

# Policy Brief: Scaling-up Sustainable, Low-Carbon Transport – overcoming funding and financing challenges, and the role of climate finance

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## **Project Background Information on the TRANSfer Project and the International Expert Group on Climate Finance for Sustainable Transport**

This document is a draft for discussion. It is an intermediate result of the work of an international expert group on climate finance for sustainable transport facilitated through the Partnership on Sustainable, Low Carbon Transport (SLoCaT). The group and its work is supported by GIZ in the frame of the TRANSfer project. The objective of the group is to help ensure that climate finance is increasingly used for sustainable transport in an effective way to realize the large GHG emission reduction potential in the sector. Further information on the group can be accessed at: <http://transport-namas.org/expertgroup/expert-group-on-climate-finance-for-sustainable-transport/> The TRANSfer project is run by GIZ and funded by the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). Its objective is to support developing countries to develop and implement climate change mitigation strategies in the transport sector as “Nationally Appropriate Mitigation Actions” (NAMAs). For more information, refer: [<http://www.transferproject.org>].

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## Executive Summary

**“Given the role that transport plays in causing greenhouse gas emissions, any serious action on climate change will zoom in on the transport sector.”**

*Yvo de Boer, Executive Secretary UNFCCC, January 2009*

**“Improving energy efficiency in the transport sector can slow down growing fuel consumption. Effective policies are available to make that happen”.**

*The Emissions Gap report 2014, UNEP*

**Transportation is responsible for more than 20% of global energy-related GHG emissions and is the fastest growing of all sources.** The International Energy Agency has calculated that the adoption of a low-carbon pathway for the transport sector (equivalent to the IPCC recommended 2 Degree Scenario) could generate at least USD 70 trillion in cumulative savings up to 2050, with significant potential for additional savings because of other developmental benefits. This summary document provides initial recommendations to policy makers on transport and climate finance on how climate finance<sup>1</sup> can accelerate the realization of sustainable, low-carbon transport. The full version of the (draft) document is available under “meetings” at: <http://transport-namas.org/expertgroup/expert-group-on-climate-finance-for-sustainable-transport/>.

### The Challenges

**The long lead-time of certain policy and investment measures in transport can cause a lock-in effect.** Choices made today on infrastructure and technology in the emerging and developing economies can lock-in a country to a fossil fuel dependent or low-carbon pathway for the next 30 to 50 years. **In order to avoid such effects it is important that all stakeholders adopt a systems change approach.**

**Significant transformational investments are urgently needed to increase the sustainability of both existing and new transport systems and to mitigate climate change.** For the period 2015-2035, it is estimated that the net transitional investment required being just over USD 3 trillion of which over 80% relates to low-carbon modes such as railways and mass transit<sup>2</sup>. These transitional investments are on top of existing investments, which are estimated to be between USD 1-2 trillion per year<sup>3</sup>.

**Transport investments are currently dominated by investments in OECD countries while the greatest need is in non-OECD countries.** Of estimated total current annual investments in transport infrastructure, 60% is represented by OECD countries and 40% by non OECD countries, the latter being generally fast growing and developing economies. In future, even if adequate global finance is available, about 85% would need to be directed towards the fast growing non OECD nations, with 15% to the OECD nations, to meet development needs and curb growth in motorization<sup>4</sup>.

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<sup>1</sup>Here, climate finance is defined as all financial flows whose expected effect is to reduce greenhouse emissions and/or to enhance resilience to the impacts of climate change in accordance with the definition of IPCC (2014). This covers private and public funds, domestic and international flows, expenditures for mitigation and adaptation, and the full value of the financial flows rather than only the share associated with the climate change benefit. For the purpose of this policy brief, International Climate Finance, is a key subject of interest, i.e. developed to developing country, public climate finance including climate relevant ODA and specific bilateral and multilateral climate funds.

<sup>2</sup>Nelson, D, Herve-Mignucci, M, Goggins, A, Szambelan, S, and Zuckerman, J (2014), page 4, Table 1.

<sup>3</sup>Lefevre, B, Leipziger, D, and Raifman, M (2014), “The Trillion Dollar Question: Tracking Public and Private Investment in Transport.” Working Paper, World Resources Institute, Washington DC.

<sup>4</sup>IEA (2013), Global Land Transport Infrastructure Requirements: Estimating road and railway infrastructure capacity and costs to 2050.” Refer page 6.

**Sustainable transport systems will generally require public financial support** for investment, operations and maintenance because of their strong welfare and external benefits. Yet, the size of the challenge, especially in the developing and emerging economies is too large to be addressed solely by the public sector. The **private sector, in addition to being a source of finance would be able to provide specific specialized knowhow**, for design, operation, and managing reasonable risk.<sup>5</sup> However, innovative approaches to involve the private sector financially are still scarce when compared e.g. to the energy sector.

**The limited scale and fragmentation of climate finance, compared to the large financing needs in the transport sector, is a constraint.** This notwithstanding the recent pledge by developed countries, as part of the international climate negotiations under the United Nations Framework Convention on Climate, who have recently USD 9.3 billion for the new Green Climate Fund. Climate finance provided through dedicated multi-lateral funds and bilateral initiatives have different purposes, and different and often long approval procedures and demanding, methodological requirements. Based on past experience, international climate finance is not (yet) working well for sustainable transport, i.e. the transport sector attracts disproportionately small amounts of climate finance and the financing that is available is not leveraging a change in transport policies and investments at the scale required.

**Box: Transport sector has difficulties in competing with energy sector for Climate Finance**

Unlike fixed energy infrastructure, with readily measured energy consumption and GHG emissions, reliable emission reduction estimates are more challenging in transport. Sustainable, low-carbon transport systems are complex and have strong sustainable development benefits as they facilitate travel, and access to goods and services, by people and firms across cities, nations and regions, through behavioural change and changes in energy consumption to millions of mobile emission sources. Therefore, the quantification of greenhouse gas reductions from transport is more data intense and costly than that for stationary energy sources. This limits transport's ability to attract a significant share of climate funding commitments if Monitoring, Reporting and Verification (MRV) requirements do not consider this properly. In addition, in many countries globally, investment frameworks for energy are better defined than for transport, which has enabled the development of a multitude policy recommendations and international initiatives for using climate finance to leverage national public and private sector funding in low-carbon energy generation and energy efficiency. Combined with the fact that many low-carbon transport projects require a total investment that goes beyond the size of most climate finance facilities and in the absence of effective approaches for blending climate finance with other funds, this has further hindered the access of the transport sector to climate finance.

**Four major funding and finance related implementation challenges are identified** that hinder the needed transition from the current, still largely car centric transport systems towards more sustainable, low carbon transport:

- i. **How to increase the range and depth of funding sources, and mechanisms used by the public sector to finance sustainable, low-carbon transport;**
- ii. **How to foster increased private sector investment in sustainable transport**
- iii. **How to scale up sustainable transport through Official Development Assistance (ODA);**

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<sup>5</sup>Lefevre, B, Leipziger, D, and Raifman, M (2014), "The Trillion Dollar Question: Tracking Public and Private Investment in Transport." Working Paper, World Resources Institute, Washington DC.

- iv. **How to increase the share of climate finance to the transport sector and use it more effectively to obtain maximum leverage.**

**All four implementation challenges are linked to generally inadequate planning and investment frameworks for transport sector that are not aligned with long term strategic goals.** Weakness in planning goes hand in hand with a limited readiness of the public sector (national and sub-national governments) to develop, implement or facilitate and monitor a pipeline of viable and effective sustainable, low-carbon transport investments.

## The solutions

**There is a clear consensus among key stakeholders that appropriate solutions for effective and efficient GHG mitigation from the transport sector are known.** Three broad strategies<sup>6</sup> to reduce GHG emissions and at the same time enhance welfare and social inclusiveness through improvements to accessibility enabled by passenger and freight transport are:

- **Avoid** travel or reduce travel distance by motorized modes through regional development policies, land use planning and travel demand management;
- **Shift** to more environmentally and socially-sustainable modes such as public transport systems, walking and cycling in the case of passenger transport and railways or inland waterways in the case of freight transport; and
- **Improve** the energy efficiency and limit the GHG intensity of transport modes and vehicle technology through the choice of types of vehicles, fuel, fuel efficiency and load factors of vehicles, and better managed transport networks with non-petroleum fuels playing an important role particularly after 2030

**A halving in GHG emissions from transport is projected to be feasible by 2050 by the International Energy Agency (IEA)<sup>7</sup>,** if Avoid-Shift-Improve based approaches are implemented at scale. Effective climate change mitigation will require an active contribution by transport to realize a 2 Degree Scenario, cross-sectoral burden sharing is feasible only to a limited extent. The IEA estimates that under a 4 Degree Scenario (4DS) cumulative investments in transport infrastructure, up-grades, vehicles, fuel and maintenance costs would be USD 515 trillion up to 2050, of which initial investments in infrastructure alone would represent USD 45 trillion. By comparison the 2DS is estimated to represent cumulative investments of USD 445 trillion and represent a cumulative investment and **operating saving of USD 70 trillion over 2010-2030**, with approximately 80% of this saving to be realized post 2025.

**International experience shows the value of national governments setting a national umbrella framework for the realization of sustainable, low-carbon transport.** To optimize the impact of such frameworks, it can be coupled with the devolvement of autonomy to sub-national governments including powers for revenue-raising. Empowering of sub-national governments is important due to continuing rapid urbanization and the impossibility of national governments effectively implementing local transport solutions in many growing cities.

**In creating a sustainable funding and financing framework for their transport sectors, national governments can use the following principles as orientation<sup>8</sup>:**

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<sup>6</sup>GIZ (2007), "Transport and Climate Change" Module 5E of Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities." Page 7.

<sup>7</sup>IEA (2013), op. cit. page 423.

<sup>8</sup>GIZ (2014), "Building Blocks for Financing Sustainable Transport Sector Development". Working document of the Sustainable Urban Transport Project (SUTP).

- **Acknowledge mobility as a public service.** Many countries acknowledge the necessity of access to mobility for everyone in policies and practice. In some countries the access to mobility services is even a constitutional right. This is often a precondition for budget allocation.
- **Get institutions and framework conditions right.** A coherent policy framework should be established, accompanied by institutional and governance reforms.
- **Using the transport-finance-transport principle.** The transport sector is too large to be subsidized and funded by other sectors. Efficient financial support for public transportation is justified because of its economic, social and external benefits. A sector-internal partial subsidization of public transportation by fuel and private vehicle tax revenues is common practice in countries with high quality transport systems.
- **Price transport to moderate excessive demand.** Reducing the over-consumption of transport can be achieved by reducing subsidies for individual motorized transport especially those that make private ownership and use cheap.
- **Set clear investment priorities.** One of the key concerns for sustainable transport financing is how to shift investments from conventional, unsustainable to low-carbon, sustainable transport. National transport policies, which are to be “translated” in comprehensive sub-sector strategic plans, and local comprehensive mobility plans provide the necessary guidance for prioritizing investments in the transport sector.

**Experience demonstrates that small step-wise changes will be not be enough to ensure the availability of adequate funding to satisfy access needs in the developing and emerging economies** in the short and medium term. A rapid delivery of priority sustainable transport initiatives on the ground requires considerable strengthening of planning and investment frameworks backed by adequate funding.

### **Our recommendations**

**Developing much needed transport infrastructure and services in developing countries will require trillions of dollars.** Sustainable, low-carbon transport solutions can substantially reduce the **total cost**. Changes are required in almost all parts of transport related funding and financing arrangements to promote the realization of sustainable, low carbon transport.

**It is recommended that policy makers should:**

- **Increase the overall availability of public funding to develop and maintain sustainable transport infrastructure and services** by: expanding current sources of domestic funding; and prioritizing available domestic funding to sustainable, low carbon transport in line with the principles outlined above;
- **Accelerate private sector investment for sustainable, low-carbon transport** by: sending the right price signals; creating clear revenue models for the operation of transport infrastructure and services; and strengthening the arsenal of private sector financing modalities;
- **Create clear and predictable investment frameworks** by: ensuring integrity of overarching long-term investment and legal frameworks; strengthening development of competitive, stable and adequately capitalized domestic banking systems; and empowering, and then assisting, sub-national governments to improve credit worthiness; and
- **Harmonize planning approaches, tools, methods and implementation procedures** by: promoting the Avoid-Shift-Improve approach; adopting appropriate appraisal methodologies that balance traditional economic assessments of transport choices and investments with environmental (both climate-related and other environmental) and social (safety and equity) considerations; and harmonizing procurement, safeguard and implementation approaches to minimize delays and ensure high quality outcomes.

**While the principles are the same across countries, the detailed interpretation and implementation of the proposed funding and financing arrangements will vary from country to country** depending on the local situation.

**ODA and international climate finance are too small in scale to substantially replace domestic funding** and private sector finance. The impact will be larger if the limited resources are not used mainly for direct implementation but instead are primarily used to build capacity, guide policy development, support sustainable transport planning and leverage public and the private funding. International Climate Finance initiatives on transport can take a lead from the Green Climate Fund (GCF) that intends that that all GCF funding will be transformative through creating a shift towards low-emission development pathways.

**Specific recommendations to make international climate finance more accessible and effective for transport include:**

### **Eligibility**

- Create a Transport Window under different climate finance mechanisms to ensure that transport is not ‘punished’ for its complex structure and ends up at the end of the line of sectors benefitting from climate finance. A special transport window can help to ensure that transport will be able to realize its full contribution to climate change mitigation.
- Develop a White List (Positive List) of transport measures that can access climate finance, thereby relaxing the need to quantify GHG mitigation and co-benefits at an early stage.
- Prioritize and reward the use of programmatic approaches over a project-by-project approach. This can include the use of ‘aggregators’ that combine smaller projects into larger viable programs.
- Adopt eligibility criteria that match the transport sector. Do not evaluate projects merely based on GHG mitigation costs; despite partly higher abatement costs than other sectors. Include co-benefits as important criterion when deciding on eligibility of transport projects. Aspire at co-benefits quantification but do not make it a prerequisite at the approval stage.

### **Readiness**

- Use international climate finance to raise awareness and build capacity for neglected transport sub-sectors that have not received much attention like freight transport.
- Demonstrate, using international climate finance, how to engage the private sector in sustainable transport, including the development of private-sector oriented mechanisms like Climate Bonds.
- Allocate a greater share of international climate finance to support institutional ‘readiness’ in the transport sector with the aim to build up a well-prepared, and viable, program and project pipeline.
- Better align ODA with the use of international climate finance. This will be in the interest of the transport sector considering that transport is typically the largest or second largest lending sector in MDBs.
- Improve approaches where climate funds are blended with other public funds (both national and international) as well as private funding to increase their impact, e.g. by using climate finance to cover part of the incremental costs for low-carbon transport programs and projects or risks related to new low-carbon technologies, which national public funds are not yet willing to take.

### **MRV**

- Establish credible but appropriate MRV requirements. Acknowledge the data intensity (and associated costs as well as required time) of doing proper MRV for transport. Allow use of appropriate but preliminary estimates of emission reductions while developing a more robust approach over time.

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**Contents**

**Executive Summary**..... ii

**List of Abbreviations** .....ix

**1 Why changes are required in transport funding and financing to realize transport fit for the 21<sup>st</sup> century** ..... 1

**2 Why sustainable transport solutions are cheaper than Business as Usual**.....3

    2.1 What is the scope of sustainable, low carbon transport.....3

    2.2 What are the solutions ..... 3

    2.3 What are some of the key financial characteristics of sustainable low-carbon transport.....5

    2.4 Pathways for sustainable, low-carbon transport .....7

    2.5 How much will it cost to transition to a 2°C low-carbon pathway .....9

**3 Challenges for current funding approaches to promote sustainable land transport** ..... 11

    3.1 Challenges for public sector funding and financing .....11

    3.2 Challenges to expanding the role of the private sector .....13

    3.3 Challenges to using ODA effectively.....15

    3.4 Challenges to leveraging climate finance .....16

**4 Key actions for financing and funding sustainable, low-carbon transport** ..... 19

    4.1 Public Sector.....19

    4.2 MDBs and Bilateral Development Institutions .....23

    4.3 Climate Finance.....24

**5 Recommendations for International Climate Finance** .....27

**References** .....29

## List of Abbreviations

ADB	Asian Development Bank
AFD	Agence Française de Développement (French Agency for Development)
BRT	Bus Rapid Transit
CDM	Clean Development Mechanism
COP 21	21st session of the Conference of the Parties to the UNFCCC
CPI	Climate Policy Initiative
CTF	Clean Technology Fund
EMBARQ	EMBARQ, World Resources Institute Center on Sustainable Urban Transport
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GFEI	Global Fuel Economy Initiative
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
Gt	Giga Ton
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ITDP	Institute for Transportation and Development Policy
MDB	Multi-lateral Development Bank
MOF	Ministry of Finance
MOT	Ministry of Transport
MRT	Mass Rapid Transit
O&M	Operations and Maintenance
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PPIAF	Public Private Infrastructure Advisory Facility
PPP	Public Private Partnership
PSP	Private Sector Participation
PTA	Public Transport Authority
SDG	Sustainable Development Goal
SLoCaT	Partnership on Sustainable, Low Carbon Transport
SOE	State Owned Enterprise
TA	Technical Assistance
TOD	Transit-oriented Development
UC-Davis	University of California, Davis
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
6DS	6° Celsius global warming scenario
4DS	4° Celsius global warming scenario
2DS	2° Celsius global warming scenario

# 1 Why changes are required in transport funding and financing to realize transport fit for the 21<sup>st</sup> century

1. **Policy makers on land<sup>9</sup> transport face the dual challenge of ensuring better access to markets and services while improving its economic, social and environmental sustainability.** Investments in the range of trillions of US dollars (USD) are needed for the expansion of transport infrastructure and services that in turn have to be operated, financed and funded on an on-going basis.

2. **Driven by economic and population growth, expanding urbanization, and resultant motorization land transport energy-related greenhouse gas emissions (GHG) are set to more than double by 2050<sup>10</sup>** (IPCC 2014; IEA 2012). This increase will happen largely in the emerging and developing economies as they expand their transport infrastructure and services in support of much needed economic and social development. To keep global warming below 2° Celsius above pre-industrial levels, the transport sector will need to play an important role in mitigating GHG emissions<sup>11</sup>.

3. **In addition to generating significant quantities of GHG emissions, the current dominant car-centric model of developing land transport infrastructure has large negative impacts on social inclusion, air pollution, road crashes and economic productivity.** In 2010 some of the key negative impacts were (i) 1.24 million people fatalities and many times more serious injuries on global roads; (ii) 184,000 deaths attributable to exposure to pollution from vehicles; (iii) more than 20% of energy-related global GHG emissions; and (iv) losses in global GDP of up to 5% per annum (WHO 2013; World Bank 2014; International Energy Agency (2012); and SLoCaT 2014 respectively).

4. **Redirecting funding away from the car-centric development model to sustainable, low-carbon transport infrastructure and services will require significant transformational investments in coming decades in sustainable, low-carbon transport infrastructure and services.** For the period 2015-2035, the Climate Policy Initiative estimates the cumulative transitional investment required to be just over USD 3 trillion of which over 70% relates to land transport. The additional transitional investments, focus on low-carbon modes such as railways and mass transit and will need to be fostered by the public sector with the bulk of funding provided by the public purse but also substantial private investment<sup>12</sup>. However, as explained in this Policy Brief, the initial investments can be recouped by very large cumulative monetary savings, also in the range of trillions of USD to 2050.

5. **Land transport's share of funding for climate change mitigation and adaptation actions is low and much lower than land transport's contribution to global GHG emissions.** As part of the international climate negotiations under the United Nations Framework Convention on Climate Change

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<sup>9</sup>This Policy Brief deals only with land transport and therefore excludes domestic and international aviation and international and domestic coastal shipping.

<sup>10</sup>In 2009, transport contributed more than 20% of global energy-related GHG emissions of which about 70% were generated by land transport (IEA 2012). GHG emissions (2009) are projected to rise by nearly 50% by 2030 and by more than 70% by 2050 (IEA 2012).

<sup>11</sup>UNEP (2013) in the "Bridging the Emissions Gap" report, citing analysis of the International Council on Clean Transportation, indicates there is potential and need to reduce emissions from the transportation sector (excluding aviation and shipping) by about 1.6 GtCO<sub>2</sub>e per annum, or about 10% of that possible for all sectors, by 2020 distributed as follows: (i) on-road, 0.4 GtCO<sub>2</sub>e; (ii) biofuels, 0.15 GtCO<sub>2</sub>e; (iii) modal shift, 0.8 GtCO<sub>2</sub>e; and (iv) travel activity reduction, 0.25 GtCO<sub>2</sub>e. Higher reductions before 2020 would reduce later climate risks.

<sup>12</sup>When considering what constitutes 'private' the following actors have been distinguished for the purposes of this Policy Brief (i) arrangers of finance; (ii) lenders including commercial banks, institutional investment and investment funds; (iii) venture capital and private equity some with MDB investment, (iv) climate bonds; and (v) private companies and households. To this list can be added, project contractors, vehicle suppliers and transport operators. Each of these groups has different motivations and perceptions of risk that need to be accommodated.

(UNFCCC), developed countries agreed to provide substantial funding for climate change mitigation and adaptation in developing countries. In the 2010 Cancun agreements, for example, industrialized countries agreed to providing USD 100 billion per year by 2020 raised from a mix of public and private sources. Today, it is estimated that public and private climate finance flows<sup>13</sup> for both mitigation and adaptation to developing countries amount to 39 to 120 billion USD per year (IPCC 2013, page 7) and possibly almost three times higher as estimated by CPI (2014, page 6). However, this funding is not working well for sustainable transport. Less than 10% of climate change mitigation related funds (i.e. International Climate Finance) from the Global Environment Fund (GEF) and 16% of the World Bank's Clean Technology Fund have gone to low-carbon transport projects. For the Clean Development Mechanism (CDM), this share is even lower, with only 0.3% of Certified Emission Reductions (CERs) being generated from transport projects. Of total public and private climate finance flows devoted to mitigation six percent are estimated to be for sustainable, low-carbon transport (CPI 2014, page 15).

**6. This Policy Brief describes how to define how International Climate Finance and Official Development Assistance (ODA) can be used effectively realize sustainable, low carbon transport on a scale sufficient to mitigate climate change. In doing so, it considers how climate finance can assist to broaden the range of funding, and financing instruments, that are needed to support these efforts. The primary audience for this Policy Brief includes:**

- **National policy-makers on International Climate Finance, and transport and development finance;**
- **Parties involved in the international climate negotiations**(specifically in the development of a new global agreement on climate change by December 2015) and in the design of international climate funds such as the Green Climate Fund (GCF);
- **Parties to the adoption of the Sustainable Development Goals (SDGs),** in September 2015 by the United Nations General Assembly; and
- **Others with a current or potential stake in funding and financing of land transport**whether they are in national or local government, the private sector, civil society or academia.

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<sup>13</sup>Here, climate finance is defined as all financial flows whose expected effect is to reduce greenhouse emissions and/or to enhance resilience to the impacts of climate change in accordance with the definition of IPCC (2014). This covers private and public funds, domestic and international flows, expenditures for mitigation and adaptation, and the full value of the financial flows rather than only the share associated with the climate change benefit. For the purpose of this policy brief, International Climate Finance provided by international sources, is a key subject of interest, i.e. developed to developing country, public climate finance including climate relevant ODA and specific bilateral and multilateral climate funds.

## 2 Why sustainable transport solutions are cheaper than Business as Usual

### 2.1 What is the scope of sustainable, low carbon transport

7. Well-formulated sustainable land transport policies, programs and projects that are effective in meeting the needs to move people and goods would also usually have a strong ability to reduce GHG emissions<sup>14</sup>. The cross-cutting nature of sustainable land transport (providing improved access in a socially and environmentally sustainable manner) is recognized in the proposed SDGs<sup>15</sup> as part of the post-2015 development framework. The transport sector needs to contribute to a cut of 50% in GHG emissions by 2050 to hold estimated average global temperatures to a 2°C increase by 2100 (IPCC, 2014, Table SPM.1)

### 2.2 What are the solutions

8. In the development of transport infrastructure and services there are three broad strategies to reduce GHG and vehicle emissions (exhaust and noise) and at the same time enhance welfare and social inclusiveness through improvements to accessibility enabled by transport, at the national or sub-national scales:

- **Avoid or reduce travel and travel distance by motorized modes.** This can be accomplished through a combination of regional development at the national level and land use planning at the urban level. Better management of the demand for travel through the use of economic and informational policy instruments can also reduce the amount of travel;
- **Shift to more environmentally and socially-sustainable modes.** The availability, quality and quantity of environmentally sustainable modes (such as urban and non-urban) passenger transport systems as well as provisions for walking and cycling is important with significant beneficial additional impacts on economic welfare (e.g. lowering congestion and related loss of time and economic productivity) and social inclusiveness (e.g. access and road safety). In the case of freight transport a greater share of goods being moved by well-utilized railways or inland waterways will reduce GHG emissions, air pollution and traffic fatalities.
- **Improve the energy efficiency of transport modes and vehicle technology.** The performance of vehicles is important. The main impacts are usually environmental and possibly on economic welfare through the choice of types of vehicles, fuel, fuel efficiency and load factors of vehicles.

9. There is a clear consensus among key stakeholders that appropriate solutions for effective and efficient GHG mitigation from the transport sector are known. Table 2.1 summarizes examples of sustainable, low-carbon transport measures at the national and sub-national scales categorized using the Avoid-Shift-Improve Framework to reduce GHG emissions. It covers: (i) national and urban passenger as well as freight travel, and rural access<sup>16</sup>; and (ii) strategy responses that include; (a)

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<sup>14</sup>In this brief they may also be referred to as carbon emissions.

<sup>15</sup>The final report of the Open Working Group (OWG) on Sustainable Development Goals (SDGs), 19 July, 2014. The Partnership on Sustainable, Low Carbon Transport (SLoCaT) prepared a Results Framework for land passenger and freight transport that proceeded in parallel with, and sought to influence, the OWG process ([www.slocat.net/resultsframework](http://www.slocat.net/resultsframework)). The SLoCaT Results Framework includes six targets: (i) rural access; (ii) urban access; (iii) national access and regional connectivity; (iv) road safety; (v) air pollution and health; and (vi) greenhouse gas emissions. Elements of all six of the SLoCaT targets are reflected directly or indirectly in the OWG proposals.

<sup>16</sup>Improvements in access to basic services, and for movement of agricultural production to local markets, is required for low-income rural populations in many countries which may necessitate rehabilitation of existing rural roads, tracks and pathways and adequate maintenance arrangements.

investment, and (b) supporting planning, regulatory, economic, information and technology instruments. A continuing and significant challenge in promoting more low-carbon oriented policies in the transport sector remains to be the measurement of changes in GHG emissions.

**10. Sustainable, low-carbon transport measures in addition to their global GHG impacts have high relevance to local jurisdictions because of their many cross-cutting benefits of a local nature.** These local benefits include safety, accessibility, economic productivity, and equity. Actions taken using the Avoid-Shift-Improve Framework could therefore qualify for support by existing international climate financing mechanisms such as CDM, GEF and the Clean Technology Fund (CTF), which all stipulate the need for climate change mitigation to take place in the context of sustainable development and other more dominant sources of domestic finance.

**Table 2.1: Examples of Sustainable, Low-Carbon Interventions at National and Metropolitan Levels**

Type	Avoid(*)	Shift	Improve
<b>National level</b>			
Planning/ regulatory, economic, information and technological instruments	<ul style="list-style-type: none"> <li>National settlement and industrial development policy</li> <li>Location of government services (e.g. education, administration)</li> <li>Nationally mandated policies on urban growth management</li> <li>Pricing of (individualized) motorized transport</li> </ul>	<ul style="list-style-type: none"> <li>Policies to promote bus, rail, walking and cycling, water transport (inland waterways) and logistics industry development</li> <li>Logistics facilitation (cross-border, other)</li> <li>Pricing of transport services</li> </ul>	<ul style="list-style-type: none"> <li>Land transport laws &amp; regulations</li> <li>Standards for accessible, fuel efficient fleet with advanced emission controls</li> <li>Green fleet interventions to reduce fuel consumption through smooth driving</li> </ul>
Infrastructure and services	<ul style="list-style-type: none"> <li>Government facilitated investment in residential developments, industrial estates, universities/ airports/ seaports to guide private sector development</li> </ul>	<ul style="list-style-type: none"> <li>Passenger and freight rail system upgrading</li> <li>Bus industry – supporting investments</li> <li>Cycling and walking related investments</li> <li>Waterway upgrading</li> </ul>	<ul style="list-style-type: none"> <li>Modern train &amp; bus fleet acquisition, maintenance of track</li> <li>Road safety improvement</li> <li>Improved rural road surfaces to enhance rural people’s access to services and reduce fuel consumption</li> </ul>
<b>Sub-national level</b>			
Planning/ regulatory, economic, information and technological instruments	<ul style="list-style-type: none"> <li>Land use and transport masterplanning and development sequencing</li> <li>Parking policy, car sharing</li> <li>Supportive policies for TOD and road pricing</li> </ul>	<ul style="list-style-type: none"> <li>Public transport information</li> <li>Travel behaviour interventions</li> <li>Pricing of transport services</li> </ul>	<ul style="list-style-type: none"> <li>Traffic enforcement</li> <li>Road safety education</li> <li>Air quality management</li> <li>Standards for accessible, fuel efficient fleet with advanced emission controls</li> <li>Green fleet interventions</li> </ul>
Infrastructure and services	<ul style="list-style-type: none"> <li>Transit Oriented Development – integrating land development and transport infrastructure</li> <li>Congestion charging schemes</li> </ul>	<ul style="list-style-type: none"> <li>Transit improvement (MRT, LRT, BRT)</li> <li>Bus networks and services improvement</li> <li>Walking and cycling system enhancement</li> <li>Investments in efficient freight</li> </ul>	<ul style="list-style-type: none"> <li>Bus priorities/ traffic management</li> <li>Bus fleet modernisation</li> <li>Road safety improvements</li> </ul>

Type	Avoid(*)	Shift	Improve
		transshipment facilities	

(\*) includes 'reduce'

## 2.3 What are some of the key financial characteristics of sustainable low-carbon transport

11. Possible sustainable, low-carbon transport policies and measures, because of their different nature and the different contexts in which they are implemented vary significantly in their financial characteristics:

- **Different investment costs and lead times for implementation.** 'Avoid' measures such as those involving effective land use planning may take several decades to achieve the desired results on the ground. 'Shift' measures such as new underground urban rail systems are expensive (costing up to USD 150 million per kilometre to construct) and complex and can often take a decade or longer to develop from identification to operation. Bus Rapid Transit (BRT) systems that are also 'shift' measures, would usually have shorter lead times than rail, in part because they are much cheaper (USD 5-10 million per kilometre to construct) even though they can deliver benefits comparable to rail. Operational improvements to existing bus systems, traffic management as well as walking and cycling networks tend to be relatively cheap and in principle straightforward and fast to implement (1-5 years) but may face delays from vested interests.
- **Different responsibilities for initial investment.** The transport measures described above must usually depend in the first instance on funding from the public purse (see Table 2.2) and that may prove to be a constraint. While rail and BRT systems can be constructed and operated by the private sector, public sector leadership to facilitate development of transit networks that maximize user and overall community benefit is important. 'Improve' measures such as the progressive improvement in vehicle fleets due to setting of appropriate fuel economy standards are usually mandated by the public sector but the costs are absorbed by their owners. Measures such as improved sidewalks and cycling lanes are essential community facilities and are closely-related to investment in, and maintenance of, street and open space networks. Funding normally relies on general community taxes on businesses and households. Cycle-share schemes being developed in many cities are sometimes funded by advertising but rely in most cases as well on public support.
- **Varying cost-recovery.** Even where passenger revenues for rail and BRT operations can cover all operating costs, in urban and most non-urban contexts, fare revenues would usually not recover much of the initial investment. Non-urban passenger and freight railways may be able to generate significant revenues and cover a higher share of initial investment cost. However, if all routes and services had to be individually profitable the scale of sustainable, low carbon transport would be much more modest and important social, environmental and economic benefits may be forgone.
- **Maximum benefits are achieved by operating public transport systems as integrated networks that would usually be operated at lower than full cost-recovery fares.** Even where individual bus or BRT lines may be able to recover all their initial investment and operating costs from passenger (and advertising) revenue passenger benefits (travel time, transfer convenience, affordability of fares) are maximized when public transport systems are operated as integrated networks. These networks exhibit a common 'look and feel', have common fares that do not vary by mode or route and have a single boarding charge (not one for each line used), and provide integrated travel information. Maximizing demand, and at the same time maximizing the mitigation of GHGs and other externalities, means charging fares that are below operating cost-recovery. Consequently, the public sector has an important role in designing effective public transport networks, financing them and arranging for their efficient operation which can involve the private sector on a 'payment for service' basis. The importance of the public sector for initial investment and on-going financial support for operations and maintenance, and renewal, in

sustainable, low-carbon transport infrastructure that is often at the local level, is shown in Table 2.2.

- **Even though sustainable transport modes tend to require public financial support for capital and operations, private sector investment and knowledge can be facilitated by appropriate contracting arrangements.** Private sector investment is needed to provide the required amounts of funding to meet identified transport needs. However, the public sector will ultimately, and over the long term, pay for much of this investment. The private sector can be used not only as a source of finance but also for their knowledge in project design, new technology and innovative construction, optimization of life-cycle costs, the efficient provision of transport services and maintenance of vehicles, and management of reasonable risks (those they can influence). In return, the private sector will expect to be compensated (make a return on their investment) including allowing for a risk premium. Where the public sector has adequate capacity, and this is currently rare in the developing world, they can structure private sector involvement in investment and operations, through appropriate contract or concession arrangements, for the benefit of their constituencies.
- **Varying types of organization of the transport sector that affect investment scale and may hinder modernization of transport systems.** In many developing nations, both public and freight transport whether regulated or informal is in hands of small scale private entities that even though they may sustain their operations from user fees may be: (i) undercapitalized and so operate old, fuel-inefficient, polluting vehicles, (ii) engage in on-road competitive behaviour to secure passengers with risk to human life and excessive fuel use and emissions; and (iii) may resist public intervention in part because they collectively represent a large part of local economies. The challenge is how to enlist the incumbent entities to effectively contribute to an improved transport system that best meets user needs with maximum safety and minimal negative externalities.

**Table 2.2: Who Pays for Sustainable, Low-Carbon Transport Infrastructure**

Types of Intervention	Avoid (*)	Shift	Improve	Who pays for initial investment?	Who pays for O&M?
<b>Vehicles</b>					
Improved private cars, motorcycles, trucks			•	Individual or fleet owner (for commercial vehicles cost is passed on to customer)	As for 'investment'
Car sharing	•			Individual or fleet owner, public support, advertising	User fees, plus public support, advertising
Bicycles		•		Individual or fleet owner	As for 'investment'
New buses		•		Fleet owner, often public sector	User fees; public support is common
New trains		•	•	Fleet owner, often public sector	User fees; public support is common
Vessels/ ferries		•	•	Fleet owner, often public sector	User fees; public support is common
<b>Behavioural change and pricing</b>					
Travel demand management		•	•	Public sector, employers	Public sector, employers, some private savings
Congestion charging		•	•	Public sector	Public sector, but



Types of Intervention	Avoid (*)	Shift	Improve	Who pays for initial investment?	Who pays for O&M?
					may be fully offset by road use charges
<b>Roadway and track infrastructure</b>					
Roads			•	Public sector, with some exceptions	Road use charges often fixed on annual basis cover maintenance
BRT		•	•	Public sector, some private investment	User fees; public support is common
Rail		•	•	Public sector, some private investment	User fees; public support is common
<b>Supporting facilities</b>					
Footpaths		•	•	Public sector (local governments usually), private in 'enclaves'	As for 'investment'
Cycle facilities		•	•	Public sector or private (advertising), individuals	As for 'investment'
Public transport terminals/stations		•	•	Fleet owner, often public sector	User fees, public support common, private in some cases
<b>Urban renewal/ TOD interventions</b>					
Anchor developments	•			Public sector/ private sector	As for 'investment'
Trunk telecommunications infrastructure	•			Public sector/ private sector	As for 'investment'

(\*) includes 'reduce'

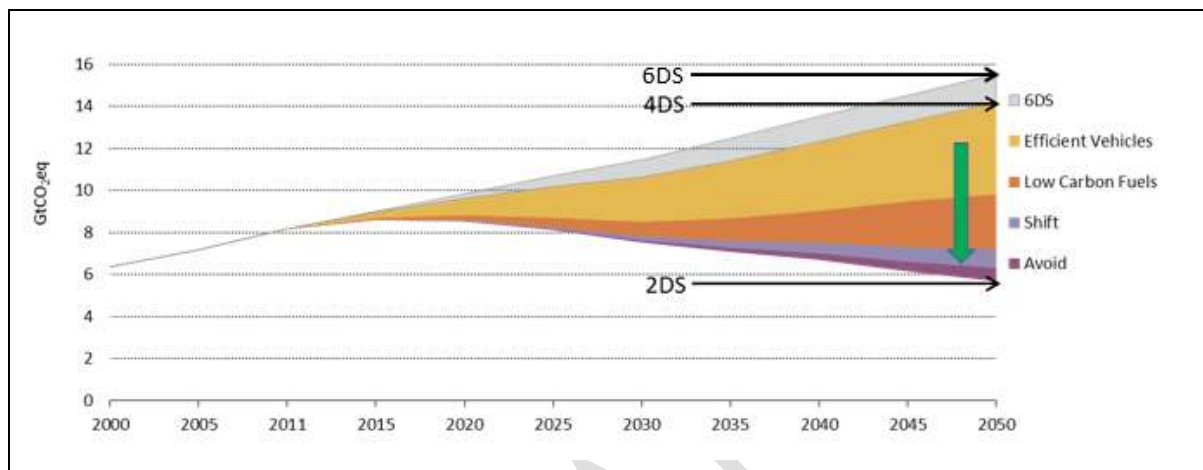
## 2.4 Pathways for sustainable, low-carbon transport

12. A halving in GHG emissions from transport is projected to be feasible by 2050 as shown in Figure 2.1 that illustrates the results of IEA (2014) modelling of the 4°C and 2°C scenarios (4DS and 2DS, with the 4DS referred to as 'business as usual') in relation to the 6DS scenario, with all scenarios relating to transport's potential contribution to GHG emissions).<sup>17</sup>The International Energy Agency's Energy Technology Perspectives (IEA 2012) recommends policies that are in line with the Avoid-Shift-Improve approach curbing travel growth and shifting trips from the private modes to public transport, walking and cycling, as well as freight related measures to reduce GHG emissions. Additionally, shifts to non-petroleum fuels would also play an important role particularly after 2030. If the transport sector is to be brought onto a 2°C stabilization pathway, GHG emissions from motorized travel must significantly decline in OECD countries over most of the projection period. This decline is needed to compensate for the increase in GHG emissions in non-OECD countries that would result even after widespread adoption of Avoid-Shift-Improve based transport policies.

<sup>17</sup>The International Energy Agency is conducting additional modelling to determine the full potential of Avoid and Shift oriented policies, whose impacts might be larger than assumed so far because of assumptions made on the willingness of policy makers in emerging economies (e.g. China) to take measures to restrict private motorization and promote investments in mass transit and green freight solutions.

13. **Choices made today on infrastructure and technology in the emerging and developing economies can lock-in a country to a fossil fuel-dependent or low-carbon pathway for the next 30 to 50 years.** The impact of ‘Shift’ initiatives, such as BRT, can be seen quickly while the impact of large scale rail investments start to show significant GHG mitigation post 2025 with ‘Avoid’ measures starting to achieve significant results post 2030 as shown in Figure 2.1. However, in order to achieve these results on the ground requires significant planning and decision-making on implementation of new rail and BRT systems today. The impact of ‘Improve’ related fuel economy measures, while promulgated now, would be felt in the future as existing fleets are replaced and upgraded. Decision making on transport policy is however not only guided by concerns on climate change. Immediate concerns on congestion, air pollution or road safety can accelerate decision-making on investments in sustainable transport.

Figure 2.1. IEA Scenarios for Low-Carbon Transport Pathways



Source: IEA (2014)

14. **The potential large GHG emission reductions that can be realized in urban passenger transport are confirmed by a new study (ITDP and UC-Davis, 2014).** More than 90% of all global population growth over 2010-2030<sup>18</sup> will occur in non OECD countries, that are currently generally low and middle income. Almost all of this growth is projected to occur in cities<sup>19</sup> in most cases by expansion of existing urban areas. ITDP and UC-Davis, in a separate modelling exercise, making use of the same IEA methodological and accounting approach but focusing on urban areas and public transport and with more ambitious assumptions regarding a shift toward public transport estimates the mitigation potential to be 1.7GT, or 40%, by 2050 compared to the IEA 4DS. This would amount to in total a 55% reduction in urban passenger transport GHG emissions by 2050 compared to IEA’s 4DS. If the Global Fuel Economy Initiative’s goal of a 50% improvement in motor vehicle fuel economy by 2030 would be added to the ITDP – UC-Davis combination of mass transit related strategies, GHG emissions from urban transport could be 10% below 2010 levels in 2050.

15. **Significant health co-benefits are also anticipated by adoption of stringent emission standards to curb harmful vehicle exhaust emissions.** Combining more stringent Euro VI emissions standards, with the types of comprehensive measures examined by IEA and ITDP/UC-Davis (resulting in a decrease in private motorization) would reduce air pollution and save 200,000 premature deaths annually by 2030. Stringent emission standards would also reduce short-lived climate pollutants such as black carbon that cause near-term global warming effects (ICCT 2013, pages 1-4). Improvements to sustainable transport systems will also reduce the estimated 1.2 million fatalities that occur annually.

<sup>18</sup> UN-Habitat (2013), data tables, Table A.1.

<sup>19</sup> Urban areas will represent cities will represent 100% of future global growth in next 15 years with disproportionate growth in the world’s poorest regions (45% of world’s annual growth in 2045 is projected to occur in Africa) UN-Habitat (2013).

## 2.5 How much will it cost to transition to a 2°C low-carbon pathway

16. **Investments in sustainable, low-carbon transport across the globe can achieve the desired transition to a 2DS with cumulative savings of USD 70 trillion to 2050.** The IEA (2014) estimates that the transport sector under the ‘business as usual’ 4DS cumulative investments (for transport infrastructure, up-grades, vehicles, fuel and maintenance costs) would be USD 515 trillion, of which initial investments in infrastructure alone would represent USD 45 trillion, up to 2050. By comparison the 2DS is estimated to represent cumulative investments of USD 445 trillion and represent a cumulative investment and operating saving of USD 70 trillion over 2010-2050, with approximately 80% of this saving being able to be realized post 2025.

17. **ITDP/ UC-Davis’s project cumulative savings to 2030 for urban transport alone at USD 100 trillion.** These are higher than for IEA’s global savings estimates for transport, due to use of more ambitious assumptions. ITDP/ UC-Davis project cumulative urban transport investment, vehicles etc. to 2050 under the ‘business as usual’ 4DS to represent USD 500 trillion of which investment in infrastructure alone is estimated to represent USD 85 trillion over 2010-2030. In their ‘high shift’ scenario (similar to a 2DS), with a total cumulative expenditure in infrastructure, vehicles etc. to 2050 of USD 400 trillion, a saving of USD 100 trillion is estimated (over 2010-2050). Again most of this saving would be realized post 2025. Neither the IEA nor the ITDP/UC-Davis calculations include the additional health co-benefits gained by sustainable transport, nor the improved air quality and reduced travel time, which would make the cost-effectiveness of a shift towards sustainable transport even more compelling.

18. **While there is uncertainty to the precise costings of the two studies, it can be concluded that a low-carbon transport pathway under 2DS is significantly cheaper (at least USD 70 trillion) than the 4DS ‘business as usual’, with significant additional potential for savings because of other developmental benefits.** Individuals and firms will enjoy a very large part of the savings estimated by IEA and ITDP through reductions in purchases of vehicles with associated reductions in operations (including fuel) and maintenance cost. At a later date it would be important to consider further where and in what quantity low carbon transport systems are needed, at what cost, in what time frame and who would pay for the investments in the first instance. A shift to sustainable, low-carbon transport under 2DS has a significant requirement for initial funding by the public sector (see Table 2.2).

19. **Significant transitional investments on sustainable, low-carbon transport will be needed.** A more detailed financial analysis of the impact of the low-carbon transition to IEA’s 2DS was made by the Climate Policy Institute (CPI) for the period 2015 to 2035. The analysis estimated transitional investments in low-carbon land, aviation and sea transport from 2015-2035 would amount to USD 10.9 trillion (in 2DS) which would offset investment required in the 4DS ‘business as usual’ of USD 7.1 trillion. The net transitional investment required over 2015-2035 to realize the 2DS is estimated by CPI to be just over USD 3 trillion, of which over 80% relates to land transport. However, the implied level of annual expenditure is lower than current investment for all transport that is estimated to lie in the range USD 1.4 to 2.1 trillion per annum (refer Box 3.1).

20. **Shifting the geographic pattern of investment to the fast growing developing nations and re-orienting investment to more sustainable transport modes rapidly are urgently required.** For both IEA’s ‘business as usual’ 4DS and the 2DS OECD countries and non OECD countries are estimated to represent 85% and 15% of all expenditures respectively by IEA (2013). This pattern of expenditure is based on meeting projected development needs of non OECD countries and their urban centres. However, Lefevre et al. (2014) estimated that currently, of total annual investments in transport infrastructure, 60% is represented by OECD countries and 40% by non OECD countries, quite a different investment pattern to that needed in future.

21. **Raising the share of private sector funding in transitioning to more sustainable transport modes in developing countries is a prerequisite considering the current and expected public sector capacity to fund the expansion of transport infrastructure and services.** This is an area of concern considering the observed need to augment transport investments in the non-OECD countries

to close the access gap. With the exception of a few large emerging economies it is not likely that the dominance of the public sector in funding and operation of new transport services can be continued. It will be important to broaden the funding base, beyond the public sector to achieve the required expansion in scale. This can be accomplished through a combination of approaches: (i) corporatizing current public sector entities so that they can function increasingly according to market principles; (ii) tap increasingly into domestic and international capital markets enabled through pro-private sector policy and regulatory frameworks as well as better revenue models; and (iii) integrate the often large informal transport sector in the provision of modernized sustainable transport services.<sup>20</sup>

**22. Improved estimates are needed of the transitional costs of 2DS and 4DS scenarios with disaggregation by region, type of transport and requirements for public and private investment.**

The estimates of needed transitional investment costs and expected whole-of-life savings at first may seem inconsistent. An open analytical framework where the assumptions are made explicit would be desirable with progressive improvements in estimates of cost associated with each scenario. Further, virtually all assessments of funding needs are estimates made by international bodies. There are very few locally developed assessments that provide a bottom-up estimate of national and local investment needs. It can be argued that because of this situation policy makers in many countries have given little thought to the quantification of investment needs or steps to be taken to ensure that these funds are mobilized.

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<sup>20</sup>An example is the Bogota model in which small-scale public transport operators were integrated, and received shares in the TransMilenio BRT system.

### 3 Challenges for current funding approaches to promote sustainable land transport

23. **Governments will have to play a leading role in achieving the needed transition to a sustainable low-carbon transport pathway.** They must: (i) set the desired economic, social and spatial development frameworks and supporting regulations and incentives; (ii) implement appropriate sector-specific policies, strategies, programs and projects; (iii) invest directly in sustainable, low-carbon transport, and facilitate much needed private sector participation in investment and operations under appropriate financing arrangements.

24. **Four major funding and finance related implementation challenges are identified** that hinder the needed transition towards sustainable, low carbon transport:

- **how to increase the range and depth of funding sources,** and mechanisms used by the public sector to finance sustainable, low-carbon transport;
- **how to foster increased private sector investment in sustainable transport;**
- **how to scale-up sustainable transport with Official Development Assistance (ODA);** and
- **how to increase the share of International Climate Finance of total climate funding and use it more effectively** to obtain maximum leverage.

25. **Readiness<sup>21</sup> is a pre-requisite for both the public and the private sector in the scaling up of sustainable, low carbon transport.** Critical to each of these challenges is how the readiness of all nations and jurisdictions to plan and implement sustainable, low-carbon transport, can be enhanced. This topic concerns the capacity of the public sector in the first instance, including international climate funds that often have deep knowledge of ‘sustainable energy’ but much less so of the transport sector. Similarly, the private sector in many countries is not well developed in part because economies are weak or government monopolies have prevented private investment and participation in the economy. Often the financial sector is not sufficiently familiar with the transport sector to engage pro-actively on sustainable transport.

#### 3.1 Challenges for public sector funding and financing

26. **Domestic public sector funding<sup>22</sup> plays a vital role but in the developing nations is currently insufficient (refer Box 3.1) to finance the needed transitional investments in sustainable transport investment and operations.** Current sources of funding include general taxes, specific transport charges and user fees. Specific charges and users fees may cover administration, and operations and maintenance, of current transport infrastructure and services (roads, railways, buses etc.) and possibly allow for renewal<sup>23</sup>. However, **opportunities for broadening and deepening revenue sources exist almost universally in many countries:** (i) increased vehicle registration and ownership charges properly structured to reflect the emissions, road damage and congestion they cause; (ii) increases in fuel taxes and

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<sup>21</sup>The term was used by Vandeweerd et al., (2012) to indicate the capacities of countries to plan for, access, receive and report on climate finance as well as implement and monitor resulting projects. In this note, the term is used more generally for sustainable transport funded from all sources.

<sup>22</sup>Public investment in transport is financed by domestic revenues, from government balance sheets or through debt instruments such as bonds that must be repaid, and in the case of low and middle income countries by loans that also must be repaid to multi-lateral and bilateral financial institutions. The poorest countries are usually entitled to grant funding or very low interest concessional loans from these institutions.

<sup>23</sup>For example, World Bank (2007) estimated that road user charges and fees cover the financial cost of sustaining the then existing road system in the Bangkok Metropolitan Region (BMR). This analysis did not cover the social cost of congestion or externalities. The financial cost recovery for bus and rail systems in the BMR were low and generally below 50%. For both roads and public transport, user charges and fees were lower than the financial costs of sustaining the entire system and could not generate a surplus sufficient to recover the cost of significant new investment in infrastructure.

shifting fixed charges to those that vary with use; (iii) direct road use charges to better reflect the marginal social costs of travel (congestion charging); and (iv) more efficient land value capture mechanisms, to reflect the beneficial impacts of transport and other sectoral investments.<sup>24</sup>

### Box 3.1: Source of Current Funding for Transport

**USD 1.4 to 2.1 trillion is estimated to be spent on capital investment in transport infrastructure annually.** Globally, private sector investment accounts for 61% of total investment in transport infrastructure in high income countries but 44% in low-middle income countries. Higher proportions of private investment are found in seaports and airports that lend themselves to commercial models but much lower levels in roads and other transport. As an example, 85% of investment in roads in India is public (Lefevre 2013, pages 3-5).

**Current multi-lateral and bilateral ODA is estimated to be about 2% of the total investments** with roads representing typically representing at least 70%). **Domestically public financed investment in transport that is globally on average 30 times as significant as ODA is also dominated by spending on roads.** The dominance of roads represents the demand of individual countries and the seeking to provide access by communities to markets and jobs, and support to economic development.

**It is estimated that about 10% of ODA support for transport is made through dedicated global climate and environmental funds such as GEF, CTF etc. and carbon markets.**<sup>25</sup> Overall, International Climate Finance<sup>26</sup> through such funds for transport is very minor and estimated at less than USD 5-7 billion annually or 0.3%<sup>27</sup> of total private and public expenditures on transport in 2012. Funding provided through GEF and CTF was approximately USD 0.4 billion in 2012. In 2012, Multilateral Development Banks in 2012 reportedly invested USD 4.7 billion from all sources in sustainable, low emission transport against a total of USD 20.9 billion in approvals of transport projects (African Development Bank et. al., 2013). Much larger than ODA for some nations are bilateral export credits e.g. Japan and France are financing via export credits new metro lines in Hanoi, Vietnam.

**Climate-themed bonds, almost all government-backed, that were outstanding for all sectors were estimated to represent USD 503 billion at March 2014** up from USD 346 billion in March 2013 (Climate Bonds Initiative, 2014 using a different definition of what constitutes 'climate'). Transport's share of the total at March 2014 was USD 358 billion, with the single largest issuer being China Rail Corp. Of the total, USD 237 billion (47%) is considered to be regarded as mainstream investments with investment grades of BBB or higher.

**27. Sustainable transport systems will generally require financial support for investment and operations and maintenance to realize their strong welfare and external benefits.** Sustainable transport may, or should, not be expected to always achieve full cost-recovery (investment and operations/ maintenance) because demand, user and climate benefits and other co-benefits would usually be maximized at low fares (below cost-recovery). However, well targeted financial support, in contrast to inefficient subsidy, can be used to purchase desired services from private or corporatized public agencies such as railway or bus enterprises. At a more basic level, there is often little interest in provision of sidewalks and cycling facilities and when they are provided there is often no provision for effective

<sup>24</sup>In regards to value capture this mechanism in the form of a betterment levy is being applied to the funding of the multi-billion pound Cross Rail project in London

<sup>25</sup>Cumulative approved spending to 2012 on 'low carbon' transport by these funds was estimated at US\$1.75 billion although much may have not been disbursed.

<sup>26</sup>More generally, it is estimated annual global climate finance flows that were mainly directed at climate mitigation were USD 331 billion down from USD 359 billion in 2012. Of the latter total, public sources represented approximately 38% with the balance of 64% being private sources, mostly from developed nations. Of public, the distribution of sources were: (i) 39% from multi-lateral and bilateral Finance Institutions; (ii) 50.1% from national development banks; (iii) 8.8% from Government budgets; and (iv) 1.2% from climate funds. Of private, the 90% was represented by (i) project developers; other private firms; commercial finance institutions; and households. Overwhelmingly 'private' means 'domestic' – in 2011 domestic private actors contributed 83% of all private investments in developing countries (Climate Finance Initiative, 2013 and 2014).

<sup>27</sup>Mahindra et al. (2013) estimated this share of climate finance for transport on the basis of total estimated expenditures for transport in 2010 of US\$1 trillion that is 30% to 52% lower than the more recent total estimated expenditures estimated by Lefvre et al. (2014). Global climate finance for all sectors (i.e. including transport) was estimated to be US\$0.36 trillion of which 63% was attributed to the private sector (Buchner et al. 2013), with the rest from public sources, mainly international sources. The amount of climate finance specifically allocated to transport by national and regional development banks was \$US4.3 billion.

maintenance. While investment in these facilities requires very minor levels of funding their almost systematic neglect in developing nations reflects complex issues including: (i) constituencies for these facilities tend to be poor; and (ii) wide-spread infrastructure deficits and systematic neglect of maintenance often reflect the status of economic development and associated factors<sup>28</sup>.

**28. Sub-national governments are critical<sup>29</sup> for locally appropriate and more rapid implementation of sustainable, low-carbon transport but many developing cities are poorly equipped to effectively play their part.** Projected continuing, rapid urbanization demands urgent local interventions to better shape growth to more compact forms, providing economies in provision of urban infrastructure of all types, and reduce congestion that is a key constraint limiting access to community services, and reducing GHG, noise, air pollution and road trauma. Sub-national governments are needed to exert leadership, manage growth and coordinate financing but face many constraints that include: (i) they may not be sufficiently empowered by national governments to raise revenue and act independently; (ii) many competing demands including a backlog of other infrastructure and services; (iii) poor readiness<sup>30</sup> to wisely use funding; and (iv) MDBs and private lenders are often not able to lend directly with in addition only 4% of the 500 largest cities in developing countries being creditworthy in international financial markets (NCE 2014)<sup>31</sup>. Few countries have institutionalized approaches for financing of new urban development and provision of viability-gap financing that would enable city governments to take up a more active role in initiating new activity centres and early provision of transport infrastructure and services.

**29. Supporting a transition to a sustainable, low-carbon pathway is generally incompatible with current planning, investment and operating approaches.** Typically local governments and many developing country transport agencies operate on using one-year forward work programs, whose funding is negotiated with their Ministries of Finance. Planning and investment frameworks needed to support the medium term transition and longer term ongoing investments in sustainable, low-carbon transport are not sufficiently focused on achieving, long term strategic goals.

**30. Investments in transport are generally project-based, without considering the benefits to be gained by scaling-up, using a programmatic approach,** with active management to ensure integrity of implementation and outcomes. In those cases where a programmatic approach has been applied in the identification, approval and funding of projects (e.g. Colombia, India and Mexico) remarkable results were achieved in numbers of projects that are being implemented simultaneously. Further, in many countries, support for maintenance and operations is dramatically scaled-back particularly at times of economic stress putting the actual performance and outcomes of sustainable transport systems at risk.

## **3.2 Challenges to expanding the role of the private sector**

**31. Private sources of investment in sustainable, low carbon transport modes is currently low, especially so in many of the developing nations,** despite the significance of private funding for ports, airports, long distance railways and enterprises that tend to have a commercial model. The private sector is needed for investment, and can play a valuable role in operations and maintenance, but there are several impediments that hinder the potential of both roles.

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<sup>28</sup>ADB data shows that 42% of their lending operations for transport infrastructure operations in their poorest Developing Member Countries over 2001-2012 were rated as 'sustainable' compared to 72% for their DMCs overall (2005-2012). These data were collated during the on-going preparation of an internal ADB study on asset management.

<sup>29</sup> There are an estimated 4,000 cities with more than 150,000 people world-wide. In India alone there were an estimated 388 cities with less than 1 million people in 2000 that represented 69% of the total urban population. There were a further 4,738 towns with a population of less than 100,000 people.

<sup>30</sup>Inadequate institutional structures, weak technical capacity, poor governance and poor quality planning, programming, budgeting, procurement and financial management and accounting systems, and weak post-evaluation monitoring and evaluation.

<sup>31</sup> The City Creditworthiness Academy led by the Public-Private Infrastructure Advisory Facility and World Bank's Low Carbon Livable Cities Initiative aim to help sub-national authorities be creditworthy in order to access market-based financing. Refer [<http://www.ppiaf.org/node/961>].

**32. Private sector participation in transport and other sectors is often actively discouraged.**

Typical barriers in many countries include: (i) domestic/ foreign shareholding requirements in enterprises; (ii) taxation; (iv) non transparent legal frameworks in case of disputes; (vi) laws that prohibit foreign involvement in certain sectors or private operation of government-owned assets; (v) other barriers to foreign direct investment; (vi) inadequate PPP laws for example that only permit private involvement in concessions where user fees recover all costs (e.g. non-recourse finance) which is not suited to sustainable transport; (vii) government control over tariffs contributing to inadequate revenue models; (viii) poorly prepared projects and optimistic assessments of demand, costs and time frames for implementation; (ix) deficient PPP contracts that may transfer excessive risk thus deterring a wide pool of bidders or greatly increase the cost of private capital; and (xi) a changeable policy environment. Broader issues such as weak government balance sheets and limited capital markets are also constraints.

**33. Private finance is needed for financing sustainable, low-carbon transport but faces additional sector-specific barriers particularly in low and low-middle countries.**

Unless sub-national and national governments improve their capacity and readiness to receive finance for programs and projects, the needed private investment is unlikely to occur. MDB and bilateral support is needed for grant, lending, de-risking projects, and to support capacity building and enhancement of readiness. More work is needed on how domestic and international capital markets could better engage in transport, and how barriers to private financing of sustainable, low-carbon transport can be removed.

**34. New capital-intensive projects such as new rapid transit systems in a 'green fields' situation may have unproven demands, uncertain returns and high perceived risk.**

Unless these projects are appropriately structured from a technical and financial perspective they may face undue delay not be developed at all. The absence of clear policies, well-articulated strategies, and detailed investment programs, and poorly prepared investment projects do not instil investor confidence. Acknowledging the private sector's desire to maximize return and minimize risk is a first step to maximize private involvement.

**35. Inadequate up-front demand constrains the adoption of low carbon transport systems on a scale sufficient to significantly lower unit costs and encourage broad adoption.**

The introduction of, for example, electric buses may require retooling of production lines, which would normally only be considered where there is assured demand. In many cases, however, technological innovation is in the form of small pilot projects resulting in costs that are not representative if the technology were to be mainstreamed. Inadequate demand from the public sector, and costly financing for lease or purchase by private sector firms that would otherwise wish to acquire new technology, contributes to inadequate demand.

**36. Financial rules and regulations may limit the interests of banks in supporting investments in sustainable, low-carbon transport.**

In Europe, institutional investors have to submit to and comply with various "stress" tests, which encourage short-term, low-risk investments. Basel III rules<sup>32</sup> and the EU Capital Requirements and Directives and Regulations for banks significantly restrict the ability of banks engage in long-term, non-recourse project financing (financing in which loan repayments can only come from the profits of a project and not from the assets of the borrower). The use of appropriate PPP modalities for sustainable, low-carbon transport, such as availability payment mechanisms with manageable transfer of risk should overcome the constraints faced by non-recourse financed projects.

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<sup>32</sup>Basel III (or the Third Basel Accord) is a global, voluntary regulatory standard on bank capital adequacy, stress testing and market liquidity risk.



### 3.3 Challenges to using ODA effectively

**37. ODA's potential role in scaling-up sustainable transport is driven by the demand of individual countries that is often focused on road construction for development reasons.** Roads, as for other infrastructure, are mostly financed by domestic budgets. Without the engagement of MDBs and bilateral development agencies in the road sub-sector, assisting to develop socially inclusive and beneficial roads such as those connecting rural communities to markets, they would have little opportunity to influence the setting of the agenda for sustainable transport. To date, the MDBs and bilateral development agencies have been effective in raising awareness of sustainable, low-carbon transport through promotion of the Avoid-Shift-Improve approach described in Section 2<sup>33</sup>. In some countries they have also played a catalytic role in shifting and scaling-up sustainable low-carbon investments often in combination with use of dedicated climate funds such as GEF or CTF.

**38. MDBs and bilateral development agencies are not necessarily effective partners for sub-national governments that would have a major role in effecting the needed transition to sustainable, low-carbon transport.** MDBs and bilateral development organizations are oriented by their charters to working with central governments typically Ministries of Finance and sector agencies. Approvals for lending operations that would benefit sub-national jurisdictions is needed from central agencies with the borrower being the national government. Delays are often incurred as sub-national governments wait to qualify for central government support.

**39. While the MDB and many bi-laterals have their private finance arms that are used to engage with, and aim to stimulate increased private sector investment, investment mobilized in this way is overshadowed by their conventional development lending.** MDBs as part of an overall strategy shift are increasingly putting more emphasis on private sector lending. Under its Long Term Strategic Framework, the Asian Development Bank's activities in private sector development and private sector operations are targeted to reach 50% of its annual operations by 2020. However, currently private sector lending in the land transport sector is typically low in ADB and other MDBs. The European Bank for Reconstruction and Development, which is a relatively new institution, has an obligation to emphasize private sector engagement in all policy, capacity and lending activities. This overarching mandate has resulted in a different transport portfolio in EBRD, with a greater private sector orientation, compared to other MDBs.

**40. Current MDB and bilateral financial instruments for protection against risk where private sector involvement is sought may be less suited to individual sustainable low-carbon transport projects.** Through use of concessional finance, equity investment, guarantees and other instruments, MDBs and the bilateral development agencies are able to provide greater risk protection and capital cost reductions beyond that can be provided by host client governments. Concessional finance is useful to support governments for large projects that may not be attractive to the private sector due to actual or perceived risks. Use of equity investments and non-concessional lending in particular projects by these international development institutions can be useful for enhancing private sector investor confidence. However, due to high transaction costs the range of de-risking instruments on offer may not be suited to smaller projects such as those typified by individual sustainable transport projects. This could be overcome if several of these smaller projects were aggregated in larger programs.

**41. There are new opportunities provided by the emergence of new development institutions but also unknowns.** Given the geographic representation of the shareholding of the recently created Asian Infrastructure Investment Bank<sup>34</sup> and the BRICS<sup>35</sup> Bank that will eventually have a

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<sup>33</sup> Based on recent reporting the eight largest MDBs are on track to implement the USD 175 billion Voluntary Commitment for more sustainable transport in developing countries by 2022 as committed at the United Nations Conference on Sustainable Development (Rio+20) in 2012.

<sup>34</sup> 21 Countries from Asia and the Middle East are part of this new Chinese led institution, which has a proposed capitalization of USD 100 billion, of which up to USD 50 billion will be provided by China, while the other USD 50 billion is expected to be provided by institutional and private sector sources.

subscribed capital to rival that of the World Bank, there is the opportunity to leverage finance with the domestic banks in their rapidly growing regions. What is unknown is the commitment to these formative institutions to sustainable, low carbon investments and comprehensive investment governance including environmental and social safeguards. Initial announcements have emphasized the need for funding for hard infrastructure as a basis for development. Sustainability issues have not featured dominantly in statements by these new institutions.

### 3.4 Challenges to leveraging climate finance

**42. The limited scale and fragmentation of public and private climate finance, compared to the large financing needs in the transport sector, is a constraint.** As shown in Section 1, less than 10% of all public and private climate finance, and International Climate Finance, has to date been allocated to sustainable, low-carbon transport. Further, International Climate Finance provided through dedicated multi-lateral and bilateral climate and environmental funds, have different purposes, and different and often long approval procedures and varying, often demanding, methodological requirements.

**43. Multi-lateral and bilateral climate funds are limited in size limiting their suitability for project implementation.** Climate funds represent less than one percent of needed transitional investment in sustainable low-carbon transport on an annual basis. Where climate funds are used for implementation it may be blended with conventional MDB lending on a 'take it all' basis and by reducing the effective interest rate, and risk, can assist to leverage other conventional lending, viewed broadly blending climate finance may not contribute to generating additional funds for low-carbon activities, since in the absence of the climate finance the multi-lateral and bilateral funds would be expected to spent elsewhere. With some exceptions these funds are project-based with much effort being applied to get a single project off the ground.

**44. Several factors make effective use of climate finance for sustainable transport challenging including: (i) limited consensus on marginal abatement costs (MAC) for the transport sector** that fully reflect both technological and behavioural approaches to mitigate climate change due to transport which makes it difficult to prioritize between sectors, and among specific activities within transport, making it difficult for climate funds to justify investing in low-carbon transport projects; **(ii) lack of general capacity, data and information on sustainable, low-carbon transport** approaches in developing countries; **(iii) difficulties in estimation of reductions in GHG emissions from transport due to its multitude of mobile sources and complex behavioural interactions;** **(iv) complexity in blending climate finance with other public and private funds** due to the cumbersome administrative and monitoring requirements for climate finance; and **(v) inadequate institutional and governance arrangements,** especially between the national and sub-national level.

**45. The Clean Development Mechanism (CDM), a project-based carbon trading mechanism, is now widely acknowledged to be a poor fit for sustainable, low carbon transport.** CDM allows low-carbon projects in developing countries to generate income by trading Certified Emission Reductions (CERs) in carbon markets with developed countries. However, the difficulty in applying stringent Monitoring Reporting and Verification requirements for transport whose project boundaries are geographically broad, with complex induced behaviour of people and firms, means that to July 2013, only 0.6% of all CDM projects were in the transport sector.<sup>36</sup>

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<sup>35</sup>Brazil, Russia, India, China and South Africa.

<sup>36</sup>While the measurement, reporting and verification (MRV) of actual direct GHG reductions due to sustainable low-carbon transport operations (e.g. railways and BRT) from switchers from private modes is not so difficult, the CDM methodologies rightly require estimation of induced effects that tend to offset the initial mitigation. This is much more complex and the cost of surveys and other transaction costs is relatively high, compared to the financial support likely to be received.

**46. Nationally Appropriate Mitigation Actions (NAMAs) may be more suitable for mitigation actions in the transport sector than other approaches.** NAMAs refer to voluntary actions, such as strategies, policies, programmes and projects, which countries undertake as part of their contributions to global climate change mitigation. They are reported by national governments to the UNFCCC. Proposals for NAMAs seeking international support for development or implementation are recorded in a registry at the UNFCCC along with requests for technology, finance and capacity building support<sup>37</sup>. NAMAs can include actions at the national and sub-national level. As of November 2014, in the UNFCCC database, transport NAMAs accounted for 29 out of 118 proposals (24.6%), which is a significant share. In addition, in the first call for proposals of the NAMA Facility, a funding mechanism for supporting the implementation of ambitious NAMAs in developing countries set up by the British and German governments, two out of five selected projects are from the transport sector.<sup>38</sup> Although promising in scope, only few of all the NAMAs have secured funding for implementation, implying that their potential role for achieving a significant impact for climate change mitigation, including through sustainable transport is still uncertain.

**47. Despite significant promise it is not yet clear whether the Green Climate Fund (GCF) will achieve its 2020 target of mobilizing USD 100 billion annually of public and private climate finance.** Having identified low-emission transport as one of four strategic level impact areas, a quick start-up of the GCF can enhance the relevancy of climate finance for transport<sup>39</sup>. Expectations with respect to the role of the GCF within the international climate finance architecture are high. It is expected to become the main multilateral international climate fund and should play a significant role in mobilizing the USD 100 billion per year of public and private climate finance by 2020 committed in the 2010 Cancun agreement. It is not yet clear whether this 2020 target will be met and what the annual size of funding would be in the years before 2020. Neither is it fully clear what the impact will be of the GCF on future funding for the Climate Change component of the Global Environment Facility or the Clean Technology Fund, which until now have been the major sources of Climate Finance for low carbon transport. The GCF published in May an initial Results Framework, which outlines how the GCF intends to contribute to low carbon development.<sup>40</sup> Low-emission transport has a prominent place in the initial Results Framework but so far targets only targets low-emission passenger transport and does not actively incorporate low-emission freight transport.

**48. Sustainable, low-carbon initiatives, are often implemented at a sub-national level (e.g. in cities, sub-regions) but sub-national governments are often ill-equipped to receive climate finance.** The constraints identified above to MDB and private lending and investment to sub-national level governments in regards climate finance also prevail. In the development of sub-national climate finance programs there is a trend towards integrated programs whereby transport is not viewed on its own. Under an integrated approach being promoted by the World Resources Institute, and recently by World Bank and GEF, transport's enabling nature in support of broader, economic and social development goals means that transport would be treated as part of city-wide multi-sectoral efforts to reduce carbon emissions. It is not yet clear whether this approach will result in a substantial increase in climate financing for transport.

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<sup>37</sup> Refer [<http://www4.unfccc.int/sites/nama/SitePages/Home.aspx>].

<sup>38</sup> See [[www.nama-facility.org](http://www.nama-facility.org)].

<sup>39</sup> In contrast to other sources of climate finance that are usually project-focused, the GCF appears to wish to ensure that all GCF funding will create a shift towards low-emission development pathways. GCF's initial Results Framework makes reference to a "country-driven policy agenda". It suggests that countries focus on enabling legal and regulatory frameworks and that they focus on: (i) developing a policy document that outlines its mitigation strategy; (ii) changing the legal and regulatory framework to be consistent with the proposed policies; (iii) building the capacity to implement the proposed programme in government institutions provided with the funding needed to attract qualified staff; (iv) enabling the financing needed to support the development and implementation of mitigation projects; and (v) establishing the monitoring and evaluation processes needed to support the evolution of the implementation programme.

<sup>40</sup> Initial Results Management Framework of the Fund, GCF/B.07/04, 07 May 2014.

**49. Use of bonds directed to climate-themed and green investments is growing and represented USD 503 billion in 2013 but the market is still in the development phase.** Standardization of definitions of what is ‘climate-themed’ or ‘green’ is required along with adequate assurance they are beneficial to the environment as well and their investment grade is warranted. The underlying integrity of the PPP concession contracts will dissuade investments in bonds if the risks are deemed unacceptable. Potential for growth of the market, and increasing funding for climate mitigation is hampered by the lack of ‘recycling’ of existing green assets (refer above) that would normally have known risk profiles. The securitization of existing green assets will give initial lenders and investors to projects and exit strategy allowing them to rapidly recycle limited capital into new projects (Climate Bonds Initiative 2014).

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## 4 Key actions for financing and funding sustainable, low-carbon transport

50. Stakeholders need to agree in principle on how to **(i) finance sustainable, low-carbon transport through a variety of sources** including regular budget provisions, domestic and international commercial loans, bonds and PPPs, as well as ODA; and **(ii) ensure that in the case of external financing there is adequate funding to repay these sources** through user fees, other transport charges and taxes including on land value uplift. Further analytical work is needed that takes into account national and sub-sectoral differences to strengthen the case for financing and funding changes. The specific nature of a financing and funding framework for sustainable, low carbon transport will vary from country to country and by sub-sector. Proposals for key actions by the main stakeholders need to be seen in this context.

51. Considering the long lead time of certain policy measures and the lock-in effect of policy and investment choices made today it is critical that all stakeholders embrace the idea of **system change opposed to small, incremental steps**. Large-scale capacity building efforts need to be prioritized whereby ODA and Climate Finance should be directed to building capacity that will enable the public and private sectors to plan, implement and monitor the large-scale investments required in sustainable transport.

### 4.1 Public Sector

52. Governments must take a leading role in the development and financing of sustainable, low-carbon transport. Both national and sub-national governments have a valuable role to play. The former sets national policies, plans, standards, laws and regulations that guides national economic and social development and the spatial distribution of urban settlements and economic hubs such as industrial zones, ports and airports. National government agencies such as Ministries of Finance, Transport, Energy, Urban Development and Environment must advise their governments on sustainable development, prepare policies, strategies, and national programs and enabling legislation and regulation. These ministries should increasingly deal directly with MDBs and bilateral development agencies in setting forward external assistance plans for their countries. While these Ministries have much power they are not necessarily always in a position to act effectively and quickly at a sub-national level to curb unsustainable development patterns with effective local action. Box 4.1 sets out a general description of the range of relevant responsibilities of national and sub-national government in relation to transport.

**Table 4.1: Examples of Scope of National and Sub-national Responsibilities of Relevance to Transport**

National Level
<ul style="list-style-type: none"> <li>• Determine national economic and development strategies – determine spatial and sectoral priorities</li> <li>• National budgeting and expenditure, raising capital for development programs and projects</li> <li>• Energy pricing, taxes on vehicle ownership and use, taxes on households and firms affecting investment and consumption decisions</li> <li>• Determine national frameworks for investment, attracting Foreign Direct Investment</li> <li>• Participation in global and regional trade and investment protocols</li> <li>• Prepare policies, laws, regulations and standards</li> <li>• Prepare planning and investment frameworks</li> <li>• Foster private sector participation in transport with transparent PPP frameworks</li> <li>• Engage directly with MDBs etc.</li> <li>• Develop sectoral governance priorities</li> <li>• Fund key national and sub-national activities</li> </ul>

- Ensure capacity at national level and support capacity building at sub-national level

#### **Sub-national**

- Economic, spatial and sectoral development plans & priorities, with emphasis on integrated, regional development
- Take the lead in developing comprehensive mobility plans and linked to that multi-year programmatic investment frameworks
- Ensure appropriate coordinated institutional and organizational capacity
- Local revenue raising, including from land value uplift
- Procurement using sound contracts with adequate recourse
- Budgeting, finance and investment in local infrastructure and services
- Provision of urban services including low cost housing, local public transport, local roads etc.

**53. National governments need to empower sub-national governments so they can effectively manage their own growth, within the national development umbrella framework, including vigorous pursuit of sustainable, low-carbon transport.** In order to rapidly develop sustainable transport requires active participation of sub-national governments (notably cities and provinces) for the projects and initiatives that relate to them (‘within their communities of interest’<sup>41</sup>). **The devolvement of autonomy, powers including for revenue-raising is critical due to continuing rapid urbanization, and growth of many small and medium sized towns to more major urban areas in future.** This also includes policies and guidelines on how cities can take on debt in a responsible manner for amongst others the development of sustainable transport systems.

**54. National governments must take the lead in creation of a sustainable funding and financing framework for the transport sector to put it onto a low-carbon trajectory.** A comprehensive approach is required. Five ‘building blocks’ for financing sustainable, low-carbon transport are set out below. These building blocks proposed by GIZ<sup>42</sup> would favourably affect the travel behaviour of individual and firms, the organization of the transport sector, the raising of adequate finance, and how public and private investment is facilitated:

- **Acknowledging mobility as a public service.** Many countries acknowledge the necessity of access to mobility for everyone in policies and practice. In some countries the access to mobility services is even a constitutional right.
- **Getting institutions and their framework conditions right.** Responsibilities in the transport sector needs to be re-organized in a transparent, efficient manner. A coherent policy framework should be established, covering all relevant policy areas and making use of all feasible policy options. Accompanying reforms in institutional and governance reforms would be needed in many countries also. External assistance is likely to be needed in addition to finance.
- **The transport-finance-transport principle.** The transport sector is too large to be subsidized and funded by other sectors. However, sustainable transport investments often do not usually provide a positive return on investment in strictly microeconomic terms. Efficient financial support for public transportation is justified because of its economic, social and external benefits. International experience has shown that an efficient transport sector is able to generate sufficient revenue to ensure adequate financing of its own infrastructure<sup>43</sup> and operation. A sector-internal

<sup>41</sup> Also known as the principle of subsidiarity whereby for example national governments only perform tasks that cannot be carried out at lower levels.

<sup>42</sup>GIZ (undated), “Building Blocks for Financing Sustainable Transport Sector Development.”

<sup>43</sup>This is the case where transport systems are mature but may not be fully applicable where low income countries are in a rapid development phase where investment in transport infrastructure is needed to support broader economic and social goals.

partial subsidization of public transportation by fuel and private vehicle tax revenues is common practice in countries with good quality transport systems.

- **Pricing transport to moderate excessive demand.** A key economic principle that applies in achieving economically optimal demand (that is not too high due to underpricing of transport) is the setting of the price of use of transport facilities to approximate the marginal social cost (marginal operating costs, congestion, road trauma and externalities) of road and public transport use. The use of such a principle leads to consideration of fuel charging for road use to moderate congestion and provision of efficient financial support for public transport. In a practical sense, reducing the over-consumption of transport can be achieved by reducing subsidies for individual motorized transport especially those that make private ownership and use cheap. Removal of fuel subsidies<sup>44</sup> and then pricing of fuel to reflect integrate all relevant social and environmental costs, increases in parking charges, charging insurance on a distance-travelled basis, and targeted pricing on a temporal and spatial basis (access charges etc.) are effective means of moderating use of vehicles while at the same time raising important revenue.
- **Setting clear investment priorities.** One of the key concerns for sustainable transport financing is how to shift investments from conventional, unsustainable to low-carbon, sustainable transport. This question is not only about additional funding but more so about how to make best use of all available funding sources. National transport policies, which are to be “translated” in comprehensive sub-sector strategic plans, provide the necessary guidance for prioritizing investments in the transport sector. Designated funding programs help to allocate investments towards sustainable transport by providing co-funding for projects, which are coherent with the national policy targets.

**55. Rapid delivery of priority sustainable transport initiatives on the ground requires considerable strengthening of planning and investment frameworks backed by adequate funding.** Policy, planning and low cost, fast-implementing sustainable transport measures such as bus-based public transport, and street networks and non-motorized networks will be needed that support compact urban development. Given the lead times to plan and commence to develop entire new urban precincts (5-10 years) and supporting trunk water, sanitation, power and trunk rail (typically 10 years or more) and bus rapid transit, walking and cycling provisions (1-5 years), this planning needs to commence now, to enable early implementation. The typical hierarchy of instruments for translating policies and plans to investments on the ground within an ideal Planning and Investment Framework is shown in Table 4.2. In many developing nations these frameworks exist on paper but typically can be strengthened in regard to: (i) integrity of content and priority setting using appropriate appraisal techniques covering economic and social dimensions in addition to the environmental dimension; (ii) discipline in preparing and implementing programs and projects; (iii) realism of funding attached to programs and projects; and (iv) adequate post project evaluation including measuring, verifying and reporting of anticipated benefits. More support by national sector agencies to sub-national agencies to strengthen knowledge of sustainable transport is required.

**56. Value capture mechanisms can be implemented on a wider scale to recoup privately enjoyed property value uplifts due to public investment in infrastructure.** The most promising type of value capture mechanism is an annual recurring tax set at a low percentage rate of improved property value across entire metropolitan areas (Walters 2012). There are two main alternative approaches. Under Tax Increment Financing (TIF)<sup>45</sup>, the level of development is estimated and the expected growth in

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<sup>44</sup> Many nations have historically advantaged road transport operations compared to other modes by subsidising diesel fuel and tolerating aged and polluting truck fleets. While the distortionary effects of these direct and indirect subsidies are well recognised, many governments find these policies difficult to abandon due to their appeal to vested interests. Approximately 40 countries, approximately 20% of all countries surveyed, were assessed by GIZ (2011, page 64) in 2010/ 2011 as having very high diesel fuel price subsidies. Many billions of dollars are provided in subsidies thereby encouraging unsustainable energy consumption practices that have clear negative effects in terms of GHG emissions and air pollution.

<sup>45</sup> See for example, [[http://www.infrastructure.gov.au/infrastructure/iff/files/IFWG\\_Report.pdf](http://www.infrastructure.gov.au/infrastructure/iff/files/IFWG_Report.pdf)].

property tax revenues due to property values increase is used to raise finance by special bond issues to finance infrastructure development. This approach is common in the United States where it is often used to fund urban renewal projects, affordable housing and public infrastructure. It aims at promoting efficiency of public investment in infrastructure by creating an incentive to locate where there is infrastructure capacity. The ‘New City Deal’ model adopted by the UK Government and the UK’s major cities is a variation on the TIF model. A different approach to the same task is the implementation of betterment taxes or special assessments (Walters 2012; Meddaet al.2010) on business and households in a defined catchment. They have a long history and typically range in value from 30% to 60% of the value increment and are for, example, being applied to the funding of Cross Rail in London. All of these mechanisms are effective approaches for capturing all or part of the incremental value created by public investment if there is community acceptance.

**57. Hong Kong’s example indicates the potential for development of rapid transit significantly financed by property development.** Key distinguishing features of the Hong Kong situation are that: (i) the government owns all the land which the mass transit agency (originally a corporatized entity) was able to package up around stations and offer to developers who would develop agreed infrastructure; and (ii) population density is very high creating a strong demand for housing and commercial development. Where these pre-conditions exist, or will exist in future urban areas, detailed development planning can assist to create realize the potential for integrated rapid transit and property development, with the former significantly financed by the latter. More generally, there is also potential for high density developments adjacent to rapid transit stations to contribute to the cost of infrastructure but their value is likely to depend on property market cycles and the strength of prevailing land use regulations that are ‘relaxed’ to permit the new developments.

**Table 4.2: Planning and Investment Framework**

<b>Instrument</b>	<b>Content</b>	<b>Time Frame</b>	<b>Jurisdiction</b>
Policy	Directional intent e.g. reduce road fatalities, achieve certain urban air quality levels, limit GHG emission from transport, create universal rural, urban and national level access,	Long term	National, sub-national
Strategy – Long Term Plans	Strategy/ long term plans integrated with land use (10 to 50 years) – directional in nature, sub-sectoral/ spatial priorities, broad sequencing of land use, transport	10 – 50 years	National, sub-national
	Medium term plans – detailed project identification, priority setting	5 – 10 years	National, sub-national
Program	Investment programs (on rolling basis), consisting of projects and other initiatives	1-2 year committed projects, 3-5 year indicative but likely investments	National, sub-national
Project	‘Ready to implement’ projects identified in programs	As above	National, sub-national

**58. National and sub-national governments must develop transparent frameworks that foster and encourage private sector participation<sup>46</sup> in transport and other infrastructure development and operations.** Overcoming the constraints on private sector investment noted in Section 3.2 must be done hand in hand with the other reforms described above. Leadership and finance from governments may be needed in the first instance to initiate these projects. Risks associated with major,

<sup>46</sup>In the poorest nations, the private sector may be limited in capacity particularly away from the national capital. As part of broader economic development government needs to facilitate growth of private firms and their capacity. Use of small-scale maintenance contracts for public infrastructure such as streets, gardens, and other services, plus provision of training in tendering and contract management is a way of stimulating early development of private sector capacity.



new ‘green fields’ projects were noted in Section 3 and need to be overcome by governments doing comprehensive technical assessments of cost, demand, revenue and risk and by careful consideration of the potential role of the potential in each instance and make realistic assessments of the financing support needed to be provided by the public purse. Financing of integrated urban development and transport on a large scale in cities to cater for large population growth would be possible using bond financing, including green bonds, using Tax Increment Financing (refer above) or a similar mechanism.

**59. The unit costs of new low-carbon technology transport technology such as electric buses can be lowered by stimulating up-front demand.** Governments with support of ODA and International Climate Finance can support direct purchase of new technology or by lowering the cost of finance for private firms wishing to acquire new technology vehicles. Such programs have included a financing facility established by ADB for clean bus leasing in China.<sup>47</sup>

**60. The private sector can play an expanded role in the transition to sustainable, low-carbon transport systems provided national and local governments are able to arrange suitable financing modalities.** Although, as explained in Section 3.2, sustainable, low-carbon transport should be viewed as a system where many of the parts should not be expected to be cost-recovering, this does not mean that private sector participation would be excluded. Extending the concept of purchasing of transport services from private providers, and overcoming the key disadvantages of non-recourse financing<sup>48</sup> for sustainable, low-carbon transport, governments can arrange appropriate concessions that seek to purchase capital, technology, provision of transport services (operations and maintenance), and allocate manageable risks, using periodic payments paid to meeting of defined outputs defined in concession contracts. Commonly called ‘availability payments’ this PPP mechanism is used widely, for example, for many of the world’s Bus Rapid Transit systems (TransMilenio, Colombia, Transjakarta, Indonesia), bus systems in Australia, rail systems in UK, LRT in France and Australia, and purchase of new trains and life time maintenance (Australia).

**61. Once a city or jurisdiction, has developed a series of successful sustainable, low-carbon transport projects it can contemplate selling them off (‘recycling’) either as individual investments or as a package.** The payments received, which in effect are released capital, can be used for new priority infrastructure as identified in forward plans and programs. Once ‘green field’ projects are underway, demands, revenues and returns are largely known and the assets can be relatively easily sold to investors. However, to ensure continuity of services provided by the infrastructure, following the sale of the assets may require governments entering into long-term agreements with private consortia where they pay for the services provided by these assets. These consortia may ultimately derive a share of their financing from bond markets, climate bonds for example.

## 4.2 MDBs and Bilateral Development Institutions

**62. ODA can support the development of capacities and the creation of adequate enabling conditions** (e.g. capacities, readiness, planning and investment frameworks, PPP frameworks as listed above). Positive signs are visible, for example, with MDB commitment at Rio+20 to provide more than USD 175 billion of loans and grants for more sustainable transport over the next decade. MDBs and bilaterals are already widely promoting the strengthening of Medium Term Investment Frameworks in many countries. What would be beneficial would be to strengthen the transport-sector specific content of these frameworks to improve: (i) planning processes; (ii) the content of plans via, for example, expanding use of the Avoid-Shift-Improve framework; (iii) appraisal methods for assessing social and economic benefits as well as climate and other environmental benefits; (iv) asset management; (v) programming and

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<sup>47</sup> ADB Project 6928-014, refer [[http://adb.org/projects/details?proj\\_id=46928-014&page=overview](http://adb.org/projects/details?proj_id=46928-014&page=overview)].

<sup>48</sup>A type of loan that is secured by collateral, which is usually property. If the borrower defaults, the issuer can seize the collateral, but cannot seek out the borrower for any further compensation, even if the collateral does not cover the full value of the defaulted amount.

budgeting; (vi) implementation, including procurement, and supporting financial management and accounting systems; and (vii) post program and project evaluation.

**63. ODA can assist in redirecting the dominant domestic funding of land transport (mainly roads) to more sustainable, low-carbon transport.** Road investment can be expected to continue to be demanded by individual nations for a range of economic and social development reasons. Withdrawal from supporting road development may risk MDBs and bi-laterals having little influence on the roads agenda and transport's role in sustainable development. ODA can play a valuable role by supporting only the most beneficial road projects with priority for rehabilitation and maintenance of existing tracks and paths in rural areas to reduce poverty, in regional contexts for facilitating cross-border trade, or for urban streets with pedestrian facilities and bus services and in cities, to provide frontage access to compact urban development.

**ODA can help in aggregating investment options that in their own right are too small to attract large scale financing.** There are many examples available of the positive impact of bundling projects into multi-jurisdictional investment programs in the case of urban transit. This could be expanded to other areas including schemes that create or improve walking and cycling facilities. The development of revenue models can be part of ODA assistance. Such assistance can assist governments to speed up implementation of sustainable, low-carbon transport projects by developing instruments that support parallel, multi-jurisdiction programs and project development. MDBs, like their member countries, provide the majority of financial assistance through projects whereby loan proceeds are directly used for the implementation of specific investment activities. It is worthwhile to consider how MDB financing can be used to promote and expand programmatic or strategic approaches including: (i) funding Programme or Project Preparatory Financing facilities; (ii) providing viability gap funding to a range of projects under a national program; and (iii) providing risk guarantees to a series of private sector projects.

**64. The MDBs and bilateral development agencies need to develop common approaches to support individual national governments.** The growth in numbers of development institutions increases the need for a harmonized approach on how they will support governments to implement soundly based national policies and plans, how they will prepare and appraise projects, how procurement would be carried out, and social and environmental safeguards would be applied. It will be important for "traditional" MDBs to develop common approaches with the new multilateral financing institutions like the Asian Infrastructure Development Bank and the recently established BRIC development bank. Failure to do so will hold back the development and implementation of comprehensive and long term sustainable transport oriented planning and investment frameworks.

### 4.3 Climate Finance

**65. Despite the challenges limiting the effectiveness of International Climate Finance to date, there have been some notable good practices including:<sup>49</sup>**

- **Supporting the development of policy and programmatic approaches** (rather than financing individual projects);
- **Stimulating greater awareness of low carbon transport options** (by, for example, engaging in demonstration projects, or developing materials to highlight the emission reduction and other benefits resulting from implementing low carbon transport);
- **Funding capacity development at agencies responsible for planning and implementing transportation projects.** This is seen as a good way to leverage limited climate finance funds as often the project preparation is not as strong as it could be in developing countries, leading to less successful low carbon projects.

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<sup>49</sup>See report on the first meeting of the Expert Group on Climate Finance, September 2014:  
[http://slocat.net/sites/default/files/u10/transfer\\_manila\\_workshop\\_report.pdf](http://slocat.net/sites/default/files/u10/transfer_manila_workshop_report.pdf)

- **Supporting the measurement of emissions through the development of a range of tools.** Measuring emissions and emission reductions from investing in low carbon projects is an important element in creating awareness about the problems of emissions resulting from the functioning of the transport sector, and the potential benefits to be had from investing in low carbon transport;
- **Facilitating taking more risks** than what would normally be considered acceptable in a market setting, by taking away some of the risks that are the least acceptable to private investors;
- **Offering differential interest rates based on desired policy objectives;**
- **Financing demonstration projects** as a way to build experience and demonstrate the feasibility of untried concepts and technologies (this helps to reduce risks in the eyes of investors and makes a project more attractive); and
- **Helping to build political support for promoting and stimulating low-carbon transport by using NAMAs** to create greater awareness about the problems and potential benefits of low carbon transport solutions.

66. **The limited scale of International Climate Finance means it should be used strategically to shift investments from business-as-usual into low-carbon alternatives** and in incentivizing increased absolute investment into the transport sector. International Climate Finance shares some of the same characteristics to ODA because it is administered by the same development institutions. However, international climate finance available for the transport sector will inevitably continue to be minor compared to investment needs for sustainable, low-carbon transportation. In this context, potential roles for climate finance could be to:

- **Support the development of a conducive policy and regulatory framework for low-carbon transport**, as well as structured land planning and respective capacity building;
- **Cover part of the incremental costs for low-carbon transport programs and projects in the initial stages of deployment** until respective technologies, practices and approaches are well known and its benefits acknowledged by national and subnational decision makers;
- Mitigate risks related to new low-carbon technologies, **which national public budgets or the private sector are not willing to take;**
- **Support robust monitoring and evaluation systems**, which would not only improve the understanding of actual GHG emission reduction benefits of sustainable transport solutions but also allow for monitoring of economic, social and environmental benefits.
- **Pilot more innovative approaches for funding sustainable, low-carbon transport such as programmatic approaches**, use of leasing or guarantees and provide such approaches with initial international public funding required to leverage larger amounts of funding from national budgets and the private sector.

67. **In order to realize this strategic potential there is a need for changing the way how much of the International Climate Finance is used in the transport sector**, and respectively to strengthen initiatives, which already apply more innovative approaches. For example, the GEF is now offering the opportunity to use non-grant elements, which could potentially be adapted to a number of transport sector programmatic activities. For example, the creation of intermediary facilities or funds could invest in: (i) improved urban parking management as part of business district revitalization; (ii) associated pedestrian and bicycle systems linked to advertising; and (iii) BRT system developments integrated with Transit-oriented Developments. Central to such a new approach is a greater use of private sector funding linked to climate financing and could be employed by CTF as well as the NAMA Facility.

68. **The limited amount of International Climate Finance should be used for co-financing multiple projects, and utilizing approaches that leverage other funds including from the private sector.** The Green Climate Fund intended to make use of this strategic approach and is a very promising development for the transport sector. A similar role was advocated above for ODA wherever possible.

69. **Experience with innovative approaches in other sectors (e.g. the energy sector) may inform the use of International Climate Finance in the transport sector as it moves beyond a more traditional project-based approach.** In the energy sector, over the past 10 years, many innovative initiatives have been developed with the aim of using international climate finance to leverage national public and private sector funding to achieve low-carbon energy generation and energy efficiency.

70. **Deploying International Climate Finance at the early stages of the policy, plan, program and project cycle is likely to more effective than in later stages.** Use of International Climate Finance for building capacities for sustainable transport planning and supporting the development of fundable programmatic approaches offers significant potential. Support for relevant measurement, verification and reporting of emissions reductions, and the marginal abatement costs, of sustainable transport is critical to putting the transport sector on a par with the energy sector, which has received a much larger share of climate finance than the transport sector. In order not lose momentum, climate funds should still be allowed to fund sustainable transport relying on ex-ante estimations of emission reductions until more robust methods and data become available.

71. **Decision makers should actively support use of International Climate Finance to promote sustainable, low carbon transport in a manner that corresponds roughly to transport's share of overall transport emissions of overall GHG emissions.** It is simply not realistic to expect that the transport sector contributes proportionally to realize the 2DS, without providing the sector with the resources to develop its approaches to do so. A factor to consider in allocating climate finance within the transport sector would be the marginally abatement costs of different interventions in the transport sector covering the full range of behavioural and technology interventions.

## 5 Recommendations for International Climate Finance

72. **Developing much needed transport infrastructure and services in developing countries will require trillions of dollars.** Sustainable, low-carbon transport solutions can substantially reduce the level of investments required. Changes are required in almost all parts of transport related funding and financing arrangements to promote the realization of sustainable, low carbon transport.

73. **It is recommended that policy makers should:**

- **Increase the overall availability of public funding to develop and maintain sustainable transport infrastructure and services** by: expanding current sources of domestic funding; and prioritizing available domestic funding to sustainable, low carbon transport;
- **Accelerate private sector investment** by: sending the right price signals; creating clear revenue models for the operation of transport infrastructure and services; and strengthening the arsenal of private sector financing modalities;
- **Create clear and predictable investment frameworks** by: ensuring integrity of overarching long-term investment and legal frameworks; strengthening development of competitive, stable and adequately capitalized domestic banking systems; and empowering, and then assisting, sub-national governments to improve credit worthiness; and
- **Harmonize planning approaches, tools, methods and implementation procedures** by: promoting the Avoid-Shift-Improve approach; adopting appropriate appraisal methodologies that balance traditional economic assessments of transport choices and investments with environmental (both climate and other environment) and social (safety and equity) considerations; and harmonizing procurement, safeguard and implementation approaches to minimize delays and ensure high quality outcomes.

74. **While the principles are the same across countries, the detailed interpretation and implementation of the proposed funding and financing arrangements will vary from country to country depending.** ODA and International Climate Finance are too small in scale to substantially replace domestic funding. Their impact will be larger if the limited resources are not used mainly for direct implementation but instead are increasingly used to build capacity, guide policy development and leverage public and the private funding.

75. **International Climate Finance initiatives can take a lead from the Green Climate Fund (GCF) that intends that that all GCF funding will be transformative through creating a shift towards low-emission development pathways.**

76. **Specific recommendations to make International Climate Finance more accessible for transport include:**

### Eligibility

- **Create a Transport Window under different International Climate Finance mechanisms** to ensure that transport is not 'punished' for its complex structure and ends up at the end of the line of sectors benefitting from climate finance. A special transport window can help to ensure that transport will be able to realize its full contribution to climate change mitigation.
- **Develop a White List (Positive List) of transport measures that can access International Climate Finance**, thereby relaxing the need to quantify GHG mitigation and co-benefits at an early stage.

- **Prioritize and reward the use of programmatic approaches over project-by-project approaches.** This can include the use of ‘aggregators’ that combine smaller projects into larger viable programs.
- **Adopt eligibility criteria that match the transport sector.** Do not evaluate projects merely based on GHG mitigation costs despite partly higher abatement costs than other sectors. Include co-benefits as important criterion when deciding on eligibility of transport projects. Aspire at co-benefits quantification but do not make it a prerequisite at the approval stage.

### Readiness

- **Use International Climate Finance to raise awareness and build capacity for neglected transport sub-sectors** that have not received much attention like freight transport.
- **Demonstrate, using International Climate Finance, how to engage the private sector in sustainable transport,** including the development of private-sector oriented mechanisms like Climate Bonds.
- **Allocate a greater share of International Climate Finance to support institutional ‘readiness’** in the transport sector with the aim to build up a well-prepared, and viable, program and project pipeline.
- **Better align ODA with the use of International Climate Finance.** This will be in the interest of the transport sector considering that transport is typically the largest or second largest lending sector in MDBs.

### Measurement, Reporting and Verification

- **Establish credible but appropriate Measurement, Reporting and Verification requirements.** Acknowledge the data intensity (and associated costs) of doing proper Measurement, Reporting and Verification for transport. Allow use of appropriate but preliminary estimates of emission reductions while developing a more robust approach over time. Appropriate Measurement, Reporting and Verification for the transport sector is important to lower transaction costs.

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