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Access to climate finance in low- and middle-income countries: 14 case studies in the transport sector

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HIGHLIGHTS

- Much has been written about scaling climate finance, but less is known about its use in specific sectors, such as transport.
- We examined the landscape of international climate finance for transport in Asia, Africa, and Latin America, looking at 839 transport projects and conducting 14 case studies. The international climate finance mechanisms we studied included climate funds, multilateral development banks, donor governments, and private investors.
- We found that a third of the transport projects that received climate finance involved building roads. Fewer public transport and electric vehicle projects accessed climate finance, and only 20 percent of projects explicitly aimed at improving resilience.
- The common barriers to accessing climate finance were inadequate policy frameworks, limited project preparation capacity, high upfront costs and risk perceptions, complex funding requirements, and difficulties in assessing projects' broader socioeconomic benefits.
- Countries can address these roadblocks by creating an enabling environment with sustainable policies and transport targets, attracting private investments with de-risking instruments, building capacity to design and implement bankable projects, and doing more to monitor and evaluate the impacts of transport measures.

EXECUTIVE SUMMARY

Background

The transport sector in low- and middle-income countries (LMICs) grapples with the challenges posed by population growth, economic development, and rapid urbanisation. The demand for transport and vehicle ownership is expected to rise sharply, exacerbating emissions, traffic congestion, air pollution, and road safety problems. Investments must be shifted away from fossil-fuelled transport modes and toward sustainable, low-carbon travel.

Mobilising climate finance for transport is crucial. Climate finance supports efforts to mitigate and adapt to climate change (UNFCCC n.d.). In the last decade, global climate finance almost doubled to 1 percent of global gross domestic product (GDP). The transport sector receives US$334 billion in global climate finance per year—favourable compared with other sectors—but the investment gap between what is being spent and what is needed for sustainable and low-carbon transport is enormous (CPI 2023a). Between now and 2050, we need to invest an estimated $2.4 trillion annually—seven times what is currently being spent—to reach a low-carbon transport pathway (CPI 2023a). This includes scaling up electric vehicles (EVs) and promoting modal shifts to public transport, walking, and cycling. And investment is uneven, with less than 3 percent flowing to the least-developed countries (CPI 2023a).

LMICs urgently need to access the financial and human resources necessary to accelerate the transition to low-carbon transport. Limited access to both public and private investments often forces these countries to borrow at higher interest rates, exacerbating their already large debt burdens (Caldwell et al. 2022). In addition, governments of these countries often lack the capacity to assess climate-related risks or develop bankable projects (Ellis and Pillay 2017).

About the research

Our research explores the international climate finance landscape, emphasising the opportunities to bridge the investment gap for sustainable and low-carbon transport. Drawing on several publicly available databases, we reviewed existing United Nations Framework Convention on Climate Change (UNFCCC) and non-UNFCCC climate finance windows. We gathered information on 839 transport projects accessed from multilateral climate funds, multilateral development banks (MDBs), donor governments, and databases that collect private finance data. We examined how countries, particularly LMICs in Africa, South Asia, and Latin America and the Caribbean, access the range of financial instruments offered by the various sources of international climate finance.

We analysed the major barriers to public and private climate finance for low-carbon, climate-smart transport projects, drawing upon findings from literature and policy documents; an analysis of 14 case studies covering various modes of transport and financial instruments; and consultations with experts in the climate, finance, and transport sectors. Although the data are preliminary and the cases limited, this paper can help inform and shape strategies for shifting financial resources to sustainable, low-carbon transport.

Key findings

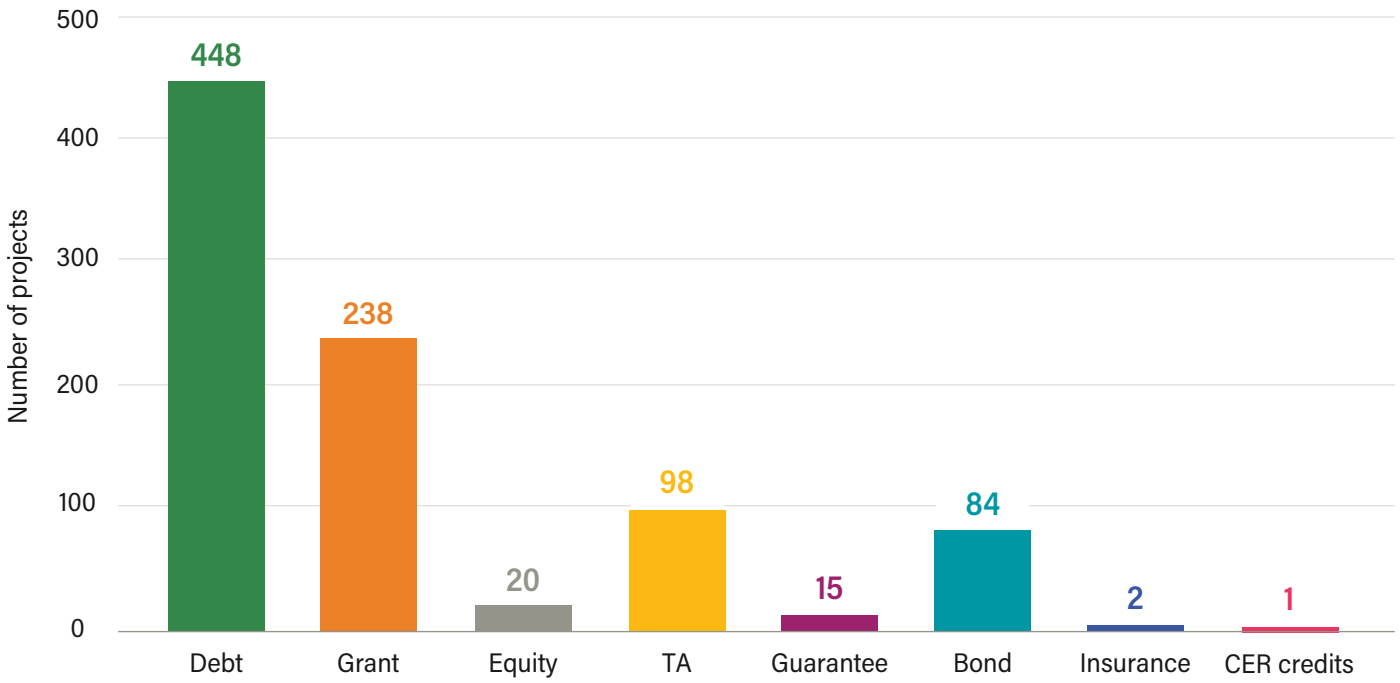
In our analysis, we identified two key sets of findings. The first relates to the international climate finance landscape for transport projects, where we evaluated the types of financial instruments used and the focus areas of these projects. For the second, we assessed the barriers to accessing climate finance for transport, particularly in LMICs.

The landscape of international climate finance for transport projects

Different sources use varying definitions for low-carbon transport. For instance, the World Bank's "sustainable transport" projects might include cycling, walking, and electric mobility which reduce emissions by minimising fossil fuel use. However other projects in the same category, like logistics and airport developments, can involve environmental costs, such as increased emissions from air travel and construction, and may not align with climate finance criteria.

Climate finance and assistance for transport projects can take many forms. Concessional loans and grants are the most common financial instruments, but others include blended finance, which combines concessional (e.g., from philanthropies or development banks) and private bank loans, green bonds, and other instruments deployed to prepare projects, carry out feasibility studies, and more (Figure ES-1).

Figure ES-1 | **Number of projects by instrument deployed in our database**



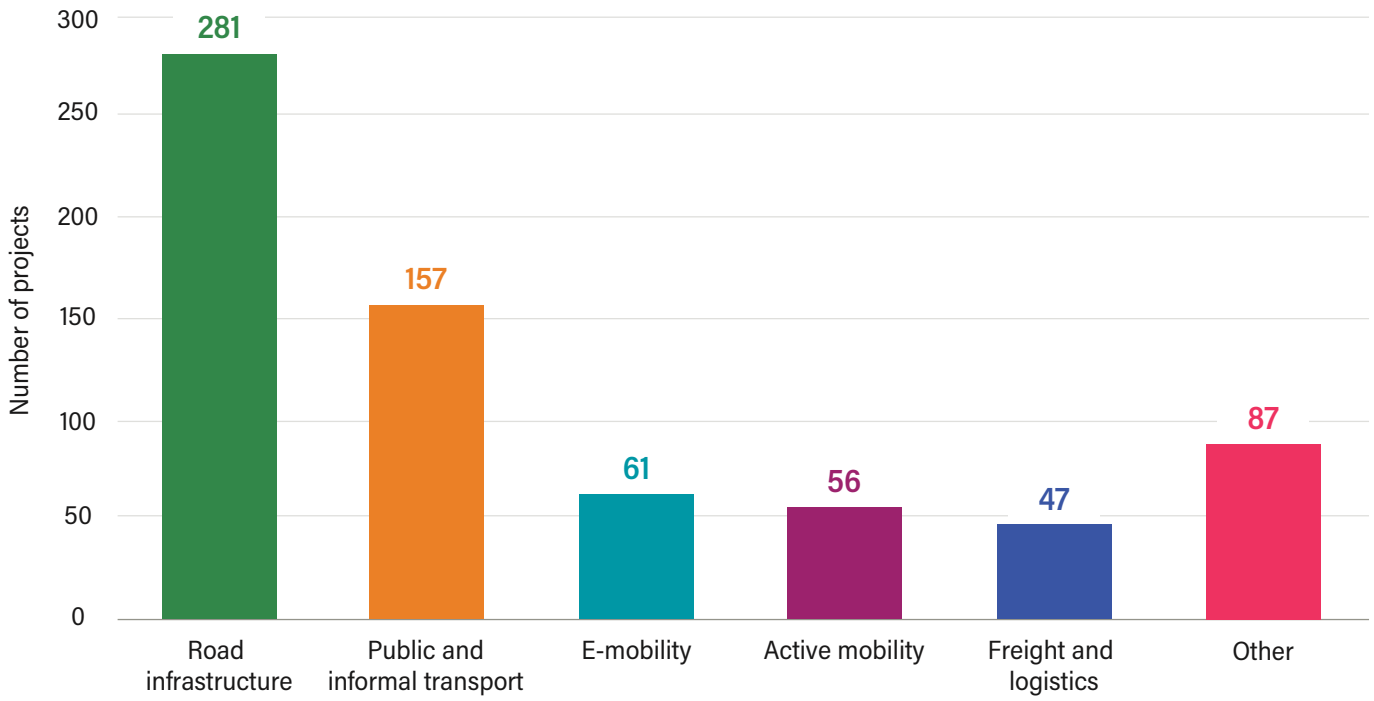
Notes: In this study, definitions for the types of instruments come from the providers of climate finance included in our database. TA, or technical assistance, refers to nonfinancial support provided to projects, which is often aimed at enhancing their capacities to effectively implement and manage financial instruments and can be deployed at different stages throughout the life cycle of an investment. One project might deploy multiple financial instruments. CER = certified emission reduction.

Source: Authors.

Blended finance is used in more than 30 transport projects to reduce perceived risks, increase investor confidence, and make investments more attractive. Nearly two-thirds of the green bonds are issued in developed countries whereas LMICs have seen relatively few.

Among the transport projects in our database, land transport projects dominate, accounting for 75 percent of the total projects. One-third of these projects involve constructing, rehabilitating, and maintaining roads, highways, and bridges and improving connectivity among modes. This includes promoting multimodality across roads, railways, and ports. Other projects include scaling up electric mobility (e.g. EVs, electric buses, electric two- and three-wheelers), promoting public transport, and supporting the transition to low-carbon transport systems through capacity-building activities or feasibility studies (Figure ES-2).

Figure ES-2 | **Number of projects by transport mode in our database**



Note: The 'other' category includes projects dedicated to technical assistance, support for policy formulation, project preparation, and feasibility studies. Mode categories may include projects that span more than one mode.

Source: Authors.

A key finding from our research is that many projects are about roads, largely funded by MDBs. Such projects illustrate two objectives of these institutions: stimulating economic development and advancing climate goals. Our database compiled projects categorised as climate finance based on the internal methodologies of the MDBs and other funders.

Another question is whether sufficient attention is being paid to adaptation. According to the MDBs' own tracking of climate finance in climate mitigation and adaptation, using the joint MDB methodology, there are 175 projects explicitly aimed at enhancing climate resilience, accounting for approximately 20 percent of all transport projects examined. While this figure reflects some focus on adaptation, it appears low given the increasing importance of improving resilience in the transport sector. Adaptation efforts have historically received less attention and funding in climate finance (Larsen et al. 2022; Frontier Economics 2022).

Barriers to accessing climate finance for transport

Access to finance for sustainable and low-carbon transport in LMICs faces several barriers:

- A lack of supportive policy and regulatory frameworks, which creates barriers to adopting low-emission technologies like EVs.
- Existing institutional arrangements often favour traditional internal combustion engine vehicles, including fossil fuel subsidies and other regulations that can limit cleaner alternatives.
- Limited capacity for project preparation and implementation across government levels, alongside poor interdepartmental coordination, which makes it hard to identify and execute bankable transport projects.
- The high upfront costs and long life cycles of transport infrastructure projects (e.g. rail, public transport), combined with the perception of high risk and low potential returns associated with new technologies, deter private investment.
- The capacities needed to access climate finance, including those needed to address the technical and administrative complexities of funder requirements, may be challenging for many LMICs.

- Inadequate monitoring and evaluation to assess the impacts of funded projects. The lack of accountability can lead to continued funding for ineffective projects, perpetuating a cycle of poor outcomes.

Recommendations

There are steps that national and local governments, financial institutions and MDBs, donors, non-governmental organisations (NGOs), private investors, and other stakeholders can take to overcome these barriers. These strategies are summarised below and in Figure ES-3.

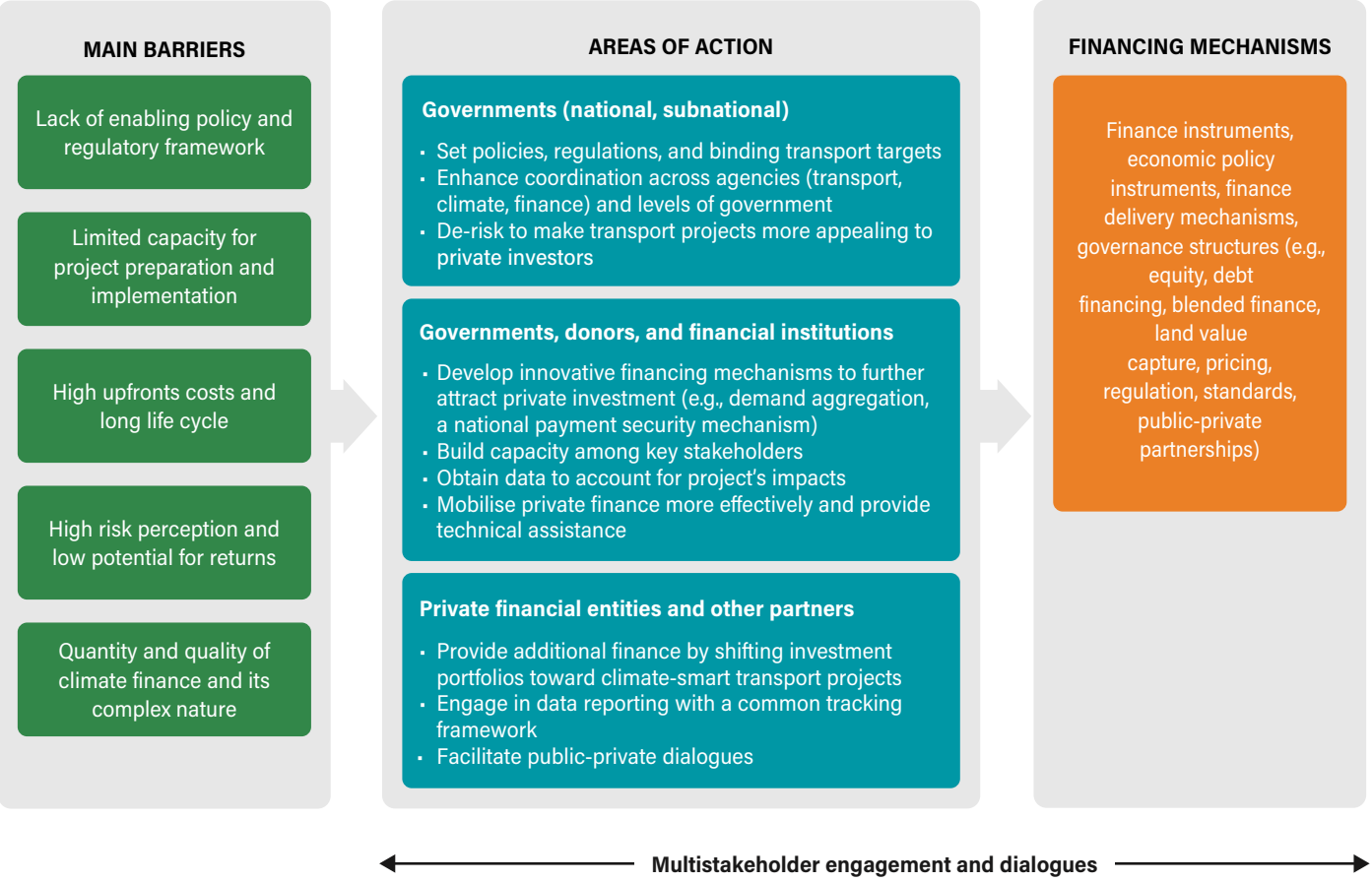
Governments—both at the national and subnational levels—play a pivotal role in creating an enabling environment for successful, climate-smart investments. Governments should do the following:

Set policies, regulations, and binding transport targets such as sector-wide and sub-sectoral targets to send clear signals to the private sector, encouraging companies to invest. As of 2022, only 64 of the over 190 countries that signed the Paris Agreement had included transport targets in their nationally determined contributions (Medimorec et al. 2023).

Enhance coordination across government agencies (transport, climate, finance) and levels of government (national, subnational) and foster public-private dialogues. Inputs from various stakeholders are essential to developing an enabling environment tailored to each country's context.

De-risk to make transport infrastructure projects more appealing to private investors. De-risking involves mitigating or sharing risks associated with climate-smart investments through policy or financial measures. Policy measures such as

Figure ES-3 | **Areas of action to scale up financing for low-carbon and resilient transport projects**



Sources: Authors, with input from BEI 2023; Sayeg et al. 2015; Apostolovic et al. 2023; Floater et al. 2017.

zero-emission vehicle mandates provide certainty to investors and developers of clean vehicles. Financial measures such as dedicated public capital in the form of guarantees help distribute the risks among participating parties and attract capital from commercial investors (Choi et al. 2022).

We recommend that governments, donors, and public financial institutions—both international and domestic—do the following:

Develop and embrace innovative financing mechanisms to further attract private investment. Increasing private investment is necessary to scale up transport projects, but this requires reducing perceived risks and creating more attractive opportunities for private investors. Demand aggregation can reduce risk and make investments more attractive by offering economies of scale (CESL 2023).

Build capacity among key stakeholders, including governments, financiers, the private sector, and other key actors. Capacity-building activities could include improving pipeline development, enhancing transport data collection, and building gender-inclusive activities into the project design.

Obtain the data and define the counterfactual needed to estimate a project's avoided emissions. Monitoring and evaluating the impacts of transport measures will inform decision-making and help direct investments to sustainable choices (TCT 2024). Monitoring and evaluating whether transport projects create and support employment opportunities might bolster the case for increased funding (UIC 2023).

Financial institutions can be more effective in mobilising private finance and provide technical assistance to governments and other stakeholders (Convergence 2023a; Neunuebel et al. 2023). MDBs' ability to attract private finance and offer credit enhancements has been instrumental in scaling up investments in LMICs. However, MDBs and development finance institutions (DFIs) must go further by providing more tailored technical assistance to help stakeholders understand funding requirements; access necessary sources; prepare robust pipelines; and enhance managerial and technical capacity for project implementation, monitoring, and reporting (TUMI 2022). Philanthropies and other development partners can also provide such support in coordination with the MDBs and DFIs.

Private financial entities and other partners, like NGOs, should do the following:

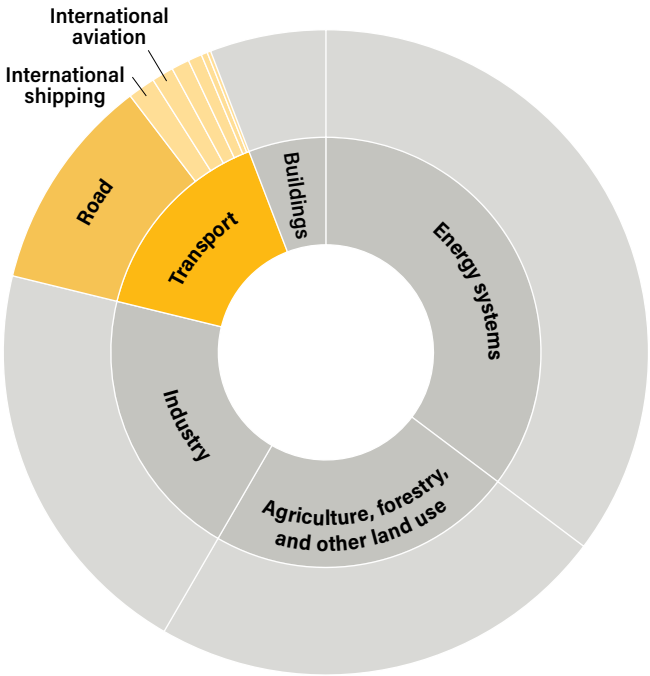
The private sector is already filling financing gaps, particularly in providing and managing transport services and fleets, but current funding levels are insufficient to meet the growing transport demand in LMICs, and more can be done. Private financial entities can provide additional finance by shifting investment portfolios toward climate-smart transport projects. Other partners, like NGOs, could facilitate public-private dialogues and develop and communicate actionable knowledge products to a wider audience.

1. INTRODUCTION

With mounting climate risks, the world faces the urgent task of curbing emissions while furnishing the assistance developing countries need to grow (Songwe 2023). Here, climate finance can play a critical role. Climate finance refers to the financial resources mobilised to support mitigation and adaptation to climate change (UNFCCC n.d.). Much attention has been paid to scaling climate finance in general, but less is known about certain sectors. For instance, there has been relatively little analysis of what types of climate finance flows into the transport sector, what barriers low- and middle-income countries (LMICs) face in accessing it, or how these roadblocks could be removed. Improving support for sustainable transport requires a clear understanding of the fundamental role transport plays in these countries.

Transport is a connective tissue that supports community development and individual livelihoods. The sector, accounting for 14.3 percent of global greenhouse gas (GHG) emissions in 2019, is one of the fastest-growing sources of carbon emissions globally (Figure 1) (Climate Watch n.d.). If left unchecked, global transport demand is projected to nearly double by 2050 compared with 2019 levels, and the associated carbon emissions could grow by 16–50 percent by mid-century (SLOCAT 2023). In the transport sector, only one outcome indicator—the share of private electric light-duty vehicles—is on track to achieving the global goal of limiting temperature rise to 1.5 degrees Celsius (°C) (SCL 2022; SLOCAT 2023). As of 2022, only 64 of the over 190 countries that signed the Paris Agreement had included transport targets in their updated nationally determined contributions (Medimorec et al. n.d.).

Figure 1 | **Breakdown of total global greenhouse gas emissions by sector (2019)**



In 2019, transport accounted for 14.3% of global GHG emissions; **72% of transport**-related emissions came from **road transport** alone, with the rest made up of shipping, aviation, and other sources.

Note: GHG = greenhouse gas.

Source: Adapted from Naimoli and Wilcox 2023; Climate Watch n.d.

In many LMICs, demand growth is soaring, mainly due to rapid urbanisation and population growth. In Asia, for example, the number of vehicles on the road rose from 310 million to 1.2 billion in the last decade and transport carbon emissions increased by 36 percent (ADB 2022a; SLOCAT 2023). Moreover, growing motorised traffic further harms air quality, causes congestion, and burdens economies with inefficiencies that drive costs up and productivity down. This exacerbates social inequality by limiting access to transport for lower-income communities.

Meeting this ever-increasing transport demand necessitates making significant investments in sustainable and low-carbon transport options like metro and bus rapid transit (BRT), electric vehicles (EVs), and high-quality walking and cycling infrastructure, as well as land-use planning. Clean transport solutions are available, but they will cost an estimated US$2.7 trillion annually between now and 2050, according to the Climate Policy Initiative—seven times the amount currently spent on transport (CPI 2023a). Critical challenges remain for LMICs seeking to access and allocate finance to deliver on their climate commitments (Caldwell et al. 2022). LMICs struggle to attract international climate investments (Cichocka and Mitchel 2022; Plavec et al. 2024; Ellis and Pillay 2017) for reasons including the following:

- Macroeconomic and political instability, which raises risks for investors
- High interest rates, which make it expensive to borrow
- Growing levels of debt, which raise questions about whether debts can be repaid
- A lack of sufficient understanding and technical capacity to develop bankable projects

In this research, we first examined the landscape of international climate finance for transport. Drawing on publicly available databases, our research included a review of the existing climate finance windows and how countries, particularly LMICs in Africa, South Asia, and Latin America and the Caribbean (LAC), access the range of financial instruments offered by multilateral climate funds, multilateral development banks (MDBs), donor governments, and private investors. We reviewed the latest findings from literature and policy documents; analysed specific cases where countries have successfully accessed climate finance; and recommend ways to improve access to climate finance for sustainable, low-carbon, and resilient transport.

2. INTERNATIONAL CLIMATE FINANCE LANDSCAPE

What is climate finance?

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate finance as the financial resources, whether from public, private, or alternative sources, that support efforts to mitigate and adapt to climate change. Climate finance is hence defined by its intent—for mitigation and adaptation purposes. In practice, financial flows are 'attributed' or 'tagged' as 'climate' according to the provider's intent or the nature of the project they are financing.

International climate finance involves wealthier countries providing funding to LMICs to address the challenges posed by climate change and the impacts these countries are facing (see Appendix A). It is channelled through a variety of mechanisms, including multilateral channels within and outside of the UNFCCC and Paris Agreement financial mechanisms, as well as bilateral, regional, and national climate change channels and funds (Amerasinghe et al. 2017; Schalatek and Watson 2021).

In the transport sector, this means that any financing that mitigates emissions or addresses challenges created by climate change would qualify. This would include projects that fall under the 'avoid-shift-improve' framework which reduces emissions by

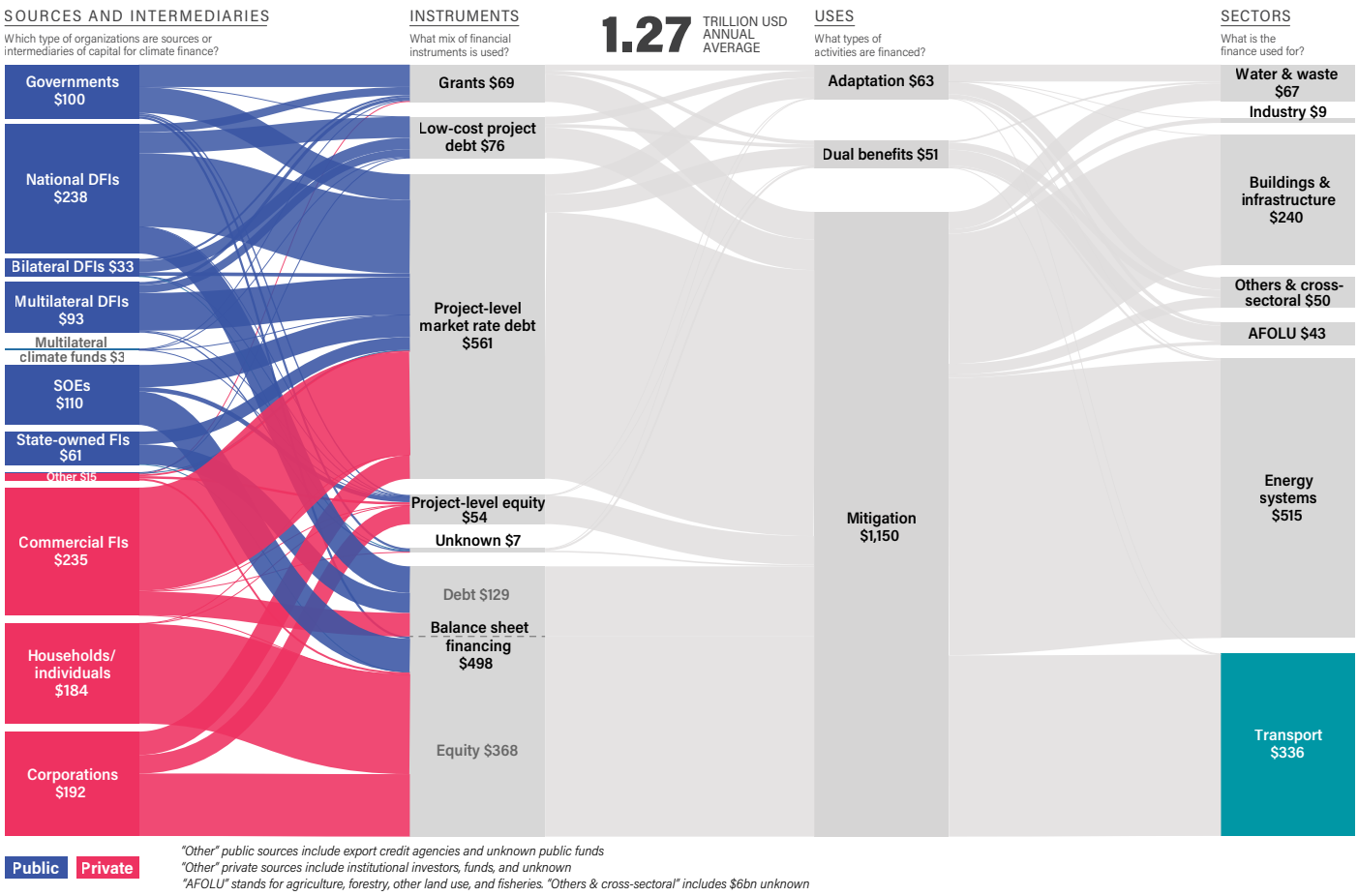
- avoiding unnecessary motorised travel;
- shifting to or retaining sustainable modes such as public transport, walking, cycling, and rail transport; and
- improving fuel and vehicle efficiency such as through electric mobility.

It also includes adaptation efforts, including projects that may provide resilience to the incidence of flooding or improve access to all-weather roads. The determination of which transport projects qualify for climate finance is guided by specific frameworks and criteria developed by these multilateral climate funds and MDBs. For example, the Green Climate Fund (GCF) focuses on promoting low-emission public transport, vehicle electrification, and zero-emission fuels (GCF 2022a). These priorities are designed and applied by experts within the GCF and its partners, ensuring that projects align with international climate goals, such as those outlined in the Paris Agreement. Similarly, MDBs often have their own climate finance guidelines in the transport sector to evaluate transport project alignment with mitigation or adaptation goals (AfDB 2013; ADB n.d.).

It's important to recognise that a wide array of sources can also provide support for these projects, and international climate finance represents a relatively small portion compared with other funding sources (see sections below). Nevertheless, climate finance is crucial for shifting and scaling up investments in ambitious climate actions in the transport sector. For example, it helps push clean technologies like EVs past tipping points, facilitating their wider adoption (Binsted et al. 2013).

According to the Climate Policy Initiative (CPI), global climate finance has almost doubled in the last decade, reaching $1.3 trillion in 2021–22 (see Figure 2). To put this

Figure 2 | **Sources of climate finance connected to end use by sector**



Source: CPI 2023a.

into perspective, this represents 1 percent of global GDP. The increase is insufficient to keep global warming within 1.5°C, and the need for adaptation finance keeps growing as the impacts of climate change become increasingly frequent (CPI 2023a).

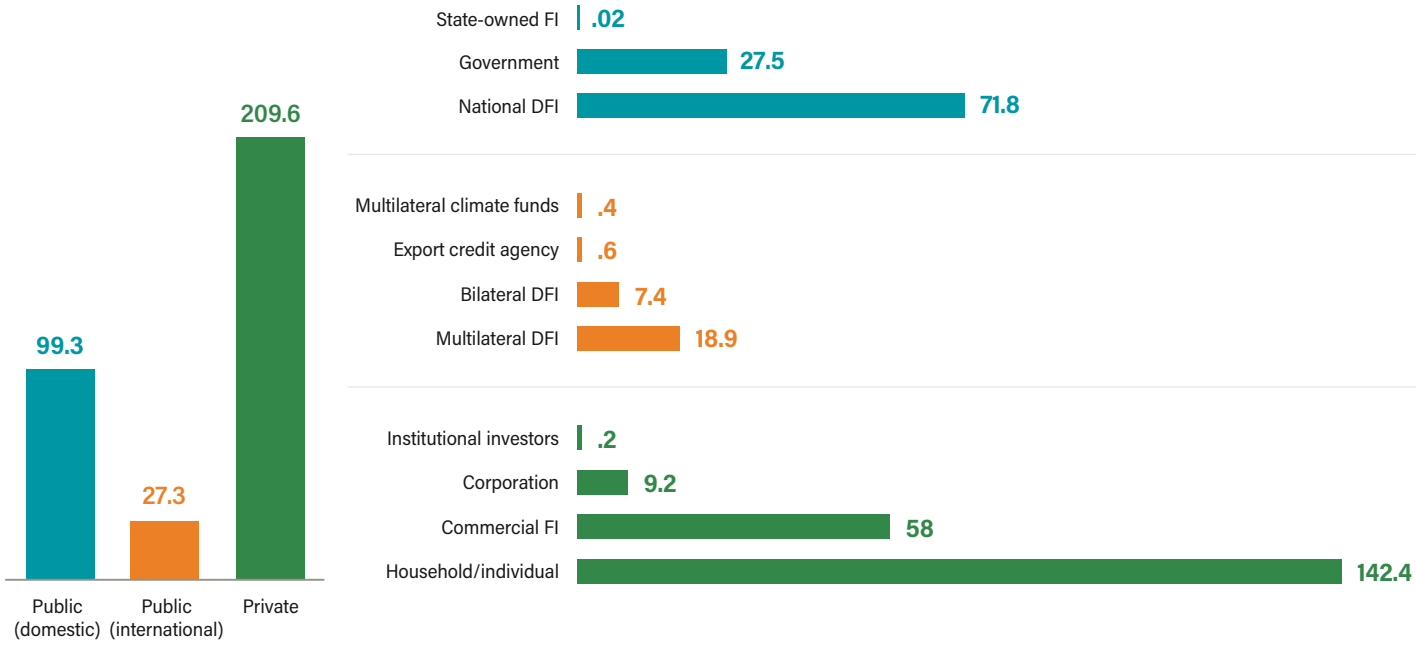
Where are we on climate finance for transport?

CPI estimated that the transport sector received $336 billion annually in 2021–22, up from $168 billion in 2019–20 (CPI 2023a). This accounted for about 29 percent of funds deployed in mitigation finance, which refers to resources allocated to activities that reduce or avoid GHG emissions, and those used to maintain or enhance GHG sinks and reservoirs (CPI 2023a). This is roughly in line with the sector's contribution of around 25 percent of all energy-related emissions (Climate Watch n.d.).

In 2021–22, private actors provided 62 percent (or $210 million) of the climate finance flows to transport, resulting primarily from household spending on global EV purchases.[1] Public actors contributed $127 million, with national development finance institutions (DFIs) being the largest source with $71.8 million, accounting for 21 percent of total flows (see Figure 3) (CPI 2023a).

Yet climate finance flows are unevenly distributed across transport modes and sub-sectors (Figure 4). Finance for EVs dominated transport investment, followed by rail and public transport with 23 percent (CPI 2023a). Inland water transport received only 1 percent of the climate finance flowing into the sector in 2021–22.

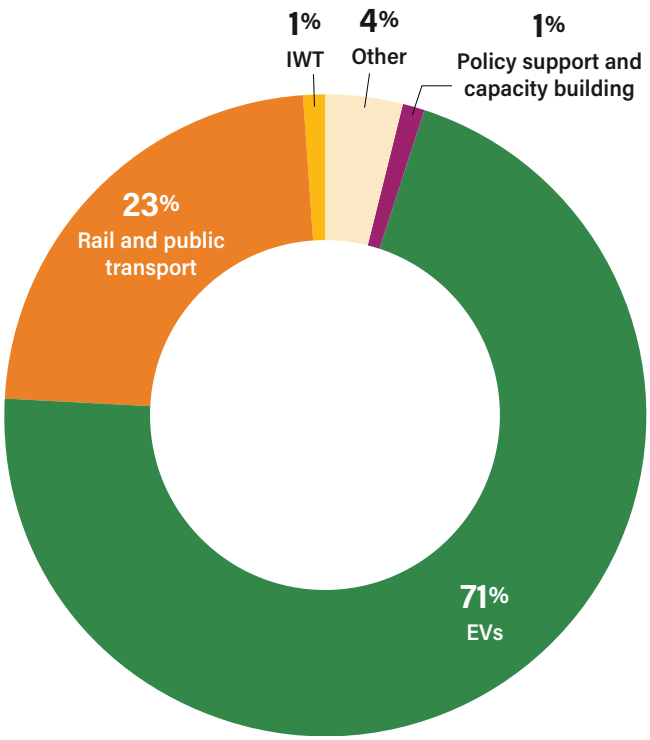
Figure 3 | **Sources of public and private climate finance for transport (2021-22 average, US$ millions)**



Note: FI = finance institution; DFI = development finance institution.

Source: Adapted from CPI 2023c.

Figure 4 | **Breakdown of climate finance by transport sub-sector (2021–22 average)**



Notes: IWT = inland water transport; EV = electric vehicle; 'Other' includes aviation, transport-oriented development, and infrastructure, as per Climate Policy Initiative methodology.

Source: Adapted from CPI 2023c.

3. METHODOLOGY

We had the following main questions at the onset of this research:

- What are the barriers to climate finance access in the transport sector in LMICs?
- What are different financing modalities, instruments, and structures observed in the transport sector, and how have countries overcome the existing barriers?
- What can we learn from the current practices of accessing climate finance in the transport sector?

To answer these questions, we started with the landscape of international climate finance for transport. We mapped existing sources of finance, breaking them down by transport mode (road, rail, inland water), region (Africa, Asia, and LAC), and type of finance (international finance, private finance) and financial instrument (concessional financing, grants, equity, bonds, guarantees). The sources we consulted included 14 multilateral climate funds, MDBs, donor governments, and databases that gather private finance data (see Figure 5). We focused on databases and project information that was publicly available, covering the period between 2015 and 2023. From these sources, we collected data on 839 transport projects.

Table 1 | **Transport modes used in the analysis**

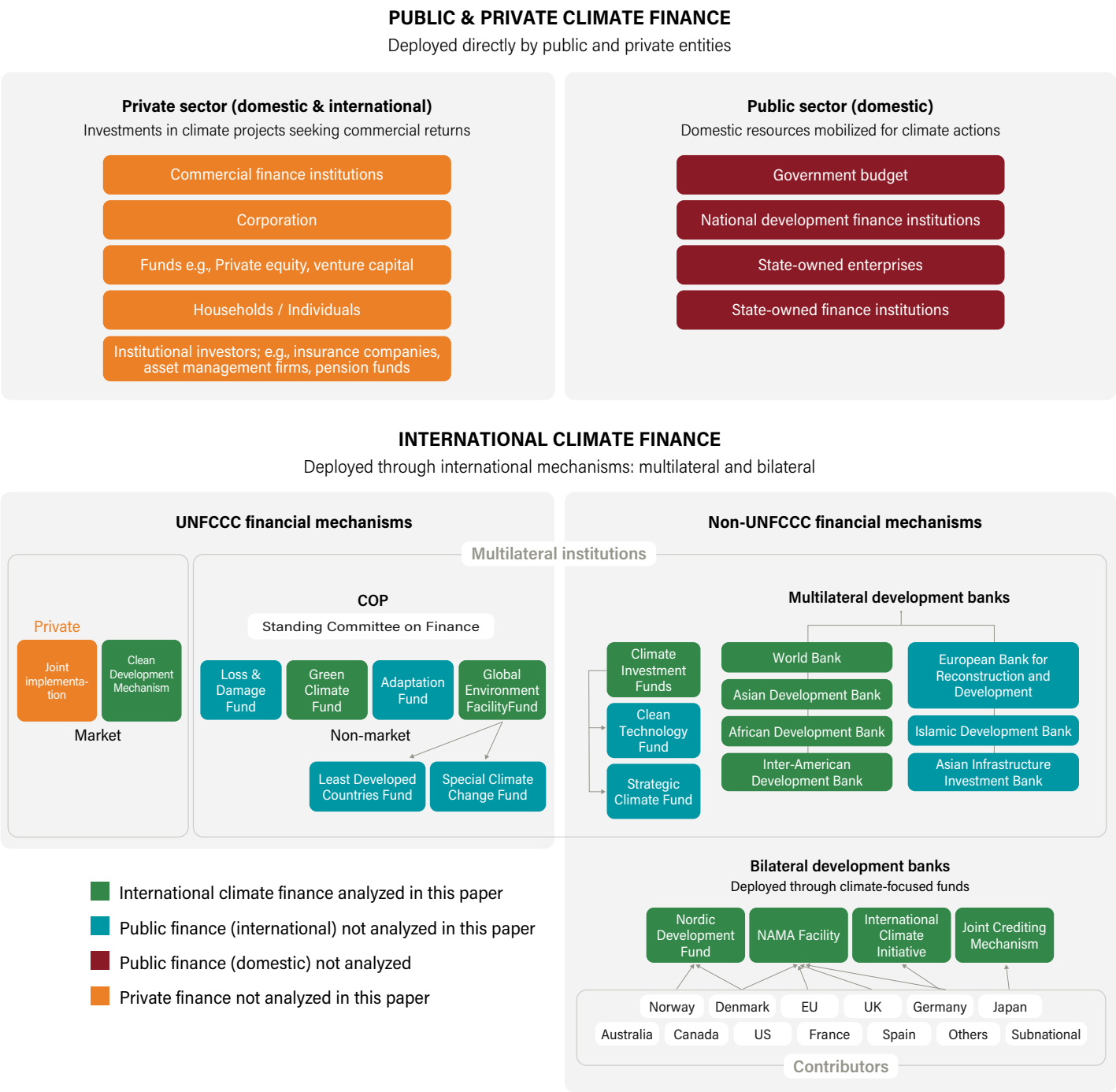
MODE OF TRANSPORT	DESCRIPTION
Active mobility	Walking and cycling infrastructure, bike share, electric bikes, and electric scooters
Public transport	Buses, bus rapid transit, mass rapid transit, light rail transit
Informal transport	Minibuses, two- and three-wheelers, motorcycles, mopeds, and rickshaws
Road infrastructure	Improving access to all-weather roads and upgrading the street network to enhance climate resilience
Rail transport	Passenger & freight and railway infrastructure, including fossil-fuelled locomotives ('transition finance')
Inland water transport	Passenger ships and ferries, freight barges
Maritime transport	Cargo ships, cruise ships
Electric vehicles (EVs)	Battery EVs, plug-in hybrid EVs, fuel cell EVs, and charging infrastructure EVs of all types—cars, vans, trucks, buses, and two- and three-wheelers

Note: Given railways' emission reduction potential, financing of most railways can broadly be classified as climate finance. We applied definitions of transport modes per the sources of finance; however, we acknowledge that freight rail is eligible for climate or green bonds once in compliance with certain thresholds (e.g., less than 25 percent of its freight is fossil fuels).

Source: CBI 2022; Authors.

We defined transport modes according to the categories specified by the sources of finance (Table 1). We excluded some projects that might broadly fit under climate finance but offer relatively limited emission reduction potential (e.g., electric aircraft). For MDB sources, we applied criteria related to the sustainability of the project and tracking of climate finance in climate mitigation and adaptation, as identified by the MDBs. We excluded projects that failed to meet MDBs' definition of climate finance. Our mapping provides a more granular description of how climate finance is channelled into the transport sector than the general landscape of climate finance.

Figure 5 | **Climate finance landscape analysed in this paper**



Notes: This diagram does not include all existing climate finance funds and initiatives. Apart from the cells shown in green, our database also includes information about green bonds and Convergence Blended Finance.

Sources: Adapted from Watson et al. 2024; Plavec et al. 2024.

Next, we extensively reviewed literature and policy documents to identify challenges to accessing climate finance in the transport sector. We searched keywords (such as climate change, climate finance, carbon finance, green finance, green investment, green bonds, transport, mobility, developing countries, low- and middle-income countries, low-income countries, Africa, Asia, Latin America and the Caribbean, South America) in academic, peer-reviewed papers, gray literature (reports, policy briefs, official government documents), and media articles to complete the picture of the state of knowledge.

We then explored 14 case studies to identify barriers for projects facing similar situations in different contexts (Table 2). We applied the following criteria for case selection: geographical spread, transport mode type, source of finance, financing instruments, and availability of information (more details about case selection are given in Appendix B). We completed and analysed the case studies using a standard template and process-tracing methodology (Collier 2011).

To verify the findings, we consulted with the climate, transport, and financing experts from MDBs, DFIs, and other nongovernmental organisations (NGOs) via unstructured interviews. Between January and June 2024, we organised four in-person stakeholder consultation meetings—one each in Kenya and India, two in Vietnam—and one virtual discussion to collect feedback to improve the research quality (see Appendix D).

Table 2 | **Location and LMIC designation of the 14 case studies**

REGION	PROJECT NAME	CASE COUNTRY	LMIC DESIGNATION
Africa	Commuter Transit-Asset-Backed Structured Finance	South Africa	UMIC
	Dar es Salaam Bus Rapid Transit System Project – Phase 2	Tanzania	LMIC
	Kalangala Infrastructure Services and Kalangala Renewables	Uganda	LI
	Railway Infrastructure Reinforcement Project	Morocco	LMIC
	Road Network Rehabilitation Project	Comoros	LMIC
Asia	Davao Public Transport Modernization Project	Philippines	LMIC
	VinFast Electric Mobility Green Loan Project	Vietnam	LMIC
	E Smart Bangkok Mass Rapid Transit Electric Ferries Project	Thailand	UMIC
	Green BRT Karachi	Pakistan	LMIC
	Promotion of Environmentally Sustainable Transport in Metropolitan Managua	Nicaragua	LMIC
Latin America and the Caribbean	E-Mobility Program for Sustainable Cities in Latin America and the Caribbean	Barbados, Chile, Colombia, Costa Rica, Dominican Republic, Jamaica, Panama, Paraguay, Uruguay	UMIC, HI
	Light Rail Transit for the Greater Metropolitan Area	Costa Rica	UMIC
	CargoX—Series F	Brazil	UMIC
		Haiti	LMIC

Notes: The LMIC designation is based on the World Bank's country classification by income level. UMIC = upper middle income; LMIC = lower middle income; LI = lower income; HI = high income.

Source: World Bank 2023a.

Limitations of analysis

Private sector investors and companies make the majority of investments into transport, constituting 58 percent of the total in 2012 (Lefevre et al. 2014). However, much of the information on these investments is neither tracked nor publicly available, so it is therefore not fully captured in this analysis (Amerasinghe et al. 2017; CPI 2023b). The preliminary analysis should be caveated because it comes from a combination of datasets, and the research scope and sources of data (international public finance, green bonds, blended finance) are limited to publicly available information. More and continual research about the quality and quantity of climate finance is needed as the landscape is complicated and continues to evolve (Neunuebel et al. 2023; Alayza et al. 2024).

4. OBSERVATIONS REGARDING THE CLIMATE FINANCE PROVIDERS' DATABASES, AND FINANCIAL INSTRUMENTS DEPLOYED

Among the transport projects in our database, land transport projects dominate, accounting for 75 percent of the total projects. In addition, 14 percent of the total are rail transport projects, 9 percent are maritime projects, and only 2 percent are inland water transport (IWT) projects. One-third of these projects are related to constructing, rehabilitating, and maintaining roads, highways, and bridges and enhancing connectivity among modes such as promoting multimodality across roads, railways, and ports. These projects are primarily funded by MDBs like the Asian Development Bank (ADB), African Development Bank (AfDB), World Bank, and Inter-American Development Bank (IADB).

According to the MDBs' own tracking of climate finance in climate mitigation and adaptation using the joint MDB methodology (when data were available),[2] there are 175 projects aimed at enhancing climate resilience, representing 20 percent of all accessed projects. The joint MDB methodology lays out general guidance for the transport sector (see Table E-1, Appendix E).

Over 130 projects in our database feature public transport; more than 60 include measures to promote electric mobility, or e-mobility (EVs, electric buses [e-buses], electric two- and three-wheelers); over 50 include some elements of active mobility; less than 50 mention freight; and around 20 include informal transport (minibus taxis, electric two- and three-wheelers) (Figure 6). Around 10 percent of the projects do not explicitly mention any specific transport mode but are focused on facilitating the conditions necessary for transitioning to low-carbon transport, such as providing technical assistance, formulating policies (e.g., parking policies, low-emission zones), preparing projects, and conducting feasibility assessments.

Different financing instruments and models are used for transport projects (Table 3). Loans—offered at market-rate and below-market interest rates—are the most common financial instrument used for financing transport projects in LMICs via international public sources. Concessional loans far outstrip other financial instruments in LMICs primarily due to their ability to provide large capital, often with favourable terms like low-interest rates and long repayment periods. This reliance on loans is further driven by the need to develop transport infrastructure for stimulating economic growth, reducing poverty, and improving connectivity. Following loans, grants are commonly deployed, which is logical given the lower- and middle-income context (Figure 7).

In addition, blended finance has been used for more than 30 transport projects combining concessional (e.g., from philanthropies or development banks) and private bank loans. Our database includes 84 transport-related green bonds, which are issued by governments (national and subnational), companies (e.g., transport operators, railway companies, car manufacturers), and financial institutions (banks) to private investors. These bonds are used to finance public transport improvements, EV infrastructure and fleet upgrades, and the expansion of rail networks. Nearly two-thirds of these green bonds have been issued in developed countries whereas LMICs have seen relatively few.

Definitions of low-carbon transport vary. For example, a project under "sustainable transport" at the World Bank might involve cycling, walking, and electric mobility in cities—effective ways to reduce emissions by decreasing reliance on fossil fuel–powered vehicles. However, other projects in the same category might involve logistics and airports, which come with environmental costs such as increased emissions from air travel and construction activities and may not fit neatly into climate finance categories. CPI tracks financing spent on battery EVs (excluding plug-in hybrid EVs) and non-fossil-fuel-powered buses and rail fleets (excluding fossil fuel–powered buses or rail engines). Although some transport projects might broadly qualify under the umbrella of climate finance, they do not necessarily meet the eligibility criteria of green bonds and loans for low-carbon transport. For example, freight rail that carries large quantities of fossil fuel (over 25 percent of the total freight) would not qualify for climate bonds (CBI 2022).

Table 3 | **An overview of the climate finance providers' databases based on our assessment**

SOURCE OF CLIMATE FINANCE	REGIONS COVERED	TRANSPORT MODES SUPPORTED			INSTRUMENTS DEPLOYED						
		Road	Rail	IWT/ Maritime	Grant	Loan	Guarantee	Debt	Equity	Insurance	TA
African Development Bank	Africa	x	x	x	x	x					
Asian Development Bank	Asia-Pacific	x	x	x	x	x					x
Convergence Blended Finance	Global	x	x	x	x		x	x	x	x	x
Clean Development Mechanism	Asia-Pacific										
Climate Investment Funds	Asia-Pacific										
Global Environment Facility	Global	x	x	x	x						x
Green bond	Global	x	x					x			
Green Climate Fund	Global	x	x	x	x	x			x		
Inter-American Development Bank	LAC	x	x	x		x					
International Climate Initiative	Global	x	x	x	x						x
Joint Crediting Mechanism	Asia-Pacific	x	x								
Nationally Appropriate Mitigation Actions	Global	x									x
Nordic Development Fund	Africa, Asia	x	x		x						
World Bank	Global	x	x	x	x	x					x

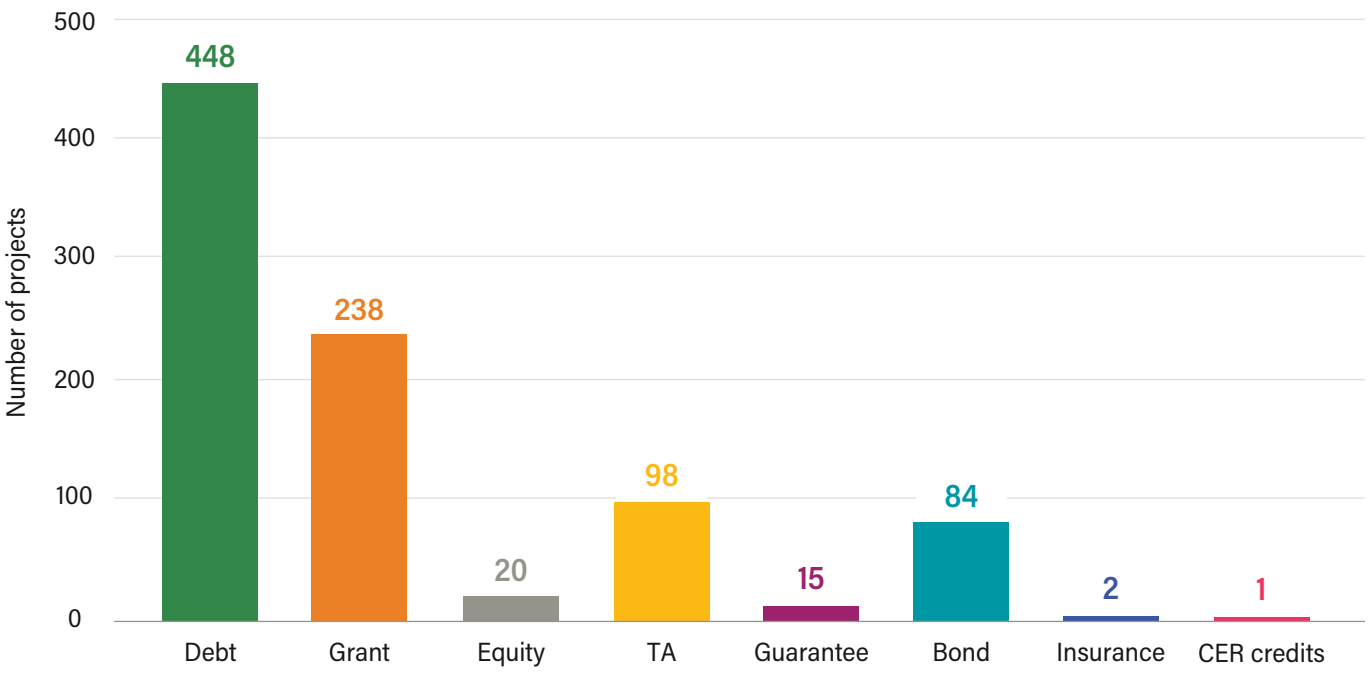
Notes: This table indicates what the climate fund providers have funded so far based on our assessment. X signifies that the source of climate finance either supports the specific transport mode or uses the type of instrument. IWT = inland water transport; LAC = Latin America and the Caribbean; TA = technical assistance. TA refers to support provided to projects, which is often aimed at enhancing their capacities to effectively implement and manage financial instruments. The terms *debt* and *loan* are used as distinct categories in the table, reflecting the original terminology from the source of finance, though they are typically similar in meaning. The term *guarantee* refers to financial instruments used in blended finance projects. Other climate funds and financial institutions included in this analysis did not explicitly list guarantees in their provided financial instruments.

Source: Authors.

One key observation is the large share of road projects. These can increase vehicle travel and emissions through the laws of induced demand. Climate finance for these road projects typically comes from MDBs. There are significant adaptation needs in the sector for all-weather roads and other improvements, given increasing floods and heat, which are stressing road and street networks, so the share of MDB funds flowing into road projects does not necessarily point to a problem. Our database compiled projects categorised as climate finance based on the internal methodologies of the MDBs and other funders, and we found no evidence that the MDBs are inappropriately applying their own methodologies.

But climate finance for transport should be aligned with the avoid-shift-improve approach, which limits unnecessary vehicle travel; promotes public transport, walking, and cycling; and lowers emissions through efficiency, electrification, and alternative fuels. Modal investments beyond roads, such as in public transport and active mobility, are in dire need of more robust implementation and financing to meet climate goals. There is a need for more transparent project documentation within the MDBs and climate funds to ensure that financing for existing and forthcoming projects brings measurable impact and contributes to adaptation and/or mitigation. But regardless of the percentage breakdowns by mode that we found, more climate finance is needed across all sectors and activities, including the transport sector.

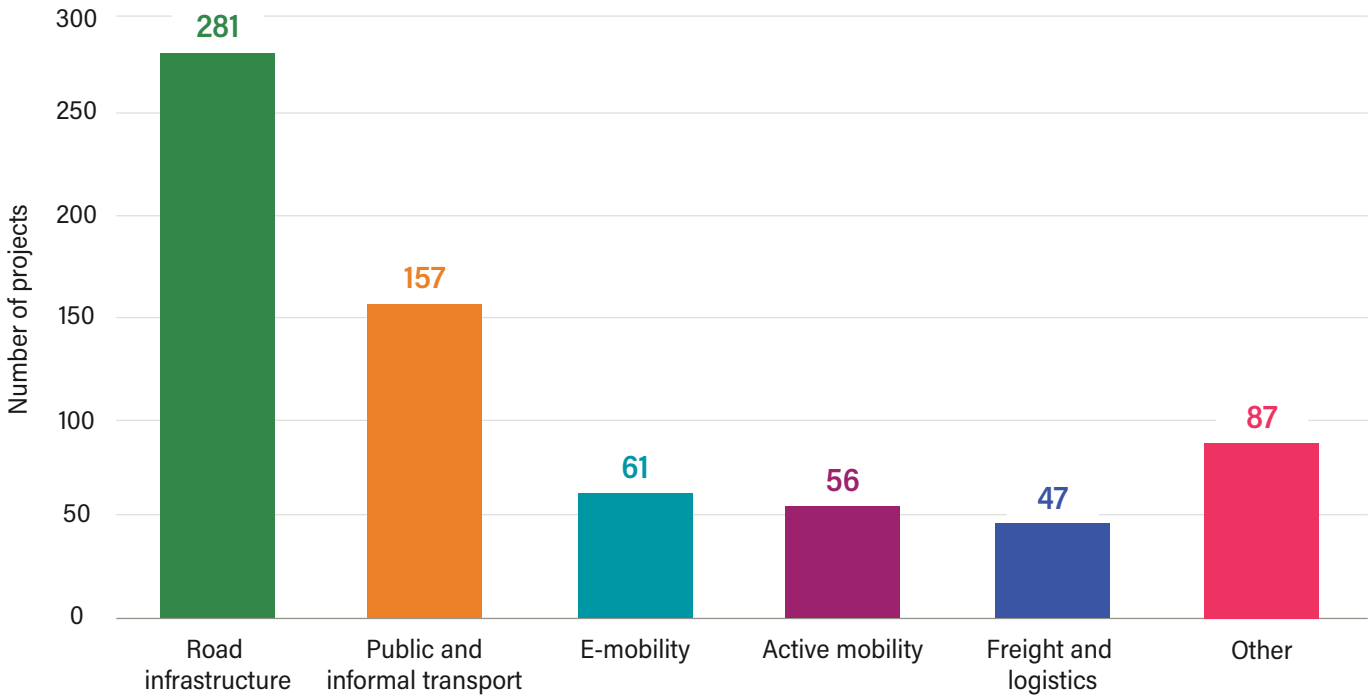
Figure 6 | **Number of projects by instrument deployed in our database**



Notes: In this study, definitions for the types of instruments come from the providers of climate finance included in our database. TA, or technical assistance, refers to nonfinancial support provided to projects, which is often aimed at enhancing their capacities to effectively implement and manage financial instruments and can be deployed at different stages throughout the life cycle of an investment. One project might deploy multiple financial instruments. CER = certified emission reduction.

Source: Authors.

Figure 7 | **Number of projects by transport mode in our database**



Note: The 'other' category includes projects dedicated to technical assistance, support for policy formulation, project preparation, and feasibility studies. Mode categories may include projects that span more than one mode.

Source: Authors.

5. BARRIERS TO ACCESSING CLIMATE FINANCE FOR THE TRANSPORT SECTOR IN LMICS

Generally, the barriers fall into two broad categories: the difficulty of securing adequate climate finance for transport and inadequate capacity to effectively use those funds. These problems compound one another. In LMICs, capacity constraints—such as limited skills in project preparation and implementation—along with economic and political instability—which make investments riskier—make it harder to attract and deploy international climate finance. The factors create a vicious cycle whereby a lack of financial resources hinders capacity building and vice versa. The case studies show how these challenges are intertwined.

Lack of enabling policy and regulatory framework

Investment in LMICs is hindered by uncertainty surrounding laws and regulations, procurement hurdles, and burdensome government paperwork and approval requirements. Disincentives for financial companies to invest in low-emission solutions like e-mobility often stem from institutional arrangements, such as fossil fuel subsidies, which favour traditional internal combustion engine (ICE) technologies by keeping the cost of operating ICE vehicles artificially low, further disincentivising investment in cleaner alternatives like EVs. The lack of clear guidelines and regulations, such as technical standards for charging infrastructure, discourages investment in e-mobility, as seen in Vietnam and other LMICs (Zhang et al. 2023).

In many African countries, where informal public transport is critical but typically unregulated, the development of low-emission transport is further hindered by the absence of official operating licenses, and broader challenges as these services are often viewed as illegal (Agyei-Boakye 2022; Mabogo 2023; Nebrija et al 2024). Additionally, securing bank credit is often a lengthy process, taking up to a year, if it's accessible at all (Kumar et al. 2021). Although innovative financing mechanisms, such as carbon markets, could help monetise the emission reductions from operating e-buses or other low-carbon solutions, countries often lack the kind of robust regulatory frameworks—such as clear carbon pricing regulations, monitoring and verification systems, and enforcement mechanisms—to effectively access and manage this type of finance.

Limited capacity for project preparation and implementation

Governments—at the national and subnational levels—often face technical and human resource limitations that prevent them from initiating projects or acting as reliable and creditworthy counterparts (Apostolovic et al. 2023; Rahman et al. 2017; Plavec et al. 2024). Organisational barriers, such as poor coordination among transport, climate, and finance ministries, further impede the identification and execution of bankable transport projects that could attract private sector participation (Zhang et al. 2023). Additional impediments include limited government experience in project design and structuring (see cases below), which complicates stakeholder engagement and investments, and a lack of coordinated efforts to pool funding for transport solutions.

High upfronts costs and long life cycles

Securing adequate financing for large-scale transport infrastructure, such as rail and public transport, can be difficult. Rail projects are typically large scale and have long life cycles, making it challenging to diversify funding sources and attract private investments (UIC 2023; Plavec et al. 2024). The upfront costs associated with e-mobility are also significant, including those for vehicle procurement, charging infrastructure, and grid upgrades (Sclar et al. 2019). Low-carbon transport projects typically lack mechanisms to guarantee payment for the extended payback periods required, adding another layer of complexity and making it harder to secure necessary investments.

High risk perception and low potential for returns

Investors often shy away from transport projects because of their low return potential and perceived high risks. New technologies such as EVs are viewed as uncertain, unproven, and costly, discouraging early adopters (Rahman et al. 2017). In some Asian countries like Vietnam, the lack of safety standards for electric motorcycles and their batteries increases the perceived risks. This situation is further exacerbated by a general lack of awareness of e-mobility benefits and technologies among both investors and ordinary citizens. Furthermore, small project sizes, insufficient financial information, and a lack of performance data introduce another level of uncertainty that exceeds the private sector's appetite (Apostolovic et al. 2023). Financing active mobility alone may offer returns that are too limited and inconsistent to attract many investors (Adriazola-Steil et al. 2021) as this sector typically does not generate direct revenue streams like tolls or fares.

Complex nature of climate finance

As highlighted in the section "International climate finance landscape," the landscape of climate finance can be very complex. Accessing climate finance can be slow, uncertain, and resource intensive, posing challenges for governments and organisations, especially in LMICs (Nair and Henry 2022; Caldwell and Larsen 2021). These countries often face high interest rates and growing levels of debt, restricting further government borrowing and complicating access. In addition, the technical and administrative complexities of funder requirements demand specific capacities and understanding that many governments and organisations in LMICs may lack (Nair and Henry 2022).

Broader economic and social benefits such as job creation, reduced air pollution, and enhanced accessibility can be difficult to quantify and monetise (Alayza et al. 2024; UIC 2023). The lack of reliable monitoring tools and comprehensive data on transport emissions further hinders stakeholders' abilities to access and track climate finance effectively, creating a barrier to funding for sustainable transport initiatives (Caldwell et al. 2022).

Findings from 14 case studies

We draw out the barriers and key findings within and across the 14 case studies (see Appendix B for more details about case selection, and Table C-1 in Appendix C for project costs and a financing breakdown). The findings are grouped by type of transport project: road infrastructure (e.g., roads), active mobility (e.g., sidewalks, bike lanes), public and informal transport (e.g., BRT, minibuses), rail, IWT (e.g., ferries), and e-mobility (e.g., e-buses, EVs, and the associated charging infrastructure).

These cases can be viewed as relative success stories, and they provide insights into the barriers faced by transport projects that have advanced to certain stages of development. However, they may represent the exception rather than the norm. Many project proposals may fail to get off the ground due to a range of factors, often linked to the barriers outlined earlier. While this paper does not cover data on how many transport projects do not receive funding or fail to advance beyond the proposal stage, it is important to recognise that these challenges are significant.

1) Road infrastructure projects

Transport infrastructure significantly improves connectivity, facilitates trade, and spurs economic development (Makovšek 2019; World Bank n.d.). Land transport infrastructure projects include the planning, construction, and maintenance of various types of infrastructure that facilitate the movement of people and goods over land.

Financing road infrastructure in low-income countries can be challenging as there are few ways to finance ongoing maintenance and cover high project costs. These projects often occur in countries with limited government capacity for managing complex financial arrangements and where political and economic instability may deter investors.

We examined two road infrastructure cases:

- The **Road Network Rehabilitation Project (2016–20)** in **Comoros** (an archipelagic country to the east of Mozambique in the Indian Ocean) rehabilitated 47 kilometres (km) of road and protected it against sea erosion. It worked to enhance access to basic services, reduce transport costs, and improve living conditions. It included road work, women's empowerment, institution building, and project management support. The AfDB funded the project with $36.5 million (AfDB 2022a, 2022b).
- The **Resilient Connectivity and Urban Transport Accessibility Project (2021–28)** in **Haiti** focuses on improving all-weather roads, infrastructure drainage, complementary transport facilities in the South Peninsula, and urban accessibility in Cap-Haïtien and other targeted areas. The project also aims to build institutional capacity in the urban transport sector with a $120 million grant from the World Bank (World Bank 2022a).

We identified the following barriers to accessing climate finance for these projects:

- **High project costs:** The Comoros project faced budget constraints, worsening financial conditions, mounting debt arrears, and late payments (World Bank 2021, 2023d).
- **Uncertainty in financing windows and opportunities:** The European Union unexpectedly withdrew funding ($16.2 million) from the Comoros project due to changing priorities, which further complicated the project's financing, showcasing the vulnerability of such projects to uncertain financing opportunities and the risk that funders will change their priorities (AfDB 2022b).
- **Political instability and macroeconomic risks:** The Haiti project faced significant risks due to the country's "fragile and low-capacity context" (World Bank 2022a). The World Bank had to allocate part of the loan to capacity building and close monitoring to mitigate these risks. Additionally, macroeconomic risks, such as exchange rate volatility, were a major concern, potentially increasing project costs.
- **Limited institutional capacity and governance issues:** The Comoros project revealed the government's highly restricted capacity to implement donor-funded programmes, with the AfDB citing problems such as incorrect payment requests and inadequate implementation

of environmental and social safeguards (AfDB 2022b). Fragmented governance of the transport sector meant that multiple authorities lacked clearly defined responsibilities, making it difficult to pool the resources needed to effectively manage the transport network.

Strategies employed to address these challenges and improve the financing and implementation of projects include the following:

- **Leveraging donor support and grants:** The Comoros project was structured with substantial grant funding to minimise the government's financial contribution. The project was primarily funded through grants; Comoros contributed only 13.3 percent of the total cost.
- **Private sector engagement and revenue-generating opportunities:** The Haiti project sought to attract private sector investment by using revenue-generating opportunities such as parking fees, market facilities, and fareboxes generated from minibuses and shared taxis ("tap-taps"). These efforts aimed to maximise the efficiency of scarce public resources and informed future public-private partnership (PPP) efforts (World Bank 2022a).
- **Capacity building and institutional strengthening:** In Haiti, part of the World Bank's loan was dedicated to capacity building, recognising the need to address the low capacity and high fragility of the local context.

2) Public and informal transport projects

Public transport, including buses, trams, and metro, serves as the backbone of urban mobility. Informal transport, also known as popular transport, paratransit, or intermediate transport, can be in the form of minibuses and motorcycles. Informal transport dominates in many LMICs due to its affordability and flexibility (Kustar et al. 2023).

High capital expenditures, long life cycles, and the need for long-term financing make it difficult to secure adequate funding for public transport projects, particularly for large-scale efforts (Ardila-Gomez and Ortegon-Sanchez 2016; UN-Habitat 2013; Makovšek 2019). Globally, BRT projects, and most public transport, do not recover costs through fare revenues alone (Makovšek 2019; Sayeg et al. 2015). Informal transport is often fragmented, with operators owning only a few vehicles, which increases their vulnerability to market fluctuations and operational risks (Sunio et al. 2024).

Our research examined three public transport projects and one minibus project:

- The **Dar es Salaam Bus Rapid Transit System Project – Phase 2 (2016–25)** in **Tanzania**, with a total cost of $121 million, is focused on enhancing urban mobility in Dar es Salaam by constructing 20.3 km of dedicated BRT lanes (AfDB 2015).
- The **Green BRT Karachi (2020–26)** in Karachi, **Pakistan**, is a $583.5 million project involving building a 26.6-km BRT corridor and operationalising the BRT system (ADB 2019a, 2019b).
- The **Davao Public Transport Modernization Project (2023–30)** in the **Philippines**, with a total cost of $1.711 billion, is an extensive effort to modernise the public bus system in Davao City, with the aim to introduce 1,100 buses; construct bus stops, depots, and terminals; and establish an intelligent transport system. The project will deploy an unprecedented 380 e-buses (ADB 2023a).
- The **Commuter Transit-Asset-Backed Structured Finance (2018–Ongoing)** project in **South Africa** provides financial support to minibus owners, particularly small and medium-sized enterprises. The $107 million project is backed by a senior loan from the AfDB and additional funding from an associated facility (AfDB 2019, 2020a).

We identified the following barriers to accessing climate finance for these projects:

- **High capital expenditures:** The project cost for the Dar es Salaam BRT is estimated at $121 million, based on detailed feasibility studies. It includes the construction cost of the 20.3-km BRT infrastructure, which includes rebuilding a corridor with dedicated lanes, terminals, and depots, as well as making upgrades to the traffic management system. The project also requires separate financing for the bus fleet, which consists of 97 articulated trunk buses and 105 feeder buses, further increasing the financial burden. For comparison, Tanzania's GDP was approximately $76 billion in 2022, and its total government resources stood at $11 billion, highlighting the disproportionate scale of the project cost relative to the country's economic capacity (World Bank 2023c). Similarly, the Davao project has a total estimated cost of $1.711 billion and aims to introduce 1,100 buses, including 380 e-buses. The estimated investment for the e-buses alone is $268 million (ADB 2023b). When compared with the Philippines' 2024 national budget of ₱5.768 trillion (roughly $103.73 billion), the Davao project's cost is significant (DBM 2023).
- **Revenue generation and cost recovery:** In Dar es Salaam, one of the challenges was identifying how much public subsidy would be needed to support operations alongside farebox revenue.[3]

- **Limited institutional capacity and weak governance:** In Karachi, the provision of transport infrastructure and services is fragmented across the country's levels of government. This fragmentation, combined with weak institutional capacity and complex arrangements, has led to limited coordination on financing, transport planning, and service delivery.
- **Perceived high risks of informal transport:** In South Africa, small borrowers, such as minibus operators or motorcycle owners, are considered high risk (Sunio et al. 2024). This is due to several factors: they typically manage fewer vehicles; face operational challenges like maintenance risks, competition, and fluctuating demand; and have limited financial resources and unstable revenue streams (Nebrija et al. 2024; Kerzhner 2023).

To address these challenges, the studied cases implemented various solutions:

- **Concessional loans and tailored structures:** The Dar es Salaam and Karachi BRT projects utilised concessional loans with below-market interest rates, extended repayment schedules (over 20 years), and grace periods to align with the long-term social and environmental benefits these systems offer (Hook and Hughes 2017). The extended payback terms match the timeline over which these benefits are realised, while the structured schedules offer certainty and clarity by specifying repayment amounts upfront. The Dar es Salaam project, with a total cost of $121 million, was financed primarily through loans from the AfDB and the Africa Growing Together Fund, along with government contributions. Similarly, the Green BRT Karachi project required a complex financing structure, including loans and grants from multiple international sources.
- **Public-private partnerships (PPPs):** Both the Dar es Salam and Karachi BRT projects employ a PPP model wherein private operators are contractually responsible for key aspects of the BRT system, reducing public sector risks, enhancing operational efficiency, and ensuring compliance through well-defined contractual obligations (Hoyos Guerrero and Lopez Dodero 2021).
- **Revenue generation opportunities:** The Karachi project is designed primarily to limit operational subsidies and ensure that revenue generated from the BRT system will cover operation and maintenance costs. The revenue comes from distance-based fares, advertising, and rent at concession shops in depots and stations. To estimate the system's financial performance, the project team developed a comprehensive financial model to valuate the net operating cash flow. The results confirmed that the projected revenue would adequately cover operating costs under various scenarios, ensuring the financial sustainability of the BRT system under the model's assumptions. To fully bridge the maintenance gap, the government plans to increase the fuel levy tax to provide ongoing revenue support. The project is expected to run until 2026.
- **A targeted approach to financing the informal transport sector:** In the case of South Africa, AfDB provided a loan of $100 million to support taxi purchases through SA Taxi, one of the largest recognised minibus service partners that provides financing to taxi operators. Via SA Taxi, small operators can access credit and expand their businesses (AfDB 2020b).

3) Active mobility projects

Active mobility refers to human-powered forms of transportation, including walking and cycling. In many LMICs, walking is the predominant mode of transport. Yet countries often need high-quality infrastructure to make it attractive or safe. In Africa, 9 out of 10 streets do not meet the minimum standards for safe walking and cycling (SLOCAT 2023).

Unlike toll roads or public transport systems, active mobility projects typically do not generate direct financial returns, making them less attractive to investors (World Bank 2023b). Active mobility initiatives traditionally fall within municipal jurisdictions. However, many municipalities, particularly in smaller cities, lack the financial resources to adequately fund these projects (Adriazola-Steil et al. 2021).

Our research examined two projects in which active mobility infrastructure is an integral component of large-scale investment projects, such as a larger BRT project.

- For the **Dar es Salaam Bus Rapid Transit System Project – Phase 2 (2016–25)** in **Tanzania**, active mobility has been integrated into the broader BRT infrastructure and used to increase access to public transport. The 21-km BRT corridor includes walking and cycling infrastructure along the route (AfDB n.d.).
- The **Promotion of Environmentally Sustainable Transport in Metropolitan Managua (2008–16) project** in **Nicaragua**, with a $64.5 million grant, aimed to encourage a shift toward public and active modes (GEF 2006; UNDP and GoN 2006). It included constructing a BRT system, building 49 km of cycle lanes, and organising public awareness campaigns and special programmes sponsored by private companies. For instance, the private sector can sponsor parking facilities or bicycle services in exchange for advertising space at bus stops (GEF 2006).

We identified the following barriers to accessing climate finance for these projects:

- **Lack of financial returns:** For some investors, financing active mobility alone may be difficult as there is no monetizable financial flow.
- **Limited financial resources at the municipal level:** While larger cities often have the means to fund their initiatives, smaller municipalities typically depend on external funding from national or regional sources. In the Nicaragua project, the municipalities of Managua and Ciudad Sandino did not provide their own financing for the design and construction of cycling lanes.

To address these challenges, the projects implemented several strategies:

- **Bundling with larger projects and holistic planning:** In the Dar es Salaam BRT project, the 21-km BRT corridor incorporates walking and cycling infrastructure along its route, which is used to enhance accessibility to public transport. The Managua, Nicaragua, project worked to promote bicycles as a sustainable transport alternative, integrating cycling facilities into broader transport network planning. By ensuring walking and cycling infrastructure is adequately designed, these projects not only enhance the accessibility of public transport systems and road networks but also align with road safety goals.
- **Pilot projects:** In the case of Managua, the construction of the cycling network was funded mainly by the national government through a concessionary IADB credit with $2 million, and a Global Environment Facility contribution of $500,000 as seed funding. This project is seen as a pilot project to showcase that cycling can be attractive and meet users' needs. Partnering with the private sector for additional funding and support can enhance project feasibility.

4) Rail infrastructure projects

Rail is more energy efficient than other land transport modes, offering a sustainable travel option for passengers and goods (UIC 2023). Despite rail's advantages, financing rail infrastructure projects presents significant challenges. Rail projects are often large scale and capital intensive with long life cycles (100 years for infrastructure and 30–35 years for rolling stocks), making them less attractive to private investors due to delayed financial returns (UIC 2023). For LMICs with limited tax revenues and constrained self-funding potential to upgrade or expand rail infrastructure, securing adequate financing is the main challenge. Meanwhile, the economic and social benefits from such projects—like job creation, reduced air pollution, and indirect impacts on accessibility and equality—can be challenging to quantify and monetise, and are often not included in current financial models (UIC 2023).

We examined the following rail infrastructure cases:

- The **Railway Infrastructure Reinforcement Project (2016–22)** in **Morocco** constructed 141 km of track and modernised railway facilities at a total cost of $402 million (AfDB 2016).
- The **Costa Rica Light Rail Transit (LRT) project (2021–22)**, currently on hold, cost $1.873 billion and aimed to install an 85-km double-track electric light rail system in San José's Greater Metropolitan Area. The project sought to encourage public transport use through transit-oriented development and improvements in micro-mobility infrastructure (CABEI 2023).

We identified the following barriers to accessing climate finance for these projects:

- **High upfront costs and difficulty in diversifying funding sources:** For Costa Rica, a country with limited tax revenue, securing $1.873 billion in financing posed a significant challenge. To put this in perspective, Costa Rica's GDP was approximately $69 billion in 2022, meaning the railway project alone represented nearly 3 percent of the country's entire economic output (World Bank 2020). This substantial cost, coupled with the country's limited fiscal space, highlights a critical barrier to upgrading or expanding rail infrastructure (World Bank 2020).
- **Limited government experience:** The Costa Rica case identified a lack of government experience in managing rail transport projects with a PPP model and how to connect them to broader goals such as accessibility and connectivity.

To address these barriers, the projects implemented several strategies:

- **Leveraging public resources:** The Morocco project cost $402 million, which was primarily funded through resources from the Moroccan National Railways Authority (Office National des Chemins de Fer; ONCF) which made a 72 percent contribution (AfDB 2023). ONCF is Morocco's national rail operator and a fully state-owned entity under the control of the Ministry of Transport and Logistics. It has substantial self-financing capacity and can raise capital through bond issues, often backed by guarantees from the government and MDBs, reducing risk for investors (EBRD 2022; ONCF 2022; AfDB 2016). It was the first company in Africa to issue

a corporate green bond aimed at sustainable transport projects. With technical assistance from the World Bank, ONCF restructured its balance sheet and optimised public service delivered to its citizens, which improved its creditworthiness for investments (Plavec et al. 2024; World Bank 2024).

- **PPPs:** The Costa Rica LRT project is also designed as a PPP, with private sector involvement in financing and operations for 35 years. The investor recovers its investment from operations. This model provides time for the government to understand the system's operations before it decides if it wants to continue operating after the concession contract ends.

5) Inland water transport projects

Inland water transport is vital for moving passengers and goods, generating jobs, and offering the potential for emission reduction and multimodal integration. However, constructing and maintaining IWT infrastructure such as dredging works, canal maintenance, and dock improvements often require significant initial capital investments (Yoshino et al. 2019; Camargo-Díaz et al. 2023). Additionally, increased climate risks from extreme weather events such as flooding are driving up the costs of infrastructure development and maintenance (Newman and Noy 2023). Furthermore, governments often lack a comprehensive vision for the regional development of IWT, which could result in fragmented and inefficient investment (Yoshino et al. 2019).

We examined the following IWT cases:

- The **Bangkok Mass Rapid Transit Electric Ferries Project (2021–ongoing)** in **Thailand** involves deploying 27 electric ferries for mass public transport along the Chao Phraya River in Bangkok and installing charging stations (ADB 2022b).
- The **Kalangala Infrastructure Services and Kalangala Renewables Project (2007–11)** in **Uganda** included several components, such as rehabilitating the island road and ferry buildings, improving ferry services and water supply, and constructing an electricity plant (Convergence 2023b, 2023c).

We identified the following barriers to accessing climate finance for these projects:

- **Limited revenue sources:** The Kalangala project faced challenges in attracting sufficient investment for its infrastructure improvements, combined with a bureaucratic process for obtaining necessary legal approvals. User fees from ferry services alone are insufficient to cover the costs associated with developing and maintaining IWT infrastructure.
- **Scaling financing beyond pilot projects:** The Bangkok project estimates that a new electric passenger boat will cost about $1 million to build (TME 2020). The borrower and project manager, E Smart, launched a pilot e-ferry service with six e-ferries in December 2020 (ADB 2022b). The pilot is important for testing the technology and proving its viability, but scaling up requires substantial additional financing.

To address these challenges, the projects implemented the following strategies:

- **Using well-designed blended finance:** The Kalangala project is an excellent example of using blended finance consisting of grants, private investor debt, DFI debt, and guarantees. The US Agency for International Development and GuarantCo provided joint guarantees to mitigate financial risks and attract investors (Convergence 2023b; OECD 2019). At the same time, InfraCo Africa, established as a private limited company with support from the United Kingdom (UK), the Netherlands, and Switzerland, focused on promoting private sector investment in developing infrastructure projects in Africa and facilitated coordination among various stakeholders to design the project, bring in private financing, and streamline project implementation (OECD 2019).
- **Diversifying revenue streams:** The Kalangala project included several revenue streams: user fees from ferry services, electricity usage, water services, and a toll for road usage. Additionally, the Global Partnership for Results-Based Approaches provided consumption-based subsidies for electricity and water, enhancing the project's profitability.
- **Conducting pilot projects to demonstrate viability:** The Bangkok project began with a pilot phase to test e-ferries. Demonstrating viability requires testing the e-ferries' operational performance, safety, and efficiency, as well as stakeholder engagement to assess public acceptance. To bring the e-ferries to scale, ADB helped obtain targeted concessional funding and mobilised co-financing in the early engagement of the project to enhance its bankability and financial sustainability. The project is the first large-scale deployment of e-ferries for public transport in Southeast Asia.

6) Electric mobility projects

E-mobility projects involve the deployment of EVs, e-buses, and charging infrastructure. The transport technologies are commercially available for the road transport sector, but their widespread adoption will rely on further innovation and reduced costs.

One major barrier to the adoption of e-mobility is the high upfront costs. For instance, procuring e-buses can be two to three times more expensive than acquiring the diesel counterparts (Sclar et al. 2019). And establishing the required charging infrastructure and upgrading power grids to support these new technologies involves significant financial investment. Another challenge is the uncertainty associated with new technologies. Concerns include the residual value of EVs, the service life of their batteries, maintenance, and grid capacity (Dellis 2024).

We examined the following cases:

- The **VinFast Electric Mobility Green Loan Project (2022–ongoing)** in **Vietnam** involves a $135 million investment to develop e-buses, manufacturing facilities, and a national EV charging network (ADB 2022c, 2022d).
- The **E-Mobility Program for Sustainable Cities in Latin America and the Caribbean (2023–30)** aims to enable the uptake of EVs, electric taxis, e-buses, electric boats, and supporting vehicle-to-grid and hydrogen storage pilots across nine countries. To kickstart mass EV deployment in the LAC region, GCF provided $200 million in financing with an additional co-financing of $195 million from the IADB and $50 million from the host countries (GCF 2022b).

We identified the following barriers to attaining climate finance for these projects:

- **High upfront costs, performance risks, and limited commercial viability:** The LAC project faced high upfront costs for EVs and long investment payback times. Performance issues are a problem for investors as well. Compared with traditional fossil-fuelled vehicles, EVs have limited range and take longer to charge, and the charging infrastructure may not be adequate, limiting demand for them and posing more problems for investors. The project also noted the limited commercial viability of electric vessels and hydrogen applications in the transport sector, which are still in the early stages of the technology adoption curve, making it difficult to assess their market potential and feasibility.
- **Lack of a supportive policy and regulatory framework:** In Vietnam, uncertainties surrounding the policy and regulatory framework for e-mobility—such as a lack of technical guidelines for charging infrastructure—deter private investment. Without clear regulations, potential investors face uncertainty and risk regarding the requirements of establishing charging networks (Le and Posada 2022). These, coupled with underdeveloped capital markets and insufficient infrastructure such as grid capacity, all impede investments, especially from commercial banks (Nguyen and du Pont 2023; OECD 2024).
- **Lack of awareness and understanding:** The widespread adoption of EVs and e-buses is hindered by limited awareness and understanding of e-mobility benefits among customers and businesses, particularly in emerging markets such as Vietnam and countries in the LAC region. Actions to promote awareness of EVs and their benefits among customers and businesses are sometimes needed to speed uptake (Tesoriere et al. 2023; Munshi et al. 2022; Shetty et al. 2020).

To tackle these challenges, the projects implemented the following strategies:

- **Concessional finance with risk mitigation measures:** The LAC e-mobility programme received concessional financing from GCF and IADB with more favourable terms (i.e., interest rate, tenor, grace period) than those on the capital markets. Combined with technical assistance and other risk mitigation measures, including government guarantees, the concessional finance mechanism helps reduce perceived risks and uncertainty as well as crowd in private investments. The programme is still in its early stages and is expected to run until 2030. It aims to act as a market accelerator for EV financing, with the potential for replication in other countries beyond the initial nine involved in the programme.
- **Promoting awareness and knowledge:** In the Vietnam project, ADB will provide technical assistance and organise public events to promote awareness about e-buses, EVs, charging facilities, and women's participation in the EV workforce.

The key takeaways from the 14 case studies are in Table 4.

Table 4 | **Takeaways from the reviewed cases**

TRANSPORT MODE	CASE-SPECIFIC LESSONS	COMMON LESSONS
Road infrastructure	▪ Counterpart contribution is minimised in light of the financial instability and debt distress faced by recipients ▪ Revenue-generating opportunities, such as parking and advertising, are integrated to support financial sustainability	**Blended finance structures:** Multiple transport modes, including IWT and e-mobility, utilise blended finance to mobilise diverse funding resources with government guarantees aimed at attracting private investment. **Public-private partnerships:** Several modes, such as public transport, rail, and e-mobility, use PPP models where private operators are involved in operations, financing, and risk-sharing to enhance project sustainability and efficiency. **Capacity building and technical assistance:** Across modes like road infrastructure, public transport, and rail, technical assistance and capacity building are emphasised to ensure financial management, project monitoring, and overall project feasibility. **Pilot projects:** Both active mobility and IWT use pilot projects to demonstrate the benefits, viability, and bankability of projects, which can help attract further investment.
Public and informal transport	▪ Structured financing for minibus operators	
Active mobility	▪ Active mobility infrastructure is integrated with public transport to enhance accessibility ▪ Awareness-raising campaigns promote cycling as a sustainable alternative	
Rail transport	▪ Rail company ONCF issued a corporate green bond to facilitate sustainable financing for transport projects ▪ The creditworthiness of ONCF is enhanced due to technical assistance from MDBs	
Inland water transport	▪ InfraCo Africa facilitates coordination among various stakeholders to bring in private financing and streamline project implementation	
E-mobility	▪ Public events are organised to promote awareness of EVs and e-buses, encouraging their wider adoption	

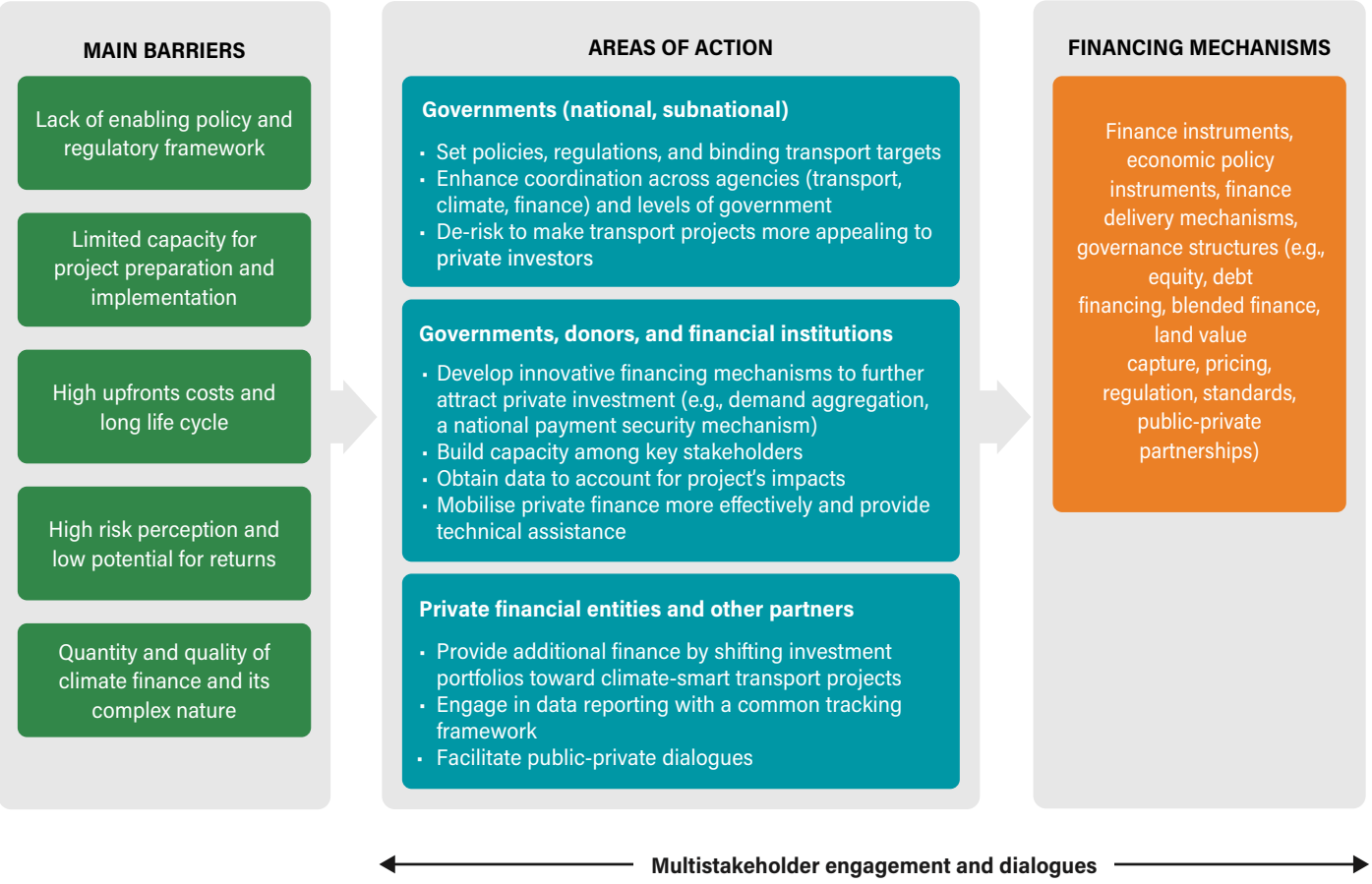
Notes: InfraCo Africa is a private company focused on developing infrastructure projects in Africa; ONCF = Office National des Chemins de Fer (Moroccan National Railways Authority); MDB = multilateral development bank; IWT = inland water transport; PPP = public-private partnership; EV = electric vehicle; e-bus = electric bus.

Sources: Authors.

6. OPPORTUNITIES TO IMPROVE ACCESS TO CLIMATE FINANCE FOR TRANSPORT

The database analysis, literature review, and case studies yielded essential insights on how governments and lenders have funded transport projects. These findings were further enriched through expert discussions held during in-person and virtual workshops (see Appendix D). In these sessions, participants were presented with the evidence gathered from our research and case studies, which informed the discussions. Drawing on this combined approach, we present recommendations here that are relevant for national and city governments, financial institutions, and other stakeholders, including private investors and NGOs, to improve climate finance access for transport projects. A summary of these recommendations is presented in Figure 8.

Figure 8 | **Areas of action to scale up financing for low-carbon and resilient transport projects**



Sources: Authors, with input from BEI 2023; Sayeg et al. 2015; Apostolovic et al. 2023; Floater et al. 2017.

Governments (national and subnational)

Recognising the challenges, governments—both at the national and subnational levels—play a pivotal role in creating an enabling environment for successful climate-smart investments. In line with countries' long-term strategies and climate pledges like nationally determined contributions, governments could set policies, regulations, and binding transport targets (e.g., sectoral emissions targets for transport and EV deployment targets) to send clear signals to private sector actors, encouraging them to invest and enter the market. Local governments should align transport actions with national policy priorities and ensure they qualify for financing support from national or regional funds or national development banks.

Coordination across government agencies in the transport, climate, and finance sectors, as well as among levels of government, is essential to improve the efficient allocation of resources and management of climate-smart transport initiatives. Fostering public-private dialogues is also crucial and gathering inputs from various stakeholders can help create an enabling environment.

Governments can de-risk climate-smart investments through policy or financial measures (Choi and Laxton 2023) such as zero-emission vehicle mandates. These provide certainty to investors and developers of clean vehicles to invest in new technologies. Financial measures such as dedicated public capital in the form of guarantees could spread risks and help attract private capital (Choi et al. 2022). As LMICs grapple with the challenges of rapid development and the transition to low-carbon economies, innovative financing mechanisms

are becoming increasingly relevant (Mampilly 2024). In e-mobility projects, leasing batteries and vehicles, along with using "as-a-service" models, offers flexibility and reduces ownership risks for consumers and fleet operators. Successful strategies for promoting e-bus adoption include demand aggregation, which allows multiple cities and states to pool their purchasing power, leading to economies of scale. In addition, standardised technical and contractual terms ensure consistency across projects by providing a clear framework that all parties can follow. In India, demand aggregation and subsidies make procuring e-buses one-third less expensive than acquiring diesel busses (CESL 2023; Vijaykumar et al. 2023). To bring e-buses further to scale, in June 2023, India and the United States announced a national payment security mechanism (PSM), financed through both public and private funds. PSM kicks in when transport authorities are not able to make timely payments to the bus operators. By ensuring that operators receive consistent payments, the PSM reduces financial uncertainty and enhances contract viability (CESL 2023; Pandey 2024).

Capacity building is needed across governments, financiers, the private sector, and other key actors. Capacity-building activities should help stakeholders understand the complex funding requirements, including the bankability and eligibility criteria of funding proposals. The financial profits or returns to be yielded by an investment are particularly emphasised by private investors. Various cases analysed above include detailed feasibility studies, robust financial models (diverse revenue streams such as fareboxes, advertising, revenue sharing via PPPs), and appropriate financing strategies (blended finance, green bonds, credit enhancements).

The need to increase gender equality in transport systems is not well recognised. Steps should be taken to enhance women's safety and meet their mobility needs, as well as to increase female participation in the workforce, generate skilled jobs for women in the e-mobility transition, and provide the necessary training and appropriate work environment.

To better inform decision-making, stakeholders need good-quality data on transport activities and emissions. Monitoring and evaluating the impacts of transport measures is vital to directing investments to sustainable choices. It is also useful to analyse co-benefits, such as economic development and improved access to jobs and opportunities, because these linkages can bolster the case for increased funding. Spatial environmental and economic justice screening tools, such as the Climate and Economic Justice Screening Tool, can help direct financial resources to the populations and areas most in need, ensuring equitable distribution and impact (CEQ n.d.).

Financial institutions (MDBs, DFIs)

Financial institutions such as MDBs and DFIs play a crucial role in getting transport projects in LMICs off the ground. In many of the cases discussed, concessional funding from MDBs has been the factor that has enabled projects to proceed (see section "Barriers to accessing climate finance for the transport sector in LMICs"). Without this support, many projects would not otherwise have seen the light of day. MDBs not only provide concessional finance, guarantees, and blended finance, but also mobilise private capital to some extent, which is essential for scaling up investments in LMICs (Convergence 2023a). Their ability to attract private finance and offer credit enhancements has been instrumental in closing financial gaps in some instances; however, there is a need for them to go further (CCFLA 2023). MDBs and DFIs should provide more tailored technical assistance to help governments and other stakeholders better understand funding requirements, prepare robust pipelines, and build managerial and technical capacity for project implementation, monitoring, and evaluation (TUMI 2022). Philanthropies and other development partners can also provide such support in coordination with the MDBs/DFIs.

Furthermore, as revealed by our analysis in the section "Observations regarding the climate finance providers' databases, and financial instruments deployed," a large number of road projects appear to be considered climate finance. MDBs should work together with countries, climate funds, and other stakeholders to help ensure that climate finance has a clear impact on resilience and emissions. For a road project to qualify as adaptation finance, it must be designed to enhance climate resilience and meet the needs of vulnerable communities (Larsen et al. 2022). MDBs and others could conduct vulnerability analyses to ensure that the roads are durable and safe for vulnerable communities and to strengthen monitoring and evaluation frameworks to estimate total emissions reduced.

Private sector and other partners

The private sector is already crucial in filling financing gaps, particularly in providing and managing transport services and fleets. But the current levels are insufficient to meet the growing transport demand in LMICs, and more can be done. Private financial entities, such as commercial banks and private equity funds, are essential in providing additional finance by shifting investment portfolios and tailoring existing instruments toward climate-smart transport projects.

While private sector investors accounted for 58 percent of transport investments in 2012 (Lefevre et al. 2014), much of the information on private investments remains untracked and unavailable (Amerasinghe et al. 2017; CPI 2023b). This data gap hinders informed decision-making for relevant stakeholders, complicates the assessment of private investment flows and their relationship to climate impacts, and may result in missed opportunities for low-emission and resilient transport. To address this, private stakeholders should be incentivised to engage in data reporting with a common framework. For instance, the enhanced transparency framework (ETF) adopted under the Paris Agreement provides guidelines for countries' climate finance tracking (Caldwell et al. 2022). The ETF recognises the importance of private stakeholders in sharing comparable and consistent information among actors (Bertazzi et al. 2023).

NGOs and research institutions

NGOs and research institutions like World Resources Institute can help facilitate public-private dialogues and bring stakeholders to the same table, in addition to developing and communicating easily accessible knowledge products with success stories that can be replicated elsewhere.

7. CONCLUSION

This paper investigates the international climate finance available for the transport sector in LMICs, focusing on the barriers to investment in sustainable and low-carbon transport. Our findings reveal a disparity in investment distributions, with LMICs that urgently need funding and financing to meet soaring transport demand and make sustainable decisions receiving far less than necessary. Moreover, there is a vicious cycle wherein LMICs have limited capacity to propose and develop bankable transport projects, restricting their access to international finance resources. This in turn hampers the development of capacity needed. To break this cycle, bolder and more deliberate actions are required, and this paper hopes to shed light on how governments, financial institutions, private sectors, and other stakeholders can address these challenges.

APPENDIX A. SOURCES OF INTERNATIONAL CLIMATE FINANCE

International climate finance is channelled through a variety of mechanisms, including multilateral channels within and outside the UNFCCC and Paris Agreement financial mechanisms, as well as bilateral, regional, and national climate change channels and funds.

Within the UNFCCC

Developed countries and higher-income countries are responsible for providing financial resources to support developing countries in implementing climate actions (United Nations 2015). This includes mechanisms such as the Global Environment Facility, Green Climate Fund, and Adaptation Fund established under the Kyoto Protocol in 2001.

Outside of UNFCCC

Beyond the UNFCCC mechanisms, multilateral development banks and multilateral climate funds also play a role in channelling climate finance to where it is needed. Specialised funds, such as the Clean Technology Fund and Strategic Climate Fund, are administrated by the World Bank Group and implemented with other regional MDBs like the Asian Development Bank and African Development Bank (Schalatek and Watson 2021). In addition, bilateral sources of climate finance are typically provided through developed countries' development aid agencies. Specific facilities are also available to support bilateral or multistakeholder initiatives, including private finance and other private sector activities.

APPENDIX B. CASE STUDY SELECTION

Our case study selection began by mapping the landscape of international climate finance for the transport sector, providing a comprehensive list of 839 potential cases. From this initial pool, we refined our selection based on the following criteria to ensure a diverse representation:

- **Geographic diversity:** We chose cases across various contexts in Asia, Africa, and Latin America and the Caribbean.
- **Modal diversity:** We included projects spanning different transport modes, such as road transport (including active mobility, two- and three-wheelers, passenger cars, and road infrastructure), rail transport (both passenger & freight trains and railway infrastructure), and inland water transport (including ships, ferries, and freight barges).
- **Financing sources:** Selected cases accessed funding from a range of sources, including international climate finance, multilateral finance, national development banks, and private finance.
- **Financing instruments:** Cases utilised various financing instruments such as concessional financing, grants, carbon credits, bonds, and guarantees.

Ultimately, we identified 14 cases that met these criteria. Using a theory-testing process tracing methodology, we conducted detailed analyses, starting with a comprehensive literature review of successful climate financing factors, barriers, and constraints. This approach allowed us to match theoretical insights with empirical evidence gathered from our selected cases.

Subsequently, we conducted a documentary search for each case in English and Spanish, covering public documents including news articles, policy documents, and academic literature. We carried out this process using Google and Google Scholar until data saturation was achieved—where no new relevant information could be found.

Our documentary analysis comprised three main steps:

1. Initial screening to ensure relevance, with irrelevant documents excluded
2. Coding of relevant documents to identify barriers, constraints, and insights. Two independent researchers conducted this coding process to ensure reliability, using qualitative data analysis software (Dedoose)
3. In-depth analysis of coded data to discern emerging themes and categories related to barriers, constraints, and insights

Following this analytical process, we compiled our findings into detailed narratives for each case, highlighting key insights and implications for accessing climate finance in the transport sector.

APPENDIX C. SUMMARY OF CASES

Table C-1 | **A summary of selected projects**

COUNTRY/ REGION	PROJECT	SOURCE OF FINANCE	PROJECT DURATION	TOTAL COST	FINANCING STRUCTURE	MAIN TRANSPORT MODE
Comoros	Road Network Rehabilitation Project	AfDB	2016–20	$36.5 million	$3.4 million (ADF grant), $16.9 million (ADF loan), $16.2 million (European Union)	Road infrastructure
Haiti	Resilient Connectivity and Urban Transport Accessibility Project	World Bank	2021–28	$120 million	$100 million (World Bank IDA grant), $20 million (crisis response window grant)	Road infrastructure
Tanzania	Dar es Salaam Bus Rapid Transit System Project – Phase 2	AfDB	2016–25	$121 million	$74 million (AfDB), $33 million (Africa Growing Together Fund), $14 million (government counterpart)	BRT; active mobility
Pakistan	Green BRT Karachi	GCF	2020–26	$583.5 million	$242 million (ADB loan), $100 million (ADF loan), $100 million (AIIB), $11.8 million (GCF grant), $37.2 million (GCF loan), and $92.5 million (government counterpart)	BRT
Nicaragua	Promotion of Environmentally Sustainable Transport in Metropolitan Managua	GEF	2008–16	$64.5 million	$3.875 million (GEF grant), $0.3 million (IADB grant), $2.5 million (CABEI grant), $35 million (government counterpart), $22.5 million (private equity), $0.29 million (in-kind)	BRT; active mobility
Philippines	Davao Public Transport Modernization Project	ADB	2023–30	$1.711 billion	$1.014.69 billion (ADB loan), $50 million (GCF loan), $10 million (ASEAN Infrastructure Fund loan), $1 million (technical assistance), $636 million (government counterpart)	Public transport
South Africa	Commuter Transit-Asset-Backed Structured Finance	AfDB	2018–ongoing	$107 million	$10 million (AfDB senior loan), $97 million (associated facility)	Minibus taxis
Morocco	Railway Infrastructure Reinforcement Project	AfDB	2016–22	$402 million	$112 million (AfDB loan), $290 million (counterpart contribution, ONCF)	Rail
Costa Rica	Light Rail Transit for the Greater Metropolitan Area	GCF	2021–on hold	$1.873 billion	$250 million (GCF loan), $21.3 million (GCF grant), $300 million (CABEI loan), $250 million (private equity), $1.052 billion (co-financing loan II)	Rail
Uganda	Kalangala Infrastructure Services and Kalangala Renewables	Blended finance	2007–11	$54 million	$7 million (EAIF debt), $2.8 million (GuarantCo guarantee), $29 million (equity from IDC, InfraCo Africa, PIDG, Nedbank Group, UDC), $6 million (PIDG grant), joint guarantee from USAID, grant from FMO	IWT
Thailand	E Smart Bangkok Mass Rapid Transit Electric Ferries Project	ADB	2021–ongoing	$11.1 million	$5.6 million (ADB loan), $5.5 million (CTF concessional loan)	IWT

COUNTRY/ REGION	PROJECT	SOURCE OF FINANCE	PROJECT DURATION	TOTAL COST	FINANCING STRUCTURE	MAIN TRANSPORT MODE
Vietnam	VinFast Electric Mobility Green Loan Project	ADB	2022–ongoing	$135 million	$20 million (ADB loan), $87 million (loans from Export Finance Australia; Finnish Fund for Industrial Cooperation; Development Bank of Austria; and ResponsAbility, a private Swiss investment enterprise), $28 million (concessional financing from Australian government, CTF, CIDF)	E-buses, charging infrastructure
LAC (multiple; see note)	E-Mobility Program for Sustainable Cities in Latin America and the Caribbean	GCF	2023–30	$450 million	$55 million (GCF grant), $145 million (GCF loan), $5 million (IADB grant), $195 million (IADB loan), $50 million (co-financing)	EVs, e-buses, e-vessels, active mobility
Brazil	CargoX—Series F	Blended finance	2021–25	$200 million	$200 million in Series F funding led by venture capital firms SoftBank and Tencent, including local currency participation of $9.9 million equity from IDB Invest, and $4.5 million concessional equity funding from CTF	Freight transport

Note: AfDB = African Development Bank; ADF = African Development Fund; IDA = International Development Association, which is the part of the World Bank that helps low-income countries; GCF = Green Climate Fund; GEF = Global Environment Facility; ADB = Asian Development Bank; AIIB = Asian Infrastructure Investment Bank; IADB = Inter-American Development Bank; CABEI = Central American Bank for Economic Integration; ASEAN = Association of Southeast Asian Nations; ONCF = Office National des Chemins de Fer (Moroccan National Railways Authority); EAIF = Emerging Africa Infrastructure Fund, a blended multi-donor fund that operates as a specialised development finance institution; UDC = Uganda Development Committee; IDC = Industrial Development Corporation of South Africa; PIDG = Private Infrastructure Development Group; USAID = United States Agency for International Development; FMO = Dutch Entrepreneurial Development Bank; CTF = Clean Technology Fund; CIDF = Climate Innovation and Development Fund, funded by Bloomberg Philanthropies and Goldman Sachs; LAC = Latin America and the Caribbean (project includes Barbados, Chile, Colombia, Costa Rica, the Dominican Republic, Jamaica, Panama, Paraguay, and Uruguay); BRT = bus rapid transit; IWT = inland water transport; e-bus = electric bus; EV = electric vehicle; e-vessel = electric vessel.

Source: The greenhouse gas emissions reduced, jobs created, and other benefits were estimated ex ante and drawn from the following project information documents, appraisals, and funding proposals: ADB 2019a, 2019b, 2022c, 2022d, 2023a, 2023b; AfDB 2015, 2016, 2019, 2020a, 2022a, 2022b, 2022c, 2023, 2024; CABEI 2023; Convergence 2023c; GCF 2022b; GEF 2006; UNDP and GoN 2006; World Bank 2020, 2021. Aggregated by WRI authors.

APPENDIX D. EXPERT CONSULTATIONS

As part of the "Improving Access to Climate Finance for Transport Projects in Low- and Middle-Income Countries (ACF)" project, we facilitated five virtual and in-person multistakeholder convenings, workshops, and roundtables between January and June 2024. These events were designed to foster dialogue among public, private, and development stakeholders and to contribute valuable insights to the case studies and research findings.

International stakeholder consultations

On January 20, 2024, we hosted a virtual meeting with over 30 international stakeholders representing the transport, finance, and climate sectors. Participants included representatives from international organisations, NGOs, and both multilateral and bilateral development banks. The discussion centred around the following guiding questions:

- How do the barriers and constraints we presented resonate with your work? Do you agree or disagree with them? Please give some examples.
- If you had to double the investments in low-carbon transport globally, what kind of solutions would you pursue? For the solutions you mentioned, which ones are most suitable for LMICs?
- What are the roles of different stakeholder groups—such as the providers of international public finance (multilateral development banks, development finance institutions, multilateral climate funds), the domestic public sector, and private investors—in these solutions? And at what stage(s) of the funding cycle?
- What current practices seem to be working or failing? How can this be scaled up across other LMICs?
- What tools or resources do you believe would be most beneficial for policymakers in LMICs to enhance their access to climate funding?

In-country stakeholder consultations (Kenya, Vietnam, India)

Between May and June 2024, we facilitated four multistakeholder workshops with country-specific participants from Kenya, Vietnam, and India. These workshops brought together key stakeholders, including policymakers, public and private financial institutions, development partners, academia, and civil society organisations, to identify and address common challenges in accessing climate finance for transport projects. Participants shared valuable insights from existing initiatives in their respective countries and regions. We developed a common agenda for discussion, as follows:

- Introducing the High-Volume Transport Applied Research Program (HVT)
- Presenting the ACF project and research findings
- Segment 1: Moderated discussions on finance access pain points: What do you see as the most pertinent pain points in climate finance? How would you rank these areas?
- Segment 2: Moderated discussions on pilot projects and scaling: Are there any pilot or existing low-carbon transport projects that have mobilised climate finance? How can we replicate and scale these projects? What role would your sector and organisation play in this process?

Nairobi, Kenya

The workshop took place on May 29, 2024, in Nairobi. We facilitated a productive dialogue among over 25 stakeholders from the following groups:

Government agencies

- UK's Foreign, Commonwealth & Development Office (FCDO)
- Kenya's Ministry of Roads and Transport and its Urban Roads Authority
- Nairobi Metropolitan Area Transport Authority

MDBs, DFIs, and philanthropies

- European Investment Bank
- African Development Bank
- Siemens Foundation

Development partners and NGOs

- High-Volume Transport Applied Research Program
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- United Nations Environment Programme

Associations

- National Public Transport Alliance
- Kenya Bankers Association

Private companies

- Roam Electric
- eWAKA

Hanoi, Vietnam

The workshop, held from June 17–19, 2024, brought together a diverse group of participants, including the following groups:

Government agencies

- Vietnam's Department of Climate Change
- Vietnam's Ministry of Natural Resources and Environment
- UK's FCDO

Government-affiliated research institutions, and development partners

- Transport Development & Strategy Institute, under Vietnam's Ministry of Transport
- GIZ Vietnam

Private companies

- VinFast
- VinBus
- PwC Vietnam

Ho Chi Minh City, Vietnam

The workshop, which took place on June 20, 2024, brought together a diverse group of stakeholders from Ho Chi Minh City's finance and transport sectors to discuss critical issues in financing and scaling green transport projects. Represented groups included the following:

Government agencies:

- Ho Chi Minh City Department of Transport
- City No. 1 Urban Railway One Member Limited Liability Company

Financial institutions and investment firms:

- Ho Chi Minh City Finance and Investment Company
- HD Bank
- Quỹ Dragon Capital

NGOs, academia, and associations

- ASSIST
- Ho Chi Minh City University of Technology
- University of Transport and Communications
- Vietnam Automobile Transport Association

Private companies

- EBOOST
- Dat Bike
- Selex

Media

- HTV (Ho Chi Minh City Television)
- Ho Chi Minh City Law Newspaper
- Young People's Newspaper (Thanh Niên)

India (virtual)

The virtual workshop, held on June 24, 2024, brought together a range of participants:

Research organisations, NGOs, and development partners

- HVT
- GIZ India
- University of California, Davis

Financial institutions

- Tata Cleantech Capital
- YES Bank
- State Bank of India
- Small Industries Development Bank of India

Private companies

- GreenCell Mobility
- Rent Alpha Pvt Ltd

APPENDIX E. MDB JOINT METHODOLOGY

The joint MDB methodology lays out general guidance for activity types that are considered to be consistent with low-GHG development pathways. The list is expected to be revised over time.

Table E-1 | **Transport activities considered to be universally aligned with the Paris Agreement**

ELIGIBLE OPERATION TYPE	CONDITIONS AND GUIDANCE
Electric and nonmotorised urban mobility	
Roads with low traffic volumes providing access to communities that currently do not have all-weather access (e.g., connecting farmers to markets or providing access to a rural school, hospital, or better social benefits)	Unless there is any risk of contributing to deforestation
Electric passenger or freight transport	
Short sea shipping of passengers and freight ships	
Inland waterways passenger and freight transport vessels	
Port infrastructure (maritime and inland waterways)	
Rail infrastructure	
Road upgrading, rehabilitation, reconstruction, and maintenance without capacity expansion	

Source: EIB 2021; Larsen et al. 2018.

ENDNOTES

1. Finance for EVs is estimated to have reached $239 billion in 2021–22, a significant increase from $73 billion in 2019–20 (CPI 2023a). The International Energy Agency reports that global electric car sales are steadily rising and could reach 17 million in 2024, accounting for one in five cars sold (IEA 2024). As the market and vehicle technology mature, electric cars will continue to progress toward mainstream adoption.

2. For example, the World Bank publishes data on the amount of financing in its project database, including the percentage allocated to climate finance for both climate change adaptation and mitigation. It estimates climate finance ex ante using the joint MDB methodology for tracking climate finance in these areas (EIB 2021).

3. Part of the fare revenue is dedicated to maintaining the system. Some critics of the Dar es Salaam BRT have argued that the fares for the BRT are higher than those for the incumbent *dala dala* minibuses which previously plied the corridor and still predominate public transport in the city (Rizzo 2019).

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