this risk during project implementation, the PMT will hire a dedicated communication and gender officer who will implement the project's gender action plan and routinely inform all partners on progress in implementing the plan, particularly with respect to the project's gender targets. It will also run participative and gender-sensitive processes for developing and executing the outputs on project plans and pilots, to mitigate this risk.	Project management team (PMT)
8	Other Brazilian cities fail to engage in SIS+ or capacity-building activities, leading to reduced project replication	Political	2	4	To mitigate this risk, the PMT will execute a gender-sensitive communication plan and execution of its activities to inform federal, state, and municipal governments of SIS+ and capacity-building activities and promote the incorporation of more cities into the system. Furthermore, if needed the PMT will undertake consultations with governments of Brazilian metropolitan regions to further encourage their participation.	Project management team (PMT)
9	Project actions lead to environmental degradation or negative global environmental benefits	Environmental	1	5	To mitigate this risk during project execution, the PMT will monitor on a periodic basis project progress (minimum every six months) against the UNEP Safeguard Risk Identification Form. On a six-monthly basis it will also assess and identify any further risks in this area, and develop risk mitigation strategies to ensure such degradation or negative benefits do not occur. The UNEP Task Managers will consult	Project management team (PMT), UNEP Task Managers

#	Risk description	Main category	Risk level rating - probability	Risk level rating - impact	Risk mitigation Strategy and Safeguards	By Whom / When?
					with PMT on a six-monthly basis on this matter (through the half-yearly and project implementation review reports).	

1) Additional information related to the climate risk assessment

Climate risk assessment, climate risks and risk mitigation

Climate risk assessment and mitigation

According to the IPCC, risk is the "*potential for adverse consequences in which something of value is at stake and in which the occurrence and degree of an outcome is uncertain. In the context of climate impact assessment, the term risk is frequently used to refer to the potential of adverse consequences from a hazard related to the climate, or to the adaptation or mitigation of that hazard, in lives, livelihoods, health and well-being, ecosystems and species, economic, social, and cultural assets, services (including ecosystem services), and infrastructure. The risk results from the interaction of the vulnerability (of the system affected), its exposure over time (to the danger), the danger (related to the climate), and the probability of its occurrence*" (IPCC, 2018).

The 4th National Communication of Brazil to the United Nations Framework Convention on Climate Change (UNFCCC) is the official document that reports Brazil's efforts to implement the UNFCCC, coordinated by the Ministry of Science, Technology, and Innovation (MCTI). The document highlights important climatic risks such as a significant increase in temperature and in extreme drought events, floods, fires, and hotspots in all Brazilian biomes (Brazil, 2020).

Such projections are in line with information in the Open Government Partnership Report (OGP), an initiative of the Federal Government that disseminates and supports the exercise of government practices related to transparency, access to public information, and social participation (mobilization and articulation).[192] According to the report, led by MCTI related to Commitment 9 of the Open Government and Climate, the incidence of extreme climatic events has increased significantly in Brazil. Only in the period between 2013-2017, its environmental impacts were registered in 68% of the municipalities and, within those, 50% were associated with extreme climatic conditions of droughts, floods, storms or floods.

(i) How will the project's objectives or outputs be affected by climate risks over the period 2020 to 2050, and have the impact of these risks been addressed adequately?

According to 2017 data, Brazil is the 79th country most impacted by extreme weather events. The country rose ten positions in relation to the 2016 ranking within the scope of the Global Climate Risk Index[193]. Climatic risks in the country are also shown in the Germanwatch ranking, which places Brazil in 27th position in the climate risk index. Another example is the Notre Dame Global Adaptation Initiative index, which places Brazil as the 68th country regarding sensitivity and exposure to climate vulnerability and ability to adapt to the negative impact of climate change. The same index also ranks Brazil 124th regarding "climate readiness", considering its vulnerability in the following sectors: food, water, health, ecosystem services, housing, and infrastructure.[194]

Climate change impacts are being felt in Brazilian urban centers and have been increasing radically in recent years. The main problems involving climate change and cities include rising temperatures, rising air pollution, rising sea levels, heat islands, floods, water and food shortages, ocean acidification and extreme events.[195] Brazilian cities suffer annually with periods of extreme rainfall, which cause damage and loss to thousands of people. "Between 2013 and 2017, more than half of the Brazilian municipalities declared

[192] See e.g. https://www.opengovpartnership.org/documents/brazil-end-of-term-report-2016-2018-for-public-comment/ - accessed on 13 Jun 2021.
[193] For comparisons https://germanwatch.org/en/cri - accessed on 13 Jun 2021.
[194] See e.g. https://gain.nd.edu/our-work/country-index/ - accessed on 13 Jun 2021.
[195] PBMC. 2016. Mudanças Climáticas e Cidades. Relatório Especial do Painel Brasileiro de Mudanças Climáticas [Ribeiro, S.K., Santos, A.S. (Eds.)]. PBMC, COPPE – UFRJ. Rio de Janeiro, Brasil. 116p. ISBN: 978-85-285-0344-9

emergency or state of public calamity.[196] Data for the same period show that droughts affected about 48.6% of the municipalities, while floods affected 31% and flash floods or landslides affected 27%.[197] Estimates for the period between 1995 and 2017[198] point to an expenditure of approximately R$ 180 billion mainly on response and/or recovery activities in regions affected by these events. In January 2020, torrential rains in record volumes in southeastern Brazil caused losses up to US$ 570 million. Hence, extreme events in Brazil cause loss and degradation of existing infrastructure. In view of the scarcity of investments for the sector, this demands important government actions with the purpose of preventing these events from becoming a trend."[199]

Disaster risk and response management in Brazil has shown that thousands of municipalities suffer from these problems.[200] An estimate shows that around 51 million people were affected by these events in the country between 1995 and 2015.[201] It is a matter of concern that the number of municipalities that declared an emergency situation due to extreme weather events in Brazil grew by 35% in the first half of 2017 in relation to the same period in 2016.[202] Moreover, disaster reports in the municipalities have increased by 40% in the last ten years as opposed to the previous decades,[203]which may imply that this phenomenon has been worsening.

Extreme weather events will increasingly the need for municipalities have capacity to analyze and plan for reducing vulnerability and adapting to climate change. These events can cause and amplify negative effects for the population and the municipal infrastructure, especially in cities.[204] Green infrastructure can be important for temperature moderation and for reducing heat islands, floods and pollution, providing municipalities with more resilience.[205] This ends up resulting in economic gains by reducing the vulnerability of cities and the costs of adapting to climate changes and other environmental changes.[206] The integrated vision of green areas will be essential, for example, for cities to create resilience and be prepared to face natural or anthropogenic disasters.[207]

1. Hazards, vulnerability and exposure

Excess or scarcity of rainfall is primarily responsible for the physical processes that threaten Brazil's population and economic activities. Accordingly, the 4th National Communication of Brazil to the UNFCCC (4NC of 2020, as of UNFCC) identified droughts, floods, and coastal floods as the most critical climatic extremes events observed between 2014 and 2018, events for which cities are particularly vulnerable. The 4NC considers different scenarios of the negative impact of climate change at different IPCC representative concentration pathways (4.5 and 8.4), and refines them to small spatial scales of 20km lat-Ion, using the Eta regional model, the English Hadley Centre Global Environmental Model (HadGEM2-ES), the Japanese global Model for Interdisciplinary Research on Climate (MIROC5), and the Brazilian Earth System Model (BESM). This results and data of the 4NC was drawn upon for the elaboration of this climate risk analysis.

Historically, droughts in Brazil are more predominant in the Northeast region. The years between 2012 and 2017 marked the worst drought in history in the Brazilian semiarid region, with six consecutive years of rainfall below average. However, in recent years, this has also become a problem in the Central-West and Southeast regions. One example is the water crisis that hit the Metropolitan Region (RM) of São Paulo between 2014 and 2016 (*ibid.*). With regards to the project pilot metropolitan regions, although drought is a real hazard for all regions of the country, the most vulnerable RM (considering its geographic location) is the Integrated Development Region (RIDE) of Grande Teresina.

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[196] Marchezini, V. The Power of Localism During the Long-Term Disaster Recovery Process. Disaster Prevention and Management: An International Journal, 28(1), 143-152. 2019

[197] IBGE. Desastres Naturais: 59,4% dos Municípios Não Têm Plano de Gestão de Riscos. Perfil dos Municípios Brasileiros. 2018. Disponível em: https:// agenciadenoticias.ibge.gov.br/agencia-noticias/2012- agencia-de-noticias/noticias/21633-desastresnaturais-59-4-dos-municipios-nao-tem-plano-degestao-de-riscos.

[198] S2ID. Sistema Integrado de Informação de Desastres. Secretaria Nacional de Proteção e Defesa Civil. Disponível em: https://s2id.mi.gov.br/.

[199] Romeiro, V. et al. 2020. Uma Nova Economia para uma Nova Era: como construir uma economia mais eficiente e resiliente para o Brasil. Working Paper. São Paulo, Brasil: WRI Brasil.

[200] See e.g. CEPED-UFSC - Centro Universitário de Estudos e Pesquisas sobre Desastres da Universidade Federal de Santa Catarina. 2013. Atlas Brasileiro de Desastres Naturais – 1991 a 2012. Florianópolis: CEPED-UFSC. See also IBGE. 2018. Pesquisa de Informações Básicas Municipais - Perfil dos Municípios Brasileiros 2017. Rio de Janeiro: IBGE.

[201] CRED - Center for Research on the Epidemiology of Disasters. 2015. The Human Cost of Weather-Related Disasters 1995-2015. Bruxelas: CRED

[202] Vicária, L. 2017. Número de cidades em estado de emergência cresce 35%. O ECO. Disponível em: < https://www.oeco.org.br/reportagens/numero-de-cidades-em--estado-de-emergencia-cresce-35/?utm_source=wysija&utm_medium=email&utm_ campaign=Newsletter+-Diaria>

[203] Ceped-UFSC, 2013

[204] Pinto & Costa, 2020

[205] PBMC, 2016

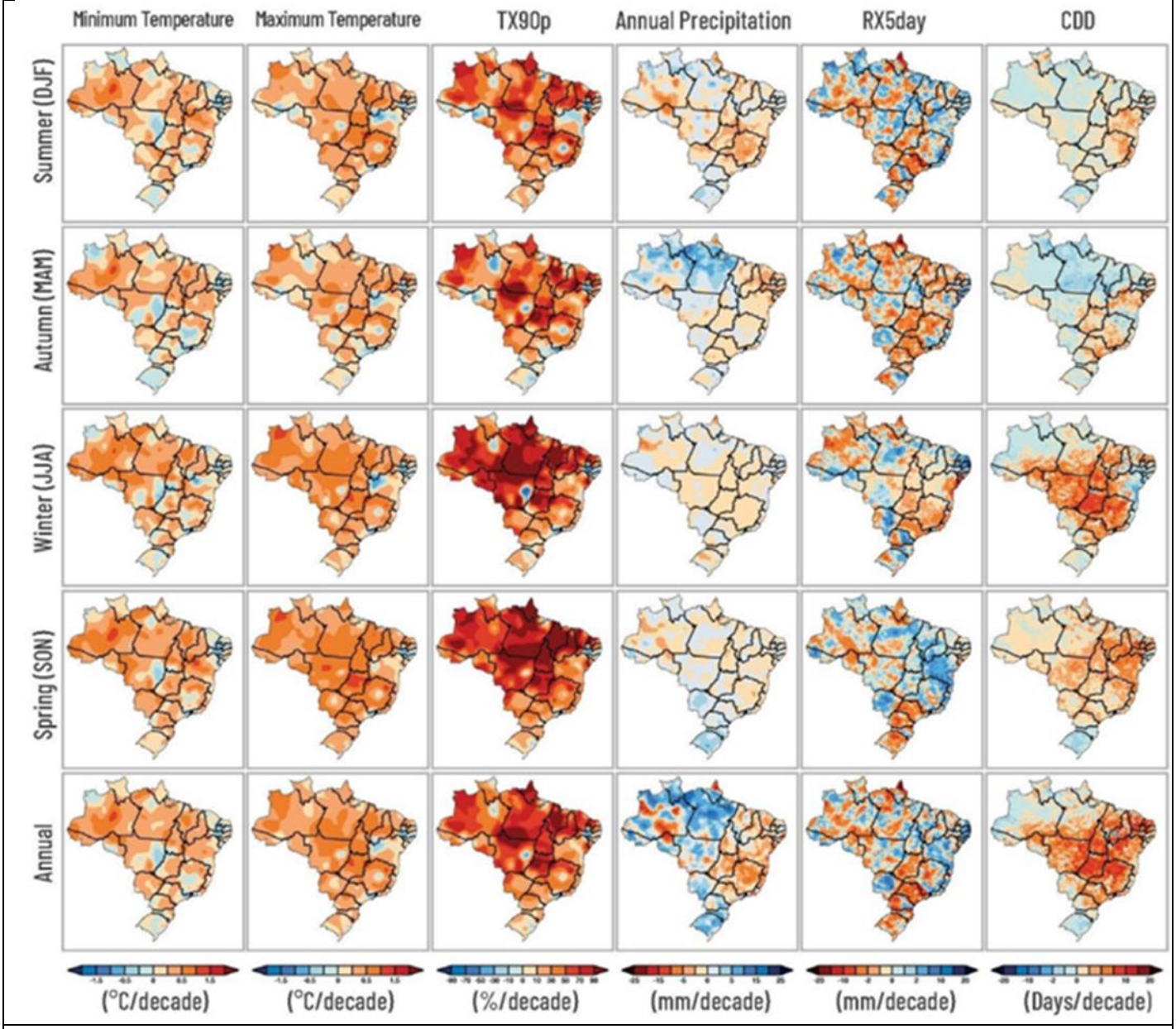
[206] Based on three sources: (i) Sanches, P. M. De áreas degradadas a espaços vegetados. São Paulo: Editora Senac São Paulo, 2014. (ii) Green, T. L. et al. 2016. Insurance Value of Green Infrastructure in and Around Cities. Ecosystems, 2016. doi: 10.1007/s10021-016-9986-x. (iii) Nielsen, A. B. et al. 2016. Spacial configurations of urban forest in different landscape and socio-political contexts: identifying patterns for green infrastructure planning. Urban Ecosystems, v. 19, p.1-14, 4 out. 2016

[207] Pinto & Costa, 2020

Analysis of flood incidence in Belém RM, Florianópolis RM and RIDE of Teresina as a possible climatic hazard is relevant mainly from the perspective of urban floods. These are related to environmental degradation, the process of urban expansion, and heavy rains, which are more intense and concentrated (Brazil, 2020 apud IPCC, 2007). Annual precipitation is expected to increase in the central-east part of the Northeast region, in the extreme of the North Region, and also in the South region (Brazil, 2020). The forecast of extreme precipitation events indicates increases in precipitation in the east of the Northeast region, much of the Central-West region, and in interspersed areas in the North region.

Table 20 presents the trends observed in temperatures and also in annual precipitation.

Figure 21 – Climatic trend in Brazil



Trends observed in minimum and maximum temperatures (degrees Celsius/decade); annual precipitation (mm/decade); number of days with maximum temperature above the 90th percentile - TX90p (% / decade); and maximum amount of accumulated precipitation in the period from 1980-2018.

Source: Brasil, 2020 apud CPC/NOAA - CHIRPS / CHC-SB

The analysis of hazards related to coastal zones shows interferences such as elevation of the relative sea-level, which causes changes in natural and man-made coastal environments, increases the vulnerability of people and goods, reduces habitable spaces, and causes vertical migration of the beach profile, among others (Brazil, 2020). Among the project pilot RMs, the Greater Florianópolis RM was one of the regions most affected by a storm surge (swelling sea) in 2016 (Brazil, 2020).

These hazards may be summarized as follows, drawing on the results presented in the 4th National Communication of Brazil to the UNFCCC:

> *• Increase in minimum and maximum temperatures of approximately 4.5 °C throughout national territory;*
> *• Reduction in precipitation volume in the North region of up to 35% and an increase of up to 30% in the South region and in the southern strip of the Southeast;*
> *• Increase in the number of consecutive dry days in the North and East of the Northeast region during summer and in the North of the Amazon and practically the entire Northeast region during winter. This situation shows precipitation reduction and precipitation volumes concentrated in a few days, that is, associated with extreme precipitation events;*
> *• Magnitude increase in maximum rainfall accumulated in a short time (approximately five days) in the Central-West, Southeast, and South regions during summer and in the northwest of the Amazon and the entire southern strip of Brazil during winter;*
> *• Substantial increase in extreme maximum temperatures in both summer and winter in all regions of the country, although this increase is less pronounced in the South during winter.*
>
> *Source: Brazil, 2020* (*ipsis litteris*).

The analysis on climate tendencies in Brazil has shown vulnerabilities are directly related to changes in temperature and precipitation. According to the World Bank, Brazil's key vulnerabilities to climate change are:[208]

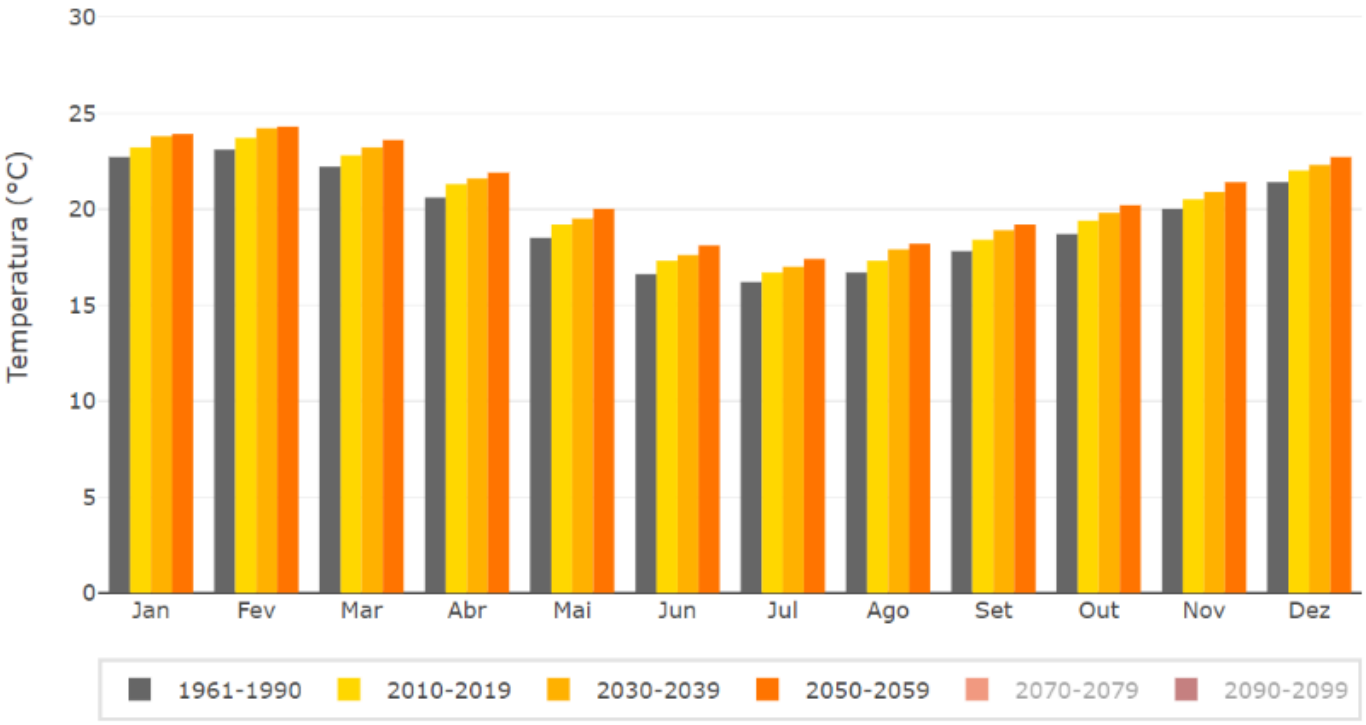
- Flooding: Floods in Brazil usually occur during La Niña years and years with warmer than average sea surface temperatures in the tropical South Atlantic. Urban areas are most susceptible to flooding.
- Droughts: The northeast region has a long history of destructive droughts. It is highly susceptible to droughts due to its strong seasonal hydrological deficit, low adaptive capacity and persistent poverty. Dry season droughts are also more dangerous because of the potential for fueling wildfires, which are common in ecosystems and forests that are in close proximity to slash-and-burn type agriculture.
- Frost: Another climate hazard that is commonly experienced in the temperate region of southern Brazil is frost, which commonly occurs during winter and can be a potential threat to agriculture and industrial plantations. Thus, under a future warmer climate, these regions are at risk of degradation.[209]

2. Hazards for the project metropolitan regions

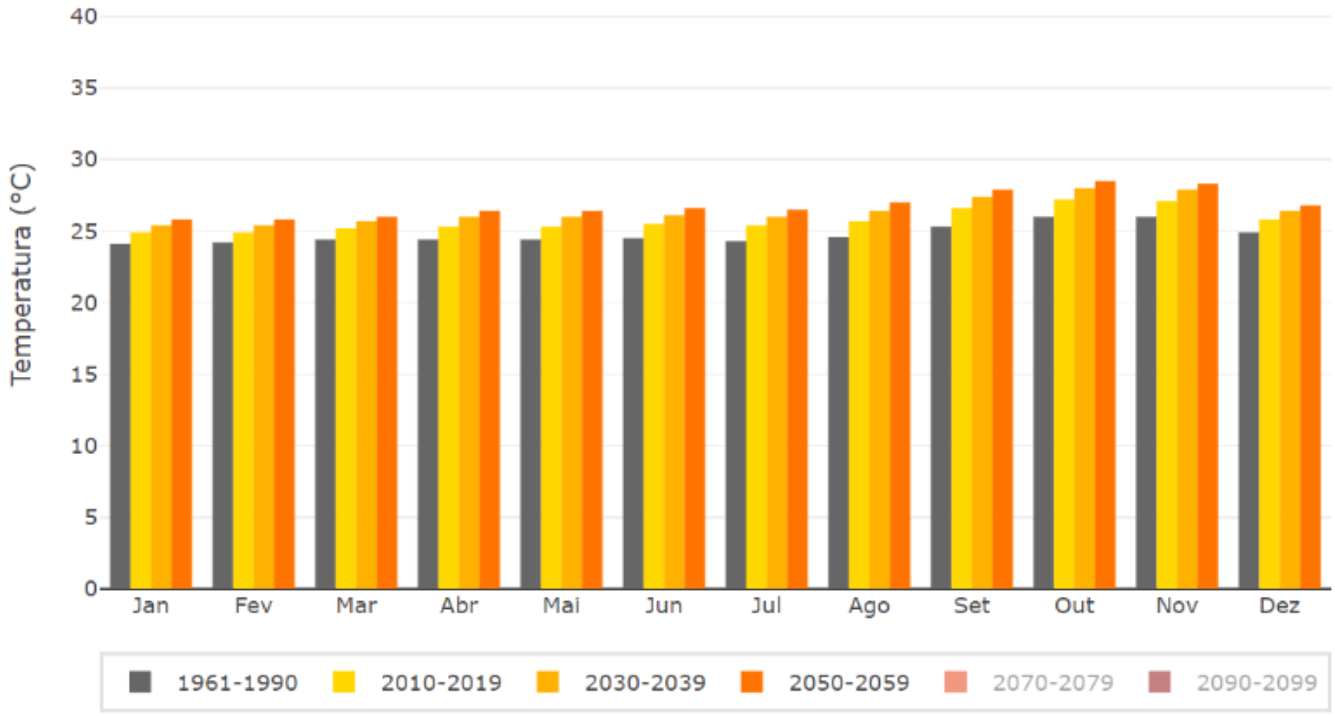
The graphs below show variation in the average monthly temperature (Figure 22) and in average monthly precipitation (Figure 23) of the metropolitan regions of the project. The tables presented below report the average temperature and precipitation in the months of February and July for the periods of 1961-1990, 2010-2019, and 2030-2039.

[208] https://climateknowledgeportal.worldbank.org/country/argentina/vulnerability
[209] Ibid.

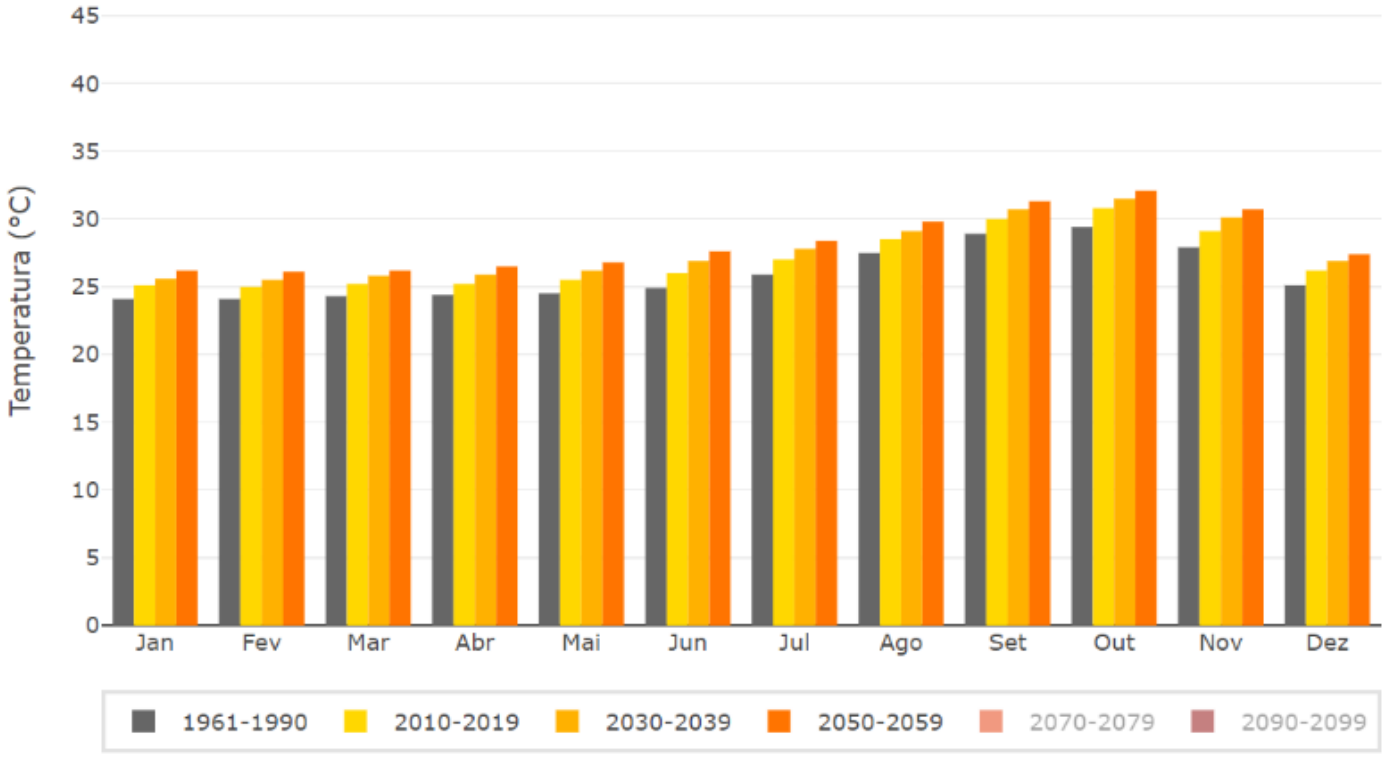
Figure 22 – Variations in Climatic patterns for the project's metropolitan regions: Temperature



(1) Florianopolis



(2) Belém



(3) Teresina

Source: Adapted from Mudanças Climáticas Brasil.[210]

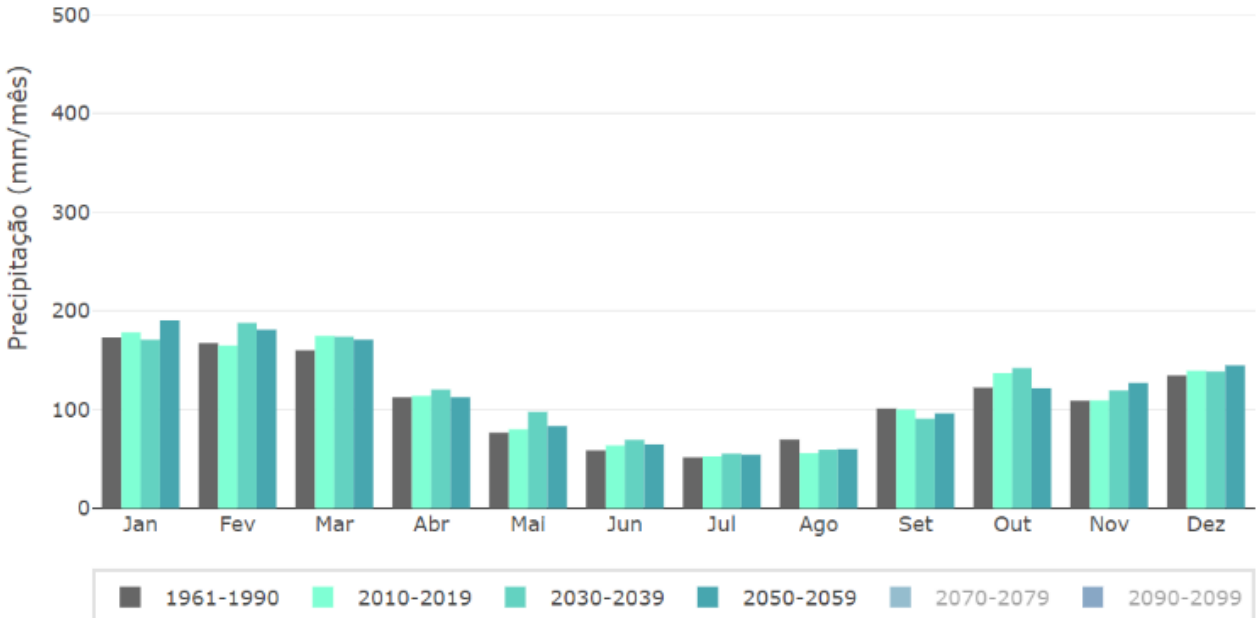
Table 29 – Averages and forecasts of average monthly temperatures in Florianópolis, Teresina, and Belém in ºC

	1961-1990		**2010-2019**		**2030-2039**	
	February	July	February	July	February	July
Florianópolis	23.1	16.2	23.7	16.7	24.2	17
Teresina	24.1	25.9	25	27	25.5	27.8
Belém	24.2	24.3	24.9	25.4	25.4	26

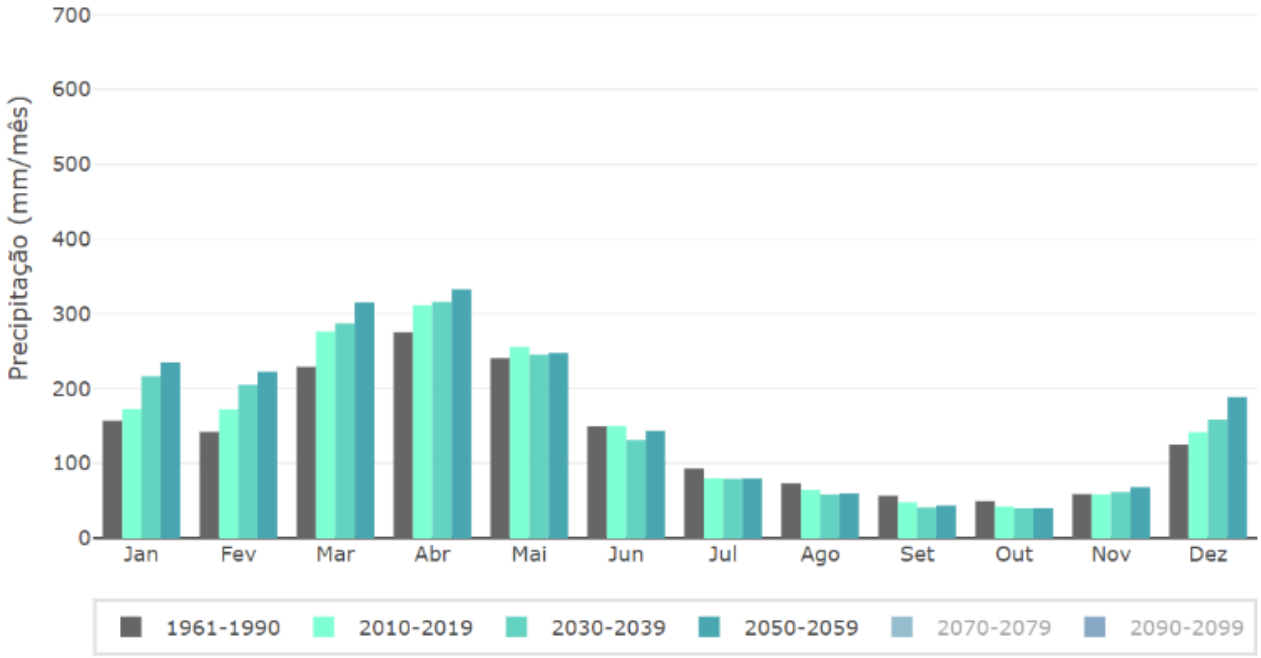
Source: Adapted from Mudanças Climáticas Brasil.

[210] https://mudancasclimaticasbrasil.com/index.html

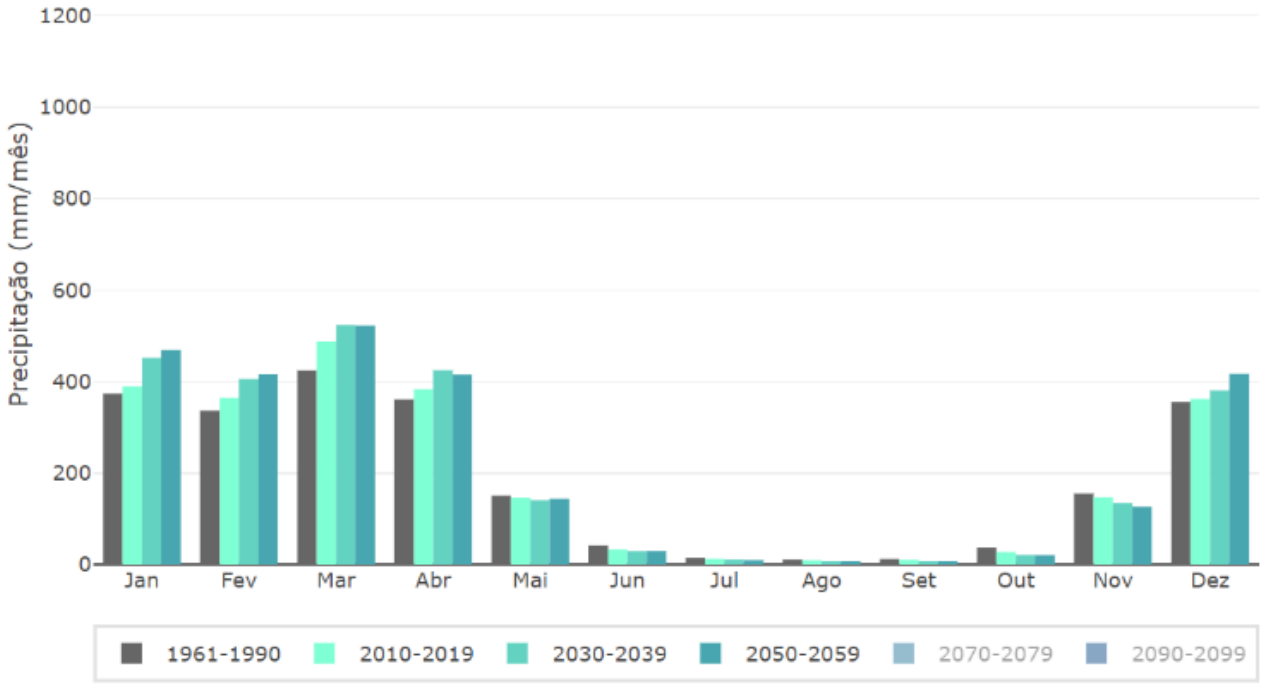
Figure 23 – Variations in Climatic patterns for project's metropolitan regions: Precipitation



(1) Florianopolis



(2) Belem



(3) Teresina

Source: Adapted from Mudanças Climáticas Brasil.

Table 30 – Averages and forecasts of average monthly precipitation in Florianópolis, Teresina, and Belém in mm/month

	1961-1990		**2010-2019**		**2030-2039**	
	February	July	February	July	February	July
Florianópolis	167.3	51.7	165.1	52.7	187.8	55.5
Teresina	336.3	14.7	364.2	12.3	405.5	10.4
Belém	142.1	93.3	172.4	80	204.9	79.4

Source: Adapted from Mudanças Climáticas Brasil, undated

In a sectoral context, water, energy, food, and socio-environmental security are pointed out as highly vulnerable areas. On this regard, a few key examples of impacts provided by the Brazilian Government, in the fourth national communication, are the change in the availability and quality of the water resources; the changes in the hydroelectric power generation and its impact on the electricity matrix, and the changes in the wind and solar energy resources are some examples of potential impacts related to the energy security. Furthermore, some examples related to food security are changes in food supply and demand, losses, and increased costs in the agricultural production chain. Finally, socio-environmental security might be impacted due to alteration of habitats and biodiversity and loss of ecosystem services (Brazil, 2020).

3. Climate risks to project execution

Climate change caused hazards may lead to risks in the execution of project activities primarily in component 2, the project pilots, which involve the greatest concentration of physical activity in the cities. Furthermore, climate hazards may lead to reduced impact of the execution of plans and financial mechanisms of components 1 and 3. In this context, key climate risks in the pilot cities are due to the following:

- Increased temperature in Belem, Teresina and Florianopolis
    - Presents a risk to the success of project actions to promote the uptake of non-motorized transport, as the public may find it too hot to use bicycles and walk between destinations;
    - Presents a risk to the success of project actions to reduce city heat island effect, causing a continuation of the desertification of the city centre;
    - Presents a risk to the success of project actions to increase the energy efficiency of buildings, as the public increase the use of cheap and in-efficient air conditioners to provide acceptable internal ambient temperatures.

- Increased precipitation and extreme weather events in Belem, Teresina and Florianopolis
    - Presents a risk to the success of project actions to promote the uptake of non-motorized transport, leading to a continued usage of individual vehicles.

Sea-level rise and frost, although identified as key hazards in previous sections, are not perceived to lead to significant risks to project execution. While sea-level rise is an important hazard for Florianopolis, it is not perceived that it presents a key risk to the successful execution of project actions in the short- to medium-term. Based on the above analysis, it is deemed that the project has a low risk to be negatively impacted by climate change in the long-term until 2050, and a moderate risk in the longer term.

4. Measures to manage risks

Measures to mitigate the impact of the aforementioned risks have been incorporated into project design.

In component 1, the plans developed in component 1 will consider a long-term horizon and as such will need to take into account potential changes in climate. The GIS platforms developed in the same component will include valuable information to help tracking these changes and their impacts, supporting town-planners to plan effectively to mitigate the negative impacts of the identified hazards.

On component 2, the mitigation pilots have been chosen to occur in dense urban areas that are generally less prone to events such as flooding. However, they may be more susceptible to the effects of heatwaves in urban areas, which are particularly severe due to the heat island effect. The project is addressing this in all cities through the design of low-emission zones that mitigate this effect and make environmental conditions for walking, cycling and public transport more attractive for potential users. Tourism can also be negatively affected by extreme temperature and heatwaves, and the project will integrate these aspects within the design of sustainable tourism practices in Belem.

In component 3, the project will support public financial institutions to create new and strengthen existing financial instruments so that they more effectively take into account climate and green criteria, as related to the potential impact of investments and also as to how they will build urban resilience and reduce vulnerability. Related risk modelling will play an important role in designing such instruments.

On component 4, SIS+ will play an important role in supporting local governments to identify and prioritize solutions that support municipalities and metropolitan regions to strengthen urban resilience and enhance the effectiveness of adaptation to climate change.

Specific measures to manage climate risk in each of the cities for the mitigation pilots is as follows:

- *Belem.* The proposed intervention area is located far from the river and as such will not be susceptible to river flooding. The location of the low-emission street is susceptible to heat island effect and directly aims to address this, as well as support improvement to sewerage infrastructure (reducing transmission of infectious diseases);
- *Florianopolis*. The proposed intervention area is in the continental part of the municipality, on an area more than 5 metres above sea level. As such, it will not be susceptible to sea flooding. The location of the sustainable district is susceptible to heat island effect and directly aims to address this;
- *Teresina*. The proposed intervention area is located far from the river and as such will not be susceptible to river flooding. The location of the low-emission city block is susceptible to heat island effect and directly aims to address this.

(ii) Has the sensitivity to climate change, and its impacts, been assessed?

Yes. The text above has considered the project's sensitivity to climate change at different IPCC representative concentration pathways (4.5 and 8.4). The likelihood for the project to be affected by changes in climate is low, with low sensitivity in the short- to medium-term until 2050 and slightly increasing afterwards in the long-term.

(iii) Have resilience practices and measures to address projected climate risks and impacts been considered? How will these be dealt with?

As noted above, the project aims to manage climate risk through careful pilot site selection and consideration of potential risks into pilot and intervention design. The project also intends to build-up urban resilience by introducing integrated planning practices and deploying sustainable practices in a variety of sectors with the aim of reducing social vulnerability, fuel dependence, use of natural resources and pressure on natural ecosystems. Together, these practices reduce the economic dependence of cities (e.g. on fossil fuels and their price volatility), increase the attractiveness of cities for investors and visitors, and create new and more resilient development opportunities, based on local assets (for instance, sustainable farming, sustainable tourism and sustainable waste management

principles). The project includes greening initiatives in the participating cities (through reforestation and interventions to reduce emissions), providing protection and increasing the resilience of the targeted areas to flooding and heatwaves.

(iv) What technical and institutional capacity, and information, will be needed to address climate risks and resilience enhancement measures?

Cities will require technical and institutional capacity to forecast weather events and long-term trends and to develop strategies for mitigating such risks and building urban resilience. The project strengthens city preparation for managing climate risks by supporting them to develop integrated plans, which will require cities to consider all potential influences on urban development (e.g., including potential climate impacts) and develop strategies and action plans to facilitate sustainable urban development. The development of integrated georeferenced platforms will further serve to support the cities in undertaking monitoring and evaluation of urban development, including as may be affected by climate impacts. These platforms, connected to external databases, will provide data on key sectors, providing information complementary to that acquired on weather forecasting.

2) COVID implications analysis

The COVID-19 and new trends: challenges and opportunities

In a bulletin dated March 2021, Oswaldo Cruz Foundation (FIOCRUZ)[211] warned about the worrying trends and challenges ahead related to the COVID-19 pandemic, in addition to calling the attention to a gender bias related to it.

Even before the COVID-19 pandemic, a trend towards emptying large urban areas had been observed. Brazil already had urbanization trends that pointed to population growth in the peripheries of metropolitan regions, especially in medium-sized cities, expanding the urban sprawl of metropolises at the same time as the central and infrastructural urban areas are emptied out.

At the national scale, data points out new population growth frontiers in the Northern region of the country and in the Amazon region. The country is witnessing an urbanization process in regions that had hitherto been much less densely populated, carrying with this movement ingrained trends of urban sprawl. In addition, data related to urban settlements show particularly worrying trends in the poorest areas of the country. These areas often stage urban conflicts that are the result of a legacy of social inequalities and that today characterize most Brazilian cities.[212] These conflicts could be aggravated.

In this sense, the COVID-19 pandemic serves to magnify and make more explicit pre-existing social disparities and urban management inefficiencies. It also accelerates trends that were already being consolidated. The pandemic enhanced the importance of polycentric urban territories and of self-sustaining neighborhoods. It also reinforced calls for availability of infrastructure and incentives for sustainable and clean mobility. Smart urban development is more than ever high on the agenda of urban managers throughout Brazilian cities. This only stresses the need for public policies to face the socioeconomic and health crisis.

Added to the historical challenges are the challenges presented by the advancement of technology and the worsening of climate change, two fundamental themes up for debate concerning urbanization today. Thinking about digital transformation while thinking about socio-environmental justice. The conclusion so far is that they are both a challenge and an opportunity to leverage integrated urban planning and that they can be leverage as a powerful tool for tackling the COVID and post-COVID challenges.

A. Risk analysis

The COVID-19 pandemic had a hard hit on cities worldwide. Urban administrations are facing challenges such as high unemployment rates, rising inequality, health system issues, among others. When also considering the challenges imposed by climate change, it is urgent that the national, subnational/local governments step up in order to build back better through a green economy recovery. The COVID-19 pandemic affected all Brazilian cities. According to the Ministry of Health (MS), between March 27, 2020 and February 21, 2021 in Florianópolis, there were more than 55 thousand cases. In Belém, the number of cases has exceeded 71 thousand and in Teresina more than 60 thousand COVID-19 cases (Brazil, 2021). The following table presents information on COVID-19 data for the states of the project pilot metropolitan regions, made available by the Ministry of Health.

[211] https://portal.fiocruz.br/en/news/brazil-faces-worst-scenario-beginning-pandemic.
[212] Kazuo Nakano. Tendências da urbanização brasileira: o desafio de reterritorializar nossas cidades. Serviço Social e Saúde, Campinas, SP, v. 3, n. 1, p. 39–50, 2015

Table 31 – COVID-19 data for the states of the project pilot metropolitan regions (February 2021)

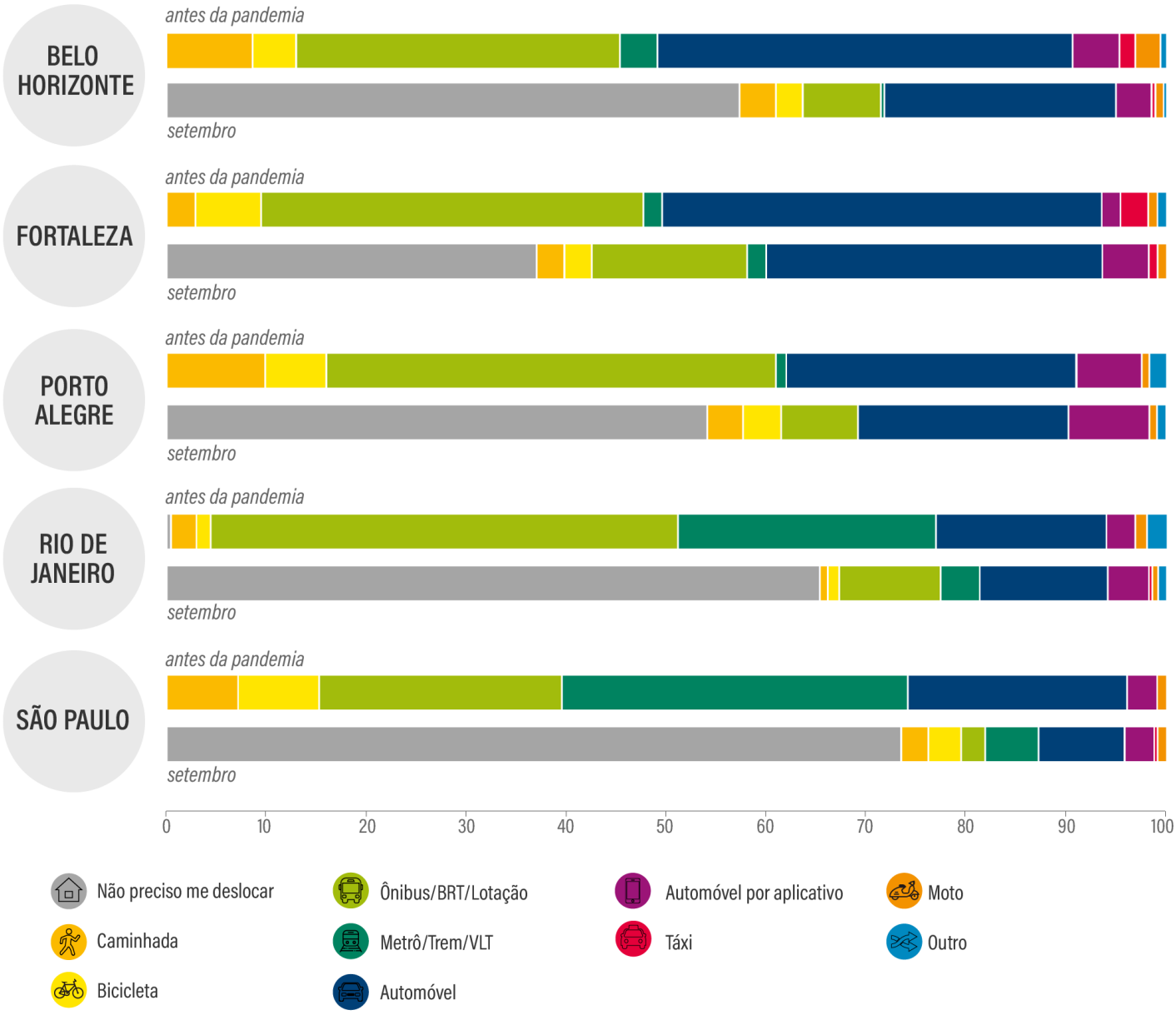
	Total					Metropolitan region				
	Population	Accumulated cases	Accumulated cases per 100,000	Accumulated deaths	Accumulated deaths per 100,000	Population	Accumulated Cases	Accumulated cases per 100,000	Accumulated deaths	Accumulated deaths per 100,000
Total	19,040,880	1,163,577	6,111	18,481	97	4,611,427	278,834	6,047	5,986	130
PA	8,602,865	355,128	4,128	8,278	96	2,510,274	95,600	3,808	3,539	141
PI	3,273,227	169,465	5,177	3,242	99	1,054,795	70,550	6,689	1,473	140
SC	7,164,788	638,984	8,918	6,961	97	1,046,358	112,684	10,769	974	93

Source: Brazil, 2021[213]

Urban dynamics in Brazil were highly impacted by the COVID-19 pandemic. The graph below shows a significant travel reduction in different Brazilian cities, as well as a change in the transport modes used. It can be observed, for example, that public transport use decreased, commuting by private car and by application increased, and bicycle use increased (Pasqual and Petzhold, 2020).

Figure 24 – Changes in the modal distribution before the pandemic and as of September 2020

[213] https://susanalitico.saude.gov.br/extensions/covid-19_html/covid-19_html.html.

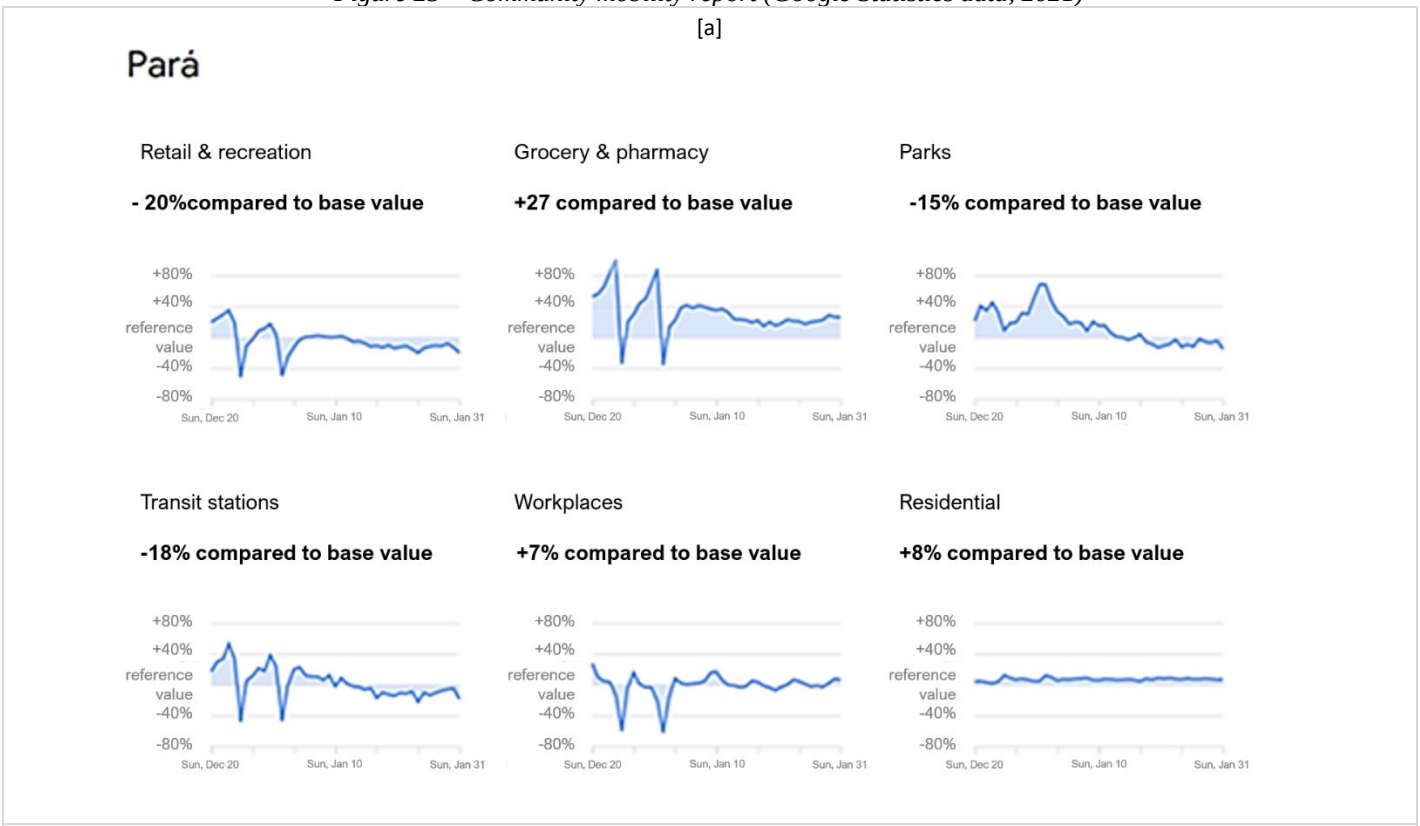


Source: Pasqual and Petzhold, 2020 apud Coe BRT + (PUC Chile).
Grey = no need to leave the home, light green = bus; purple = car through an application; dark orange = motocycle; light orange = walking; dark green = subway or train; red = taxi; blue = other; yellow = bicycle; dark blue = private vehicle.

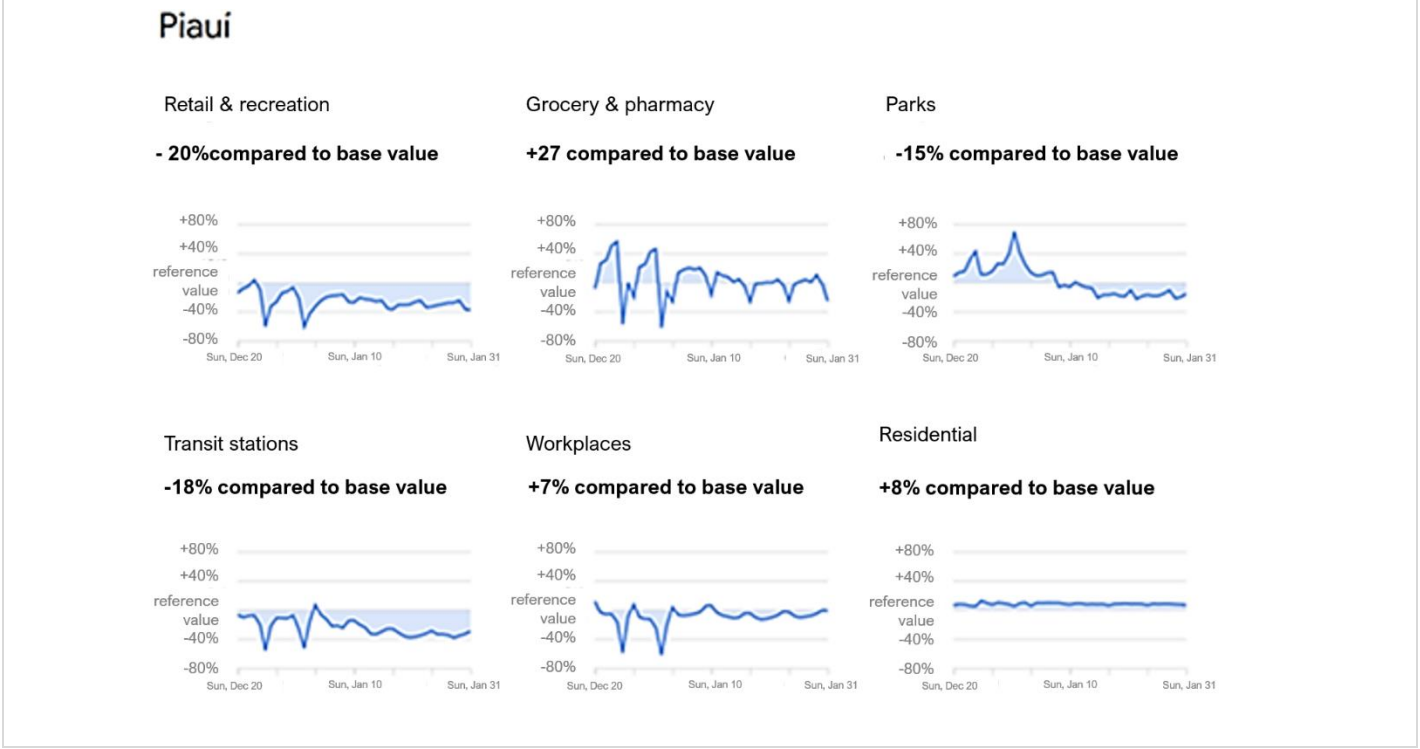
Google Statistics presents periodic data on the COVID-19 pandemic in the “Community mobility report”. The objective of generating this data on changes in mobility is to reduce the impact of COVID-19, presenting information on changes that are being perceived in relation to mobility for supermarkets and parks, for example, in each geographic region. Figure 25 shows data for the states of the project pilot metropolitan regions: [a] Pará, [b] Piauí, and [c] Santa Catarina:

Figure 25 – Community mobility report (Google Statistics data, 2021)

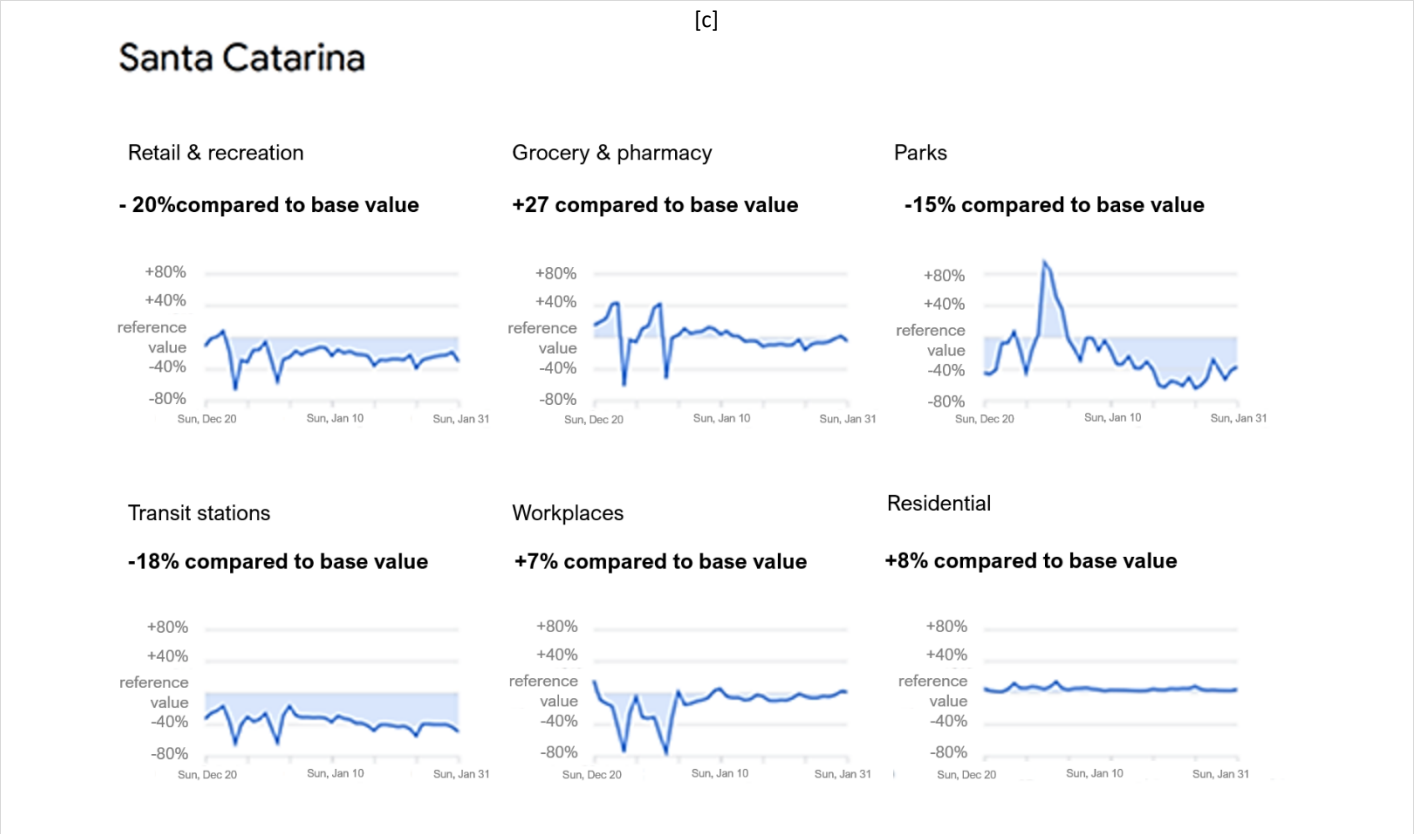
[a]



[b]



[c]



Since the GEF-7 Project deals directly with the development of integrated urban planning policies and actions, the perception and incorporation of these changes in urban logistics and their strategy are fundamental to mitigate risks, as well as to identify ways to enhance their actions.

The following are the main challenges related to the COVID-19 pandemic identified for the project:

- Low prioritization by public agents and local actors regarding the activities of the project in face of the urgencies resulting from the COVID-19 pandemic in the RMs aforementioned. Resource targeting (human and financial) to minimize the crisis caused by the pandemic can decrease the availability of efforts to implement the actions of the project. Although this risk applies to different activities and phases of the project, it is important to highlight the impact of this risk on the various actions that require the dialogue of different stakeholders with different priority agendas.

- Challenges for engaging stakeholders and civil society due to the social distancing required by the pandemic. The actions of the project intend to directly influence the quality of life of the populations that inhabit the metropolitan regions. Thus, strong dialogue between the different governmental actors involved in the project and an intense participatory process is essential. Among actions of the project, it is important to highlight the workshops for participation in the pilot projects of Component 2. Challenges of this nature could prove particularly material to local communities who reside in protected areas for the community-based tourism pilot in Florianopolis and agroforestry pilot in Belem. Both these activities, most notably the tourism dimension are contingent upon some sense of normality returning. A continued unstable outlook in Brazil in relation to COVID could also impact all activities involving protected areas in Components 1, 2 and 3 as the very accessibility to these areas to initiate activities represents a barrier.

- Challenges on data management, since the context of the pandemic can lead to possible distortions in the baseline mapping of project plans and actions. For example, data collection for elaboration of the plans predicted by Component 1 and the monitoring indicators of the ex-ante and ex-post scenarios of the implementation of the pilot projects predicted in Component 2.

- Less availability of financial resources, since financial entities may prioritize projects linked to income security and support to small and medium entrepreneurs in the short term, and promotion of post-pandemic economic recovery (green or brown) in the medium-term, which can limit the space for financing sustainable urban development.

B. Mitigation measures

Key measures to mitigate risks include the following:

- Develop strategies to ensure local city focal points are aware of the project's potential to support COVID-19 pandemic recovery and are constantly engaged in the project, even during times of increased pandemic intensity. The local advisory group (LAG) will play a key role in this regard. The LAG will facilitate a close monitoring of city focal points by creating sub-goals and activities and dividing activities according to the municipality's response capacity. It will also reinforce the importance and benefits of the actions of the project, demonstrating, for example, how project actions related to sustainable development and green recovery can be a way to overcome the challenges imposed by the COVID-19 pandemic. In this sense, monitoring of the project indicators will be essential to highlight the results of the actions of the project, strengthening monitoring and engagement actions.

- Greater use of alternative means of communication and engagement, such as online platforms and social networks. Project execution will start at a period when several people will already be familiar with this type of communication, facilitating the process. However, it is important to strategically define the best communication model to be adopted in the different products of the project. The project communication activities will consider this, as well as take into account people who do not have access to the internet or have little knowledge of how to use it;

- Data accuracy: changes in urban dynamics must be identified in order to ensure that the data used reflect the usual reality using, for example, averages from the last few years or even making estimates based on the available data. The identification of possible data changes, as well as the risk mitigation strategy, shall be defined together with the technical specialists hired to execute the project activities.

- Close monitoring of sustainable financing opportunities available to financial entities involved in the project, to support such entities to promote financing of a green recovery and avoid promotion of a non-sustainable and high-emission economic rejuvenation.

C. Opportunity analysis

The aspects below can enhance the objectives of the project:

- The GEF-7 project has the opportunity to support Brazil in undertaking a green economic recovery post-pandemic. In particular, the actions of component 1, on supporting cities to undertake integrated planning processes, of component 3, on supporting public financing institutions to strengthen sustainable financing mechanisms, and of component 4, on supporting cities to identify validated sustainable solutions and build capacity. All of these actions can support the pilot cities and cities through-out Brazil to kick-start local economies post-COVID, in a way which considers environmental and social benefits in addition to those that are economic. A study coordinated by WRI Brasil in partnership with New Climate Economy (NCE) indicates a possible gain of Brazilian Real $2.8 trillion in the Brazilian GDP by 2030 if changes are adopted for a low emissions economy compared to the normal growth trajectory (Romeiro et al., 2020).

- In this context, both BNDES and FINEP currently are implementing financing lines to support actions to address COVID. [214] By working with these partners, the project has a key opportunity to shape the economic recovery, supporting such financial institutions to promote lines with strong incorporation of sustainable principles and criteria.

- The increased digitalization of the Brazilian population and local government working modalities presents an opportunity for the effective adoption of the metropolitan digital modules and use of SIS+. Just a year ago many local governments would struggle to connect to online calls. The pandemic has forced a quick upgrading of skills of all local administrators, which paves the way for more openness to adopting and using the project-created online planning tools.

- Another key opportunity is for the project to build upon and support national initiatives promoting a green recovery from the pandemic. Since March 2020, the national government has adopted measures to support citizens and economic sectors most hit by the pandemic. With regards to promoting economic recovery, the government has not announced a single plan or strategy, but through its Ministry of Economy has announced a series of measures for support income resilience and recovery. These include

[214] http://www.finep.gov.br/chamadas-publicas/chamadapublica/642.

direct payments to low-income citizens which have lost income due to the pandemic, as well as emergency credit lines for withstanding reduced income and for triggering an economic recovery.[215] The credit lines are provided through BNDES, Caixa Economica and Banco do Brasil. In this sense, one of the key opportunities here is as noted above and will be seized upon through output 3.1 – that of working with these key financial institutions to support them in making available financial mechanisms that promote and facilitate a green economic recovery. The government has also been working on a project entitled "*Health, Economy and Climate Change facing COVID-19 in Brazil: socioeconomic impacts and the role of mitigating GHG emissions in the economic recovery*" to identify the socio-economic impacts of social isolation measures imposed by COVID-19 with the goal to define short and long-term public policies to mitigate the impacts caused by the pandemic. It will address all five regions of Brazil and contemplate the importance of low emission policies to overcome the current economic crisis, partly invoked by the pandemic.

- An opportunity is related to observed changes in transport modal use. The implementation of projects will occur at a time when there is a greater share of the population using non-motorized modes for urban displacement. In other words, there is a greater number of people potentially benefited by the project than in a pre-pandemic scenario. In addition, this greater number of beneficiaries can contribute to encourage the replication of pilots in other locations in the city.

- The pandemic has had significant impacts on the relationship between humans and the natural environment, in terms of physical and mental connection. Among other examples, many people have increased the amount of time spent in green areas, including as a means of congregating safely. These experiences can be built upon by the project to enhance its overall urban-nature connectivity objectives.

[215] See https://www.gov.br/economia/pt-br/acesso-a-informacao/perguntas-frequentes/covid-19 and https://www.tesourotransparente.gov.br/visualizacao/painel-de-monitoramentos-dos-gastos-com-covid-19.

6. INSTITUTIONAL ARRANGEMENT AND COORDINATION

1) Institutional arrangements

The institutional arrangements for project implementation are presented in the following figure.

Figure 26 – Institutional arrangements of the project

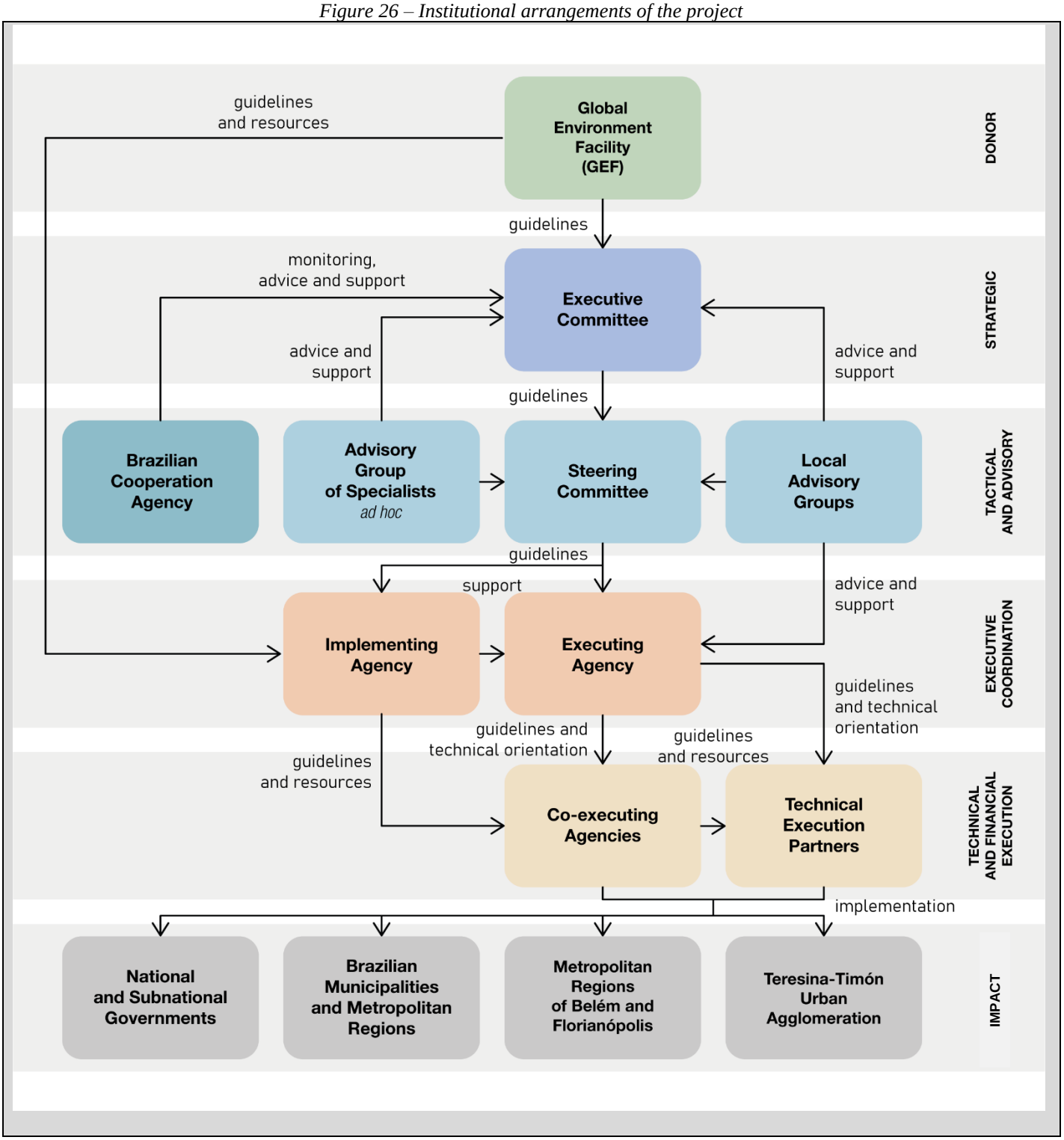
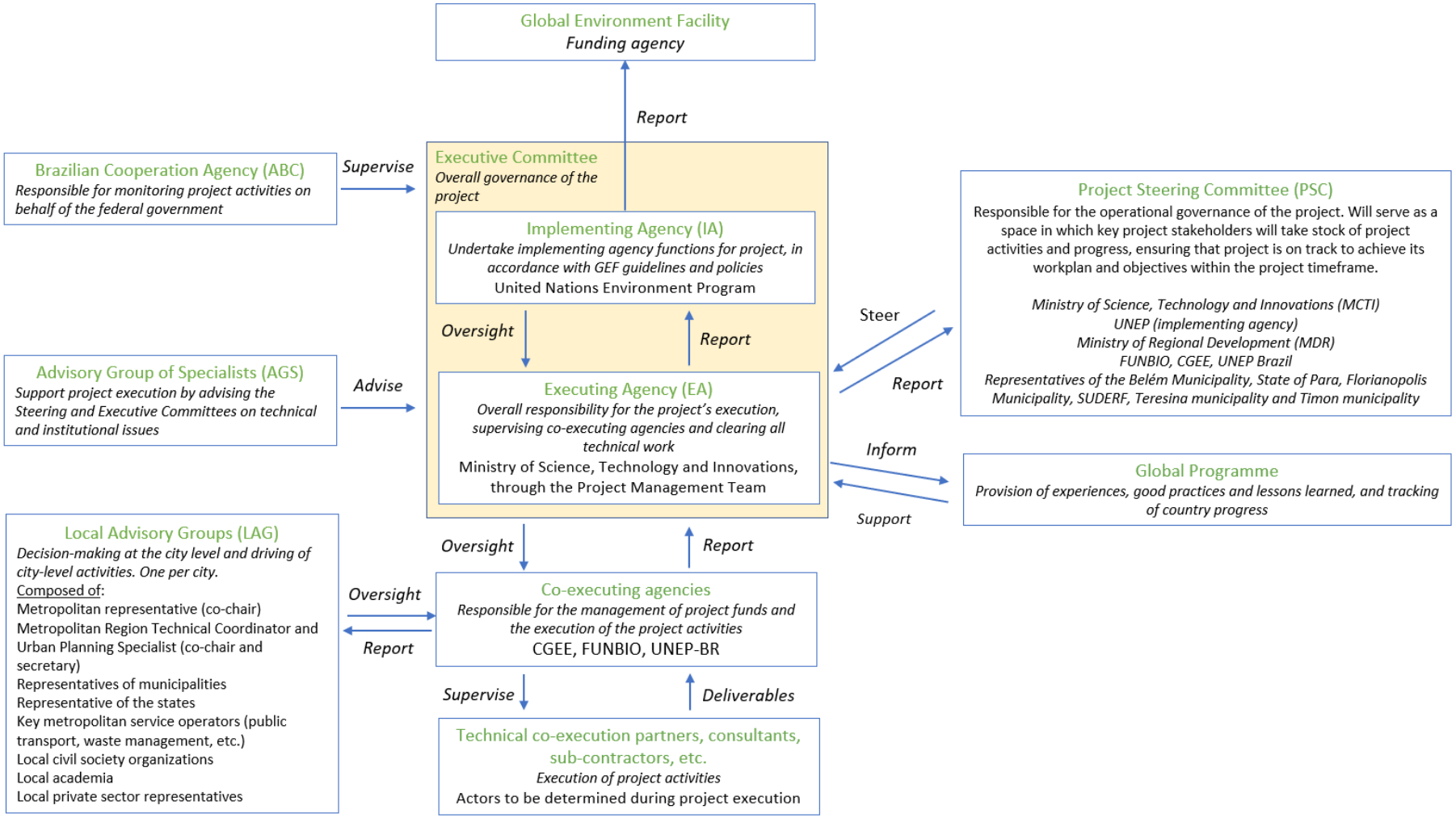


Figure - Reporting arrangements of the project



The **Executing Agency** is responsible for the project execution. This role will be undertaken by the Ministry of Science, Technology, and Innovations (MCTI). The ministry will hold overall responsibility for the project's execution and will establish a project management team (PMT) which supports, supervises and provides technical guidance to the executing partners (CGEE and FUNBIO) for project execution. The Ministry, together with the Brazilian Cooperation Agency (ABC), will sign an *executive programme* agreement with UNEP (Economy and Ecosystem Divisions) for the execution of the project. UNEP, as the implementing agency, will also sign project cooperation agreements with CGEE, FUNBIO and UNEP Brazil, as agencies which will support project execution (see below). However, the overall project responsibility at the national level resides with MCTI through the governing umbrella executive programme. MCTI will review and clear all technical work undertaken by CGEE and FUNBIO (UNEP Brazil does not undertake technical work). The overall division of responsibilities between the agencies is the same as that used successfully for the GEF-6 integrated approach pilot sustainable cities project in Brazil. i.e. MCTI with overall project responsibility, and co-executing partners managing project funds and leading project technical work under the ministry's supervision.

The PMT will contain the National Director and National Coordinator (both appointed and co-financed by MCTI), a Project Manager, a Junior Urban Planning Specialist, a Communication and Gender Advisor, a Climate Mitigation and Platforms Specialist, a Biodiversity Specialist, and three Metropolitan Region Technical Coordinator and Urban Planning Specialists (one located in each pilot metropolitan region). Key functions of the project management team will include:

- Ensuring the overall technical quality and coherence of the project;
- Ensuring that the project is executed in accordance with the project workplans and budgets;
- Supporting the Co-executing Agencies and the Technical Execution Partners in project execution, including by supporting the preparation of technical terms of reference;
- Reviewing workplans and budgets;
- Supervising activities;
- Facilitating coordination between the Co-executing Agencies, the Technical Execution Partners and the Local Advisory Groups;
- Chairing the Advisory Group of Specialists (AGS) and co-chairing the Local Advisory Groups (LAG) (see details of these below).
- Establishing a framework for cross-fertilization between the different entities (metropolitan regions, co-executing partners, Technical Execution Partners, AGS, LAG) that enables lessons learned to be shared and facilitates mutual support for project execution. This will build upon work undertaken to compile experiences, good practices and lessons learned through output 4.2. This builds upon a recommendation of the mid-term review of the GEF-6 Brazil sustainable cities project,[216]
- Leading all monitoring and evaluation activities, including racking the implementation of the results based framework and the gender action plan.

The **Implementing Agency** (IA) is responsible for the project to the Global Environment Facility (GEF). This role will be undertaken by the United Nations Environment Program (UNEP), Economy and Ecosystem Divisions. In undertaking this role, UNEP will build upon its experience as implementing agency for the GEF-6 sustainable cities project in Brazil (CITinova) as well as its experience as lead agency for the GEF-7 global program on sustainable cities. Furthermore, it will draw on in-house expertise on sustainable buildings and cities led by its Economy Division, Energy and Climate Branch, Resource Efficiency sub-program.

In undertaking this role, UNEP will ensure a strict separation of responsibilities between that of UNEP as implementing agency (through the Economy and Ecosystem Divisions) and that of UNEP Brazil, which will undertake a minor role in project execution (see below). UNEP has internal procedures which will ensure a clear separation of implementation and executing functions, including through different divisions. UNEP's Economy and Ecosystems Divisions have completely separate financial, operational and senior management oversight arrangements to the UNEP Brazil Country Office. These internal procedures, used in other projects, including the GEF-6 sustainable cities project in Brazil, ensure clear lines of responsibility, reporting, monitoring and evaluation, and accountability within the GEF Agency between the project implementation and execution functions. This includes, but is not limited to: settlement processing, procurement processing, risk management / reconciliations and accounting.

Key functions to be undertaken by UNEP as the implementing agency (Economy and Ecosystem Divisions) include:

[216] Recommendation #9: "*establish an operational framework for cross-fertilization amongst the project executing partners*."

- Ensuring timely disbursement/sub-allotment to co-executing agencies based on agreed legal document and in accordance with UNEP and GEF fiduciary standards;
- Following-up with co-executing agencies for progress, equipment, financial and audit reports;
- Providing consistent and regular oversight on project execution and conduct project supervisory missions as per Supervision Plans and in doing so ensures that all UNEP and GEF criteria, rules and regulations are adhered to by project partners;
- Technically assessing and overseeing the quality of project outputs, products and deliverables – including formal publications;
- Providing no-objection to main TORs and subcontracts issued by the project, including selection of the Project Manager;
- Attending and facilitating inception workshops, field visits where relevant, and steering committee meetings;
- Assessing project risks, and monitor and enforce a risk management plan;
- Regularly monitoring project progress and performance and rate progress towards meeting project objectives, project execution progress, quality of project monitoring and evaluation, and risk;
- Monitoring reporting by project executing partners and provide prompt feedback on the contents of the report;
- Promptly informing the management of any significant risks or project problems and take action and follow up on decisions made;
- Applying adaptive management principles to the supervision of the project;
- Reviewing of reporting, checking for consistency between execution activities and expenditures, ensuring that it respects GEF rules;
- Clearing cash requests, and authorization of disbursements once reporting found to be complete;
- Approving budget revision, certify fund availability and transfer funds;
- Ensuring that GEF and UNEP quality standards are applied consistently to all projects, including branding and safeguards;
- Certifying project operational completion;
- Linking the project partners to any events organized by GEF and UNEP to disseminate information on project results and lessons;
- Managing relations with the GEF secretariat.

The responsibilities of UNEP Brazil, in providing minor execution support to the project, may be found further below in this section.

The **Brazilian Cooperation Agency (ABC)** is responsible for monitoring the activities resulting from the "Executive Program of the Project" (document that will be signed by ABC, UNEP and MCTI) at the federal government level.

The **Executive Committee** will be responsible for the overall governance of the project. It will be composed of MCTI and UNEP (IA) and will be responsible for strategic decisions on all aspects of the project. Key functions will include:

- Revision and validation of workplans and budgets;
- Revision and validation of project changes;
- Resolution of any project issues.

The **Steering Committee** will be responsible for the operational governance of the project. It will serve as a space in which key project stakeholders will take stock of project activities and progress, ensuring that project is on track to achieve its workplan and objectives within the project timeframe. The Committee will meet twice a year. It will be composed of MCTI (committee chair), UNEP Implementing Agency, the Ministry of Regional Development (MDR), the co-executing agencies (FUNBIO, CGEE, UNEP Brazil) and focal points of the governments of the Belém Municipality and State of Para, Florianopolis Municipality and SUDERF, and the municipalities of Timon and Teresina. Building upon a recommendation of the mid-term review of the GEF-6 Brazil sustainable cities project,[217] the steering committee will also contain a forum of project leaders for on-going project risk assessment and management. Held primarily during the steering committee meetings, this will facilitate early adoption of mitigation actions to preempt risks that may arise due to events such as political elections, pandemics and national disasters, as well as the structural limitations of Brazilian local governments. Effort will be made to ensure that the Steering Committee is gender-balanced and follows gender-sensitive processes.

The **Advisory Group of Specialists (AGS)** will be established to support project execution by playing a key role in advising the Steering and Executive Committees. Its terms of reference are as follows:

Purpose

[217] Recommendation #9: "*establish a Permanent Forum of Project Leaders for Risk Assessment*."

Building upon a recommendation of the mid-term review of the GEF-6 Brazil sustainable cities project,[218] the AGS will facilitate coordination among key national actors in the sustainable city space for ensuring effective execution and maximum impact of the GEF-7 project. Key functions of the AGS include:

- Facilitating coordination, establishing synergies and avoiding duplication between project actions and those of other initiatives;
- Providing technical guidance, upon request of the Executive Committee, to project activities on areas including integrated urban planning, climate mitigation and biodiversity conservation, finance and knowledge management. This may include, upon request:
    - Providing advice to the PMT on spatial planning and integrated planning policy topics;
    - Provide technical, organizational and regulatory advice related to mitigation and biodiversity aspects of the project. In particular, as required it will provide such advice to the design of mitigation and biodiversity aspects of the integrated plans and modules (component 1). It will also play a role, when required, in providing advice to support cities and other key actors in designing and executing the pilots (component 2);
    - Providing support, when requested, to the development of SIS+ and the integration in the platform of the project's outputs and lessons learnt, as well as the design and execution of capacity building activities to replicate the project's good practices in other cities (component 4);
- The group will not provide support on finance (component 3) as this will be undertaken by CODUS, a committee created under output 3.1. CODUS will fulfil the role of providing technical guidance on finance and ensuring effective participation in project activities of all stakeholders involved in the financing of sustainable urban development in Brazil;
- Facilitating connection to key national and international experts in project areas when required.

Scope:
All project activities (upon request).

Membership:
Chaired by the PMT, the AGS will include focal points from the Ministry of Regional Development (MDR), Ministry of Environment (MMA), the Brazilian Development Bank (BNDES), the Funding Authority for Studies and Projects (FINEP), the Sustainable Cities Programme (based in São Paulo), ICLEI, WRI, C40, FNP, ABM, CNM, and the Technical Execution Partners. It may also draw upon the support of other organizations, including universities, research institutions and the private sector, as required. Effort will be made to ensure that the AGS is gender-balanced, includes participation of relevant gender-representative groups and follows gender-sensitive processes.

Meeting arrangements:
The AGS will meet on an ad-hoc on-demand basis, but at minimum once per year. Meetings may be virtual or presential, and could be held a day before or after a steering committee meeting or meeting of the MCTI-MDR City Chamber 4.0.

Reporting:
Minutes will be prepared after each meeting and made publicly available on SIS+ a maximum of one month after the meeting. The AGS will decide on a case-by-case basis the need to keep information private.

Resources:
The AGS will receive resources for meeting logistics through the budget line *110425 - Communication consultancy* to a maximum amount of USD $2,000 over the four years of the project. Additional resources may be requested and will be considered on a case-by-case basis by the PMT and UNEP Task Managers on a case-by-case basis.

A **Local Advisory Group (LAG)** will be established in each of the three participating metropolitan regions. The LAG's terms of reference are as follows:

Purpose:
Provide political and technical guidance to the development and execution of project activities in the city. Serve as the primary voice of the city in ensuring that project interventions are aligned with local priorities and needs. Key functions of the LAG will include:

- Ensuring political buy-in of the local government (or governments, for metropolitan regions) and the state government,
- Facilitating local and state government internalization, approval and use of project outputs (such as the platforms, plans, pilots, etc.).

[218] Recommendation #5: "*establish a national multi-stakeholder committee for sustainable cities*."

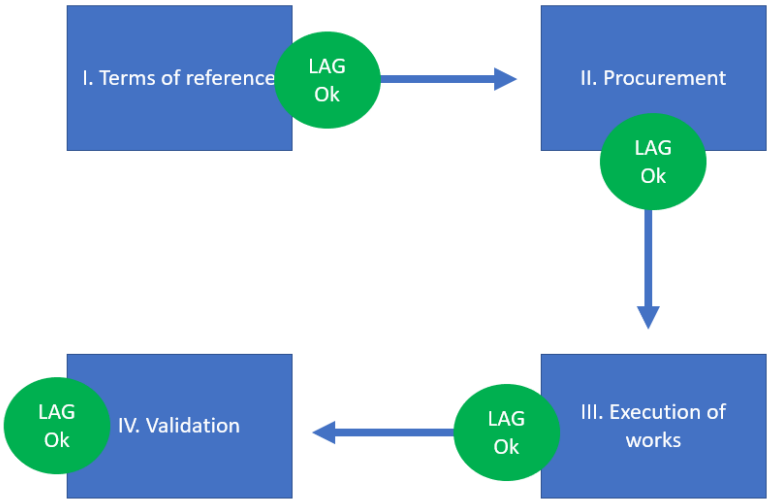
- Ensuring buy-in of key local stakeholders, including academia, private sector and civil society and their effective contribution to the project where required;
- For core execution activities, including those related to component 1 (the undertaking of urban planning processes, strengthening of urban governance, and development of digital platforms), component 2 (pilot activities), and component 3 (financial mechanisms – where locally specific), the LAG will execute functions including the following:
    - Provide guidance for the development of technical terms of reference (TOR), reviewing TORs and providing technical input to support their elaboration and finalization (noting that the PMT and the Executing Agency have final decision on the awarding of contracts);
    - Identify possible key local partners for execution of project activities;
    - Review and provide technical input to technical documents as related to local project activities;
    - Ensure the design of local project interventions is aligned with local and state priorities (noting that the PMT and the Executing Agency have the final decision on project design, in coordination with UNEP and in alignment with the CEO endorsement document);
    - Facilitate the executing of project activities in the local jurisdiction, including the obtaining of local and state governmental permissions as required to execute the project pilots and other project activities;
    - Supervise project execution by assessing deliverable progress at meetings on a minimum quarterly basis and ideally monthly (as part of the LAG meetings);
    - Further information on the role of the LAG in core execution activities related to infrastructure (digital and for the pilots) is contained below;
- Facilitating and supporting M&E activities;
- Supporting communication and diffusion of information on the project with local stakeholders;
- Supporting the obtaining of updates on co-financing commitments by local partners.
- Serving as a first point for local stakeholders to express grievances who may be adversely affected by the GEF UNEP project. In the event that such concerns are not resolved at the local level, such stakeholders may access UNEP's Stakeholder Response Mechanism, operated through the Independent Office for Stakeholder Safeguard-related Response (IOSSR).[219]

In addition to the aforementioned functions, city representatives of the LAG will play a key role in facilitating the execution of project deliverables related to infrastructure in their city. Four key functions are listed below. In the first six months of project execution, MCTI together with LAG will develop a *modus operandi* document containing further details on how these four functions will be carried out. The functions are:

- Terms of reference (TOR). The LAG may develop the TOR for the project deliverables or identify their key elements, with the TOR then elaborated by the co-executing agencies (CGEE or FUNBIO). City representatives of the LAG will provide clearance (through a note of the LAG co-chairs or LAG meeting minutes) on the TOR before they are published;
- Procurement. As noted in the above diagram and in following section, CGEE and FUNBIO are the project co-executing agencies and as such will undertake all procurement of project activities. City representatives of the LAG will support procurement processes by assisting in the identification of candidate/service provider shortlists. They will also be invited to participate in the selection panel or the process to review the proposals (provided no conflict of interest would exist). The LAG will provide clearance (through a note of the LAG co-chairs or LAG meeting minutes) on the chosen candidate/service provider before the contract is offered;
- Supervision of project works. The LAG will support supervision of project works by assessing deliverable progress at meetings on a minimum quarterly basis and ideally monthly (as part of the LAG meetings). The LAG will consider progress to execute deliverables based on updates provided by the Executing Agency at these meetings. These meetings will be project-funded (see section on meeting arrangements below);
- Completion of project works. The LAG will ensure that the completed works respond to city needs as per the prepared terms of reference and will provide clearance (through a note of the LAG co-chairs or LAG meeting minutes) for the signing off of all deliverables related to infrastructure.

[219] UNEP's Stakeholder Response Mechanism fulfils two primary functions (1) a compliance review process to respond to claims by stakeholders alleging that activities implemented or executed as part of UNEP-funded projects and programs are not in compliance with UNEP's Environmental and Social Sustainability Framework (ESSF); and (2) a grievance redress process that provides people allegedly affected by activities implemented or executed as part UNEP-funded projects and programs access to appropriate dispute resolution processes for hearing and addressing project-related disputes. The mechanism will receive and address complaints in a timely and culturally appropriate manner and adhere to UNEP's ESSF requirements. https://wedocs.unep.org/bitstream/handle/20.500.11822/32023/ESSFRM.pdf?sequence=1&isAllowed=y.

Figure 27 – Four key functions of the Local Advisory Group for infrastructure works



Scope:
All project activities in the city.

Membership:
Each LAG will be co-chaired by the PMT *Metropolitan Region Technical Coordinator and Urban Planning Specialist* (under the Project Manager's guidance) and a metropolitan representative:

- For Belém this person will be nominated by the State of Pará;
- For Florianopolis this person will pertain to SUDERF and will be nominated by that entity;
- For the Teresina-Timon Urban Agglomeration this person will be nominated by the Municipality of Teresina.

That person will also be the focal point to the SCIP (see section 1d). The *Metropolitan Region Technical Coordinator and Urban Planning Specialist* will also serve as the LAG secretary (where possible with the support of the Junior Urban Planning Specialist). The LAG will include representatives of all metropolitan region municipalities and the state (to be nominated by each jurisdiction). Each LAG will include representatives from municipal and metropolitan technical services relevant to the project's activities in the metropolitan area. The LAG may also include one local representative from each of the following: civil society organizations, academia and the private sector (three in total), to be determined and appointed by the LAG co-chairs and revised annually. Effort will be made to ensure that the LAGs are gender-balanced, include participation of relevant gender-representative groups, and follow gender-sensitive processes.

Meeting arrangements:
The LAG will meet on a minimum quarterly basis, and ideally monthly, in the city (or virtually) to discuss the project's progress in the city.

Reporting:
Minutes will be prepared after each meeting and made publicly available on the local governmental modules a maximum of one month after the meeting. The LAG will decide on a case-by-case basis the need to keep information private.

Resources:
The LAG will receive resources for meeting logistics through the budget line *110404 - Stakeholder participation consultancy* to a maximum amount of USD $2,000 for each LAG over the four years of the project. Additional resources may be requested and will be considered on a case-by-case basis by the PMT and UNEP Task Managers on a case-by-case basis.

The **Co-executing Agencies**, FUNBIO and CGEE will be responsible for the execution of the project activities. Key functions will include:

- Administration of project funds;
- Hiring and supervision of Technical Execution Partners;
- Direct execution of technical components;
- Drafting and submitting biannual workplans and budgets to the Executive Committee;
- Elaborations of project reports as required by UNEP (including, but not limited to, the project implementation review report, the half-yearly progress report, quarterly expenditure reports, annual audit reports and annual inventories of equipment);
- Reporting regularly on the progress of the project activities to the MCTI Project Management Team.

Concretely, CGEE will be responsible for the execution of components 1, 3 (except for output 3.3) and 4. FUNBIO will be responsible for the execution of component 2 and output 3.3. It will also execute a few specific consultancies in outputs 1.2, 1.5 and 1.8. For more information, refer to the UNEP project budget in annex 1-1 of the UNEP project document, where a specific column of the budget highlights the division of responsibilities. Both CGEE and FUNBIO will sign project cooperation agreements with UNEP as the implementing agency, and will be responsible for managing GEF project funds for the aforementioned project components, outputs and consultancies. As noted previously, MCTI, as the executing agency, will review and clear all technical work undertaken by CGEE and FUNBIO.

The **Technical Execution Partners**, contracted by the Co-executing Agencies, will undertake project technical activities.

The **United Nations Environment Programme, Brazil Country Office (UNEP-BR),** will be responsible for providing administrative and financial support to the PMT. Key functions will include:

- Hiring the project funded members of the PMT (as listed above);
- Purchasing computers and IT equipment for the PMT;
- Facilitating travel arrangements for the PMT;
- Organizing national steering committee meetings.

UNEP-BR will also facilitate coordination with the UN Country Team and Resident Coordinator, ensuring they are informed of the project's progress and that it aligns with the Brazilian UNDAF.

2) Coordination with other initiatives

At the local level, the aforementioned local advisory groups (LAGs) will play the central role in facilitating coordination of project activities with those of other initiatives being undertaken within the metropolitan region or municipality under question. Refer to the LAG terms of reference in the previous section for further information. At the national level, the project Steering Committee, together with the AGS, will play the central role in facilitating effective coordination between the project activities and those of other national-level initiatives. See their descriptions and the AGS terms of reference in the previous section for further information. In particular, the Steering Committee will include the MCTI and MDR, to ensure effective coordination between this project and those being undertaken by MDR in the urban space, such as ANDUS (see baseline for further information).

For certain themes, coordination will be enhanced beyond these mechanisms. For instance, to ensure coordination on financing, through output 3.1 the Committee for Supporting Access to Financing for Sustainable Urban Development (CODUS) will be created within the scope of the existing Inter-Ministerial City Chamber 4.0 (*Câmara das Cidades 4.0*). CODUS will be led by the MCTI and will include representatives of all key actors in this space, including MDR, BNDES and FINEP. See output 3.1 for further information. On capacity building (particularly outputs 3.2 and 4.3), MCTI and MDR, which already coordinate through the Inter-Ministerial City Chamber 4.0, will enhance their coordination on these activities to ensure that the project is complementary to existing and on-going MDR initiatives in this area.

The following table highlights synergies and coordination between this project and other primarily GEF-funded initiatives. See also baseline section 2(iii), which highlights how this GEF-7 project will build synergies with and build upon other finance, knowledge management and baseline projects and initiatives.

Table 32 – Coordination with other projects (primarily GEF)

#	Agency	Title	Amount (M USD)	Source of funds	Period	Lessons learned, synergies and proposed collaboration
1	UNEP	GEF-6: *Cities-IAP: Promoting Sustainable Cities in Brazil through Integrated Urban Planning and Innovative Technologies Investment*	$22.6	GEF	Since 2018 (on-going)	Refer to: Table 19 – Building upon the GEF-6 Brazil project.

#	Agency	Title	Amount (M USD)	Source of funds	Period	Lessons learned, synergies and proposed collaboration
2	UNEP	GEF-5 project: *Greenhouse gas emissions mitigation options in key sectors of Brazil*	$11.0	GEF	Closed since 2012	Coordination will be facilitated by MCTI, which was the project executing agency, and UNEP, which was the project implementing agency. The GEF-7 project will build upon the prioritized GEF-5 options in the construction of the SIS+ solutions database. This database will be developed as part of the GEF-6 OICS, which will be transformed into SIS+ in GEF-7. Building further on other climate change enabling activities, the project aimed to assist the Government of Brazil in strengthening its technical capacity in supporting the implementation of its mitigation actions for greenhouse gas emissions in key economic sectors (energy, forests, industry, agriculture and animal husbandry, transportation, civil construction, and residues) in Brazil (including costs) as identified in the Brazilian National Policy and Plan on Climate Change. Several lessons were drawn from the project. Without it, it would not have been possible for understand the patterns behind GHG emissions in Brazil.
3	UNEP	Green Climate Fund (GCF) Readiness Proposal: *Technological needs assessment project for the implementation of climate action plans in Brazil*	$0.7	GCF	2017-now (will close shortly)	Coordination will be facilitated by MCTI, which is the project executing agency, and UNEP, which is the project implementing agency. The GEF-7 project will build upon the prioritized TNA action plans in the construction of the SIS+ solutions database. This database will be developed as part of the GEF-6 OICS, which will be transformed into SIS+ in GEF-7. The TNA follows a standardized methodology developed by UNEP DTU for assessing technology needs and their application. It aims at developing a comprehensive 'Technology Needs Assessment for the Implementation of Climate Action Plans in Brazil'. In GEF-7, the lessons learned during the execution of this project, as well as the ranking and prioritization methodology developed, will be used by SIS+ and for identifying low carbon solution options, through the local modules (outputs 1.1, 1.4 and 1.7), to be implemented in the component 2 pilots.
4	UNEP	GEF ID: 9413: Realizing the Biodiversity Conservation Potential of Private Land	$9.0	GEF	Since 2018 (on-going)	Coordination will be facilitated by UNEP, which is the project implementing agency. The project aims at scaling up sustainable landscape management and contribute to biodiversity conservation and ecosystem services provision in private areas in Brazil. The specific learning on how to work with the private sector on the co-management of protected areas will provide valuable lessons for the development of integrated urban biodiversity plans under component 1.
5	UNEP	GEF ID 3722: Improving Brazilian Capacity to Conserve and Use Biodiversity through Information Management and Use	$8.1	GEF	Closed since 2010	Coordination will be facilitated by UNEP, which was the project implementing agency. Although closed, it was a trailblazer with respect to biodiversity mainstreaming. A valuable lesson from this early mainstreaming project that will be applied to the present one regarding techniques and methodologies for landscape level management for conservation.
6	Inter-American Development Bank	GEF ID 4834 GEF-5 project: Recovery and Protection of Climate and Biodiversity Services in the Southeast Atlantic Forest Corridor of Brazil	$31.5	GEF	Since 2016 (on-going)	Coordination will be facilitated by MCTI, which is the project executing agency. The project aims the recovery and preservation of the Atlantic Forest (AF) of Brazil's Southeast Corridor through different instruments, including the implementation of 3 Payment for Environmental Services (PES) schemes in São Paulo, Rio de Janeiro and Minas Gerais. This project will provide important lessons and results for the GEF7 project, which aims to develop a PES scheme for Belém (Component 3).
7	GIZ	ANDUS	$ 4.9	IKI	Since 2017	Coordination will be facilitated through the Steering Committee, as the Ministry of Regional Development

#	Agency	Title	Amount (M USD)	Source of funds	Period	Lessons learned, synergies and proposed collaboration
					(on-going)	(MDR) will be a member of that committee. See previous section for more information. For information on the ANDUS project see Table 15 – Baseline finance projects and relevance to the GEF-7 project.

#	Links
1	https://www.thegef.org/project/cities-iap-promoting-sustainable-cities-brazil-through-integrated-urban-planning-and
2	https://www.thegef.org/project/mitigation-options-greenhouse-gas-ghg-emissions-key-sectors-brazil
3	www.greenclimate.fund/sites/default/files/document/readiness-proposals-brazil-unep-strategic-frameworks.pdf
4	https://www.thegef.org/project/realizing-biodiversity-conservation-potential-private-lands
5	https://www.thegef.org/project/improving-brazilian-capacity-conserve-and-use-biodiversity-through-information-management
6	https://www.thegef.org/project/recovery-and-protection-climate-and-biodiversity-services-southeast-atlantic-forest-corridor
7	https://www.gov.br/mdr/pt-br/assuntos/desenvolvimento-urbano/rede-de-desenvolvimento-urbano-sustentavel

7. CONSISTENCY WITH NATIONAL PRIORITIES

The project is consistent with the following national strategies and plans or reports and assessments under relevant conventions:

- Nationally Determined Contributions (NDC). In December 2020, Brazil submitted an updated NDC, which confirms the commitment to reduce its greenhouse gas emissions in 2025 by 37% and commits to reduce the countries' emissions in 2030 by 43%. The project is in line with the emission reduction proposals of the NDC, mainly in the transport sector, through the promotion of efficiency measures and improvements in transport infrastructure and public transport in urban areas. See the baseline section for further information.

- National Communication (NC) under the UNFCCC. The GEF-7 project is aligned with the findings of the third national communication, noting that transport and waste are two of the largest non-LULUCF emitting sectors.

- National Biodiversity Strategies and Action Plan (NBSAP) under UNCBD. The National Biodiversity Strategy and Action Plan (2016-2020)[220] defines the Brazilian long-term vision to achieve the conservation and sustainable use of biodiversity which, through the provision of benefits to people, including ecosystem services, supports and ensures resilience to social and economic systems. This project is aligned with objectives and urban area indicators of the action plan.

- National Action Program (NAP) to Combat Desertification and Mitigate the Effects of Drought under UNCCD. This program, elaborated in 2004, characterized the areas susceptible to desertification in Brazil by long periods of drought, followed by others of heavy rains, creating significant economic, social and environmental damage, which tends to affect with greater force that less-favored part of the population. Accelerated urbanization has been one of the causes of land degradation pointed out by this program. The project is aligned with the UNCCD NAP.

- National Action Plan for Adaptation (NAP) to Climate Change under UNFCCC. Brazil submitted its NAP to the UNFCCC in 2016.[221] The purpose of its plan is to guide initiatives for management and reduction of long-term climate risks. As it regards to the project, the evolution of proposed urban planning considers issues associated with increased risks caused by climate change and respective adaptation strategies, as dictated by NAP in its sectoral strategies. Cities and biodiversity are among the key themes highlighted in the plan.

- National Implementation Plan (NIP) under POPs (Stockholm Convention). Brazil published its NIP in 2015.[222] It includes strategies and actions of the NIP of Brazil to meet the Convention's commitments, based on the country's situation verified

[220] https://www.cbd.int/doc/world/br/br-nbsap-v3-en.pdf.
[221] https://www4.unfccc.int/sites/NAPC/Documents/Parties/Brazil%20NAP%20English.pdf.
[222] file:///Users/nancymoreno/Downloads/UNEP-POPS-NIP-Brazil-1.English.pdf.

in the inventories and the intervention priorities that were determined. The project will interact with these priorities in fields such as sustainable waste management or pollution.

- Biennial Update Report (BUR) under UNFCCC. Research and innovation are the focus of the third and last BUR report sent by Brazil to the UNFCCC. The mapping of land cover and land use change supports the understanding of urban dynamics, rural production and the mapping of protected areas at various levels (local, state, federal) and over time. The GEF-7 project foresees will align with this, using land use mapping data to compose analyses and support the design of sustainable public policies that reduce greenhouse gas emissions.

- Sendai Framework. The project aims at stimulating actions to contain disaster risks, especially risks intensified by climate change. This includes mapping the main risks to which RMs would be subject and mitigating these effects through concrete actions in urban planning, protection of green areas and water bodies and infrastructure adaptation at the local level.

- United Nations Development Assistance Framework (UNDAF). The GEF project is aligned with the five pillars of the Brazilian strategic planning cycle and the 2030 Agenda: People, Planet, Prosperity, Peace and Partnerships (five Ps). Its objectives include generating a positive impact to guarantee diversity and an inclusive society, adequate resource management, quality of life and multiple partnerships. UNEP-BR will facilitate coordination with the UN Country Team and Resident Coordinator, ensuring they are informed of the project's progress and that it aligns with the Brazilian UNDAF.

- Sustainable Development Goals (SDGs). The project is directly connected to the respective Sustainable Development Goals (SDGs) and respective targets:

Table 33 – SDG Targeted by the Project

Goals	Targets
Goal 3. Health and well-being	• By 2030, reducing premature mortality from noncommunicable diseases by prevention and treatment, promoting mental health and well-being, worker health, and preventing suicide, significantly altering its upward trend. • Performing activities related to the Low-Emission Zone definitions, aiming to improve air quality for the surrounding population. • By 2030, halving deaths and injuries from traffic accidents. • Performing actions aimed at increasing road safety.
Goal 5. Gender equality	• Guaranteeing full and effective participation of women and equal opportunities for leadership at all levels of decision-making in the public sphere, in its political and economic dimensions. This process must consider intersections with race, ethnicity, age, disability, sexual orientation, gender identity, territoriality, culture, religion and nationality, especially for women from the fields and the forests, from the waters and from urban peripheries. • Guaranteeing gender equality in access, skills of use and production of information and communication technologies, considering intersections with race, ethnicity, age, disability, sexual orientation, gender identity, territoriality, culture, religion and nationality, especially for women from the fields and the forests, from the waters and from urban peripheries. • Adopting and strengthening public policies and legislation aimed at promoting gender equality and empowering all women and girls, as well as promoting mechanisms for their effectiveness - at all federal levels - in their intersections with race, ethnicity, age, disability, sexual orientation, gender identity, territoriality, culture, religion and nationality, especially for women from the fields and the forests, from the waters and from urban peripheries.
Goal 6. Drinking water and sanitation	• By 2030, achieving universal and equitable access to water for human consumption, which should be safe and accessible for all. • Supporting and strengthening the participation of local communities, prioritizing social control to improve water and sanitation management.
Goal 7. Clean and accessible energy	• By 2030, maintaining a high share of renewable energies in the national energy matrix. • The project encourages the use of renewable fuels for public transport and electrification at some points.
Goal 10. Reducing inequality	• By 2030, empowering and promoting social, economic and political inclusion for all, thus reducing inequalities, regardless of age, gender, disability, race, ethnicity, nationality, religion, economic condition or other. • By addressing urban sprawl as a major cause of inequalities through complex urban land use planning processes.
Goal 11. Sustainable cities and communities	• By 2030, guaranteeing full access to decent, adequate and affordable housing and to basic services; urbanizing precarious settlements in accordance with the goals assumed in the National Housing Plan, with special attention to groups in situations of vulnerability. • The project foresees an analysis of the territorial dynamics of RMs, supporting the prioritization of suitable areas for housing, with access to the supply of essential items. • By 2030, improving road safety and access to the city through more sustainable, inclusive, efficient and fair urban mobility systems, prioritizing mass public transport and active transport, with special attention to the needs of people in situations of vulnerability, such as individuals with disabilities and reduced mobility, women, children and the elderly. • Implementing complete streets and living labs. • By 2030, increasing inclusive and sustainable urbanization, improving capacities for planning, for social control and for participatory, integrated and sustainable management of human settlements, in all Federation Units. • The project foresees investments and guidelines for urban planning suitable for sustainable development, seeking to reduce environmental impacts and generate positive social impacts. • By 2030, significantly increasing the number of cities that have policies and plans developed and implemented for mitigation, adaptation and resilience to climate change and integrated disaster risk management according to the SENDAI Framework.

Goals	Targets
	• The strategies developed and disseminated by the project consider mitigation and adaptation to climate change, including mapped and targeted urban planning to reduce risks associated with disasters.
Goal 13. Action Against Global Climate Change	• Increasing resilience and adaptive capacity to risks and impacts resulting from climate change and natural disasters. • The project provides that urban planning considers the reduction in the use of fossil fuels, air quality improvement and mitigation of greenhouse gas emissions, also considering issues related to minimizing exposure to risks associated with the intensification of climatic events. • Integrate the National Policy on Climate Change (PNMC) with national policies, strategies and plans. • The project seeks to align RM strategies with low GHG development, incorporating aligned technologies that support the mitigation goals brought by the PNMC.
Goal 15. Earth life	• By 2020, the conservation units foreseen in the Law of the National System of Conservation Units (SNUC)[223], and other categories of officially protected areas such as Permanent Preservation Areas (PPAs), Legal Reserves (LRs) and indigenous lands with native vegetation, will be responsible for preserving at least 30% of the Amazon, 17% of each of the other terrestrial biomes and 10% of marine and coastal areas, mainly areas of special importance for biodiversity and ecosystem services. This should be done by ensuring and respecting demarcation, regularization and effective and equitable management, aiming to guarantee interconnection, integration and ecological representation in broader terrestrial and marine landscapes. • By 2030, having zero illegal deforestation in all Brazilian biomes, expanding the area of forests under sustainable environmental management and recovering 12 million hectares of forests and other forms of degraded native vegetation. This should include all biomes, preferably covering Permanent Preservation Areas (APPs) and Legal Reserves (LRs). In areas of alternative land use, expanding the area of planted forests by 1.4 million hectares. • Through planning at the RM level, the project proposes greater protection of forestry areas, reducing pressure from urban areas. • Mobilizing significant resources from all sources and at all levels to finance sustainable forest management and providing adequate incentives for developing countries to promote sustainable forest management, including for conservation and reforestation. • By 2020, implementing measures to prevent the introduction and significantly reduce the impact of invasive alien species on terrestrial and aquatic ecosystems, and to control or eradicate priority species. • The project foresees investments based on integrated plans designed for the recovery of urban green areas using native species.
Goal 17. Partnerships and means of implementation	• Promoting the development, transfer, dissemination and diffusion of environmentally friendly technologies to developing countries, under favorable conditions, including concessional and preferential conditions, as mutually agreed. • Encouraging and promoting effective partnerships in the public, public-private, private and civil society spheres, based on the experience of the resource mobilization strategies of these partnerships.

8. KNOWLEDGE MANAGEMENT

Knowledge management is a central component of this GEF project, and core to achieving the transition envisaged in the project's theory of change. A key focus in this sense is on strengthening the capacities of public administrations through the provision of learning material and training of key stakeholders (particularly local government officials) focused on integrated strategic planning and sound implementation of innovative investments better aligned with urban sustainability principles. Furthermore, knowledge management is essential to support the dissemination of evidence on the performance of integrated and other innovative approaches and to facilitate access to viable models and solutions for the implementation of innovative approaches to sustainable urban development. The end goal of dissemination, of course, is replication and expanded uptake both by the target urban areas and by additional cities beyond those directly targeted by the project.

With these goals in mind, the project will develop and curate knowledge on integrated planning and sustainable solutions for urban transformation. There is a specific component dedicated for knowledge improvement and dissemination (more information in the section on Component 4 - insert page at the end). Moreover, the project envisages maintaining continuous dialogue and connection with the SCIP global platform, with the participating cities and with the national government, and knowledge management will be at the core of this strategy.

The project's central pillar for knowledge management will be the System of Innovations and Solutions for Sustainable Urban Planning (SIS+). As described in output 4.1, this system will make available and share with Brazilian city managers information on experiences, good practices and lessons-learned of other cities in undertaking integrated urban planning, including those of this GEF project and from around the world (through connecting to the SCIP platform). The system will also consist of local modules in the three pilot cities, ensuring that the cities are able to learn from good practices from around the world, as well as share their experiences with other Brazilian cities (through uploading information to SIS+).

[223] Conservation Unit (UC) is synonymous with Protected Area (PA).

Furthermore, output 4.2, "*Brazilian city stakeholders strengthen their knowledge, through SIS+ and national networks, on good practices and public policies for achieving integrated sustainable urban development"* will focus directly on ensuring that local governments throughout Brazil may learn from the experiences, good practices and lessons-learned garnered through this GEF-7 child project, the Sustainable Cities Impact Program Global Platform (SCIP-GP) and other GEF-7 child projects. This is undertaken with the aim of supporting such local governments to draw on good practices demonstrated through the GEF SCIP and avoid repeating mistakes made. Ultimately, the intention of that output is to facilitate an effective knowledge transfer so that local stakeholders can promote the replication and scale-up of good practices on integrated urban planning and sustainable urban development throughout Brazil.

The capturing of experiences, good practices and lessons learned from all project outputs has been centralized through this output. Quarterly monitoring of progress in executing project outputs will be undertaken. Progress will be captured on all project elements, including as related to the undertaking of planning processes, the execution of pilot investments and the development of the SIS+ and its local modules. The recorded experiences, good practices and lessons learned will be uploaded to SIS+ to ensure that all local governments may learn from these experiences.

Effort will be made to ensure that the production of all knowledge management materials is undertaken in a gender-sensitive way, and that the produced materials are gender-sensitive. This will include, where possible:

- Selecting male and female content-producers and reviewers for diversity of perspective;
- Using gender-sensitive language and gender-balanced images (women not presented as victims but as agents of change);
- Checking context and content (use gender analysis; use convincing gender arguments based on reliable sources and qualitative and quantitative data including sex disaggregated data);
- Making reference to international and national policy framework, policies, strategies and plans related to gender.

While the majority of the project outputs have elements focusing on knowledge management (for instance, integrated plans could be considered a capturing of knowledge), the knowledge management strategy will be anchored in the following activities:

Table 34 – Knowledge management on all project outputs

Component	Output	Knowledge developed/shared and how it will be managed	Budget (USD)
Component 1	Outputs 1.1, 1.4 and 1.7	• Digital modules will provide technicians and managers of the states and municipalities of each of the metropolitan regions with a broad database, plans and georeferenced maps to support evidence-based decision making. • Digital modules developed in partnership with local actors as a strategy for maintaining knowledge (e.g., creating a portfolio of sustainable development projects and indicators). • Training of local actors to manage and update the developed digital modules, maintaining technical knowledge within public bodies and giving freedom to local actors.	$ 1,339,615
Component 2	Output 3.2	• Training module for federative entities for the elaboration of project proposals for sustainable urban development solutions, including with the support of the Global Program for Sustainable Cities and the MDR. • SIS+ will provide its users with a guide to facilitate access to finance for sustainable urban development solutions, making the content accessible to multiple states and municipalities.	$ 310,667
Component 4	Output 4.1	• Structuring of the SIS+ Platform, a system for the dissemination of clean technological solutions, sharing best practices for sustainable integrated planning. • Training of federal, state and municipal governments for the use, dissemination and updating of the SIS+ database. • The system will make available and share with Brazilian city managers information on experiences, good practices and lessons-learned of other cities in undertaking integrated urban planning, including those of this GEF project and from around the world (through connecting to the SCIP platform)	$ 1,844,484
	Output 4.2	• Monitoring and disseminating good practices and lessons learned from the project's outputs through a guide to good practices, the SIS+ platform and other national networks.	
	Output 4.3	• Training on topics related to the mitigation of greenhouse gases, conservation of biodiversity and sustainable integrated planning, offered to strengthen the capacities	

Component	Output	Knowledge developed/shared and how it will be managed	Budget (USD)
		of both the actors - at the technical and political level - and the multiplying institutions. • Training of multiplying institutions will allow the content of the project to continue to be disseminated even after its completion. • Participation of representatives of Brazilian cities in Global Platform events such as SCIP Lab and SCIP Forums.	
		Total	$ 3,494,766

9. MONITORING AND EVALUATION

Monitoring and Evaluation (M&E) activities and related costs are presented in the cost M&E plan (Annex J) and are fully integrated in the overall project budget. The project will comply with UNEP standard monitoring, reporting and evaluation procedures. Reporting requirements and templates are an integral part of the legal instrument to be signed by the Executing Agency and the Implementing Agency

The project M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Annex A includes SMART indicators for each expected outcome as well as end-of-project targets. These indicators along with the key deliverables and benchmarks included in Annex L will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification to track the indicators are summarized in Annex A.

The M&E plan will be reviewed and revised as necessary throughout the project to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. General project monitoring is the responsibility of the Project Management Team (PMT) but other project partners could have responsibilities in collecting specific information to track the indicators. It is the responsibility of the Project Manager to inform UNEP of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

The executing agency will receive periodic reports on progress and will make recommendations to UNEP concerning the need to revise any aspects of the Results Framework or the M&E Plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures is the responsibility of the project's UNEP Task Managers. The UNEP Task Managers will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

Project supervision will take an adaptive management approach. The UNEP Task Managers will develop a project Supervision Plan at the inception of the project, which will be communicated to the Project Management Team and the project partners during the Inception Workshop. The emphasis of the Task Managers's supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring.

Progress vis-à-vis delivering the agreed project global environmental benefits will be assessed with the executing agency at agreed intervals. Project risks and assumptions will be regularly monitored both by the PMT, the project partners and UNEP. Risk assessment and rating is an integral part of the PIR. The PIR will be completed by the Project Manager and ratings will be provided by UNEP's Task Managers. The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. UNEP's Task Managers will have the responsibility of verifying the PIR and submitting it to the GEF. Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

Since this is a Full-Size Project (FSP), resources have been set aside in the project budget for a Mid-Term Review (MTR) or Mid-Term Evaluation (MTE). The Task Managers will decide when the MTR/MTE shall be initiated. The purpose of the Mid-Term Review (MTR) or Mid-Term Evaluation (MTE) is to provide an independent assessment of project performance at mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. The review will include all parameters recommended by the GEF Evaluation Office for Terminal Evaluations and will verify information gathered through the GEF tracking tools, as relevant. The review will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. Such parties were identified during the stakeholder analysis (see section 2. above). Members of the PMT may be interviewed as part of the MTR/MTE process and the PMT will develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the Task Managers to monitor whether the agreed recommendations are being implemented.

In-line with UNEP's Evaluation Policy and the GEF's Monitoring and Evaluation Policy, the project will be subject to a Terminal Evaluation (TE) commissioned by the UNEP Evaluation Office (EOU) at the end of project implementation. The EOU will be responsible for the Terminal Evaluation and will liaise with the Task Managers and Executing Agency's Project Management Unit throughout the process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, the GEF, executing partners and other stakeholders. The direct costs of the evaluation will be charged against the project evaluation budget (as have been allocated, see annex I-1). The terminal evaluation will typically be initiated after the project's operational completion. If a follow-on phase of the project is envisaged, the timing of the evaluation will be discussed with the Evaluation Office to feed into the submission of the follow-on proposal.

The draft terminal evaluation report will be sent by the Evaluation Office to project stakeholders for comment. Formal comments on the report will be shared by the Evaluation Office in an open and transparent manner. The final determination of project ratings will be made by the Evaluation Office when the report is finalized. The evaluation report will be publicly disclosed and will be followed by a recommendation compliance process. The evaluation recommendations will be entered into a Recommendations Implementation Plan template by the Evaluation Office. Formal submission of the completed Recommendations Implementation Plan by the Project Manager is required within one month of its delivery to the project team. The Evaluation Office will monitor compliance with this plan every six months for a total period of 12 months from the finalization of the Recommendations Implementation Plan.

The GEF Core Indicator Worksheet is attached as Annex F. It will be updated at mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report. As mentioned above, the terminal evaluation will verify the information of the tracking tool.

The direct costs of reviews and evaluations will be charged against the project evaluation budget. A summary of M&E activities envisaged is provided in Annex J. The GEF contribution for this project's M&E activities is US$238,034.

10. BENEFITS

The GEF-7 project aims to generate social, economic and environmental benefits for Brazil and its citizens. The project objective makes reference to co-benefits that will be generated in addition to mitigation and biodiversity benefits.

1) Social Benefits

The project aims to create significant social benefits for local city populations by applying an integrated approach which facilitates collaborative and participatory urban development, leading to more inclusive cities. For instance, the development of project plans and pilot investments will be designed through participatory processes in each city. This will ensure that the concerns, needs and priorities of residents, local communities and civil society organizations will be considered and incorporated in such interventions, leading to outcomes that respond to social needs.

Project activities will improve the management of important urban issues such as transportation, sanitation and urban sprawl, leading to an improvement in people's quality of life in the pilot metropolitan regions. This will include as with regards to health (low-emission transport, improved sanitation management), safety (reduced urban sprawl leading to more compact cities, with better provision of urban services including lighting and policing), and productivity (reduced travel times, greater safety). The development of platforms for the integration of municipal plans and data, and the strengthening of capacities for better metropolitan governance, are some examples of activities that can increase the population's access to important public services. Furthermore, the developed climate mitigation plan will promote a low-emission development pathway, leading to reduced air contamination and consequently reduced negative health impacts upon the local community. Plans to promote the scale-up of low-emission zones focus on developing spaces that promote a more livable and people-focused space. These will be designed as places for people, rather than for transport thorough-fares.

A second category of benefits, which in some cases can be translated, or converted, into economic terms (in others not), consists of the social benefits derived from increased access to green space, both within urban centers and in urban and nearby protected areas. The project's support for green space establishment and conservation has the potential to make a significant contribution to the wellbeing of urban residents in each of the pilot cities. Benefits are associated with recreational opportunities that encourage residents to spend increased amount of time outdoors in natural surroundings. In addition to physical and health benefits associated with enhanced opportunities for exercise (walking, biking, etc.), a range of additional health and wellness benefits, including enhanced cognition, arise from the restorative benefits of nature exposure. As noted, such benefits have an economic component as well, via improved health and wellbeing and enhanced productivity.

Another important benefit correlates specifically with the theme of gender – and inclusivity more broadly. Mapping opportunities, training on issues and addressing gender, in addition to fostering a governance structure that strengthens women's action, give voice to vulnerably etc., can be a gateway to empowerment of women and other marginalized groups within the project's sites (see also the gender analysis and action plan for details). One example is the support for sustainable value chains on the Combú Island Environmental Protection Area (Belém), which has a strong potential to contribute to the strengthening of female leadership, in addition to rescuing culture and traditions of riverine traditional populations in the region.

2) Economic Benefits

Through its component 3, the project aims to directly lead to economic benefits for Brazilian municipalities by enhancing the availability of financial offer for investing in sustainable urban development. By having enhanced access to such public financing, municipalities will be able to increase investment, and attract greater private investment, for promoting the development of sustainable cities. Increased investment in urban infrastructure is a significant job-creator and stimulus for responding from economic downturns, which many Brazilian cities currently find themselves within.

The project also focuses on creating economic benefits for civil society and the private sector. On the former, through the development of integrated plans in component 1, the project aims to lead to reduced travel times (through prioritization of public and non-motorized transport) and reduced energy usage costs (through uptake of efficiency measures) for communities, resulting in increased productivity and household savings. The project also aims to directly kick-start new economic opportunities for the private sector. Building on the component 2 investments, national financing institutions will strengthen and create financial instruments for catalyzing new opportunities for private sector investment in areas such as transport, energy services and waste management. For instance, the project will support FINEP to strengthen financial instruments for incentivizing micro-, small- and medium-sized enterprises to innovate solutions for responding to local sustainable urban development challenges. This may build upon existing innovation calls it has in the areas of Technology 4.0, Innovative Women, and Investment in Innovative Startups, as related to the urban context.

Improving metropolitan governance is also expected to promote better management of public resources and investments, potentially increasing the availability of resources to address other urban issues. If executed effectively, the project has the potential to change realities and leverage economic development where it intervenes locally. An example is the coordinated action between municipalities for basic sanitation solutions, which can potentially optimize public and private investments in each municipality through economies of scale, thus potentially generating a surplus for investment in other projects. Within the scope of pilot interventions to be carried out by the project, activities that revive the local trade and services through urban upgrading projects may generate economic gains and potentially also employment opportunities. Another example relates to fostering sustainable tourism and the sustainable production of local produce from certain protected areas. They represent an important source of income to local people and an incentive to protect nature and support these areas.

Taking a longer-term view, it is also possible to consider reductions in public health costs as a result of stimulating low-emission zones and transport modes. Likewise, better structuring of the urban environment through requalification can also have climate change adaptation benefits and result in potential savings for addressing the consequences of climate change, for example, in connection with the recovery of urban infrastructure affected by natural disasters.

3) Environmental Benefits

Beyond mitigation and biodiversity benefits to be generated by the project, described in section 6, there are many other environmental benefits that result from its interventions. These include: (i) reduced pollution in the form of noise, water, air and soil pollution; (ii) reduced heat island effect associated with excess traffic and the burning of fossil fuel; (iii) the spontaneous creation of urban gardens by surrounding communities as a result of the enhancement of green areas and their inclusion into the overall management of the wider landscapes, fighting thereby land degradation and food security locally. Concretely, in Belem, Teresina and Florianopolis the climate mitigation and low-emission technology action plans, the low-emission zone pilots, and the low-emission zone plans will lead to reduced air contamination and heat island effect. Furthermore, in Belem, the integrated solid waste plan will lead to less solid waste disposal, more solid waste recycling and re-use, and consequential reduced land and ground water contamination.

Furthermore, the GEF project, through its interventions in component 1 and 2, will contribute directly to increasing the resilience and supporting the adaptation of the metropolitan regions of Belem, Florianopolis and Teresina. On the one hand, the integrated planning platforms will support metropolitan actors to visualize key geospatial data, including layers related to geographical and physical attributes of the city's environment. Through these platforms and such visualization, the cities will be able to plan more effectively for building resilience, for instance with regards to managing coastline development to avoid erosion and increased possibility of flooding in Belem and Florianopolis. Furthermore, the integrated plans that the cities develop in component 1 will take into account risk matrices, ensuring that new developments incorporate considerations of urban resilience. For instance, in Teresina, the climate mitigation and low-emission technology plan may also focus on nature based solutions and other interventions to reduce the urban

heat island (UHI) effect, one of the key challenges in the city. In this way, through natural and low-emission cooling measures, the plan will support the city to reduce GHG emissions generated through air conditioning, as well as increase the city's resilience to temperature rise.

Component 2 also contributes directly to climate adaptation and resilience benefits. While the exact solutions will be determined during project execution, the integrated low emission street, block and district in Belem, Teresina and Florianópolis (Ouputs 2.1, 2.3 and 2.4) may include nature-based solutions that reduce UHI effect, but also serve to support storm-water runoff management and reduce flood impacts. This may also include solutions related to green infrastructure (such as green façades and roofs). The low-emission zones may also pilot solutions such as the retrofitting of public buildings and the use of sustainable materials with high thermal inertia to address UHI effects, increasing local resilience to increased temperatures in all three cities. Furthermore, the agroforestry production chain in Combu Island (Output 2.2) aims to provide benefits for climate resilience by reducing the vulnerability to extreme events both with regards to agriculture productivity and for the families that rely on the income from such agriculture. In synthesis, project interventions aim to reduce the vulnerability of communities directly involved in the areas of intervention by the implementation of integrated and climate-resilient solutions.

PART III: ANNEXES

The CEO Endorsement Document annexes may be found in the following pages.

ANNEX A: PROJECT RESULTS FRAMEWORK

1) Core indicators

Project Objective	Objective level Indicators	Baseline	Mid-Point Target (if applicable)	End of project Target	Means of Verification	Assumptions & Risks
Brazilian metropolitan regions reduce greenhouse gas emissions, conserve biodiversity and achieve economic, social and environmental co-benefits through an integrated urban planning approach	Indicator A (GEF core indicator 4): Area of landscapes under improved practices (excluding protected areas)	0	0	27,861	Project and government records. Plans developed and available for download on SIS+	Local government support (see risk #2 in section 5 of the CEO document) ensures all project pilots are fully executed (component 2) and project plans are adopted and implemented (component 1).
	Indicator B (GEF Core indicators 1 and 2): Protected areas under improved management for conservation and sustainable use:	0 ha terrestrial 0 ha marine	0 ha terrestrial 0 ha marine	16,355 ha terrestrial 1,687 ha marine	Project and government records. PA management plans developed/ revised and available for download on SIS+	Local government support (see risk #2 in section 5 of the CEO document) ensures all project pilots are fully executed (component 2) and project plans are adopted and implemented (component 1).
	Indicator C (contributing to GEF core indicator 6): Greenhouse gas emissions mitigated (metric tons of CO2e)	0	0 (pilots will begin operation only in year 2)	Direct: 106,380 Tons CO2e	Governmental monitoring records	Local government support ensures all project plans and pilots are fully executed (risk #2).
	Indicator D: Number of direct beneficiaries	0	1000 Women 1000 Men 2000 Total	Women: 1,200,000 Men: 1,160,000 Total: 2,360,000	Analysis of geographical and population coverage of developed plans	Local government support ensures all project plans and pilots are fully executed (risk #2).

2) Outcome indicators

Project Outcomes	Outcome level Indicators	Baseline	Mid-Point Target (if applicable)	End of project target	Means of verification	Assumptions
Outcome 1: Governments of the Belém Metropolitan Region, the Florianópolis Metropolitan Region and the Greater Teresina RIDE adopt integrated plans, strengthen governance and use new planning tools for accelerating sustainable urban development	Indicator 1A: # of metropolitan areas that adopt protocols for use of local integrated planning digital modules	0. The Belem and Florianopolis Metropolitan Regions and the Greater Teresina RIDE do not have GIS planning platforms	All three metropolitan regions and urban agglomerations test prototypes of the modules	3 metropolitan areas: 1Ai. The State of Pará has adopted a technical cooperation agreement (protocol) for institutionalizing, managing and updating the local integrated planning module 1Aii. At least two municipalities of the Belém Metropolitan Region have each made at least one planning decision based on the use of the local integrated planning module 1Aiii. The Teresina and Timon municipalities have adopted a technical cooperation agreement (protocol) for institutionalizing, managing and updating the local integrated planning module 1Aiv. The Teresina and Timon municipalities have each made at least one planning decision based on the use of the local integrated planning module. 1Av. SUDERF has adopted a technical cooperation agreement (protocol) for institutionalizing, managing and updating the local integrated planning module 1Avi. At least two municipalities of the Florianópolis Metropolitan Region have each made at least one planning decision based on the use of the local integrated planning module	Government records	Political will of local and provincial governments (risks #2)

Project Outcomes	Outcome level Indicators	Baseline	Mid-Point Target (if applicable)	End of project target	Means of verification	Assumptions
	Indicator 1B: # of metropolitan regions, urban agglomerations and RIDEs with improved evidence-based sustainable, inclusive integrated plans	Belém metropolitan region, the Teresina-Timon Urban Agglomeration and Greater Teresina RIDE have no integrated plans. Florianopolis Metropolitan Region has the Sustainable Urban Mobility Plan (PLAMUS)	Each metropolitan region / urban agglomeration / RIDE has initiated a process to develop at least i) one climate mitigation and technology action plan and ii) one biodiversity conservation plan	3 metropolitan regions and urban agglomerations: 1Bi. A climate mitigation and low-emission technology action plan for the Belém Metropolitan Region is adopted by the State of Pará together with Belém Metropolitan Region municipalities 1Bii. An Integrated Management Plan for Protected Areas (PAs) and Urban Green Areas for the Belém Metropolitan Region is adopted by the State of Pará 1Biii. A climate mitigation and low-emission technology action plan for the urban agglomeration is adopted by the Teresina and Timon municipalities 1Biv. A Comprehensive Biodiversity and Ecosystem Services Plan and Actionably Strategy is adopted by the Greater Teresina RIDE 1Bv. A climate mitigation and low-emission technology action plan for the Florianopolis Metropolitan Region is adopted by CODERF 1Bvi. Socio-environmental macro-zoning of the Florianópolis Metropolitan Region is adopted by CODERF	Government records of the state and metropolitan region municipalities which show officially approved plans	Political will of the local governments (risk #2) to adopt new or improved plans
	Indicator 1C: # of metropolitan regions and urban agglomerations with enhanced and gender-sensitive institutional arrangements	Belém metropolitan region: limited arrangements exist by State Law No. 76/2011 but were not operationalized	Completed technical study of good governance structures for each of the three metropolitan regions / urban agglomerations	3 metropolitan regions and urban agglomerations: 1Ai. The State of Pará and Belém metropolitan area municipalities have reviewed a proposal for updating Complementary Law 027/95 (for enhanced and gender-sensitive metropolitan governance and management arrangements)	Government records of the state and metropolitan region municipalities	Political will of and effective coordination between the local governme

Project Outcomes	Outcome level Indicators	Baseline	Mid-Point Target (if applicable)	End of project target	Means of verification	Assumptions
		Teresina-Timon Urban Agglomeration: no arrangements exist Florianopolis: arrangements as per Complementary Law No. 636/2014		and the Legislative Assembly of the State of Pará has formally considered this for adoption on at least one occasion 1Aii. The Teresina and Timon municipalities have reviewed a proposal for creating urban agglomeration governance and gender-sensitive management arrangements and their Municipal Chambers have considered the proposal for adoption on at least one occasion 1Aiii. A strategy for enhancing Florianopolis Metropolitan Region gender-sensitive governance and management arrangements is adopted by CODERF		nts (risk #1) to facilitate inclusive planning processes
Outcome 2: The governments of the municipalities of Belém, Florianópolis and Teresina invest in science and evidence-based solutions for low-emission and biodiversity-conservation-centered urban development	Indicator 2: # of cities with sustainable integrated low-emission, resilient, conservation or land restoration investment plans or project pipelines	0	Three (3) completed designs of sustainable integrated low-emission and biodiversity-conservation solutions in the municipalities of Belém, Florianópolis and Teresina, for executing in the second half of the project to generate evidence for scale up through investment plans	At least 3 cities have prepared low-emission project pipelines and submitted a minimum of one project to a financing institution: 1. Based on the experiences of the pilot low-emission street, Belem City has submitted minimum one project to a financing institution to scale-up the integrated pilot; 2. Based on the experiences of the pilot low-emission city block, Teresina City has submitted minimum one project to a financing institution to scale-up the integrated pilot; 3. Based on the experiences of the pilot sustainable district, Florianopolis City has submitted minimum one project to a financing	Local government records and reporting of public financial institutions to CODUS	Political will of the local governments (risk #2) to implement project pilots and submit project proposals

Project Outcomes	Outcome level Indicators	Baseline	Mid-Point Target (if applicable)	End of project target	Means of verification	Assumptions
				institution to scale-up the integrated pilot.		
Outcome 3: Metropolitan region and national actors initiate or strengthen innovative financing mechanisms for scaling-up sustainable urban solutions	Indicator 3A: # of metropolitan regions and national public financing institutions that have initiated or strengthened innovative financial mechanisms for scaling-up sustainable urban solutions	BNDES and FINEP existing financing mechanisms to promote sustainable urban development (see section 1b.2(iii)).	Belém Metropolitan Region: New environmental services to be provided in the surroundings of the Utinga State Park have been identified. National public financing: an analysis report has been prepared and submitted to national financing institutions on local government financial demand profiles, national financial sources, the effectiveness of existing financial instruments, and good international practices and criteria for financing sustainable urban development	3 metropolitan regions/national institutions with innovative financial mechanism operational. 3.1.i. One payment for ecosystem services mechanism in the Utinga State Park has been adopted by the Belém Metropolitan Region. 3.1.ii. Two new or strengthened innovative financial mechanisms for sustainable urban development have been implemented by national public financing institutions such as the Brazilian Development Bank (BNDES) and the Funding Authority for Studies and Projects (FINEP).	Reporting of public financial institutions and Belém Metropolitan Region, including Ideflor-bio, to CODUS, and noting by CODUS (for instance through meeting minutes) that such mechanisms exist or have been strengthened	Public and private financing institutions and private sector actors engage in project activities (risk #6)
	Indicator 3B: $USD available through new or enhanced innovative financial mechanisms for scaling-up sustainable urban solutions	$USD 0	Public financing institutions have access to recommendations on financing models and criteria for sustainable urban development suited to the Brazilian urban reality and different types of financial institutions	Minimum USD $75,000,000 confirmed to be available through new or strengthened public financial mechanisms for sustainable urban development, including through mechanisms of BNDES and FINEP (in accordance with their co-financing letters – see annex I-2)	Reporting of public financial institutions to CODUS	Public financial institutions continue to have resources and priorities focused on investment in sustainabl

Project Outcomes	Outcome level Indicators	Baseline	Mid-Point Target (if applicable)	End of project target	Means of verification	Assumptions
						e urban development (risk #5)
Outcome 4: Brazilian metropolitan region governments commit to greater ambition on sustainable urban development by drawing on new tools, enhanced access to good practices and strengthened capacity	Indicator 4A # average monthly visits to the SIS+ online platform over a six-month period	0	0 (beta version is available for internal testing)	Average of 500 visitors per month over a six-month period	SIS+ platform webpage analytics	#8. Other Brazilian cities fail to engage in SIS+ or capacity-building activities, leading to reduced project replication
	Indicator 4B: # of new commitments by Brazilian metropolitan region governments to develop integrated urban plans, including PDUIs	0	Minimum 14 metropolitan regions identified with potential interest to scale up ambition and invited to participate in the capacity-building activities	7 additional[224] metropolitan regions (10% of all metropolitan regions)[225]	State and municipal decisions as captured in related government documents	Brazilian cities have access to finance (risk #6) and technical support (risk #1) which leads them to enhancing ambition
	Indicator 4C: # of cities that have shared good practices and	0	1	3	SCIP global platform records	Cities are supportive of sharing their

[224] That is, not including the metropolitan regions of Belém and Florianópolis and the Greater Teresina RIDE.
[225] https://www.ibge.gov.br/geociencias/organizacao-do-territorio/estrutura-territorial/18354-regioes-metropolitanas-aglomeracoes-urbanas-e-regioes-integradas-de-desenvolvimento.html?=&t=sobre.

Project Outcomes	Outcome level Indicators	Baseline	Mid-Point Target (if applicable)	End of project target	Means of verification	Assumptions
	lessons learned with the SCIP global platform					experiences with other countries (risk #2)

ANNEX B: RESPONSE TO PROJECT REVIEWS

Comments from council at PFD stage:

Comments from Germany

1. Germany recommends including a specific section on potential for expanding the platform, and the programs activities to LDCs, as part of the theory and change and knowledge management. In its core function, the impact program should aim at going beyond supporting 24 cities in 9 countries, and particularly look at potential for supporting more LDCs – who are often characterized by high urban population growth and, at the same time, a lack of technical, financial and institutional capacities for sustainable planning of urban settlements.

Agency Response
LDCs will be invited to all GP activities, more specifically to regional city academies, the SCIP Forum, webinars and other learning events. There are set-aside resources from the GP for a number of LDCs cities to participate.

2. Germany recommends improving stakeholder-mapping in infrastructure-related issue areas such as transport and energy and clarifying the program's added value. The SCIP should carefully evaluate the risk of "doubling" and rather seek complementarities with the breadth of ongoing initiatives on sustainable/low-carbon/resilient infrastructure in cities. SCIP could provide the necessary policy backing and capacity building support and, as such, a cross-sectoral entry point for initiatives that operate further downstream, such as project preparation facilities and bilateral/multilateral development banks.

Agency Response
Countries, cities and implementing agencies of the country child projects must be responsible for choosing investments that complement rather doubling on existing work. The Regional Coordinators of the Global Project will be responsible for coordinating with project cities and implementing agencies to refine the training materials and make them relevant to the cities investments, and as such make add value to knowledge and capacity of the cities.

3. Germany welcomes the choice of UNEP as lead agency, especially given the topical focus of the initiative on land-use planning, urban metabolism, urban ecology, and the related UNEP platforms on resource efficient cities and GlobalABC. However, Germany would recommend including a dedicated section on cooperation with UN-Habitat. Its capacity building efforts for urban planners (such as Planners for Climate Action), knowledge resources, partner networks and global platform (UN-Habitat Assembly) should be leveraged to ensure a coherent and efficient approach.

Agency Response
UNEP and UN-Habitat have a strong, ongoing partnership under the umbrella of the Greener Cities Partnership. UN-Habitat will play a key role in global advocacy. Their events such as the World Urban Forum are explicitly mentioned in the project as an opportunity to organize SCIP side-events. SCIP will also build on existing tools of UN-Habitat such as the City Prosperity Index.

4. Lastly, Germany would recommend mainstreaming the issues of durability and follow-up funding for of each Child Project, as the proposal does not address this issue

Agency Response
The Sustainability section of each child project will address this concern. In addition, components 3 and 4 will create the conditions for durability and future funding. In the case of the Global Platform, the fact that the project will be implemented by UNEP, WRI, C40 and ICLEI, all committed organizations in the area of urban sustainability will ensure the continuity of the vision. As mentioned in the sustainability section, these institutions will aim to maintain project partnerships that could continue the work of the Global Platform. UNEP will ensure data and information from the project website are kept online for public consumption.

Comments from United States

1. We look forward to tracking the experience of the Sustainable Cities Impact Program in linking the public and private sectors, as well as its future expansion to a greater number of cities across continental Africa. We suggest that the program consider developing additional programming on water-related goals, particularly those related to energy production, health care, gender equality, industry development, and subsidence.

Agency Response
Non-SCIP cities will be invited to all in country events, and the global platform has set aside resources to finance the participation of non-SCIP LDC cities to expand the impact of the project. The project has a strategic plan on financing and a number of interventions to foster partnership with the private sector including a number of city business marketplaces aimed at linking businesses with cities. Finally, the SCIP GP will have a model of nature-based solutions and resilience. The module will include wetland and coastal nature-based solutions to address current issues that SCIP cities are facing in Freetown and Kigali.

2. Additionally, we would want to ensure that this program takes into account the Government of Rwanda's plans for affordable housing and model communities and integrates programming, to the greatest extent possible, with those plans.

Agency Response
This comment has been shared with the World Bank Task Team Leader in Rwanda. The World Bank does cover slum upgrades, so they will be able to take this comment into account.

Comments from Norway-Denmark constituency

1. The program appears to involve an ambitious coordination effort between four different international organization (UNEP, ADB, UNDP, WB). If successful, the project can potentially benefit from having four agencies with different areas of expertise and outreach.

Agency Response
N/A

2. Regarding various components including Comp. 1 where the outcome is "Local and/or national governments have strengthened governance, institutions, processes, and capacities to undertake evidence-based, sustainable, inclusive, integrated planning and policy reform" and Comp. 4 where the outcome is "Policy making and action are influenced at local, regional and national levels to promote sustainable and inclusive cities", the indicators proposed are broad and will likely be challenging to monitor and separate between correlation and causation, and/or determine the impact of. For example, indicator 8. "# of resolutions

and/or commitments to advance urban sustainability and inclusiveness in high-level policy making events" – presumably not all resolutions will be equally impactful.

Agency Response
These comments refer to the Program Framework Document (PFD) monitoring framework, which is designed to cover the full scope of all child projects under the program and allow them to report at the program level during implementation. Child projects are not expected to adopt the exact language of the PFD monitoring framework indicators but tailor their indicators so that they remain relevant to the PFD monitoring framework but more specific to their project scope and focus. For example, where a PFD monitoring framework indicator refers to policies or plans, the country child project should refer to the specific policy or plan it aims to improve. In this way we hope to be able to link the impacts of projects to the program level and be specific about what those impacts are. This logic should also apply to governance and institutions. Projects should be referring more specifically to the governance or institutional arrangements they plan to improve.

3. Indicator 11. "# of cities that have shared their good practices and lessons learned with the SCIP GP" – what constitutes "shared" – sharing at a large conference, shared online, partially shared, or fully shared? Etc.

Agency Response
Each child project has been asked to set aside funding to develop and share best practices with the SCIP GP. All the lines of outreach of the global program will be open to the child projects to share these best practices, including the project website, as part of the communication strategy, meetings, conferences and webinars. The SCIP GP will actively promote good best practices through its means of outreach to reach a broad and relevant audience.

4. Comp. 3 has a proposed outcome of "Local and national governments initiate innovative financing and business models for scaling-up sustainable urban solutions" where one of the indicators (7) is "USD leveraged through the innovative financial mechanisms and business models for scaling-up sustainable urban solutions". – Is it clearly defined what constitutes "innovative financing"? Are blended-finance models still considered innovative? Can "traditional" financing still be considered valuable in this context?

Agency Response
The program does not aim to duplicate the work of financing institutions whose core work is often focused around tried and tested (and therefore less risk), financing approaches. The aim of the program is to promote innovate financing mechanisms to make additional sources of financing available to cities to make their investments. Many of the child projects have identified innovative sources of financing, such as green bonds, public private partnership or land value capture arrangements. The program will actively monitor as support these arrangements and bring them to the attention of other cities and promote capabilities in the cities to leverage this mechanism to help them finance their integrated initiatives.

Specifically, component 1 of the Global Child project has an associated workstream on finance that will complement the activities led by the child projects on finance. Giving the huge gap between infrastructure needed for sustainable cities and the resources channel to meet this end, SCIP will take a look to 'traditional' finance instruments (government funding and loans) and 'innovative' (blended finance, PPPs, land value capture, green bonds) financial mechanisms to fund sustainable urban infrastructure projects

5. USD 6,949,003 is budgeted for Program Management Cost (i.e. ca. 5%) presumably for implementing the various components. USD 13,205,219 in addition is requested from the various agencies (UNEP, UNDP, WB, and ADB), i.e. ca. 8.3% - is this on top of the fee above?

Agency Response
The fee is on top of the project management costs, but these sources of funds are used for different purposes. The Project Management Costs is related to the project execution it aims to cover administrative and finance activities such as the audits, reporting, procurement and contracts management and these funds are used by the Executing Agency. The GEF policy limits the PMC to 5%. This amount is different to a 9% Implementing Agency fee of the total project cost and is used by the Implementing Agencies of the program supervision and oversight of GEF projects, on behalf of the GEF.

6. Estimated co-financing is USD 1,689,754,351 so the potential leveraged resources are significant. However, the most significant of which is loans provided by World Bank (WB) to Indonesia and China, ADB to India, and the Governments of Argentina, Brazil, Costa-Rica and Indonesia. There is also a large co-investment by the Chengdu Environment Group in China. Only USD 11.5 is expected from private actors. This lack of private investors may be explained by the fact that it involves long-term investment with significantly complex interactions between sectors and without a standardized measurement, hence difficult for investors to measure the anticipated impact, and hence make decisions based on anticipated impact. Is the objective with the "innovative finance" above to increase the amount of private investment leveraged or to be innovative with existing public finance available? It is positive to note that the SCIP Global Platform aims to focus on a number of key areas for private sector engagement.

Agency Response
The SCIP GP has a number of outputs specifically designed to promote private sector participation in city work and leverage innovative financing mechanisms. While innovate financing per se is not solely directed at the private sector it does include the private sector. The response above provide a complete explanation of some of the outputs that will be dedicated to innovative finance and the private sector.

Comments from STAP at PFD stage:

Part I: Project Information			Responses
GEF ID	10391		
Project Title	Sustainable Cities Impact Program		
Date of Screening	2-Dec-19		
STAP member Screener	Saleem H. Ali		
STAP secretariat screener	Sunday Leonard		
STAP Overall Assessment		Minor issues to be considered during project design	
		STAP welcomes the Program Framework Document (PFD) for the Sustainable Cities Impact Program. The PFD has been developed with broad geographic scope after detailed consultations through the GPSC and key partners WRI, C40, and ICLEI. The project components are generally well defined and are likely to deliver the expected global environment benefits. However, one area where there is some ambiguity is on energy source emission reductions. The "low carbon" transition that is aspired for needs to be further unpacked, especially regarding energy usage and buildings in cities. The expected outcomes are clearly noted, but the methods used to calculate carbon savings are not provided. To have confidence in the carbon savings numbers, there needs to be some more explicit guidance on calculations presented for outcomes. It is not enough to say that these are estimates which will be "verified and validated in the developmental phase." Some level of verification and confidence should exist at this stage. The numbers seem contrived and exaggerated in the current form without any backing in data or calculation citations. Also related to the above, on page 82, the total GHG emissions reduction from each country was presented in Table 8. However, information on how this was arrived at or which specific intervention will lead to the estimated GHG emission reduction is not provided. It will be useful to include information on which specific aspect or intervention or component of the child projects that will generate these GHG emission reductions. Some of the conservation areas noted are tangible outputs in hectares, but the rest of the outcomes are too generalized to be presented as "outputs." There is also concern that there is much ambiguity about the outcome metrics and	• Comment at the program level. • Comment at the program level. • During project design GHG emission reductions have been estimated with more detail based on specific outputs. The interventions that lead to the GHG emission reductions are indicated in the estimation methodology description (Annex M). • Comment at the program level.

		indicators. Rather than setting goals for the level of low carbon energy penetration, there are vague statements about undertaking a range of sustainable initiatives but no clear benchmarking on levels of improvement with the status quo.	

		There is a detailed theory of change presented in diagrammatic form, and the linkages between the components are covered in Table 2 though fairly generic (bottom-up diagram reading). Also, some of the assumptions presented in the Theory of Change should be discussed in more detail, such as "resource decoupling." The UNEP's International Resource Panel has done extensive work on how decoupling is enabled, particularly regarding the rebound effect concerns raised by resource efficiency. Furthermore, there should be some more explicit mention of green growth as a key driver of change. Cities are economic engines where green businesses galvanized by the right policy changes can lead to a virtuous cycle of market-driven sustainability. Hence, the critical role of green growth for sustainable cities needs to be actioned in this program. Some useful references: Hammer, S. et al. (2011), "Cities and Green Growth: A Conceptual Framework," OECD Regional Development Working Papers 2011/08, OECD Publishing. http://dx.doi.org/10.1787/5kg0tflmzx34-en; Green Growth in Cities (http://urban-intergroup.eu/wp-content/files_mf/oecdgreengrowthincities.pdf) The innovation aspect of the proposal is presented mainly in terms of financing and accelerator development (Chart 3). Specific green technology innovations need to be more explicitly targeted and noted in the plan development of the project. Digital platforms, data, and map digitization are also presented as another form of innovation in the program. Blockchain technology is an emerging technology that can be beneficial in this regard and could be considered for the project. Please see STAP's recent paper on "harnessing blockchain technology for the delivery of global environmental benefits," which provide useful information on how blockchain can help enable sustainable cities. Clustering is presented as a scaling-up mechanism. This is plausible in the urban context. However, STAP recommends that further review of the literature on this topic should be considered and cited. A recent book in this regard worthy of note is: Iftikhar, M. N., Justice, J. B., & Audretsch, D. B. (Eds.). (2019). Urban Studies and	• Comment at the program level. • Comment at the program level. • Comment at the program level.

		Entrepreneurship. New York, NY: Springer.	
Part I: Project Information	What STAP looks for	Response	
B. Indicative Project Description Summary			
Project Objective	Is the objective clearly defined, and consistently related to the problem diagnosis?	Yes – the impact program has been well-deliberated through consultations and the Global Platform on Sustainable Cities and objectives and outcomes are clearly presented.	N/A
Project components	A brief description of the planned activities. Do these support the project's objectives?	The components are generally well defined but one area where there is some ambiguity is on energy source emission reductions. The "low carbon" transition that is aspired for needs to be further unpacked, especially with reference to energy usage and buildings in cities.	• Comment at the program level.
Outcomes	A description of the expected short-term and medium-term effects of an intervention.	The outcomes are clearly noted but the methods used to calculate carbon savings are not provided. To have confidence in the carbon savings numbers there needs to be some clearer guidance on calculations presented for outcomes. It is not enough to say that these are estimates which will be "verified and validated in the developmental phase." What is the point of that when the money has already been approved? This should be verified upfront. The numbers seem contrived and exaggerated in current form without any backing in data or calculation citations.	• Comment at the program level.
	Do the planned outcomes encompass important global environmental benefits/adaptation benefits?		
	Are the global environmental benefits/adaptation benefits likely to be generated?		

Outputs	A description of the products and services which are expected to result from the project. Is the sum of the outputs likely to contribute to the outcomes?	Some of the conservation areas noted are tangible outputs in hectares but the rest of the outcomes are too generalized to be presented as "outputs." I am also concerned that there is a lot of ambiguity about the outcome metrics and indicators. Rather than setting goals for level of low carbon energy penetration, there are vague statements about undertaking a range of sustainable initiatives but no clear benchmarking on levels of improvement with the status quo	• Comment at the program level.
Part II: Project justification	A simple narrative explaining the project's logic, i.e. a theory of change.	Theory of change diagram is helpful but some of the assumptions presented should be discussed such as "resource decoupling." IRP has done extensive work on how decoupling is enabled, particularly with reference to the rebound effect concerns raised by resource efficiency.	• Comment at the program level.
1. Project description. Briefly describe:			
1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)	Is the problem statement well-defined?	These sections are detailed enough and there has been identification of barriers and threats with reference to urbanization trends and economic drivers of unsustainable planning.	N/A
	Are the barriers and threats well described, and substantiated by data and references?		
	For multiple focal area projects: does the problem statement and analysis identify the drivers of environmental degradation which need to be addressed through multiple focal areas; and is the objective well-defined, and can it only be supported by integrating two, or more focal areas objectives or programs?		
2) the baseline scenario	Is the baseline identified clearly?	There is a good description of baseline scenarios on Page 35 and complementarity with a range of existing programs. Having C40 onboard is	• As aforementioned, during project design GHG emission reductions have been estimated with more detail based on specific outputs. The interventions that lead to the GHG emission

or any associated baseline projects		reassuring since they have considerable metrics driven approaches owing to Bloomberg philanthropies funding which is highly data-driven. However, as noted earlier, the specific benefit numbers provided do not have adequate explanation of methods and source of data and calculations.	reductions are indicated in the estimation methodology description (Annex M).
	Does it provide a feasible basis for quantifying the project's benefits?		
	Is the baseline sufficiently robust to support the incremental (additional cost) reasoning for the project?		
	For multiple focal area projects:		
	are the multiple baseline analyses presented (supported by data and references), and the multiple benefits specified, including the proposed indicators;		
	are the lessons learned from similar or related past GEF and non GEF interventions described; and		
	how did these lessons inform the design of this project?		
3) the proposed alternative scenario with a brief description of expected outcomes and components of the project	What is the theory of change?	There is a detailed theory of change presented in diagrammatic form and the linkages between the components is covered in Table 2 though fairly generic in form (bottom up diagram reading). There should be some clearer mention of green growth as a key driver of change. Cities are economic engines and how green businesses that are galvanized by some of the policy changes can lead to a virtuous cycle of market-driven sustainability action should be noted.	• Comment at the program level.
	What is the sequence of events (required or expected) that will lead to the desired outcomes?		
	What is the set of linked activities, outputs, and outcomes to address the project's objectives?		

	Are the mechanisms of change plausible, and is there a well-informed identification of the underlying assumptions?		

	Is there a recognition of what adaptations may be required during project implementation to respond to changing conditions in pursuit of the targeted outcomes?		
5) incremental/additional cost reasoning and expected contributions from the baseline, the GEF trust fund, LDCF, SCCF, and co-financing	GEF trust fund: will the proposed incremental activities lead to the delivery of global environmental benefits?	The public sector investment and co-financing is massive and will require close monitoring as to whether there is even budget in government coffers, particularly in countries like Argentina with checkered records of public budgets, to offer these incentives, lest GEF investment become stranded.	• Cofinance has been identified through in-depth consultations with the different partners. A commitment letter has been issued, the Executing Agency will request yearly cofinance reports from the partners and will validate the contributions.
	LDCF/SCCF: will the proposed incremental activities lead to adaptation which reduces vulnerability, builds adaptive capacity, and increases resilience to climate change?		
6) global environmental benefits (GEF trust fund) and/or adaptation benefits (LDCF/SCCF)	Are the benefits truly global environmental benefits, and are they measurable?	Yes they are but their measurement is questionable as noted before.	• As aforementioned, during project design GHG emission reductions have been estimated with more detail based on specific outputs. The interventions that lead to the GHG emission reductions are indicated in the estimation methodology description (Annex M).
	Is the scale of projected benefits both plausible and compelling in relation to the proposed investment?		
	Are the global environmental benefits explicitly defined?		
	Are indicators, or methodologies, provided to demonstrate how the global environmental benefits will be measured and monitored during project implementation?		
	What activities will be implemented to increase the project's resilience to climate change?		
		The innovation aspect of the proposal is largely	• Comment at the program level.

7) innovative, sustainability and potential for scaling-up	Is the project innovative, for example, in its design, method of financing, technology, business model, policy, monitoring and evaluation, or learning?	presented in terms of financing and accelerator development (Chart 3). Clustering is presented as a scaling up mechanism. This is plausible in the urban context though further reading of the literature on this topic should be considered and cited. A recent book in this regard worthy of note is: Iftikhar, M. N., Justice, J. B., & Audretsch, D. B. (Eds.). (2019). Urban Studies and Entrepreneurship. New York, NY: Springer.	
	Is there a clearly-articulated vision of how the innovation will be scaled-up, for example, over time, across geographies, among institutional actors?		
	Will incremental adaptation be required, or more fundamental transformational change to achieve long term sustainability?		
1b. Project Map and Coordinates. Please provide geo-referenced information and map where the project interventions will take place.		Provided	
2. Stakeholders. Select the stakeholders that have participated in consultations during the project identification phase: Indigenous people and local communities; Civil society organizations; Private sector entities. If none of the above, please explain why. In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and	Have all the key relevant stakeholders been identified to cover the complexity of the problem, and project implementation barriers?	Yes – there has been active stakeholder engagement through the GPSC and local efforts as well.	N/A

means of engagement.			
	What are the stakeholders' roles, and how will their combined roles contribute to robust project design, to achieving global environmental outcomes, and to lessons learned and knowledge?		

3. Gender Equality and Women's Empowerment. Please briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis). Does the project expect to include any gender- responsive measures to address gender gaps or promote gender equality and women empowerment? Yes/no/ tbd. If possible, indicate in which results area(s) the project is expected to contribute to gender equality: access to and control over resources; participation and decision-making; and/or economic benefits or services. Will the project's results framework or logical framework include gender-sensitive indicators? yes/no /tbd	Have gender differentiated risks and opportunities been identified, and were preliminary response measures described that would address these differences?	Good section on gender and adequate discussion of this topic though it may be useful to differentiate between countries on where further attention may be needed given baseline gender empowerment differentials.	• Please refer to the gender section in this document to find a gender analysis at the child project level.
	Do gender considerations hinder full participation of an important stakeholder group (or groups)? If so, how will these obstacles be addressed?		
5. Risks. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design	Are the identified risks valid and comprehensive? Are the risks specifically for things outside the project's control?	Coastal cities have the greatest risk of impact during the 2020 to 2050 timeframe. There could be further refinement of this comparative risk vulnerability presented.	• The Brazil project includes one coastal metropolitan region: Florianopolis. This specific climate risk vulnerability is taken into account in the document.

	Are there social and environmental risks which could affect the project?		
	For climate risk, and climate resilience measures:		
	How will the project's objectives or outputs be affected by climate risks over the period 2020 to 2050, and have the impact of these risks been addressed adequately?		
	Has the sensitivity to climate change, and its impacts, been assessed?		
	Have resilience practices and measures to address projected climate risks and impacts been considered? How will these be dealt with?		
	What technical and institutional capacity, and information, will be needed to address climate risks and resilience enhancement measures?		
6. Coordination. Outline the coordination with other relevant GEF-financed and other related initiatives	Are the project proponents tapping into relevant knowledge and learning generated by other projects, including GEF projects?	Yes, there is detailed discussion of crossover external projects and organizations. However, since this is the first GEF integrative program in this arena there is some understandable lack of detailed comparisons.	• Comment at the program level.
	Is there adequate recognition of previous projects and the learning derived from them?		
	Have specific lessons learned from previous projects been cited?		
	How have these lessons informed the project's formulation?		
	Is there an adequate mechanism to feed the lessons learned from earlier projects into this project, and to share lessons learned from it into future projects?		
8. Knowledge management. Outline the "Knowledge Management Approach" for the project, and how it	What overall approach will be taken, and what knowledge management indicators and metrics will be used?	The GPSC is noted as the key knowledge management mechanism as well as partnerships with UN Habitat.	• Comment at the program level.

will contribute to the project's overall impact, including plans to learn from relevant projects, initiatives and evaluations.			
	What plans are proposed for sharing, disseminating and scaling- up results, lessons and experience?		
STAP advisory response	Brief explanation of advisory response and action proposed		
	Concur	STAP acknowledges that on scientific or technical grounds the concept has merit. The proponent is invited to approach STAP for advice at any time during the development of the project brief prior to submission for CEO endorsement.	• Comment at the program level.
	* In cases where the STAP acknowledges the project has merit on scientific and technical grounds, the STAP will recognize this in the screen by stating that "STAP is satisfied with the scientific and technical quality of the proposal and encourages the proponent to develop it with same rigor. At any time during the development of the project, the proponent is invited to approach STAP to consult on the design."		
	Minor issues to be considered during project design	STAP has identified specific scientific /technical suggestions or opportunities that should be discussed with the project proponent as early as possible during development of the project brief. The proponent may wish to:	• Comment at the program level.
	(i) Open a dialogue with STAP regarding the technical and/or scientific issues raised;		
	(ii) Set a review point at an early stage during project development, and possibly agreeing to terms of reference for an independent expert to be appointed to conduct		

	this review.		
	The proponent should provide a report of the action agreed and taken, at the time of submission of the full project brief for CEO endorsement.		
	Major issues to be considered during project design	STAP proposes significant improvements or has concerns on the grounds of specified major scientific/technical methodological issues, barriers, or omissions in the project concept. If STAP provides this advisory response, a full explanation would also be provided. The proponent is strongly encouraged to: (i) Open a dialogue with STAP regarding the technical and/or scientific issues raised; (ii) Set a review point at an early stage during project development including an independent expert as required. The proponent should provide a report of the action agreed and taken, at the time of submission of the full project brief for CEO endorsement.	• Comment at the program level.

ANNEX C: STATUS OF UTILIZATION OF PROJECT PREPARATION GRANT (PPG)

Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: **US$ 229,358**			
Project Preparation Activities Implemented	***GETF Amount (US$)***		
	Budgeted Amount	***Amount Spent to date***	***Amount Committed***
World Resources Institute Brazil	120,000	120,000	-
UNEP Brazil	32,950	15,031	17,919
GEF international consultant	35,000	35,000	-
(Unused funds)	41,408	-	-
Total	**229,358**	**170,031**	**17,919**

If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to undertake exclusively preparation activities up to one year of CEO Endorsement/approval date. No later than one year from CEO endorsement/approval date. Agencies should report closing of PPG to Trustee in its Quarterly Report. **A balance of USD 41,408 is unspent from PPG activities and will be used during the first year of project execution in accordance with the above text.**

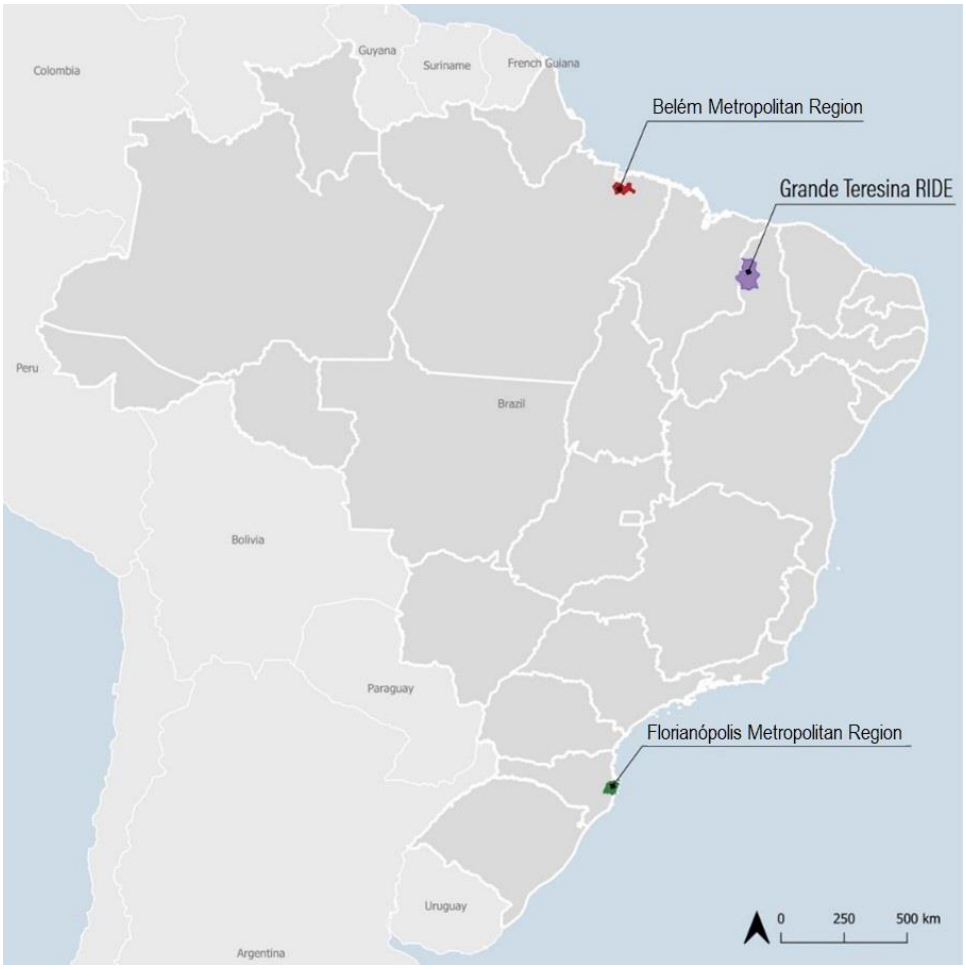
ANNEX D: CALENDAR OF EXPECTED REFLOWS (IF NON-GRANT INSTRUMENT IS USED)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF Trust Funds or to your Agency (and/or revolving fund that will be set up) – if applicable.

Not applicable.

ANNEX E: PROJECT MAP(S) AND COORDINATES

Project map



Cities / Subnational jurisdictions	Latitude	Longitude
Florianópolis	-27.5969	-48.5495
Teresina	-5.08921	-42.8016
Belém	-1.45502	-48.5024

ANNEX F: GEF 7 CORE INDICATOR WORKSHEET

Core Indicator 1	**Terrestrial protected areas created or under improved management for conservation and sustainable use**							***(Hectares)***
				Hectares (1.1+1.2)				
				Expected		Achieved		
				Concept note stage	Endorsement	MTR	TE	
				12,942	16,355.7			
Indicator 1.1	Terrestrial protected areas newly created							
Name of Protected Area	WDPA ID	IUCN category		Hectares				
				Expected		Achieved		
				Concept note stage	Endorsement	MTR	TE	
			Sum					
Indicator 1.2	Terrestrial protected areas under improved management effectiveness							
Name of Protected Area	WDPA ID	IUCN category	Hectares	METT Score				
				Baseline		Achieved		
					Endorsement	MTR	TE	
Belém Metropolitan Region Environmental Protected Area (Belém Metropolitan Region) *- without overlap with the area for Utinga Park*	WDPA ID 555600216	V	6,063.9		46			
Utinga State Park (Belém)	WDPA ID 478590	II	1,393.1		65			
Combú Island Environmental Protected Area (Belém Metropolitan Region)	WDPA ID 352212	V	1,597.2		50			
Amazon Metropolis Wildlife Refuge (Belém Metropolitan Region)	WDPA ID 555576202	III	6,367.3		55			
Museum Seringal Park Municipal Area of Relevant Ecological Interest (Belém Metropolitan Region)	WDPA ID 351750	VI	1.35		30			
Antônio Danúbio Botanic Garden Municipal Park (Belém Metropolitan Region)	WDPA ID 555576346	IV	3.54		21			
Carijós Ecological Region (Florianópolis Metropolitan Region)	WDPA ID 10822	I	759.3		52			
Palmares National Forest (Teresina Metropolitan Region)	WDPA ID 351807	IV	170.0		60			
		Sum	*16,355.7*					
Core Indicator 2	**Marine protected areas created or under improved management for conservation and sustainable use**							***(Hectares)***
				Hectares (2.1+2.2)				
				Expected		Achieved		
				Concept note stage	Endorsement	MTR	*TE*	
Indicator 2.1	Marine protected areas newly created							
Name of Protected Area	WDPA ID	IUCN category		Hectares				
				Expected		Achieved		
				Concept note stage	Endorsement	MTR	TE	
			Sum					
Indicator 2.2	Marine protected areas under improved management effectiveness							
Name of Protected Area	WDPA ID	IUCN category	Hectares	METT Score				
				Baseline		Achieved		
				Concept note stage	Endorsement	MTR	TE	
Pirajubaé Marine Extractive Reserve (Florianópolis Metropolitan Region)	WDPA ID 67715	VI	1,687.0		*54*			
		Sum	*1,687.0*					
Core Indicator 3	**Area of land restored**							***(Hectares)***
				Hectares (3.1+3.2+3.3+3.4)				
				Expected		Achieved		

			Concept note stage	Endorsement	MTR	TE
Indicator 3.1	Area of degraded agricultural land restored					
			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Indicator 3.2	Area of forest and forest land restored					
			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Indicator 3.3	Area of natural grass and shrublands restored					
			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Indicator 3.4	Area of wetlands (including estuaries, mangroves) restored					
			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Core Indicator 4	**Area of landscapes under improved practices (hectares; excluding protected areas)**					***(Hectares)***
			Hectares (4.1+4.2+4.3+4.4)			
			Expected		Expected	
			Concept note stage	Endorsement	MTR	TE
			23,342	27,861		
Indicator 4.1	Area of landscapes under improved management to benefit biodiversity					
			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
(1) Unprotected Urban Green Areas within Belém RM	rounded off numbers in hectares	*Hectares, rounded off numbers for "Áreas verdes urbanas não protegidas: 10.152,7 ha". As assessed by WRI's PPG baseline study based MapBiomas estimated green urban areas outside of PAs. The area at PIF stage is approx. and was based on the total of 23,342 ha for all three RMs, pro-rata.*	*8,552*	10,153		
(2) Unprotected Urban Green Areas within Florianópolis RM	rounded off numbers in hectares	*Hectares, rounded off numbers for "Áreas verdes urbanas não protegidas: 6.678,8 ha". Area, as assessed by WRI's PPG baseline study based MapBiomas estimated green urban areas outside of PAs. The area at PIF stage is approx. and was based on the total of 23,342 ha for all three RMs, pro-rata*	*5,626*	*6,679*		
(3) Unprotected Urban Green Areas within RIDE Grade Teresina	rounded off numbers in hectares	*Hectares, rounded off numbers for "Áreas verdes urbanas não protegidas: 10.879,15 ha". Area, as assessed by WRI's PPG baseline study based MapBiomas estimated green urban areas outside of PAs. The area at PIF stage is approx. and was based on the total of 23,342 ha for all three RMs, pro-rata*	*9,164*	*10,879*		
		Sum	*23,342*	*27,711*		
Indicator 4.2	Area of landscapes that meet national or international third-party certification that incorporates biodiversity considerations					
Third party certification(s):			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Indicator 4.3	Area of landscapes under sustainable land management in production systems					
			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Urban Garden- Teresina				*150*		

Indicator 4.4	Area of High Conservation Value Forest (HCVF) loss avoided					
Include documentation that justifies HCVF			Hectares			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
Core Indicator 6	**Greenhouse gas emission mitigated**					***24,548,863***
			Expected metric tons of CO_2e (6.1+6.2)			
			Concept note stage	Endorsement	MTR	TE
	Expected t CO2e (direct)		4,978,653	5,611,683		
	Expected t CO2e (indirect)		19,681,089	18,937,180		
Indicator 6.2	Emissions avoided outside AFOLU					
			Expected metric tons of CO_2e			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
	Expected t CO2e (direct)		4,978,653	5,611,683		
	Expected t CO2e (indirect)		19,681,089	18,937,180		
	Anticipated start year of accounting		2025	2025		
	Duration of accounting		20 years	20 years		
Core Indicator 11	**Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment**					*2,320,000*
			Number			
			Expected		Achieved	
			Concept note stage	Endorsement	MTR	TE
		Female	*1,122,000*	*1,200,000*		
		Male	*1,039,000*	*1,160,000*		
		Total	*2,161,000*	*2,360,000*		

ANNEX G: GEF PROJECT TAXONOMY WORKSHEET

Include the GEF 7 Taxonomy Worksheet to list down the taxonomic information required under Part I, item G by ticking the most relevant keywords/topics/themes that best describe this project.

Level 1	Level 2	Level 3	Level 4
☒ **Influencing models**			
	☒ **Transform policy and regulatory environments**		
	☒ **Strengthen institutional capacity and decision-making**		
	☐ **Convene multi-stakeholder alliances**		
	☒ **Demonstrate innovative approaches**		
	☒ **Deploy innovative financial instruments**		
☒ **Stakeholders**			
	☐ **Indigenous Peoples**		
	☒ **Private Sector**		
		☐ Capital providers	
		☐ Financial intermediaries and market facilitators	
		☐ Large corporations	
		☐ SMEs	
		☐ Individuals/Entrepreneurs	
		☐ Non-Grant Pilot	
		☐ Project Reflow	
	☐ **Beneficiaries**		
	☒ **Local Communities**		
	☒ **Civil Society**		
		☐ Community Based Organization	
		☐ Non-Governmental Organization	
		☐ Academia	
		☐ Trade Unions and Workers Unions	
	☒ **Type of Engagement**		
		☒ Information Dissemination	
		☐ Partnership	
		☒ Consultation	
		☒ Participation	
	☒ **Communications**		
		☒ Awareness Raising	
		☐ Education	
		☐ Public Campaigns	
		☐ Behavior Change	
☒ **Capacity, Knowledge and Research**			
	☐ **Enabling Activities**		
	☒ **Capacity Development**		
	☒ **Knowledge Generation and Exchange**		
	☐ **Targeted Research**		
	☐ **Learning**		
		☐ Theory of Change	
		☐ Adaptive Management	
		☐ Indicators to Measure Change	
	☒ **Innovation**		
	☒ **Knowledge and Learning**		
		☒ Knowledge Management	
		☐ Innovation	
		☒ Capacity Development	
		☐ Learning	

	☒**Stakeholder Engagement Plan**		
☒**Gender Equality**			
	☒**Gender Mainstreaming**		
		☒Beneficiaries	
		☐Women groups	
		☒Sex-disaggregated indicators	
		☒Gender-sensitive indicators	
	☐**Gender results areas**		
		☐Access and control over natural resources	
		☐Participation and leadership	
		☐Access to benefits and services	
		☐Capacity development	
		☐Awareness raising	
		☐Knowledge generation	
☒**Focal Areas/Theme**			
	☒**Integrated Programs**		
		☐Commodity Supply Chains ([226]Good Growth Partnership)	
			☐Sustainable Commodities Production
			☐Deforestation-free Sourcing
			☐Financial Screening Tools
			☐High Conservation Value Forests
			☐High Carbon Stocks Forests
			☐Soybean Supply Chain
			☐Oil Palm Supply Chain
			☐Beef Supply Chain
			☐Smallholder Farmers
			☐Adaptive Management
		☐Food Security in Sub-Sahara Africa	
			☐Resilience (climate and shocks)
			☐Sustainable Production Systems
			☐Agroecosystems
			☐Land and Soil Health
			☐Diversified Farming
			☐Integrated Land and Water Management
			☐Smallholder Farming
			☐Small and Medium Enterprises
			☐Crop Genetic Diversity
			☐Food Value Chains
			☐Gender Dimensions
			☐Multi-stakeholder Platforms
		☐Food Systems, Land Use and Restoration	
			☐Sustainable Food Systems
			☐Landscape Restoration
			☐Sustainable Commodity Production
			☐Comprehensive Land Use Planning
			☐Integrated Landscapes
			☐Food Value Chains
			☐Deforestation-free Sourcing
			☐Smallholder Farmers
		☒Sustainable Cities	
			☒Integrated urban planning
			☒Urban sustainability framework
			☒Transport and Mobility
			☐Buildings
			☒Municipal waste management
			☒Green space
			☒Urban Biodiversity
			☐Urban Food Systems
			☒Energy efficiency

[226] In accordance with NDC-2016 and PNAMCC-2019

			☒ Municipal Financing
			☐ Global Platform for Sustainable Cities
			☐ Urban Resilience
	☒ **Biodiversity**		
		☒ Protected Areas and Landscapes	
			☒ Terrestrial Protected Areas
			☒ Coastal and Marine Protected Areas
			☐ Productive Landscapes
			☐ Productive Seascapes
			☐ Community Based Natural Resource Management
		☒ Mainstreaming	
			☐ Extractive Industries (oil, gas, mining)
			☐ Forestry (Including HCVF and REDD+)
			☐ Tourism
			☐ Agriculture & agrobiodiversity
			☐ Fisheries
			☒ Infrastructure
			☐ Certification (National Standards)
			☐ Certification (International Standards)
		☐ Species	
			☐ Illegal Wildlife Trade
			☐ Threatened Species
			☐ Wildlife for Sustainable Development
			☐ Crop Wild Relatives
			☐ Plant Genetic Resources
			☐ Animal Genetic Resources
			☐ Livestock Wild Relatives
			☐ Invasive Alien Species (IAS)
		☒ Biomes	
			☐ Mangroves
			☐ Coral Reefs
			☐ Sea Grasses
			☐ Wetlands
			☐ Rivers
			☐ Lakes
			☒ Tropical Rain Forests
			☒ Tropical Dry Forests
			☐ Temperate Forests
			☐ Grasslands
			☐ Paramo
			☐ Desert
		☐ Financial and Accounting	
			☐ Payment for Ecosystem Services
			☐ Natural Capital Assessment and Accounting
			☐ Conservation Trust Funds
			☐ Conservation Finance
		☐ Supplementary Protocol to the CBD	
			☐ Biosafety
			☐ Access to Genetic Resources Benefit Sharing
	☐ **Forests**		
		☐ Forest and Landscape Restoration	
			☐ REDD/REDD+
		☐ Forest	
			☐ Amazon
			☐ Congo
			☐ Drylands
	☐ **Land Degradation**		
		☐ Sustainable Land Management	
			☐ Restoration and Rehabilitation of Degraded Lands
			☐ Ecosystem Approach
			☐ Integrated and Cross-sectoral approach
			☐ Community-Based NRM

			☐ Sustainable Livelihoods
			☐ Income Generating Activities
			☐ Sustainable Agriculture
			☐ Sustainable Pasture Management
			☐ Sustainable Forest/Woodland Management
			☐ Improved Soil and Water Management Techniques
			☐ Sustainable Fire Management
			☐ Drought Mitigation/Early Warning
		☐ Land Degradation Neutrality	
			☐ Land Productivity
			☐ Land Cover and Land cover change
			☐ Carbon stocks above or below ground
		☐ Food Security	
	☐ **International Waters**		
		☐ Ship	
		☐ Coastal	
		☐ Freshwater	
			☐ Aquifer
			☐ River Basin
			☐ Lake Basin
		☐ Learning	
		☐ Fisheries	
		☐ Persistent toxic substances	
		☐ SIDS : Small Island Dev States	
		☐ Targeted Research	
		☐ Pollution	
			☐ Persistent toxic substances
			☐ Plastics
			☐ Nutrient pollution from all sectors except wastewater
			☐ Nutrient pollution from Wastewater
		☐ Transboundary Diagnostic Analysis and Strategic Action Plan preparation	
		☐ Strategic Action Plan Implementation	
		☐ Areas Beyond National Jurisdiction	
		☐ Large Marine Ecosystems	
		☐ Private Sector	
		☐ Aquaculture	
		☐ Marine Protected Area	
		☐ Biomes	
			☐ Mangrove
			☐ Coral Reefs
			☐ Seagrasses
			☐ Polar Ecosystems
			☐ Constructed Wetlands
	☐ **Chemicals and Waste**		
		☐ Mercury	
		☐ Artisanal and Scale Gold Mining	
		☐ Coal Fired Power Plants	
		☐ Coal Fired Industrial Boilers	
		☐ Cement	
		☐ Non-Ferrous Metals Production	
		☐ Ozone	
		☐ Persistent Organic Pollutants	
		☐ Unintentional Persistent Organic Pollutants	
		☐ Sound Management of chemicals and Waste	
		☐ Waste Management	
			☐ Hazardous Waste Management
			☐ Industrial Waste
			☐ e-Waste
		☐ Emissions	
		☐ Disposal	
		☐ New Persistent Organic Pollutants	
		☐ Polychlorinated Biphenyls	

		☐ Plastics	
		☐ Eco-Efficiency	
		☐ Pesticides	
		☐ DDT - Vector Management	
		☐ DDT - Other	
		☐ Industrial Emissions	
		☐ Open Burning	
		☐ Best Available Technology / Best Environmental Practices	
		☐ Green Chemistry	
	☒ **Climate Change**		
		☐ **Climate Change Adaptation**	
			☐ Climate Finance
			☐ Least Developed Countries
			☐ Small Island Developing States
			☐ Disaster Risk Management
			☐ Sea-level rise
			☐ Climate Resilience
			☐ Climate information
			☐ Ecosystem-based Adaptation
			☐ Adaptation Tech Transfer
			☐ National Adaptation Programme of Action
			☐ National Adaptation Plan
			☐ Mainstreaming Adaptation
			☐ Private Sector
			☐ Innovation
			☐ Complementarity
			☐ Community-based Adaptation
			☐ Livelihoods
		☒ **Climate Change Mitigation**	
			☐ Agriculture, Forestry, and other Land Use
			☒ Energy Efficiency
			☒ Sustainable Urban Systems and Transport
			☐ Technology Transfer
			☒ Renewable Energy
			☒ Financing
			☐ Enabling Activities
		☐ **Technology Transfer**	
			☐ Poznan Strategic Programme on Technology Transfer
			☐ Climate Technology Center & Network (CTCN)
			☐ Endogenous technology
			☐ Technology Needs Assessment
			☐ Adaptation Tech Transfer
		☐ **United Nations Framework on Climate Change**	
			☐ Nationally Determined Contribution