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Policy recommendations for the promotion and recognition of sustainable transport infrastructure projects in Colombia

Initiative to ensure sustainable and resilient infrastructure

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Editor: Angélica María Cantor Ortiz

November 2024

Sponsors

We would like to express our sincere gratitude to all the people and organizations that contributed significantly to the creation of this document. In particular, we highlight the valuable participation and contributions of our allies' teams throughout this process. We extend special recognition to Laura Correa, Mauricio Ossa and Eduardo Bettin from Odinsa, as well as to Milena López, Gustavo Antonio Ramírez and Paula Durán from Corficolombiana, whose knowledge and experience were fundamental to the development of the project. Likewise, we thank the Proindesa and Pacífico 2 teams for their important contribution with valuable information for the various analyses carried out in the study.

From ISA, we express our most sincere gratitude to Nathalia Pineda, Emilio Sanabria Salcedo, Juliana Suso, Nathalia Gómez, Sergio Díaz, Carolina Maldonado, Sebastián Castañeda, Vanessa Bautista and María Adelaida Correa, as well as to the Ruta Costera team, for their valuable contributions and unconditional support. We also acknowledge the commitment of Liliana Tovar, Alberto Villegas de Laing and the Ruta del Cacao team, whose participation, analysis and contribution of information were fundamental in this process.

We express our deep gratitude to Luis Carlos Restrepo, Natalia Ariza Donato, Agustina Calatayud, José Manuel Sandoval, Mauricio Ayala, Juan Martín Álvarez, Mónica Charry, Diego Fernando de Pablos Cadena and Enrique Domínguez, of the Inter-American Development Bank (IDB), for their constant support and technical advice, which were essential to achieve the objectives set. We also thank the Colombian Chamber of Infrastructure (CCI) for being a strategic platform for the dissemination and feedback of the study within the colombian infrastructure sector.

Finally, we would like to acknowledge the valuable contributions of María Constanza García, Minister of Transport, Magda Buitrago, Felipe León and Sandra Ángeles of the Ministry of Transport, and the teams of the National Infrastructure Agency (ANI), the National Institute of Roads (INVIAS), and the Transport Planning and Infrastructure Unit (UPIT), whose comments and observations considerably enriched the content of this document.

To all of you, our deepest gratitude for your invaluable contribution.

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Introduction

The Regional Center for Sustainable Finance of the University of Andes, Colombia, developed this project with the objective of promoting sustainable, resilient and inclusive infrastructure in Colombia, so that assets are profitable and accessible to society. This summary presents a reference framework that integrates the concepts of sustainability and resilience within the context of transport infrastructure development. The study also includes national and international experiences of sustainable infrastructure, a review of the mechanisms for certifying sustainable infrastructure and offers public policy recommendations for Colombia.

The project had the support of a group of strategic allies that include Odinsa, ISA, Macquarie, Corficolombiana and Jhon Laing as actors in the transport infrastructure sector; and the Inter-American Development Bank (IDB). In addition, in the development of the project, important work was done with key validators such as the Colombian Chamber of Infrastructure (CCI) and with government entities such as the Ministry of Transport, the National Institute of Roads (Invías) and the National Infrastructure Agency (ANI).

Context

Infrastructure projects—due to their duration, complexity, and impact—are a fundamental pillar for global development. Quality infrastructure must support productivity and economic growth, protect social well-being and ecosystems. Consequently, it is essential to strengthen the sustainability and governance of these projects, and make them resilient to ensure sustainable development.

Investments in the development and operation of transport infrastructure are long-term and have intergenerational implications in financial, geographic (definition of physical spaces), environmental, and social terms. They also establish public policy restrictions, as they must be prospective and take into account future investments.

Infrastructure projects are characterized by their dynamic nature. The fulfillment of their purpose depends on their ability to adapt, over time, to the demands imposed by physical, environmental, social, and financial changes. The success of an infrastructure project depends on the implementation of decision-making support mechanisms that are based on reliable information and efficient management of the life cycle of assets within a flexible regulatory framework that promotes innovation.

The context in which infrastructure projects are planned and executed is dominated mainly by an accelerated increase in population and urbanization, the growth of markets and trade; and, as a consequence, by an increase in greenhouse gas emissions and global warming. Therefore, and given the importance of infrastructure for development, it is urgent and imperative to have a different vision of the way in which projects are planned and executed. It is essential to include sustainability, in all its dimensions, as the guiding axis of the development of new projects and the management of existing projects.

The world faces high climate vulnerability, which requires reducing greenhouse gas (GHG) emissions to limit the increase in global temperature and strengthen the resilience of infrastructure to natural phenomena. This challenge positions the infrastructure sector as a key player in climate mitigation and adaptation. In this context, it is essential that the update of the country's Nationally Determined Contributions (NDCs) include clear commitments to transform infrastructure into a driver of sustainability and resilience, beyond sustainable mobility. In short, and in line with the global goals of the Sustainable Development Goals (SDGs), and especially the medium- and long-term climate objectives, we must view infrastructure from its environmental, social and financial sustainability, through governance mechanisms that guarantee a fair transition.

This project proposes the 3+ Model as a mechanism to guide the way in which this transformation should be implemented. The model identifies fundamental aspects of the three dimensions of sustainability (social, environmental and economic); and the plus sign (+) represents the inclusion of resilience in the analysis.

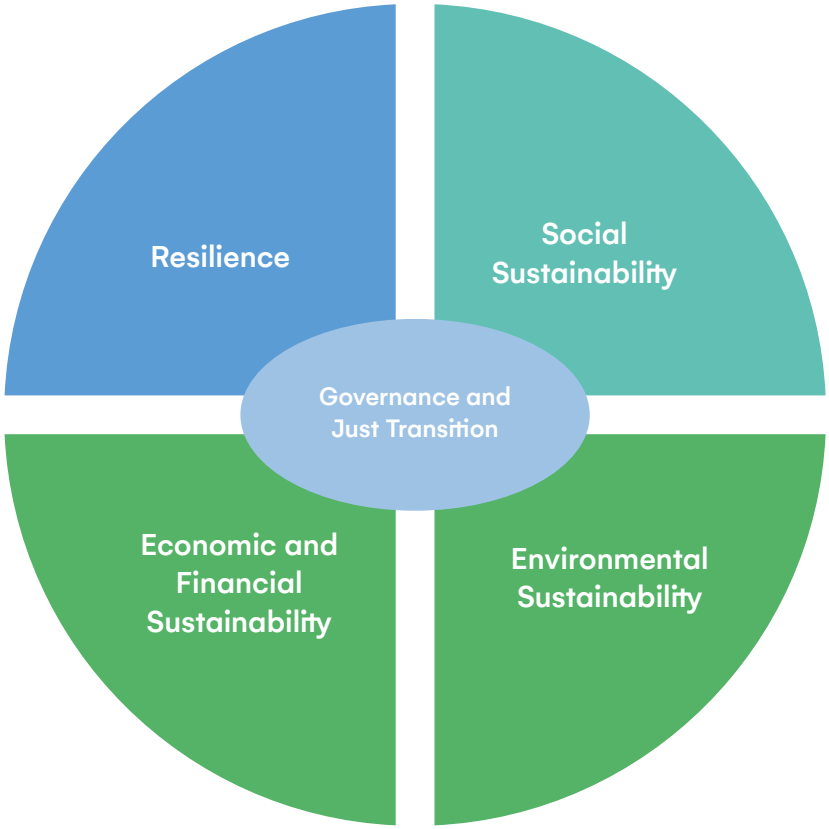
The model proposes evaluation dimensions divided into attributes with specific indicators for the evaluation of each project. The 3+ Model is proposed as a guide for the development of infrastructure based on the best practices of the sector and the recommendations of international institutions and entities. The Model is presented in Figure 1.

Sustainability and resilience are central concepts for infrastructure development. Sustainability, in its broadest sense, focuses on intergenerational responsibility and the way we consume resources to ensure the well-being of future generations. Resilience is understood as the set of characteristics, actions and strategies that seek to prevent and/or mitigate the effects of exposure to a disruptive event, contributing to preserving the functionality of the infrastructure through a rapid recovery after an impact on the operation.

This document proposes an integration between resilience and sustainability within a holistic approach that allows guaranteeing the quality of the infrastructure. In this context, the concept of quality infrastructure is defined as: the infrastructure capable of consistently maintaining the expected performance levels, ensuring equity between generations in environmental, social and economic aspects through sustainable and continuous means, which is why the Model 3+ is proposed.

This proposal is flexible and can be adapted to the physical and operational characteristics of the type of infrastructure being evaluated. The model proposes that each evaluation dimension be divided into subcategories with particular indicators for each project that is considerate with the model.

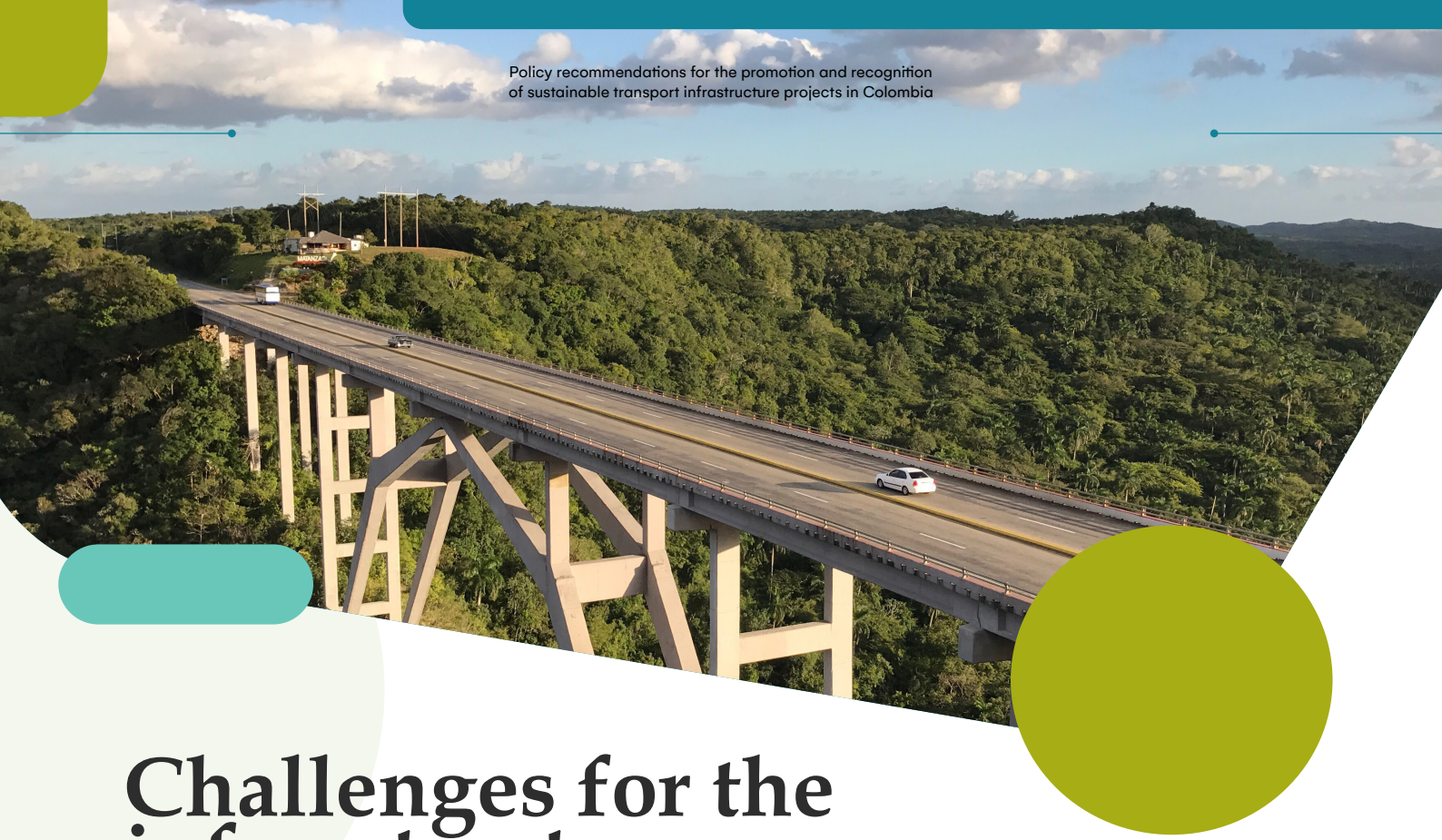
Figura 1. 3+ Model



Source: Own elaboration

Based on an extensive literature review and the formulation of the 3+ Model, as well as an analysis of national and international cases, the research project presents a series of public policy recommendations with the aim of guiding the discussion around the construction of a more efficient infrastructure that is better integrated with social, environmental and economic issues. The recommendations are aimed at pre-contractual and contractual issues, and suggest elements that aim to generate capacities and incorporate flexibility and technological change in the different phases of transport infrastructure projects.

Additionally, an analysis is carried out on the sustainable infrastructure certifications of the industry, given the tendency of the financial sector and institutional investors to guarantee that they operate, invest and finance sustainable assets and therefore leverage these certifications. Within this trend, it is also found that the cost of not aligning with these efforts can have implications on the access and cost of financing. These reference frameworks are flexible and can be adapted to the physical and operational characteristics of the different types of infrastructure.



Challenges for the infraestructure sector in Colombia

According to the literature review, the workshops held and the dialogues with the infrastructure sector, a series of challenges facing the infrastructure and road and airport infrastructure sector were identified in relation to the inclusion of sustainability and public policy aspects in Colombia and the region.

The challenges identified include:

- Building a consensus within the different interest groups (government, private sector, academia, civil society) on what is meant by sustainable infrastructure.
- The central role of infrastructure in meeting Colombia's climate objectives in terms of mitigation and adaptation.
- Incorporating sustainability and resilience criteria into existing infrastructure assets.
- Need for a more flexible framework in the design and contracting phases to incorporate climate change.
- Ensuring participation in the project review to include sustainability criteria in the design and implementation of public infrastructure by territorial entities, regional autonomous corporations and control bodies with a view to ensuring flexibility in project management to ensure and overcome the difficulties of climate change management, while maintaining the operation of the infrastructure.
- Including in the design criteria of the projects, their budgets and cash flows, and in the administration rules the work of analyzing the costs associated with the incorporation of sustainability recommendations, and the flexibility required to manage the risks associated with climate change.
- Work on incorporating recognition and incentives in the selection process and in the execution of projects to promote sustainability criteria.
- Coordination between the different actors in the sector at an inter-institutional and multi-level level to identify a course of action. In addition to strengthening the capacities of institutions and their teams throughout the value chain.
- Review the current risk matrix of projects to incorporate risks linked to climate change and establish their appropriate allocation.
- Incorporate recommendations to ensure the sustainability of infrastructure projects into public policy instruments and regulations.
- Establish schemes that help in prioritizing actions to advance the incorporation of sustainability in infrastructure projects.

Transport infrastructure certifications

Infrastructure certification systems are a set of activities to assess an asset's compliance with specific requirements. Sustainable infrastructure certifications are distinguished by their ability to assess economic, environmental, social and governance performance. The certification assigns an overall rating to the infrastructure project to indicate the level of sustainability throughout its life cycle. To do this, a series of indicators or evaluation parameters are generally established, where the final rating, in most certifications, is calculated in two ways: i) the direct sum of the partial scores obtained, or ii) the weighted sum.

The emergence of certifications has been, to a large extent, driven by institutions that finance infrastructure globally. Certifications allow generating confidence in different interest groups such as: the government, the private sector and civil society, and, in particular, institutional investors, as they indicate that the project meets high quality and sustainability criteria of the industry. Likewise, they enable the adaptation of criteria considering the context in which the project is developed. In addition, certifications play a crucial role in mitigating risks associated with asset financing by ensuring the implementation of best practices in the various areas of assessment. The project conducted a critical analysis of ten international sustainable infrastructure certifications. The objective was to determine which ones most comprehensively address sustainability criteria in the environmental, social, governance and resilience areas. The most important findings identify the role of certifications in assessing the risk of investors, financiers and the stakeholders involved, since compliance with sustainability criteria in their environmental, social and governance pillars implies the guarantee of the adoption of good practices in the design, execution and operation of projects. This ensures that they comply with national regulations and with international agreements and standards. The latter could indicate, in a preliminary manner, a more efficient mobilization (in volume and cost) of private resources towards infrastructure projects, given the lower risks associated with sustainable projects.

Furthermore, this analysis reveals that the certifications address sustainability criteria in a more comprehensive manner, incorporating specific aspects of resilience and governance, while the national regulations, although they address similar issues, lack the same depth and scope. For example, in the social aspect, it has a focus on prior consultation, occupational health and safety, job creation, among others, but there is a lack of requirements related to equity and social justice. On the other hand, the governance aspect is not very robust within the project phases and efforts are still needed to make this pillar transversal to the development of the national infrastructure. Along the same lines, in environmental issues, the regulations have a focus on the issuance and compliance of environmental licenses, project compensations, but there is a lack of details in the base documents, regarding habitat protection, circularity of materials, biodiversity and emissions, pointing out the need for concrete metrics. Although the creation and regulatory inclusion of the Green Road Infrastructure Guidelines (LIVV) document is an important step forward, the challenge of incorporating criteria of social, governance and environmental sustainability, related to the optimization and management of resources, circularity and resilience, beyond ecosystemic and biodiversity aspects, is identified. This highlights the need to raise the minimum standards of Colombian regulations to comply with international sustainability standards in a holistic manner.

Finally, this analysis allows us to more clearly visualize the evaluation criteria of international certifications, as well as to understand which of these can be better adjusted to the national context. Certifications such as Envisión, Sure, Fast-Infra or IS-Scheme address in a more holistic and complete way the sustainability and resilience variables raised in the 3+ Model. However, technical, strategic and governance capacities within the infrastructure sector need to be improved in order to achieve the minimum scores required by these certifiers.

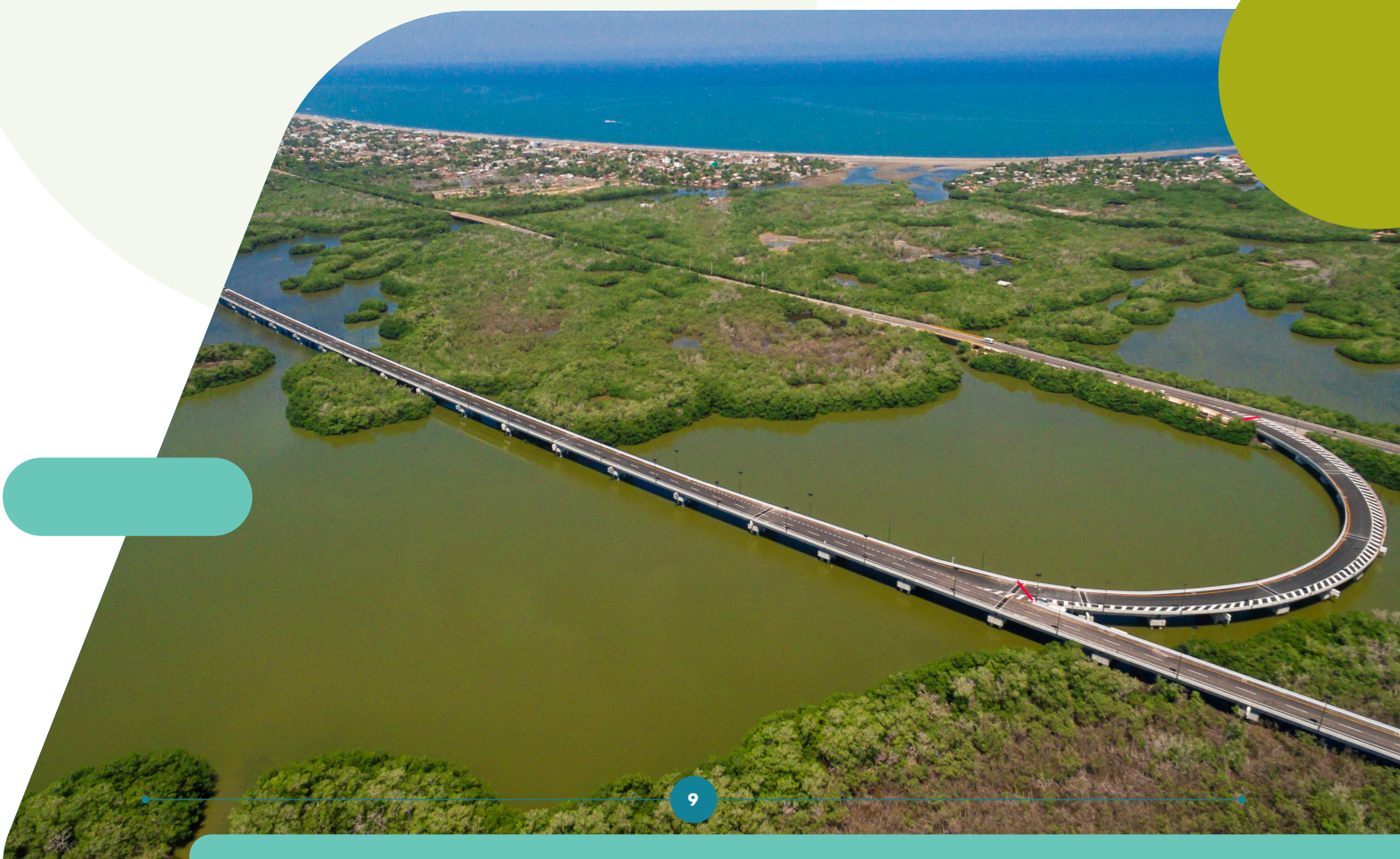
In this same sense, the implementation of the 3+ model is emerging as a strategic tool to advance the adoption of certifications and address the critical issues facing the country in terms of sustainable infrastructure. Certifications, by establishing clear and verifiable standards, play a fundamental role in generating trust towards the institutions and actors that finance infrastructure. These mechanisms not only ensure compliance with sustainability criteria, but also improve the capacity of projects to attract long-term capital by reducing perceived risks and minimizing uncertainties in the development and operation of these projects.

Policy Recommendations

The most important contribution that we hope this study can achieve is the adoption of the 3+ Model as a key component of the reference framework for the development of public policy in infrastructure and transport projects in the country. The main objectives of this proposal are: i) to have clear transport infrastructure policies, plans and programs that facilitate the identification of new sustainable and resilient projects; ii) to ensure the sustainability and resilience of existing and operating infrastructure; iii) to generate a fair transition of existing and operating infrastructure projects; iv) to plan new projects, taking into account sustainability and resilience criteria; and v) to generate and maintain capacities in the public and private sectors, in order to develop points i, ii, iii and iv.

The recommendations are grouped into three main lines: a) regulatory framework, policies, plans and programs; b) capacity building in the public and private sectors, including control agencies; and c) inclusion of the 3+ Model in the planning of new projects and in the stages of the contracting process for new projects, as well as in existing and operating projects. The recommendation to include the 3+ Model is directed both to those who design and plan contracting processes, as well as to those who manage contracts.

The most important recommendations are presented below, and some additional ones can be found in the guide document for this summary.



Transportation infrastructure policies, plans and programs

1. Public transport infrastructure policy must incorporate a look at the information on existing and planned transport infrastructure in accordance with the Intermodal Transport Master Plan 2021–2051, propose a way to standardize the information (terminology, classification, sources), the way to report it, update it and share it.

2. The national government must review the existing infrastructure from the point of view of its sustainability and resilience. Identify what changes the projects require to face the challenges of disasters, taking into account the well-being of the communities and the value of the asset.

3. The policy, plans and information system must support spending decisions which must move from the simple reduction of the value of capital and the highest price in a bidding process, to a more holistic look at the value for the stakeholders in the infrastructure asset.

4. Incorporate into the sector's plans and programs the concept of layers of available social, environmental and economic information referred to in the 3+ Model.

5. Define a national framework for assessing infrastructure sustainability (Model 3+), which will serve as a reference for defining a direction in public policy.

6. Create a national infrastructure sustainability roundtable: create an organization made up of the government, the private sector and academia that will define the guidelines and strategy in the medium and long term. This roundtable will supervise and accompany the implementation of the strategy, ensuring its continuity over time.

7. Create flexible legal and administrative frameworks: encourage flexibility in the design and operation of infrastructure to facilitate adaptability to a changing environment (e.g., climate change).

Capacity building in the public and private sectors

1. Develop the necessary capacities to plan projects, prepare preliminary studies and documents, tender documents, contracts, evaluation of offers and contract management, considering the purpose of sustainable and resilient transport infrastructure.

2. Create or complement a national information system (Hermes or Aniscopio) on sustainability in infrastructure: identification of key indicators (KPI) and continuous monitoring and evaluation.

3. Competencies to update calculations of the useful life of assets and their minimum conditions, as well as the treatment that should be given to them at the end of their useful life.

4. Generate the knowledge and skills to incorporate sustainability criteria in the enabling requirements that those participating in the tender must prove, as well as what they can offer and the evaluation criteria for such offers.

5. Public sector, private sector and academic alliances should be encouraged, such as those that exist in other Latin American countries and that generate virtuous circles of capacity and knowledge. 6. Foster a culture of quality and promote the use of certifications (e.g. Envision) to ensure that sustainability is an integral part of infrastructure projects.

6. Evaluate the cost and socio-economic impact that the implementation of sustainable infrastructure would have on the different sectors, as well as the implications in terms of transactions (financing, deadlines, new products, other types of financiers). This allows prioritizing implementation actions over time.

Inclusion of the 3+ Model in new and existing projects

In planning the project, its promoters must consider each component, topic and subtopics of the 3+ Model, so that in the previous studies and documents there is a section that accounts for each component and its topics, and that these are reflected in the specifications or terms of reference for the selection of contractors, and in the contracts. Likewise, flexibility mechanisms must be proposed for the incorporation of these criteria in existing projects. Recomendaciones en la dimensión ambiental:

Recommendations in the environmental dimension:

1. Develop actions towards the identification of areas of high ecological value and the subsequent selection of project locations so as to minimize any disturbance in these areas.

2. Develop comprehensive restoration of affected plant areas after construction, with the aim of not only recovering their pre-project functionality, but also helping to preserve and enhance their ecosystem services.

3. Integrate the efficient use of materials and waste management in all stages of the project, design, selection process, construction and operation.

4. Management of greenhouse gas emissions and other polluting gases in the value chain.

5. The criteria for evaluating bids must allow and reward innovation in environmental sustainability (nature-based solutions, wildlife crossings, etc.), and facilitate competition between bidders who wish to raise the proposed standards associated with incentives in the qualification.

6. Leave open in the contracts the possibility of incorporating new systems, mechanisms and incentives aimed at improving environmental and social management, and the general guidelines for their assessment, given the long duration of these projects (nature-based solutions, wildlife crossings, works focused on improving resilience).

Recommendations on resilience:

1. Conduct comprehensive risk assesment across all lifecycle stages, focusing on emerging issues like climate change to determine relative risk.

2. Implement continuous monitoring systems, early warning and use of technology to better understand risk and make better decisions.

3. Implement an asset management plan in all projects that includes life cycle analysis, maintenance programs, operation management and response plans in the event of an emergency.

4. Strengthen research and knowledge creation to promote continued technological advancement in issues such as materials and water management.

5. Generate technical and technological capabilities with data analytics tools, artificial intelligence (AI), and mathematical instrumentation and modeling that support the decision-making processes of the different actors.

Recommendations on governance and just transition:

1. Multi-level governance system within both the government and the concessionaire company.

2. Management of threats to the integrity of the project; early warning systems and a plan for dissemination and transparency of decisions taken throughout the project cycle.

3. Integrate consultation and dialogue processes from the project design.

4. Responsibility of the state to make an early identification of environmental and social challenges, and to make an inventory of habitat and communities.

5. Strengthen long-term planning and vision of infrastructure. Prioritize critical projects and protect them from short-term political dynamics.

6. Inventory of the social benefits of the project and determination of indicators and their monitoring ((i) employment; (ii) purchases of goods and

services; (iii) taxes; (iv) competitiveness; (v) travel time; and (vi) safety of people). To this end, indicators must be designed and explained clearly to the different audiences and interest groups.

7. Review of contractor pre-selection processes that guarantee high standards in sustainability and resilience, also encouraging innovation in solutions to environmental and social challenges.

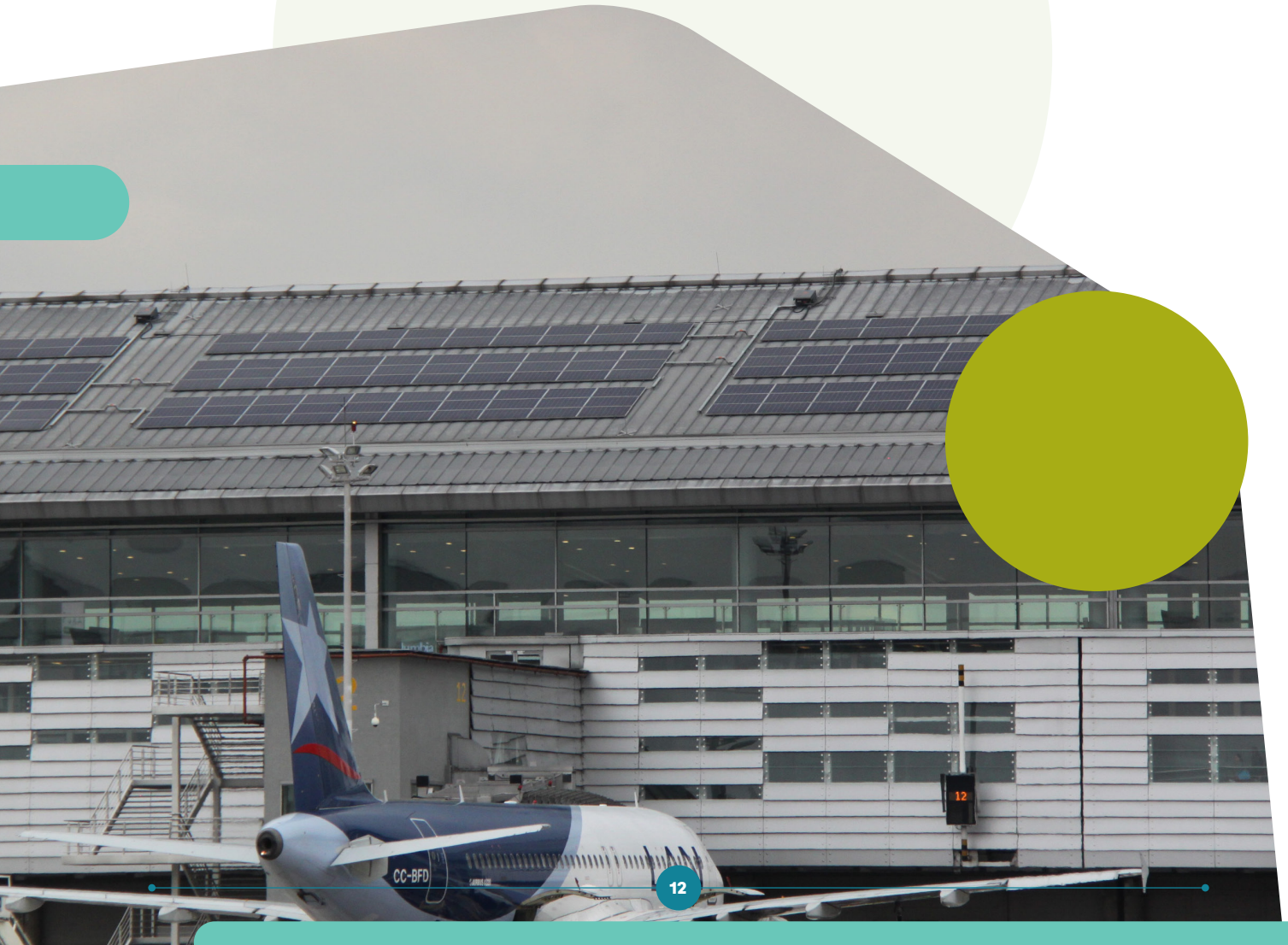
Recommendations of social dimension:

1. Integrate consultation and dialogue processes from the project design stage.

2. It is the State's responsibility to make an early identification of environmental and social challenges, and to make an inventory of habitats and communities.

3. Inventory of the social benefits of the project and determination of indicators and their monitoring ((i) employment; (ii) purchases of goods and services; (iii) taxes; (iv) competitiveness; (v) travel time; and (vi) safety of people). To do this, it must design indicators and effectively socialize them with the different audiences, but especially with the communities and civil society related to the project.

4. Develop actions such as identifying areas of high ecological and cultural value, the subsequent selection of project locations so that any disturbance in these areas is minimized.



Conclusions and steps forward

This report represents a major effort to compile information, which is essential to understand the challenges and opportunities that Colombia faces in the development of sustainable and resilient infrastructure. In this context, it is essential that the country adopts a comprehensive and holistic approach, where sustainability and resilience are key pillars. This approach will not only ensure the profitability of projects, but also their accessibility, inclusion and long-term sustainability.

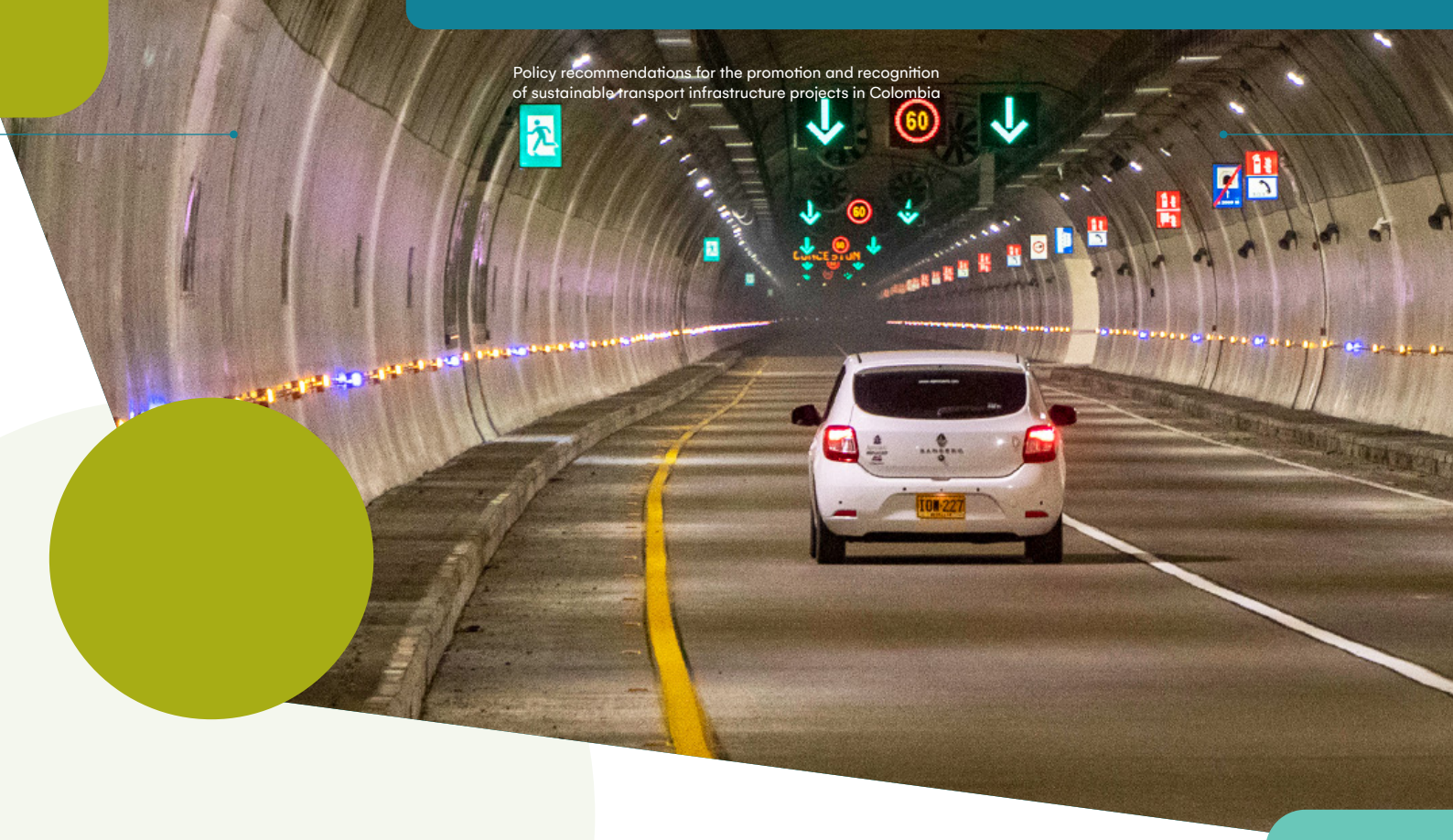
Furthermore, the transport infrastructure sector plays a strategic role in both mitigation and adaptation to climate change. On the one hand, it can significantly contribute to the reduction of greenhouse gas emissions through the design and construction of more efficient projects, with the use of materials with a vision of a circular economy, with facilities that encourage low-emission transport and with lower environmental impacts. On the other hand, well-planned and resilient infrastructure is essential to protect communities and ecosystems from the adverse effects of climate change, such as extreme weather events or the deterioration of key natural resources. In this sense, sustainable infrastructure is not only a driver for economic development, but also a crucial tool for a low-carbon, adapted and resilient economy in line with the country's long-term ambition.

One of the main questions that arises is: what should be the business decision? To answer this, intensive work must be done to focus actions, establishing clear priorities based on the aspects that represent greater risks and a robust cost-benefit analysis. The adoption of the 3+ Model, which integrates the social, environmental and economic dimensions of sustainability with an additional focus on resilience, is key to assessing and prioritizing projects. This model, which can be adapted to different types of infrastructure, allows for a flexible and holistic assessment.

In addition, work needs to continue towards how to implement these recommendations. It is not enough to identify areas for improvement; it is imperative to develop a concrete plan that facilitates the execution of the proposed actions, taking into account public policy recommendations that suggest the adaptation of existing infrastructures and the planning of new ones, prepared to face climate and social challenges.

Another critical aspect is to make more visible the need to work on current infrastructure assets. It is essential to identify what changes and incentives are necessary for these projects to be able to face the challenges related to sustainability and resilience, maintaining the well-being of the affected communities as a priority and preserving the value of the assets. Flexibility in the design and contracting phases will be crucial to incorporate sustainability and resilience criteria, guaranteeing equitable and sustainable development for future generations.

Finally, it is essential to strengthen the technical and operational capacity of the responsible teams and optimize coordination between government, private, academic and social actors. In this context, the creation and/or activation of an intersectoral working group is presented as an essential tool to articulate the various visions and actions in the field of sustainable infrastructure in the country. This entity would facilitate the establishment of direct channels of communication and cooperation, allowing not only the exchange of emerging knowledge and innovative practical experiences in the field, but also the definition of key elements to consolidate public policies and their technical specifications. Furthermore, this roundtable would play a critical role in monitoring and analysing progress, ensuring a comprehensive and coordinated approach that enhances sustainable development and confidence in the sector's initiatives.



Future research for the implementation of the recommendations

This study has shed light on some key points of sustainable infrastructure in Colombia. However, it is necessary to continue researching and developing initiatives to implement the recommendations of this project, which bring together ways to build sustainable infrastructure in the country and the region. Therefore, investment in research and development of new knowledge promotes the execution and implementation of technological solutions that continuously improve infrastructure.

Below are some ideas for future research and work to be developed:

1. Build a baseline to help determine where the sector currently stands in relation to the desirable sustainability standards proposed by the 3+ Model, starting with the concession assets that currently incorporate best practices in the sector such as 4G and 5G.
2. Design a roadmap for the gradual elevation of this baseline over time, supported by cost-benefit studies of the impact of the actions (comparisons between Capex and Opex of the projects).
3. Support the prioritization process, through the use of some KPIs, that allow monitoring progress in the implementation of the roadmap.
4. Take or adapt this framework to smaller national and regional projects, and guarantee solutions that involve communities.
5. Identify, analyze and pilot the potential of using tecnology innovations with nature-based solutions (NbS), circular economy and resilience to improve the environmental and social performance of infrastructure in the country. Likewise, the way in which these solutions can be integrated into the cycle of current and future infrastructure projects.