



# **GREEN RECOVERY THROUGH THE CITIES**

## **IDENTIFYING INVESTMENT OPPORTUNITIES FOR A SUSTAINABLE FUTURE**



# **GREEN RECOVERY THROUGH THE CITIES – IDENTIFYING INVESTMENT OPPORTUNITIES FOR A SUSTAINABLE FUTURE**

**URBAN ACTIVITIES AND INFRASTRUCTURE ALIGNED WITH THE CRITERIA AND  
PRINCIPLES OF GREEN ECONOMIC RECOVERY**

## Datasheet

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### Elaborated by

SITAWI Finances for the Good

### Coordinators of FELICITY in Brazil

Carlos Alexandre Pires – MME

Gustavo M. Ribeiro – GIZ

### Publication Coordination

Alexandra Albuquerque Maciel – MME

Samira Sana Fernandes de Sousa Carmo – MME

Aline Rabelo – GIZ/FELICITY

Fernanda Feil – GIZ/FiBraS

Lukas Prinz – GIZ/FELICITY

Maria Rosa Tesser – GIZ/FELICITY

Yara Martinelli – GIZ/FELICITY

### Technical Revision – GIZ

Aline Rabelo – GIZ/FELICITY

Fernanda Feil – GIZ/FiBraS

Gustavo M. Ribeiro – GIZ/FELICITY & FiBraS

### Authors

SITAWI Finances for the Good

### Research and Text

Camila Franco

Isabella Duarte

Laura Domingues

Rafaela Carneiro

### Revision

Tatiana Assali

Rafael Gersely, CFA

### Edition and Revision

Clarisse Mourão

Ana Laura Cabral

### Graphic Project and Layout

Paula Lima de Melo

### Translation

Álvaro Vidal – Translator

David Haxton Jr. – Native Reviewer

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# FOREWORD

The health emergency imposed by the Covid-19 pandemic triggered an unprecedented crisis that imposed dramatic changes on reality which demanded the coordinated efforts of all countries in the world in order to preserve lives. The adaptation measures introduced to address the pandemic have profoundly affected the lives of all people in different ways and proportions.

Different activities in our daily lives have been impacted, some were limited, others interrupted, and many discontinued, with a profound impact on access to services, products, employment and investment in all sectors of the economy, including the energy sector. Nevertheless, during the pandemic, energy security was maintained, enabling essential services such as hospitals, food production and adaptive measures, such as working and studying remotely.

As society overcomes the challenges and the economy reorganizes itself in a post-COVID-19 economic recovery scenario, the opportunity arises for public policies to promote new economic activities that generate a positive environmental impact, green jobs, and contribute to sustainable development.

Investments such as distributed power generation from renewable sources and energy efficiency gain importance in this regard, especially when used jointly in public buildings, generating savings for public administration, contributing to the fiscal sanity of municipalities, promoting new green jobs and helping mitigate the effects of climate change. In addition, they also help reduce the demand for energy in times of higher consumption (end

consumers), reducing the need for new investments in centralized power generation and bolstering the resilience of the national integrated system (SIN) in periods of low water availability.

In this regard, the present publication **Green Recovery in Cities – Identification of Investment Opportunities for a Sustainable Future** is published at a propitious moment, providing recommendations to accelerate investments in low-carbon urban infrastructure on three different levels: federal public policies, the financial environment, and at the local level, in municipal governments. The importance of multi-level articulation becomes particularly clear given our ambition to build a more prosperous, resilient and sustainable future.

**Carlos Alexandre Príncipe Pires**

MINISTRY OF MINES AND ENERGY



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These institutions, the participants in the Green Finance WG of the Financial Innovation Laboratory – LAB<sup>1</sup>, associates of ABDE<sup>2</sup>, and members of the IPC – Investors for the Climate<sup>3</sup> initiative, have shared their views on the current integration of environmental, social and governance (ESG) aspects and safeguards in infrastructure projects (focusing on urban infrastructure) as a window of investment that opens, aimed at post COVID – 19 economic recovery, which can be regarded as a point of inflection in how national economic and investment policies are conducted, incorporating, from now on, aspects of environmental and social sustainability aligned with economic potential and universal access to basic goods and services.

A special thanks, also, to the teams at the WRI World Resources Institute and C40 Cities, who made significant contributions with data, comments, suggestions and insights towards the preparation of this work.

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<sup>1</sup> <https://www.labinovacaofinanceira.com/financas-verdes/>

<sup>2</sup> <https://abde.org.br/>

<sup>3</sup> <https://www.investidorespeloclima.com.br/>

## ABBREVIATION/ACRONYM CHART

<b>ABDE</b>	Brazilian Association for Development
<b>AFAP</b>	Foment Agency of the state of Amapá
<b>ASG</b>	Environmental, Social and Governance
<b>BADESC</b>	Foment Agency of state of Santa Catarina
<b>BADESUL</b>	Foment agency of the state of Rio Grande do Sul
<b>BDMG</b>	Development Bank of the state of Minas Gerais
<b>BID</b>	Interamerican Development Bank
<b>BMU</b>	Ministry of Environment, Nature Protection and Nuclear Safety of Germany
<b>BNB</b>	Bank of the Northeast
<b>BNDES</b>	National Bank for Social and Economic Development
<b>BRDE</b>	Regional Bank for Development of the Extreme South
<b>CAU/MG</b>	Architecture and Urbanism Council of the state of Minas Gerais
<b>CBCS</b>	Brazilian Council for Sustainable Construction
<b>CBI</b>	<i>Climate Bonds Initiative</i>
<b>CONPET</b>	Brazilian Business Council for Sustainable Development
<b>CONPET</b>	Programa Nacional de Racionalização do Uso dos Derivados do Petróleo e do Gás Natural: National Programme for the Rationalization of Oil and Natural Gas byproduct use
<b>COVID-19</b>	Coronavirus Disease 2019
<b>CEPEL</b>	Electricity Research Center
<b>EMBRAPA</b>	Brazilian Agricultural Research Company
<b>EPE</b>	Brazilian Energy Research Company
<b>FEBRABAN</b>	Brazilian Federation of Banks
<b>FNE</b>	Constitutional Fund for the Financing of the Northeast
<b>GBC</b>	<i>Green Building Council Brazil</i>
<b>GBP</b>	Green Bond Principles
<b>GEE/Gases de Efeito Estufa</b>	Green House Gases
<b>GIZ</b>	<i>German Development Agency</i>
<b>GSM Association</b>	Global System for Mobile Communications
<b>IBGE</b>	Brazilian Institute of Geography and Statistics
<b>ICLEI</b>	Local Governments for Sustainability
<b>ICMA</b>	<i>International Capital Markets Association</i>
<b>IDB</b>	<i>Inter-American Development Bank</i>
<b>IEA</b>	International Energy Agency
<b>IFC</b>	International Finance Corporation
<b>IFD</b>	Financial Institution for Development
<b>INMETRO</b>	National Institute for Metrology, Norm Setting and Industrial Quality
<b>INPE</b>	National Institute for Space Research



<b>IPC</b>	Investors for Climate
<b>IKI</b>	<i>International Climate Initiative</i>
<b>LAB</b>	Financial Innovation Laboratory
<b>LED</b>	<i>Light emitting diode</i>
<b>LEED</b>	Leadership in Energy and Environmental Design
<b>MCTI</b>	Ministry of Science, Technology and Innovation
<b>MDR</b>	Ministry of Regional Development
<b>MMA</b>	Ministry of the Environment
<b>MME</b>	Ministry of Mines and Energy
<b>MWH/Megawatt-hora</b>	Megawatt-hour
<b>NCI</b>	<i>New Climate Institute</i>
<b>ILO:</b>	<i>International Labour Organization</i>
<b>NDC</b>	Nationally determined contributions
<b>NPEB</b>	<i>National Practitioner Data Bank</i>
<b>ODS</b>	Sustainable Development Objectives
<b>OIT</b>	International Labor Organization
<b>OMS</b>	World Health Organization
<b>PBE:</b>	Brazilian Labeling Programme
<b>PMG</b>	<i>Parliamentary Monitoring Group</i>
<b>PNUMA</b>	UN Environment Programme
<b>PPI</b>	Partnerships and Investment Programme of the state of Santa Catarina
<b>PPPs</b>	Public Private Partnerships
<b>PROCEL</b>	National Program for Electricity Savings
<b>SBP</b>	Social Bond Principles
<b>SEEG</b>	System for Emission Estimate and GHG Removal
<b>SIDSSA</b>	<i>Sustainable Infrastructure Development Symposium South Africa</i>
<b>SNIS</b>	National System of Sanitation Information
<b>TCFD</b>	Task Force on Climate-related Financial Disclosures
<b>tCO<sub>2</sub>e</b>	Tons of Carbon equivalent
<b>TICs</b>	Information and Communication Technologies
<b>UNEP</b>	United Nations Environment Programme
<b>UNESCO</b>	<i>United Nations Educational, Scientific and Cultural Organization</i>
<b>WRI</b>	<i>World Resources Institute</i>
<b>WWF</b>	<i>Worldwide Fund for Nature</i>

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# EXECUTIVE SUMMARY

The pandemic of the new Coronavirus or COVID-19 (from Coronavirus Disease 2019) has proven to be a tragic global event. Data of the World Health Organization - WHO show that up to October 2021 more than 244 million cases of COVID-19 were diagnosed, and more than 4.9 million people died from the disease<sup>1</sup>. In Brazil, the scenario is no different: alarming data have been observed, with more than 21 million cases, and 610,000 deaths, which places the country in 2<sup>nd</sup> position in the sad ranking of countries with the highest number of deaths<sup>2</sup>.

Although uncertainties and threats (as per the Delta variant<sup>3</sup>) are still present, the global response to the virus has been gaining strength – also according to the WHO, approximately 7 billion vaccine doses have been applied, which allows visualizing a way out of the situation in which the global population finds itself.

The outbreak of the COVID-19 pandemic has affected the global economy in an alarming way. The social and economic crises have exposed vulnerabilities and social inequality in several countries, which have been markedly aggravated by economic growth reduced to historical lows.

Data show that COVID – 19 brought on the worst economic crisis since the Great Depression of 1929. The pandemic has driven many into unemployment and has drastically reduced incomes, imposing the need for emergency relief and economic aid programs for a significant portion of the global population.

In 2020, there was a retraction of 4.4% in global GDP. Also in this context, all G8 countries (group of the 8 largest world economies), except for China, witnessed increases in their unemployment rates. In Brazil, this rate reached 13.5% of the economically active population, the highest level since the historical series was started in 2012. Sectors related to tourism activities, such as travel and hospitality, and retail sales have been the most affected.

When projecting economic recovery in the post-pandemic scenario, the efforts and resources destined to the recovery of national and subnational economies have become a historic opportunity to leverage economic development.

This in turn has made it possible to foster an increase in the job generation potential, especially those related to the green and sustainable sectors, through greater productivity and efficiency of a circular and low-carbon economy, the effective realization of social inclusion, the preservation of natural capital, and by making risk management the basis for decision-making.

On the other hand, the need for the participation and the

articulation of public and private initiatives is now on the agenda, along with the urgent adoption of an inclusive development trend that considers actions aimed at mitigating the effects of global warming.

The COVID-19 pandemic has reminded us of the fragility of society's relationship with nature and its resources. From a climate perspective, scenarios of change and emergency have been observed even before the onset of the pandemic, whose effects on the population and the economy may, in just a few years, cause damage even more severe than that brought about by COVID-19.

We have reached a point in our society's history in which investing in greener and more sustainable technologies and infrastructure stands as a solution not only for creating jobs and resuming growth, but also to pivot society towards a more sustainable path, with a focus on well-being, inclusion, equality, sustainable use of resources, and economic prosperity.

In this regard, the present study offers an exploratory view of potentially enabling activities towards a Green Recovery in the area of urban infrastructure, aligned with national and international benchmarks and indicators of social, economic, environmental and climatic impact.

## Why speak about Green Economic Recovery?

When countries begin to direct their efforts towards the development of economic policies that are no longer aimed at short-term support and emergency aid, an investment plan or roadmap must be devised so as to maximize the use of these resources to promote social well-being. Toward this end, it is essential that medium and long-term economic recovery strategies are aligned with those aimed at promoting environmental and climatic benefits.

This context thus opens a rarely seen window of opportunity, made possible by the efforts of decision-makers to lead and rebuild an economy different from the one guided by "business as usual", subject to the increasingly prominent risks of climate change, and to how environmental and social resources are utilized.

It is the chance to establish a resilient, adapted, circular economy that contributes to the mitigation of climate change and that is capable of integrating, in an equitable and just manner, its greatest available capital, human capital.

This study understands that the path to a structural change in which the green outlook becomes the *status quo* of the economy lies in adopting safeguards, practices and guide-

1 <https://covid19.who.int/>

2 [https://en.wikipedia.org/wiki/Statistics\\_of\\_the\\_COVID-19\\_pandemic\\_in\\_Brazil](https://en.wikipedia.org/wiki/Statistics_of_the_COVID-19_pandemic_in_Brazil)

3 <http://www.iff.fiocruz.br/index.php/8-noticias/782-variante-delta>

lines which, on one hand, mitigate the environmental and social impacts connected to our existence as a production society and generator of wealth. On the other, these initiatives can reduce the emission of greenhouse gases, promote a more sustainable economy, and direct measures towards a more equitable and just society.

Thus, by integrating the perspective of financial resources aimed at reviving the economy, and directing actions towards promoting positive environmental, climate and social impacts, this study presents potentially enabling green economic recovery initiatives for urban settings. The mitigation of the impacts on the environment and the building of resilience to climate risks, which are becoming increasingly more robust, are key aspects in the development of this list of initiatives, which can be adapted and adjusted according to the reality of each decision-maker.

### Why cities?

Cities are home to practically 87%<sup>7</sup> of the Brazilian population (2019) and have become, not only in Brazil, but globally, the epicenter of the pandemic and the crisis caused by it.

With the pandemic scenario, issues related to inequality have increased, given that most vulnerable populations, from a socioeconomic, climatic and environmental perspective, live in cities<sup>8</sup>. On the other hand, cities are centers of change and protagonists in long-term green recovery: urban environments are the machinery of the global economy – in other words, if cities come to a halt, so does the world.

Cities are responsible for more than 80% of the world's GDP but, in contrast, are responsible for 70% of global Greenhouse Gas emissions. Additionally, cities are progressively growing in size, making inequality increasingly prominent given the scarcity of livelihoods in these areas.

Furthermore, urban infrastructure is not keeping pace with populational growth, and this lack of investment is already making it difficult for cities to meet people's basic needs, increasing the importance of global development and climate challenges in urban environments<sup>9</sup>.

In this regard, fostering socioeconomically egalitarian cities becomes key to achieving climate and development goals. According to the WRI – World Resource Institute (2021)<sup>10</sup>, two thirds of the world's people will be living in cities and vulnerable urban communities, and therefore will be among those most affected by adverse climate. The need has arisen for a new perspective on the construction and management of urban areas so that cities can effectively become more equitable and sustainable.

Regional development is thus fundamental as a basic strategy to implement local adaptation initiatives for the 2030 Agenda. The city Master Plans and other municipal management and regulatory instruments, such as the Federal Urban Land Regularization (Reurb) Law No. 13.465/2017, which grants families at risk the right to property, makes it possi-

ble for cities to be better prepared for increasingly frequent climate change scenarios.

However, 75% of Brazilian municipalities have less than 120 thousand inhabitants, and thus they are not required to draw up Master Plans, distancing these Brazilians from the main municipal urban policies aimed at adapting to climate change. In this regard, initiatives are needed to help decision makers define strategies and measures that promote the adoption of the needed adaptive activities.

Returning to the argument that there is currently a rarely seen window of opportunity for economic reconstruction, as in developed countries, it is important for Brazil to direct economic recovery resources towards the most affected territories and people – cities and their residents. However, we must keep in mind that this initiative will be enabled by the substantial participation of governments and financial institutions capable of funding this economic revival. These funds, in line with ESG precepts and safeguards, may foster profound transformations in urban management, making urban infrastructure the main strategy for adopting climate resilience initiatives and promoting an inclusive circular economy.

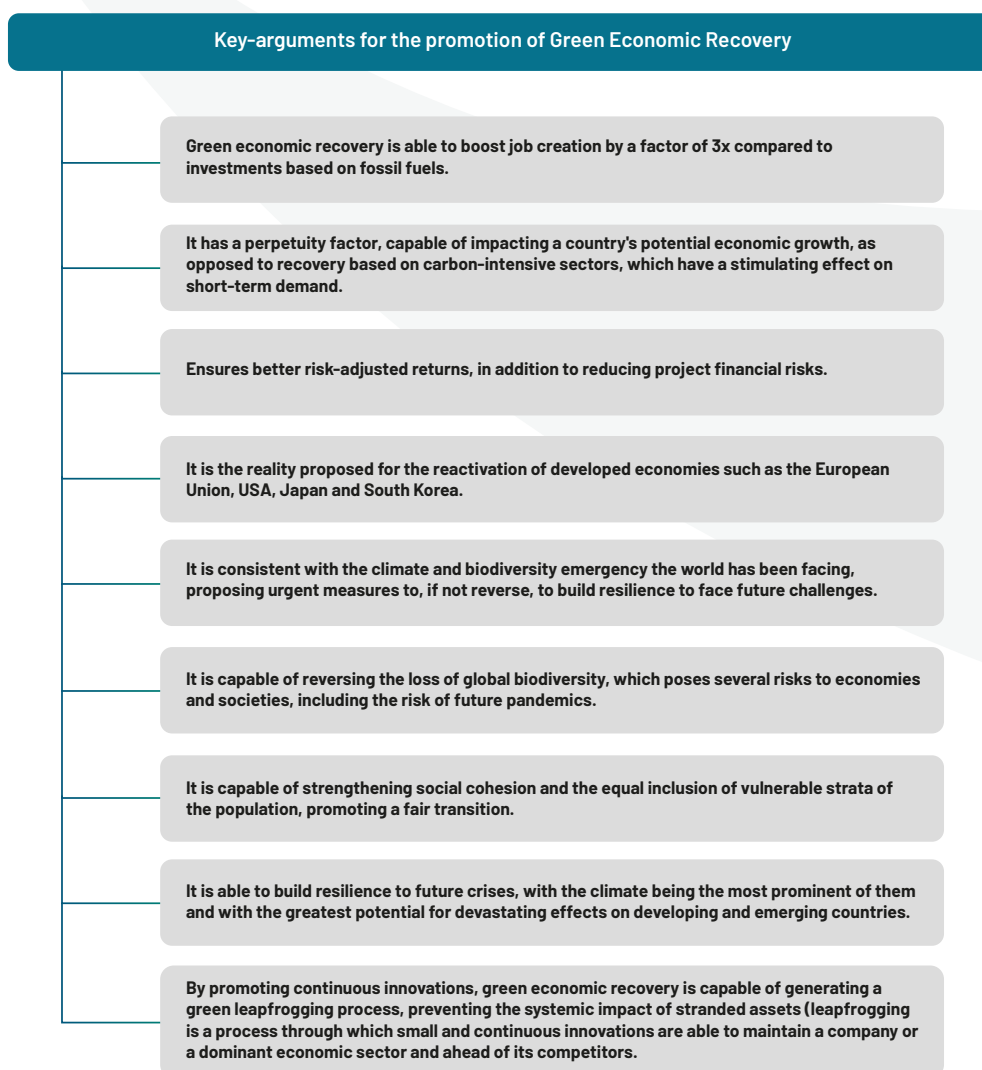
The purpose of this study is to identify investment opportunities aimed at the sustainable development of urban infrastructure initiatives, capable of enabling a green, resilient, inclusive and just transition which favors the creation of local jobs, especially for the more vulnerable populations.

The eligibility criteria of the initiatives that have the potential of making the green recovery viable were based on the arguments described in **Box 1**. The crossing of indicators related to the generation of economic additionality with positive social, environmental and climate externalities led to the selection of the following focus areas: Sanitation and Solid Waste Management; Renewable Energy and Energy Efficiency; Green Buildings; Urban Mobility and Accessibility; Information and Communication technology; and Adaptation to climate change, public space design and nature-based solutions.

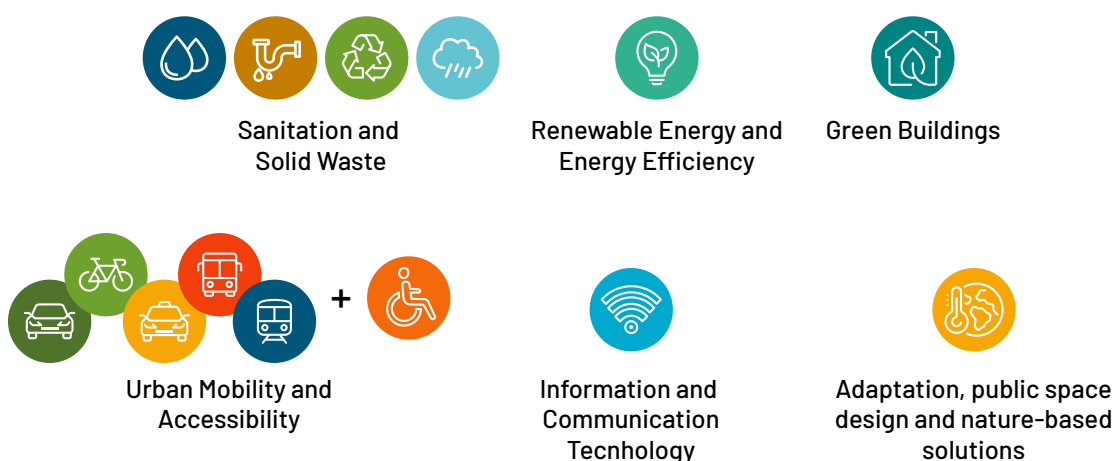


## BOX 1

## Key-arguments for the promotion of green recovery and potential urban infrastructure activities for green recovery



The study delved deeper into 6 selected areas related to urban infrastructure, based on their potential for generating jobs, the additional benefits at the environmental and social level, and the economic-financial feasibility: Sanitation and Solid Waste Management; Renewable Energy and Energy Efficiency; Green Buildings; Urban Mobility and Accessibility; Information and Communication Technology; and Adaptation to climate change, public space design and nature-based solutions.



Source: SITAWI, 2021

## METHODOLOGY FOR THE ALIGNMENT OF POTENTIAL GREEN RECOVERY ACTIVITIES

The methodological proposal of the present study is the alignment of activities that have sustainable objectives (environmental and/or social) based on pre-established methods, targets and/or metrics, duly aligned with the international Sustainable Finance standards.

This systematizing process can thus be used as a tool to facilitate decision-making regarding the funding of activities that have a positive impact from a socioeconomic, environmental, social and climatic perspective.

In the context of green recovery, stakeholders have yet to reach an understanding regarding its form and execution. In order to comprehend the perceptions of the actors involved in the urban infrastructure funding decision-making process, a diagnosis was carried out (to be discussed in Diagnosis of the green economic recovery in Brazil: perceptions and actions) through a questionnaire and interviews with relevant funding agents regarding how the green economic recovery should be conducted.

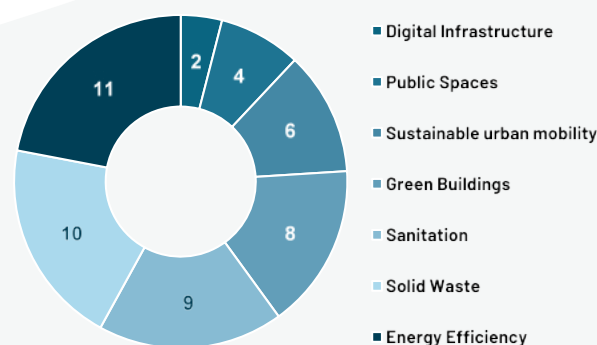
This diagnosis revealed that there is still no common language among municipal managers and urban infrastructure funders regarding the potential of generating a positive impact from the ESG aspects of the projects. It also identified a lack of definitions, indicators and criteria regarding green recovery that could be applied to urban infrastructure activities and projects.

In 57% of the institutions, projects aimed specifically at green recovery have been implemented and the interviewees provided important information regarding the degree of incorporation of ESG safeguards and of the socio-environmental intention and additionality of the projects currently being implemented or under study at their respective institutions.

In addition, the country's regional particularities and the latent post-pandemic recovery challenges have also influenced the engagement of stakeholders in this area, as the actions in many states and municipalities across the country are still of an emergency nature.

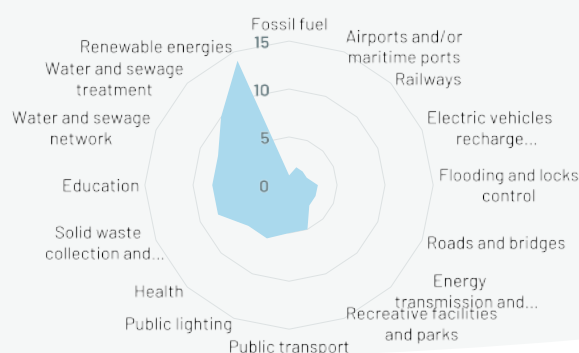
**Graphs 1 and 2** present the results of how funding agents view the key sectors and activities of the green urban infrastructure and the investment targets in the sector. As may be seen, the assessment reveals that there is a convergence between these activities and the areas of economic additionalities and positive environmental, social and climate externalities, confirming that these activities should be considered in the funding decision-making processes for green urban infrastructure management.

**GRAPH 1**  
Stakeholder interests – urban infra sectors



Source: SITAWI, 2021

**GRAPH 2**  
Focus of investments of the infrastructure funding agents



Source: SITAWI, 2021

Brazil continues to face a significant infrastructure gap, between regions of the country, between cities in the same region or even between different strata of residents of a particular municipality. Universal provision of infrastructure services is something that has been long discussed but faces certain peculiarities.

According to the WRI<sup>4</sup>, in Brazil the economic viability and funding alternatives of sustainable infrastructure projects are major barriers faced by cities regarding their execution. In addition, sustainable solutions compete with other priority areas for the tax revenue of Brazilian cities.

On the other hand, banks and development agencies such as BNDES have been structuring their institutional guidelines to support projects and activities related to sustainable economic development. These agents are being driven by global trends, especially with regard to sustainable finance and the incorporation of social and environmental safeguards<sup>5</sup>.

<sup>4</sup> Urban Funding | WRI Brasil

<sup>5</sup> BNDES News Agency - BNDES is among the best assessed companies in the sustainability world ranking

The lack of a common language among municipal managers and funders with regard to urban infrastructure projects that aim to address environmental, social and climate issues is a major obstacle to the feasibility of these activities. On one hand, municipal managers focus their urban development actions on the short term and on projects that do not consider potential positive impacts from an environmental and climate perspective. On the other, despite having clear sustainable development objectives, financial institutions claim that they do not receive technically viable projects that have these aims.

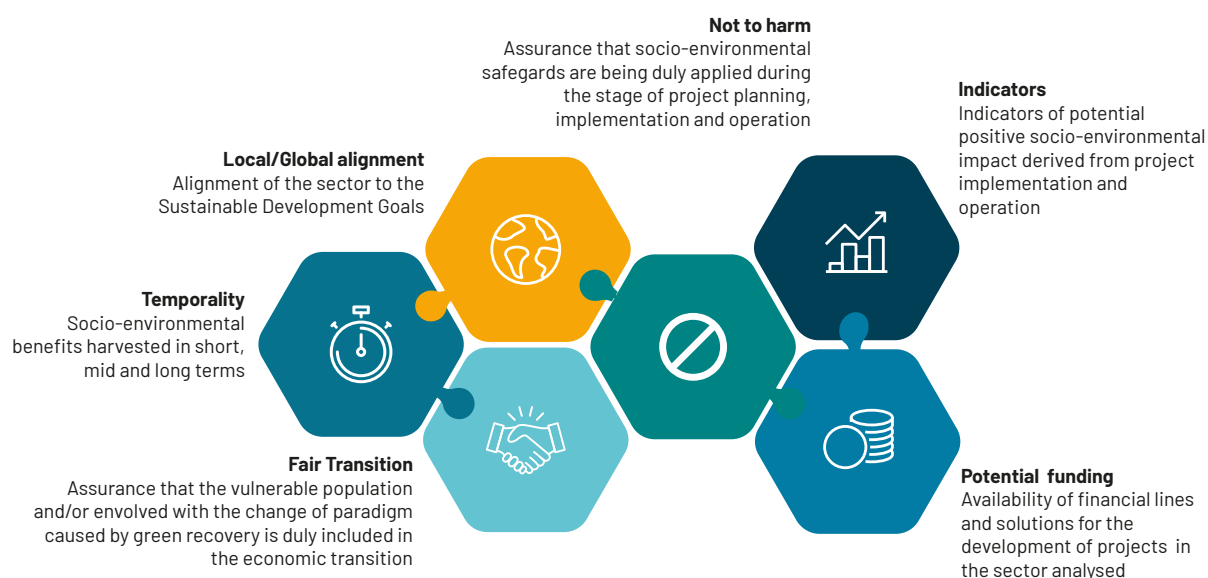
Thus, the objective of this study is to create bridges between municipalities and their managers and funding agents, by proposing indicators, practices, guidelines, alignments and safeguards which are capable, on one hand of scaling up the socio-environmental benefits generated by urban infrastructure projects and, on the other, valuing the preservation of natural resources and the just economic inclusion of populations most affected by the pandemic.

The strategy adopted in this study to prioritize sectors linked to green recovery is in line with international best practices and adapted to the Brazilian context. The methodology used to list and rank the economic activities and sectors has been adopted internationally by institutions such as the IFC (International Finance Corporation<sup>6</sup>), the European Investment Bank<sup>7</sup>, and the GIZ<sup>8</sup> itself, which have proposed frameworks capable of capturing the key elements of green economic recovery.

With the alignment proposed in this study between the activities and the principles of sustainability, the methodology adapted to the national scenario is expected to serve as a guide to direct urban infrastructure projects and their potential positive socio-environmental impacts towards green economic recovery. The intention to enable the incorporation of essential layers to current urban planning and structuring practices, along with the perspectives of sustainability, protection of biodiversity, neutrality and climate resilience and a just transition for the most vulnerable.

These aspects were analyzed according to the characteristics defined in **Box 2**. These will be addressed for each potential green recovery enabling activity, seeking to provide information to support decision-making on the projects that will have a greater positive impact on the economic recovery of cities.

**BOX 2**  
**Characteristics analyzed to define the eligibility of activities aligned with the green recovery**



Source: SITAWI, 2021

As a result of this study and the methodology developed, it is expected that activities and projects in Brazilian municipalities be increasingly aligned with the international context focused on sustainable finance. This dialogue will promote the convergence of the views of municipal managers and financing institutions, fostering common understanding and efforts between these two groups in order to achieve sustainable development.

<sup>6</sup> Ctrl-Alt-Delete: A Green Reboot for Emerging Markets (ifc.org)

<sup>7</sup> Environmental and Social Standards (eib.org)

<sup>8</sup> Green Recovery for Practitioners: Setting the Course Towards a Sustainable, Inclusive and Resilient Transformation | Green Growth Knowledge Platform



The image features a city skyline, likely Singapore, with various skyscrapers and greenery. A large teal overlay covers the top and left portions of the image. A diagonal line splits the bottom of the image, with the left side being teal and the right side showing a textured, light-colored surface. The title text is centered in the teal area.

# **POSSIBLE PATHS TOWARDS A GREEN RECOVERY: AN INTRODUCTION**



## THE SOCIOECONOMIC IMPACTS OF THE COVID – 19 PANDEMIC

Although there is no consensus in the scientific community, it is believed that the COVID-19 pandemic is directly connected to global environmental issues, such as the loss of biodiversity, climate change, air and water pollution, and waste management<sup>9</sup>. This view is related to both the origin of COVID-19 as well as the consequences it will have on our relationship with the environment and the future well-being of societies around the world, leading to changes in habits and behavior<sup>10</sup>.

Due to the economic composition and the greater or lesser use of natural resources by each economic sector, the economic impacts of the pandemic do not translate into environmental impacts in an identical manner. For example, the service sector was the hardest hit by the pandemic. However, since this sector has a lower intensity of resource use and emits less Greenhouse Gases (GHG) than the industrial or energy sectors, this sector's share in reducing pressure on natural resources, in the short term, is lower than its share in reducing global GDP. Thus, the reduction in pressure on the environment caused by human economic activity is not an exact reflection of the reduction in economic activity.

According to a publication (2021)<sup>11</sup> by the SEEG - Climate Observatory's Greenhouse Gas Emission Estimation System, GHG emissions related to energy activities fell 4.6% in 2020 compared to 2019, driven by recession and social isolation in the first semester, and the sharp reduction in gasoline consumption for passenger transport. However, GHG emissions from agricultural and land use increased, respectively, 2.5% and 23.7% compared to the same period. In this scenario, Brazil, in opposition to the rest of the world, had a 9.5% increase in emissions compared to a global reduction of 7%.

As we envision setbacks regarding climate goals, it is essential that long-term green economic recovery be duly considered. It is necessary commitments be towards economic activities that are based on criteria and strategies aimed at reducing pressure on natural resources and the climate and that enable a new social paradigm of equality and justice.

## THE PATH TO A RECOVERY

Evidence<sup>12</sup> has shown that the long-term impact of economic recovery will be determined by investment in innovation. Conversely, in spite of the possibility of the recovery being "brown", green investments can produce even greater multiplier effects. Recovery measures that incorporate the green or sustainable labels in a clear and direct manner will be capable of accelerating economic growth, strengthening social cohesion, and accelerating the transition to climate neutrality.

At a time when more and more countries, states, municipalities, companies and financial institutions are committed to a net zero future<sup>13</sup>, in line with the Paris Agreement, with low carbon intensity and focused on achieving the Sustainable Development Goals (SDGs), the post-pandemic opens a rarely seen window of opportunity for productive investments and commitment to long-term sustainable development programs.

When we realize that short-term economic restoration initiatives, so necessary during the darkest moments of the pandemic, which ensured livelihoods and access to basic services for the population, are no longer urgent<sup>14</sup>, thinking about long-term recovery becomes the focus of global action. Thus, as will be highlighted further on, the focus of this study is to suggest medium and long-term measures and investments, as well as changes in infrastructure that can be carried out by national and subnational agents.

Countries are uniquely positioned to mobilize green recovery initiatives. Some are capable of affording large economic stimulus packages, while others will only be able to attempt to meet the basic needs of their population and their businesses (including having to divert resources away from initiatives aimed at sustainable development towards emergency aid actions). Other national circumstances, such as the availability and access to natural resources, political dynamics, empowerment, and social dynamism, as well as possible paths for decarbonizing the economy are also specificities to be considered when planning for green economic recovery.

This study takes a look at Brazilian characteristics – on the promoting and hindering factor level – in order to analyze the feasibility of economic recovery from a sustainable perspective, with a focus on urban infrastructure and the relationship between municipalities and financing agents.

9 COVID-19 and the environment: A critical review and research agenda – PubMed (nih.gov)

10 The COVID-19 pandemic and its implications on the environment (nih.gov)

11 OC\_03\_report\_2021\_FINAL.pdf

12 <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>

13 Net-zero is an international scientific consensus which, in order to avoid worse climate damage, global emissions of liquid carbon dioxide (CO2) caused by humans need to drop to 45% of the levels of 2010 to 2030, reaching zero liquid around 2050. (What is Net Zero? – Net Zero Climate)

14 From pandemic to recovery: Local employment and economic development (oecd.org)

## ASSESSMENT OF THE GREEN ECONOMIC RECOVERY IN BRAZIL: PERCEPTIONS AND ACTIONS

The challenges involved in economic recovery after an event as significant as the COVID - 19 pandemic are numerous and should be discussed from a broader perspective in order to meet the needs of the population, especially the most vulnerable groups, who are the most affected in calamitous situations such as this. In addition to the economic aspects, society's needs also include environmental preservation, and the mitigation of and adaptability to climate change, since a just, inclusive and planned economic transition has the potential of increasing the population's resilience to adverse events.

Toward this end, the idea of green economic recovery is capable of addressing and promoting the economic, social, environmental and climatic improvements that the country needs, not only in the post-pandemic period, but also as an essential guide for public policies, development strategies and to prioritize economic sectors and activities.

### BOX 3 The green economic recovery



Green Recovery is a term that has been gaining ground to describe the transformative financial packages and measures that address the social, economic and political consequences of the COVID - 19 crisis through the definition of a new economic course of action, focused on the structuring and long-term reforms that aim to shift from the BaU (Business as usual) scenario to a reality that incorporates the precepts of environmental and social sustainability, the protection of biodiversity, resilience, and economic neutrality. The green economic recovery is also founded on a pillar of sustainable development: the inclusion of vulnerable populations in the formal economy through the precepts of a fair transition, i.e. giving a voice to this share of the population in decision-making and "leaving no one behind". In addition, it is important to emphasize that when defining a green recovery strategy, certain project initiatives and investments involving fossil fuels or potentially polluting activities must necessarily be excluded. (GIZ, 2021)

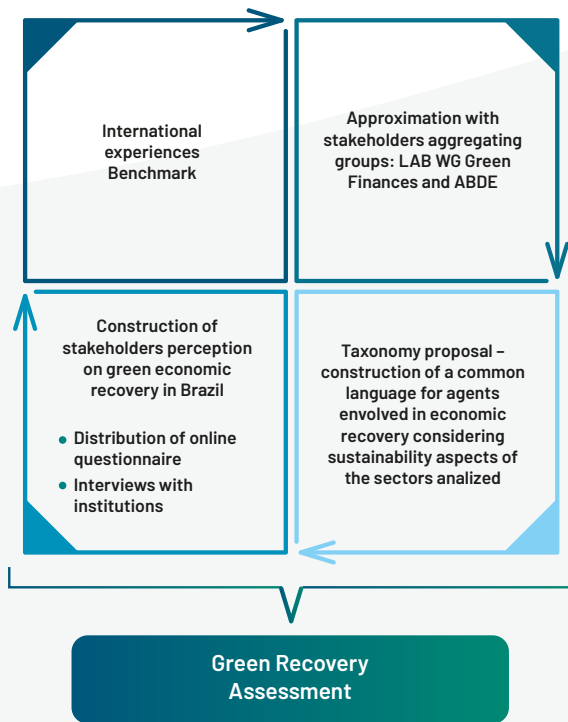
This concept – green economic recovery – can be adopted as a guide for the entire economy of a given country, state or municipality, permeating industrial, commercial, sectorial, social policies, etc. In this study, however, the focus is on how green economic recovery can drive economic activity and produce positive socio-environmental impacts through improvements in city infrastructures.

Using the definition of green economic recovery presented in **Box 3** of this study to bridge the gap between low-carbon infrastructure and sources of funding for projects that promote adaptation to climate change, energy efficiency, and the integration of renewable energy sources in the energy, water, transport, waste and construction sectors, this study, **in the context of a post COVID-19 green economic recovery**, aims to:

- Survey the urban infrastructure sectors with the greatest potential for conducting green recovery, including latent opportunities, economic benefits and environmental and social additionalities;
- Identify standards and techniques for enabling business opportunities that can strengthen the green economy in Brazilian municipalities;
- Propose criteria and indicators capable of evaluating the alignment of sectors, activities and urban infrastructure projects with the assumptions of green recovery;
- Propose, to Brazilian municipalities, a green recovery strategy in order to facilitate and deepen access to credit lines and dedicated investors.

The study was divided into the following stages:

**FIGURE 1**  
**Study methodology**



Source: SITAWI, 2021

The international experience benchmark served as a first contact with the initiatives of other countries during and after the most critical period of the pandemic, with a focus on low-carbon urban infrastructure projects. Projects in countries with some similarity to the Brazilian reality were chosen, including the financial solutions implemented by these initiatives. This initial activity served as a guide to identify sectors considered Green Recovery in the international context, to further enhance how this sector is perceived in Brazil, through the engagement of stakeholders.

Toward this end, approximation was sought with the LAB Green Finance WG and the ABDE. The former is where multidisciplinary topics are discussed and articulated which are focused on sustainable finance and on the enabling of financial solutions capable of addressing current social and environmental challenges and of generating business opportunities with environmental and social additionalities. The latter includes among its associates development finance institutions (DFIs) which, given the characteristics of the Brazilian economy and the dynamics of municipal infrastructure funding, are the main providers of funding for projects of this nature. After the project was presented at these forums, a questionnaire was sent to its member institutions.

From a methodological point of view, the assessment stage was initially carried out with a survey of primary qualitative data, through a structured questionnaire and, subsequently, interviews with semi-structured questionnaires were conducted with institutions that fund urban infrastructure in Brazil. In the latter case, the selection criteria

were institutions that offered lines funding for infrastructure activities.

The development of the questionnaire sought to broadly address the participants' understanding of projects that could be interpreted as providers of social and environmental additionalities, with a section dedicated to sectors and activities related to urban infrastructure. The previous existence of actions of this type was addressed, with the detailing of the development phases and strategies, to then delve more specifically into actions aimed at post-COVID 19 economic recovery and green economic recovery.

Interviews were also conducted with representatives of foment and development institutions. These interviews furthered the assessment process of the green recovery scenario in Brazil. The activities of the institutions that funded projects served as a guide to assess, together with the answers to the questionnaires, the main issues that make it difficult for institutions to understand and adhere to practices and initiatives related to green economic recovery.

According to the data collected by the assessment, the inexistence of a national economic recovery strategy with a sustainable bias was an issue that became quite clear, even though the subject is on the agenda of several countries. What is seen in Brazil is still what could be considered emergency economic aid.

However, the focus of the study was on the potential role of municipalities in this agenda and, for this, its funders were also analyzed. It was noted that, despite the performance of DFIs being currently aimed at aspects intrinsically related to sustainability (both in nature as well as the requirements/covenants of the supported projects) and green economic recovery, the national scenario still suffers from a lack of definitions related to the theme: given its recent appearance, borrowers (including municipalities) and funding providers (especially DFIs) are still unclear as to what sectors, projects and activities would be considered Green Recovery. Furthermore, the support of projects with clear environmental, social and climate additionalities (such as climate adaptation projects) still lacks refinement in terms of indicators and benefits to be monitored, of socio-environmental safeguards, and of measures for the inclusion of the most affected populations. This gap was precisely what this study focused on, whose solution is the proposition of a method to align activities with the precepts of sustainability.



The image features a city skyline with various skyscrapers, including a prominent one with a spire. A large teal overlay covers the top and right portions of the image. A diagonal line splits the bottom of the image, with the left side being teal and the right side showing a textured, light-colored surface. The text is centered in the teal area.

# **GREEN ECONOMIC RECOVERY: FROM AMBITION TO ACHIEVEMENT**



In order for the concerns regarding green economic recovery to become a reality, this study proposes a method of aligning activities in urban infrastructure that can potentially enable the incorporation of positive externalities from the social, environmental, and climatic aspects with the perspective economic additionality so necessary for post-COVID recovery. In this system, international sustainable finance references are considered to support the viability of the activities to be financed by an international contribution of capital, with structured ESG criteria and safeguards.

The developed system provides up-to-date, but not comprehensive, information which may be added as new activities are envisioned in light of the technological innovation that is presumed to be a primordial factor for long-term recovery. The present study, which is preliminary and exploratory, seeks to gather information on the predictability of activities under classification systems and taxonomies that have been developed by international and national entities. It also analyses temporality, the potential impact on job creation, GHG reduction, compliance with SDGs, investment potential, and possible financing lines, paths to a fair transition, damage that may be caused by the activities, and indicators to monitor social, environmental and climate changes.

## METHODOLOGY: ALIGNMENT OF ACTIVITIES IN URBAN INFRASTRUCTURE TOWARDS SUSTAINABILITY

Internationally, there has been an effort to define activities and projects and their capacity to provide social and environmental additionalities and to contribute to a more sustainable economic transition. In this sense, rating systems and best practices are used as instruments for the issuance of thematic debt securities. The *International Platform on Sustainable Finance – IPSF*<sup>22</sup>, a multilateral forum launched by the European Union in 2019 to facilitate dialogue between policymakers, is an example of this concern of encouraging green financing, with an aim to foster the mobilizing of private capital towards environmentally sustainable investments.

The objective of the development of a method of alignment of activities for urban infrastructure presented here, based on an understanding of the demands for a real green economic recovery, is to build bridges and converge municipalities and financing agents under a single language, capable of facilitating the design, the financial support and implementation of activities from the perspective of economic potential, positive environmental and social impact, and climate mitigation and resilience. These have been condensed under the term **green economic recovery**.

To develop this alignment method, potential activities in urban infrastructure were listed so that economic recovery is properly addressed from the perspective of the potential economic benefits, sustainability, and climate resilience of Brazilian cities.

Furthermore, another aspect was also considered: temporal. Here it is assumed that, given the emergency brought about by the pandemic scenario, eligible activities should be capable of providing immediate, short-term economic impacts, measured especially by the generation of “green jobs”, targeting specific groups with acute needs. However, on the other hand, these sectors must produce a medium and long-term effect, capable of establishing a direction for socio-economic, environmental and climate transformations.

The listed activities were analyzed according to the following characteristics:

**TABLE 1**  
**Characteristics of green economic recovery**

Characteristic	Description
 <b>Green jobs<sup>15</sup></b>	Green jobs are central to sustainable development and respond to the global challenges of environmental protection, economic development, and social inclusion. In the context of green recovery, they are the main drivers, in the short term, of economic recovery, providing the population with access to goods, services and safe living and well-being conditions. Under the characteristic of green employment, also included is the opportunity for professional qualification which is adequate to a new economic reality, as well as better working conditions and the incorporation of advanced health and safety standards in the analyzed sector.
 <b>GHG emission reduction<sup>16</sup></b>	The replacement of carbon-intensive technologies by green technologies, within the context of economic recovery, is a great opportunity to establish new economic trends in line with future climate challenges.
 <b>Investments<sup>17</sup></b>	The investment potential provides a perspective of the infrastructure gap, resource allocation opportunities and demands for new activities and sustainable projects, taking into account not only the need to create infrastructure, but also the modernizing of the existing infrastructure.
 <b>Temporality</b>	Green Recovery actions must, on one hand, be quick, targeted and urgent, to reduce socioeconomic damage. On the other hand, they must produce medium and long-term effects that establish a new socio-economic, environmental and climate path.
 <b>Local-global alignment</b>	During the planning and implementation of Green Recovery measures, certain sectors must adhere to international standards and agreements, such as the Paris Agreement, the Nationally Determined Contributions (NDC), and the Sustainable Development Goals (SDGs). Such alignment demonstrates the possibility of positive externalities at the local and global levels.
 <b>Just transition</b>	The transition to a low-carbon economy is urgent. However, with this transition there will be socioeconomic losses and gains. Measures must be taken to reduce the impact of job losses and the gradual extinction of sectors aligned with the BaU scenario, and to generate new jobs, including training for vulnerable groups. Although there is no single definition for the term, just transition conveys the idea that justice and equality should be an integral part of the transition to a low-carbon world <sup>18</sup> . In practice, the development of transition and transformation plans is a collective strategy, which simultaneously addresses the environment, social justice and poverty reduction. According to the European Commission <sup>19</sup> , the Just Transition Mechanism (JTM) is a key tool to ensure that the transition to a climate-neutral economy takes place in a fair way, leaving no one behind. In the activity alignment methodology, measures and actions are presented to ensure a fair transition in the listed sectors.
 <b>Do No Significant Harm</b>	Sectors, activities and projects must comply with the “Do No Significant Harm” principle, according to which activities must not be supported or conducted that cause significant harm to any of the six environmental objectives defined by the EU Taxonomy, namely the mitigation of climate change, adaptation to climate change, sustainable use and protection of water and marine resources, transition to the circular economy, pollution control and prevention and, lastly, protection and restoration of biodiversity and ecosystems.
 <b>Indicators</b>	Indicators to monitor the impact and performance of sectors, activities and projects in the short, medium and long terms, with a view to assessing environmental, social and climate additionalities.
 <b>Potential Funding</b>	Perspectives of possible sources and lines of funding dedicated to the sector, their predictability in national policies and in sector plans and targets. Information on potential funding is not exhaustive.

Source: SITAWI, 2021

<sup>15</sup> Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC – IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

<sup>16</sup> Data for Brazil up to 2050. Source: SITAWI – NPEB <https://www.sitawi.net/publicacoes/nao-perca-esse-bond/>

<sup>17</sup> Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC – IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf




<sup>18</sup> Mapping Just Transition(s) to a Low-Carbon World | Publications | UNRISD

<sup>19</sup> The Just Transition Mechanism: making sure no one is left behind | European Commission (europa.eu)

In addition to these characteristics, the study also provides summary sheets (available in the Annexes) on the alignment of activities with taxonomies: Não Perca Esse Bond (SITAWI), the FEBRABAN Green Taxonomy (FEBRABAN), Green Bond Principles (ICMA), Social Bond Principles (ICMA) and Climate Bonds Initiative (CBI) criteria, and in the latter case these activities were analyzed regarding their potential contribution to climate mitigation and adaptation/resilience.









The alignment with the CBI and FEBRABAN taxonomies is done through symbols and colors (as originally used in their publications). Below is a breakdown of the meaning of each one:

**TABLE 2**  
**CBI criteria**

Subtitles CBI Criteria	
	Assets or projects that automatically meet the Mitigation and/or adaptation and resilience requirements of the criteria
	Eligibility for the use of these resources is conditioned to the fulfillment of specific demands and requirements
	Further studies are necessary for classification

Source: Adapted from CBI, 2021.<sup>20</sup>

**TABLE 3**  
**The FEBRABAN green taxonomy**




FEBRABAN Taxonomy	
Exposure to climate change	
	High exposure to Climate Change
	Moderate exposure to Climate Change
	No exposure to Climate Change
Economia Verde	
	High contribution to Green Economy
	Moderate contribution to Green Economy
	No contribution to Green Economy
Environmental Risk Exposure	
	High exposure to Environmental Risk
	No exposure to Environmental Risk

Source: SITAWI, 2018

The assessment of projects and activities from the perspective of alignment with climate change scenarios was adapted from the publication *Não Perca Esse Bond* (SITAWI).

**TABLE 4**

***Não Perca Esse Bond* climate alignment**

Climate Alignment	
	Projects and activities that have the potential to systematically contribute in the long-term to a low-carbon economy (for example, activities that neutralize emissions or that generate reductions of over 90% throughout their life cycle, or that store a relevant volume of carbon, over 50 tons per hectare).
	Projects and activities that are a step towards a low carbon economy (for example, activities capable of generating emissions reductions of over 20% over their life cycle, or of storing a reasonable amount of carbon, between 20-50 tons per hectare).
	Projects and activities that comply with specific emissions reduction legislation/policies or that are able to generate only incremental emission reductions/stocks (for example, activities that generate reductions of under 20% over their life cycle, or that stock a low amount of carbon, under 20 tons per hectare).

Source: SITAWI, 2018

## AN ASSESSMENT OF POSITIVE EXTERNALITIES AND ECONOMIC ADDITIONALITIES

The activities analyzed in the Urban Infrastructure and Activities Aligned with Green Economic Recovery section of this study may play a priority role in the planning and execution of a national economic recovery policy, based on sustainability, fair transition, and climate mitigation and adaptation/resilience. It is up to the agents involved and decision makers to analyze each of these activities according to the presented characteristics.

Within the scope of this study, an exercise was also carried out to rank the urban infrastructure sectors, based on economic, environmental, social and climate indicators, in order to provide stakeholders with the possibility of comparing and prioritizing projects in different sectors, through the use of a single scale.

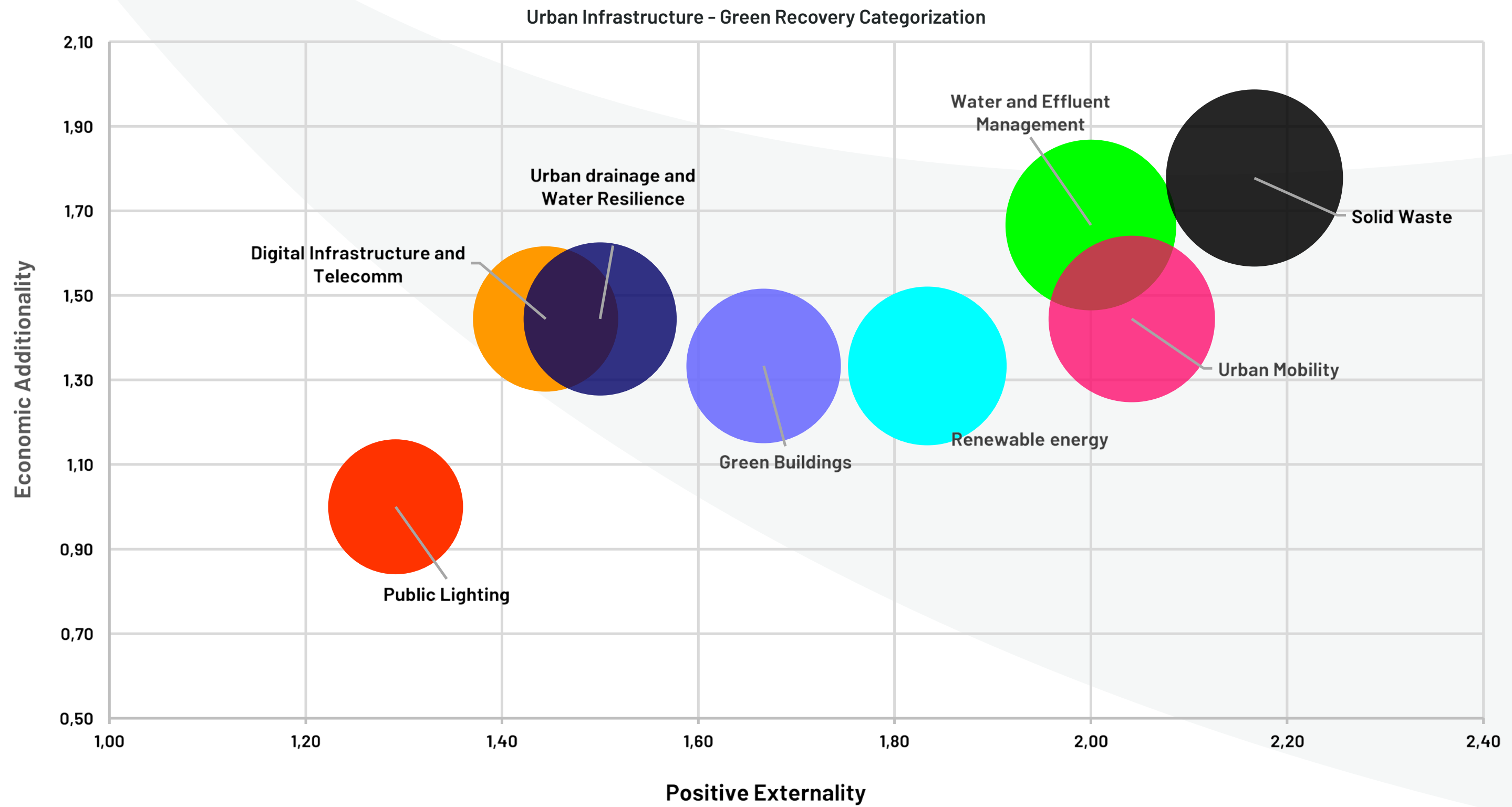
This scale is the combination of two dimensions to which urban infrastructure sectors, projects and activities are submitted:

- Positive externalities – in this dimension, indicators on 3 themes are analyzed: environmental, climate and social. The objective is to verify the positive environmental, social and climate impacts of projects carried out in a given sector, through indicators such as biodiversity conservation potential, GHG emissions reduction potential, contribution to the 2°C scenario, job generation, and gender diversity;
- Economic additionality – this dimension analyzes indicators on the topics of investment gaps, opportunities, and fair transition. Here, the objective is to determine the economic multiplier and opportunity generation potentials arising from investments in a given sector. This is done through indicators such as universal infrastructure service investment gaps, cost-benefit analyses, extent of private sector performance, and regulatory maturity.

By conducting this exercise, given the current Brazilian reality, activities related to the area of Solid Waste Management, Water and Effluent Management, Urban Mobility, Renewable Energy and Green Buildings have the greatest potential of leveraging green economic recovery. On the other hand, Public Lighting and Information and Communication Technologies (ICT) activities have the least potential<sup>28</sup>, but they are of fundamental importance to provide cities and their inhabitants with essential services, in line with the new context of change brought about not only by the pandemic, but also by the need to make them more accessible.

The inclusion criterion of the other areas presented as drivers of the green economic recovery also considered how funding agents regard the prioritizing of activities and area of focus, as presented in the section **Assessment of green economic recovery in Brazil: perceptions and actions.**

GRAPH 3  
Sectorial categorization



Source: SITAWI, 2021





# ACTIVITIES AND URBAN INFRASTRUCTURE ALIGNED WITH GREEN RECOVERY

This section presents an overview of focus sectors which were analyzed with regard to the factors of impact enabling green economic recovery. As an assumption, information is provided on the national context of the activity, the investment potential, the connection with green economic recovery (socio-environmental additionality and economic potential), degree of maturity, as well as regulatory, and possible difficulties faced for its execution.



## SANITATION AND SOLID WASTE MANAGEMENT

Access to sanitation services is directly related to the reduction of infant mortality and waterborne diseases. According to data from the *Instituto Trata Brasil* and *Ex Ante Consultoria Econômica*<sup>21</sup>, between 2004 and 2016, the benefits from investments in sanitation in Brazil reached BRL 590.7 billion, of which BRL 488.8 billion were direct benefits (income generated by the investment and by the sanitation activities and consumption and production tax revenue), and BRL 101.9 billion from the reduction of losses associated with the positive externalities of the investments.

In the same period, incurred costs totaled BRL 389.2 billion, indicating a positive social balance of BRL 201.5 billion. It is estimated that between 2016 and 2036 the balance between costs and benefits will reach BRL 1.13 trillion, or BRL 56.29 billion per year.

The Sanitation and Solid Waste sector also plays a key role in the climate debate, from both the climate change mitigation perspective, as well as with regard to adaptation and resilience. Sanitation projects will be affected by extreme weather events such as changes in rainfall and droughts, which will tend to increase the frequency of severe events over the next few decades.

According to SEEG data, in 2020 the Waste sector (which gathers data on the disposal of solid waste, incineration or open burning of waste, treatment of domestic effluents, treatment of industrial liquid effluents, and biological treatment) was responsible for 92 million tons of CO<sub>2</sub> and presented a slight increase (1.8%) in relation to the previous year<sup>22</sup>.

The final disposal of waste was responsible for the emission of 59.2 Mt of CO<sub>2</sub> and was accompanied by the expansion of access to urban solid waste management services (USW), especially in the collection and environmentally adequate

final disposal rates. Methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) emissions in landfills represent one of the main sources of greenhouse gases in metropolitan regions. As a result of the pandemic, surveys conducted by said report also indicated a 10% increase in waste generation in Brazil.

More evidently, in the last decade (2010 in comparison with 2019), there was an increase in the access to sanitation related services in Brazil: access to drinking water increased from 81.1% to 83.7%, from 46.2% to 54.1% in the sewerage network, from 92.1% to 93.4% in solid waste management, and from 51.3% to 53.4% in the drainage network and rainwater management (between 2015 and 2019); however, the scenario remains challenging with regard to universalization: just over half (54.1%) of Brazilians have access to sewerage collection, a proportion that is slightly higher when considering the population in cities, which reached 61.9%, according to 2019 data<sup>23</sup>.

Regarding the supply of treated water, 83.7% of Brazilians are covered by this service, this rate reaching 92.9% in cities. However, access to this service is affected by problems such as distribution system losses, with an average waste rate of 39.2%<sup>24</sup> in addition to the uneven distribution throughout the country: according to the data, this service is available to 95.9% of the urban population of the Southeast region, but to only 57.5% of the inhabitants of the North region of Brazil.

The New Regulatory Framework for the sector, established by Federal Law No. 14.026/2020<sup>25</sup>, promises to leverage investments and attain universal access to the service by 2033, ensuring that 99% of the Brazilian population has access to drinking water, and 90% to the treatment and collection of sewage. Federal government estimates project that, with the implementation of the Framework, up to BRL 700 billion will be invested over the next 10 years through public and private efforts, the latter being made possible by new concession contracts and PPPs.

The financial sector plays a fundamental role in providing the investments necessary to ensure universal access to sanitation services. Several international bodies have recognized, mainly through the proposal of sectorial taxonomies, of categories and of eligibility criteria for labeled debt securities (such as the Climate Bonds Initiative – CBI<sup>26</sup> certification criteria, the ICMA<sup>27</sup> labeling principles, and the European Union<sup>28</sup> taxonomy), the positive socio-environmental externalities generated by sanitation projects.

21 Trata Brasil Institute and Ex Ante Consultoria Econômica, 2018. Economic and Social Benefits of Sanitation Expansion in Brazil. Available at: <<http://www.tratabrasil.org.br/estudos/estudos-itb/itb/beneficios-economicos-e-sociais-da-expansao-do-saneamento-brasileiro>>.

22 OC\_03\_report\_2021\_FINAL.pdf

23 SNIS – PANEL ON SANITATION INFORMATION

24 SNIS – PANEL ON SANITATION INFORMATION

25 L14026 (planalto.gov.br)

26 Microsoft Word – Water Criteria Final Document\_17Jan21.docx (climatebonds.net)

27 The Principles, Guidelines and Handbooks (icmagroup.org)

28 EU Taxonomy, TEG final report on the EU taxonomy (europa.eu)



In addition to the climatic pressures of sanitation, new sources need to be included in the energy matrix, including the possibility of generating energy via “Waste to Energy”. With the exclusion of the activities of a controversial nature related to “Waste to Energy” (especially incineration of urban solid waste - USW), and the inclusion of activities that use landfill biogas, anaerobic biodigestion by composting, and waste-derived fuel (WDF) in cement plants, this technology can enable the Circular Economy, the inclusion of vulnerable populations, and the strengthening of a low-carbon energy matrix, as well as solve the improper disposal of USW. It is worth noting that in the last decade, according to Abrelpe<sup>29</sup>, this disposal reached 72.7 million tons, of which approximately 60% is adequate final disposal in landfills. This situation directly impacts the health of 77.65 million Brazilians, and has an environmental and health care cost of around USD 1 billion per year.

In order to achieve a GHG emission reduction scenario for the sector, efforts must focus on a long-term perspective that leads to a structural adjustment, for which the closure of landfills is a priority, followed by waste valuation (treatment) practices, final disposal of residues, and the destruction/use of methane in landfills. These measures will directly contribute to increasing resilience and the quality of life in Brazilian cities.

Furthermore, the ability to measure and monitor the results and impacts of investments is as important as the funding itself. In order to ensure the social and environmental additionalities of the initiatives, the use of adequate indicators is essential, allowing comparisons, the proposal of ambitious goals, and the transparent reporting of the benefits achieved.

Therefore, when discussing alignment with green economic recovery, the Sanitation and Solid Waste sector is a fundamental part of cities. From this perspective, the feasibility of funding and the predictability in international taxonomies, as well as regulatory maturity allow for safe investments to be made, funding projects capable of providing better living and health conditions for the population, as well as contributing to the mitigation and adaptation to climate change.

### BOX 4

#### Urban Solid Waste, project ProteGEEr – Pilot Municipality of Campo Verde – MS



The Ministry of Regional Development, MDR, in partnership with GIZ, developed the Cooperation for Climate Protection in Solid Waste Management – ProteGEEr project, sponsored by the BMU, the German Ministry for the Environment, Nature Conservation and Nuclear Safety. With an amount reaching EUR 6 million, the project proposes to contribute to the reduction of GHG emissions through the sustainable management of solid waste, supporting the conservation of natural resources.

The project developed a kit of tools and instruments capable of supporting municipal managers’ decision-making on sustainable waste management actions, considering, among other topics, the circular economy, technological routes, economic and financial sustainability through the charging of fees or tariffs, selective collection, etc. The project supported 32 municipalities and has five pilot projects. Among these, to be highlighted is the one in Campo Verde, a municipality with 46 thousand inhabitants in the state of Mato Grosso. Up until 2017, the city disposed of its waste in an open-air dump, which would burn and cover the city with soot. Only in 2018, a donation from the National Health Foundation made it possible to build a landfill that began operating in that same year.

To reverse the situation of the municipality, actions were carried out to identify the sector’s GHG emission reduction potential and to articulate these actions according to government guidelines. The measures included providing technical assistance to the city of Campo Verde towards the planning of selective collection, aiming to increase recycling rates.




The Municipality closed its dump, implemented the integrated management of urban solid waste – RSU, and gained access to non-refundable resources to improve municipal management in this regard.


In 2019, Campo Verde presented a funding proposal to optimize management through the acquisition of equipment. With the help of the ProteGEEr initiative, the municipality raised BRL 3.8 million for dedicated equipment and became a reference in waste management in the state of Mato Grosso.

The purchase of equipment made the collection and recycling of around 40 thousand tons of MSW per year more efficient, benefiting the entire population, improving the working conditions of collectors and recyclers, and developing a value chain which includes the sale of recyclable dry waste and its subsequent reuse.



## WAY TO A GREEN RECOVERY

		
Green jobs	Emission Reduction GHG	Investment
6.1 Million <sup>30</sup>	1.940 million tCO <sub>2</sub> e <sup>31</sup>	USD 582.4 Billion <sup>32</sup>

Characteristic		Description
	Temporality	<p><b>Short term</b> (&lt; 1 year): Generation of jobs in the development and construction phases of projects, and in operation, with a high capacity to include the most vulnerable strata of the population in the formal economy; avoiding and/or minimizing the improper disposal of USW; providing economic and technical conditions (training) to ensure continuity of the work of recycling cooperatives, and raising awareness of municipal managers and administrators and the community at large regarding the importance of recycling.</p> <p><b>Mid Term</b> (1 to 5 years): Better urban infrastructure ensuring resilience to extreme weather events; greater social and economic dynamism by guaranteeing the inclusion of the most vulnerable strata of the population in the formal economy; efficient use of resources and reuse of materials, generating savings in different value chains; in the case of <i>waste to energy</i> plants, offering of energy generated by an alternative source (use of biogas), with a high capacity to reduce GHG emissions; efficient use of resources and reuse of materials, generating savings in different value chains.</p> <p><b>Long term</b> (&gt; 5 years): Guarantee of better levels of collective health, disease prevention, and quality of life; better urban infrastructure ensuring resilience to extreme weather events; greater social and economic dynamism by guaranteeing the inclusion of the most vulnerable strata of the population in the formal economy; efficient use of resources and reuse of materials, generating savings in different value chains; in the case of <i>waste to energy plants</i>, <i>energy supply</i> generated by an alternative source, with a high capacity of reducing GHG emissions.</p>
	Local-global alignment	<p>SDG 1 - Eradicating poverty: Ending poverty in all its forms, everywhere</p> <p>SDG 3 - Health and well-being: Ensuring healthy living and promoting well-being for all, at all ages</p> <p>SDG 7 - Clean and affordable energy: Ensuring access to cheap, reliable, sustainable and renewable energy for all</p> <p>SDG 6 - Drinking water and sanitation: Ensuring the availability and sustainable management of water and sanitation for all</p> <p>SDG 9 - Industry, innovation and infrastructure: Building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation</p> <p>SDG 11 - Sustainable cities and communities: Making cities and human settlements inclusive, safe, resilient and sustainable</p> <p>SDG 12 - Responsible consumption and production: Ensuring sustainable production and consumption patterns</p> <p>SDG 13 - Action Against Global Climate Change: Taking urgent action to combat climate change and its impacts</p>

30 Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

31 Data for Brazil until 2050. Source: SITAWI - NPEB <https://www.sitawi.net/publicacoes/nao-perca-esse-bond/>

32 Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

	<b>Just transition</b>	<p>Offering the population, citizens and workers involved in the activities that will be replaced, such as dumps, the opportunity of training (capacity-building) and jobs with properly established health and safety conditions.</p> <p>Ensuring, in this transition, access to income, housing, food, and labor union and legal support to rights and access to basic services for a career transition.</p> <p>Provide companies that will be replaced with support in the transition to low-carbon technologies and economic diversification, creating attractive conditions for public and private investors, providing easier access to loans and financial support. Promote the creation of new companies and start-ups investing in research and innovation activities.</p> <p>Support municipalities in the transition to low-carbon and resilient activities, creating new jobs in the green economy, with access to funding of such activities, such as affordable loans, in addition to providing technical assistance for the design of projects with such a scope. Improve digital connectivity and provide support on the state and/or federal levels so that macro infrastructure systems can be improved.</p>
	<b>Do no harm</b>	<p>Transition to a circular economy, waste prevention and recycling.</p> <p>Prevention and control of pollution.</p> <p>Protection of healthy ecosystems.</p> <p>Guarantee of safety practices and respect for workers.</p>
	<b>Indicators</b>	<p>Job creation (number of people)</p> <p>Prevention of the impacts of extreme weather events (e.g.: population not affected by seasonal floods due to the implementation of drainage works)</p> <p>Volume of recycled waste (tons)</p> <p>Biomethane volume generated (m<sup>3</sup>)</p> <p>Volume of electricity generated (kWh)</p> <p>Relative (tCO<sub>2</sub>e/liter or ton) and absolute (tCO<sub>2</sub>e) avoided GHG emissions</p>
	<b>Potential financing *</b>	<p>AFAP (Amapá Foment Agency)</p> <p>AgeRio - Infrastructure</p> <p>AgeRio - Avançar Cidades: Sanitation and Mobility</p> <p>AgeRio - Environment</p> <p>BASA - FNO: Amazon Green Infrastructure</p> <p>Banco do Nordeste - FNE: Water</p> <p>Badesc - Basic Sanitation</p> <p>Badesul - Education: Health Security</p> <p>Badesul - Infrastructure</p> <p>Bandes - Procities</p> <p>BNB (FNE Water)</p> <p>BRDE - Urban Mobility: Pró Transport</p> <p>BRDE - Sanitation: for everyone</p> <p>BRDE - Sanitation</p> <p>BRDE - Sanitation AFD</p> <p>BRDE - Sanitation: Avançar cidades</p> <p>BRDE - Intelligent cities and sustainable projects: Pró Cidades</p> <p>BRDE - Intelligent cities and sustainable projects: AFD</p> <p>Crescol - Pronaf Bioeconomy</p> <p>Desenbahia - Municipalities: Infrastructure</p> <p>Desenvolve SP - <i>Linha Economia Verde</i>: Sanitation and Waste</p> <p>Desenvolve SP - Clean Water Line</p> <p>Capital Market (B3)</p>

\*Not exhaustive data  
Source: SITAWI, 2021



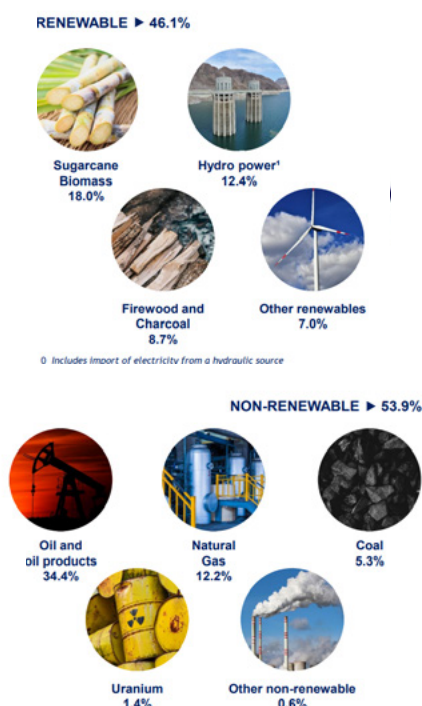
## RENEWABLE ENERGY AND ENERGY EFFICIENCY

In the Brazilian energy structure, the Energy Supply and Energy Demand areas are part of the Energy Sector, which in turn are divided into several sub-areas of focus. It is important to emphasize that, in this report, only the Renewable Energy and Energy Efficiency activities are discussed on an exploratory basis and have been included as examples of other activities and areas in the sector.

This choice was made due to the potential impact, notably in relation to the reduction of GHG emissions: Energy Efficiency technologies are some of the main solutions for the reduction of GHG emissions.

In structural terms, the Brazilian energy matrix (electricity and other energy sources such as fossil fuels, LPG) is 46.1% renewable, of which the electric power matrix is 83% (2019) from renewable sources, predominantly water sources (64.9% in 2019) which are vulnerable to climate change, in particular to variations in water regimes<sup>41</sup>. This fact is already reflected in the 7.7% reduction in the supply of hydraulic energy in the year to August 2021, and a 10% reduction is expected for the entire year. With that, the supply generated by Itaipu is so far 31.1% lower in the current year<sup>42</sup>.

**FIGURE 2**  
**National energy balance 2020**



Source: BEN, 2020<sup>42</sup>

As a national projection until 2050, the National Energy Plan (PNE) foresees that the share of renewable sources will increase by 50% in overall energy, and by 85% for electricity, a goal that will only be possible to be achieved, according to the PNE, if investments are made by the Research & Development sector in alternative forms of generation, for which the availability of financing by different financial institutions is essential from a strategic perspective. According to the forecasts made by the PDE 2029, it is estimated that in 2029 the energy efficiency gains can contribute with nearly 21 million tons of oil equivalent (toe) in 2029, approximately 8% of the end energy consumption in Brazil observed in 2018<sup>33</sup>.

Together with efforts towards more sustainable generation and use of energy, Energy Efficiency provides significant benefits from an economic, social and environmental point of view. However, there is still a long way to go for this sector to be broadly and fully consolidated, and for its positive impact to supplant the global use of energy in the traditional and polluting format that still prevails in the productive and consumption sectors. It should be noted that the impacts of efficiency policies have been significantly felt in recent decades and, globally, efficiency gains since 2000 have led to a 12% reduction in consumption (up to 2017)<sup>34</sup>.

### BOX 5 Electricity Efficient Cities Network – RCE



Created in 1998 through a partnership between Eletrobras-PROCEL and IBAM, the Efficient Electric Power City Network – RCE, has the main objective of facilitating and strengthening the exchange of information on energy efficiency between associated municipalities through Municipal Energy Management (GEM). Successful experiences or projects in the areas of electric power consumption (Public Lighting, Sanitation Systems and Public Buildings), with the use of new technologies, are promoted and facilitated through exchanges between the 1,055 municipalities that comprise the network (2018 data).

The RCE distributes, free of charge to the municipalities that are part of the network, the “Municipal Energy Information System (SIEM)” computer program, which helps municipal administrators monitor electricity bills and expenditures, making it possible to monitor the evolution of electricity consumption in the public buildings and public lighting segments. It also promotes the “Efficient City Award”, which recognizes and publicizes the actions and initiatives of the municipalities that stood out in terms of the efficient use of electricity in the various segments of the municipal scope.

33 Microsoft Word – PDE 2029 CP sem alter.docx (epe.gov.br)

34 [https://iea.blob.core.windows.net/assets/d0f81f5f-8f87-487e-a56b-8e0167d18c56/Market\\_Report\\_Series\\_Energy\\_Efficiency\\_2018.pdf](https://iea.blob.core.windows.net/assets/d0f81f5f-8f87-487e-a56b-8e0167d18c56/Market_Report_Series_Energy_Efficiency_2018.pdf)

In Brazil there have been, for at least two decades, Energy Efficiency programs such as Procel - National Program for the Conservation of Electric Power, the National Program for the Rationalization of the Use of Oil Derivatives and Natural Gas - Conpet, and the Brazilian Labeling Program - PBE, all of which are internationally recognized.

The Ten-Year Energy Efficiency Plan (PDEf), launched in January 2021 by Eletrobras/Procel, provides information that energy efficiency will be responsible for about 40% of the reduction in energy-related greenhouse gas emissions over the next 20 years in the projected Scenario for Sustainable Development. In this document, considering the year 2029, energy savings of 23.1 million tons of oil equivalent are expected, of which 16% corresponds to electric power savings, and 84% to fuel savings<sup>35</sup>.

In this sense, as a credit guarantee fund, the BNDES Energy Efficiency Fund - FGEnergia will allow the generation of guarantees of around R\$ 200 million in energy efficiency projects throughout Brazil<sup>36</sup> and its effectiveness indicators include energy savings generated by guaranteed projects, generation of renewable distributed energy, reduction in peak demand, and fuel savings (fossil)<sup>47</sup>.

This resource was developed in partnership with the LAB - Financial Innovation Laboratory and will help to meet this demand, which will allow financial agents to lessen the real guaranteed requirements to grant financing. This perspective should promote greater access to credit and an increase in the number of projects in the sector. The increase in the efficiency of the national energy system will have relevant impacts on the economy's productivity, on the reduction of fossil fuel consumption, and on the emission of greenhouse gases, contributing to a more sustainable Brazil.

As an example of a project in this area, the PotencializEE program - Transforming Investments for Energy Efficiency in Industry - aims to promote Energy Efficiency in industrial SMEs (Small and Medium Enterprises). The implementation is focused in the São Paulo region, given the greater concentration of industries and the higher levels of power consumption, and will feature strategies aimed at leveraging the Energy Efficiency in Industry potential on the national level. This is a project of the Guarantor Fund through Desenvolve SP and was implemented through cooperation between GIZ and the Ministry of Mines and Energy.




Both initiatives (FGEnergia and PotencializEE) are references of initiatives that seek to overcome one of the main barriers to the implementation of energy efficiency projects: the limitation of guarantees offered by Energy Conservation Service Companies, the ESCOs, to access funding to implement energy efficiency projects.




35 iX - Eletrobras - PDEf - Product 11\_vfinal - recorded and printed.pdf

36 BNDES Energy Efficiency Fund will receive BRL 30 Million from Procel



## PATH TO A GREEN RECOVERY

 Potential Generation of Green Jobs	 Potential Reduction of GHG Emissions	 Potential Investment
4.4 million <sup>37</sup>	1,221.4 million tCO <sub>2</sub> e <sup>38</sup>	USD 239.8 billion <sup>39</sup>

Characteristic		Description
	<b>Temporality (potential benefits)</b>	<p><b>Short term</b> (&lt; 1 year): Generation of jobs (project phase, installation and start of operation).</p> <p><b>Mid Term</b> (1 to 5 years): Availability of energy generated from renewable sources in the national integrated system, benefiting the population in general and even those without access to this service; reaping of environmental benefits, especially avoided GHG emissions.</p> <p><b>Long term</b> (&gt; 5 years): Expansion of installed capacity based on renewable sources of energy; contribution to an even cleaner national energy matrix; increased efficiency in energy use; reaping of environmental benefits, especially avoided GHG emissions.</p>
	<b>Local-global alignment</b>	<p>SDG 1 – Eradication of poverty: End poverty in all its forms, everywhere.</p> <p>SDG 7 – Clean and Affordable Energy: Ensuring reliable, sustainable, modern and affordable energy access for all</p> <p>SDG 8 – Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.</p> <p>SDG 9 – Industry, innovation and infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.</p> <p>SDG 11 – Sustainable cities and communities: Making cities and human settlements inclusive, safe, resilient and sustainable.</p> <p>SDG 12 – Responsible consumption and production: Ensure sustainable production and consumption patterns.</p>
	<b>Just Transition</b>	<p>Offer workers involved in activities that will be replaced, such as polluting energy sources such as coal, the opportunity for training and jobs in green activities with properly established health and safety conditions. Ensure, in this transition, access to income assistance, housing, food and labor union and legal support to rights and access to basic services for a career transition.</p> <p>Provide support, for the transition to low-carbon technologies and economic diversification based on climate-resilient investments and jobs, to companies of the sector that will be replaced by other technologies, creating attractive conditions for public and private investors, providing easier access to loans and financial support, plus incentives for the creation of new companies and start-ups investing in research and innovation activities.</p> <p>Support municipalities in the transition to low-carbon and climate-resilient activities, creating new jobs in the green economy, with access to funding for said activities, such as affordable loans, in addition to providing technical assistance for the design of projects with such scope. Improve digital connectivity and provide support within the state and/or federal system so that macro infrastructure systems can be improved.</p>

<sup>37</sup> Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC – IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

<sup>38</sup> Data for Brazil until 2050. Source: SITAWI – NPEB <https://www.sitawi.net/publicacoes/nao-perca-esse-bond/>

<sup>39</sup> Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC – IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf



	<b>Do no harm</b>	<p>Transition to a circular economy;</p> <p>Prevention of waste generation and recycling;</p> <p>Prevention and control of pollution;</p> <p>Ecosystem protection;</p> <p>Compliance with Occupational Health and Safety regulations;</p> <p>Minimization of impacts on the surroundings.</p>
	<b>Indicators</b>	<p>Job creation (number of people);</p> <p>Annual GHG emissions reduced/avoided in tCO<sub>2</sub>e;</p> <p>Annual generation of renewable energy in MWh/GWh or GJ/TJ;</p> <p>Power generation capacity of built or rehabilitated renewable energy plant(s), in MW or GW;</p> <p>Capacity of the renewable energy plant(s) to be served by the energy transmission systems (Transmission and Distribution);</p> <p>Absolute annual GHG emissions in the project implementation phase.</p>
	<b>Financiamento potencial*</b>	<p>AFAP- Solar Energy Line</p> <p>AgeRio- Credits for Sustainable Projects</p> <p>Bandes: Green Economy</p> <p>Badesul: BADESC Energy</p> <p>Banestes- Clean Energy Credit</p> <p>Banestes- Clean Energy Microcredit: Physical Entity</p> <p>Banestes- BNDES: FINAME Renewable Energy</p> <p>Banestes- BNDES: Climate Fund</p> <p>BanPará- BNDES Finame: Low Carbon</p> <p>Banco do Nordeste- FNE Sun Physical Entity</p> <p>Banco do Nordeste- FNE Green</p> <p>Banco do Nordeste- FNE Sun: Legal entity</p> <p>BASA- FNO: Green Business Amazon</p> <p>BASA- FNO: Green Infrastructure Amazon</p> <p>BASA- FNO: Non-Rural Green Energy</p> <p>Badesul- ABC Programme</p> <p>Badesul- BNDES Finame Renewable energy</p> <p>BB- BB Renewable Energy Credit</p> <p>BDMG- Solar PHOTOVOLTAIC</p> <p>BDMG- Sustainability</p> <p>BDMG- SUSTAINABILITY SELFCONSUMPTION</p> <p>BNDES Finame - RENEWABLE ENERGY</p> <p>BNDES Finem - ENERGY GENERATION</p> <p>BNDES - CLIMATE FUND</p> <p>BNDES Finem - ENVIRONMENT</p> <p>BNDES Finem - ENERGY EFFICIENCY</p> <p>BRDE- Renewable Energy and Infrastructure</p> <p>BRDE- Agribusiness: Pronaf Agroindustry</p> <p>BRDE- Forests e Integrated Production Systems: ABC</p> <p>BRDE- Urban Mobility: Equipment Purchase</p> <p>BRDE- Intelligent Cities and sustainable projects: Pro cities</p> <p>BRDE- Intelligent Cities and sustainable projects: AFD</p> <p>BRDE- Intelligent Cities and sustainable projects: Energy Efficiency</p> <p>Crescol- Renewable Energy</p> <p>Crescol- Pronaf Bioeconomy</p> <p>DesenvolveSP- Green Economy Line</p> <p>DesenvolveSP- Green Economy Line: Machines</p> <p>DesenvolveSP- Green Economy Line: Municipalities</p> <p>DesenBahia: Sustainable Municipalities</p> <p>Fomento Paraná- Renewable Energies</p> <p>Fomento Paraná- Energy Foment</p> <p>Fomento Paraná- Finame Low Carbon: Renewable Energies</p> <p>FNE - SOL</p> <p>FCO - FINANCING MICRO AND MINI ELECTRICITY GENERATION FOR PHYSICAL ENTITTY</p> <p>FNO - GREEN ENERGY</p> <p>GoiásFomento- Energy Efficiency</p> <p>CEF PRO-MUNICIPALITIES</p> <p>Capital Market (B3)</p> <p>SICREDI- Financing for Solar Energy: Physical Entity</p> <p>SICREDI- Financing for Solar Energy: Legal entity</p> <p>Sicoob- BNDES Finame: Renewable Energy</p>

\*Non-exhaustive data  
Source: SITAWI, 2021





## GREEN BUILDINGS

According to the IEA, approximately 10% of the current global workforce is directly involved in construction or in other building-related activities<sup>51</sup>. Although the sector was initially impacted at the beginning of the COVID-19 pandemic, Brazil had a balance of more than 100,000 formal jobs in 2020<sup>52</sup>. This is one of the factors why the Green Buildings area was elected as potentially favoring green recovery. Additionally, thinking about more sustainable constructions is to invest in technologies and innovation that will bring long-term benefits, also from a climate perspective, crucial for a structural change in development.

Measures to promote energy efficiency, the use of renewable energy generation sources, and to incorporate the ESG theme in the construction sector have, therefore, a strong impact on the generation of jobs and the economic potential. In this sense, the Brazilian Program for Labeling in Buildings (PBE Edifica) was created in 2009, as a result of a partnership between Procel Edifica and the Brazilian Labeling Program. The program is carried out by INMETRO based on procedures developed by the Technical Group for Energy Efficiency in Buildings in the Country (WG-Buildings), aimed at evaluating the energy efficiency of buildings built in Brazil in addition to the rational use of electricity<sup>40</sup>.

The PBE Edifica Label is granted in accordance with two types of building groups:

- commercial, service and public buildings; and
- residential buildings, divided into:
  - autonomous housing units;
  - multifamily buildings; and
  - areas of common use.

The PBE Edifica Label makes it possible to know the energy efficiency level of buildings, which ranges from A (most efficient) to E (least efficient) and, since its launching, 224 labels have been issued to commercial, service and public buildings, and 5,356 labels to autonomous housing units<sup>41</sup>.

Other examples of building labeling, such as the Procel Energy Savings Seal, a product developed and awarded by Procel, coordinated by the Ministry of Mines and Energy and executed by Eletrobras, the Casa Azul Seal, from Caixa Econômica Federal, and the international LEED (Leadership in Energy and Environmental Design) and AQUA-HQE, also adopt as criteria energy efficiency, the rational use of materials in construction, and the maintenance of green buildings.

Funded by ICS - Instituto Clima e Sociedade - and executed by CBCS - the Brazilian Council for Sustainable Construction, the Efficient Cities Project is a sector response to the growing demand for increased efficiency in the use of resources by municipal managers, and currently comprised of 130 municipalities in 21 states.

In the first phase of implementation in 2018, the project promoted and supported structuring actions for the long-term reduction of greenhouse gas emissions in buildings, through energy efficiency, rational use of water, distributed generation, and urban mobility. In the second phase of the project, which ended in 2021, the main objective was the structuring of governance and public policy elements in cities, capable of enabling and ensuring the permanence of measures for energy efficiency in buildings and systems, energy supply expansion and diversity, greenhouse gas emission reductions, and resilience to climate change<sup>42</sup>.

Regarding the participation of sustainable constructions in the capital market, there is a trend of growth in the theme, which has been made possible by the issuance of Certificates of Real Estate Receivables (CRIs), which are instruments for the funding of new constructions or the retrofitting of existing buildings. The possibility of accessing these bonds allows companies dedicated to the activity to raise funds and address actions aimed at constructions that meet the resilience and adaptation demands required for climate change scenarios.

From a climate impact point of view, green roof designs have the potential of lowering temperatures and increase air humidity, especially in densely populated urban areas<sup>56</sup>, reducing the impact of heat islands. In addition to the weather aspect, green roofs are capable of capturing an average of 70% of the volume of rainfall<sup>57</sup>, relieving underground rainwater systems and releasing rainwater back into the atmosphere. This factor of increasing urban drainage becomes even more important in view of the projected rises in increasingly intense weather events due to climate change.

40 About | PBE EDIFICA

41 IX - Eletrobras - PDEf - Product 05\_vfinal - recorded and printed.pdf

42 Efficient Cities - Cidades Eficientes (cbcs.org.br)

### BOX 6 Green buildings, Porto Alegre, RS



The Municipality of Porto Alegre, with the support of FELICITY, implemented by GIZ in partnership with the European Investment Bank (EIB), has structured the “Luz do Saber” project, which introduced Energy Efficiency measures in 98 schools in the municipal network of Porto Alegre (RS) and installed photovoltaic panels on the roofs of 70 technically eligible schools, which jointly have an installed capacity of 2.1 MWp.

The “Luz do Saber” project aims to save energy, reduce GHG emissions, improve teaching conditions (improved thermal comfort) and contribute to the fiscal health of the municipality, by generating an estimated cost reduction of approximately BRL 3 million per year. The implementation of the BRL 25 million project will be carried out through direct investments by the municipal government and with international climate action funding by the EIB operated by BRDE.

With the implementation of this project, it is expected that more than 50,000 students will be benefited.




FELICITY assisted the city in conceptualizing the basic project, in the training, and the financial structuring.

According to the IFC<sup>58</sup>, the retrofitting of existing buildings represents another major investment opportunity and plays a key role in achieving global climate goals, as most non-carbon neutral buildings built today will need to be reconditioned in order to meet the objectives of the Paris Agreement.

These factors make the green building sector a fundamental part of the green recovery, with the emergence of new construction profiles not only for housing but also for commercial and public buildings. Investments in the sector will provide a new perspective so that buildings and constructions in cities are prepared to leverage their safety, comfort and, consequently, the quality of life for urban populations.



## PATH TO A GREEN RECOVERY

		
<b>Green Jobs</b>	<b>Emission Reduction GHG</b>	<b>Investment</b>
<b>3.6 Million<sup>43</sup></b>	<b>1,229 million tCO<sub>2</sub>e<sup>44</sup></b>	<b>USD 91.2 Billion<sup>45</sup></b>

Characteristic		Description
	<b>Temporality (potential benefits)</b>	<p><b>Short term</b> (&lt; 1 year): The civil construction and buildings sector is essential as a counter-cyclical and economic recovery tool. It has the capacity of generating jobs and intensifying the use of human capital (design and construction phases).</p> <p><b>Mid Term</b> (1 to 5 years): Overall, projects aimed at energy efficiency in lighting systems and thermal control in buildings lead to reductions of between 50% and 70% in energy consumption. Green buildings also contribute to the efficient use of water resources and the circular economy. In addition, in the mid term, positive externalities may be reaped from investments in housing and urban revitalization, such as the reversal of 'slumization' and degradation processes and the transformation of these spaces into habitable areas, at affordable prices, and capable of generating economic benefits.</p> <p><b>Long term</b> (&gt; 5 years): Sustainable growth in job offerings. Potential for neutralizing direct emissions of buildings and those related to electric power consumption, and better use of natural resources. Potential for providing an urban legacy that contributes to the mitigation, adaptation and resilience to climate change and socioeconomic development.</p>
	<b>Local-global alignment</b>	<p>SDG 1 - Eradication of poverty: End poverty in all its forms, everywhere;</p> <p>SDG 7 - Clean and affordable energy: Ensuring reliable, sustainable, modern and affordable access to energy for all;</p> <p>SDG 8 - Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;</p> <p>SDG 9 - Industry, innovation and infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;</p> <p>SDG 11 - Sustainable cities and communities: Making cities and human settlements inclusive, safe, resilient and sustainable;</p> <p>SDG 12 - Responsible consumption and production: Ensure sustainable production and consumption patterns;</p> <p>SDG 13 - Action Against Global Climate Change: Take urgent action to combat climate change and its impacts.</p>
	<b>Just Transition</b>	<p>Offer the population, citizens and workers involved in activities that will be replaced, such as traditional buildings, the opportunity for training (capacity building) and jobs in green activities with properly established health and safety conditions. Assurance, in this transition access, to income assistance, housing, food, and labor union and legal support to rights and access to basic services for a career transition.</p> <p>Provide companies in the sector that will be replaced by other technologies with support for the transition to low-carbon technologies and economic diversification based on climate-resilient investments and jobs, creating attractive conditions for public and private investors, providing easier access to loans and financial support. Invest in the creation of new companies and start-ups investing in research and innovation activities. Support municipalities in the transition to low-carbon and climate-resilient activities, creating new jobs in the green economy, with access to finance for such activities, such as affordable loans, in addition to providing technical assistance for the design of projects with such scope. Improve digital connectivity and provide support within the state and/or federal system so that macro infrastructure systems can be improved.</p>

43 Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

44 Data for Brazil until 2050. Source: SITAWI - NPEB <https://www.sitawi.net/publicacoes/nao-perca-esse-bond/>

45 Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

	<b>Do no harm</b>	<p>Transition to a circular economy, waste prevention and recycling;</p> <p>Prevention and control of pollution;</p> <p>Prevention of excessive consumption of water resources;</p> <p>Prevention of the use of health harmful materials (for example, asbestos);</p> <p>Protection of healthy ecosystems;</p> <p>Compliance with the Occupational Health and Safety regulations;</p> <p>Minimization of impacts on the surroundings.</p>
	<b>Indicators</b>	<p>Job creation (number of people)</p> <p>Annual energy savings in MWh/GWh and GJ/TJ from the installation of energy efficiency systems</p> <p>Rational use and saving of water resources (m<sup>3</sup>)</p> <p>Reduced / avoided annual GHG emissions in tons of CO<sub>2</sub>e</p> <p>Smart grid extension (km)</p> <p>Provision of housing to vulnerable populations (number of people, offer in m<sup>2</sup>)</p> <p>Increased economic activity due to the implementation of buildings and/or urban improvement works (level of gentrification in the region, job creation, increased sales/revenue for local businesses)</p> <p>Obtaining Green Buildings and Retrofit certifications (eg: LEED and AQUA)</p>
	<b>Potential Funding *</b>	<p>Agerio - Credit for sustainable projects</p> <p>BNDES Finem ENVIRONMENT - ENERGY EFFICIENCY</p> <p>BDMG- Solar photovoltaic</p> <p>BDMG- Sustainability</p> <p>BDMG- Sustainability and self consumption</p> <p>Banestes- Clean Energy Credit</p> <p>Banestes- Clean Energy Microcredit</p> <p>Bandes- Green Economy</p> <p>Badesc: Energy</p> <p>BNDES Finame: Renewable Energy</p> <p>BASA- FNO: Non-rural Green Energy</p> <p>BanPará- BNDES Finame: Low Carbon</p> <p>Banco do Nordeste- FNE Water</p> <p>Banco do Nordeste- FNE Green</p> <p>Banco do Nordeste- FNE Sun</p> <p>BRDE-Renewable Energy and Infrastructure</p> <p>BRDE- Urban Mobility: Equipment Purchase</p> <p>BRDE- Intelligent Cities and sustainable projects: Energy Efficiency</p> <p>BRDE - PRO CITIES</p> <p>Crescol- Renewable Energy</p> <p>DesenBahia- Sustainable Municipalities</p> <p>Desenvolve SP - Green Economy Line</p> <p>Desenvolve SP - Line of support for municipal investments</p> <p>FCO- FINANCING MICRO AND MINI GENERATION OF ELECTRICITY FOR PHYSICAL ENTITY</p> <p>FNO- GREEN ENERGY</p> <p>FomentoParaná- Renewable energy</p> <p>FomentoParaná- Energy Foment</p> <p>FomentoParaná- Finame Low Carbon: Renewable energy</p> <p>Itau- Green Businessmen Plan</p> <p>Capital Market (B3)</p> <p>Sicoob- BNDES Finame: Renewable Energy</p>

\*Non-exhaustive data  
Source: SITAWI, 2021



## URBAN MOBILITY AND ACCESSIBILITY

According to data from the Continuous Annual National Household Sample Survey (PNADCA), in 2019 most of the Brazilian population, 87%<sup>62</sup>, lived in urban areas, occupying an area corresponding to only 0.63% of the national territory<sup>63</sup>. These inhabitants live out their daily lives in the same space, sharing the same infrastructure and moving from one point to another, making the transport sub-sector (belonging to the energy sector), for example, responsible for 9% of gross GHG emissions in 2020, despite the 10% drop in passenger transport and the 1.6% decrease in cargo transport caused by the COVID-19 pandemic, compared to 2019<sup>64</sup>.

Urban mobility is the condition in which people and cargo are moved around urban spaces. It is an attribute of cities that regards the facility of moving people and goods in urban spaces; in other words, it regards the conditions of the access roads and the possibility of movement.

### BOX 7

#### Integrated metropolitan transport system, Florianópolis, SC



Aimed at eight municipalities in the metropolitan region of Florianópolis – RMF, the program structured by FELICITY in partnership with the Regional Superintendence for the Development of RMF – SUDERF, was launched in 2019, in order to serve the urban mobility sector. The project aims to develop an integrated regional public transport system, capable of providing alternative solutions to urban mobility problems by renewing the fleet of around 450 diesel-powered buses by vehicles powered by clean energy sources and by forming a consortium of municipalities served by an energy efficient mode of public transportation. In addition to the renewal of the fleet, the project includes works aimed at integrating the RMF transport system, the construction of terminals and integration stations, the provision of new lines, user information, visual and social communication, operational control and inspection centers, and associated management. In structuring the project, FELICITY was responsible for drawing up a comparative plan for clean technologies for buses and the associated required infrastructure, through a Total Cost of Ownership analysis, aiming to reduce financial and technical uncertainties associated with clean energy buses. FELICITY will also provide support by advising on the project's economic impacts and potential social and environmental benefits, such as reducing GHG emissions. The project aims to improve the quality of the public transport system offered to more than 1 million inhabitants in the region, creating new jobs (including green jobs) and improving the quality of life for the entire population served.

In this sense, the National Urban Mobility Policy is an instrument of the urban development policy, which aims to contribute to universal access in cities, to promote and enable conditions that contribute towards the implementation of the policy's urban development principles, objectives and guidelines.

As part of the Urban Mobility sector, the Transport sub-sector, according to SEEG, emitted approximately 185.4 million tCO<sub>2</sub>e in 2020, trucks and cars being the two main sources of emissions, which can be potentially mitigated in scenarios of Climate Change<sup>65</sup>.

The Brazilian NDC, together with the Paris Agreement, has defined a specific target to expand the use of biofuels, such as ethanol and biodiesel, by approximately 18% by 2030<sup>66</sup>, which directly impacts the transport sector. In addition, the NDC aims actions at promoting efficiency, and at improving infrastructure and urban public transport, but without specifying quantitative targets for these items.

According to CEBDS data<sup>67</sup>, investments estimated at BRL 133 billion will be invested in transportation over the next 25 years: 32% in the road sector, and 68% in the railway sector. Data from the Climate Bonds Initiative<sup>68</sup> show that, globally, transportation is the main issue within the climate universe and, in Brazil, the issuance of debt securities related to transportation infrastructure, when approved by the Ministry of Transportation, can be classified as “incentivized debenture”, exempting individual and non-resident investors from income tax.

Also, in relation to the mobility of people, infrastructure projects must consider all different groups, such as pedestrians, cyclists, public transportation users, people with permanent or temporary disabilities and drivers. Currently, in Brazil, 45 million people – 24% of the population – declare having some type of disability.



In the context of green recovery, inclusive and sustainable infrastructure is essential for cities to adapt to the mobility needs of their inhabitants and to become resilient to climate change. This applies especially to urban transportation and its infrastructure, in order to provide efficient services that can significantly contribute to low-carbon cities.





## URBAN MOBILITY AND ACCESSIBILITY


		
<b>Green Jobs</b>	<b>Emissions Reduction GHG</b>	<b>Investment</b>
<b>1.1 Million<sup>46</sup></b>	<b>1,860 million tCO<sub>2</sub>e<sup>47</sup></b>	<b>USD \$32.8 billion<sup>48</sup></b>

Characteristic		Description
	<b>Temporality (potential benefits)</b>	<p><b>Short term</b> (&lt; 1 year): Green investment plan aimed at mitigating climate change; it is a sector that is closely linked to other economic sectors, such as civil construction, metallurgy, steel, and automobile manufacturing, which tends to expand its job generation capacity. Improvements in the transportation system, modernizing of the network and guaranteeing accessibility to quality urban transportation to a larger proportion of the population; positive externalities such as, for example, better quality of life and health of the population due to the use of active modes and the revitalizing of urban areas.</p> <p><b>Mid Term</b> (1 to 5 years): Investments in Urban Mobility provide the most affordable way to get around in cities. Investment in low-carbon modes are closely associated with the Brazilian NDCs and with the 2030 Agenda, contributing to the decarbonization of the sector, the mitigation of climate change and cooperation with the climate adaptation scenario; reducing traffic jams by converting to quality and affordable public modes of transportation also tends to attract and retain companies and businesses. Achieving better levels of health and quality of life and revitalizing urban areas by the use of active modes.</p> <p><b>Long term</b> (&gt; 5 years): Investments in technologies that allow full integration of low carbon modes to the daily life of cities also tend to create a segment of highly skilled workers with high added value. In addition, in the long term, it is possible to generate climate benefits and align with national goals under the Paris Agreement, increase quality of life and health of local populations, revitalize urban areas, increase ease of access to essential services (health, for example), and attract and retain businesses and companies.</p>
	<b>Local-global alignment</b>	<p>SDG 1 - Eradication of poverty: End poverty in all its forms, everywhere;</p> <p>SDG 7 - Clean and affordable energy: Ensuring reliable, sustainable, modern and affordable access to energy for all;</p> <p>SDG 8 - Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;</p> <p>SDG 9 - Industry, innovation and infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;</p> <p>SDG 11 - Sustainable cities and communities: Making cities and human settlements inclusive, safe, resilient and sustainable;</p> <p>SDG 12 - Responsible consumption and production: Ensure sustainable production and consumption patterns;</p> <p>SDG 13 - Action Against Global Climate Change: Take urgent action to combat climate change and its impacts.</p>

46 Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

47 Data for Brazil until 2050. Source: SITAWI - NPEB <https://www.sitawi.net/publicacoes/nao-perca-esse-bond/>

48 Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Fonte: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf

	<b>Just Transition</b>	<p>Offer the population, citizens and workers involved in the activities that will be replaced, such as fossil fuel transportation, training and jobs in green activities with properly established health and safety conditions. Ensure, in this transition, access to income assistance, housing, food, and labor union and legal support to rights and access to basic services for a career transition. Support for the most vulnerable classes that use their own means of transportation (especially cars, motorcycles and bicycles) as work tools (especially ride-hailing drivers and delivery couriers).</p> <p>Provide the companies in the sector that will be replaced by other technologies with support in the transition to low-carbon technologies and economic diversification based on climate-resilient investments and jobs, creating attractive conditions for public and private investors, providing easier access to loans and financial support. Invest in the creation of new companies and start-ups involved in research and innovation activities.</p> <p>Support municipalities in the transition to low-carbon and climate-resilient activities, creating jobs in the green economy, with access to funding for such activities, such as affordable loans, in addition to providing technical assistance for the design of projects with such scope. Improve digital connectivity and provide support within the state and/or federal system so that macro infrastructure systems can be improved.</p>
	<b>Do no harm</b>	<p>Prevention and control of pollution.</p> <p>Protection of healthy ecosystems.</p>
	<b>Indicators</b>	<p>Extension in km of projects targeting low-carbon urban mobility modes;</p> <p>Measurement of low carbon passenger transportation (passengers/km) and cargo (ton/km);</p> <p>Number of accessibility devices (Universal design; Architectural barriers; Assistive technology; Space for wheelchair circulation; Vertical and horizontal signage; Access ramps; Elevator platforms; Floor layouts; Information in Braille; Accessible restrooms and Parking).</p> <p>Avoided annual fossil fuel consumption;</p> <p>Increase in TUK offers – Tones per Useful Kilometer of the system, when compared to the BaU scenario.</p>
	<b>Potential funding*</b>	<p>BNDES</p> <p>CEF (Pro - Transport; Urban Mobility Programme)</p> <p>Agerio - Vehicles, Equipment and Mobility</p> <p>AgeRio- Environment</p> <p>AgeRio- Advance Cities: Sanitation and Mobility</p> <p>AFAP - Navigate</p> <p>Banestes- Clean Energy Line</p> <p>Banco do Nordeste- FNE Green</p> <p>BASA- FNO: Amazon Green Infrastructure</p> <p>BASA- FNO: Non-Rural Green Energy</p> <p>BRDE- Urban Mobility: Pro Transport</p> <p>BRDE- Urban Mobility: Fleet Renewal</p> <p>BRDE- Urban Mobility: Equipment Acquisition</p> <p>BRDE- Urban Mobility</p> <p>BRDE- Intelligent Cities and sustainable projects: Pro Cities</p> <p>Desenvolve SP - Via SP</p> <p>DesenvolveSP- Green Economy Line: Machines</p> <p>DesenvolveSP- Green Economy Line: Municipalities</p> <p>Capital Market (B3)</p>

\*Non-exhaustive data  
Source: SITAWI, 2021



## INFORMATION AND COMMUNICATION TECHNOLOGY

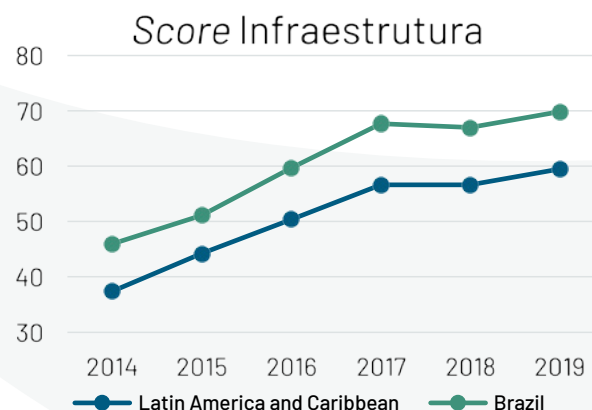
Better communication conditions and access to technologies help create jobs, ensure access to information and education, and improve social indicators. In recent years, improvements have made to the Brazilian telecommunications infrastructure<sup>49</sup>, with a 7% increase in 2020 in the number of internet users compared to 2019, but access to this infrastructure and its services remains quite unequal among populations in different social classes.

In urban households, in 2019, 86.7% of the urban population in Brazil had internet access, increasing from 83.8% in 2018. However, the COVID-19 pandemic boosted the population's interaction with digital media: the need for online interaction, both professional or personal, has become a reality. However, according to PNAD<sup>50</sup> data, barriers such as the high price of access to the service and the lack of knowledge and instrumentation regarding the use of the internet continue to be a reality for many Brazilians, and a total of 12.6 million households are still without internet access.

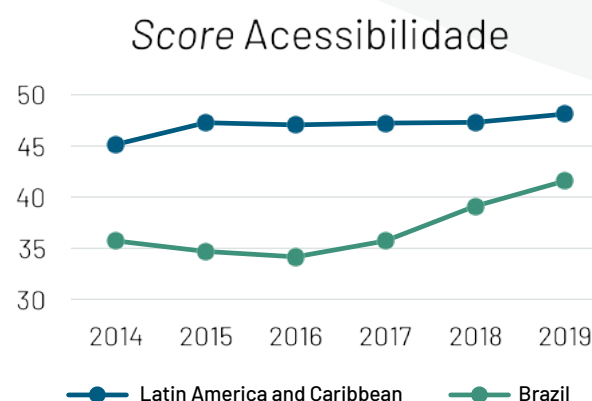
According to the Mobile Connectivity Index, measured by the GSMA tool, which ranks the performance of 170 countries in relation to the mobile internet, in 2019 Brazil obtained a score of 63.5, behind countries such as Uruguay, Chile, Bolivia, Peru, Ecuador, Argentina and other countries in Latin America. This index assesses each country based on four elements which are key in mobile internet use: infrastructure, accessibility, consumer availability and content<sup>51</sup>.

When analyzed separately, in relation to other countries in Latin America, Brazil performed better with regard to infrastructure, which considers the percentage of the population covered by mobile networks and the speed of these connections. Under the accessibility criterion – service costs in comparison with per capita GDP, the price of devices, and indirect taxes (both in terms of the mobile device and mobile network availability costs) – Brazil's performance is lower, indicating that the amount paid by the end consumer is still an impediment to broadband access in the country (Graphs 5 and 6).

**GRAPH 4**  
ICT infrastructure



**GRAPH 5**  
ICT accessibility



Source: Adapted from the GSMA Mobile Connectivity Index, 2019<sup>52</sup>

In recent years, access to technology services has been expanding throughout the world. In 2013, UNESCO proposed four principles to achieve sustainable development goals (SDG) through universal access to the internet: that it be based on human rights, be open, be accessible to all, and be promoted with multisectoral participation.

49 Brazil has 152 million people with Internet access | Agência Brasil (ebc.com.br)

50 Research shows that 82.7% of Brazilian homes have Internet access — Português (Brasil) (www.gov.br)

51 GSMA Mobile Connectivity Index

52 GSMA Mobile Connectivity Index

## BOX 8

### Controlled public lighting technology, Salvador, BA



Through a PPP for the concession of the management of the Public Lighting Network in Salvador, the capital of the state of Bahia currently has 763 remotely monitored public lighting fixtures, capable of reducing consumption by 35%. Intelligent lighting is able to regulate the intensity of the light, given the need of the road. In addition, the system generates notifications, via cell phone and e-mail, regarding burned out light bulbs and instability in the power supply. When the tender was announced, almost BRL100 million in investments in remote management was projected by 2027. Throughout the country since 2016, telemanagement has become an important step towards the optimizing of functionalities within public administration, which also seeks the involvement of the population in management. Salvador was one of the first cities to invest in technology and intends to install 54,000 lighting points connected to the system by 2024. This intelligent lighting system allows other functionalities to be connected to it, such as CO<sub>2</sub> monitoring and rainwater measurements, aspects that will allow the efficient management of the city.

In the European context, the expansion of infrastructure, technologies and digital applications are seen as essential to address climate change and enable the transition to a low-carbon economy. Also, according to a GSMA study, ICT solutions are capable of sustaining a 15% cut in global CO<sub>2</sub> emissions.




When analyzing the Brazilian context, lines of funding for technology, innovation and internet of things (IoT) projects are currently available, offered for the expansion of various services, the development of software, etc. Development banks offer lines aimed at small, medium and large technology companies and at municipal and state governments, with fixed interest rates and with other types of financial guarantees, since many companies in the sector do not have tangible assets. Since January 2021, Law No. 14,108 has been in force, offering tax incentives to the IoT, which are expected to lower the costs of technology and enable the generation of more than 10 million related jobs in the coming years<sup>53</sup>.



In Brazil, there is also a potential for projects that involve improving digital security, data privacy, lowering the rates charged, and increasing investment in research and development. Investments in service expansion and improvement are justified by several factors, including the increased demand for internet services, including residential, with more people working from home and for distance learning. The improvement of this type of service, in the mid and long term, will also help reduce GHG emissions, with fewer people moving around, either for professional or academic reasons.

53 2020 Retrospective shows advancements of Ministry of Communications 2020 — Português (Brasil)([www.gov.br](http://www.gov.br))




## PATH TO A GREEN RECOVERY

		
Green Jobs	Emission Reduction GHG	Investment
N/D	N/D	USD 11,1 Billion <sup>54</sup>

Characteristic		Description
	Temporality	<p><b>Short term</b> (&lt; 1 year): Generation of jobs in the area of telecommunications infrastructure (project and installation phases) and in the area of telecommunications operations (operation/maintenance phase). Expansion of internet access to digitally excluded populations, contributing to the universal access to knowledge. Attracting new businesses and qualified personnel. In addition, the development of ICT infrastructure allows monitoring GHG emissions of urban transportation fleets, buildings, and energy grid (smart grid).</p> <p><b>Mid Term</b> (1 to 5 years): Access and democratizing of information and digital inclusion. Generation of skilled labor. Reduction of carbon footprints by optimizing the digital infrastructure (by reducing multiple networks) and by optimizing the consumption of resources and inputs by companies and their value chains.</p> <p><b>Long term</b> (&gt; 5 years): The sharing of infrastructure will generate positive environmental impacts by reducing carbon footprints by lowering consumption of materials, energy, and reducing exposure to non-ionizing radiation (health hazard) by optimizing the network. Investments in ICT also allow for the improvement of global warming and climate resilience systems in light of increasingly frequent extreme weather events.</p>
	Local-global alignment	<p>SDG 1 - Eradication of poverty: End poverty in all its forms, everywhere;</p> <p>SDG 4 - Quality education: Ensure inclusive, equitable and quality education, and promote lifelong learning opportunities for all;</p> <p>SDG 7 - Clean and affordable energy: Ensuring reliable, sustainable, modern and affordable access to energy for all;</p> <p>SDG 8 - Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;</p> <p>SDG 9 - Industry, innovation and infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;</p> <p>SDG 10 - Reducing inequalities: Reducing inequality within and between countries;</p> <p>SDG 11 - Sustainable cities and communities: Making cities and human settlements inclusive, safe, resilient and sustainable;</p> <p>SDG 13 - Action Against Global Climate Change: Take urgent action to combat climate change and its impacts.</p>

<sup>54</sup> Aggregate data for Argentina, Brazil, Colombia and Mexico from 2020 to 2030. Source: IFC - IFC\_GreenReport\_FINAL\_web\_1-14-21.pdf



	<b>Just Transition</b>	<p>Offer to the population, citizens and workers involved in activities that will be replaced, such as obsolete technologies, the opportunity for training and jobs in green activities with properly established health and safety conditions. Ensure, in this transition, access to income assistance, housing, food and labor union and legal support to rights and access to basic services for a career transition. Ensure access of the most vulnerable to information and communication systems, especially the internet, in order to guarantee access to knowledge and opportunities. Guarantee the access of families with school-age children to internet services, to ensure that the learning of these children is not hampered by the pandemic.</p> <p>Provide companies in the sector that will be replaced with other technologies, support the transition to low-carbon technologies and economic diversification based on climate-resilient investments and jobs, create attractive conditions for public and private investors, provide easier access to loans and financial support, encourage the creation of new companies and start-ups that invest in research and innovation activities.</p> <p>Support municipalities in the transition to low-carbon and climate-resilient activities, creating jobs in the green economy, with access to funding for such activities, such as affordable loans, in addition to providing technical assistance for the design of projects with such scope. Improve digital connectivity and provide support within the state and/or federal system so that macro infrastructure systems can be improved.</p>
	<b>Do no harm</b>	<p>Ensure compliance with information use, confidentiality and data protection regulation;</p> <p>Ensure the use of energy efficiency alternatives for power consumption in data processing centers (which tend to increase their power consumption given the greater demand for their services – 5G, Internet of Things (IoT), and Artificial Intelligence);</p> <p>Transition to a circular economy, from waste prevention to recycling;</p> <p>Prevention and control of pollution, especially from electronic waste and hardware used in ICT facilities;</p> <p>Efficient use of natural resources.</p>
	<b>Indicators</b>	<p>Job creation (number of people)</p> <p>Annual reduced/avoided GHG emissions in tCO<sub>2</sub>e;</p> <p>Annual power savings in MWh/GWh and GJ/TJ due to the installation of energy efficient systems</p> <p>Proportion of population or number of households covered by broadband networks</p> <p>Cell phone service subscriptions (per 100,000 inhabitants)</p> <p>Secure Internet servers with data protection networks (per 100,000 inhabitants)</p> <p>Number of schools with broadband and network access service.</p>
	<b>Financiamento potencial *</b>	<p>Foment Agency of the State of Tocantins - Inovacred</p> <p>Banco do Nordeste- FNE Startup</p> <p>BRDE- Investment Projects: MPME</p> <p>BRDE- Investment Projects: Large business</p> <p>BRDE- Machines and Equipment: acquisition and Commerce</p> <p>BRDE- Inovation: Inovacred Programme</p> <p>BRDE- Inovation: Inovacred connect</p> <p>BRDE- Inovation: Inovacred Express</p> <p>BRDE- Inovation: Inovacred 4.0</p> <p>BRDE- Public Management: Public Security</p> <p>Fomento Paraná- BNDES Finame</p> <p>Sicredi- Household appliances</p> <p>Sicredi- Computers</p> <p>Sicoob- BNDES Finame</p> <p>IDB Invest C2DB</p> <p>IDB Brazil More Digital</p> <p>Capital Market (B3)</p>

\*Non-exhaustive data  
Source: SITAWI, 2021



## ADAPTATION TO CLIMATE CHANGE, PUBLIC SPACE DESIGN AND NATURE-BASED SOLUTIONS

According to the 6th Report of the Intergovernmental Panel on Climate Change – IPCC<sup>78</sup> released in August 2021, human action in inducing climate change is indisputable. The report also confirms that climate change is taking place and faster and more intensely than expected. According to the projections, with a high level of probabilistic confidence, average temperatures are increasing and at an accelerated pace, which tends to intensify acute and chronic physical events such as cyclones, storms, relative rise in the sea level, the retreat of coastlines and maritime heat waves.

In Brazil<sup>79</sup>, areas of greater climate sensitivity, such as the semi-arid and arid regions, will suffer a reduction in water resources due to climate change, with estimated groundwater replenishment tending to drastically decrease by more than 70% in Northeastern Brazil (compared to the 1961-1990 rates). Rainfall, on the other hand, will tend to increase in the Southeast, with a direct impact on the frequency and intensity of flooding in large cities such as Belo Horizonte, Rio de Janeiro and São Paulo. This scenario alerts us to the need for investments in infrastructure so that measures may be implemented aimed at adapting and increasing urban resilience to extreme weather events, such as those provided for in official documents.

The National Plan for Adaptation to Climate Change (PNA<sup>80</sup>) is an instrument developed by the federal government together with civil society, the private sector and state governments that aims to promote the *reduction of national vulnerability to climate change and to carry out associated risk management of this phenomenon*. The PNA groups the actions to be taken according to the adaptation needs of each area of focus, including City Strategies<sup>81</sup>, with the planning of actions for the rehabilitation of urban areas, large-scale housing, slope containment, sanitation (solid waste management and effluents), urban drainage, research and technology.

From an investment perspective, BNDES operates the National Climate Change Fund or Climate Fund, which is an instrument of the National Policy on Climate Change and is linked to the Ministry of the Environment<sup>82</sup>. This fund applies the reimbursable portion of resources of the National Climate Change Fund towards activities, projects and studies aimed at mitigating climate change. Among the activities listed, the area of Sustainable Cities and Climate Change is included, with support of projects that increase the sustainability of cities, improving their global efficiency and reducing the consumption of energy and natural resources.

As highlighted by the IFC (2021)<sup>83</sup>, one of the key lessons of the COVID-19 pandemic is the importance of preparing and strengthening society's resilience in light of existing physical and economic risks. As the cost of natural hazards and disasters escalates, delayed investment in projects to build resilience and climate adaptation further threatens economic stability and recovery efforts.

In the scope of the efforts aimed at creating resilience, adaptation and mitigation of the effects of climate change, there is also the concept of "Nature-based solutions", which are actions to manage and sustainably restore natural or modified ecosystems by simultaneously providing human well-being, benefits to biodiversity, and the capacity to respond to social and environmental challenges.

### BOX 9

#### Urban climate resilience, Belo Horizonte, MG






Provided for in the Master Plan of the municipality of Belo Horizonte, the "Rain Gardens" project aims to increase the area of water infiltration of the city's rains, which have become more intense and frequent in recent years and which tend to intensify due to climate change. The project provides greater resilience to urban spaces, reducing the city's asphalted or concreted area, increasing soil permeability and creating alternatives for rainwater to infiltrate into the subsoil. This is a solution to reduce the gathering of large volumes in the lower parts of the city, where flooding normally occurs. As a project for a nature-based solution, the Rain Gardens initiative, in addition to helping to reduce runoff and flooding in the streets, will also regulate local microclimates, improve thermal comfort, as well as increase urban biodiversity, making the city more beautiful, green and pleasant. To implement rainwater gardens in Belo Horizonte, the city received support from Local Governments for Sustainability, a non-governmental organization for sustainable development focused on urban development. To finance projects in the capital, the NGO invested around BRL 350 thousand from the IKI – International Climate Initiative, a German government fund for sustainable urban development projects. In addition to the Master Plan, the Green Credit Certification Program – GCCP – was instituted by Law 11.284/2021, creating tax incentives for those who adopt sustainable measures in the city, such as the installation of solar energy panels and rainwater collection mechanisms. According to the text of the law, the GCCP aims to encourage the adaptation of buildings to sustainability and resilience measures, contributing to reduce the impacts of climate change.



Since urban environments are strongly linked to the conditions of the natural environment, especially regions such as coastal ones, solutions such as the preservation and restoration of natural ecosystems (such as mangroves, for example) provide protection against storms and floods; or even encouraging the preservation of forests and reforestation along watersheds, helping to regulate rainfall and purify the municipal/regional water supply. According to the World Economic Forum<sup>84</sup>, investments in nature-based solutions dedicated to infrastructure can reach USD 1 trillion, generating economic benefits and preventing of economic losses.

The theme is here to stay. Data confirming that cities will be strongly impacted by extreme events related to climate change are already observed and tend to become even more frequent. Thus, it has become necessary to include the creation and strengthening of urban climate resilience and adaptation, also with a focus on nature-based solutions, green recovery activities and projects, as part of the mandate of institutions that finance infrastructure projects.



## PATH TO A GREEN RECOVERY

		
Green Jobs	GHG Emissions Reduction	Investment
N/D	N/D	USD 70 Billion <sup>55</sup>

Characteristic		Description
	Temporality	<p><b>Short term</b> (&lt; 1 year): Generation of jobs (design and installation phases).</p> <p><b>Mid Term</b> (1 to 5 years): Expansion of urban infrastructure ensuring resilience to extreme (eg: urban floods) and chronic (eg: heat waves, rising sea levels) weather events; positive externalities for other urban infrastructure sectors (eg: the use of nature-based solutions for water filtration and purification can bring savings to water treatment and sewage systems); positive externalities such as the generation of jobs in related sectors (tourism, for example) and the recovery of degraded urban areas.</p> <p><b>Long term</b> (&gt; 5 years): Reduction of municipal energy consumption and GHG emissions; improving air quality; better levels of collective health, disease prevention and quality of life; better urban infrastructure ensuring resilience to extreme (eg: urban floods) and chronic (eg: heat waves, rising sea levels) weather events; positive externalities for other urban infrastructure sectors (eg: the use of nature-based solutions for water filtration and purification can bring savings to water treatment and sewage systems); promotion and restoration of biodiversity; positive externalities such as the generation of jobs in related sectors (tourism, for example) and the recovery of degraded urban areas.</p>
	Local-global Alignment	<p>SDG 1 - Eradication of poverty: End poverty in all its forms, everywhere;</p> <p>SDG 2 - Zero hunger and sustainable agriculture: End hunger, achieve food security and improve nutrition and promote sustainable agriculture;</p> <p>SDG 3 - Health and well-being: Ensuring healthy living and promoting well-being for all, at all ages;</p> <p>SDG 6 - Drinking water and sanitation: ensuring the availability and sustainable management of water and sanitation for all;</p> <p>SDG 7 - Clean and affordable energy: Ensuring reliable, sustainable, modern and affordable access to energy for all;</p> <p>SDG 8 - Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;</p> <p>SDG 9 - Industry, innovation and infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;</p> <p>SDG 11 - Sustainable cities and communities: Making cities and human settlements inclusive, safe, resilient and sustainable;</p> <p>SDG 13 - Action Against Global Climate Change: Take urgent action to combat climate change and its impacts.</p>

<sup>55</sup> Estimated annual cost for climate adaptation of developing countries – Report on Adaptation Gap 2020 | UNEP – UN Environment Programme

	<b>Just Transition</b>	<p>Offer the population and workers involved in activities that will be replaced, such as new public designs (projects and materials), the opportunity for training (capacity building) and jobs in green activities with properly established health and safety conditions. Ensure, in this transition, access to income assistance, housing, food and labor union and legal support to rights and access to basic services in the career transition.</p> <p>Provide companies in the sector that will be replaced by other technologies with support for the transition to low-carbon technologies and economic diversification based on climate-resilient investments and jobs, creating attractive conditions for public and private investors, providing easier access to loans and financial support. Invest in the creation of new companies and start-ups that develop research and innovation activities.</p> <p>Support municipalities in the transition to low-carbon and climate-resilient activities, creating jobs in the green economy, with access to funding for said activities, such as affordable loans, in addition to providing technical assistance for the design of projects with such scope. Improve digital connectivity and provide support within the state and/or federal system so that macro infrastructure systems can be improved.</p>
	<b>Do no harm</b>	<p>Protection of healthy ecosystems</p> <p>Care of environmental protection areas and historic heritage</p>
	<b>Indicators</b>	<p>Revitalized and/or accessible area (m<sup>2</sup>)</p> <p>Prevention of impacts from extreme weather events (eg: population not affected by seasonal floods due to the implementation of drainage works)</p> <p>Biodiversity recovery</p> <p>Improved air quality and reduced noise pollution</p> <p>Reduction of GHG emissions (tCO<sub>2</sub>e)</p> <p>Reduction in energy consumption (kWh)</p> <p>Natural corridors (km)</p> <p>Number of inhabitants served by urban gardens (number of people)</p>





## Potential Funding\*

BNDES – Climate Fund  
 BNDES Finem – Environmental Sanitation and water resources  
 Desenvolve SP – Multiuse Arena Line  
 Global Environmental Fund – GEF  
 Green Climate Fund – GCF  
 Adaptation Fund – AF  
 International Climate Initiative – IKI  
 AgeRio- Credit for Sustainable Projects  
 AgeRio- Environment  
 AgeRio- Advance Cities: Sanitation and Mobility  
 AgeRio- Vehicles, Equipment and Mobility  
 AgeRio- Education, Culture, Sport and Leisure  
 AFAP- Cultural Entrepreneurs  
 AFAP- Solar Energy Line  
 Foment Agency of RN S.A- Family Agriculture  
 BASA- Amazon Green Business  
 BASA- FNO: Amazon Green Infrastructure  
 BASA- FNO: Non-Rural Green Energy  
 Banpará- BNDES Finame: Low carbon  
 Banco do Nordeste- FNE Sun Physical Entity  
 Banco do Nordeste- FNE Water  
 Banco do Nordeste- FNE Aquiculture/fishfarming  
 Banco do Nordeste- FNE Irrigation  
 Banco do Nordeste- FNE Proatur  
 Banco do Nordeste- FNE Profrota  
 Banco do Nordeste- FNE Green  
 Banco do Nordeste- FNE Sun: Legal Entity  
 DesenvolveSP- Green Economy Line  
 DesenvolveSP- Green Economy Line: Machines  
 DesenvolveSP- Green Economy Line: Sanitation and Waste  
 DesenvolveSP- Green Economy Line: Municipality  
 DesenvolveSP-Clean Water Line  
 DesenvolveAL- Solar Energy  
 DesenBahia- Sustainable Municipalities  
 DesenBahia-  
 Badesul- ABC Programme  
 Badesul- BNDES Finame Renewable Energy  
 Badesul- Infrastructure  
 Badesul- Education: Health – Safety  
 BDMG- Sustainability  
 BDMG- Sustainability and selfconsumption  
 BDMG- Solar Photovoltaic  
 Banestes- Clean Energy Credit  
 Banestes- Clean Energy Microcredit – Physical Entity  
 Banestes- BNDES Finame: Renewable Energy  
 Banestes- BNDES Climate Fund  
 Bades- Green Economy  
 Bades- Energy  
 BRDE- Renewable Energy and Infrastructure  
 BRDE- Forests and Integrated Production Systems: ABC  
 BRDE- Small Farmers and Family Agriculture: Pronaf Agroindustry  
 BRDE- Urban Mobility: Equipment Acquisition  
 BRDE- Urban Mobility  
 BRDE- Sanitation: for everyone  
 BRDE- Sanitation: AFD  
 BRDE- Sanitation: Advance Cities  
 BRDE- Intelligent Cities and sustainable projects: Pro-cities  
 BRDE- Intelligent Cities and sustainable projects: AFD  
 BRDE- Intelligent Cities and sustainable projects: Energy Efficiency  
 BRDE- Urban Resilience: Resilient South  
 Crescol- Renewable Energy  
 Crescol- Pronaf Agroecology  
 Crescol- Pronaf Bioeconomy  
 FINEP- Pre-investment  
 FomentoParaná- Parana Women's Bank: Microcredit  
 FomentoParaná- Parana Women's Bank: MPE  
 Sicredi- Financing for Solar Energy  
 Sicredi- ABC: Programme for GHG Reduction in Agriculture  
 Sicredi- PRONAF Investment: National Programme for the strengthening of Family Agriculture

\*NON-EXHAUSTIVE DATA  
 SOURCE: SITAWI, 2021

The background of the slide is a photograph of a city skyline, likely New York City, featuring several prominent skyscrapers. A large, semi-transparent teal overlay covers the top and right portions of the image. A diagonal line splits the bottom of the slide, with the left side showing a brown, textured surface (possibly a path or ground) and the right side showing a dark teal textured surface. The word "CONCLUSIONS" is written in white, bold, uppercase letters across the middle of the teal overlay.

# CONCLUSIONS

Cities face a series of environmental, social and economic challenges, for example: increases in populational densities and in the demand for energy, the impacts of climate change, and the lack of resources. The COVID-19 pandemic has intensified some of these problems, generated new ones, and aggravated the vulnerability of certain groups to these impacts.

In this context of natural resource scarcity, the need to reduce social inequality and the climate crisis and, more importantly, to control a pandemic has become a reality. It has thus become extremely important to regard urban management from the perspective of city infrastructure in order to ensure greater resilience in this new reality. Therefore, it is important to create a convergent understanding of what green economic recovery is and how this principle can be applied towards the development of a more sustainable economy.

By making the diagnosis on the impressions of the financing agents, it was possible to understand how these institutions understand and experience the technical and scope limitations of the cities' infrastructure projects and how the green recovery and the activities mentioned by the stakeholders can be potentiators of economic changes, social, environmental and climate issues in the short, medium and long term. This is the guarantee that the resources will be truly aligned with the principles of green recovery.

When defining a green economic recovery strategy, certain activities and investments in projects involving fossil fuels or potentially polluting activities, for example, will necessarily be excluded. The principles of "do no harm", "just transition" and the benefits in the short, mid and long term, will support the decision-making and the measures needed to remedy possible negative impacts, enabling a green recovery with nobody left behind.

The contextualization of activities with international references such as GBP, SBP, CBI and with FEBRABAN itself made it possible to align the activities suggested here with the global scenario of sustainable finance and the potential transformations from an environmental, social and climatic point of view. This study, therefore, brings convergence so that municipalities can plan their projects under such perspectives.

This study aimed to evaluate characteristics and list possible priority areas for funding given the historical lack of investment in the sectors and the potential impact on the post-COVID green recovery in Brazil, observing the socio-economic, environmental and climate dimensions as a prerequisite for profound, long-term transformational change.

It is important to emphasize, once again, that the present study brings the theme of post-pandemic green recovery from the perspective of cities, in a preliminary nature. It is expected that the next steps will lead to the structuring of a classification system that makes it possible to establish ranking guidelines for each project and activity so that they can be gradually listed according to their transformation potential.

In this regard, we sought to provide definitions and references that can help decision makers, including municipal managers and funding agents, to promote areas, activities and projects that enable a fair transition to a more equitable, circular, low-carbon economy, with the capacity to mitigate and be resilient to climate change.



The background features a city skyline, likely New York City, with prominent skyscrapers like the Empire State Building. The image is overlaid with a teal gradient that covers most of the frame. A diagonal line splits the image, with the bottom-left corner showing a clear, unfiltered view of a park area with trees and a paved path. The word "REFERENCES" is centered in white, bold, uppercase letters, with a thin white horizontal line extending from its left side across the middle of the image.

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# ANNEXES

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## Sanitation and Solid Waste Sector Activities and Projects

## Biological Mechanical Treatment (BMT) (R)

1,5°C

**GBP category:** Pollution Prevention and Control**SBP category:** Affordable basic infrastructure, socioeconomic advancement and empowerment and employment generation**CBI category:** Waste, pollution control and sequestration – Activities for circular economy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy:** Subclass 3821-1/00 Treatment and disposal of non-hazardous wasteClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Compost (R)

1,5°C

**GBP category:** Pollution Prevention and Control**SBP categories:** Affordable basic infrastructure, socioeconomic advancement and empowerment and employment generation**CBI category:** Waste, pollution control and sequestration – Activities for circular economy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy:** Subclass 3821-1/00 Treatment and disposal of non-hazardous wasteClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure



## Recycling Expansion (R) (E)

2°C

**GBP category:** Pollution Prevention and Control**SBP category:** Affordable basic infrastructure, socioeconomic advancement and empowerment and employment generation**CBI category:** Waste, pollution control and sequestration - Activities for circular economy**Compliance with CBI Criteria:**

Mitigation

Resilience/Adaptation

**FEBRABAN Green Taxonomy: Subclass 3821-1/00** Treatment and disposal of non-hazardous wasteClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Membrane Bioreactor (MBR) (E)

2°C

**GBP category:** Pollution Prevention and Control**GBP categories:** Affordable basic infrastructure and employment generation**CBI Category:** Waste, pollution control and sequestration - Technologies and products**Compliance with CBI Criteria:**

Mitigation

Resilience/Adaptation

**FEBRABAN Green Taxonomy: Subclass 3821-1/00** Treatment and disposal of non-hazardous wasteClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Cloistered Flare (R)(E)

2°C

**GBP category:** Pollution Prevention and Control**SBP category:** Affordable basic infrastructure, socioeconomic advancement and empowerment and employment generation**CBI category:** Waste, pollution control and sequestration - Landfill gas capture (under study)**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Subclass 3821-1/00** Treatment and disposal of non-hazardous wasteClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Opened Flare (R)(E)

NDC

**GBP category:** Pollution Prevention and Control**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Waste, pollution control and sequestration - Landfill gas capture (under study)**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Subclass 3821-1/00** Treatment and disposal of non-hazardous wasteClimate  
Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure





## Renewable Energy Sector Activities and Projects

## Biogas Thermoelectric

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Energy - Bioenergy**Compliance with CBI Criteria**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk ExposurePlanted Biomass Thermoelectric with  
Energy Purposes

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Energy - Bioenergy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Residual Biomass Thermoelectric

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Energy - Bioenergy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Black Liquor Thermoelectric

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Energy - Bioenergy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Renewable Energy Transmission and Storage

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Electricity Grid and storage**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.12-3 Electricity Transmission**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Solar Photovoltaic Power Plant

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Solar Energy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Solar Thermal Power Plant (CSP)

1,5°C

**GBP category:** Renewable Energy**SBP category:** Affordable basic infrastructure and employment generation**CBI category:** Solar Energy**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**Climate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

Smart Grid

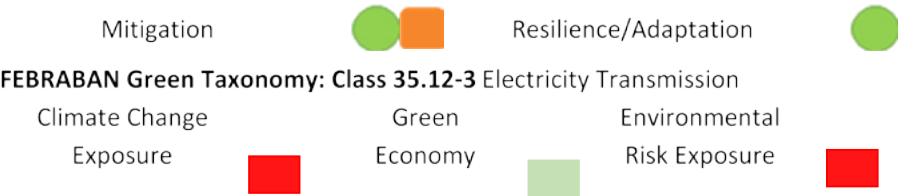
**GBP category:** Renewable Energy  
**SBP category:** Affordable basic infrastructure and employment generation  
**CBI category:** Electricity Grid and Storage  
**Compliance with CBI Criteria:**



NDC

Transmission, Distribution and Storage

**GBP category:** Renewable Energy  
**SBP category:** Affordable basic infrastructure and employment generation  
**CBI category:** Electricity Grid and Storage  
**Compliance with CBI Criteria:**



NDC



## Green Buildings and Retrofit Sector Activities and Projects

## Renewable Distributed Energy Generation

1,5°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Green Buildings**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy:** Class 35.11-5 Electricity GenerationClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Zero Carbon Building

1,5°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Green Buildings**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure



## Solar Water Heating System

1.5°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Energy capture systems**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Class 35.11-5** Electricity generationClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Thermal Solar Collector for Air Conditioning and Refrigeration

1.5°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Energy capture systems**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Class 35.11-5** Electricity generationClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Efficient Thermal Comfort

2°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Energy efficiency technology**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Efficient Lighting

2°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Energy efficiency technology**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Subclass 9001-9/06** Sound and lighting activitiesClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Lean Construction

2°C

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Green Building**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Other buildings with certification

NDC

**GBP category:** Energy Efficiency**SBP categories:** Affordable housing, affordable basic infrastructure and Employment generation**CBI category:** Buildings – Green Building**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

**FEBRABAN Green Taxonomy Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure



Urban Mobility and Accessibility Activities and Projects

Hydrogen Vehicles Supply Station

**GBP category:** Clean Transport

**SBP category:** Affordable infrastructure and Employment generation

**CBI Category:** N/A

**Compliance with CBI Criteria:**

Mitigation

N/A

Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Class 35.11-5 Electricity Generation**

Climate Change  
Exposure



Green  
Economy



Environmental  
Risk Exposure



1,5°C

Electric Vehicles Recharging Station

**GBP category:** Clean Transport

**SBP category:** Affordable infrastructure and Employment generation

**CBI Category:** Transport – Electric vehicles infrastructure (under definition)

**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 2710-4/03 Electric motors, parts and accessories manufacturing**

Climate Change  
Exposure



Green  
Economy

Environmental  
Risk Exposure



1,5°C

## Structure for Public and Private Bicycle Use

1,5°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Bicycle transport**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4649-4/03** Whole sale of bicycles, tricycles and other recreational vehiclesClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Light Rail Vehicle Infrastructure (LRV)

1,5°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Urban train system**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4211-1/01** Railways and roadways constructionClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Electrified Railway Infrastructure

1,5°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Urban train system**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation




N/A

**FEBRABAN Green Taxonomy: Subclass 4211-1/01** Railways and roadways constructionClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

Biogas and/or Sugar Cane Ethanol Vehicles

1,5°C




**GBP category:** Clean Transport  
**SBP category:** Affordable infrastructure and Employment generation  
**CBI Category:** Transport – Alternative fuel vehicle  
**Compliance with CBI Criteria:**

Mitigation		Resilience/Adaptation	N/A
<b>FEBRABAN Green Taxonomy: Subclass 2910-7/01</b> Manufacturing of automobiles, trucks and utility vehicles construction			
Climate Change Exposure		Green Economy	Environmental Risk Exposure 

Hydrogen Cell Vehicle

1,5°C




**GBP category:** Clean Transport  
**SBP category:** Affordable infrastructure and Employment generation  
**CBI Category:** Transport – Alternative fuel vehicle  
**Compliance with CBI Criteria:**

Mitigation		Resilience/Adaptation	N/A
<b>FEBRABAN Green Taxonomy: Subclass 2910-7/01</b> Manufacturing of automobiles, trucks and utility vehicles			
Climate Change Exposure		Green Economy	Environmental Risk Exposure 

Electric vehicle

1,5°C

**GBP category:** Clean Transport  
**SBP category:** Affordable infrastructure and Employment generation  
**CBI Category:** Transport – Electric vehicles  
**Compliance with CBI Criteria:**

Mitigation		Resilience/Adaptation	N/A
<b>FEBRABAN Green Taxonomy: Subclass 2910-7/01</b> Manufacturing of automobiles, trucks and utility vehicles			
Climate Change Exposure		Green Economy	Environmental Risk Exposure 



## Hybrid Ethanol and Electric Vehicles

1,5°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Electric vehicles**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 2910-7/01** Manufacturing of automobiles, trucks and utility vehiclesClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Accessibility

1,5°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Urban development (non developed criteria)**Compliance with CBI Criteria:**

Mitigation

N/A

Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Hostile architecture removal

1,5°C

**GBP category:** N/A**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Urban development (non developed criteria)**Compliance with CBI Criteria:**

Mitigation

N/A

Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## BRT Infrastructure

2°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Bus Rapid Transit**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Intelligent Transport System (ITS)

1.5°C

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Transport logistics**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4221-9/04** Construction of telecommunication stations and networksClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Efficient trains

NDC

**GBP category:** Clean Transport**SBP category:** Affordable infrastructure and Employment generation**CBI Category:** Transport – Railways system (for electrified infrastructure)**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4912-4/02** Municipal and metropolitan rail passenger transportClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

### Blended Fuel Vehicles – Gasoline and Ethanol or NVG and Querosene and Bioquerosenes

NDC

**GBP category:** Clean Transport

**SBP category:** Affordable infrastructure and Employment generation

**CBI Category:** Transport - Efficient vehicles

**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 2910-7/01** Manufacturing of automobiles, trucks and utility vehicles

Climate Change  
Exposure



Green  
Economy

Environmental  
Risk Exposure



### Vehicular Natural Gas Vehicles (VNG)

NDC

**GBP category:** Clean Transport

**SBP category:** Affordable infrastructure and Employment generation

**CBI Category:** Transport - Alternative fuel vehicles

**Compliance with CBI Criteria:**

Mitigation



Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 2910-7/01** Manufacturing of automobiles, trucks and utility vehicles

Climate Change  
Exposure



Green  
Economy

Environmental  
Risk Exposure





Information and Communication Technology Sector Activities and Projects

School connectivity

<b>GBP category:</b> Circular Economy and Ecoefficient Products		
<b>SBP category:</b> Basic affordable infrastructure and Employment generation		
<b>CBI Criteria:</b> N/A		
<b>Compliance with CBI Criteria:</b>		
Mitigation	Resilience/Adaptation	
<b>FEBRABAN Green Taxonomy: Subclass 6209-1/00</b> Technical support, maintenance and other information technology services		
Climate Change Exposure	Green Economy	Environmental Risk Exposure

Public Internet Access

<b>GBP category:</b> Circular Economy and Ecoefficient Products			
<b>SBP category:</b> Access to essential services and socioeconomic advancement and empowerment			
<b>CBI Criteria:</b> N/A			
<b>Compliance with CBI Criteria:</b>			
Mitigation	N/A	Resilience/Adaptation	N/A
<b>FEBRABAN Green Taxonomy: Subclass 6209-1/00</b> Technical support, maintenance and other information technology services			
Climate Change Exposure	Green Economy	Environmental Risk Exposure	

## Safe access (information safety)

**GBP category:** N/A

**SBP category:** Access to essential services and socioeconomic advancement and empowerment

**CBI Criteria:** N/A

**Compliance with CBI Criteria:**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 6209-1/00** Technical support, maintenance and other information technology services

Climate Change Exposure	Green Economy	Environmental Risk Exposure
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## User training platform

**GBP category:** N/A

**SBP category:** Employment generation and socioeconomic advancement and empowerment

**CBI Criteria:** N/A

**Compliance with CBI Criteria:**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 6209-1/00** Technical support, maintenance and other information technology services

Climate Change Exposure	Green Economy	Environmental Risk Exposure
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Climate Change Activities and Projects

System and Infrastructure against flooding

2°C

**GBP category:** Climate Change adaptation  
**SBP category:** Affordable infrastructure and Employment generation  
**CBI category:** Urban development  
**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 4222-7/01** Construction of water supply and sewage collection networks and related constructions, except irrigation works

Climate Change Exposure		Green Economy		Environmental Risk Exposure	
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Green areas (infiltration and thermal comfort)

1,5°C

**GBP category:** Climate Change adaptation  
**SBP category:** Affordable infrastructure and Employment generation  
**CBI category:** Urban development  
**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 0122-9/00** Ornamental plant and flower cultivation

Climate Change Exposure		Green Economy		Environmental Risk Exposure	
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## Hostile architecture removal

1,5°C

**GBP category:** Climate Change adaptation**SBP category:** Affordable infrastructure and Employment generation**CBI category:** Urban development**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 7111-1/00** Architecture servicesClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Flood Containment Dikes

**GBP category:** Climate Change adaptation**SBP category:** Affordable infrastructure and Employment generation**CBI category:** Urban development**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 4299-5/99** Other civil engineering works not previously specifiedClimate Change  
ExposureGreen  
EconomyEnvironmental  
Risk Exposure

## Water storage cisterns

**GBP category:** Climate Change adaptation

**SBP category:** Affordable infrastructure and Employment generation

**CBI category:** Urban development

**Compliance with CBI Criteria: (under development)**

Mitigation N/A

Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4222-7/01** Construction of water supply and sewage collection networks and related constructions, except irrigation works

Climate Change  
Exposure



Green  
Economy



Environmental  
Risk Exposure



## Flooding shelters

**GBP category:** Climate Change adaptation

**SBP category:** Affordable infrastructure and Employment generation

**CBI category:** Urban development

**Compliance with CBI Criteria: (under development)**

Mitigation N/A

Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 4120-4/00** Building construction

Climate Change  
Exposure



Green  
Economy

Environmental  
Risk Exposure



## Urban ecologic corridors

**GBP category:** Climate Change adaptation

**SBP category:** Employment generation

**CBI category:** Urban development

**Compliance with CBI Criteria: (under development)**

Mitigation N/A

Resilience/Adaptation

N/A

**FEBRABAN Green Taxonomy: Subclass 0220-9/06** Natural forest conservation

Climate Change  
Exposure



Green  
Economy



Environmental  
Risk Exposure

1,5°C

## Urban agriculture

**GBP category:** Climate Change adaptation

**SBP category:** Food safety and Sustainable food systems and Employment generation

**CBI category:** Urban development

**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 0161-0/99** Agriculture support activities not previously specified

Climate Change Exposure		Green Economy	Environmental Risk Exposure	
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## Thermal adaptation for public buildings (heat corridor, green roofs, efficient lighting and cooling systems)

**GBP category:** Climate Change adaptation



**SBP category:** Employment generation

**CBI category:** Urban development

**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 4299-5/99** Other civil engineering works not previously specified

Climate Change Exposure		Green Economy	Environmental Risk Exposure	
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## Climate change monitoring systems

**GBP category:** Climate Change adaptation

**SBP category:** Employment generation

**CBI category:** Urban development

**Compliance with CBI Criteria: (under development)**

Mitigation	N/A	Resilience/Adaptation	N/A
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**FEBRABAN Green Taxonomy: Subclass 8020-0/01** Monitoring activities of electronic security systems

Climate Change Exposure	Green Economy	Environmental Risk Exposure
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## COMPILED REPORT OF INTERVIEWS WITH STAKEHOLDERS

The interviews conducted with stakeholders were important guides to understand the main difficulties and potential for the development of urban infrastructure projects with clear sustainability and socioeconomic development aspects, characterized here as Green Recovery in Brazil.

The institutions interviewed – BDMG, BRDE, PARANACIDADE and DESENVOLVESP – have been quite active in ensuring the feasibility of municipal infrastructure projects through financial and technical support. Furthermore, all the projects organically incorporate the ESG theme in their mandates, operations and guidelines.

According to these projects, with regard to promoting economic recovery through initiatives that encompass socio-environmental additionality criteria, the national scenario suffers from a lack of definitions: there is not enough knowledge, on the part of borrowers and providers of resources, regarding which eligible initiatives could be classified as Green Recovery. As it is a very recent topic, both internationally and particularly in the national reality, and only discussed in specific sectors of the institutions, the dissemination of this subject remains limited, and attention is still essentially focused on emergency actions both during the pandemic and after.

In situations where the alignment with sustainability criteria and the economic opportunity of enabling projects that can be considered Green Recovery initiatives are clear, some obstacles still make their implementation difficult. It was unanimous among those interviewed that the short-term vision of public managers makes it difficult to invest in sustainable and resilient urban infrastructure projects, given the need to deliver works and consolidate projects during an electoral mandate period, which provide short-term benefits, but disregard opportunities that could be left as a legacy to the municipality.

This is due to the fact that structural projects in cities (for example: basic sanitation, waste treatment, energy generation via renewable sources) take longer to start presenting social and environmental benefits that can be capitalized on by city managers, and also require better municipal financial health (in order to access financial resources).

This situation, however, also opens a window of opportunity on the work carried out toward this end, by proposing milestones and procedures to capture the benefits associated with the long term of the projects, albeit in shorter periods. These benefits are linked to the economic and social mobilization potential of more complex projects, such as the generation of jobs, the revitalizing of economic chains, and income generation.

Another point highlighted was that, for the stakeholders interviewed, the difficulty faced by municipalities in preparing complex projects also hinders the obtaining of funding.

Generally, smaller municipalities do not have qualified technical staff, and even projects in larger municipalities are not aligned with the social and environmental safeguards required by funding agents (which, in turn, may be linked to capital supply contracts signed with multilateral agencies and international development funding institutions). Again, understanding the problem emerged as an opportunity to reflect on possible solutions, where the technical assistance role of these financing agents and the union of municipalities in the form of consortia proved to be appropriate.

In addition to the proposals to create milestones, indicators that capture the long-term benefits in shorter periods of time, and the role of providing technical assistance to municipalities, respondents agreed that the establishment of standards and criteria, such as a “taxonomy”, would unlock many opportunities to create bridges between municipalities and financing agents, as it would help frame urban infrastructure projects according to the precepts of green economic recovery.

### Compiled report on the results of the online questionnaire

This stage of the questionnaire focused on understanding how the national market perceives (urban) infrastructure sectors with economic, social and environmental appeal and the potential to drive economic recovery. The 21 institutions that took part in this stage were private initiative institutions, financial institutions (DFIs), professional investors, and municipal entities, at the state or national level. The quantitative distribution of representatives from each of the sectors was quite similar, with greater representation of private institutions.



Initially, questions were directed towards a broader perception of what institutions understand as green and sustainable sectors, projects and initiatives (detailed in the table below) to then address awareness and existence of projects aimed at post COVID-19 recovery and Green Recovery.



Sectors understood as green/sustainable	Answers
Energy generation (renewable sources)	20
Collection and treatment of solid waste	17
Water and sewage treatment	14
Flooding and lock control	13
Implementation and operation of water and sewage network	13
Education	12
Health	11
Public lighting	10
Parks and recreational facilities	9
Railroads	7
Energy transmission and distribution	7
Others	5
Broadband network	5
Public transport	5
Roads and bridges	3
Power generation (nuclear)	3
Telecommunication towers	3
Satellites	2
Electric vehicle recharge infrastructure	1
Airports and/or maritime ports	1

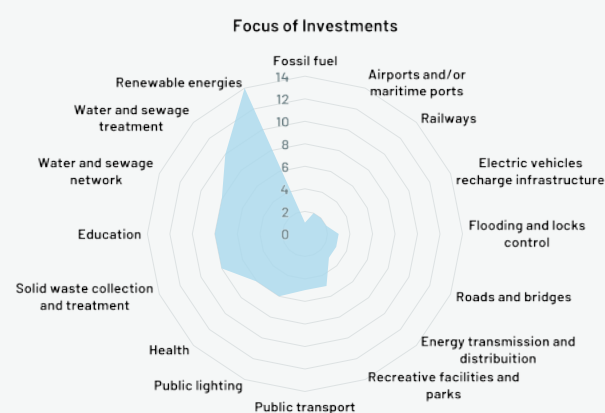
Many of the responding institutions are currently working on projects that they consider green and/or sustainable. Most of these projects are funded through loans, financing and debt contracts (57% of the projects) and through the structuring of public-private partnerships (PPPs).

Most respondents (15) are also carrying out actions focused on enabling projects for post COVID - 19 economic recovery, mainly through assistance and support to private companies. In the area of Green Recovery, practically all participants (20) answered that they understood the approach to the theme.

Institutions that declared having projects or financial products aimed at post COVID - 19 economic recovery (13) or that do not yet have any, but expressed institutional interest in implementing projects aimed at Green Recovery (4), consider as priority initiatives aimed mainly at supporting the installation of power plants using renewable sources, indicating the interest of these institutions in the economic opportunities aligned with energy transition and climate mitigation in Brazil. This result is not surprising since Brazil has an electric power matrix mostly made up of renewable sources. Since the country has expertise and a track record of projects of this nature, its natural characteristics allow scale gains for projects that seek to provide renewable energy to the national power grid.

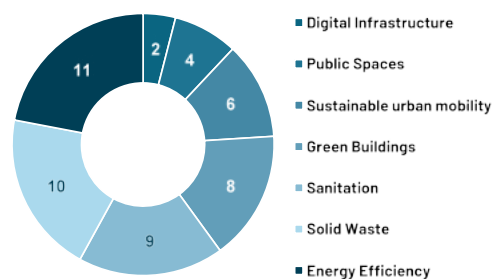
Next were the sanitation and solid waste management sectors which, admittedly, lack investments and are not yet universal in the national context. These sectors offer, in addition to the environmental additionality potential, positive

social impacts, contributing to the generation of jobs and income, the inclusion of vulnerable segments of the population in the formal economy, and better collective health and quality of life statistics.



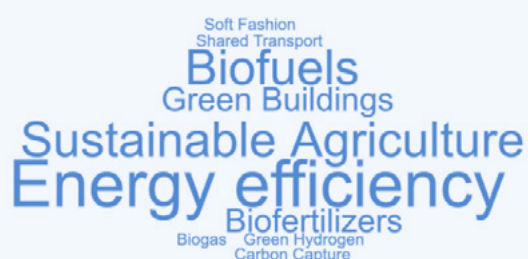
When observing the focus of the investments mentioned by the participants, it is clear that a good part have been directly or indirectly directed towards infrastructure related to cities and the urban environment. In addition to these, other sectors focused on urban infrastructure were cited as being of interest to institutions, such as Green Buildings, sustainable urban mobility, public spaces and digital infrastructure.

Interest stakeholders - Urban Infra sectors



Participants also mentioned other sectors and terminology that they consider as green/sustainable, but which were not explicitly described among the options provided by the questionnaire.

In the cloud of words presented below, it can be seen that the energy sector and its ramifications (fuels and energy efficiency, in particular) were well remembered with regard to sustainable projects.



Just over half of respondents (57%) declared that their institutions currently have projects specifically aimed at Green Recovery, and provided important information regarding the incorporation of environmental, social and governance (ESG) safeguards and intentions, as well as socio-environmental additionalities in the projects currently being implemented or studied in their respective institutions.

According to the respondents, the projects consider ESG criteria as prior conditions to support projects or during the due diligence and risk assessment stage of the operations. In this sense, the following criteria were mentioned: the adoption of assessment instruments and continuous monitoring; attention to best environmental practices; and socio-environmental risk management.

For the most part – 62% of the responses collected – the projects supported which clearly consider ESG criteria and indicators were smaller in scale, with amounts of up to BRL 25 million. On the other hand, high value projects, between BRL 100 and BRL 500 million appear less frequently (22% of cases) and are linked to state and municipal governments and development banks. This was expected due the actions of these entities aimed at economic development and infrastructure support.

Some of the participants who declared not having Green Recovery projects at their institutions shared their reasons for this being the case. Among these, we can mention:

- Lack of knowledge about the sectors and projects that can be considered eligible for green recovery\*;
- Low funding capacity;
- Subsidies for financing and greater access to credit (by micro and small companies – MSCs);
- Lack of expertise in the segments that can leverage the economic recovery

Finally, another point that the questionnaire sought to verify was the attention paid by respondents to the potential for generating jobs directly and/or indirectly linked to the sectors with the assessed environmental additionality – Green Jobs.

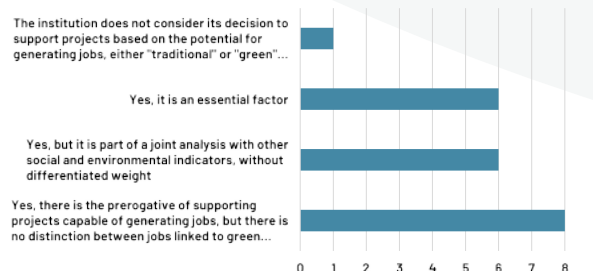
Most respondents stated that they are indeed concerned with the potential for generating jobs through the support

of infrastructure projects, during the feasibility analysis stage and subsequent financial support. However, this is a prerogative adopted for all supported infrastructure sectors, with no distinction between what is regarded as traditional and sustainable infrastructure.

However, despite this majority, there were a relevant number of responses stating that they do consider the potential for generating jobs connected with each project from the perspective of linking these projects and ventures to sectors known to be sustainable. Thus, we can conclude that employment is a key variable in supporting (or not) infrastructure projects. However, analyses from the perspective of socio-environmental additionality has been gaining more and more strength.

\* Here we see the study's great potential of addressing this gap since the objective was to present sectors of urban infrastructure from a perspective of economic recovery aligned with social and environmental benefits.

#### Consider the potential of Green Jobs



## ONLINE QUESTIONNAIRE APPLIED TO LAB GREEN FINANCES WG MEMBERS AND ABDE ASSOCIATES

### GREEN RECOVERY QUESTIONNAIRE

The SITAWI Finanças do Bem consultancy aims, through the application of this questionnaire, to support the challenge of national “green” economic recovery and to develop a Green Recovery investment strategy focused on cities in Brazil. For this purpose, it seeks to mobilize actors and define sectors and projects, through criteria and indicators which are capable of scalability for “green” economic recovery.

Green Recovery can be understood as the adoption of measures financed by the public and/or private sector that contribute to address the immediate consequences of an environmental, social, economic and political crisis (such as the one caused by the COVID - 19 pandemic), as well as structural reforms and transformative changes needed to ensure sustainability, resilience and climate neutrality during economic and social recovery. Additional information about the project can be found at this link: <http://tiny.cc/felicityGR>

The questionnaire takes about 20 minutes to complete. Please note that the answers given to this query will be kept anonymous and the data presented will be consolidated. In case of doubt, we are available at the following contacts:

Rafael Gersely, CFA, Sustainable Finances Specialist and Project Coordinator – [rgersely@sitawi.net](mailto:rgersely@sitawi.net);

Camila Franco, Sustainable Finances Analyst and Project Team member – [cfranco@sitawi.net](mailto:cfranco@sitawi.net);

Thank you very much for your contribution.

## QUESTIONNAIRE

**Section 1 – Basic information and identification**

1. Institution
2. Select below your institution's type of business segment
  - a. Regional Development Bank
  - b. Federal Development Bank
  - c. State Commercial Public Bank with Development Portfolio
  - d. Federal Commercial Public Bank with Development Portfolio
  - e. Development Agency
  - f. Cooperative Bank
  - g. Private enterprise (please identify the sector)
  - h. Consultancy
  - i. Municipal, state or federal entity
  - j. NGO
  - k. Other (please specify)

**Section 2 – Understanding of projects considered green/sustainable**

1. Which economic sectors does your institution consider as being green/sustainable?
  - a. Power generation from renewable sources (eg: wind, solar)
  - b. Power generation from fossil fuel burning (eg: coal, oil, gas)
  - c. Power generation from nuclear source
  - d. Power transmission and distribution
  - e. Implementation and operation of water and sewage network
  - f. Implementation and operation of a gas and oil distribution network
  - g. Collection and treatment of solid waste
  - h. Water and sewage treatment
  - i. Control of floods and locks
  - j. Airports and/or seaports
  - k. Roads and bridges
  - l. Railways
  - m. Public transportation
  - n. Electric vehicle charging infrastructure
  - o. Telecommunication towers
  - p. Satellites
  - q. Broadband network
  - r. Education
  - s. Health
  - t. Recreational facilities and parks
  - u. Street lighting
  - v. Other
2. Has your institution carried out actions focused on enabling economic recovery after COVID - 19? If so, could you explain these actions? Describe or provide the link to the information.

(open writing question)

3. Does your institution currently finance any project or provide financial products to Urban Infrastructure sectors? *You may select more than one option*
  - a. Energy efficiency
  - b. Sanitation (Water, sewage and drainage system)
  - c. Solid waste
  - d. Green Buildings (buildings that provide for the efficient use of resources and low environmental impact)
  - e. Digital Infrastructure
  - f. Public spaces
  - g. Sustainable urban mobility (rail systems, clean buses, bicycle paths, cable cars, integration of modes, etc.)
  - h. None of the above
4. In case your institution is currently involved in any of the above, in what stage are the dedication and provision of resources in support of the sectors listed in the previous question (3)?
  - a. Internal Discussions / Planning
  - b. Financing (search for funders and other supporting institutions)
  - c. Implementation
  - d. Operation (projects classified in the above sectors are currently supported by your institution)
  - e. Other (Which?)
5. If the sectors listed in "3" are not yet a focus of funding, is the institution interested in any? *You may select more than one option*
  - a. Energy efficiency
  - b. Sanitation (water, sewage and drainage system)
  - c. Solid waste
  - d. Green Buildings (buildings that provide for the efficient use of resources and low environmental impact)
  - e. Digital Infrastructure
  - f. Public spaces
  - g. Sustainable urban mobility (rail systems, clean buses, bicycle paths, cable cars, integration of modes, etc.)
  - h. Not interested
6. If the previous answer was "not interested", could you explain the reasons for this a bit further? (Example: it is not the focus of your institution's operations, there are no dedicated lines, it does not have expertise in these segments, it does not see a demand for financial support for the segments, etc.).
7. How are projects considered green/sustainable financed or supported? *You may select more than one option*
  - a. Debt
  - b. Equity (shareholding)
  - c. Structuring of Project Finance
  - d. Structuring of Public Private Partnerships (PPPs)
  - e. Structuring of Concessions
  - f. Other (which one?)
8. In which phase of the project(s) does your institution seek to act? *You may select more than one option*
  - a. Planning
  - b. Funding
  - c. Implementation
  - d. Operation
  - e. Other (which one?)



### Section 3 – Specific questions for post COVID – 19 pandemic economic recovery and Green Recovery

9. Does your institution understand the approach to Green Recovery Projects, as defined at the beginning of the questionnaire?
  - a. Yes
  - b. No
10. In case your answer to the previous question was “no”, please provide more details about how your institution understands the approach to Green Recovery projects (open answer)
11. Is the topic Green Recovery relevant to the operations of your institution during the pandemic and as a line of action towards economic recovery?
  - a. Yes
  - b. No
  - c. Maybe
12. Does your institution have financial projects/products aimed at post COVID – 19 pandemic economic recovery?
  - a. Yes
  - b. No
13. Is your institution interested in supporting/implementing/adapting financial projects/products towards Green Recovery?
  - a. Yes
  - b. No
  - c. Don't know
14. If the answer as “yes” to question 12, which sectors are a priority? Please check all sectors of interest to your institution

#### GERAL

- a. Renewable Energies (eg: wind, solar)
- b. Fossil fuel (eg: coal, oil, gas)
- c. Nuclear
- d. Power transmission and distribution
- e. Water and sewage network
- f. Gas and pipeline distribution network
- g. Collection and treatment of solid waste
- h. Water and Sewage treatment
- i. Control of floods and locks
- j. Airports and/or seaports
- k. Roads and bridges
- l. Railways
- m. Public transportation
- n. Electric vehicle charging infrastructure
- o. Telecommunications towers
- p. Satellites
- q. Broadband network
- r. Education
- s. Health
- t. Recreational facilities and parks
- u. Street lighting
- v. Other

#### INFRAESTRUTURA URBANA

- a. Energy efficiency
- b. Sanitation (water, sewage and drainage systems)
- c. Solid waste
- d. Green Buildings (buildings that provide for the efficient use of resources and have low environmental impact)
- e. Digital Infrastructure
- f. Public spaces
- g. Sustainable urban mobility (rail systems, clean buses, bicycle paths, cable cars, integration of modes, etc.)
- h. None of those listed above

15. If the answer was “yes” to question 12, in what stage are the dedication and provision of resources to support the sectors listed in the previous question?
  - a. Internal Discussions / Planning
  - b. Financing (search for funders and other supporting institutions)
  - c. Implementation
  - d. Operation (these projects classified under the sectors above being supported by your institution)
  - e. We are not supporting any of the Urban Infrastructure segments listed above
  - f. Other (Which?)
16. If your institution has financial projects/products aimed at Green Recovery, can you provide more information about the dedicated lines, supported projects, and the initiatives taken to make projects viable? (Open answer)
17. If your institution has financial projects/products aimed at Green Recovery, are environmental, social and governance (ESG) criteria considered conditioning factors, or during the risk assessment of the operations? If yes, which? (Open answer)
18. If your institution DOES NOT have financial projects/products aimed at Green Recovery, can you provide more information about the reason for this (lack of demand, lack of good projects, lack of expertise in the segments that are able to leverage economic recovery, etc.)? (Open answer)
19. Who are the main borrowers of these financial projects/products?
  - a. Private companies
  - b. Private public services utilities
  - c. State companies
  - d. Public entities (states or municipalities)
  - e. We are not supporting any project aimed at Green Recovery
  - f. Other (Which ones?)
20. Is the potential for generating jobs linked to financial projects/products classified as Green Recovery (Green Jobs) a concern to your institution when analyzing the project's feasibility and subsequent financial support?
  - a. Yes, it is an essential factor;
  - b. Yes, but it is part of a joint analysis with other social and environmental indicators, with no different weight;
  - c. Yes, there is the prerogative of supporting projects capable of generating jobs, but there is no distinction between jobs linked to green/sustainable projects and those linked to traditional projects;
  - d. The institution does not consider the decision to support projects based on the potential for generating jobs, whether “traditional” or “green” jobs (linked to green/sustainable projects).
21. What is the total amount that your institution provides to fund and/or support Green Recovery projects?
  - a. 0 to 25 million (BRL)
  - b. 25 to 50 million (BRL)
  - c. 50 to 100 million (BRL)
  - d. 100 to 500 million (BRL)
  - e. 500 million to 1 billion (BRL)
  - f. More than 1 billion (BRL)
22. What incentives would influence your institution (or sector to which it belongs) to take practical measures to reduce Greenhouse Gases/GHG emissions linked to projects supported and/or resulting from your economic activity, with greater urgency? (Open question)

23. Are there norms or standards that influence your institution (or sector to which it belongs) to reduce GHG emissions linked to supported projects and/or resulting from your economic activity, with greater urgency? (Open question)
24. What actions should be taken to reduce the skill/knowledge or staffing (human resources) gaps that may hamper your institution's progress towards low-carbon development? (Open question)

On behalf of:



of the Federal Republic of Germany

