Mobilizing Climate Finance for Railways

Matthias Plavec, Martha Lawrence, and Jyoti Bisbey
February 2024
Acknowledgements

This report was written by Matthias Plavec (Junior Professional Officer, ITRGK), Martha Lawrence (Senior Transport Specialist, ITRGK) and Jyoti Bisbey (Consultant), with contributions from Satheesh Kumar Sundararajan (Lead Climate Finance Specialist, SCCFE), John Gregory Graham (Principal Industry Specialist, CNGTR), Daniel Benitez (Senior Transport Economist, ITRGK), Edpo Covalciuk Silva (Transport Specialist, ILCT1), Florencia Leticia Sanchez Zunino (Climate Change Specialist, SCCFE), and Jing Xiong (Senior Transport Specialist, ITRGK).

The team thanks Nicolas Peltier (Director, ITRGK) and Binyam Reja (Practice Manager, ITRGK) for their guidance in preparing the report. Jonathan Davidar oversaw production and publication of this report, which was edited and designed by RRD GO Creative.
# Table of Contents

Acknowledgement .............................................................................................................................................. i
List of Abbreviations ........................................................................................................................................ v
Glossary ................................................................................................................................................................ vi
Executive Summary ................................................................................................................................................ viii

Chapter 1: Introduction ........................................................................................................................................ 1
  What is Climate Finance? .................................................................................................................................... 2
  Climate Finance for Railway Investments ........................................................................................................ 4

Chapter 2: Private Climate Financing Instruments ......................................................................................... 6
  Green Bonds and Loans ........................................................................................................................................ 7
    Georgia Railways Green Bond .......................................................................................................................... 10
    Moroccan Railways Green Bond .................................................................................................................... 10
    Chile Government Green Bond for Rail & Metro ............................................................................................ 11
    Brazilian Private Rail Operator’s Green Bond ................................................................................................. 11
  Sustainability-Linked Finance .......................................................................................................................... 12
    Sustainability-Linked Financing for Rail Supplier ........................................................................................ 13
  Accessing Private Climate Finance .................................................................................................................. 13

Chapter 3: Carbon Finance Markets ................................................................................................................ 16
  Voluntary Markets ............................................................................................................................................. 17
    Kochi Metro Project ......................................................................................................................................... 18
  Compliance Markets .......................................................................................................................................... 19
  Potential for Carbon Markets to Finance Rail Projects .................................................................................. 21
    Challenges ...................................................................................................................................................... 21
    Potential Solutions ........................................................................................................................................ 22

Chapter 4: Climate Funds and Results-Based Climate Finance ...................................................................... 23
  Climate Funds ..................................................................................................................................................... 24
    Costa Rica Light Rail Project .......................................................................................................................... 25
  Results-Based Climate Finance ....................................................................................................................... 25
  Potential for Climate Funds and Results-Based Climate Finance to Finance Rail Projects ......................... 26
    Challenges ...................................................................................................................................................... 26
    Potential Solutions ........................................................................................................................................ 27
Chapter 5: Mobilizing Climate Finance for Railways

- Familiarity
- High Abatement Costs
- Standards
- Creditworthiness
- Next Steps

References

Annex: Multilateral Climate Funds

- Green Climate Fund
- Global Environment Facility

Image Credit
List of Tables

Table 2.1. Main Low-Carbon Land Transport Eligibility Criteria under Climate Bonds Standard ....... 9

List of Figures

Figure E.1. Scaling up Climate Finance for Railways ........................................................................ x
Figure 1.1. Climate Finance Landscape .......................................................................................... 3
Figure 1.2. Sources of Climate Finance for Rail & Public Transport .................................................. 5
Figure 2.1. Green Bonds Issued by Sector, 2014-2022 ..................................................................... 7
Figure 2.2. Private Finance Raised by Railways .................................................................................. 14
Figure 3.1. Issued credits in voluntary carbon markets from 2015-2021 by Sector............................ 18
Figure 3.2. Compliance carbon markets worldwide .......................................................................... 21
Figure 4.1. Amount of Funding Approved by Climate Funds for Transport by Year ......................... 24
Figure 5.1. Primary Challenges for Railways to Access Climate Finance ........................................ 29
Figure 5.2. Scaling Up Climate Finance for Railways ........................................................................ 32

List of Boxes

Box 3.1. The lifecycle of a carbon credit ......................................................................................... 19
Box 3.2. EU ETS: Regulations in the Energy Sector as an example for the Rail Sector .................... 20
Box 4.1. Marginal Abatement Cost ................................................................................................. 26
### List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>CCM</td>
<td>Climate Change Mitigation</td>
</tr>
<tr>
<td>CPI</td>
<td>Climate Policy Initiative</td>
</tr>
<tr>
<td>DB</td>
<td>Deutsche Bahn [German Railways]</td>
</tr>
<tr>
<td>DFI</td>
<td>Development finance institution</td>
</tr>
<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
</tr>
<tr>
<td>EU ETS</td>
<td>European Union Emissions Trading System</td>
</tr>
<tr>
<td>GCF</td>
<td>Green Climate Fund</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse gas</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>MRV</td>
<td>Monitoring, Reporting and Verification</td>
</tr>
<tr>
<td>LMIC</td>
<td>Low- and Middle-Income Countries</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>RBCF</td>
<td>Results-based Climate Finance</td>
</tr>
<tr>
<td>RZD</td>
<td>Russian Railways</td>
</tr>
<tr>
<td>SLB</td>
<td>Sustainability-Linked Bonds</td>
</tr>
<tr>
<td>SLF</td>
<td>Sustainability-Linked Finance</td>
</tr>
<tr>
<td>SLL</td>
<td>Sustainability-Linked Loans</td>
</tr>
<tr>
<td>SOE</td>
<td>State Owned Enterprise</td>
</tr>
<tr>
<td>TCAF</td>
<td>Transformative Carbon Asset Facility</td>
</tr>
</tbody>
</table>
Glossary

**Activity-based finance** includes all finance that is provided up front to enable specific activities or investments before they reach operational stage, that mitigate GHG emissions or support climate adaptation and resilience.

**Carbon markets** are “trading schemes that create financial incentives for activities that reduce or remove greenhouse gas emissions. In these schemes, emissions are quantified into carbon credits that can be bought and sold” (UNDP 2023).

**Climate Finance** refers to domestic or international financing provided by any public or private entity for activities that, in whole or in part, mitigate GHG emissions or support adaptation and resilience to climate change. Climate finance can employ different financial instruments and can be used for different activities, including climate mitigation, adaptation, and resilience (World Bank Group 2022) (UNDP 2023).

**Dedicated Climate Finance** refers to multilateral and bilateral climate funds, and philanthropic funds, which provide concessional financing specifically to promote investment in climate change mitigation and adaptation measures. These funds offer grants and concessionally priced finance.

**Climate Change Adaptation** refers to “actions that help reduce vulnerability to the current or expected impacts of climate change” (e.g., floodings, sea-level rise, droughts, heatwaves) (UNDP 2023).

**Climate Change Mitigation** refers to any action taken “to reduce or prevent GHG emissions or to enhance carbon sinks, that remove GHG from the atmosphere” (UNDP 2023).

**Climate Resilience** is “the capacity of a community or environment to anticipate and manage climate impacts, minimize their damage, and recover and transform as needed after the initial shock” (UNDP 2023).

**Financing** is the provision of funds to pay for activities or investments with timing different (typically in advance of) than the underlying funding.

**Funding** refers to the sources of money available over time that can be used to pay for a project or service, and/or to repay financing. For railway projects, major sources of funding are often government revenue (general taxes, earmarked taxes, intra-governmental transfers, or non-repayable grants), user revenue (whether freight or passenger services), commercial revenues, and real estate development revenue.

**Green Finance** includes all financial investments “flowing into sustainable development projects and initiatives, environmental products, and policies that encourage the development of a more sustainable economy. Green finance includes climate finance but is not limited to it” (GEF 2017).
Greenhouse gas (GHG) emissions are gases in Earth’s atmosphere that contribute primarily to human-caused global warming by absorbing and trapping heat radiation from the sun, thereby raising the temperature of the Earth’s surface and lower atmosphere (UNDP 2023).

Outcome-based finance is money provided for achieving verified GHG emission reductions. Results-based climate finance and carbon market are subsets of outcome-based finance.

Project finance refers to “the financing of projects that are dependent on project cash flows for repayment, as defined by the contractual relationships within each project. By their very nature, these types of projects rely on a large number of integrated contractual arrangements for successful completion and operation” (EXIM n.d.).

Results-based climate finance (RBCF) is finance, usually grant money provided against verified GHG emission savings. RBCF is paid when results are achieved, and occasionally upon meeting interim milestones (World Bank 2022).

Sustainability-linked finance encompasses various financial instruments in which issuers pledge to achieve specific sustainability objectives, with target achievement directly affecting the interest rates of the instrument (Orden and Calonje 2022).
Executive Summary

Railways are a low carbon way to access opportunities and move goods to markets. To realize the benefits of railways in low-and middle-income countries (LMICs), an estimated USD 25-80 billion of investment annually will be needed. Many organizations and investors want to support green activities and a variety of climate finance sources and instruments have been developed to do just that. However, railways have had limited success in accessing climate specific financing instruments.

This report examines the experience in attracting financing from climate-specific financing instruments of railways in LMICs. The review encompasses private sector climate finance, whose resources could potentially meet the entire rail financing gap, as well as carbon markets, and other results-based climate finance and climate funds.

Climate finance presents several opportunities for railways, with successful examples demonstrating the considerable potential:

- **Green Bonds & Loans**: Several governments, railways, and PPP projects have successfully issued green bonds to finance various investments that support GHG reductions. Accessing climate finance through this avenue can provide additional opportunities for creditworthy railways and bankable railway projects.

- **Sustainability-Linked Financing Instruments**: Use of these instruments grew significantly in recent years, and they can be accessed by governments, railways, PPP project and other rail-related businesses, including logistics providers and manufacturing companies.

- **Carbon Markets**: So far, carbon markets have only been accessed for smaller urban rail projects, which earn carbon credits for emissions reductions. But the potential could be expanded rapidly with the introduction of additional regulations and standards for rail. The significant advantage of carbon markets lies in their ability to offer an additional source of funding for rail projects.

- **Climate Funds and Results-based Finance**: Although these instruments have provided limited financing opportunities for railway investments thus far, examples of successful financing secured through these instruments exist, particularly in the urban passenger sector. In the future, these instruments may complement other financing options or potentially enhance financing opportunities, such as incentivizing the adoption of electrified rolling stock or providing risk guarantees for commercial financing.

To unlock the potential of climate finance instruments, the following challenges must be addressed:

- **Familiarity**: Climate-specific financing sources are fragmented, each with its own processes and standards for qualification. Rail is an unfamiliar industry to many funds and financial institutions. To address this familiarity challenge, potential solutions include rail and climate finance experts working together to identify suitable matches between financing sources/instruments and rail investments and helping to qualify a first set of rail projects.
• **GHG savings.** Railway investments are capital intensive and therefore often have higher abatement costs (cost per tCO2eq of GHG saved) than projects in other sectors, with GHG savings typically spread over a long project life. This is particularly an issue for activity-based climate funds, which traditionally prioritize cost efficiency in project selection. Addressing this challenge could involve prioritizing rail investments with higher GHG savings per dollar and aggregating rail activities to achieve higher total GHG savings.

• **Standards.** Every climate-specific financing instrument has different standards and methodologies for verifying that the investment is climate-friendly, agreed KPIs are met, or GHG savings are achieved. To enhance rail access to these instruments, uniform standards across instruments are needed, along with the development of specific standards for rail for carbon markets and other results-based climate finance mechanisms.

• **Creditworthiness.** Climate finance from commercial and capital markets requires high level of creditworthiness of the borrower, which necessitates visibility on finance repayment and reasonable levels of risk. Increasing efforts to assist railways in LMICs in achieving creditworthiness, particularly SOEs and public entities, will be crucial for expanding the availability of climate finance.

The World Bank and other development institutions can play an instrumental role in addressing these challenges (Figure E.1):

• **Mainstreaming Climate Finance in Railways.** Staff of development institutions may develop sector knowledge in both railways and climate finance instruments to bridge the information gap between railways and climate financiers. They can help railways structure their projects to tap into climate finance and support them in presenting the projects to climate financiers. This could include bundling projects to meet GHG savings requirements and explaining to activity-based climate funds how supporting railways helps to address hard-to-abate sectors like transport.

• **Developing Standards.** Development institutions can contribute to the development of monitoring, reporting and verification standards for railway investments, enhancing their eligibility for results-based climate finance instruments such as carbon markets.

• **Supporting Creditworthiness.** Development institutions can provide technical support to government and railways on their sector reforms to achieve creditworthiness. They can also provide various types of guarantees to de-risk climate financing, helping governments and railways to access climate finance markets and establish a favorable track record for future financing.

By strategically considering climate-specific financing opportunities and the broader investment requirements of railways, development institutions can assist in leveraging financing from climate-specific instruments, as well as traditional sources such as public sector and development finance. This approach aims to unlock untapped potential for climate finance within the railway sector.
### Figure E.1. Scaling Up Climate Finance for Railways

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Activity-based financing$^1$</th>
<th>Results-based financing$^2$</th>
</tr>
</thead>
</table>
| Mainstreaming | • Identify rail investments suited to climate funds of private sector climate finance  
• Support governments & railways to qualify first set of projects  
• Provide grants to cover costs of applications/certification  
• Advocate for modifying GHG savings per $ screening criteria | • Identify rail activities whose GHG savings can be certified for carbon markets or results-based climate finance  
• Support railways & government to qualify first set of rail projects  
• Aggregate rail activities to meet screening criteria for based climate finance  
• Advocate for modifying screening criteria for results-based climate finance  
• Provide grants to cover costs of application/certification |
| Standards | • Seek opportunities to standardize certification processes | • Develop modeling to validate GHG savings from modal shift  
• Encourage financiers to adopt rail modeling  
• Develop MRV standards for rail  
• Encourage standard agencies to adopt MRV standards for rail  
• Encourage regulators to cover all modes of surface transportation including rail |
| Creditworthiness$^3$ | • Support structural & governance reforms  
• Provide risk mitigation guarantees | |

**Notes:**

1. Includes climate funds, green loans & bonds, and sustainability-linked financing.
2. Includes carbon markets and results-based financing.
3. This is not an issue for climate funds, as creditworthiness is not a requirement to access financing.

**Most critical measures shown in yellow.**

Chapter 1:
Introduction
Introduction

Railways play an important role in reducing greenhouse gas (GHG) emissions from transport, while supporting economic development and increased mobility. Rail provides low-cost transport with small physical footprint in corridors with high volume transport demand. And rail is a green mode. Thus, in appropriate markets rail can deliver the efficient mobility and logistics countries need with a low carbon footprint. Rail investments can contribute to mitigating GHG emission from transport in several ways:

- Rail is more energy efficient than road or air modes. When rail investments cause traffic to shift from road to rail—or prevent a shift away from rail—then 70–80 percent of GHG are typically saved (Lawrence 2022).

- In urban areas, in addition to shifting traffic to urban rail, rail transport makes rail stations attractive hubs for transit-oriented development. TOD’s denser, mixed-use development encourages walking, bicycle, and transit use, which reduces GHG emissions.

- A variety of rail technologies, alternative fuels, and operational improvements can be adopted, which will further improve rail’s already low GHG emissions.

The rail industry is vulnerable to climate-related weather events and must address the issue of infrastructure adaptation and resiliency. Adverse conditions — such as excessive heat, flooding, sea-level rise, tornadoes, hurricanes, and wildfires — are exacerbated by climate change and threaten the safety and reliability of rail networks. Investments are needed to strengthen the resilience of rail assets and improve warning and response systems.

Rail is a capital-intensive industry with substantial investment gap. An estimated USD 300 billion in additional annual investments is required merely to keep pace with expected economic growth. This infrastructure financing gap further widens when considering the necessary investments to achieve all the United Nations Sustainable Development Goals (SDGs) and to make rail infrastructure climate resilient (McKinsey Global Institute 2016). A recent white paper estimates that railways in developing countries will need investments of USD 25 – 80 billion per year (University of Birmingham, Roland Berger, Alstom, UIC 2023).

What is Climate Finance?

Climate finance can be defined in a variety of ways. The World Bank’s definition, used in this report, is:

Climate finance is financing provided by any public or private entities for activities that, in whole or in part, mitigate carbon emissions or support adaptation and resilience to climate change. (World Bank Group 2022)

---

1 Recent and current World Bank rail projects include the Indian Eastern Dedicated Freight Corridor (estimated total savings of 1.02 MtCO2e), the Quito Metro Line One Project (estimated total savings of 2.5 MtCO2e), and the Project on Railway Improvement and Safety in Egypt (estimated total savings of 651,000 tCO2e).
2 A recent study confirmed that “[l]ess sprawling development is associated with lower CO2 and PM2.5 emissions from the residential and transportation after sectors: [...]sectors (Munkin 2023).
Thus, climate finance is defined by its *purpose*, not its source or its instrument. Because using railways instead of road or air saves GHG emissions, financing of most railway investments would be considered climate finance, even if the investment is undertaken for development or other productive purposes rather than primarily for climate benefits.

Climate finance can be divided into two types (Figure 1.1). Activity-based climate finance is provided up front to enable activities that mitigate GHG emissions and/or support climate adaptation and resilience. Outcome-based climate finance is provided for achieving actual and verified GHG emission reductions.

**Figure 1.1. Climate Finance Landscape**

Sources of activity-based climate finance include:

- **Dedicated Climate Finance**: Multilateral, bilateral, and philanthropic organizations have been established to expand availability of climate finance.

- **Development Finance**: Multilateral organizations like the World Bank and regional development banks lend and help secure financing on concessional terms\(^3\) to support climate-related projects in developing countries. Some countries also provide financing—often on concessional terms—directly to other countries through bilateral development financing institutions and export credits.

- **Private Sector**: This includes financing on commercial terms through commercial banks, capital markets (domestic and international), infrastructure funds and private equity, impact investments, including through institutional investors, private entities, and corporations.

- **Public Sector**: This includes funding and financing provided by sovereign and sub-sovereign public budgets, state-owned enterprises (SOEs), state-owned financial institutions and national development institutions.

This finance may be provided in the form of grants, loans, guarantees, and investments in bonds, equity, or other instruments.

Some of these same organizations also provide outcome-based financing:

- **Results-based climate finance** provides payments (typically in the form of grants) against verified GHG emission savings.

- **Carbon markets** are intended to accelerate the reduction or removal of greenhouse gas (GHG) emissions from the atmosphere by delivering outcomes-based finance to carbon abatement projects. They provide funds, through voluntary carbon markets or compliance markets, in return for permanent removal of GHG emissions from specified activities such as energy generation or transport.

### Climate Finance for Railway Investments

While no organization tracks all climate finance, the Climate Policy Initiative (CPI) tracks climate finance by financing source for several sectors including transport (Climate Policy Initiative 2023). Worldwide, it followed USD 1.7 trillion in climate finance flows across all sectors for 2021-2022. Over 99 percent was used for climate mitigation measures and most financed activities happened in OECD countries.\(^4\) About 40 percent (USD 672 billion) was invested in the transport sector, and nine percent (USD 156 billion) in the rail and public transit subsector (Climate Policy Initiative 2023).

---

\(^3\) Concessional finance is financing provided on generous terms. It includes grants and loans with below market interest rates, grace periods (time at the beginning of the loan when the borrower is not required to make loan repayment) and long repayment periods.

\(^4\) The limited financing for developing countries seems partly to result from the inherent investment risks associated with emerging economies. These risks include macroeconomic stability, currency volatility, fiscal space, political instability, and others. Overcoming these challenges requires careful risk assessment and strategic planning by investors and stakeholders.
In rail and public transit, CPI tracks financing spend on: (i) modal shift policy; (ii) energy efficiency retrofits of vehicles; and (iii) investments in non-fossil fuel bus and rail fleets and related (e.g., charging) infrastructure. For these investments, CPI data show that national development finance institutions (DFIs) are the primary source of climate finance, with multilateral DFIs and bilateral DFIs playing a smaller, but significant, role (Figure 1.2.). Governments, multilateral climate funds and export credit agencies play a negligible role.

Figure 1.2. Sources of Climate Finance for Rail & Public Transport

![Source: World Bank analysis based on (Climate Policy Initiative 2023).](image)

The picture is likely different when focusing on railways in developing countries and when considering investments in railway infrastructure as well as rolling stock. In most developing countries, the railway is a government agency or state-owned enterprise (SOE), whose equity belongs to government. In such cases, government and/or its SOEs often pays for nearly all investments, either directly through the budget or through facilitating loans. Thus, government would be a larger share. For example, the government of India makes substantial provision in the national budget for Indian Railways investments each year and sometimes also borrows from multilateral and bilateral DFIs and export credit agencies for railway investments, facilitating financing from these other sources.

Railways have had limited success in attracting financing from climate funds, carbon markets or private climate finance instruments. This report examines these sources and instruments to understand what constraints prevent railways from accessing them and how these constraints could be addressed. Chapter 2 covers private climate finance, Chapter 3 discusses carbon markets, and Chapter 4 examines climate funds and results-based climate finance. Chapter 5 contains recommendations for expanding the role of climate finance in the railway sector.
Chapter 2:
Private Climate Financing Instruments
Investor’s desire to ensure that their funds are used for sustainable purposes has given rise to a broad range of private sector financing instruments linked to sustainability. These include green loans and bonds, whose proceeds can only be used for agreed green purposes (e.g., purchase of electric locomotives), and sustainability linked bonds and loans that can be used for any purpose if key performance indicators (KPIs) related to sustainability are met. Just like any commercial finance, these instruments offer commercial terms and borrowers must be creditworthy to use them. Sustainable finance has been growing rapidly with the volume of both green bonds/loans and sustainability linked bonds/loans more than doubling over the five years from 2017 to 2021. The amount of sustainable finance is much larger than concessional finance and is particularly well-suited to meet the investment needs of railways.

**Green Bonds and Loans**

Green bonds and loans are commercial bonds/loans that finance green investments and are labelled accordingly. To access this financing, the investment financed must be certified as sufficiently “green” by a qualified third-party and the bond issuer/borrower must be creditworthy, similar to any other private sector loan or bond. In 2022, green bond issuances alone reached USD 487 billion. The use of green bonds in the transport sector has been trending up in recent years (Figure 2.1.). While evidence regarding the costs of green financing vis-à-vis more customary commercial sources is inconclusive, these debt instruments clearly tap into a growing pool of investors interested in achieving a better climate result by their underlying portfolios.

**Figure 2.1. Green Bonds Issued by Sector, 2014-2022**

![Graph showing green bonds issued by sector from 2014 to 2022](image)

Source: Climate Bonds Initiative, accessed August 16, 23.

---

5 Green investments extend beyond climate finance (for adaptation, mitigation or resilience measures) and can be include investment in various other environmental goals, like pollution control or biodiversity protection.
Many railway investments could potentially qualify for green bonds and loans. Green bonds can finance both climate mitigation and climate resilient investments and can be used for refinancing projects and assets post-implementation. Green bonds can be issued by railway companies, governments, or financial institutions to raise funds for railway infrastructure projects or operations.

Standards agencies issue eligibility criteria and certify results for green bonds and loans. For example, Climate Bonds Initiative’s Climate Bonds Standard and Certification Scheme (CBI n.d.) is a labeling scheme for bonds and loans. It is designed as an easy-to-use tool for investors and governments and is a public good resource for the market. Rigorous scientific criteria ensure that bonds and loans with its certification, are consistent with the 1.5°C warming limit in the Paris Agreement. The scheme is used globally by bond issuers, governments, investors, and the financial markets to prioritize investments which genuinely contribute to addressing climate change. Under the low-carbon transport eligibility criteria, many railway investments could qualify.6

Climate Bonds Initiative’s eligibility under low-carbon transport criteria can be summarized into two groups, investment that are automatically eligible and investment that are eligible if they comply with certain criteria (Table 2.1.). For more detail and updates, see the website, as this is a dynamic topic and new criteria and amendments are added periodically.

Image 2.1. New hydrogen-powered regional train, presented at InnoTrans trade fair

Source: Frank Paukstat.

6 Investments for freight railways that carry substantial quantities of fossil fuel would not qualify.
Table 2.1. Main Low-Carbon Land Transport Eligibility Criteria under Climate Bonds Standard

<table>
<thead>
<tr>
<th>Automatically eligible upon submission and verification</th>
<th>Eligible once in compliance with the thresholds(^7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Most fully electric, hydrogen, or other zero-direct emissions transport, including private vehicles, passenger trains, urban subway/metro, trams, and their directly supporting infrastructure</td>
<td>• Zero direct-emissions (such as electric or hydrogen) freight rail, for which &lt;25% of its freight is fossil fuels</td>
</tr>
<tr>
<td>• Electric charging and hydrogen fueling infrastructure</td>
<td>• Hybrid private vehicles (not including lorries or trucks)</td>
</tr>
<tr>
<td>• Public walking and bicycle infrastructure</td>
<td>• Fossil fueled public transport - buses, trains</td>
</tr>
<tr>
<td>• Some types of manufacturing facilities for components of the above</td>
<td>• Technology and infrastructure that allows for car sharing schemes, road charging systems, better utilization of public transport, and other such systems</td>
</tr>
<tr>
<td>• Construction and development, purchase, and/or operation of dedicated infrastructure for eligible rolling stock, railway lines and networks, for example:</td>
<td>• Infrastructure is automatically eligible if 100% dedicated to eligible lines</td>
</tr>
<tr>
<td>• Train and bus stations</td>
<td></td>
</tr>
<tr>
<td>• Inspection depots for freight rail rolling stock</td>
<td></td>
</tr>
<tr>
<td>• Traction maintenance depots/Motive power depots for rolling stock</td>
<td></td>
</tr>
<tr>
<td>• Backup electricity generators</td>
<td></td>
</tr>
<tr>
<td>• Signaling infrastructure including buildings</td>
<td></td>
</tr>
<tr>
<td>• Relevant research and development, training and program implementation costs and expenditures, where there is a definable future asset, product and/or process that can be linked to climate benefits under the Transport Criteria</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s adaptation based on The Land Transport Sector Eligibility Criteria of the Climate Bonds Standard & Certification Scheme, April 2023.

Accessing private capital markets, including green bonds and loans, requires the railway (or ring-fenced project) to be creditworthy. This means that an examination of the railway’s (or project’s) revenues, costs, and risks would demonstrate that the railway (project) will be able to repay the financing with interest. Many railways, including in China, Russia, India, North America, and Europe are creditworthy and have been able to raise private financing and many are accessing green bonds.

\(^7\) See CBI (climatebonds.net) website for CO\(_2\) thresholds that the assets must meet.
Railways that provide loss-making public services, such as urban passenger services, have the potential to access private financing. While many such railways, especially passenger railways, do not generate enough revenue from sales to cover their operating and capital costs, governments can enable their railways to be creditworthy through provision of predictable support and collateral for loss-making public services and exercising effective governance of their railway SOEs. Many DFIs, including World Bank, have credit enhancement instruments to help railway SOEs become creditworthy.

Railways in developing countries have benefitted from green bond financing. Georgia Railways and Moroccan Railways were able to establish themselves as creditworthy borrowers with green investments. In Chile, the government issued green bonds and used part of the proceeds to finance railway and metro investments. And in Brazil, the structuring of metro concessions enabled the private sector metro operator to issue green bonds.

**Georgia Railways Green Bond**

Georgian Railway (GR), based in Tbilisi, is the country’s only railway operator. It provides freight and passenger railway transportation services, terminal services, and railway infrastructure development. GR connects to Georgian ports on the Black Sea as well as rail systems of Armenia, Azerbaijan, and Turkey.

GR took several steps towards the planning of green bond. First, Georgia’s rail system has been fully electrified since the 1990s, so fossil fuels are only used directly for some auxiliary assets. Second, the company has established policies and procedures for to address environmental risks as well as workforce benefits and operational safety. Third, the issuer has developed a green bond framework to help finance projects that contribute to its sustainability goals. The objectives of GR’s green bond framework correspond to its sustainability commitments of minimizing and mitigating the environmental effects caused by its activities, as well as improving the overall environmental performance of the country’s transportation sector. Fourth, accessed EBRD and ADB as institutional investors to jumpstart the marketability of the green bond.

In June 2021, Georgian Railway successfully issued a 7-year, USD 500 million green bond with a coupon of 4%, the first green bond issued by a Georgian state-owned company. The Asian Development Bank (ADB) and European Bank for Reconstruction and Development (EBRD) invested a combined USD 70 million in this bond. Projects financed under the bond framework will support the electrification, modernization, and extension of the country’s railway infrastructure (ADB 2021) (EBRD 2021).

**Moroccan Railways Green Bond**

In Morocco, the Office National des Chemins de Fer du Maroc (ONCF) is the state-owned passenger and freight rail operator. It was the first company in Africa to issue a corporate green bond for sustainable mobility projects. To prepare for issuing the bond, the World Bank supported the Government of Morocco and the railway to structure compensation for public services and

---

8 Guidance on the reforms to support creditworthy railways can be found at World Bank, *Railway Reform: Toolkit for Improving Rail Sector Performance* (2017).
restructure ONCF’s balance sheet, shedding certain debt. The technical assistance offered played a crucial role in readying ONCF to be creditworthy.9

The inaugural bond was issued in 2022 and valued at approximately USD 95 million. For this project, funding of green certification costs by the EBRD instead of the Moroccan partners was pivotal for the successful issuance. Otherwise, the financing likely would have taken place through a conventional financial product rather than a green bond. (EBRD 2022).

**Chile Government Green Bond for Rail & Metro**

Chile also uses green bonds to finance railway and metro projects. In this case, the Chilean Ministry of Finance issues the bond rather than the railway SOE or other entities. The proceeds from these bonds are subsequently allocated to projects outlined in the annually updated Green Bond Project Portfolio. Railways have substantially benefitted from this financing. In 2019, Clean Transportation Projects accounted for 92.2% of the total Green Bond Project Portfolio, including several new Metro Lines and Extensions, as well as the refurbishment of trains of the Chilean state-owned railway EFE (Ministry of Finance Chile 2020).

In 2020, Chile became the largest issuer of sovereign green bonds in Latin America and the third largest issuer among emerging markets. The bonds were issued at remarkably low yields, featuring negative issue premiums, consequently enhancing the country’s borrowing costs compared to conventional bonds (Pérez 2023). This approach allows Chile to leveraging the sovereign’s credit rating to access green financing, and SOEs do not need to be creditworthy. Instead, they secure the financing only through the government’s public budget. This presents a significant advantage and therefore this strategy may be especially interesting to other countries or regions where SOEs face considerable challenges in attaining creditworthiness. However, the approach carries a potential drawback in that it may heighten dependence on government funding for new projects, potentially diminishing future chances for accessing private finance.

**Brazilian Private Rail Operator’s Green Bond**

Public-Private-Partnerships (PPP) are another way to streamline access to green financing, especially for urban rail projects. When a PPP structure is chosen for operating an urban rail line, a contractual agreement governing the provision of subsidies and public budget support. This makes the budget allocated to the urban rail project more predictable and often reflected in the government’s medium to long-term financial planning and laws. This dynamic alters the nature of creditworthiness compared to State Owned Enterprises (SOEs), which are typically subjected to public budget contingencies, thus preventing easy access to green financing instruments.

For example, the suburban train lines 8 and 9 in São Paulo, Brašil were recently transferred to the private sector through a PPP-transaction structured by the International Finance Corporation (IFC). This allowed the private operator to issue green bonds, marking a significant milestone in Brašil’s transport landscape. This achievement would have been unattainable within the public domain,

---

9 The World Bank is actively extending comparable technical support for the restructuring of balance sheets of other State-Owned Enterprises (SOEs) and enhancing access to commercial finance, with the aim of effectively increasing the scale of sustainable finance.
underscoring how PPPs can serve as means to facilitate access to green financing (Reuters 2020) (bnamericas 2021).

IFC is also actively involved in structuring a PPP for the Brazilian East-West Rail Corridor (FICO-FIOL). In that case the federal government has already “pre-qualified” this project for a green bond issuance, securing a pre-certification from the Climate Bonds Initiative (CBI). This underscores the essentiality of incorporating climate financing prerequisites into the project’s design from the outset.

**Sustainability-Linked Finance**

Sustainability-linked finance (SLF) can be any financial products in which issuers pledge to achieve specific sustainability objectives, with target achievement directly affecting the interest rates of the product. Corporate sustainability-linked loans (SLLs) and bonds (SLBs) are currently the most prevalent examples. Sustainability-linked finance offers a more dynamic approach than traditional use-of-proceeds instruments like green loans and bonds. Unlike these, SLLs and SLBs generally do not impose constraints on the use of proceeds. Instead, SLFs allows funds to be allocated for general corporate purposes, granting borrowers discretion in capital allocation.

The commitments by the issuer to achieve sustainability objectives and targets are measured through Key Performance Indicators (KPIs). These targets should align with a company’s sustainability objectives and be accompanied by credible action plans and budgets. The interest rate of SLF instruments includes an adjustable incentive mechanism, based on whether the issuer successfully meets the KPIs. This creates a financial incentive for companies to actively work towards their sustainability objectives, providing both financial and environmental benefits. The incentive structure can vary, with interest rates increasing if the targets are missed (step-up) or decreasing if the targets are met (step-down).

A wide range of businesses, from logistics and transportation providers to industrial and manufacturing companies, can leverage SLF to support various aspects of their operations while simultaneously pursuing sustainability goals. While sustainability targets can extend beyond climate benefits and focus on other sustainability domains (e.g., gender equality), targets for reducing carbon emissions consistently rank as the most popular option.

SLF was introduced in 2017 and has rapidly gained traction as the fastest-growing sustainable finance instrument, with the offered flexibility being the driving force behind its growth. Since its inception, over $809 billion of sustainability-linked financing has been issued. Emerging markets, although initially accounting for only 5 percent of total sustainability-linked financing issuances, have seen significant growth. In 2021, sustainability-linked financing in emerging markets experienced a remarkable 327 percent increase compared to 2020 volumes. However, market activity in Africa and Latin America remains relatively limited so far. While no specific data for the railway sector are available, infrastructure companies, including those in transport and other sectors like Energy and Water, account for 39 percent of all issuances (Orden and Calonje 2022).

Investors have shown a particular interest in “super-green” structures, where companies commit to both use-of-proceeds requirements as well as sustainability targets. These “super greens” provide
investors with reassurance about a company’s dedication to their sustainability targets, and such instruments align with investors’ portfolio green allocation commitments. Railway projects would appear well-positioned to take advantage of these instruments, as the allocation of funds for green investments is relatively straightforward to verify and the companies can then shoot for ambitious KPI targets over time as part of the dual qualification.

The flexibility of SLF makes it available to a broad range of companies. For instance, a logistics company might issue a sustainability-linked bond, committing to shift a larger portion of its cargo transportation to rail, or electrify its operations – with both commitments being assessed through KPIs. These financial instruments also open doors for companies engaged in manufacturing rail technology and equipment to secure funding for expanding their production capabilities, as exemplified by the issuance of a SLB by Knorr-Bremse AG, described below.

**Sustainability-Linked Financing for Rail Supplier**

In 2022, Knorr-Bremse AG, a global leader in rail braking and other, issued its first sustainability-linked bond. This bond carries a total value of EUR 700 million and offers an annual coupon rate of 3.25 percent. (Knorr-Bremse 2022) The bond’s interest rate is linked to the achievement of a specific sustainability target by Knorr-Bremse, defined within a framework for sustainability-linked financing known as the Sustainability-Linked Bond Framework. The sustainability objective is to achieve a Scope 3 emissions reduction target, focusing on the company’s value chain. The ESG agency, ISS Corporate Solutions (ISS), evaluated the framework and confirmed that it aligns with Knorr-Bremse’s ambitions and priorities, and adheres to market standards. In case the sustainability target is not met, the bond’s interest rate will increase by 20 basis points per annum until the bond reaches its maturity. The funds raised through this bond issuance are intended for general corporate purposes and do not need to be specifically allocated for emission reduction expenses, capitalizing on one of the primary advantages of SLF instruments.

The market for SLF is growing rapidly and numerous railway investments would be potentially eligible under the framework. The greater flexibility of SLF is particularly appealing to rail manufacturing companies, who might face challenges in access to green bonds.

**Accessing Private Climate Finance**

Private finance is the only source of climate-specific finance large enough to satisfy the investment financing needs of railways in LMICs. Accessing private climate finance requires the borrowing entity to be creditworthy—to have debt capacity and ability to repay debt service. The borrower must demonstrate sufficient funding over time to pay debt service on commercial borrowing, while also covering necessary operating and maintenance costs. Predictability of funding and cash flow sources are critical for credit risk assessment for lenders and capital markets. Consequently, investors look at risks that could impair borrower’s repayment ability including market risk, sector governance risk, cash flow risk and overleveraged balance sheet. Investors also examine the borrower’s internal governance systems, including financial controls and management of environmental and social issues.

---

10 Debt service is interest and principal repayment for loans, interest, and bond redemption for bonds.
Many railways from developed and upper middle-income countries, including the World’s largest railways by traffic are currently able to access private finance. The North American railways raise all their capital (both debt and equity) from commercial sources including the private capital markets. Together, they have raised over USD 240 billion in capital. Russian Railway (RZD), China Railway\textsuperscript{11} and European railways such as Deutsche Bahn (DB) are state owned enterprises (SOEs) with government equity but tap commercial capital markets for debt (Figure 2.2.). Indian Railway’s subsidiary Indian Rail Finance Corporation has raised over USD 60 billion in commercial financing since its inception in 1986 (IRFC n.d.).

\textbf{Figure 2.2. Private Finance Raised by Railways}

Source: Compiled from publicly available financial statements. Data are from 2020 for RZD and 2022 for all other railways.

The North American railways are profitable freight railways and RZD has a large profitable freight operation. The others are mixed passenger and freight railways with strong revenue generation, and transparent and audited finances. All the SOE railways benefit from strong national government backing.

Many developing country railways are not yet creditworthy. Most are either government agencies (so cannot borrow on their own) or SOEs with mandates to provide loss-making passenger services. Often funding is inadequate, and even when it is sufficient, it is not provided in a structured, predictable way that gives lenders confidence to lend. For these railways to access the required level of financing, their funding certainty, affordability, and high creditworthiness risks need to be addressed. Key measures include (World Bank 2017):

\textsuperscript{11} China Railway is not shown on the graph because its capital—USD 675 billion commercial loans and bonds, USD 459 billion equity—is an order of magnitude greater than the other railways.
• Reforms to improve governance and transparency of the SOE and incentives to strengthen sector governance and enhance the SOEs market orientation, efficiency, financial sustainability, and corporate governance. This both reduces risk to lenders and potentially increases funding.

• Leveraging those reforms to increase profitable traffic (usually freight) to increase funding.

• Provide greater predictability and adequacy of government funding through contractual arrangement between government and railway for provision of loss-making services. When this cannot be done at the scale of the entire railway, sometimes, a specific service can be ring-fenced in a PPP and the government’s share of the funding can be specified in the PPP contract.

• Leverage land value through transit-oriented development of railway land around urban stations and logistics facility development around freight stations in industrial areas. While these activities can be complex and take considerable time to develop, they can both bring more traffic to the railway and generate real estate revenue to increase funding.

• Pursue outcome-based financing including carbon markets that monetizes that GHG savings created by railways.

• Employ risk mitigation instruments such as guarantees by MDBs that facilitate SOEs’ access to private sector financing.
Chapter 3:
Carbon Finance Markets
Carbon finance markets enable trading of carbon credits, which represent reductions and/or removals of greenhouse gas emissions. These markets exist to help countries and companies meet their emission reduction targets. Carbon markets have several benefits. They provide a financial incentive for companies and countries to reduce their greenhouse gas emissions. They also promote the transfer of cleaner technologies to developing countries, helping them achieve sustainable development. Furthermore, carbon markets can contribute to global efficiency gains by allowing emission reductions to occur where they are most cost-effective. Both compliance and voluntary carbon markets play a role in addressing climate change. The goal of these markets is to create financial incentive for reducing emissions by allowing those who reduce GHG emissions to receive financial benefits for the reduction (UNDP 2022). In both cases, a third-party verification agency makes sure that the GHG emissions have been saved and are not claimed more than once.

**Voluntary Markets**

Voluntary carbon markets allow individuals, organizations, and companies to purchase carbon credits to voluntarily offset their greenhouse gas emissions. Historically the demand has been driven from nonstate actors, such as corporations, institutions, and individuals that wish to offset their GHG emissions or contribute to the reduction of GHGs within their jurisdictions. Unlike the compliance market, activity in voluntary markets is not currently regulated by a state or supervisory body. Companies often purchase carbon credits to achieve carbon neutrality or to meet sustainability commitments. Individuals may buy offsets to “neutralize” their personal carbon footprint, such as emissions from travel or energy consumption.

The voluntary carbon market had a total annual value in the order of just under USD 2 billion in 2022 (Ecosystem Marketplace 2023). Most credits issues in the voluntary market are for renewable energy, forestry and land use, and waste disposal projects (Figure 3.1.). Transport related credits accounted for less than 1 percent of the total credits issued between 2015 and 2021 (World Bank 2023).

**Image 3.1. Freight train operated by Moroccan railways ONCF**

Source: Christof Hofbauer.
Voluntary markets require certification by recognized crediting standards and methodologies for measuring, reporting, and verifying emissions reductions (Box 3.1). Examples of such standards include Verra’s Verified Carbon Standard, the Gold Standard’s SustainCert, the American Carbon Registry, the Climate Action Reserve, Plan Vivo, the Global Carbon Council and Climate Forward. The price of carbon credits in voluntary markets can vary widely depending on supply and demand, project type, and the market’s specific characteristics. It is often influenced by market dynamics and the perceived value of the projects being funded.

**Kochi Metro Project**

An example of a rail investment seeking carbon finance is the Kochi Metro project in India. The operator of the metro (KMRL) is currently trying to qualify the metro for carbon credits by certifying its saved GHG emissions, resulting from the shift in traffic from road to public transport. KMRL has partnered for the project with EKI Energy Services, who will be responsible for the validation, registration, verification, issuance, and trading of carbon credits. If successful, the carbon credits would generate extra income for KMRL, which could be used for funding its other projects (CarbonCredits.com 2023).

Credits traded at higher prices include nature-based solutions, credits with co-benefits, Sustainable Development Goals, and newer vintages.
Box 3.1. The lifecycle of a carbon credit

A carbon credit represents one ton of carbon dioxide that has been prevented from entering or has been removed from the atmosphere. The steps for a carbon credit to be created, certified, and sold may take considerable time. The process is illustrated for a forestry project:

1. A project developer plans the forestry project and assesses its potential to permanently reduce GHG emissions. The project developer selects the carbon credit methodology—the peer-reviewed approach to how the credit will be assessed and verified.

2. A standards body and verifier then assess that the project proposal is valid and accept (or reject) its suitability for carbon credits.

3. The project developer implements the project, which may take several years. For example, the new trees will need to grow to a substantial size before absorbing carbon.

4. The carbon project then needs to prove that it is operating successfully in the manner set by its methodology.

5. Finally, the carbon credit can be certified. This encompasses several steps and is done on a periodic basis: documentation submission, monitoring, reporting, and verification (normally annually) of a project’s carbon reduction or removal claims.

6. Once a third-party verifier has checked the project’s progress, they give the green light for credits to be issued.

7. The project developer can then sell the carbon credits to organizations or individuals who retire them to compensate for the emissions released by their day-to-day operations. Intermediaries may also buy carbon credits and re-trade them.

8. When a credit is retired, the carbon offset it represents is permanently removed from market circulation. This means that only the party retiring the credit can claim to have reduced emissions.


Compliance Markets

Compliance carbon markets are created and overseen by national, regional, or provincial authorities that mandate emissions sources to comply with GHG emission reduction requirements. The regulatory authority sets an overall cap on the total amount of greenhouse gas emissions allowed within the covered sectors or industries for a specific compliance period, such as a year or several years. This can be accomplished through a carbon tax, emission trading system, or crediting mechanism. The most widely used emission trading systems, the “cap-and-trade”. The right to emit a certain amount of greenhouse gases is divided into allowances or permits, with each permit typically representing one metric ton of carbon dioxide (CO\(_2\)) or its equivalent. These allowances are
allocated to or auctioned off to covered entities consistent with the emissions cap. Covered entities, such as industrial facilities, are legally obligated to hold enough allowances to cover their emissions. If they emit more than their allocated allowances, they may face penalties or fines. Under crediting mechanisms, there is no fixed limit on emissions but carbon emitters that reduce their emissions more than they would otherwise be obliged to can earn allowances that they can sell to others who need them.

Entities in compliance markets can trade allowances among themselves. This trading allows companies that can reduce emissions more easily or cost-effectively to sell excess allowances to those facing greater challenges in reducing emissions. Examples of compliance carbon markets include the European Union Emissions Trading System (EU ETS) (Box 3.2.), the Regional Greenhouse Gas Initiative (RGGI) in the northeastern United States, and the California Cap-and-Trade Program.

**Box 3.2. EU ETS: Regulations in the Energy Sector as an Example for the Rail Sector**

The overall volume of greenhouse gases that can be emitted by power plants, industrial facilities and intra-European flights covered by the EU ETS is limited by a ‘cap’ on the number of emission allowances. The cap decreases every year, ensuring that total emissions fall. Each allowance gives the holder the right to emit:

- One ton of carbon dioxide, or
- The equivalent amount of other powerful greenhouse gases, nitrous oxide and perfluorocarbons.

For example, in the energy sector, the ETS encompasses all power plants within EU countries, as well as those in Iceland, Liechtenstein and Norway. Under the current phase 4 of the EU ETS (2021-2030), power plant operators do not receive any free emission allocations. Operators covered by the EU ETS are required to have an approved plan for monitoring and reporting annual emissions and are obligated to submit an annual emissions report, subjected to verification by an accredited institution. If a company emits more CO$_2$ than they have covered by emission allowances, a fine of EUR 100 per excess ton is incurred.

The EU ETS also encompasses parts of the aviation sector but applies solely to flights occurring between member states of the EU ETS. There are intentions to incorporate maritime transportation into the scheme by 2024, with discussions regarding a strategy for the inclusion of road freight transport. The current roadmap does not entertain the prospect of integrating rail transport.

Source: Adapted from Climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en.

As of January 2023, 28 different emissions trading systems are in operation world-wide, mostly in high income countries, with a further 20 being currently under development or consideration (ICAP 2023). Currently, the majority of existing ETS either do not encompass the transport sector or, at most, only include specific sub-sectors (such as aviation and maritime transportation). (Figure 3.2.).
Figure 3.2. Compliance carbon markets worldwide

Potential for Carbon Markets to Finance Rail Projects

Carbon finance markets differ from loans and bonds described above in that they provide funding for investment and do not have to be paid back. The potential for railway carbon finance is still developing. In principle, rail projects that reduce emission through transitioning from fossil fuel-powered engines to alternative fuels and/or produce GHG reduction through diverting traffic from carbon-intensive transport modes like trucks, could tap into the carbon finance market.

Challenges

Experience with carbon markets in the transport sector is limited. In addition to the challenges particular to the transportation sector, participation in carbon markets is complex and characterized by some peculiarities which include:

- Challenges associated with measuring GHG emissions from the sector. Transport projects, especially projects involving modal shift, are difficult to ring fence. The sources of emissions may involve millions of individual people and firms across multiple modes and operators, including informal transport operators. This creates challenges for devising a transport GHG assessment methodology that can be applied across countries and regions.

---

13 Transport projects often involve large investments with long project lives. They may involve of large numbers of stakeholders, social risks from significant land acquisition and multiple environmental risks.
• Difficulties in monitoring, reporting and verification (MRV) for transport sector and modal shift. For example, transportation vehicles use a variety of fuels (electricity, gasoline, diesel, kerosene, CNG, biofuels, etc.) and are operated by a huge number of individuals or enterprises. As a result, it is difficult to collect data and accurately identify the boundaries of the assessment.

• Investment financing is needed upfront for rail investments, while carbon markets provide funds after the GHG savings has taken place. Since carbon markets generate grant-like resources, railways could develop them as part of the funding stream that supports the repayment of the initial financing.

Potential Solutions

To promote rail carbon finance, carbon market regulations specifically for land transport are necessary. These would limit emissions from land transport and qualify GHG reductions from modal shift, including active transport (cycling and walking), public transport and ridesharing instead of single occupied private cars, as well as substituting rail for air travel and for freight. Developing transport carbon markets that reward both shift to green fuel and modal shift to lower emitting modes means that regulations need to address:

• The methodology for quantifying emissions of land transport operators for both passenger and freight.

• Clear rules for quantifying the reduction in emissions and verifying them using standardized methodologies.

• The methodology and taxonomy of how modal shift to railway can be counted as carbon credits.

• The market mechanisms for verifying and trading carbon credits. For compliance markets, this would include developing a methodology for setting emissions limits and allocating emission permits.

The Kochi Metro project in India, is leading the way with an effort to qualify GHG savings from shifting traffic from road to public transport (Box 4.3.).

The World Bank and other development institutions could support this work through:

• Improving and developing MRV standards for rail interventions. The World Bank is already financing work in that sector. Using a grant by the Transformative Carbon Asset Facility (TCAF), a World Bank trust fund, a prototype MRV model including rail is being developed and will be finalized in 2024.

• Working with standards agencies to adopt the standards for rail and encourage regulators in compliance markets to cover all modes of surface transportation, including rail.

• Supporting railways and governments to qualify a first set of projects for support from carbon markets.
Chapter 4:
Climate Funds and Results-Based Climate Finance
Multilateral, bilateral, and philanthropic funds provide grants, concessional financing, and risk-mitigation instruments specifically to promote investment in climate change mitigation and adaptation measures. Their resources are relatively limited and shared across multiple sectors including agriculture and energy, as well as transport. Funds can offer activity- or outcome-based instruments, and some offer both.

**Climate Funds**

Several multilateral climate funds\(^{14}\) have been established to promote investment in climate change mitigation and adaptation measures. These include the Clean Technology Fund, the Global Environment Facility, the Green Climate Fund, the Least Developed Countries Fund, the Pilot Program for Climate Resilience, the Scaling Up Renewable Energy Program, and the Special Climate Change Fund. These funds cover multiple sectors including agriculture and energy. As shown in Figure 7, transport is a relatively small beneficiary of the climate funds, receiving USD 496 million in 2022 (Climate Policy Initiative 2023).

The Green Climate Fund (GCF) and the Global Environment Facility (GEF) have emerged in recent years as the most active multilateral funds in the transport sector (Figure 4.1.). GCF and GEF both originated with the United Nations Framework Convention on Climate Change. This convention established financial mechanisms to provide financial resources to developing country parties, which also serves the Kyoto Protocol, and the Paris Agreement. Both funds have the World Bank acting as the trustee and receive most of their funding from developed country donors, with smaller contributions coming from other countries, entities, and foundations. Annex 1 provides more information about GCF and GEF.

**Figure 4.1. Amount of Funding Approved by Climate Funds for Transport by Year**

![Figure 4.1. Amount of Funding Approved by Climate Funds for Transport by Year](image)

Source: Benitez and Bisbey 2023 derived from Climate Funds Update Data Dashboard.

---

\(^{14}\) Concessional financing is also available from bilateral organization such as the Korea Economic Development Co-operation Fund and philanthropic organizations such as the Global Energy Alliance for People and Planet.
Costa Rica Light Rail Project

The Costa Rica Light Rail project is one of a small number of railway investments in the urban passenger sector that have accessed global climate funds. The project will construct a new 85 km double-track light rail transit system powered by more than 90 percent renewable energy. It will directly reduce GHG-emissions, through mode shift and more efficient transportation, by 7.6 mt during its total lifespan. Additional benefits include significant improvements to the urban air quality and reduction in trip times (GCF n.d.).

The project is an example of blended finance, where grants and loans from the Green Climate Fund and a DFI were blended with private equity capital. Total cost of the Costa Rica Light Rail project is USD 1.9 billion. GCF is financing USD 250 million of debt and providing a USD 21 million grant. Other financing includes a loan from the Central American Bank for Economic Integration and private capital. The project includes a PPP component, with a private concessionaire financing part of the project and operating the system for an initial 35-year period, which includes the construction phase. The private investor will recoup their investment during the operations phase, while the PPP structure also reduces risk and the required investment for the government (GCF 2021). This serves as an example of capital provided by climate funds acting as leverage to mobilize private capital.

Results-Based Climate Finance

Results-based climate finance (RBCF) is money paid for achieving agreed-upon climate-related results, particularly those targeting reducing greenhouse gas emissions. The disbursement of funds is directly linked to actual GHG emission reductions, which have been independently verified as real and additional. RBCF shifts the focus from simply providing upfront financing to ensuring that the desired outcomes are achieved (World Bank 2022).

Results-based climate finance has several benefits. It encourages accountability and ensures that funds are allocated based on actual results achieved. It also promotes transparency and enhances the effectiveness of climate actions. Like SLF, its linking of financing to results incentivizes countries and organizations to prioritize and implement climate projects that deliver tangible outcomes. RBCF also rewards good project management due to the need to achieve pre-agreed results, thereby also increasing the likelihood that a project will be successful (TCAF 2023).

Investments in sustainable infrastructure, including the transport sector, were identified by the World Bank as one of three areas particularly well-suited for RBCF (World Bank 2022). In the rail sector, results-based climate payments could bring in additional funds, by monetizing, the shift to rail from more carbon-intensive transport modes.

The Transformative Carbon Asset Facility (TCAF), managed by the World Bank, is an example of a fund using results-based climate finance. TCAF supports developing countries’ efforts to scale up mitigation actions, create the conditions needed for private sector investments in low-carbon

---

15 Development organizations have recognized that concessional finance alone cannot meet the investment needs of developing countries and “the mobilization of all public and private financing sources, at scale” (AFD 2023) will be needed. This has led governments and institutions to explore how the concessional finance could be used strategically to mobilize additional commercial sources (OECD 2018). This use of concession finance to leverage commercial finance is called “blended finance”.
technologies, bridge financial gaps, and access carbon markets. World Bank is bringing TCAF and all the other RBCF programs it houses together in the partnership Scaling Climate Action by Lowering Emissions (SCALE) to increase their impact (World Bank 2022).

One of the key objectives of TCAF is to assist and develop carbon accounting methodologies for a range of sectors (TCAF 2023). This is crucial as RBCF instruments require the development of MRV capacities. World Bank is currently working with TCAF on a modeling tool for ex-ante and ex-post qualification of GHG savings in the transport sector (including railways) to support access to RBCF.

**Potential for Climate Funds and Results-Based Climate Finance to Finance Rail Projects**

Historically climate funds and results-based climate finance have offered a limited financing opportunity for railway investments. Given the relatively small amount of financing capacity of climate funds, they cannot be expected to fully finance large railway investments. Rather they may complement other financing or potentially leverage other financing. For example, they could potentially “sweeten” the choice of electrified rolling stock. Or they could leverage other financing through providing risk guarantees for commercial finance or to cover the administrative costs for railway projects to be certified for purposes of qualifying for green bonds/loans or carbon markets.

**Challenges**

Projects compete for the limited financing available based on GHG reductions per dollar and only a few other criteria. Rail projects often have a higher cost per tCO2eq than projects in other sectors. Since most climate funds have traditionally prioritized cost efficiency in selecting projects, this higher cost has caused other sectors to be prioritized. However, as this approach is changing to avoid even higher corrective costs in the future and capitalize on various co-benefits, investments in transport projects are still considered (see Box 4.1.).

**Box 4.1. Marginal Abatement Cost**

Early thinking on climate change used the concept of marginal abatement cost to prioritize mitigation interventions. The marginal abatement cost of an intervention is the cost to achieve one ton of CO2 savings with that intervention. Spending one’s mitigation budget on the lowest cost (or highest net benefit) interventions would maximize the impact of mitigation spending.

Most recently, policy makers have recognized that this approach would fail to address hard-to-abate sectors and not achieve net zero by 2050. Additionally, the approach failed to capture the interactions between interventions and that supporting interventions could bring down the cost of certain technologies (such as solar panels) changing their marginal abatement cost. This is why policy makers are now focusing on the total rather than the marginal cost of decarbonization and seeking the most economically efficient path to reaching net zero.

Other challenges include:

- Rail projects have longer lives over which GHG savings would occur than many other investments. Estimated annual emissions savings of rail projects accumulate over a long period of time and do not meet many donors’ high expectation of “immediate and transformative” climate actions (many funds have an informal project goal of at least 1 million tons of GHG savings per year.)

- Since rail benefits come primarily from mode shift, the modeling to demonstrate GHG savings for results-based financing is complex and in development.

- The quantum of financing available from climate funds is quite limited compared to the size of many railway projects, so climate fund support must be bundled as part of a larger financing package, with other like-minded creditors (e.g., DFIs).

- The process for rail projects to determine if they can qualify and the subsequent process to access the financing is uncertain and usually takes considerable effort and time, discouraging project sponsors of rail projects.

**Potential Solutions**

World Bank and other development institutions could play a role in reducing the institutional barriers between railways and climate funds. For the funds, they could help railways present the parts of their investment programs most likely to fit the funds’ criteria. This could include bundling the activities of several railways to offer a higher total of GHG savings. DFIs could also fill the knowledge gap, as World Bank is with TCAF, on verifying the GHG emission savings through rigorous modeling. For railways, DFIs could guide on which funds might be suited to the railways’ investment programs, help with administrative processes, and support railways to secure the balance of their financing from other sources.

**Image 4.1. Station Universidad de Chile of the Metro de Santiago**

Source: Rjcastillo.
Chapter 5: Mobilizing Climate Finance for Railways
Railways are a low carbon way for to access opportunities and move goods to markets. To realize the benefits of railways in LMICs, an estimated USD 25-80 billion of investment annually will be needed. Many organizations and investors want to support green investments and a variety of climate finance sources and instruments have been developed to do just that. However, railways have had limited success in accessing climate specific financing instruments such as climate funds, carbon markets, green bonds and loans, and sustainability linked finance. Railways’ experience with climate-specific financing reveals challenges: familiarity, high abatement costs, standards, and creditworthiness.

**Figure 5.1. Primary Challenges for Railways to Access Climate Finance**

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Results-based financing</th>
<th>Activity-based financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiarity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High abatement cost (GHG saved per $ investment)</td>
<td>Green = not a major constraint, Red = blocking constraint, Yellow = impediment</td>
<td>Red = blocking constraint, Green = not a major constraint</td>
</tr>
<tr>
<td>GHG savings spread over long asset life</td>
<td>Red = blocking constraint, Green = not a major constraint</td>
<td>Green = not a major constraint</td>
</tr>
<tr>
<td>Standards</td>
<td>Red = blocking constraint, Yellow = not a major constraint</td>
<td>Yellow = not a major constraint</td>
</tr>
<tr>
<td>Creditworthiness</td>
<td>Yellow = not a major constraint</td>
<td>Yellow = not a major constraint</td>
</tr>
</tbody>
</table>

Key: 🟥 = blocking constraint, 🟢 = impediment, ⓑ = not a major constraint.

**Familiarity**

The sources of climate-specific financing are fragmented among many institutions and instruments, and each has its own processes and standards for qualification. This complexity can be daunting for the finance team of an individual railway and discourage them from seeking climate finance. On the flip side, rail is an unfamiliar industry to many funds and financial institutions, making rail a difficult industry for managers to consider financing.

Development institutions could take on a matchmaking role to overcome this gap. Staff who develop knowledge in both railways and climate-specific financing instruments, could help railways structure their projects to tap into climate finance and support them to present their projects to climate financiers. This could include bundling projects to meet GHG savings thresholds, selecting suitable elements of an investment program to present for climate finance, and supporting railways and governments to implement a first set of transactions.
High Abatement Costs

While railway projects offer significant climate and development benefits, their abatement costs tend to be high. In comparison to other sectors, the GHG savings per invested dollar from rail projects are moderate, especially in LMIC countries who’s overall GHG emissions from transport are small. Railway projects typically involve high up-front investment with development and climate benefits accruing over a long project life. This creates challenges for railways to access climate funds and results-based climate finance:

- Climate funds often prioritize their interventions by cost efficiency. Railway’s high-up front costs mean railway investments often have a higher cost per tCO2eq of GHG saved than projects in other sectors, so are not prioritized in the allocation of the funds’ limited resources.
- Results-based climate finance resources prioritize their interventions by volume of GHG savings. Railway investments typically have their GHG savings spread over a long project life so they often have difficulty passing the informal screening threshold of one million tCO2eq of GHG saved per year, even though their total GHG savings over the investment’s lifetime may be considerable.

While the fundamental characteristics of railway investments (high up-front cost and long life) are unlikely to change, development institutions can support presentation of railway activities to climate funds and results-based climate financiers by:

- Identifying the parts of a railway’s investment program most likely to fit climate funds’ investment criteria (including cost efficiency) and supporting the railway to present these investments to appropriate climate funds.
- Aggregating interventions across railways to increase their aggregate annual GHG savings for results-based climate finance support.
- Explaining how supporting railways helps to reduce GHG emissions from the hard-to-abate transport sector to persuade both climate funds and results-based financiers to consider modifying the screening criteria.

Standards

Every climate-specific financing instrument has standards and methodologies for verifying that the activity supported will support climate goals:

- Private sector climate finance requires the investment financed to be certified as green through agencies such as the Climate Bond Initiative. Sustainability-linked finance requires establishment and monitoring of KPIs.
- Carbon markets require monitoring, reporting and verification standards, which currently do not exist for railway investments.
- Results based climate finance requires an accepted methodology for estimating GHG savings, which currently does not exist for railways.
- Activity based climate funds also require the verification of GHG savings and would therefore benefit from a standardized verification methodology for rail projects.
Developing the missing standards carbon markets and other output-based climate finance will involve complex climate modeling that is beyond what any railway might undertake to access financing. Development institutions should lead in developing this knowledge and working with standards agencies to adopt it. The World Bank is currently developing the modeling for result based climate financing instruments, which could subsequently be extended to carbon markets. Concepts developed in this work could also inform and help standardize methodologies for private sector climate finance and activity-based climate funds.

**Creditworthiness**

While all providers of climate-specific finance will look to the sustainability of investments supported, private sector climate finance also looks to the creditworthiness of the borrower. Creditworthiness requires visibility on repayment of finance. It also requires reasonable levels of risk, considering among others governance, environment, social, technological, and operational risks. Many railways in LMICs do not currently meet these requirements.

The World Bank and other development institutions have an important role in addressing creditworthiness constraints to climate financing. These include:

- Guiding governments through the process of accessing the private sector financing instruments on behalf of their railways, on the strength of the sovereign credit rating.
- Supporting governments and railway SOEs in making the structural and governance reforms necessary for the SOE to become creditworthy.
- Providing risk mitigation instruments such as guarantees that facilitate SOEs’ access to private sector financing.

**Next Steps**

Most railways in LMICs will continue to be financed from a combination of sources that include government budget funds and possible concessional financing from development finance Institutions. But to meet the financing needs, railways will also need to scale up access to private sector climate finance, carbon markets, results-based climate finance and climate funds.

- The pool of private sector investors in sustainable financing is large and growing quickly. Green bonds and loans can finance a wide range of adaptation and mitigation investments, while sustainability-linked climate finance could support an even broader range of investment. These instruments are potentially available to both governments on behalf of their railways and to creditworthy railway SOEs.
- With changes in regulations, carbon finance markets have potential to provide meaningful funding for rail activities, with the added benefit that the funds do not have to be repaid.
- Climate funds and results-based financing, by themselves, are not scaled to address the substantial financing needs in the railway sector. But they can be used together with other finance to reduce cost, leverage co-financing benefits or reduce risk.
The World Bank and other development institutions, with their broad perspective on the range of financing instruments, could help railways create blended financing plans that draw on all suitable sources.

To enable that to happen, development institutions can help scale up climate finance for railways through a program of interventions that addresses the constraints of familiarity, high abatement costs, standards, and creditworthiness. Such a program is outlined in Table 5.1. It is needed for railways to access sufficient finance to scale up low carbon, rail-based mobility, and logistics for development.

**Figure 5.2. Scaling Up Climate Finance for Railways**

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Activity-based financing</th>
<th>Results-based financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstreaming</td>
<td>• Identify rail investments suited to climate funds of private sector climate finance</td>
<td>• Identify rail activities whose GHG savings can be certified for carbon markets or results-based climate finance</td>
</tr>
<tr>
<td>Standards</td>
<td>• Support governments &amp; railways to qualify first set of projects</td>
<td>• Support railways &amp; government to qualify first set of rail projects</td>
</tr>
<tr>
<td>Creditworthiness</td>
<td>• Provide grants to cover costs of applications/certification</td>
<td>• Aggregate rail activities to meet screening criteria for based climate finance</td>
</tr>
<tr>
<td></td>
<td>• Advocate for modifying GHG savings per $ screening criteria</td>
<td>• Advocate for modifying screening criteria for results-based climate finance</td>
</tr>
<tr>
<td></td>
<td>• Seek opportunities to standardize certification processes</td>
<td>• Provide grants to cover costs of application/certification</td>
</tr>
<tr>
<td></td>
<td>• Support structural &amp; governance reforms</td>
<td>• Develop modeling to validate GHG savings from modal shift</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Encourage financiers to adopt rail modeling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop MRV standards for rail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Encourage standard agencies to adopt MRV standards for rail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Encourage regulators to cover all modes of surface transportation including rail</td>
</tr>
</tbody>
</table>

Notes:

1 Includes climate funds, green loans & bonds, and sustainability-linked financing.
2 Includes carbon markets and results-based financing.

Most critical measures shown in yellow.

References


Annex:
Multilateral Climate Funds
The Green Climate Fund (GCF) and the Global Environment Facility (GEF) have emerged in recent years as the most active funds in the transport sector. GCF and GEF both originated with the United Nations Framework Convention on Climate Change. This convention established financial mechanisms to provide financial resources to developing country parties, which also serves the Kyoto Protocol, and the Paris Agreement. Both funds have the World Bank acting as the trustee and receive most of their funding from developed country donors, with smaller contributions coming from other countries, entities, and foundations.

**Green Climate Fund**

The Green Climate Fund (GCF) was established at COP 16 in 2010 and operates under the oversight of the COP, which determines its policies and program priorities. The primary mission of GCF is to support developing countries in achieving their ambitions for low-emission, climate-resilient pathways as outlined in their Nationally Determined Contributions (NDCs). GCF has eight result areas including transport. The current GCF portfolio gives strong emphasis to supporting health and food security, livelihoods, ecosystems, and energy.

GCF provides a range of financial instruments, including loans, grants, and other forms of financial support. The loans offer soft terms, roughly similar to those provided by International DFIs. In 2021, GCF disbursed a total of USD 792 million. Currently, total commitments in the portfolio amount to USD 12.8 billion, of which grants are USD 5.3 billion, loans are USD 3.5 billion, and other financial instruments such as guarantees, equity, and results-based payments account for the balance.

As of July 2023, GCF had a total of 15 active transport projects in its portfolio, with a combined value of USD 952 million. GCF’s financing in transport is focused on climate change mitigation. Projects financed promote low emission public transport, electrification of transport systems, and the deployment of new generation zero-emission fuels to transition from both single occupancy and fossil fuel vehicles (GCF 2023). GCF assesses project proposals using six criteria:

- **Impact**: Contribution of the project to GHG emissions mitigation, preferably achieved through shift to low or zero emissions public transport, electric charging infrastructure and electrification, or zero emission fuel technologies.

- **Paradigm shift**: Creation of long-lasting impact beyond a “one-off” investment. The three sub-criteria are:
  - Scale – Path and plans for how project will scale up, including analysis of estimated mitigation and adaptation impacts.
  - Sustainability – Medium-to-long term climate impacts, as well as local risks to climate change and how the project enables long-term mitigation and/or adaptation measures.
  - Replicability – How and at what scale the project can be replicated.

- **Sustainable development**: Alignment of the project with national SDG priorities and outlining of all expected co-benefits. Common co-benefits for transportation include improved accessibility and mobility, improved air quality, increased safety, and economic benefits.
• **Recipient need:** Consideration of national and local context and the priorities regarding the financing needs of the country. For the low emission transport sector that may mean focusing on imminent, non-climate-related challenges like congestion and travel times. Proposals for the transport sector should also demonstrate cross-sectoral benefits of the project (e.g., in urban development, or the energy sector).

• **Country ownership:** The implementing country has the capacity to implement the project and establish the needed programs, policies, and institutions.

• **Efficiency and effectiveness:** Demonstration of economic and financial soundness of project and cost efficiency in providing expected climate impact. GCF acknowledges in their sectoral guide that transportation projects can have a much higher cost for each tCO2eq than other sectors. To avoid even higher corrective costs in the future and due to the various co-benefits, investments in transport projects are still included.

The Global Climate Fund primarily adopts a country-driven approach, wherein developing countries wield significant influence and often lead part of GCF’s programming. This approach involves direct collaboration with countries through their National Designated Authorities (NDAs), which are government agencies serving as intermediaries between the country and the Fund. NDAs oversee GCF activities within their countries and convey climate-related priorities, in accordance with their NDCs.

GCF deploys resources through a diverse range of accredited entities, including private, public, national, regional, and international (e.g., MDBs) organizations. These entities are required to have well-defined and actionable climate projects or programs, while also meeting GCF’s standards in finance, environment, social safeguards, and gender. These entities, who often provide co-financing for projects, then develop project proposals, oversee the approved projects, and ensure their successful implementation. Currently, 78 entities have completed the accreditation process, with the largest MDBs being accredited entities.

Examples of rail projects financed by GCF and programs that could on-lend to rail projects indicate a focus on urban rail:

• **Costa Rica Light Rail.** The project will construct a new 85 km double-track LRT system powered by more than 98% renewable energy. It will reduce GHG-emissions, through mode shift and more efficient transportation, by 7.6mt. Additional benefits include significant improvements to the urban air quality and reduction in trip times. Total project cost is USD 1.9 billion. GCF is financing USD 250 million of debt and providing a USD 21 million grant. Other financing includes a loan from the Central American Bank for Economic Integration and private capital (GCF n.d.).

• **Tbilisi Metro Modernization.** The project will rehabilitate and upgrade the existing metro infrastructure in Tbilisi. Total project cost is EUR 130 million. GCF is financing EUR 10 million and providing a EUR 5 million grant. Other financing includes sovereign loans from EBRD totaling EUR 115.6 million. The project is part of the EBRD Green Cities Facility, which provides financing and funding to address climate change (GCF n.d.). This includes initiatives such as reducing greenhouse gas (GHG) emissions by investing in public transport. The program currently includes cities in nine different countries (EBRD n.d.).
Mobilizing Climate Finance for Railways

- **ASEAN Catalytic: Green Finance Facility - Green Recovery Program.** The program will support at least 20 high-impact low-emissions projects in the region. The potential project pipeline currently includes urban railway projects in Indonesia and the Philippines. Potentially available GCF financing: USD 300 million with co-financing of up to USD 3.4 billion, coming from the Asian Development Bank (ADB) (GCF n.d.).

### Global Environment Facility

The Global Environment Facility (GEF) is a multilateral family of funds that provides climate finance through grants and blended finance to invest in projects designed by developing countries. GEF aims to combat climate change, address biodiversity loss and pollution, including the broader challenges affecting the health of both lands and oceans. Over the past three decades, since its inception in 1992, the GEF has provided more than USD 23 billion and mobilized USD 129 billion in co-financing for more than 5,000 national and regional projects.

The GEF’s project funding and implementation strategy centers around five focal areas (rather than specific sectors): biodiversity, climate change, land degradation, international waters, and chemicals and waste. GEF funds channeled through these areas adhere to international environmental conventions and act as these conventions’ official funding mechanisms. For example, the GEF’s climate change focal area adheres to the United Nations Framework Convention on Climate Change (UNFCCC) and acts as one of UNFCCC’s official funding mechanisms to the Paris Agreement to channel climate finance into developing countries to help meet their NDC and net-zero commitments.

The majority of GEF’s financial resources are channeled through programs with funding averaging USD 5-15 million and smaller projects with funding less than or equal to USD 2 million per project. These grants frequently serve as co-financing for larger projects in partnership with GEF’s 18 partner agencies (MDBs, IFIs, and United Nations development agencies acting as “Executing Agencies” to the GEF). In the current GEF replenishment cycle covering 2022-2026, donor governments have pledged a total of USD 5.3 billion in funding to support the GEF’s five focal area initiatives. The most relevant for railways is Climate Change Mitigation (CCM), with GEF-8 having currently allocated USD 852 million to this focal area, with USD 94 million earmarked for zero-emission mobility.

The following three funding/financing windows appear to be the most relevant for rail projects that achieve considerable GHG emission reduction savings:

- **Climate Change Mitigation (CCM) Focal Area – Grant Funds.** These funds are allocated at the beginning of the GEF-8 cycle as “Grants” to each country based on country size and stage of development. The country-specific CCM focal area allocations range from USD 1 million to up to USD 47 million, with most countries averaging close to USD 8-10 million. The allocation window is driven by a Country-GEF agency process, with the client country determining the recipients of the funds. (GEF 2023).

- **Integrated Programs – Grant funds (Net-Zero Nature Positive Accelerator and Greening Transportation Infrastructure Development).** These programs have dedicated grant funds totaling USD 130 million and USD 129 million respectively and have competitive, country-driven
selection processes (via Expression-of-Interest). In general, the integrated programs have a mandate to promote projects with a whole-of-economy approach for systems transformation by leveraging integrated policy and sectoral solutions to achieve deep decarbonization goals. The Net-Zero Positive Accelerator Program specifically aims to promote the electrification of the transport sector including promoting green hydrogen.

- **Non-Grant Instruments (NGI)/Blended Finance Program.** This window provides loans, equity, and risk mitigation instruments (guarantees, risk-sharing facilities) at concessional rates to promote private capital mobilization through blended finance solutions. The NGI Program has set-aside non-grant funds totaling USD 195 million (2022-2026) and offers a maximum financing amount of USD 15 million per project. The NGI Program is globally driven and managed by the GEF Secretariat through a competitive selection process. Winning projects are primarily selected based on their ability to attract the private sector and leverage private capital, but also based on their climate impacts from expected GHG reductions.

GEF funding activities must demonstrate “additionality”. Projects must seek GEF financing only for the agreed incremental costs or costs additional to the business-as-usual case, for measures to achieve global environmental benefits. This means only a small share of a project would qualify for financing from GEF. Projects must be consistent with national priorities and support sustainable development.

GEF’s current transport portfolio focuses on scaling up zero-emissions e-mobility and active mobility and does not include any rail or metro projects up to now (GEF 2022). In the past, GEF financed a project for improving energy efficiency in the Indian Railway System. The project, approved in 2011, received GEF financing of USD 5.2 million (co-financed was provided by Indian Railways) (GEF 2023).
# Image Credits

<table>
<thead>
<tr>
<th>Page No.</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Rjcastillo, <a href="https://commons.wikimedia.org/wiki/File:Metro_Santiago_-_Estaci%C3%B2n_Univ_de_Chile.jpg">https://commons.wikimedia.org/wiki/File:Metro_Santiago_-_Estaci%C3%B2n_Univ_de_Chile.jpg</a></td>
</tr>
</tbody>
</table>