Transport Readiness for Climate Finance:
A framework to access climate finance
in the transport sector

Benoit Lefevre and David Leipziger
EMBARQ – The World Resources Institute (WRI)
program for sustainable transport and urban development

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The Bridging the Gap initiative is a multi-stakeholder partnership formed in 2009 at COP14 to encourage international recognition that land transport should play a more prominent role in addressing climate change in the Post-2012 agreement. The partners work together at ‘bridging the gap’ between the sustainable transport community and the climate change negotiations process. Partners actively follow the process and latest developments and frequently organise workshops and side events, publish reports, collecting relevant information on land transport and climate change and promoting sustainable solutions for developing countries.

www.transport2020.org
Glossary

**Additionality**: The property of a GHG-reducing activity that would have not been implemented in the absence of climate finance.

**Baseline Scenario**: A set of reasonable assumptions and data describing events or conditions that are likely to occur in the absence of any mitigation actions.

**Blending**: The process of combining different types of finance, which are sometimes concessional, to finance projects.

**Boundary**: The parameters for what sectors, geographies, chemical compounds, emissions sources, and timeframe will be considered for a particular GHG accounting methodology.

**Climate Finance**: All financial flows whose expected effect is to reduce net greenhouse emissions or to enhance resilience to the impacts of climate variability and projected climate change (IPCC, forthcoming).

**Concessionality**: The ratio of the discounted future debt flows of a loan to its face value. Development institutions often extend lesser concessionality requirements to poorer countries by structuring loans at below market terms (e.g. at lower interest rates); such loans are often called “concessional.”

**Incremental Cost**: The marginal difference between cheaper, more environmentally harmful investment and a costlier, more sustainable or climate-resilient one (Buchner et al., 2012).

**Instrument**: The tool or financial mechanism used to mobilise monetary flows (e.g. loans, fees, grants or taxes). Each instrument dictates some kind of economic relationship between the agent that gives/grants and the agent who receives them.

**Intermediaries**: The entity that looks for an investor and pushes/promotes the use of instruments and tools to resolve a mitigation or adaptation problem.

**Investor**: The entity that makes the investment and receives the profits driven from the investment.

**Jurisdiction**: A sub-sovereign political entity, such as a county or city, which governs a defined geographical area.

**Leakage**: An increase in emissions outside of the project boundary that is caused by activities within the project boundary; this can apply to the geographic, temporal, or sectoral aspects of the boundary (WRI and WBCSD, 2004).

**Leverage**: The process of public finance being used to encourage private investment.

**MRV**: Measurement, Reporting and Verification – the framework for tracking emissions, the reduction of emissions, the performance of projects, programmes, or policies and the support provided.

**Offsetting**: The practice of investing in carbon emission reductions in order to counter-balance an increase elsewhere. This is often carried out through carbon markets and usually occurs between the developed and the developing world.

**Readiness**: The capacities of countries to plan for, access, receive, and report on climate finance as well as implement and monitor resulting projects (Vandeweerd et al., 2012).

**Recipient**: The local entity which receives climate finance resources and is responsible for the compliance and debt repayment responsibilities commensurate with the financing instrument.

**Scope**: The scope framework distinguishes direct and indirect emissions within a given boundary. Scope 1 covers all direct emissions; Scope 2 covers indirect emissions within the boundary; Scope 3
covers all other related emissions (WRI and WBCSD, 2004). For transport, Scope 3 treats emissions from within to beyond the boundary.

**Source:** The institution from which a monetary movement is initiated (e.g. the GEF, Deutsche Bank). Normally each source has its own rules on what is financed and the instruments used.

### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AIDB</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>BMU</td>
<td>German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety</td>
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<tr>
<td>CCF</td>
<td>Climate Change Fund</td>
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<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>CIF</td>
<td>Climate Investment Funds</td>
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<tr>
<td>CO₂e</td>
<td>Carbon dioxide equivalent</td>
</tr>
<tr>
<td>CTF</td>
<td>Clean Technology Fund</td>
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<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<tr>
<td>FSF</td>
<td>Fast-Start Finance</td>
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<tr>
<td>GCCA</td>
<td>Global Climate Change Alliance</td>
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<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>GIZ</td>
<td><em>Deutsche Gesellschaft für Internationale Zusammenarbeit</em></td>
</tr>
<tr>
<td>IDB</td>
<td>Inter-American Development Bank</td>
</tr>
<tr>
<td>ICCTF</td>
<td>Indonesian Climate Change Trust Fund</td>
</tr>
<tr>
<td>ICI</td>
<td>International Climate Initiative of the BMU</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
</tr>
<tr>
<td>KfW</td>
<td><em>Deutsche Kreditanstalt für Wiederaufbau</em></td>
</tr>
<tr>
<td>MAPT</td>
<td>Measuring and Performance Tracking</td>
</tr>
<tr>
<td>MDB</td>
<td>Multilateral Development Banks</td>
</tr>
<tr>
<td>MRF</td>
<td>Measurement, Reporting and Verification</td>
</tr>
<tr>
<td>NAMA</td>
<td>Nationally Appropriate Mitigation Action</td>
</tr>
<tr>
<td>NDF</td>
<td>Nordic Development Fund</td>
</tr>
<tr>
<td>ODA</td>
<td>Official Development Assistance</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>PPP</td>
<td>Public-Private Partnership</td>
</tr>
<tr>
<td>PROTRAM</td>
<td><em>Programa de Apoyo Federal al Transporte Masivo</em></td>
</tr>
<tr>
<td>SECCI</td>
<td>Sustainable Energy and Climate Change Initiative</td>
</tr>
<tr>
<td>SUTP</td>
<td>Sustainable Urban Transport Project</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WRI</td>
<td>World Resources Institute</td>
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</tbody>
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Executive Summary

Transport is the second source of global energy-related CO₂ emissions, and the fastest-growing sector. To mitigate a massive potential increase in atmospheric CO₂, the global economy must dramatically shift annual spending to increase the role of low-carbon transport. To do this, diverse funding types, including both public and private sources, are needed to supply climate finance for the transport sector.

This paper adopts the Intergovernmental Panel on Climate Change (IPCC) definition for climate finance: all financial flows whose expected effect is to reduce net greenhouse emissions or to enhance resilience to the impacts of climate variability and projected climate change (IPCC, forthcoming). This definition includes the entire value of the financial flow rather than only the incremental investment associated with emissions reduction. Carbon finance is used to describe financing derived from markets on which carbon is traded.

In order to attract and effectively leverage climate financing, conditions in recipient countries must reflect the capability to plan for, access, and operationalize financing, and to monitor and report on impacts. In this paper, “readiness” conditions focus on the recipient (how to get ready?) rather than the funder (assessment of country’s readiness). Readiness in this sense is not a status but a process of improving conditions to access financing and leverage investment.

Table 1-1: Features and criteria of largest climate/environmental funds and private sector firms supporting financing low-carbon transport

<table>
<thead>
<tr>
<th>Recipient Status</th>
<th>CTF</th>
<th>GEF</th>
<th>GCCA</th>
<th>ICI</th>
<th>Japan’s FSF</th>
<th>NAMA Facility</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Government</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Regional Government</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Local Government</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Private Sector</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions Supported</th>
<th>CTF</th>
<th>GEF</th>
<th>GCCA</th>
<th>ICI</th>
<th>Japan’s FSF</th>
<th>NAMA Facility</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts &amp; Planning</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Capital Investment</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Operations &amp; Maintenance</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Technology Transfer</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity Building</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Types Of Support</th>
<th>CTF</th>
<th>GEF</th>
<th>GCCA</th>
<th>ICI</th>
<th>Japan’s FSF</th>
<th>NAMA Facility</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Debt</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Technical Assistance</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>


The volume of annual transport climate finance is difficult to estimate. Annual financial flows to the transport sector are about $1 trillion, split evenly between public and private sources (Sakamoto et al., 2010; Mahendra et al., 2013). Climate finance, totalling about $359 billion per year across all sectors, depends more on the private sector and on international funding. A summary of what different transport climate finance vehicles can fund is shown in Table 1-1.
There are many public sources of international climate finance, but transport is only recently emerging as an important sector which can be supported by climate finance. Table 1-2 shows the international public sources most likely to support transport climate activities (Binsted et al., 2013), and how much they have channelled to the sector. These funds are usually not large enough to provide the necessary funds for transport projects but provide important sources of funding that can be instrumental to leverage additional money.

**Table 1-2: Size of climate funds and related transport spending as of 2012**

<table>
<thead>
<tr>
<th>Fund Name</th>
<th>Acronym</th>
<th>Year Created</th>
<th>Admin</th>
<th>Spending Approved (millions of USD)</th>
<th>Spending on Low-Carbon Transport (millions of USD)</th>
<th>Proportion of Spending on Low-Carbon Transport</th>
<th>Low-Carbon Transport Actions Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MULTILATERAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Technology Fund</td>
<td>CTF</td>
<td>2008</td>
<td>WB</td>
<td>2,300</td>
<td>372.6</td>
<td>16.2%</td>
<td>43</td>
</tr>
<tr>
<td>Global Environment Facility</td>
<td>GEF</td>
<td>2010*</td>
<td>WB</td>
<td>452</td>
<td>45.3</td>
<td>10%</td>
<td>6</td>
</tr>
<tr>
<td>Global Climate Change Alliance</td>
<td>GCCA</td>
<td>2007</td>
<td>EC</td>
<td>382</td>
<td>10</td>
<td>2.6%</td>
<td>3</td>
</tr>
<tr>
<td>Nordic Development Fund</td>
<td>NDF</td>
<td>2009*</td>
<td>Nordic gov’ts</td>
<td>180.19</td>
<td>16.88</td>
<td>9.4%</td>
<td>3</td>
</tr>
<tr>
<td>ADB Clean Energy Fund (Partnership Facility)</td>
<td>CEF(PF)</td>
<td>2007</td>
<td>ADB</td>
<td>72.3</td>
<td>0.87</td>
<td>1.2%</td>
<td>2</td>
</tr>
<tr>
<td>IDB Sustainable Energy and Climate Change Initiative</td>
<td>SECCI</td>
<td>2007</td>
<td>IDB</td>
<td>58.7</td>
<td>5.2 **</td>
<td>8.9%</td>
<td>Unknown</td>
</tr>
<tr>
<td>ADB Climate Change Fund</td>
<td>CCF</td>
<td>2008</td>
<td>ADB</td>
<td>50.1</td>
<td>5 **</td>
<td>10%</td>
<td>4</td>
</tr>
<tr>
<td>Partnership for Market Readiness</td>
<td>PRM</td>
<td>2012</td>
<td>WB</td>
<td>5.25</td>
<td>3</td>
<td>57%</td>
<td>16</td>
</tr>
<tr>
<td><strong>BILATERAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan Fast Start Fund Initiative</td>
<td>n/a</td>
<td>2009</td>
<td>JICA</td>
<td>10,800</td>
<td>1,270</td>
<td>11.8%</td>
<td>8</td>
</tr>
<tr>
<td>International Climate Initiative</td>
<td>ICI</td>
<td>2008</td>
<td>BMU</td>
<td>639.7 †</td>
<td>23</td>
<td>3.6%</td>
<td>9</td>
</tr>
</tbody>
</table>

Sources: 2012 annual reports and related publications from each fund.
*Most recent environmental/climate change-related funding cycle.
**Estimated
† Mitigation funding only

Although valued at more than $175 billion annually, the role of and interest in carbon trading markets is currently waning as the carbon price has dropped dramatically (World Bank, 2012). Project-based carbon trading mechanism primarily used to support low-carbon development in developing countries, the Clean Development Mechanism (CDM) has supported only 28 transport projects (0.6% of the total as of July 2013) and is certainly not a good fit for transport because the complexity of tracking the sector’s emissions makes performing stringent MRV costly and a challenge. The Nationally Appropriate Mitigation Action (NAMA) modality promises greater flexibility and customization for transport climate finance. About 19% of 72 NAMA initiatives under development are in the transport sector.
sector. To assist with financing, the British and German governments created the NAMA Facility in 2012 to supply NAMA activities with grants and loans.

There are two promising new funding sources emerging from the 2009 UNFCCC Copenhagen Accord. Supported by thirty-six developed countries, the **Fast-Start Finance (FSF)** mobilized about $25 billion from 2010 to 2012 (Polycarp et al., 2012), and evidence from Japan’s contribution (devoting $1.2 billion of its $10.8 billion to transport) has been favourable to the sector. The **Green Climate Fund (GCF)** is the newest climate financing entity, expected to play a key role in assembling the committed yearly $100 billion by 2020. It will fund long-term low-carbon development in the public and private sectors; the potential for transport is considerable. It is yet to achieve full operationalization.

**Private investment** in transport is common in the building, operating or maintaining of infrastructure, supplying vehicle stock, and operating mass transport. Vehicles for investment include commercial banks, institutional investors, climate bonds, and private companies. The wealth of private capital markets is a leveraging opportunity for countries that can demonstrate economic viability and financial stability.

This paper identified seven components of readiness to access transport climate finance. Represented in Figure 2-1, these characteristics apply to the capacities and actions of governments, institutional stakeholders, and the private sector, as well as to local resources and market conditions.

*Figure 2-1: Framework for transport readiness for climate finance*

- **Institutional arrangements.** Coordination between levels of government ensures that efforts are efficient, properly coordinated, and in-line with national objectives.
- **Enabling environment.** An enabling environment constitutes characteristics of the public and private sectors from the national/federal to the local level. These overall market conditions encourage investment in and application of low-carbon transport strategies.
- **Comprehensive financial strategy.** The tracking of diverse funding opportunities and strategic acquisition of complementary financing can maximise resources and help to mobilize baseline funding.
- **Attracting private investment.** Attracting private sector investment to the low-carbon transport sector can greatly increase resources but often requires the use of financial instruments that mitigate risks.
- **Assessing co-benefits.** Identifying co-benefits, such as reduced traffic fatalities or reduced commuter times, can broaden interest in financing actions and makes low-carbon transport more attractive to diverse audiences.
- **Calculating GHG emissions.** A sound calculation procedure should include a baseline with growth assumptions; a boundary defining the geographic, temporal, and variables under evaluation.
- **Data needs.** Direct data pertaining to the ASIF framework (Activity, modal Share, energy Intensity, and carbon content of Fuel) should be prioritised, although indirect data can be derived from national or international averages or default values.
These readiness components must be accompanied by a strong Monitoring Reporting and Verification (MRV) process. Successful MRV requires a detailed plan and rigorous methodology, both of which should be evaluated on an on-going basis.

As climate finance evolves, financing opportunities and evaluation processes are diversifying. Attracting financing for low-carbon transport necessitates concerted action from numerous stakeholders, and the process may be difficult. However, readiness for investment at the country level will ensure the on-going capacity to access, receive, and implement finance for transport actions. Moreover, there are three priority strategies: a focus on capacity, planning early and upstream, and prioritizing data are cross-cutting tactics to augment readiness.

**Table 4-1: Immediate and residual benefits of readiness components for transport climate finance**

<table>
<thead>
<tr>
<th>Readiness Components</th>
<th>Benefits to Transport Climate Finance Activities</th>
<th>Additional Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enabling Environment</strong></td>
<td>Clear incentives favouring low-carbon transport</td>
<td>Clear vision and targets</td>
</tr>
<tr>
<td></td>
<td>Build and increase investor confidence</td>
<td></td>
</tr>
<tr>
<td><strong>Institutional Arrangement</strong></td>
<td>Structure to report on donor/lender requirements</td>
<td>Develop long-term inter-agency partnerships</td>
</tr>
<tr>
<td></td>
<td>Manage climate investment across jurisdictions and sectors</td>
<td></td>
</tr>
<tr>
<td><strong>Financial Strategy</strong></td>
<td>Distribute investment risk</td>
<td>Reduce debt obligation</td>
</tr>
<tr>
<td></td>
<td>Leverage impact of donor investment</td>
<td>Identify new funding sources</td>
</tr>
<tr>
<td><strong>Attracting the Private Sector</strong></td>
<td>Meet co-financing requirements</td>
<td>Precedent/experience working with private sector</td>
</tr>
<tr>
<td></td>
<td>Leverage more resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase local private sector capacity</td>
<td></td>
</tr>
<tr>
<td><strong>Assess Co-benefits</strong></td>
<td>Drive baseline funding</td>
<td>Involvement of diverse stakeholders in sustainable transport issues</td>
</tr>
<tr>
<td></td>
<td>Galvanise political support for climate finance</td>
<td></td>
</tr>
<tr>
<td><strong>Emissions tracking</strong></td>
<td>Demonstrate environmental impact of investment</td>
<td>Improve local and national emissions inventory</td>
</tr>
<tr>
<td><strong>Data Needs</strong></td>
<td>Enable accurate MRV reporting</td>
<td>Inform transport sector policy</td>
</tr>
</tbody>
</table>

In addition, investing in readiness offers benefits beyond simply the attraction of climate finance. As represented in Table 4.1, **spill-over effects of climate finance readiness** can boost the overall investment profile on a country, build up skills of both public and private actors, and mobilise support for gaining international finance for all suitable sustainable development projects more broadly.
Introduction

Transport is the second source of global energy-related CO₂, accounting for 23%, and a leading cause of greenhouse gas (GHG) emissions, comprising 15% worldwide (IEA, 2012). The sector is also the fastest-growing source of CO₂ emissions (UNEP, 2012). Without a massive change in transport patterns, the volume of atmospheric CO₂ attributable to the transport sector could double by 2050 (OECD, 2012). IEA suggests that to mitigate this impact, an average of $3 trillion—about 4% of 2011 global economic output—must be spent each year on capital, operations, maintenance and reconstruction costs (Dulac, 2013).

To minimise the emissions caused by new global transport investments, resources are needed to support energy-efficient and resilient low-carbon strategies. There is no agreed-upon definition of “climate finance” (Haites, 2011; Stadelmann et al., 2011; Buchner et al., 2012; Forstater and Rank, 2012). This paper adopts the Intergovernmental Panel on Climate Change (IPCC) definition and characterises climate finance as ‘all financial flows whose expected effect is to reduce net greenhouse emissions or to enhance resilience to the impacts of climate variability and projected climate change’ (IPCC, forthcoming). Sources of climate finance can be public or private, international or domestic. This definition includes the entire value of the financial flow rather than only the incremental cost associated with emissions reduction.

This definition of “climate finance” broadens the financial streams considered as supporting sustainable transport. Climate funds and other international public financing are more traditionally considered climate finance, and often focus on meeting the incremental cost of an investment with net emissions-reduction (an effective leveraging strategy for sectors like transport that are often capital-intensive). But private finance, too, can play a significant role in low-carbon transport. Research from the Climate Policy Initiative (Buchner et al., 2012) estimates that 70% of climate finance is private sector-sourced.

Box 1-1: Key References

For further information on readiness for, and mobilisation of, climate finance for transport see:


Aim, scope and structure

This paper aims to highlight the existing funds and opportunities, to provide a clear understanding on how to have access to these climate finance flows, and to catalogue what is needed in terms of performance tracking. These messages are intended for national and local decision-makers in developing countries, responsible for supporting low-carbon transport policy design and implementation.

In order to attract and effectively leverage climate financing, conditions in recipient countries must reflect the capability to plan for, access, and operationalise financing, and to monitor and report on impacts. Such conditions, defined broadly as “readiness”, apply to the capacities and actions of governments, institutional stakeholders, and the private sector, as well as to local resources and market conditions.
In this paper, “readiness” conditions focus on the recipient (how to get ready) rather than the funder (assessment of country’s readiness). Readiness in this sense is not a status but a process of improving conditions to access financing and leverage investment. The focus is primarily on land transport, which is at the core of the Bridging the Gap Initiative, and surface passenger transport in particular. It is acknowledged that substantial transport emissions are generated from other transport modes and activities, but these are not the focus of this paper.

The climate financing options described in this paper are largely international rather than domestic-focused, and cater to those sources and channels which are most likely to support low-carbon transport activities (Binsted et al., 2013). They include multilateral and bilateral institutions, carbon markets, and private sector entities. Domestic climate finance is a significant source of investment to be sure, but given the global reach of this paper is considered to be outside of the scope herein.

Part One presents the major climate financing mechanisms and institutions that fund transport, noting their orientation towards transport investments and an overview of how to gain access to funding. Part Two discusses the preconditions for accessing and receiving climate finance in the transport sector and the major challenges involved in this process. Part Three describes the challenges and best practices of measurement, reporting, and verification (MRV) of emissions impacts from policy action. The final section concludes.

Part One: Overview of existing funds and opportunities for transport climate finance

Globally, annual investment in all transport modes is estimated to be at least $1 trillion per year (Sakamoto, et al., 2010; Mahendra et al., 2013). Part of the uncertainty of this figure stems from the unclear figures of private investment, which are not consolidated or publicly available. It is clear, however, that most spending (64%) is domestic, from a combination of public and private sources, and that only a small fraction comes from climate funds and carbon markets (Figure 1-1).

It is difficult to estimate the proportion spent on low-carbon transport, but estimates of global climate finance (covering all sectors, including transport) totals about $359 billion (Buchner et al., 2013). About $230 billion of that (63%) comes from the private sector, but the allocation to the transport sector is difficult to determine. The rest is public sector, mostly from international sources (Figure 1-2). The investment of transport climate finance from national and sub-regional development banks was $4.3 billion 2012 (ibid).

![Figure 1-1: Composition of $1 trillion in global annual transport investment](source: Mahendra et al., 2013 (Sum of percentages exceeds 100 due to rounding)).

![Figure 1-2: Composition of $359 billion in global annual climate finance (all sectors)](source: Buchner et al., 2013)

Climate finance is a relatively new concept (most mechanisms were created within the last decade) and is constantly evolving. Box 1-2 lists several online sources with more information on the landscape of public sector climate funding. There are some 50 international public funds and carbon markets that can...
provide transport climate financing. The public sources and channels described in this section are funds which have been determined most likely to support low-carbon transport activities (Binsted et al., 2013).

1.1 What can be funded by transport climate finance

Climate finance for transport covers a broad range of activities and types of support. Activities include initiative planning and design, infrastructure development, operations, and capacity building. There is demand across all these areas, and climate finance support spans grants, loans, and technical assistance at the national and local level. Table 1-1 describes the eligibility criteria for the most significant climate finance mechanisms for transport.\(^1\)

Understanding the overlaps of various sources of support enables potential climate finance recipients to plan and focus funding pursuits. The table highlights the flexibility of NAMAs and also suggests the difficulty of extending debt financing to local governments. Although low-carbon transport actions are often implemented at the municipal level, investors are only likely to invest in local public debt if a jurisdiction has a favourable credit rating. Sub-sovereign credit ratings are rare for developing cities, and depend on an assessment of urban financial governance by international rating agencies (more detail in Section 1.6).

### Table 1-1: Features and criteria of largest funds, NAMAs, and private sector for funding low-carbon transport

<table>
<thead>
<tr>
<th>Recipient Status</th>
<th>CTF</th>
<th>GEF</th>
<th>GCCA</th>
<th>ICI</th>
<th>Japan's FSF</th>
<th>NAMA Facility</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>National government</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Regional government</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Local government</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Private sector</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actions Supported</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts &amp; planning</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital investment</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations &amp; maintenance</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology transfer</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity building</td>
<td></td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Types Of Support</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Technical Assistance</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*Source: Binsted et al., 2013*

The private sector has the potential to fill the financing gap, though more often through project finance. The actions supported are also narrower, as private investors will only support activities which can generate a secure funding stream for repayment. Still, it can be a valuable lever for projects at the local level. In Mexico City, for example, the private sector contributed about $40 million for the installation of the infrastructure for Line 4 of the Metrobús BRT system as part of a concession agreement (Francke et al., forthcoming).

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\(^1\) For more detail on what activities can be funded with which types of support, refer to Box 1-1.
Given the diversity of climate funding sources, determining where to turn for support can be a challenge. See Box 1-1 for key resources on where to find climate finance support according to particular goals and needs.

1.2 Climate and environmental funds

The major source of international public investment in climate finance is through climate and environmental funds. These funds make investments in initiatives that will have a climate change mitigation or adaptation impact. For transport, the modes and activities funded are generally those employing cleaner fuel sources or systems which reduce the role of private motorised transport. Due to the recent embrace of climate change impacts by the international community, new funds are being created. The most important funds for low-carbon transport are listed in Table 1-2 and briefly described below. A relevant distinction is between multilateral and bilateral funds.

Table 1-2: Size of climate funds and transport spending as of 2012

<table>
<thead>
<tr>
<th>Fund Name</th>
<th>Acronym</th>
<th>Year Created</th>
<th>Admin</th>
<th>Spending Approved (millions of USD)</th>
<th>Spending on Low-Carbon Transport (millions of USD)</th>
<th>Proportion of Spending on Low-Carbon Transport</th>
<th>Low-Carbon Transport Actions Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MULTILATERAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Technology Fund</td>
<td>CTF</td>
<td>2008</td>
<td>WB</td>
<td>2,300</td>
<td>372.6</td>
<td>16.2%</td>
<td>43</td>
</tr>
<tr>
<td>Global Environment Facility</td>
<td>GEF</td>
<td>2010*</td>
<td>WB</td>
<td>452</td>
<td>45.3</td>
<td>10%</td>
<td>6</td>
</tr>
<tr>
<td>Global Climate Change Alliance</td>
<td>GCCA</td>
<td>2007</td>
<td>EC</td>
<td>382</td>
<td>10</td>
<td>2.6%</td>
<td>3</td>
</tr>
<tr>
<td>Nordic Development Fund</td>
<td>NDF</td>
<td>2009*</td>
<td>Nordic gov'ts</td>
<td>180.19</td>
<td>16.88</td>
<td>9.4%</td>
<td>3</td>
</tr>
<tr>
<td>ADB Clean Energy Fund (Partnership Facility)</td>
<td>CEF(PF)</td>
<td>2007</td>
<td>ADB</td>
<td>72.3</td>
<td>0.87</td>
<td>1.2%</td>
<td>2</td>
</tr>
<tr>
<td>IDB Sustainable Energy and Climate Change Initiative</td>
<td>SECCI</td>
<td>2007</td>
<td>IDB</td>
<td>58.7</td>
<td>5.2 **</td>
<td>8.9%</td>
<td>Unknown</td>
</tr>
<tr>
<td>ADB Climate Change Fund</td>
<td>CCF</td>
<td>2008</td>
<td>ADB</td>
<td>50.1</td>
<td>5 **</td>
<td>10%</td>
<td>4</td>
</tr>
<tr>
<td>Partnership for Market Readiness</td>
<td>PRM</td>
<td>2012</td>
<td>WB</td>
<td>5.25</td>
<td>3</td>
<td>57.1%</td>
<td>16</td>
</tr>
<tr>
<td><strong>BILATERAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan Fast Start Fund Initiative</td>
<td>n/a</td>
<td>2009</td>
<td>JICA</td>
<td>10,800</td>
<td>1,270</td>
<td>11.8%</td>
<td>8</td>
</tr>
<tr>
<td>International Climate Initiative</td>
<td>ICI</td>
<td>2008</td>
<td>BMU</td>
<td>639.7 †</td>
<td>23</td>
<td>3.6%</td>
<td>9</td>
</tr>
</tbody>
</table>

Sources: 2012 annual reports and related publications from each fund.
*Most recent environmental/climate change-related funding cycle.
**Estimated
† Mitigation funding only

i. Multilateral funds

Multilateral institutions gather capital from numerous international donors. Some of these resources furnish climate funds, which abide by the financing criteria of their parent institution. Usually, both the public and private sectors are eligible for financing; indeed, the major climate funds acknowledge the import of leveraging support in both sectors and promoting public-private partnerships (PPPs) (www.climatefundsupdate.org). Combining multiple sources of
financing is encouraged and often required for multilateral support. The proportion of the multilateral funds devoted to transport, however, is variable (see Table 1-2). The principle multilateral funds for transport climate finance are listed below.

**Clean Technology Fund (CTF)**
Created in 2008, the Clean Technology Fund is implemented by six MDBs.² The CTF was created to support mitigation or adaptation on more concessional terms than standard MDBs use (USAID, 2013).³ Its intended purpose is the development, demonstration, and diffusion of low-carbon practices and technologies, in the power, energy efficiency and transport sectors. To date, 43 approved actions (accounting for $16.2% of CTF’s $2.3 billion total spending since 2008) have been in the transport sector (CIF, 2012).

**Global Environment Facility (GEF)**
The Global Environment Facility (GEF) is an operating entity of the UNFCCC.⁴ Although not exclusively dedicated to climate finance, the GEF has substantial funds for climate-change mitigation/adaptation, which generally cover incremental costs. The most recent installation of GEF funds, GEF 5 (2010-2014), includes promoting energy efficient, low-carbon transport and urban systems as one of the key mitigation objectives. To date, GEF 5 has funded 6 transport actions with $45.3 million, 10% of its approved spending (GEF, 2012; GEF, 2013). This amount leveraged an additional $700.6 million in co-financing from national governments and other sources. The GEF’s co-financing ratio for transport initiatives is 1:10.8, and has been steadily increasing.

**Global Climate Change Alliance (GCCA)**
The European Commission created the GCCA in 2007 and manages on-going operations. The GCCA only supports technical assistance and capacity-building in the countries most vulnerable to climate change effects. The GCCA offers assistance around the world but only through grants. It is one of the few funds that does not finance the private sector. It is also unique because support is not contingent on co-financing. To date, three national programmes (in Samoa, the Seychelles, and Solomon Islands) which include transport components have received just over $10 million (GCCA, 2012). This comprises just under 3% of the fund’s spending.

**Nordic Development Fund (NDF)**
The NDF is an international development finance institution backed by five Nordic countries. Its mandate as of 2009 covers climate change-related investments; in those three years it has supported three initiatives (about 9% of its funding) in the transport sector (NDF, 2013).

**ADB Clean Energy Fund (CEF)**
The Asian Development Bank (ADB) created the CEF as a flexible fund supporting energy efficiency and energy security in Asia. In addition to grants, loans, and technical assistance, the CEF will support ‘any other form of co-operation’. The CEF expanded to incorporate funding from more countries, resulting in the establishment of the Clean Energy Financing Partnership Facility (CEFPF). Of the new entity’s $72.3 million spending, however, only about $870,000 financed transport actions (ADB, 2012b).

**Sustainable Energy and Climate Change Initiative (SECCI)**
An initiative of the Inter-American Development Bank (IDB), SECCI was created in 2007 primarily to increase investment in renewable energy and energy efficiency in Latin America and the Caribbean. SECCI is a small fund that commonly supports actions across multiple countries: about one-third of SECCI’s budget supported regional programmes (Yu and Miller, 2010). Through 2010, SECCI allocated about 9% of its $58.7 million spending on the transport sector

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² AfDB, ADB, EBRD, IDB, IFC, and World Bank.
³ This includes longer durations, lower interest rates, and repayment grace periods.
(Ibid). To complement the SECCI fund, IDB created the Regional Environmentally Sustainable Transport Action Plan in 2010 to raise the profile of the sector in ADB projects.

**ADB Climate Change Fund (CCF)**

A second ADB initiative, the CCF, was created in 2008 to support adaptation and mitigation activities in Asia. ADB estimates that 75% of the CCF funding will be dedicated to mitigation. Of these mitigation funds, 10% (four actions) supported sustainable transport, a total of about $5 million (ADB, 2012a). In addition to the CCF, the ADB created the Asian Sustainable Transport Urban Development programme, linking up with GEF funding for 2012-2017.

**Partnership for Market Readiness (PMR)**

The PMR is a capacity-building trust fund created in 2012 and managed by the World Bank. Its goal is to support carbon market readiness in Brazil, Chile, China, Colombia, Costa Rica, Jordan, India, Mexico, Morocco, South Africa, Thailand, Turkey, Ukraine, and Vietnam. Support is given through grants to countries in order to develop carbon market-based instruments such as domestic emissions trading or credited projects. OECD countries have pledged over $100 million to the PMR. In 2012, the PMR spent $5.25 million on actions of $350,000 each; more than half of that total (57%) supported transport. This is the largest proportion of funding spent on transport among the funds listed here. More actions are currently underway and, moving forward, the PMR will disburse funds in increments of $3 million to $8 million (UNDP, 2011); it plans to target investment in Brazil, Mexico, and Colombia (PMR, 2013).

**ii. Bilateral climate funds**

Bilateral institutions provide financing from one country to another. Bilateral climate funds are often the channels for national commitments to climate change spending. The principle bilateral funds available for transport climate finance are:

**Japanese Fast-Start Finance (FSF) Initiative**

The Japanese FSF was launched in 2009 to support sustainable economic growth and in particular those countries that are most vulnerable to climate change impacts. Although it has fallen just shy of an ambitious mandate to amass $15 billion in assets by 2012, the fund has approved $10.8 billion in spending to date. About $1.27 billion has been directed to 8 transport projects (UNFCCC, 2012). Japan’s FSF is by far the world’s largest climate funder of low-carbon transport in absolute terms, but it is also the least transparent about what precise efforts have been funded.

**International Climate Initiative (ICI)**

The ICI is a German initiative from 2008 that has grown quickly in the past several years. It has initiated hundreds of actions and approved over $1 billion in spending. About 52% ($639.7 million) is dedicated to mitigation. Of that, $23 million has been directed to nine projects in the transport sector (BMU, 2013). Like the GEF, ICI only gives grants and runs technical assistance initiatives.

**1.3 Carbon markets**

Carbon markets supply financing for low-carbon development by capitalising carbon reduction measures into redeemable credits. Based on local system allowances, national limits, or corporate sustainability goals, private companies and individuals buy and sell emissions credits. The weakness of carbon markets is their volatility; reinvestment in sustainable projects is difficult if the price of carbon falls too much. The value of voluntary markets reached almost $570 million (Kossoy et al., 2012); voluntary offsets accounted for about 54 million tonnes of CO₂e being traded in 2008 but have supported almost no transport projects (CDC Climat, 2013). Compliance markets for carbon trading exceeded $175 billion in 2011. Carbon markets have primarily used the Clean Development Mechanism (CDM) to support low-carbon development, especially in developing countries.  

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5 Most of this total came from Fast-Start Finance, or rapidly-mobilised climate finance funds, which is further explained in Section 1.5.

6 Although the Annex I countries that receive investment via Joint Implementation are generally not considered “developing,” several comprise the intended audience of this paper.
i. Clean Development Mechanism (CDM)

The CDM is a project-based carbon trading mechanism under the Kyoto Protocol which has operated since 2004. The CDM allows low-carbon projects in developing countries to generate income from the trading of certified emission reductions (CERs). These CERs can be used by industrialised countries to meet a part of their emission reduction target under the Kyoto Protocol. While trading CERs is unlikely to cover investment costs for transport projects, it can add a significant funding stream in the long run, making a project more sustainable or financially attractive. In order to be eligible under the CDM, projects have to deliver real, measurable and long-term emission reductions that are additional to what would have happened without support through the CDM (called additionality). In order to secure these requirements, a stringent and comprehensive regime of rules, procedures and methodologies for the monitoring, reporting and verification (MRV) of emission reductions has been developed under the CDM.

Transport has not been a very successful sector in the CDM. As of July 2013, just 28 out of 7,128 (0.6%) registered projects are transport projects. These projects have been able to reduce a total of about one million tCO₂ so far, which represents less than 1% of the CDM’s overall mitigation impact to date. The key reason for the stark underrepresentation of transport projects in the CDM is the stringent MRV requirements. Estimating emissions reductions precisely is difficult for transport projects due to the data collection and methodology challenges of tracking a large number of mobile sources. Most existing CDM transport methodologies are thus highly complex and require large amounts of data which are often not readily available at the required quality. It has also been difficult to prove the additionality of projects in the transport sector where climate change is only a minor factor in decision-making and policy. The up-front costs for preparing a transport project for CDM compliance are therefore rather high and demand a lot of specialised efforts in developing countries. Due to such problems, most CDM project developers have shown little interest in transport so far.

ii. Joint Implementation (JI)

JI is very similar to, but less common than, the CDM. Instead of supporting low-carbon action in developing countries, JI initiatives route funds from one Annex I country to another. Projects are also approved by the UNFCCC, and the resulting carbon units, Emissions Reduction Units (ERU), are traded the same way as CERs. Complications like double-counting have arisen in Europe, however, due to interplay between JI initiatives and the EU Emissions Trading Scheme (OECD, 2010).

1.4 Nationally Appropriate Mitigation Action (NAMA)

NAMAs are relatively new instruments introduced to encourage voluntary action on climate change mitigation in developing countries. The NAMA concept was conceived at the UNFCCC climate change conference in Bali in 2007. A NAMA constitutes any voluntary climate change mitigation activity conducted in developing countries at the national, regional or local level. NAMAs can apply to policy and planning activities, making it broader and more flexible than project-based modalities like the CDM. NAMAs are also intended to be tailored to each country’s own priorities for sustainable development, making evaluation methods less rigid. The modality is new and, while many NAMAs have been proposed to date, none have been implemented.

There are three types of NAMAs: unilateral, supported, and credited. Unilateral NAMAs are autonomous actions by developing countries backed by local resources; external support takes the form of recognition. Supported NAMAs are undertaken with external support and a more stringent level of MRV. Finally, credited NAMAs trade their associated carbon offset credits in international markets. Presently there are several examples of transport NAMAs being developed and they are either domestic or bilateral (supported). The market is not yet mature enough for credited NAMAs in the transport sector.

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7 One CER is equal to one tonne of carbon dioxide equivalent. (Source: http://www.co2offsetresearch.org).
8 The current list can be found at www.cdm.unfccc.int.
9 While unilateral and supported NAMAs have been internationally agreed-upon, credited NAMAs are still under discussion.
NAMAs may prove effective where the CDM has lagged. Although none have yet been implemented, their numbers have steadily increased since 2009 (Allen et al. 2013). The UNFCCC registry lists few transport-related NAMAs, but there are plenty of non-registered NAMAs which are fully developed and soliciting funding. The Ecofys database (www.nama-database.com) indicates that transport is the second-most common sector for NAMAs, comprising 19% of the 72 proposals under development\(^\text{10}\). The newly created Transport NAMA Database, which provides access to transport NAMAs that are at all stages from initial concept to implementation, is available at: http://www.transport-namadatabase.org.

The NAMA concept is still being refined. The process will be bottom-up rather than directed by the UNFCCC. There is no standard financing strategy or MRV methodology. A new fund, the NAMA Facility (http://www.international-climate-initiative.com/en/issues/nama-facility), aims to help operationalise NAMAs. The Facility uses resources from the German and United Kingdom governments to finance exclusively NAMA activities. Created in 2012, the Facility currently has $90 million to support NAMA activities through existing bilateral channels of the German Development Bank (KfW) (Jue et al., 2013). The fund intends to supply grants and loans between 5 million and 15 million euros (DECC, 2013). It is intended to support a broad range of actions and sectors, including transport. The NAMA Facility has selected one initiative (an energy-efficient housing programme in Mexico) to date and the first call for proposals was announced in July of 2013. Of the four projects which have been selected for in-depth appraisal, two initiatives (in Indonesia and Colombia) are in transport.

1.5 Fast-Start Finance (FSF) and the Green Climate Fund (GCF)

Complementary to the onset of NAMAs, pledges for new and additional funds to meet immediate demand without waiting for international consensus were made in response to the 2009 UNFCCC Copenhagen Accord. This so-called Fast-Start Finance (FSF) intended to inject a new round of funding into climate finance. In a response to the funding gap before the launch of the GCF, thirty-six developed countries pledged over $30 billion from 2010 to 2012. About 83% of this pledge was committed (Polycarp et al., 2012) and some funds will continue. These funds were intended to be “new and additional,” dispersed through new or existing climate funds as grants loans or other instruments. Some countries’ contributions were dedicated to particular sectors or funds. It is unclear how much of these funds supported transport projects: none of the 7.2 billion euros mobilised from the EU Member States supported transport, for example, but Japan’s FSF (as noted earlier) directed $2.1 billion to transport.

Sights are now set on the newest climate financing entity, the Green Climate Fund (GCF). The creation of the fund was approved by the UNFCCC in 2010; it should reach full operation in 2014 (www.gcfund.net). The fund is intended to be scalable and flexible, amenable to long-term low-carbon development strategies. The GCF will play a key role in assembling the committed yearly $100 billion by 2020, however it has proved difficult to get the level of commitment from Parties to commit funds to the GCF. The fund will include a public and private sector facility, both of which are likely to target the transport sector for investment. It remains unclear what quantity will be available for transport actions, however, given that there are no sectoral windows.

1.6 Private investment

Private sector financing is responsible for the vast majority (about 63%) of present climate finance across sectors. For transport, this covers largely the project implementation side—building or maintaining infrastructure, supplying vehicle stock, and operating mass transport. The UNFCCC maintains that $10 trillion of investment across all sectors is needed in the next decade, and that about 85% of that must come from the private sector (Buchner et al., 2012). This includes users and small-scale local investment as well as large-scale financing and foreign direct investment. Volumes of private debt and equity investment are not well understood. The U.S. Agency for International Development (USAID) estimates that there are 6,000 private investment funds active in climate finance around the world, but evidence on what portion is invested in transport is difficult to ascertain (USAID, 2013).

i. Potential sources

There are myriad sources of private financing for low-carbon transport. Infrastructure funds and institutional investors, in particular, have played a significant role in developing mass transport,

\(^\text{10}\) The Ecofys database only considers supported NAMAs, so there are many unilateral ones unaccounted for.
particularly rail, in large, rapidly developing countries (mostly China, India, and Brazil). This section describes what providers of private sector capital are available to support low-carbon transport.\textsuperscript{11}

**Commercial Banks**
Commercial debt can help to expand companies involved in low-carbon transport technologies or concessions and other risk-sharing structures common for public transport. Infrastructure projects for low-carbon transport modes depend heavily on commercial debt (Sharma, 2013). Often commercial banks will lend to infrastructure projects in developing countries through syndicated loans—pools of multiple banks financing a common project together.

**Institutional Investors and Investment Funds**
With an asset pool of nearly $60 trillion in global assets (USAID, 2013), institutional investors are playing an increasing role in investment in illiquid assets like infrastructure (OECD, 2012b). Pension funds and sovereign wealth funds, in particular, are attracted to the low-risk and long-term profile of infrastructure investments like transport. Institutional investors generally channel equity through infrastructure or environmental funds to finance low-carbon transport (see Box 1-3). Much of this funding is debt or equity invested in special purpose vehicles formed through a public-private partnership.

**Venture Capital and Private Equity**
These firms effectively take ownership positions in high-risk, high-return companies or projects in fields like new transport technology (UNDP, 2011). Many development banks, such as the ADB and International Finance Corporation (IFC), invest in private equity firms which reinvest in businesses solving energy and environmental challenges (OECD, 2012b).

**Climate Bonds**
Bonds are issued by companies or governments to raise long-term finance. Bonds which support low-carbon development, which are labelled “climate-themed”, raised about $74 billion in 2012, with almost 80% in the transport sector (CBI, 2013). The vast majority of climate-themed bonds are in the rail sector,\textsuperscript{12} which comprised 85% of bond value in 2012, although only 3% was in developing countries (Ibid). This could be a powerful climate finance mechanism as developing markets mature (USAID, 2013).

**Private Companies/Organisations**
Entities involved in transport service provision or related services play an integral role in supporting low-carbon transport at the local level. Project developers involved in PPPs or joint ventures are sources of project finance, and local businesses can support sustainable initiatives like non-motorised transport. In Tanzania, small-scale local businesses help popularise bicycles and community groups erected infrastructure to reduce the use of motorised vehicles (Pendakur, 2005).

\textsuperscript{11} Most details on private sector investors come from USAID’s 2013 “Fast out of the Gate.”

\textsuperscript{12} The reference publication (CBI, 2013) assumes that rail (including passenger and freight, but excluding coal shipment) is, broadly-speaking, a lower carbon emitter than comparable road/air alternatives, using the UK as an example. Ang et al. (2013) substantiate the low-carbon performance of passenger rail, citing the sector as an example of “sustainable land transport infrastructure for passenger use.”

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**Box 1-3: A climate-focused asset manager**
The Global Environment Fund is a private sector asset manager which focuses its investments on clean energy and energy efficiency companies. It is not to be confused with the United Nations-supported multilateral grant-making institution, the Global Environment Facility. Instead, the Fund has more than $1 billion in private assets, and attracts institutional investors like the Overseas Private Investment Corporation (OPIC) and other prominent foundations, endowments and pension funds. The company has financed several dozen private equity holdings in new technology across multiple sectors (USAID, 2013).
need an internationally-acknowledged credit rating to demonstrate creditworthiness. It will be difficult for many cities, especially in developing countries, to provide all the information necessary and fulfil all the requirements to obtain a credit rating. But a strong credit rating can lead to vastly increased private financial resources.

Credit rating systems assess creditworthiness, an analysis of the borrower’s capacity to repay based on an evaluation of different factors such as the sources and composition of expenditures and revenues, nature of assets and liabilities, and degree of budget transparency. Creditworthiness, as assessed by market players including rating agencies (like Moody’s or Standard & Poor), should consider the local resource endowment, soundness of the local government finance framework and its capacity to withstand stress and issue debt in a way consistent with long-term macro-economic stability. Thus, credit analyses of sub-sovereign issuers and the assessment of an issuer’s ability to service debt seek to address the following:

1. **Economic and social characteristics of the jurisdiction.** This would include local resource endowment, existing stock of productive assets, level/distribution of income, level of education, quality of services, etc.

2. **Sources and composition of revenues and expenditures.** This covers the predictability of fiscal relations with, and transfers from, central government; and the local revenue base, including composition of taxes (property, business, development, sales, etc.), adequacy of tax rates and tax administration, and existence, diversification and sustainability of other revenues upon which local governments would call to meet debt service.

3. **Structure of local government financial operations.** This includes outstanding debt and other financial commitments; structure of assets/liabilities; liquidity availability; the quality of financial controls and the transparency and credibility of budgeting; accounting and auditing systems; and the issuer’s record in honouring financial commitments especially under adverse circumstances.

4. **Regulatory and institutional setting for local service delivery.** These conditions refer to the capacity and efficiency of local government institutions; quality of local asset management; degree of autonomy of utilities companies; reliability of services to consumers and recurrent income; competition and pricing policies in the provision of local services; criteria for monitoring performance of monopoly services; and processes for planning and selecting local investments (including infrastructure) that help local government expand businesses and increase employment.

5. **Legal and regulatory environment for local government credit.** Such an environment includes the framework for debt issuance, settlement, repayment and custody; regulations on local government bankruptcy; creditors’ rights and claims on local assets against other liabilities, etc.

6. **Credit enhancement mechanisms.** This would cover the assessment of features that strengthen the credit of local government debt issues in providing security collateral through dedicated streams of income, third party support such as guarantees, insurance.

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**Part Two: What does it mean to be ready for transport climate finance?**

Readiness for climate finance is defined by UNDP (Vandeweerdt et al., 2012) as ‘*the capacity of a country to plan for, access, deliver, monitor and report in ways that are fully integrated with national climate change strategies and development priorities*’. Addressing the categories of this framework signals to investors that the transport sector is primed for investment in sustainable, low-carbon transport.

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In many ways, the conditions necessary to finance low-carbon transport are similar to any investment proposition. Activities must be bankable; there must be appropriate capacity in-country to receive and invest funds transparently and cost-effectively; and investments must be designed, operated and managed in accordance with the requirements of the funding source. Climate finance bears the additional burden of demonstrating emissions reductions.

Financing low-carbon transport faces additional challenges over other sectors. Conducting MRV for GHG emissions from the transport sector is particularly difficult because emissions come from a large number of mobile sources, making data collection and MRV methodologies a struggle. Transport is also a resource-intensive sector, necessitating the use of more funding sources and greater leveraging than other sectors. Thus, it is important to plan strategically, attract private investors, and demonstrate co-benefits to drive broader support for low-carbon transport. The major barriers to transport finance have included technical capacity, national and local policies on fuel and mobility, and undeveloped local industries which support low-carbon transport development.

This section introduces strategies and conditions to address these and other challenges. As shown in Figure 2-1, the seven readiness components of this framework are: an enabling environment, proper institutional arrangement, a financial strategy, attracting the private sector, data needs, calculating emissions, and assessing co-benefits.

**Figure 2-1: Framework for transport readiness for climate finance**

<table>
<thead>
<tr>
<th>Institutional Arrangements</th>
<th>Financial Strategy</th>
<th>Attracting the Private Sector</th>
<th>Data Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling Environment</td>
<td>Assessing Co-benefits</td>
<td>Calculating Emissions</td>
<td></td>
</tr>
</tbody>
</table>

### 2.1 Institutional arrangements

Leveraging climate finance requires a regulatory and institutional framework that is effective, stable, and accountable. The effective participation and coordination of planning institutions is therefore a critical precondition to prepare for climate finance (Nakhhooda et al., 2012). This is particularly important in the context of developing a plan and supporting agencies for implementing, executing and verifying transport climate finance. Recipient governments must share a common strategic vision and identify regulatory and institutional gaps that might impede the coordination of climate finance activities (PMR, 2011). These needs are facilitated in two directions: by coordination across administrative levels and among sectoral authorities.

#### i. Coordination between national and local governments

Transport climate finance is often accessed at the national level and filtered down to the regional and local jurisdictions where funds are dispersed. Further, data on transport outcomes is often collected by local authorities (see Section 2.7 for more on data calculation processes), and bundled up to higher administrative levels to measure broader impacts. To ensure that resources and accountability transcend national and local levels, coordination between levels of government is essential. The process is a challenge for several reasons: cities are often not involved in national climate change dialogues or policies; the political, economic, and emissions boundary of a city are difficult to reconcile; and city governments have varying levels of autonomy (Lefevre, 2012). But ensuring coordination between national and local authorities crucially aligns plans and expectations. This can be done in a variety of ways – Mexico has passed a climate law that helps to encourage coordinated efforts at national and local levels. The Indonesian government took a step in this direction in 2011, when they reorganized government institutions and published “Guidelines for Implementing Greenhouse Gas Emissions Reduction Action Plan” in an effort to guide actions from the central and local governments to support NAMA development (van Tilburg et al., 2012).
ii. Coordination among agencies and departments
Climate change-resilient development is by nature multi-sectorial. As such, effective implementation of low-carbon transport initiatives necessitates collaboration across sectors of government to ensure that efforts are properly coordinated in order for resources and responsibilities to be properly allocated (Nakhooda et al., 2012). Climate financed actions, especially in the transport sector, should also be incorporated into broader low-carbon development strategies (Polycarp et al., 2013). Government authorities which can contribute to data collection, policy support and planning efforts for low-carbon transport include (in addition to transport-related bodies) the fields economic development, environment, energy, and finance. Insufficient coordination across sectors of government leads to fragmentation and duplication, impairing the effectiveness of actions and related on-going development.

2.2 Enabling environment
Research from the OECD (Kennedy et al., 2012; Ang et al., 2013) states the readiness conditions for transport climate finance include strategic goal-setting, public incentives, financial policy, and capacity-building. This paper adapts these conditions into the concept of an enabling environment. An enabling environment for low-carbon transport is the overall market conditions that drive investment in low-carbon transport technologies and services (Stadelmann et al., 2011). This definition applies to the favourability of the market, including government action and private sector capabilities. A small investment in an enabling environment can lead to a big payoff in terms of stimulating climate finance investment (Polycarp et al., 2013). An enabling environment for transport is described here in four areas: laws and policies, institutional and market capacity, regulation, and economic policy. As shown in Figure 2-2, actions across these areas span the national and local levels.

Figure 2-2: Examples of steps to create an enabling environment at the national and local level

i. Laws and policies
Government support for low-carbon transport—through laws, policies, emissions targets and mandates—sends a strong signal to potential investors that climate change is a priority issue and aligns consumer incentives with climate change prerogatives. Removing fossil fuel subsidies, for example, can be a powerful national-level action that stimulates market demand for low-carbon transport. At the local level, one of the most important enabling policies is integrating land-use and transport planning (Inderst et al., 2013). A significant amount of political will is often required to secure broad governmental and public support for sustainability programmes (Dalkmann, 2007). In Brazil, for example, a 2012 National Urban Mobility Law...
made clear the government’s intention to prioritize public and non-motorised urban public transport. The law, implemented by the Brazilian Ministry of Cities, requires municipalities with over 20,000 inhabitants to create mobility plans (FGV, 2012). In direct response, the city of Belo Horizonte is developing a supported NAMA proposal for a comprehensive city mobility plan to include enhanced public transport, fare integration, non-motorised transport infrastructure, and land use studies (Harrison, 2013). The project is requesting financial support from the federal Brazilian government and technical assistance from multiple sources.

ii. Institutional and market capacity
There are significant institutional capacity needs in the public and private sectors in developing countries that can impede or limit transport climate investment. Climate change mitigation actions demand the technical, managerial and administrative skills for programme design and implementation (Polycarp et al., 2013). Transport, in particular, demands further specialised skills in the fields of infrastructure finance, traffic engineering, and urban planning. Financing plans for sustainable transport actions should include resources to be used for building these public sector skills (Mahendra et al., 2013). In India, for example, the country’s national urban development programme, the Jawaharlal Nehru National Urban Renewal Mission, includes a financing plan with 1% of local grant funds set aside for capacity building efforts (MoUD, 2013). These skills are valuable in the local private sector as well. Civil society organisations must be capable of analysing issues and working alongside the government (Polycarp et al., 2013). Local industry in project development, communications, and storage and technical services must have the capacity to support implementation of low-carbon transport projects.

iii. Regulation
All financial investments require risks to be limited and fairly allocated. It is important that laws and industries are underpinned by predictable and enforced regulation. Rules of conduct and accountable regulators provide stability and assurance to investors that long-term investments like transport activities will provide them with returns that are high enough to justify their investment. Climate funding requires added effort in terms of ensuring that the project will also deliver the mitigation goals that are set out. Leveraging and scaling transport climate investment (particularly from the private sector) is quite difficult without regulations like fuel standards, safety standards and financial regulation.

iv. Economic policy
Economic policy—fiscal, financial, and monetary—plays a key role in signalling market readiness. Governments’ tactful use of subsidies, tariffs, and tax structures can provide incentives to encourage low-carbon investment. By combining smart fiscal policy with sound monetary policy (e.g. currency valuation and interest rates) governments can lay the foundation for economic growth and can help assure investors of a predictable return. A critical policy issue in the transport sector is the easing of fossil fuel subsidies (Whitley, 2013). Annual fossil fuel subsidies could be as high as $700 billion (Bast, et al., 2012), and often exceeds basic services. In 2011, for example, fossil fuel subsidies in Venezuela, Indonesia, and Pakistan were twice as high as education spending (ODI, 2013). Phasing out fossil fuel subsidies could independently reduce global emissions 6% by 2050 (UNEP, 2008) and encourage investment in low-carbon alternatives. Macroeconomic conditions give investors a convenient pulse-check on the value of a particular market.

2.3 Developing a comprehensive financial strategy
The ability to develop and, more often, to implement a sustainable low-carbon transport activity can be dependent upon the receipt of climate finance. The volumes of climate finance are, however, considerably smaller than those of other more traditional sources of finance (Sakamoto, et al., 2010). Particularly with transport, which often requires high up-front costs and long-term investment, climate finance needs to be ‘packaged’ with multiple sources of funding. It is often discussed in relation to ‘co-financing,’ ‘blending,’ ‘leveraging’ (see Box 2-1). It is therefore imperative that transport decision-makers engage with financial strategy and that they recognise the role of relevant stakeholders in developing a financial strategy.
comprehensive, multi-tiered financial strategy. These stakeholders include domestic and international experts (such as financiers, NGOs, and the private sector) who can support governments to establish and manage comprehensive financial strategies.

Baseline domestic public sector funding can be part of a financing strategy. In order to optimise its ability to leverage transport climate finance (and to demonstrate commitment) domestic budget allocations should be reviewed, and where necessary steps taken to reallocate, to ensure that revenues are earmarked for investment in sustainable transport. An example at the national level is Mexico’s federal public transport programme (PROTRAM), which was formed in 2009 to provide federal funding for public transport in large cities. PROTRAM, which is managed by the National Works and Public Services Bank, offers grants to cover studies and infrastructure costs. It should not, however, be forgotten that discretion for setting new priorities with budgetary implications can be limited (Lefevre, 2012), and that any related changes are likely to be time consuming to take effect.

The allocation of national budgets is a challenging task, but there is the scope for all countries to do so in support of low-carbon transport and related national and international goals. It requires government priorities and associated project appraisal frameworks to be aligned with this goal. Several developing countries have established national funds to support this earmarking of funding for climate change mitigation in key sectors like energy, land use, and transport. The Indonesia Climate Change Trust Fund (ICCTF), for example, was established to facilitate investment in nationally appropriate climate change activities (see ICCTF, 2012). The relationship of the ICCTF to collaborating entities in Indonesia is represented in Figure 2-3. These national funds can also facilitate the combination and blending of sources of finance, as well as the leveraging of public funds to attract climate finance (see UNDP, 2013 for more information).

**Figure 2-3: Relationship of ICCTF to other Indonesian climate finance authorities**

![Diagram showing the relationship of ICCTF to other Indonesian climate finance authorities](http://www.icctf.or.id)

**Box 2-1: What it means to combine, blend and leverage sources of finance.**

**Blending** is a climate finance term that refers to the process of combining grants and loans to finance projects, often with the help of ‘blending mechanisms’ or ‘blending facilities’ (e.g. Latin-America Investment Facility, EU-Africa Infrastructure Fund). Any sources of finance can be co-financed (or ‘packaged’), whereby multiple sources are combined. Grants can combine with debt instruments (notably loans) and other instruments. The blending of finance can serve to make a project financially viable, and ensure a high leverage of grant funds.

**Leveraging the private sector** refers to the process of public finance being used to encourage private investment. The availability of public finance, and the instrument used, can reduce the perceived level of risk for the private sector, thereby making it more attractive to private sector investors. The blending of finance, which can increase the affordability of debt instruments, can also, for example, leverage private sector investment, thereby supporting the combination of a larger number of sources of finance. See UNCRD (2013) for additional details and examples of leveraging in the context of sustainable low-carbon transport.
The ‘blending’ of climate finance in financial strategies requires an understanding of the complementarities of these different funding sources, such as the ability for debt instruments and grants to be combined to reduce the total cost of capital. Such an understanding requires financial experience, early planning and support at the most influential political level. This helps identify any potential incompatibilities between sources of finance. The eligibility criteria, evaluation criteria, and MRV processes, for example, vary considerably between different funders having a range of safeguarding policies and procedures in place. In developing a comprehensive finance strategy decision makers should be mindful from the outset of the different requirements of funding sources.

In reality, as transport projects are often quite complex, they are usually based on some form of blending (either intentionally or unintentionally). The BRT system in Mexico City, Metrobús, is an example of an initiative that successfully blended financing from the CDM, the World Bank, and the private sector (Francke et al., forthcoming).

Private finance is an integral component of financial strategies for transport project implementation, and the need to increase focus on leveraging private sector investment is particularly high in the current economic climate. This is reflected in the approach of International Financial Institutions (IFIs), which are placing increasing emphasis on the fact that their key role should be to leverage private investments in low-carbon activities.

Involving private finance for transport typically implies transferring project responsibility and risk to the private sector, a legal and administrative challenge for many countries. Several proven models exist, such as BOT (Build, Operate, Transfer), DBOT (Design, Build, Operate, Transfer), etc. National finance and ODA, however, can be used to catalyse private sector investment, notably by offering guarantees or coordinating loans from multiple lenders (see Section 2.4 for more about private sector investment). This is an example of where the ‘blending’ of finance needs to be based on a robust understanding of the characteristics of different sources of finance.

### 2.4 Attracting private sector transport investment

Given the large role of the private sector in—and the increased need for—transport investment in terms of capital and operating costs, fostering conditions favourable to the private market is critical. At present, private companies are almost always involved in transport actions through concessions, PPPs, and procurement. This presence can be leveraged to support more low-carbon development. Businesses and financial institutions including banks, industries, equipment providers, etc. are generally interested in participating in low-carbon urban transport but there is a need to increase the perceived profitability of investment.

Private investors aim to maximise return and minimise risk. There are several potential risk factors that act as barriers to sustainable transport investments: political risk (e.g. regime change), technological risk (e.g. failure of switching or signalling systems), financial risk (e.g. macroeconomic manipulations), construction risk (e.g. delays or unexpected costs), operational risk (e.g. accidents or vandalism), and commercial risk (e.g. incorrect cost or volume estimates due to factors like poor data) (Nash, et al., 2001). Although attracting private sector investment can often be a faster process than for public investment, it often requires the use of financial instruments that mitigate these kinds of risks.

Public institutions can provide de-risking instruments to help increase investors’ confidence by reducing costs, increasing revenues, or guaranteeing project profitability. Experience in São Paulo, Bangkok, and Buenos Aires (Rebelo and Benvenuto, 1995; Zegras, 2002) has shown that financing urban public transport depends on assurance for private investors that economic or political volatility will not endanger profits. Important de-risking instruments include: insurance and guarantees which compensate investors if borrowers, including governments, default on payments for transport-related services; swaps or derivatives, which are financial arrangements where a borrower pays a fee or premium in exchange for risk coverage in the case that large fluctuations in weather, interest rates, currency valuation, or commodity prices affect demand for the transport sector; local currency loans, which protect borrowers from fluctuating exchange rates; and liquidity facilities, which allow borrowers access to quick, short-term cash flow to insulate against foreign exchange risk (Venugopal et al., 2012). In developing countries, where political and macroeconomic risks are common, these types of
instruments are valuable tools that public institutions can use to improve the risk/reward profiles of low-carbon transport investments and thus attract private sector investors.

The financing of the São Paulo metro Line 4 offers an example of de-risking for sustainable transport. The state government of São Paulo had agreed to on-going subsidies to the private concessionaire of the metro line in order to keep tariffs low. Private bidders were worried that a change in government would lead to a halt in these contractual payments because government disbursements must be budgeted and approved each year. In order to assuage investor risk, the state agreed to reimburse the concessionaire from a separate guarantee fund called the Paulista Partnership Company in the case of default.

2.5 Assessing co-benefits

Low-carbon transport initiatives have widespread positive externalities, also known as “co-benefits”. The implementation and operation of transport-related actions have substantial co-benefits across the social, economic, environmental, and health sectors. For example, an improved public transport system can reduce congestion, which improves commuter access to jobs (social mobility), speeds up business supply chains (economic productivity), improves air quality (environmental protection), and reduces respiratory disease from pollution (public health). It is worth noting that the successful use of climate financing mechanisms has its own co-benefits as well, including international recognition and building relationships with funders.

These positive impacts substantiate the cost-effectiveness of sustainable transport and drive baseline funding. Most transport activities depend on the added value of co-benefits to mobilise political will and budgetary resources. This can be particularly true of NAMAs, given their local nature. For example, in cases where potential environmental benefits of more sustainable transport are insufficient to compel public approval, the demonstration of co-benefits to daily commuting costs may be the most valuable point of leverage for policymakers. Effectively assessing co-benefits also makes it easier to implement a comprehensive financial strategy. Demonstrating the economic benefits of low-carbon transport, for example, will help attract more private investment. Communicating potential co-benefits to both the public sector as well as to local industry can lead to greater private sector input, broadening policy effectiveness and leveraging resources (Nakhooda et al., 2012).

The estimation or quantification of co-benefits is helpful but its cost-benefit should be carefully weighted. Even after an action has been implemented, measuring co-benefits can strengthen an impact assessment but may not be worth the required resources.

The existence of co-benefits turns out to be decisive to encourage sustainable development. Decision-makers at the local level (but also at the national level) tend to recognise that, in practice, co-benefits are truly opportunities and their importance outweighs climate-related issues when it comes to supporting sustainable transport.

2.6 Calculating GHG emissions reduction

Demonstrating capability to receive climate finance also depends on the development of a robust emissions calculation methodology and the capacity to implement it. There are numerous standards for calculating GHG emissions from transport projects (Table 2-1), but certain climate finance mechanisms (namely NAMAs) enable governments to develop individualised protocols. NAMA emissions reduction calculation methodologies, if the actions are unilateral or supported, are customised and developed largely internally; if actions are credited, however, they should comply with the appropriate methodological approach.
Table 2-1: Characteristics of common transport emissions calculation methodologies

<table>
<thead>
<tr>
<th>Methodologies</th>
<th>Author*</th>
<th>Main features</th>
</tr>
</thead>
</table>
| AM0016, AM0031, AM0090 AM0101, AM0110 | CDM | - Eight different methods for specific transport modes (including BRT)  
- Stricter, with more data requirements about ownership, operation and technical attributes (because CERs value is tied to this evaluation) |
| “Citywide Transportation Greenhouse Gas Emissions Inventories” | WRI | - Has levels of ideal, optional, and less desirable data types and sources  
- Recommends hybrid approach of top-down and bottom-up to corroborate findings |
| “Manual for Calculating Greenhouse Gas Benefits of Global Environmental Facility Transportation Projects” | GEF | - Focus on projections since GEF funds given up-front  
- Not overly data-demanding  
- Interested in indirect impacts and market development |
| Clean Technology Fund Guidelines for Calculating GHG | CTF | - Useful for projects of varying sizes as the boundary requirement is not fixed  
- Based on thorough modelling at relatively high cost |
| Transport Emissions Evaluation Model (TEEMP) | CAI Asia, ITDP ADB, UNDP, and GEF | - Used by many large climate funds  
- Conducts a “project” and “no-project” scenario  
- Available for 14 different interventions  
- Tailored to use available data not only requisite data |
| Custom NAMA methodology | n/a | - Includes more qualitative and projected benefits  
- Methods agreed upon bilaterally (if a supported or credited project). |

Sources: World Bank, 2010; www.slocat.net; ITDP, 2011; and manuals for each of the methodologies listed.
* WBCSD is the World Business Council for Sustainable Development; CAI is the Clean Air Initiative; ITDP is the Institute for Transportation and Development Policy.

Transport climate finance requires emissions performance tracking in order to demonstrate effectiveness and (in the case of the CDM or credited NAMAs) to quantify emissions reductions for carbon credit generation. Emissions should be calculated ex-ante, the term for calculating expected emissions based on theoretical modelling, as well as ex-post, meaning based on measurement after a policy or project has been implemented. A sound procedure for calculating GHG emission reductions from transport must consider the following parameters:

**Baseline**
A baseline is a profile of the set of transport activities and its emissions contribution. An accurate baseline is needed to monitor performance compared to a business-as-usual case. Baselines are constructed with a reference year and term, a profile of local transport, and detailed assumptions over a finite time period about economic activity, energy prices, population growth, and policy adoption (WRI, 2012b). A base year and term should be determined based on data availability and quality, ideally coinciding with other jurisdictional goals or policy deadlines in order to align data sets.

The use of different baseline methodologies makes comparing climate finance policies and projects a challenge. The UNFCCC is, for example, undertaking a long and difficult effort to standardize baselines for the CDM. Tools from WRI and WBCSD include the “GHG Protocol Policies and Actions Standard,” and the “GHG Protocol for Project Accounting.”

**Boundary**
Emissions from transport are diffuse, difficult to contain within a discrete area, and based on a large number of individual emitters (Ellis, et al., 2001). Complete transport emissions baselines are therefore difficult to generate accurately. A clearly-defined boundary outlines parameters for...
the time frame, geography, variables, and modes which are included in the calculation assessment. An effective boundary definition helps to mitigate leakage and double-counting (Clapp et al., 2010).

**Top-down or bottom-up approach**

Emissions can be calculated in a top-down or bottom-up methodology. Top-down approaches use summary figures like total energy consumption or fossil fuels sold in a year to estimate the impact of particular actions. The approach provides a snapshot of emissions in a region or country during a specified time period, but attributing savings to a specific action is more difficult without more granular data. A bottom-up approach is more detailed, multiplying the amount of travel activity for each mode by the fuel mix and intensity of the transport sector. The framework is typically described by the acronym ASIF—Activity of vehicles, Share of traffic, Intensity of fuel, and Fuel mix—as represented in Figure 2-4 (Schipper et al., 2000). Specific data needs are discussed in the following section.

**Figure 2-4: ASIF framework for bottom-up transport emissions calculation**

![ASIF framework](image)

Source: Eichhorst et al., 2012

### 2.7 Data needs

Any type of finance depends on good data to monitor performance. Historical and on-going output data are needed, particularly for transport emissions inventories.\(^{14}\) Data needs to be relevant, complete, consistent, transparent, and accurate. It is rare for all ideal data to be accessible, and plans for improving data should be prioritised. An innovative means of accruing unavailable or inadequate data, the transport observatory, relies on inter-jurisdictional collaboration to generate and review transport data. The concept is described further in Box 2-2. The typical data needs and sources are listed in Table 2-2, and descriptions of data types that should be tracked are listed below.

**Direct data**

Data for any particular climate mitigation activity has particular units, specificity, frequency, sector, geography, and other dimensions (PMR, 2011). Where direct sources are available, data can be drawn from national or local agencies, industry groups, and transport models based

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\(^{14}\) Some finance channels, like unsupported NAMAs, monitor broader environmental, economic, or social impacts instead of tracking emissions.
on comprehensive surveys. In some cases, local data from individual fuelling stations can be used. Vehicle kilometres travelled and mode share may be available from public agencies, but more often rely on extensive surveys and traffic modelling or odometer readings and traffic counts. Some methodologies utilize aerial photos and GPS data as well. Vehicle characteristics can be derived from vehicle registration records.

**Indirect data**
Where direct data are incomplete or unavailable, efforts should be made to identify proxy, or indirect, data sources and to simplify calculation methods. The lack of data availability in developing countries is a recurrent issue and is a potential barrier for countries to fully access climate finance today and in the future. Moreover, data for transport rarely follows political or administrative boundaries making it complicated and quite costly to generate according to the boundary parameters required for emissions tracking. Indirect data are generally derived from national or international averages or default values. Fuel efficiency and emissions content can come from IPCC or other accredited bodies (Eichhorst et al., 2012).

**Default values**
Default values are often used when relevant local data is insufficient or absent. Default, or proxy, values are common for emissions factors and carbon intensities because they vary less across countries and cities than other data fields. Reliable defaults are published by the IPCC and listed in GHG calculation manuals.\(^\text{15}\) The manual for GHG accounting of GEF initiatives includes (by region and mode): average trip rate, trip length, vehicle occupancy, emission factors, and construction emissions among others (GEF, 2010). Default values should be acknowledged in the publication of emissions calculation methodologies and the reporting of results. Furthermore, the UNFCCC website requests that emissions reporting follow prescribed international data sharing standards.\(^\text{16}\)

### Table 2-2: Critical data fields and sources for GHG calculations in the transport sector

<table>
<thead>
<tr>
<th>Approach</th>
<th>Important data</th>
<th>Direct (preferred) Data Sources</th>
<th>Indirect (alternative) Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top-down</strong></td>
<td>Total fuel consumption and by fuel type</td>
<td>Fuelling station data</td>
<td>Aggregate fuel sales</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agency energy statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total fuel consumption by vehicle type</td>
<td>Fuelling station data (uncommon)</td>
<td>Estimated national fuel sales</td>
</tr>
<tr>
<td><strong>Bottom-up</strong></td>
<td>Vehicle stock</td>
<td>Local vehicle registration records</td>
<td>Use national or international averages</td>
</tr>
<tr>
<td></td>
<td>Vehicle kilometres travelled by vehicle type</td>
<td>Vehicle inspection records</td>
<td>Estimate from regional or national averages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Household and/or Community survey</td>
<td>Extrapolate from simplified survey</td>
</tr>
<tr>
<td></td>
<td>Fuel efficiency by vehicle and fuel type</td>
<td>Public survey</td>
<td>IPCC default values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel consumption databases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emission factor</td>
<td>Local default values</td>
<td>IPCC default values</td>
</tr>
</tbody>
</table>

Source: Adapted from WRI 2012c

\(^\text{15}\) The Transport Emissions Evaluation Model (TEEMP) tool, common in GHG emissions modelling, offers default values for many critical data points.

Part Three: Measuring and evaluating performance

As previously mentioned, a successful climate-financed transport action depends on a strong MRV framework. The term “MRV”, which was coined in the 2007 Bali Action Plan of the UNFCCC, has come to stand for the process of Measuring, Reporting, and Verifying the impact of climate investment, namely the GHG emissions reduction. As climate finance becomes more widespread, MRV methodologies will become increasingly important (USAID, 2013).

MRV processes should track qualitative as well as quantitative performance; examples for transport are shown in Table 3-1. Ideally, performance tracking will include direct indicators—outcomes which demonstrate immediate emissions achievements. In other cases, especially with non-credited NAMAs and local evaluation frameworks, indicators are indirect—outputs that imply emissions reductions to be achieved later on. If it is not possible to measure these first two types of impacts, process indicators can track intermediary events that lay the groundwork for—or accelerate—activities to reduce emissions. While not a substitute for more concrete impacts, process indicators comprise institutional changes, capacity-building efforts, and legal precedents that may not directly cut emissions but are a prerequisite for future GHG reductions.

<table>
<thead>
<tr>
<th>Table 3-1: Sample results indicators for evaluation of climate finance-supported transport projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Indicator (Outcome)</td>
</tr>
<tr>
<td>Tonnes of CO(_2)e gases abated by new transport fuel or system</td>
</tr>
<tr>
<td>Number of vehicle registrations</td>
</tr>
</tbody>
</table>

Source: Eichhorst et al., 2012

Although more thorough MRV will confirm with greater certainty the effectiveness of an action, the cost of rigorous evaluation should be balanced with the benefits and risks associated (Larmuseau, 2011). CDM projects have the toughest MRV requirements since the resulting emissions will be priced and sold (USAID, 2013). The exact details of compliance of NAMAs is still evolving but one thing is certain, NAMAs will definitely have more flexible compliance processes and it is likely that emission reductions can be bundled across sectors and projects. Many MRV standards are sector-specific, and several exist for transport (previously shown in Table 2-1). Sector-neutral approaches are intended to be more accessible and useful to local authorities, who may not have the resources to invest in several sector-specific tools. This section is split between the process of planning for, carrying out, and accountability for MRV.

3.1 Developing an MRV plan

Before accessing climate finance, recipients need to be aware of the parameters and conditions for evaluation. The procedure for evaluating GHG emissions performance is complex and involves a variety of actors. A planned course of action with specific responsibilities is critical. There is no consensus on how to develop an MRV plan. Some standards exist (such as the Measurement and Performance Tracking tool from WRI), but there are no clear best practices to suggest who should be responsible for overseeing the planning process, although expertise within MRV implementing agencies is desirable. The general scope of an MRV plan should follow these stages:

1. Determine the goals of the MRV process and the benchmarks or targets against which performance will be measured.
2. Determine institutional, technical, financial, and industry capacity, including the gaps therein.
3. Locate available data sources (both direct and indirect) and the entities responsible for their creation and management.
4. Establish a consensus baseline as reference point for current and future comparison.

Adapted from Pang et al., 2012.
5. Establish a process to review MRV action in order to make room for improvement and transparency.
6. Exchange experience internationally and develop improvement plan.

3.2 Evaluating GHG action

The MRV process is used to assess and, effectively, justify the use of climate finance. MRV processes can be applied in three areas: MRV of emissions (inventories), MRV of actions, and MRV of support (Eichhorst et al., 2012). The third area is beyond the scope of this paper, but the first two are strongly inter-related. WRI has developed a standard that considers both, the “GHG Protocol: Policies and Actions Accounting and Reporting Standard.” The pilot version, released in July 2013, has informed the description of the evaluation process outlined below.

1. Define objectives. Examine appropriate accounting principles and reporting obligations; articulate the objectives of the process, and assemble necessary tools.
2. Design the goal and define accounting methods. Devise the mitigation goal, including a defined boundary and baseline scenario; account for potential double-counting, counteraction, or mutual reinforcement.
3. Ex-ante assessment. Calculate expected emissions in the target year given the assumptions built into the baseline scenario.
5. Evaluate and manage uncertainty. Verify results and divulge any uncertainty in emissions assessment. Uncertainty can apply to individual parameters, overall scenarios, or the calculation model.
6. Reporting results. The final outcomes, as well as the data and assumptions going into each stage of the MRV process, should be properly reported.

MRV processes should be monitored on an on-going basis. Evaluation is important to judging the effectiveness of climate activities, and should apply not only to impacts but also to MRV approaches themselves (Ibid). As part of the MRV plan, a protocol should enable possibility of corrective action. As much as possible, this should be incorporated to the action’s design phase. Interaction between government agencies and local stakeholders can also help evaluate the progress of an initiative and its MRV practices.

3.3 Accountability

The verification process ensures accountability of results for a climate financed action. Having an entity substantiate results lends credibility to claimed outcomes and allows for the designation of responsibility for good or bad performance. An apolitical, objective evaluation to verify the outcomes of climate finance builds confidence among local and international audiences that resources for climate financed initiatives are being spent correctly.

i. Entities responsible

Verification is an expensive process, so its nature and completeness often depends on funding sources. There is as yet no consensus on who should conduct verification. But the impartiality of verifiers is important to demonstrate confidentiality and credibility. As domestic capacity is often limited in developing countries, verification services are often international or included in capacity-building efforts (Ibid). In-country capacity is growing, however. In the case of the CDM, designated auditors (known as Designated Operational Entities) are increasingly from developing countries.

ii. Verification process

Verification can involve a range of activities to cross-check the assumptions and methods used to monitor and report climate finance performance. This includes validation of underlying data and methodology, as well as confirmation of purported emissions inventory. The process involves quality control (of data and technical inputs) as well as quality assurance (of data systems and institutional procedures) (Pang, et al., 2012). Although a seemingly tautological point, verifiers should evaluate data that is easily verifiable in order to maximize effectiveness.
Success in verification requires a focus on measurement and reporting at the MRV planning phase.

**Conclusions**

In this paper, we focus on the how well positioned a country would be to receive climate finance for transport projects. Readiness in this context is an on-going process of improvement instead of a status to achieve in order to release funds. As the nature of climate finance evolves, particularly with the onset of NAMAs, the GCF, and increasing private sector participation, funding sources and evaluation methods are diversifying and requirements are continuously evolving. Quantifying the outcomes of climate finance activities will become more difficult, making efforts to standardise MRV, like WRI’s “GHG Protocol: Policies and Actions Accounting and Reporting Standard,” increasingly important. But readiness for investment at the country level will ensure the on-going capacity to access, receive, and implement finance for transport actions.

The readiness characteristics proposed in this paper necessitate concerted action from numerous stakeholders. But there are cross-cutting strategies. The priority strategies for acting on improving readiness should be to focus on institutional capacity, to plan early and with sufficient levels of authority, and to prioritise data in all aspects of the process.

- **Focus on institutional capacity.** The steps for identifying, prioritising, and delivering on transport climate finance involve multiple stakeholders; the coordination of parties requires strong administrative acumen. Also important are the capabilities to understand and engage with the private sector, which operates under faster timelines, fewer constraints, and more economic incentives than government.

- **Plan early and with authority.** Planning early and at the highest possible level of authority can lay the foundation for climate investment in low-carbon transport. Influencing policy at the national level helps to catalyse and shape the direction of local policy and provides a leveraging platform for international climate finance. Involving the most important decision-makers well in advance of climate finance deadlines ensures a methodical process. Early planning efforts also enable a more robust financial strategy can improve the long-term sustainability of low-carbon transport activities.

- **Prioritise data.** From start to finish, the process of financing low-carbon transport is data-dependent. Pushing for the best possible data—that which is independent, reliable, consistent, and accurate—has enormous value. It may be necessary to devise defensible proxies or estimates, but placing a high value on the quality of data and its tracking mechanisms cannot be overstated.

The benefits of putting readiness provisions in place can extend beyond the attraction of climate finance. Spill-over effects of climate finance readiness can boost the overall investment profile on a country, build up skills for both public and private actors, and mobilise support for sustainable development more broadly. Table 4-1 offers a summary of how addressing each readiness component benefits transport climate finance activities and local conditions more broadly. Enhancing the enabling environment and attracting the private sector have particularly wide impacts.
Table 4-1: Immediate and residual benefits of readiness components for transport climate finance

<table>
<thead>
<tr>
<th>Readiness Components</th>
<th>Benefits to Transport Climate Finance Activities</th>
<th>Additional Benefits</th>
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<tbody>
<tr>
<td><strong>Enabling Environment</strong></td>
<td>Clear incentives favouring low-carbon transport</td>
<td>Clear vision and targets</td>
</tr>
<tr>
<td></td>
<td>Build and increase investor confidence</td>
<td></td>
</tr>
<tr>
<td><strong>Institutional Arrangement</strong></td>
<td>Structure to report on donor/lender requirements</td>
<td>Develop long-term inter-agency partnerships</td>
</tr>
<tr>
<td></td>
<td>Manage climate investment across jurisdictions and sectors</td>
<td></td>
</tr>
<tr>
<td><strong>Financial Strategy</strong></td>
<td>Distribute investment risk</td>
<td>Reduce debt obligation</td>
</tr>
<tr>
<td></td>
<td>Leverage impact of donor investment</td>
<td>Identify new funding sources</td>
</tr>
<tr>
<td><strong>Attracting the Private Sector</strong></td>
<td>Meet co-financing requirements</td>
<td>Precedent/experience working with private sector</td>
</tr>
<tr>
<td></td>
<td>Leverage more resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase local private sector capacity</td>
<td></td>
</tr>
<tr>
<td><strong>Assess Co-benefits</strong></td>
<td>Drive baseline funding</td>
<td>Involvement of diverse stakeholders in sustainable transport issues</td>
</tr>
<tr>
<td></td>
<td>Galvanise political support for climate finance</td>
<td></td>
</tr>
<tr>
<td><strong>Emissions tracking</strong></td>
<td>Demonstrate environmental impact of investment</td>
<td>Improve local and national emissions inventory</td>
</tr>
<tr>
<td><strong>Data Needs</strong></td>
<td>Enable accurate MRV reporting</td>
<td>Inform transport sector policy</td>
</tr>
</tbody>
</table>

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