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FINANCING NEEDS FOR SUSTAINABLE TRANSPORT SYSTEMS FOR THE
21ST CENTURY

(Background Paper for Plenary Session 8 of the Provisional Programme)

Final Draft

This background paper has been prepared by Ms. Anjali Mahendra, Mr. Matthew Raifman and Mr. Holger Dalkmann, for the Seventh Regional EST Forum in Asia. The views expressed herein are those of the authors only and do not necessarily reflect the views of the United Nations.

Financing Needs for Sustainable Transport Systems for the 21st Century

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EXECUTIVE SUMMARY

Around the world, and especially in Asia, current demographic, economic, climate change, health, and safety trends are creating opportunities and risks, particularly in rapidly growing urban areas. In the transport sector, resource allocation has perpetuated a longstanding emphasis on traditional private vehicle-oriented transport projects and programs by domestic and international funders. Investment in sustainable transport, with priority to public and non-motorized transport modes and integration of land use and transport planning, is essential to improving mobility and accessibility for the majority of people. Sustainable transport can save lives, reduce energy consumption and greenhouse gas emissions, boost economic growth, foster equitable urban communities, and improve overall quality of life. The Rio+20 commitment by eight multi-lateral development banks (MDBs) to shift \$175 billion to more sustainable transport programs over the next decade could catalyze investments in sustainable transport, but it must be aligned with domestic finance and national transport programs.

Moving in the Wrong Direction

In Asia, where the urban population is growing rapidly, the need for sustainable transport investments is particularly pronounced, as trends show increasing rates of car ownership and use, greenhouse gas emissions, and fatalities resulting from road accidents. For the first time in history, in 2011 more Chinese lived in urban centers than rural areas. A similar trend is underway in India, where the majority of the population is expected to be urban by 2041. Vehicle fleets across Asian countries are increasing exponentially owing to urbanization and rising incomes, doubling every 5-7 years. Road congestion costs Asian economies 2-5 percent of Gross Domestic Product (GDP) each year due to lost time and higher transport costs. The transport sector is also the fastest growing source of CO₂ emissions in Asia. The Asian Development Bank (ADB) forecasts that the region's share will rise to 31 percent of global transport sector CO₂ emissions by 2030 at its current pace, with total regional emissions projected to triple by 2050. Asian cities now have among the highest air pollution levels in the world and traffic accidents in the region are the highest, at nearly 2,000 deaths a day.

Rethinking Transport Finance

Currently, national and international funding streams do not sufficiently recognize the importance of supporting sustainable transport projects and initiatives that will mitigate these negative trends. There are examples of national governments and MDBs that have begun to prioritize funding for sustainable transport projects, but the scale of the problem requires greater engagement from all parties. The Asian Development Bank's 2010 launch of the Sustainable Transport Initiative and the initiation of national urban transport programs in People's Republic of China, India, and Indonesia that specify investment in sustainable transport are a step in the right direction. Yet, there is still much work to be done to develop national level urban transport programs and policies, clarify and track investments in

sustainable transport at the MDB, national, and local government levels, and leverage domestic and private finance to satisfy the \$2.5 trillion investment in transport that will be needed by 2020 in Asia alone, according to the ADB.

\$175 Billion Shift towards Sustainable Transport is Only the Beginning

The commitment by the eight MDBs to invest \$175 billion in sustainable transportation systems over the coming decade provides an opportunity to move forward on the key issues currently facing the transport sector. It is a key indicator of shifting priorities for the MDBs, as they consider the long-term impacts of climate change and recognize the public health, environmental, and economic benefits and inclusiveness of sustainable transport. In order to realize the commitment to its fullest, the MDBs need to clearly define what constitutes sustainable transport and the key indicators to evaluate it, shift funding to sustainable transport projects, and transparently report allocations to sustainable transport on a frequent basis. At the national level, all countries should develop transport programs that build demand for sustainable transport funding and operationalize the MDB commitment in a strategic way, leveraging domestic and private financing opportunities.

National Governments Play Vital Role in Transport Finance

National governments can play a crucial role in financing and supporting sustainable transport systems that help meet the key challenges of the 21st century. The primary need is to bridge the gap between the supply of international MDB financing and demand from national and local governments for sustainable transport projects. National governments are vital for linking their national finance programs with international finance sources to promote a shift to more sustainable transport.

In this background paper, we identify two key areas where national governments play a core role in financing sustainable transport for the 21st Century: leveraging sustainable transport financing for greater impact and increasing the effectiveness of sustainable transport financing. Further, we articulate six fundamental actions that national governments should seek to fulfill (three for each area) to move sustainable transport financing forward.

Six Actions for National Governments to Leverage Sustainable Transport Financing and Improve its Effectiveness

Leveraging Sustainable Transport Financing for Greatest Impact

- Linking International with National Finance and Leveraging Climate Finance. In order to overcome the longstanding bias towards unsustainable transport, national governments must establish strong policy frameworks that prioritize sustainable transport project and program investments as well as national funding programs to implement them. These investments could be based on the Avoid-Shift-Improve paradigm that is being increasingly recognized as a useful way to identify and define sustainable transport initiatives. The national funding programs should supplement and leverage MDB funding, while providing incentives for local governments to plan, evaluate, and implement sustainable transport

projects. In addition, national governments should leverage available climate finance to increase allocations towards sustainable transport projects. The combined impact of these actions would grow local demand for sustainable transport financing and establish a virtuous cycle that continuously increases demand for international, domestic, and private financing for sustainable transport projects.

- Engaging the Private Sector and Creating Supportive Conditions for Private Investment. National governments or MDBs alone cannot fulfill the vast infrastructure needs in the transport sector. However, they can attract private sector financing by ensuring a viable regulatory and legal environment, appropriate design and structure of markets, and long-term incentives for private investment. While India and Thailand in particular have embraced public-private partnerships, this vehicle has been so far used primarily for financing airports and ports, rather than for sustainable urban transport used by the majority of people on a day to day basis.
- Use of Local and Innovative Funding Sources for Sustained, Long-term Financing. In addition to private sector financing, another way for national governments to leverage their own finances, and the funding received from international sources, is to tap into local funding sources and develop other innovative financing sources. National governments collect user fees and revenue from land use, vehicle, income, and fuel taxes. Governments can implement additional instruments to invest future property value increases into infrastructure improvements, like the innovative financing scheme on the Mass Transit Railway in Hong Kong Special Administrative Region of China. National governments also play a vital role in correctly pricing fuel and reducing fuel subsidies. In Indonesia, for example, the government is pursuing reforms to reduce market distortion. India's planned "green surcharge" on petrol, "green cess" on personal vehicles, and "urban transport tax" on the purchase of new cars and two-wheelers are also notable. Raising additional financing through local sources is an important opportunity that national governments could pursue to fund sustainable transport projects demanded by local areas.

Increasing the Effectiveness of Sustainable Transport Financing

- Enabling Institutional Arrangements to Streamline Flow of Funding to Local Level. Often accompanying national financial commitments, legislative changes are sometimes important for setting the stage for scaling up innovation, but long-lasting political support can be hard to achieve. Targeting financing from national ministries to local governments requires a strong, enabling planning and institutional framework. In Mexico and Brazil, recent legislation has facilitated greater focus on sustainable transport and other low-carbon solutions for climate change. Similar legislation would be a worthy target of governments throughout Asia.
- Impact-based Monitoring and Evaluation (M&E). Current decision-making processes typically fail to take into account the full economic, social, and environmental consequences of transport policies, programs, and projects. National governments can increase the effectiveness of financing decisions by following a structured process starting with needs

assessment, planning and policy formulation, implementation, monitoring, and finally ex-post evaluation. Financing based on performance outcomes should be a practice followed by both national governments and MDBs. One potential method of impact evaluation is a scorecard with mandatory and recommended outcomes, including safeguards for mitigating environmental, social, and other risks.

- Capacity Building and Policy Guidance.** In order to operationalize impact-based M&E, national governments should seek out opportunities to provide the technical training, knowledge resources, and policy guidance needed by local governments to build the capacity for impact-based analysis at the local level. Several countries, including the U.S., India, Mexico, and Germany require the creation of integrated transport and land use plans that can guide the region’s growth in a sustainable way and avoid unintended consequences. The preparation of these plans and their evaluation requires technical resources and capacity at the local and national level, across agencies responsible for land use, transport, environmental planning, and financing. In addition, the coordination on developing these plans between local, national, and international players can facilitate knowledge exchange that can build capacity and help scale up sustainable transport projects. Capacity building at the local level would also ensure continued demand for such projects as local areas share experiences.

Figure 1. Actions National Governments can take to Leverage Financing for Sustainable Transport and Increase its Effectiveness

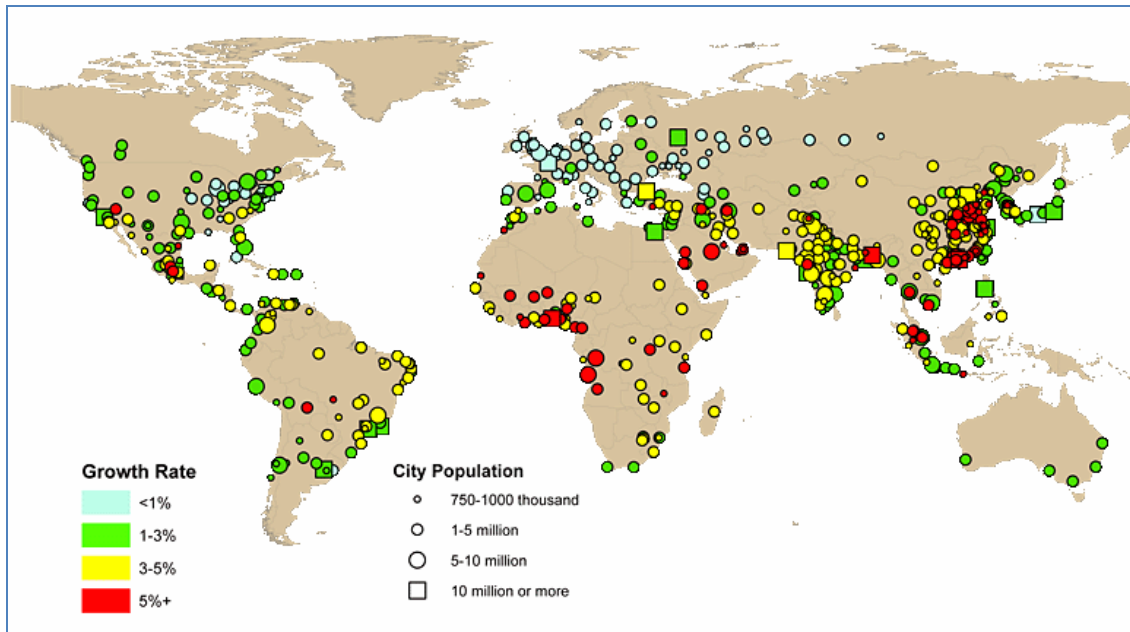
<i>LEVERAGING SUSTAINABLE TRANSPORT FINANCING FOR GREATEST IMPACT</i>	<i>INCREASING THE EFFECTIVENESS OF SUSTAINABLE TRANSPORT FINANCING</i>
<ul style="list-style-type: none"> ▪ Linking International with National Finance and Leveraging Climate Finance ▪ Engaging the private sector and creating supportive conditions for private investment ▪ Use Local and Innovative Funding for Sustained, Long-term Financing 	<ul style="list-style-type: none"> ▪ Enabling Institutional arrangements to streamline flow of funding to local level ▪ Impact-based Monitoring and Evaluation ▪ Capacity building and policy guidance

1. INTRODUCTION

The transport sector has a crucial impact on the economy, environment, health and well-being of people and as such, it is intricately linked with sustainable development. Rapid rates of urbanization and economic activity in countries of the developing world are creating immense demands on the transport sector. Rising incomes are increasing motorization at unprecedented rates, while the supply of transport infrastructure and services lags behind. Consequently, cities in developing countries are facing the brunt of serious challenges related to traffic congestion, air pollution, traffic-related injuries and deaths. These pressures on the transport sector are also leading to unsustainable trajectories of energy consumption and climate change.

Although Latin America is already highly urbanized, Africa and Asia are still undergoing rapid urbanization (see Figure 2). Projections show that People's Republic of China is expected to add about 400 million new urban residents by 2030 and India about 215 million urban residents in the same timeframe (Foreign Policy, August 2010); together, this is an addition of urban population equal to about twice the *total* population of the United States. Several other Asian countries are growing and urbanizing rapidly as well. As the world's population increases from about 7 billion in 2011 to about 9.8 billion by 2040, cities are acquiring an ever more important role in terms of their share of the population and contribution to the national economy. However, the rapid growth of motorization in cities comes with economic and social costs. For instance, road traffic deaths annually around the world are projected to double from 1.2 million to 2.4 million between 2011 and 2030 (WHO, 2011), with nearly half of these occurring in urban areas.

Figure 2. Growth rates of urban agglomerations, 1970-2011



Source: United Nations, Department of Economic and Social Affairs, Population Division: World Urbanization Prospects, the 2011 Revision.

This has created a critical need for increased investment in urban transport projects and policies that can help combat the challenges mentioned above and ensure improved access to goods and services for all population groups. Recognizing this need, in June 2012, eight multi-lateral development banks (MDBs)¹ voluntarily committed to support sustainable transport at the United Nations Conference on Sustainable Development - or Rio+20 meeting in Rio de Janeiro, Brazil. The support includes a pledge to commit an amount of \$175 billion in loans and grants over the coming decade, to invest in more sustainable transport systems in developing countries (Rio+20 Joint Statement, 2012). This financial commitment is expected to be coupled with support for sound policies, institutional capacity building, and knowledge and expertise sharing, so that best practices across countries can be mainstreamed. The aim of this investment is to ensure development of sustainable transport, defined in the commitment as “transport that is accessible, affordable, efficient, financially sustainable, environment friendly, and safe.”²

This paper describes the need to rethink transport finance to enable a more sustainable transport trajectory as compared to the status quo. Effectively leveraged, the Rio+20 \$175 billion commitment from the MDBs could be the catalyst to shift the paradigm towards sustainable transport. The paper highlights the central role of national governments in this process, where they can help create the demand for sustainable transport projects at the local level through national programs that provide funding and technical assistance to local governments. National governments can also provide crucial links to international finance sources by coordinating with multi-lateral and national development banks and private investors.

In this paper, we first describe current conditions in Asia and the need for investment in sustainable transport; then the current financial flows in the transport sector, with a discussion of current financing gaps and barriers; followed by recommendations on what national governments can do to utilize and leverage the financing from the MDBs most effectively. There are undoubtedly significant returns that could be achieved on these investments, both in terms of economic costs saved and reduction in environmental externalities.

1.1. Asia is Trending in the Wrong Direction

The Asian Development Bank (ADB) reported sobering statistics for Asian countries in its 2012 Transport Forum on “Inclusive and Sustainable Transport” (ADB, 2012a). Vehicle fleets across Asian countries are increasing exponentially, owing to urbanization and rising incomes. Road congestion costs Asian economies 2-5 percent of Gross Domestic Product (GDP) each year due to lost time and higher transport costs. Rising incomes are doubling motor vehicle fleets every

¹ The eight MDBs are African Development Bank, Asian Development Bank, CAF – Development Bank of Latin America, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, Islamic Development Bank, World Bank.

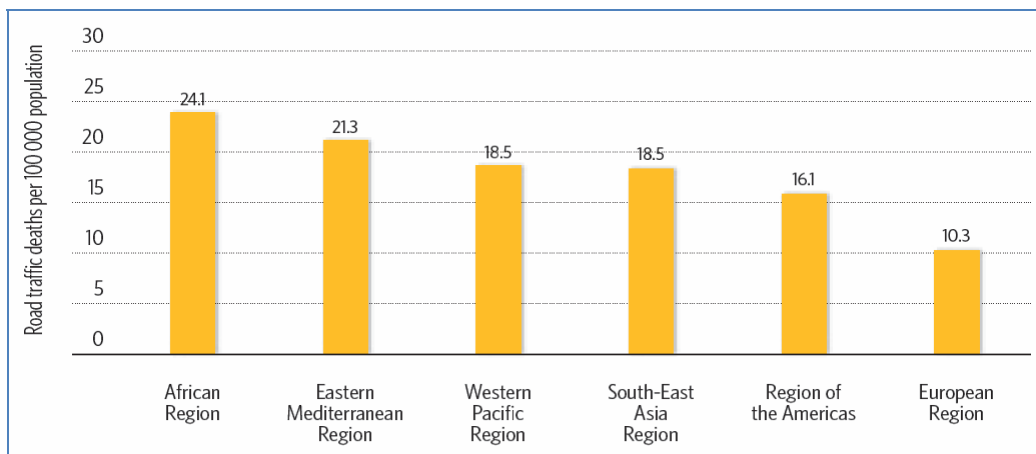
² See the ‘Commitment to Sustainable Transport’ made at Rio+20 on this link:

<http://sustainabledevelopment.un.org/index.php?page=view&type=1006&menu=1348&nr=290>

5-7 years in Asian countries. Asia's share of the global vehicle fleet was 9 percent in 1980, 17 percent in 2005, and is expected to be 46 percent in 2030. The increase in vehicles over time is dramatic, from about one in ten motorized vehicles in the world being in Asia in 1980 to about *half the global total* by 2030³.

The transport sector currently accounts for 23 percent of global CO₂ emissions and is expected to increase to 50 percent by 2030 and 80 percent by 2050 (ITF, 2010). Although transport emissions per capita in developing countries are relatively low on an absolute basis as compared to OECD countries, close to 90 percent of the increase of global transport related CO₂ emissions is expected to occur in developing countries, mostly from private vehicles and freight (UNCSD, 2012). According to the ADB, the transport sector is the fastest growing source of CO₂ emissions in Asia. Asia currently accounts for 19 percent of the transport sector's CO₂ emissions. The region's share will rise to 31 percent of global transport sector CO₂ emissions by 2030 at its current pace,⁴ with total regional emissions projected to triple by 2050.

Figure 3. Road Traffic Deaths per 100,000 Population, by WHO Region



Source: World Health Organization (WHO), 2013

In developed and developing countries alike, serious public health concerns are arising due to physical inactivity and safety. As more travel is happening in private motor vehicles with unsafe conditions, more crashes are occurring on roadways, leading to injuries and fatalities. Nowhere is the issue of road safety more significant than in Asia, which accounts for 60 percent of the 1.24 million fatalities that occur every year or 2,000 people every day.⁵ According to the 2013 WHO Global Status Report, the rate of road traffic deaths in Western Pacific and Southeast Asia (both 18.5 per 100,000, Figure 3) exceeds that of the Americas and European regions (WHO, 2013). Worldwide, 2.8 million people die every year from being overweight or obese, and many more suffer in their daily lives. While the Asian region has historically had lower incidence of

³ All data in this paragraph comes from ADB infographic on “Inclusive and Sustainable Transport” available on this link: <http://visual.ly/inclusive-and-sustainable-transport>

⁴ Key facts and figures on climate change in Asia can be found on the Asian Development Bank website, available at: <http://www.adb.org/themes/climate-change/facts-figures>

⁵ Key facts and figures on sustainable transport in Asia can be found on the Asian Development Bank website, available at: <http://www.adb.org/sectors/transport/main>

overweight population and obesity, prevalence of overweight population has been increasing dramatically over the past decade. In some countries, like Thailand, The Republic of Korea, and People’s Republic of China, over one-quarter of the adult population is overweight (Ramachandran and Snehalatha, 2010).

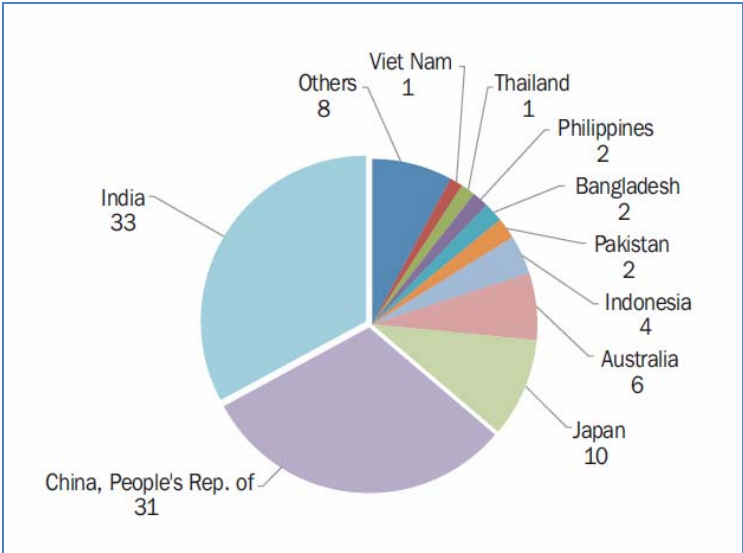
1.2. The Need for Urgent Action in the 21st Century

The ADB reports that in Asia alone, the transport sector needs an enormous investment of about \$2.5 trillion over the 2010-2020 period (ADB, 2012a; Rio+20 Joint Statement, 2012). Three key realities that create an urgent need to direct investment towards sustainable transport in the 21st century are: (i) the largest investments are continuing to be directed at large capacity road projects aimed at improving vehicle flows, (ii) climate change is no more just a possibility, rather it is already being considered a catastrophic reality and continues to become a more serious threat, and (iii) the social and economic returns from investing in sustainable transport are enormous and often go unaccounted. These three issues together make a strong case for a paradigm shift in transport financing to support long-term sustainable development. (Each of these is discussed below.)

1.2.1. Unsustainable Road Infrastructure is Still the Focus of Asian Governments

Across Asian cities, is not just the need for new investment that is a great challenge, but also the misdirection of current investments towards transport projects that may not achieve sustainable outcomes. For example, in Asian cities, significant resources are allocated to constructing additional road capacity, justified by the need to accommodate the growing number of private vehicles; despite the projection that by 2020, 78 percent of households in People’s Republic of China and 72 percent in India will not have access to private motorized vehicles (Leather et al., 2011).

Figure 4. Distribution of Road Network in Asia and the Pacific, Latest Year (%)

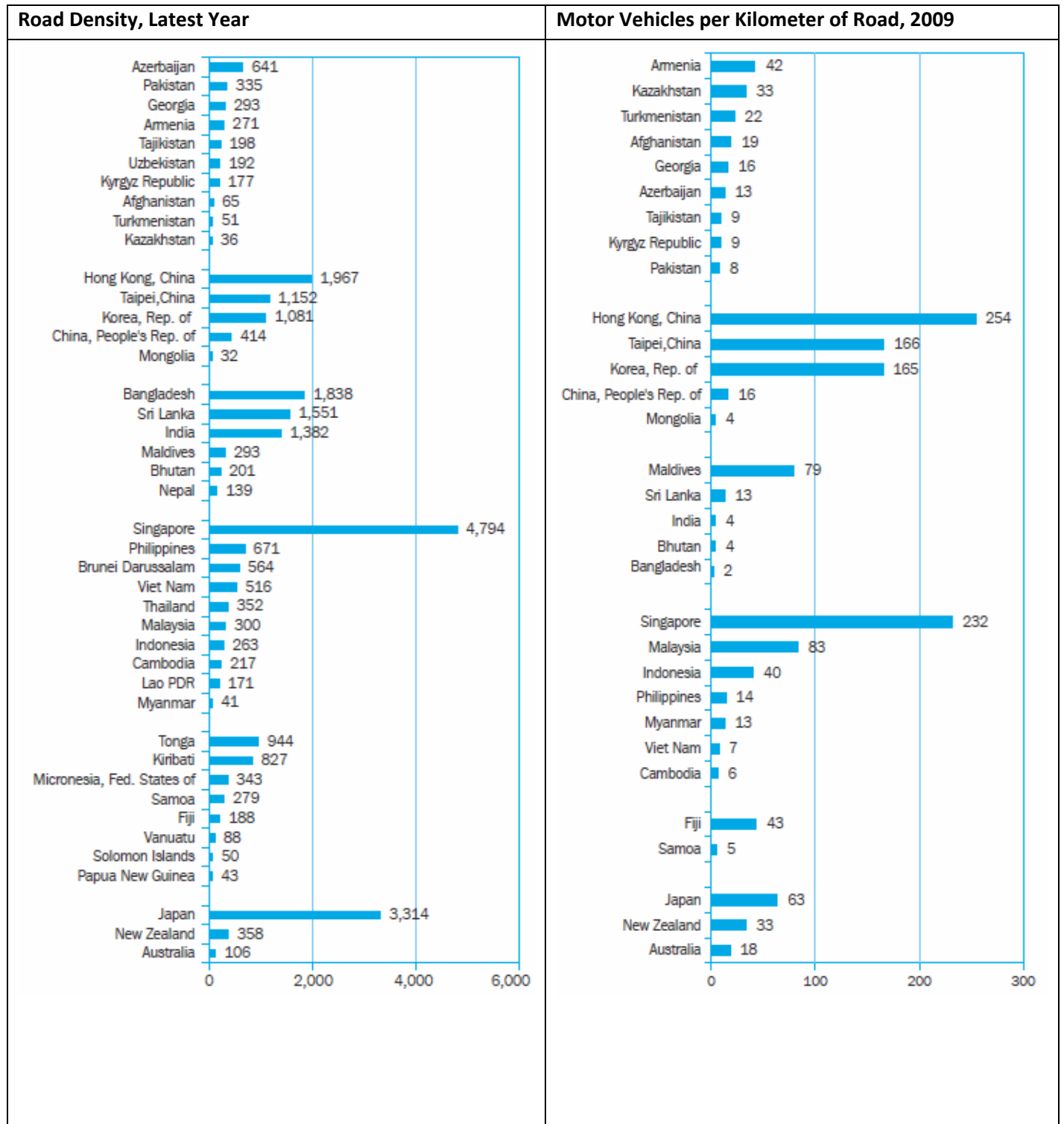


Source: Key Indicators for Asia and the Pacific, ADB (2012b)

According to data from the ADB for 2012 shown in Figure 4, the combined road networks, measured in kilometers, in People's Republic of China and India cover 64 percent of the region's total road networks (ADB, 2012b). Yet, more resources are increasingly being spent on road construction, while the budget allocation for pedestrian facilities is often in the range of only 0.2-5 percent of total transport budgets in Asian cities (Leather et al., 2011). In many cases, where these road capacity investments are made, conditions for public and non-motorized transport modes, used by the majority of the urban population, continue to deteriorate, while private vehicles, which include cars and two-wheelers in many Asian cities, continue to grow. Figure 5 shows statistics for road density (km of road per 100 sq. km. of land area) and motor vehicles per kilometer of road for all Asian countries. The link between higher income and number of motor vehicles is clear when we see the data for Singapore, The Republic of Korea, Taiwan Province of China, and Hong Kong Special Administrative Region of China. Despite being at much lower income levels than these, the South Asian countries of Bangladesh, India, and Sri Lanka appear to have disproportionately higher road density.

While there remains a need for road construction and improvement projects to fulfill basic access needs in many areas where accessibility is limited, this should not be used as justification to prioritize construction of high capacity urban and interurban roads. The key point is that funding priorities need to shift to more sustainable transport modes such as public transport and non-motorized transport amenities, used by the majority of people in Asian countries. It does not mean that road construction needs to be eliminated altogether.

Figure 5. Road Density and Motor Vehicles per Kilometer of Road



Source: Key Indicators for Asia and the Pacific, ADB (2012b)

1.2.2. The Growing Threat of Climate Change and Need for Climate Resilient Infrastructure

The transport sector is a main contributor to greenhouse gas emissions leading to climate change, accounting for 23 percent of global CO₂ emissions and approximately 15 percent of overall greenhouse gas emissions (ITF, 2010). Further, the Asian Development Bank (ADB) forecasts that the Asian region's share of global CO₂ emissions will rise to 31 percent by 2030 at its current pace, with total regional emissions projected to triple by 2050. Continued investment in road infrastructure, and the continued embrace of car-centric urban development, will only increase greenhouse gas emissions that lead to climate change by encouraging unsustainable modes of transportation. In addition, climate change-related damage from sea-level rise and natural disasters can be minimized by forward-thinking planning when developing transport infrastructure and prudent investment in adaptation. When considering the impact of climate change on transport infrastructure, there is a need to not only focus on mitigation of climate change through reducing GHG emissions in the transport sector, but also adaptation of capital-intensive transport infrastructure to damages that may be caused by climate change impacts in the future.

The threat of serious climate change is becoming all the more apparent with severe weather events and rising temperatures becoming more frequent. According to NASA, 2012 was the ninth warmest year worldwide since recording began in 1880.⁶ The effects of climate change on sea level rise, natural disasters, and severe weather are particularly pronounced in Southeast Asia. In rankings of climate change vulnerability, typically more than half of the top ten countries most affected by climate change are in Asia, as shown in Figure 6.⁷ Natural disasters affected more than 200 million people in the Asia and Pacific region per year between 2001 and 2010.⁸ Asia contains the largest proportion of cities and populations located in low elevation coastal zones threatened by risks of sea level rise and storm surges (see Figures 7 and 8). Current development trends in Asia indicate the need to internalize climate-related externalities into decision making, especially within the transport sector. This is essential if the threat of climate change is to be contained.

The World Bank's study on the Economics of Adaptation to Climate Change (World Bank, 2010c) estimated adaptation costs for developing countries and found that the cost between 2010 and 2050 of adapting to an approximately 2-degree Celsius warmer world by 2050 is in the range of \$75 billion to \$100 billion a year. This range is of the same order of magnitude as the foreign aid that developed countries now give developing countries each year. This is a large sum, but many studies show that much more funding is needed; compared to an estimated \$100 billion per year available, the need for mitigation and adaptation finance may be \$275 billion per year (World Bank, 2009b). Urban infrastructure-drainage, public buildings, and similar assets-

⁶ NASA, "NASA Finds 2012 Sustained Long-Term Climate Warming Trend," assessable at: <http://www.nasa.gov/topics/earth/features/2012-temps.html>

⁷ See Harmeling, S. (2012), "Global Climate Risk Index 2013," Germanwatch or Afifi, et al. (2012), "Climate change, vulnerability and human mobility," United Nations University.

⁸ ADB, "Facts & Figures: Climate Change in Asia and the Pacific," assessable at: <http://www.adb.org/themes/climate-change/facts-figures>

accounts for about 54 percent of the infrastructure adaptation costs, followed by railways at 18 percent, and roads (mainly paved) at 16 percent (World Bank, 2010c). Across scenarios, an average of 45 percent of these costs would be incurred in the South Asia and East Asia and Pacific regions (calculated by authors from data in World Bank, 2010c).

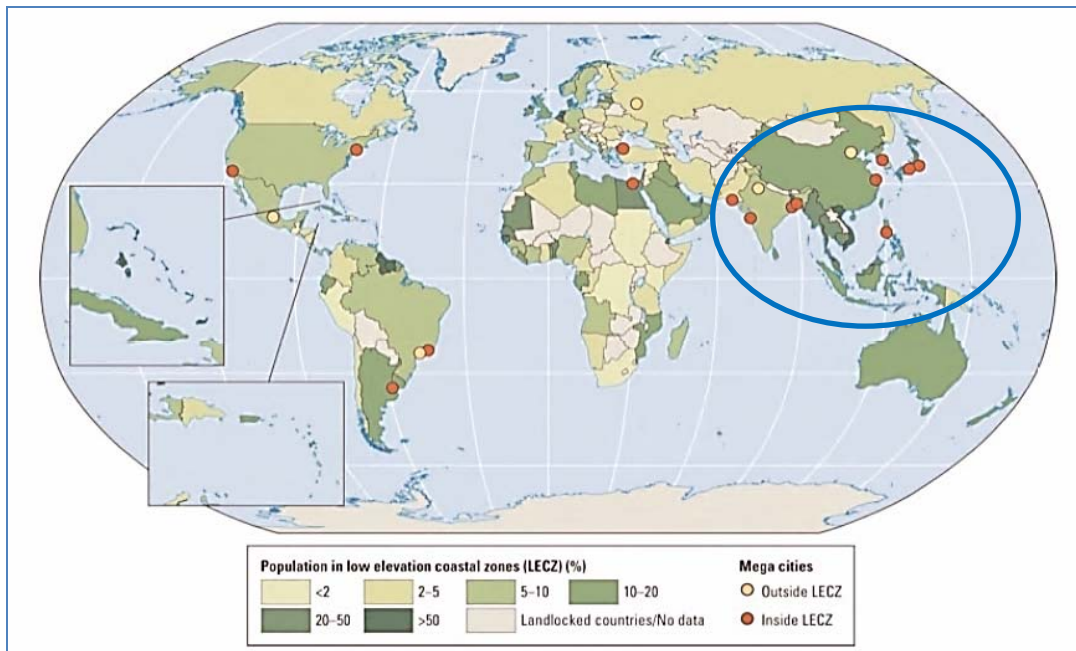
Figure 6. A Region at Risk (Countries from East Asia and Pacific Region in orange)

A region at risk			
The EAP region is home to many of the top dozen countries worldwide in terms of vulnerability to climate-related threats, especially floods and storms (highlighted in the table below). The human toll of environmental damage in the region is already significant and will rise if not checked urgently by investment and policy measures.			
Drought	Floods	Storms	Sea level rise
Malawi	Bangladesh	Philippines	All low-lying Island States
Ethiopia	China	Bangladesh	Vietnam
Zimbabwe	India	Madagascar	Egypt
India	Cambodia	Vietnam	Tunisia
Mozambique	Mozambique	Moldova	Indonesia
Niger	Laos	Mongolia	Mauritania
Mauritania	Pakistan	Haiti	China
Eritrea	Sri Lanka	Samoa	Mexico
Sudan	Thailand	Tonga	Mynamar
Chad	Vietnam	China	Bangladesh
Kenya	Benin	Honduras	Senegal
Iran	Rwanda	Fiji	Libya

Note: The typology is based on both absolute effects (e.g., total number of people affected) and relative effects (e.g., number affected as a share of GDP).
 Source: World Bank, Sustainable Development Network, Environment Department, 2008.

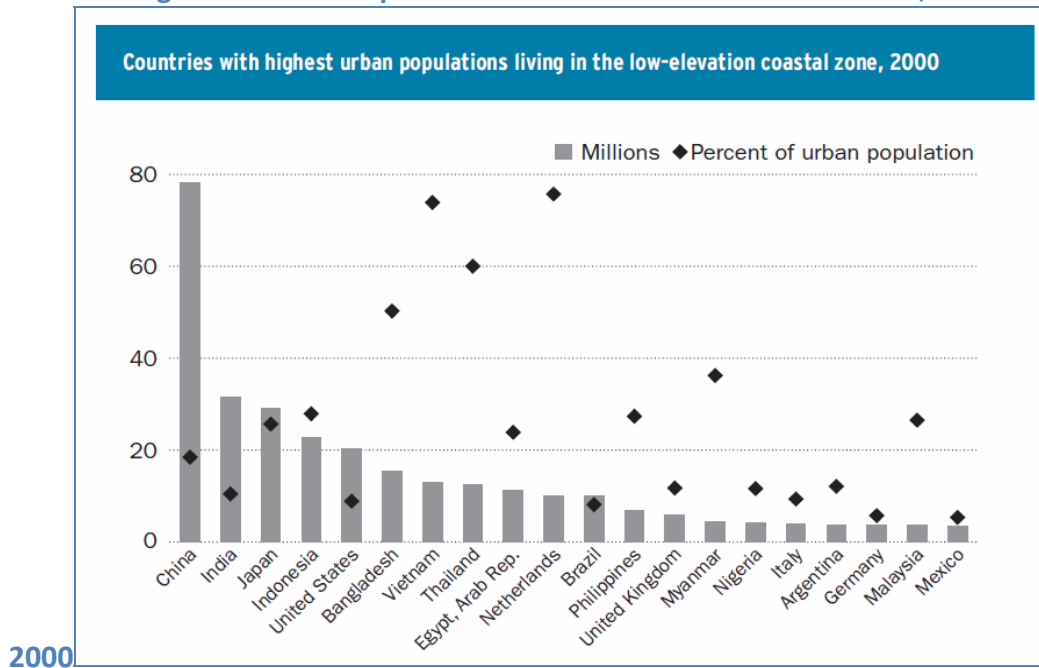
Source: *A Climate for Change in East Asia and the Pacific* (2009), World Bank

Figure 7. At Risk: Population and Megacities Concentrated in Low-elevation Coastal Zones (LECZ) Threatened by Sea-level Rise and Storm Surges



Source: *Cities and Climate Change: An Urgent Agenda (2010)*, World Bank

Figure 8. Urban Populations in Low Elevation Coastal Zones,



Source: *Cities and Climate Change: An Urgent Agenda (2010)*, World Bank

While climate finance funding, through its focus on mitigation and adaptation, has identified the need to consider the impacts of climate change on international investments, funding for transport projects typically excludes climate adaptation costs and considerations from an urban planning perspective and a financial risk perspective. Given the impending risks of climate change, the additional transport-related operational, maintenance, and reconstruction costs in the future owing to the destructive impacts of climate change need to be accounted for. The need for a stronger link between transport finance and climate change at the domestic, as well as international level, is an area requiring additional consideration going forward, both in terms of climate change adaptation and mitigation.

1.2.3. Significant Future Cost Savings from Sustainable Transport Investments

A strong argument in favor of financing sustainable transport programs is that of significant economic gains, cost savings, and consequently higher returns resulting from these investments. These may be investments under the three-pronged Avoid-Shift-Improve⁹ paradigm for sustainable transport strategies -- to avoid the need to travel and reduce distances traveled, through integrated land use practices (sustainable transport oriented development) and use of telecommunication technologies (telecommuting and net-meeting); to shift from less energy-efficient modes (individual motor vehicles) to more energy-efficient

⁹ See Common Policy Framework for Transport and Climate Change, Bellagio Meeting, May 2009, http://www.sutp.org/bridgingthegap/?page_id=582

modes (walking, biking, and public transportation); and to improve vehicle and fuel technologies and operations to reduce transport emissions (Dalkmann and Brannigan, 2007).

A recent study released by the International Energy Agency (IEA, 2013) estimated the costs of global transport infrastructure requirements in two scenarios -- a business as usual (BAU) scenario (4 Degree Scenario -- 4DS -- to imply that an atmospheric temperature rise of 4 °C could occur by 2050 due to the rise in greenhouse gas emissions) and a scenario involving reduction in transport-related fuel consumption and GHG emissions, leading to a temperature increase of 2 °C (2DS scenario). Under the 4DS BAU scenario, cumulative land transport expenditures are expected to reach USD 120 trillion by 2050 (growing gradually from 1.6 trillion per year in 2010 to 2 trillion per year in 2050), with nearly 65 percent of the amount going towards road infrastructure.

The 2DS scenario considered hypothetical strategies implemented under the Avoid-Shift-Improve paradigm. On analyzing both scenarios, IEA found that global transport infrastructure requirements in the future under the 2DS scenario comprising the Avoid-Shift-Improve strategies could be reduced considerably. About 23 percent fewer vehicle kilometers would be traveled globally in 2050 under that scenario, leading to a decrease in roadway additions by over 10 million lane-km and 27,000 square km decrease in parking requirements by 2050.

Despite increased expenditures on rail, high speed rail, and BRT infrastructure in this scenario, cumulative global land transport infrastructure spending would decrease by nearly USD 20 trillion over the BAU case. The largest proportion of the savings (about USD 15 trillion) would come from reduced roadway investment and maintenance costs (a 20% reduction from BAU), while USD 10 trillion of savings would come from reduced parking provision costs (35% reduction from BAU). Rail expenditures would increase by 3.5 trillion (15% higher than BAU) and BRT by about 350 billion (ten-fold increase over 2010 levels).

Note that these are only the savings in global land infrastructure provision costs and do not include the economic benefits associated with travel time savings, reduced pollution, and other co-benefits resulting from the hypothetical strategies. Given that annual global road traffic deaths are projected to double from 1.2 million to 2.4 million between 2011 and 2030 (WHO, 2011), and assuming a constant fatality rate out to 2050, the estimated reduction in vehicle kilometers in the IEA study could lead to about 700,000 fewer annual traffic-related deaths by 2050 (analysis done by EMBARQ, 2013). The social and economic value of these lives saved are several orders of magnitude greater than the infrastructure savings, but as in the IEA analysis, this enormous benefit often goes unaccounted.

Overall, there is strong evidence that the implementation of projects conforming with the Avoid-Shift-Improve paradigm of sustainable transportation would lead to substantial net mobility benefits, with net reductions in transport energy use, infrastructure expenditures, emissions, and traffic fatalities, and therefore, significant net benefits to society (IEA, 2013). Sustainable transport coupled with complementary land uses that encourage physical activity, could also decrease the prevalence of obesity and the health costs of being overweight. Figure 9 lists the wide range of co-benefits that could result from sustainable transport projects.

Figure 9. Co-Benefits from Sustainable Transport Projects

Category of Co-Benefit	Description
Environment	<ul style="list-style-type: none"> • Reduced greenhouse gas (GHG) emissions • Reduced air pollutants • Reduced noise • Reduced impact in wetlands and protected areas
Social	<ul style="list-style-type: none"> • Reduced accidents • Equitable accessibility • Increased sense of community pride and belonging • Higher quality of life
Transport	<ul style="list-style-type: none"> • Reduced travel time (walking, waiting, transferring, in-vehicle) • Reduced travel time uncertainty, therefore higher reliability • Reduced traffic congestion • Reduced long-term economic costs of transport¹⁰
Economic	<ul style="list-style-type: none"> • Increased economic productivity • Increased employment¹¹ • Better labor conditions for transport operators • Increased accessibility to job, business, and education opportunities • Avoided future costs of climate change
Urban Development	<ul style="list-style-type: none"> • Increased density and mix of land uses • Improved design and creation of public and open spaces • Reduced cost of utility networks in integrated land-transport developments • Increased social interactions • Improved accessibility to transit and to destinations
Public Health	<ul style="list-style-type: none"> • Reduced health impacts due to global warming • Reduced deaths and respiratory diseases from air pollutants • Reduced deaths and disabilities from traffic accidents • Reduced stress • Increased physical activity when cycling and pedestrian amenities are improved (reduced obesity and other illnesses from sedentary lifestyles)

Source: Adapted from Hidalgo et al. (2010)

In the next section, we discuss the current financial flows in the transport sector, historic trends in transport expenditures made by the MDBs, particularly the ADB, and by national governments in Asia, to understand the current financing picture.

¹⁰ Travel costs may vary by demographic group and by individual users or fleet operators, and may be higher or lower in the short term. In sustainable transport projects involving pricing for private vehicle use, higher income travelers, typically car drivers, are likely to face higher transport costs. Truck pricing could raise costs for truck operators. In projects involving transit operations improvements, transit agencies may save costs. In the long-term, however, all such projects can reduce the total costs of operations, maintenance, and externalities related to transport.

¹¹ While new transport systems may provide employment opportunities, the reorganization and rationalization of existing systems may sometimes lead to layoffs.

2. FINANCIAL FLOWS, TRENDS IN TRANSPORT EXPENDITURES AND CURRENT FINANCING GAPS

2.1. Current Financial Flows

As discussed earlier, the June 2012 commitment by eight MDBs to shift \$175 billion of their lending portfolio to sustainable transport over the next ten years, offers an unprecedented opportunity to prioritize sustainable transport programs. However, we also recognize that, if about \$2.5 trillion of investment is required over the next decade in Asia alone (Rio+20 Joint Statement), 2012), the commitment of the MDBs is only a fraction of the required investment. National urban development and transportation programs, like, Jawaharlal Nehru National Urban Renewal Mission (JnNURM) in India¹² and Public Transportation Federal Support Program (PROTRAM) in Mexico¹³, are driving development of transport from domestic sources, not from international flows, highlighting the need for coordination between international and domestic financing.

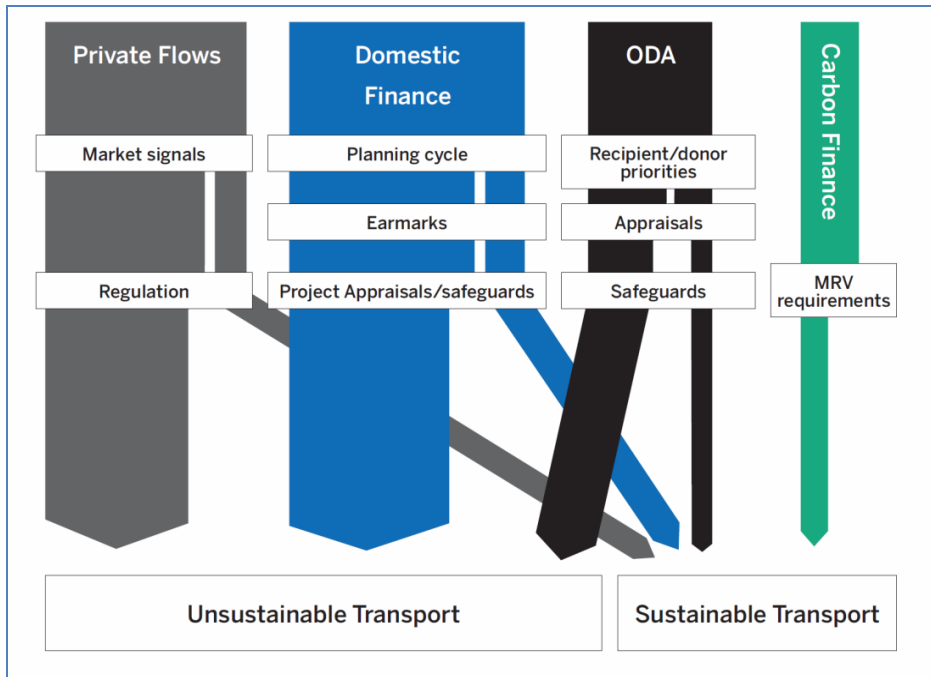
Transport financing is currently built around a paradigm that favors private, motorized transport, channeling domestic and international funds to roads, bridges, and other infrastructure that benefit personal vehicles. This focus is reflected in the current funding priorities advanced by national governments, bi-lateral and multi-lateral development banks, and foreign direct investment. Only a very small portion of transport funding is allocated to sustainable transport projects. While the \$175 billion commitment for the next ten years should be applauded, this amount is far too small to meaningfully impact global transport trends in the absence of leveraging and greater investment from national and local governments and from private sector investors. A visualization of the estimated financial distribution to sustainable transport can be found in Figure 10.

Globally, transport investments have been estimated to be around \$1 trillion per annum, with the majority (roughly 65 percent) coming from domestic finance (public and private) (Sakamoto et al., 2010). Around 18 percent of funding for transport comes from foreign direct investment and another 18 percent from international debt finance. Only a small fraction, around 1/10th of one percent, comes from carbon finance. While all carbon finance funding is devoted to sustainable transport, currently only a small portion of domestic finance, private flows, and official development assistance (ODA; includes bilateral funding) is channeled to sustainable transport. As a result, the aggregate global contribution is grossly insufficient when compared to investments in unsustainable transport. Figure 10 shows a schematic diagram of these current financial flows in the transport sector from all sources.

¹² See Hidalgo, H. et al. (2012), "National Investment in Urban Transport: Towards People's Cities through Land Use and Transport Integration," accessible at: <http://www.embarq.org/en/national-investments-in-urban-transport-report-EMBARQ-India>

¹³ See Owen, B. et al. (2012), "Evaluate, Enable, Engage: Principles to Support Effective Decision Making in Mass Transit Investment Programs," accessible at: http://www.embarq.org/sites/default/files/EMB_Evaluate_Enable_Engage.pdf.

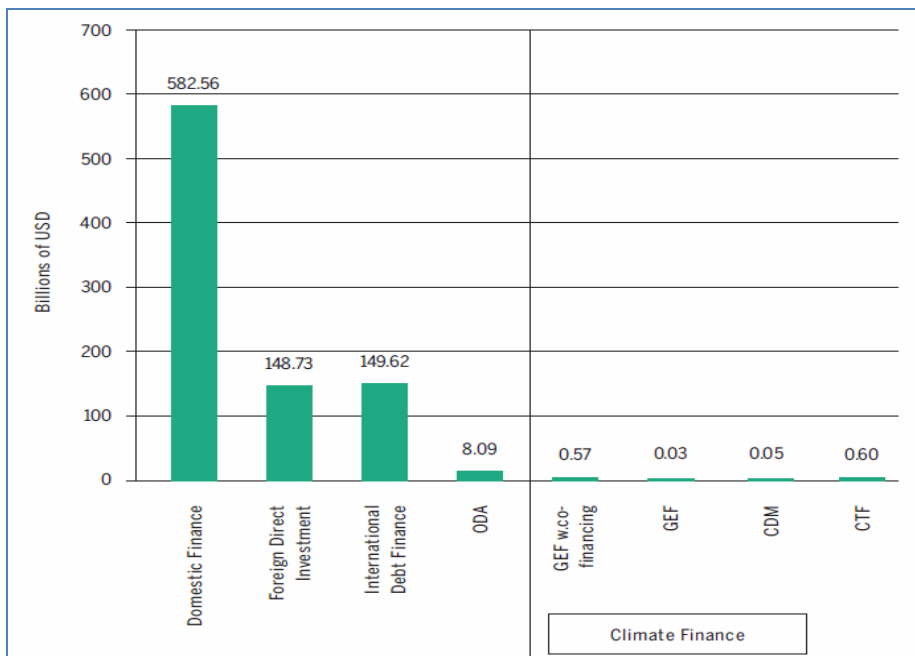
Figure 10. Schematic Depiction of Current Financial Flows



Source: Sakamoto et al., (2010), “A Paradigm Shift Towards Sustainable Low-Carbon Transport”

A shift to funding sustainable transport is needed across all funding streams, but most prominently in the domestic finance stream as domestic finance accounts for such a large percentage of transport financing (see Figure 11).

Figure 11. Annual Global Transport Investment by Source of Finance



Source: Sakamoto et al., (2010), “A Paradigm Shift Towards Sustainable Low-Carbon Transport”

National governments have a vital role to play in funding sustainable transport. Across the world, transport is a core component of public expenditure for governments, accounting for between two and 13 percent of all expenditures for a typical country (Sakamoto et al., 2010). In general, domestically funded and developed transport programs do not sufficiently favor sustainable transport, though there is some indication that they are beginning to prioritize sustainable solutions. For example, in Mexico and Brazil, the adoption of climate change legislation coupled with ambitious transport development has the capacity to tip the scale in favor of sustainable transport options. In general, however, inadequate consideration of environmental, social, health, and climate impacts of transport projects, lead to an undervaluing of the long-term benefits of sustainable transport projects (as shown in Figure 9), leading to underinvestment in such projects.

2.2. Transport Investments by Asian Development Bank and National Governments

Below we discuss the trends in current transport expenditures in Asia and projections for the future. Although we recognize that the World Bank is the other MDB actively investing in Asian countries, this section focuses primarily on the ADB's transport lending in Asia.

2.2.1. Asian Development Bank Lending

Transport is a key sector supported by the ADB, given its relationship to the important goals of economic development and poverty reduction. The transport sector has accounted for 21 percent of overall ADB lending since 1966, and 27 percent during 2005–2009 (ADB, 2010)¹⁴. ADB estimates lending \$3.4 billion per year to the public sector for transport projects in the 2010–2012 lending pipeline (ADB, 2010). As seen in Figure 12 below, historically the largest proportion of ADB transport lending has been for roads. Per the ADB classification, these are generally rural, provincial or national roads and include highways and expressways. Lending for urban transport, which includes mass rapid transit, non-motorized transport and other interventions occurring within city boundaries, has been very limited in the past.

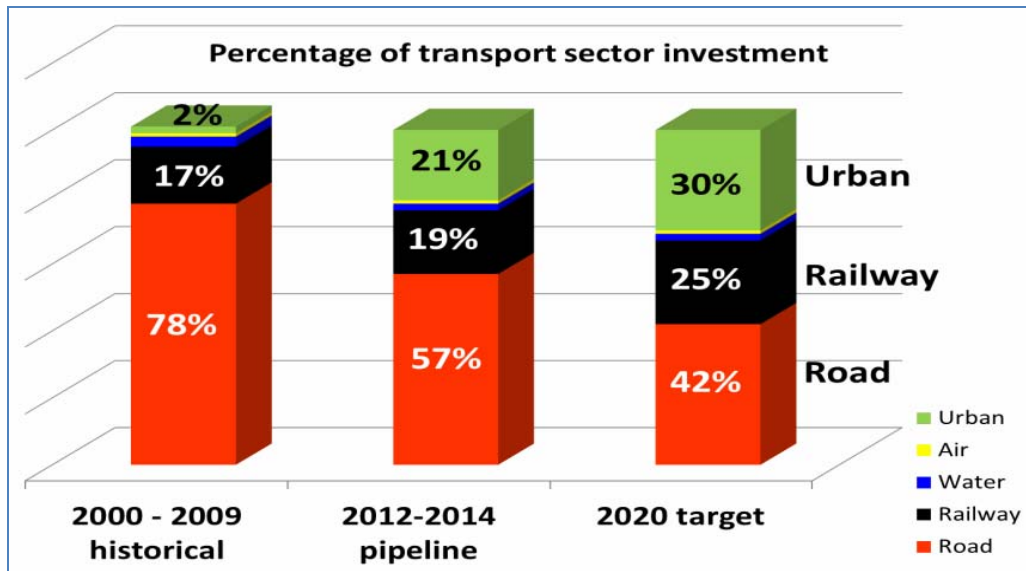
However, with the recently established Sustainable Transport Initiative for 2010-2020, funding priorities in the Asian transport sector are gradually changing (see Figure 12). The most significant change is the decrease in funding for roads from 78 percent to a 2020 goal of 42 percent and the large increase in funding for urban transport from 2 percent to a 2020 target of 30 percent, owing to growing demand for Asian member countries. This is a positive trend, but the shift needs to occur faster if the growing challenges of rapid motorization are to be met.

Some new roads, in specific locations carefully targeted to relieve severe bottlenecks, accommodate public transport, or improve access in locations with limited accessibility, can be considered essential; but these should be part of an integrated plan focusing on sustainable transport. Funding for these road projects could be made contingent on specific criteria that show how the project meets local sustainability goals. A growth in the share of urban transport

¹⁴ This figure does not include support for urban transport included within broader urban development projects, road improvements that were part of agriculture projects, or transport operations of the Private Sector Operations Department

investments is important because the scale of impacts, returns on investment, and overall economic benefits of implementing sustainable transport projects in urban areas is high, given that these are the areas where the rapid growth in motorization with associated social and economic costs, is concentrated.

Figure 12. Subsector Shares of ADB Transport Lending-Actual, Pipeline, and Target



Source: Asian Development Bank (2013)

One way to accelerate the shift of resources towards sustainable urban transport is to use available financing to leverage more private sector financing for such projects through public-private partnerships (PPPs) and private concessions for transport operations. Privatized operation of transport systems is in use in Brazil, India, and Thailand, among other nations, as a way to leverage the national government's resources for the transport sector. However, in most cases, the private financing is directed towards road infrastructure and operations (GIZ, EMBARQ and SLoCaT, 2012).

According to the 2010 ADB Operational Plan, during 2000–2009, ADB's average annual private sector lending for transport was only \$23 million—less than 1 percent of its total lending for transport. Challenges such as weak policy, legal, regulatory, and institutional arrangements, corruption, and significant bureaucracy often create a difficult environment for transport PPPs (Hidalgo et al., 2012) in Asian countries and make attracting private investment difficult. These difficulties have made PPPs a less tapped resource in the transport sector and they account for a relatively small proportion of transport investments even in developed countries (MGI, 2013), where the share of PPPs that have actually been executed is low. For example, only 40 percent of transport PPPs planned in the United States since 1985 had been funded by the end of 2010 (MGI, 2013). The transport community in general must therefore consider new ways to entice private investment in this sector. ADB's strategic vision (Strategy 2020) recognizes that private sector participation must increase and has set an overall target for private sector development and operations to reach 50% of total ADB lending by 2020 (ADB, 2010).

2.2.2. National Investment Programs – Status quo

Recognizing the immense need for investments in the transport sector, developing countries around the world have adopted national policies to finance transport programs and projects. For example, India's National Urban Transport Policy (NUTP)¹⁵ recognizes the demographic trend towards urban living in Asia and recommends policies that focus on moving people not vehicles, a basic tenet of sustainable transport systems. The policies and supporting funding have promoted investment in mass transit projects such as Bus Rapid Transit (BRT) and urban rail. There are also lessons to be learned from other parts of the world, including Mexico's Mass Transit Program (PROTRAM), and Brazil's Program to Accelerate Growth (PAC). In general, national programs have encouraged cities to complete comprehensive planning for future transport needs. Nevertheless, the impact of these programs has been limited, as regional and local municipal bodies still favor road expansion as the primary solution to address transport needs (Hidalgo, 2012).

The funding programs vary across countries and funding responsibilities are often shared between the national and local governments, and sometimes also with the private sector. For example, in Mexico, transport financing responsibilities are shared between the national government through the PROTRAM program, state and municipal governments, and private sector. Public-private partnerships provide at least a third of the resources to finance capital costs for infrastructure, with the private sector assuming responsibility for operations. Other countries like India have set conditions or criteria that must be met for local agencies to receive national government funding. We discuss below the status of national transport funding in Asia's two largest countries, India and People's Republic of China. For additional information, some national transport financing programs worldwide, along with their key areas of emphasis are listed in the Appendix.

India

In India, national funding under the Jawaharlal Nehru National Urban Renewal Mission (JnNURM) invested US\$20 billion in urban infrastructure and basic services to the urban poor between 2005 and 2012, across 63 cities in India. The program is an ambitious attempt to invest in renewing infrastructure, while reforming the political, institutional and financial relationships between national, state, and city levels of government that have hampered sustainable urban development in the past.

To that end, the program combines financial support for infrastructure projects, under a cost-sharing arrangement with the states and local governments, linked to a carefully structured governance model, that includes both central assistance and mandatory and optional reforms at the state/local level. According to JnNURM regulations, the Indian Ministry of Urban Development requires cities to develop citywide development plans, comprehensive mobility plans, and detailed project reports to become eligible to receive financial support (Pai, 2010).

In 2012, the next phase of JnNURM (JnNURM II) was announced by the Indian Ministry of Urban Development. The second phase has expanded upon phase I and will include US\$40 billion in

¹⁵ India's National Urban Transport Policy may be accessed at: urbanindia.nic.in/policies/TransportPolicy.pdf

funding over five years (likely to begin in 2014 after the next parliamentary election) with a focus on infrastructure development in the states and in local municipalities. While not ostensibly focusing on transport financing, the JnNURM will continue to include significant funding for transport under the umbrella of infrastructure and the National Urban Transport Policy has been included in initial discussion with local representatives and state officials. The JnNURM II provides an opportunity to channel funds from the national to local level for local sustainable transport projects and to share knowledge and build capacity at the local level.

People's Republic of China

In People's Republic of China, cities are responsible for financing the development, operation and maintenance of transport infrastructure and services. The role of national level government agencies is limited to promoting research, exchange of good practices and encouraging cities to implement sustainable transport projects (GIZ, EMBARQ and SLoCaT, 2012).

People's Republic of China has released a comprehensive set of policies and programs aimed at strengthening urban public transport and non-motorized transport over the last decade. The country's 12th Five Year Plan (2010–2015) prioritizes the development of urban public transport, setting goals for increasing the mode share of public transport, promoting urban rail and BRT systems, promoting non-motorized transport and calls for an increase of transport system efficiency. A new policy encouraging cycling was also released in September 2012. While the plan sets a GDP growth target of 7 percent per year, it does not specify funding levels for transport and urban development and does not establish a dedicated national fund for these programs. At present, the chief revenue sources in transport are fuel consumption and vehicle purchase tax revenues, which are typically earmarked for highway construction, not for public and non-motorized transport.

Overall, central government tax transfers make up about 20-25 percent of local government revenue. So far, cities heavily rely on land concessions to generate revenue for local investments, including public transport. This has created an inconsistent system in which public transport developments are financed through an unsustainable source of income which simultaneously fosters urban sprawl (GIZ, EMBARQ and SLoCaT, 2012).

People's Republic of China does not impose property taxes, so there is no mechanism to capture increased land values resulting from transport improvements. Although a Public Transit Priority program has been established at the national level, the high levels of subsidies the public transport systems receive are unsustainable. New funding must be generated to cover the maintenance costs of the growing public transport infrastructures and services. It is important therefore that new sources of revenue are identified or that more money is directed away from highway construction to public and non-motorized transport development.

Despite the prevalence of some national programs, these programs are not widespread across Asia, and existing programs do not focus on the full range of sustainable transport projects that could be considered. The next section delves deeper into some of the current financing gaps and barriers.

2.3. Financing Gaps and Barriers

2.3.1. Financing Gaps

Some important aspects of sustainable urban transport have received limited attention in MDB and national government programs, such as the integration of land use and transport planning, investment in non-motorized transport, ensuring a multimodal transport system, implementing travel demand management programs for private vehicles, and climate-resilient transport planning. Below we provide a case study describing many of these financing gaps at the national and local level through a real-world example from India followed by key financing gap takeaways applied to the Asia context.

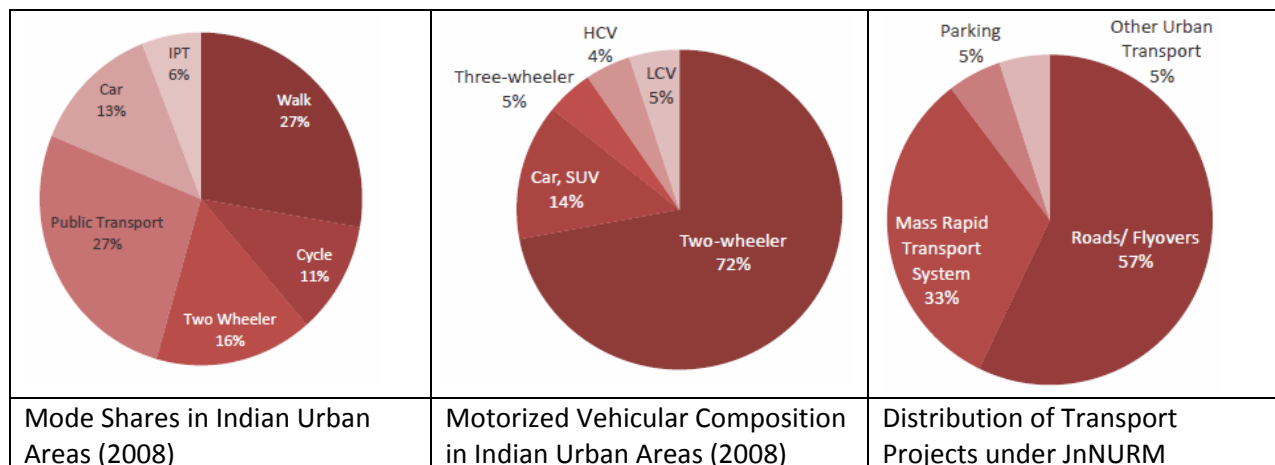
Case Study of Financing Gaps – India

The improvements offered by the JnNURM policy for the urban transport sector in India are important, with respect to assisting cities with policies and funding for moving people, not vehicles. However, the program has not sufficiently shifted investment in the urban transport sector from road widening and road expansion to sustainable transport (CSE, 2011). A recent evaluation of the JnNURM program by Hidalgo et al. (2012) found that the national investment program has focused more on primarily disbursing funding than delivering sustainable transport projects. According to a study done by the Center for Science and the Environment (CSE, 2011), only 35 percent of projects sanctioned under the JnNURM have been completed to date. Moreover, the funds are not necessarily allocated to sustainable transport investments, but to construction of roads and flyovers to accommodate the growing demand for private vehicles (cars and two-wheelers).

Figure 13, taken from an analysis done by the Indian Institute of Human Settlements (IIHS, 2011) puts this mismatch in perspective for Indian cities. Cars and two-wheelers comprise nearly 86 percent of the vehicles on the road, but account for only 29 percent of trips in Indian urban areas. Under the JnNURM, the allocation of funding to the transport sector is only 11 percent of total investment, but within this, about 62 percent is allocated to roads, flyovers, while only 33 percent is allocated to mass public transport and funding for pedestrian and other non-motorized transport is almost absent. These modes capture 38 percent of the trip mode share and in particular, fulfill the mobility and access needs of the most vulnerable population group. Yet, lack of investment in improving amenities for them is striking. The Ministry of Urban Development's own study suggests that the percentage of roads with pedestrian footpaths is hardly 30 percent in most cities (MoUD, 2008).

In the second round of JnNURM funding proposed for the 2012-2031 period, a High Powered Expert Committee (HPEC) in India estimates a drastic need for increased transport sector investment, to comprise almost 60 percent of total investment. However, the focus of the transport projects continues to remain on road construction.

Figure 13. Mode Shares, Motorized Vehicles, and Transport Investment in Indian Cities



Source: IIHS (2011)

This mismatch between funding priorities and sustainable transport objectives at the national scale seen in the JnNURM investments extends to the local level as well. An analysis of the transport budget for the city of Pune, for example, shows that although the city's Comprehensive Mobility Plan (CMP) establishes a goal of achieving 50 percent mode share from non-motorized transport and 40 percent from public transport, the city allocated 61 percent of its 2011-2012 budget to projects catering to motorized vehicles such as the building of new roads, flyovers, parking structures and re-tarring of roads. Only 18 percent of Pune's budget was allocated to public transport projects and 9 percent to non-motorized transport (Menon, 2011).

The analysis then considered an alternative scenario in which it re-allocated the city's investment budget for non-motorized transport (footpaths, cycle tracks), public transport (bus augmentation, BRT, metro and mono-rail), and some of the funds allocated to roads and other projects likely to have marginal benefits. The re-allocation was aimed at achieving the goals of the Pune city CMP. The analysts found that the city could have built around 62.5 kilometers of BRT (including 125 kms of cycle tracks), 612 kilometers of footpaths, 25 kilometers of cycle tracks (on non-BRT roads) and added about 525 buses to the city fleet, with the funding allocated to roads and flyovers. This reallocated budget could have achieved 100 percent of the target for footpath construction, cycle track construction, bus fleet augmentation and BRT corridor construction under the CMP, while the original budget has only achieved 15%, 0%, 17% and 26% respectively (Menon, 2011).

The Pune analysis shows that despite there being an availability of funds, the continued misallocation of funding toward road projects is locking Indian cities on a trajectory of unsustainable growth. As this discussion has shown, this challenge is evident at both the national and local scales. There is thus a significant need to develop a coherent vision for sustainable transport investment, required investment needs, and a pipeline of projects at the national and the local level, so that any existing and potential investment can be better directed

towards them. This situation is also not unique to India but is evident across other Asian countries as well.

Key Financing Gap Takeaways

Land use-transport integration:

The transport sector is a key contributor to global greenhouse gas emissions and this makes it imperative for Asian countries to invest in projects and policies that promote low-carbon climate-resilient transport systems in the coming years. Transport provision must be closely integrated with land use and urban development policies so that trip lengths in Asian cities do not continue to grow, and safer urban environments with higher quality of life, better accessibility, and shorter travel times can be achieved. This also involves increasing the focus on non-motorized transport and incorporating proper pedestrian planning principles and pedestrian/cyclist safety measures into programs.

Non-motorized transport:

Non-motorized transport (NMT) is an important area of consideration for any comprehensive approach to transport as it can eliminate the need for public transport or roads, alleviate road congestion (and its associated environmental and health impacts), improve public health outcomes for individuals due to increased exercise, and provide end-of-the-line access for vulnerable populations. To date, there has been limited focus on funding non-motorized transport (NMT) and fulfilling the access needs of vulnerable population groups through transportation investment plans. In India, for example, use of non-motorized transport, especially cycling, has declined from 30 percent of the mode share in 1994 to 11 percent today. It is hypothesized that the decline has occurred because of road congestion, increased trip length due to urban sprawl, increased purchasing power of people, and inadequate facility for cycling (EMBARQ India, 2013). While some countries mandate comprehensive urban mobility plans, most do not and the piecemeal approach to transport planning tends to exclude NMT from the equation.

Multimodal transport systems:

Multimodal systems that provide a choice of effective, high quality, reliable, and financially sustainable public transport modes (including metro rail systems and bus rapid transit) must be developed to provide travelers with an alternative to private vehicle use. These projects typically require high levels of capital investment, strong financing support, and a sustainable plan of financing their operations and maintenance with cost-recovery through fares and other sources. Without these aspects, these projects will face challenges.

While not evidenced in the India case, demand management and climate resilient infrastructure are additional areas that should be considered in national transport plans and programs and are often overlooked.

Demand management:

In parallel with improving public transit modes, cities will need to find better ways of managing growth in private vehicle ownership and use, a key contributor to the high economic costs and

externalities of urban transport. As has been demonstrated in Singapore, London, Stockholm, and elsewhere, vehicle or road pricing mechanisms can play a key role in doing this, with the added advantage of generating financial resources to expand and maintain the urban transport network and systems (ADB, 2010).

Climate resilient infrastructure:

While the frequency and magnitude of natural disasters are on the rise across Asia, traditionally Asian countries have not viewed their transport policy, planning, design, development, as well as investment from a resiliency point of view (with regard to adapting to climatic impact, increasing frequency of natural disasters, economic crisis, etc). By building more climate resilient transport infrastructure today with appropriate land use planning and transport integration, countries can reduce considerable economic losses in the long run as well as cities and communities could be better equipped to cope in the event of natural disasters as compared to cities with poor urban and transport infrastructure (as evident from the earthquake/tsunami event in 2011). For instance, the damage due to the last flooding in Thailand amounted to US\$46.5 billion, while the recovery and reconstruction costs will amount to at least US\$50 billion according to Government of Thailand and U.N rapid assessments.¹⁶ There is thus a strong need to appropriately channel or realign the national and/or international funds available towards more climate resilient transport infrastructure that can withstand disasters stemming from climate change and that is sustainable over many subsequent generations.

2.3.2. Financing Barriers

In addition to financing gaps, there are important institutional barriers in Asian countries that prevent the scaling up of best practices and replication of successful projects. With respect to financing and the availability of resources for sustainable transport, two key barriers are: (i) the presence of fuel price subsidies that create market distortions and are at odds with the goals of sustainable transport, and (ii) the institutional barriers that prevent private sector participation in the transport sector.

Distortions in the Transport Market

In many countries, the market for transport is heavily distorted leading to overinvestment in unsustainable transport. The negative impacts of motorized transport, including environmental degradation, noise and air pollution, and public health are not internalized in the price of vehicles or fuel. Fuel itself is often heavily subsidized, as an attractive populist policy, leading to poor evaluation of the economic cost of investing in roads compared to sustainable transport. This is a very expensive proposition for national governments and economically inefficient – globally, an estimated \$500 billion is spent by governments on fossil-fuel subsidies every year (IMF, 2013). When including negative externalities, the cost to society of energy subsidies rises to \$1.9 trillion per year. According to the IMF study, countries in emerging and developing Asia accounted for over 20 percent of global subsidies. Brunei Darussalam and Indonesia have the highest petroleum subsidies with, respectively, 2.3 and 2.6 percent of GDP (IMF, 2013).

¹⁶ ADB (2012), “Natural disasters and how much they affect the economy,” blog post accessible at: <http://blogs.adb.org/blog/natural-disasters-and-how-much-they-affect-economy>

Eliminating fuel subsidies could have a significant impact on climate change by encouraging more rational use of scarce resources and by shifting individuals to more sustainable forms of transportation. According to a *Washington Post* op-ed by President Kim of the World Bank, ending harmful fuel subsidies globally could lead to a five percent decline in carbon emissions by 2020.¹⁷ As part of a larger strategy of pricing low-carbon growth accurately, the World Bank has begun to advocate for correction of fuel pricing and the elimination of harmful subsidies that are at odds with sustainable transport, but national governments have been slow to react as these changes are nearly always politically unfavorable. Figure 14 shows the levels of fuel subsidies versus taxation in Asian countries.

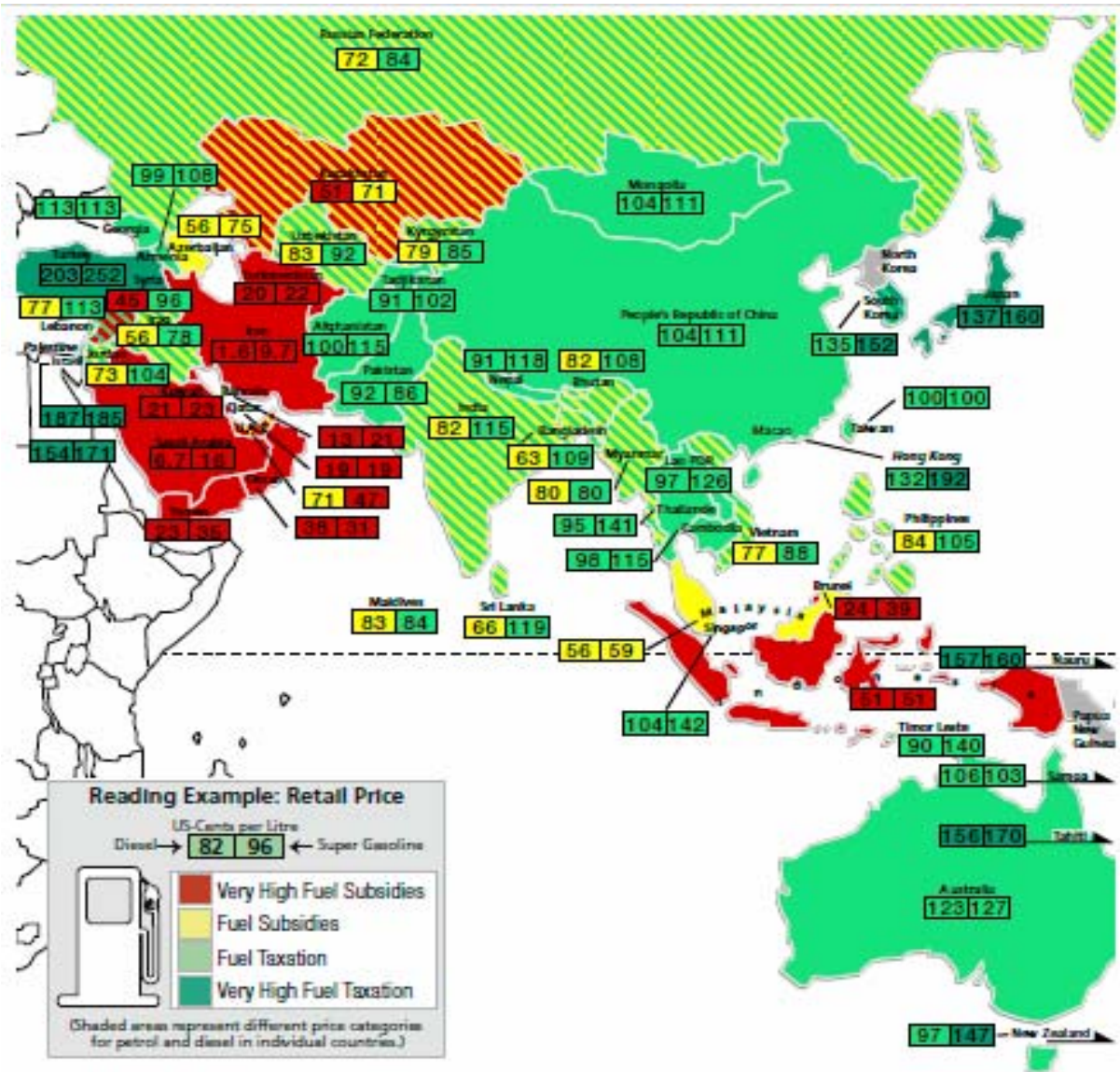
Challenges to involving the private sector

In many Asian countries, there are barriers to private financing, related to asset management regulations, limited capability to successfully structure and manage public-private partnerships (PPPs), and high transaction costs. Although there is the potential to attract capital from the private sector for transport projects, since transport facilities are essentially public goods, privatization often faces opposition from decision makers, politicians, and citizens wary about transferring public assets to private ownership (MGI, 2013). The concerns arise from the potential for conflicts, corruption, and vested interests (MGI, 2013), and the risks thereof, since the legal, enforcement and regulatory systems in many developing countries are not always robust. Research done by EMBARQ India for the Indian Ministry of Urban Development (EMBARQ India, 2013) found that fragmented jurisdictions, multiple government authorities, complex procedural requirements, and lack of capacity are cited as key deterrents to private sector participation in the infrastructure sector.

The next section discusses the MDB financial commitment and how it might be advanced through linkages with national government funding programs.

¹⁷ Kim, J., "Make climate change a priority," *The Washington Post*, January 24, 2013, accessible at: http://www.washingtonpost.com/opinions/make-climate-change-a-priority/2013/01/24/6c5c2b66-65b1-11e2-9e1b-07db1d2ccd5b_story.html

Figure 14. Fuel Subsidy Levels in Asia, Australia and Pacific, November 2010 (in US cents/liter)



Fuel Taxation Category 1: Very High Fuel Subsidies

The retail price of fuel (average of Diesel and Super Gasoline) is below the price for crude oil on world market.

Fuel Taxation Category 2: Fuel Subsidies

The retail price of fuel is above the price for crude oil on world market and below the price level of the United States.

Note: The fuel prices of the United States are average cost-covering retail prices incl. industry margin, VAT and incl. approx. US 10 cents for the 2 road funds (federal and state). This fuel price may be considered as the international minimum benchmark for a non-subsidised road transport policy.

Fuel Taxation Category 3: Fuel Taxation

The retail price of fuel is above the price level of the United States and below the price level of Romania (Luxembourg).

Note: In November 2010, fuel prices in Romania (Luxembourg) were the lowest in EU-27. Prices in EU countries are subject to VAT, fuel taxes as well as other country-specific duties and taxes.

Fuel Taxation Category 4: Very High Fuel Taxation – The retail price of fuel is above the price level of Romania (Luxembourg).

Source: GIZ (2011), International Fuel Prices 2010/2011, 7th Edition

3. THE WAY FORWARD – THE MDB COMMITMENT AND ROLE OF NATIONAL GOVERNMENTS IN FINANCING SUSTAINABLE TRANSPORT

There is much to be done to operationalize the \$175 billion MDB commitment as we approach the first anniversary of the commitment. Developing an operational definition of sustainable transport for the \$175 billion commitment is an important first step to realizing the shift in investment, for a definition is vital to determining what projects should be classified as sustainable. As national governments are central to the paradigm shift towards sustainable transport, and play a vital role in bringing together local projects and international support, the definitions of sustainable transport identified in national transport plans and those used by the MDBs should be aligned. Ensuring this alignment in definitions at the local, national, and international levels will facilitate greater collaboration on financing, planning, and evaluating project outcomes with respect to how they meet sustainable transport goals. In this regard, both national governments and the MDBs also need to establish clear performance outcomes to assess the impacts of funded projects, using indicators of health, safety, equity, access, environmental quality, and economic productivity. These outcomes could provide the foundation for an outcome-based operational definition of sustainable transport.

The Asian Development Bank was one of the first MDBs to offer an operational definition based on sustainable objectives in 2010, defining a sustainable transport system as, “accessible, safe, environment-friendly, and affordable” (ADB, 2010). This systematic definition has facilitated the development of the ADB Sustainable Transport Initiative, which has begun to operationalize a transition to sustainable transport. However, there needs to be consensus among all the MDBs on the operational definition that will be used.

The Avoid-Shift-Improve paradigm is one framework that could be used as the basis of a procedural definition of sustainable transport. These three tenets have been accepted by many as core criteria against which potential transport projects should be tested, including the ADB. Through integrated land-use and forward thinking transport planning, it is possible to avoid trips (or reduce trip distances) and stimulate economic development. The trend towards urbanization across the globe offers an opportunity to implement the avoid principle into city planning. The trips that need to be taken should be shifted to more sustainable modes, such as public or non-motorized transport for passengers, and rail and water transport for freight. Increased emphasis on the effects of climate change, public health, and safety could provide the impetus for advancing a shift towards sustainable modes of transport. Finally, when vehicles must be used, emphasis should be placed on improving vehicles, and fuels and operations to reduce pollution and GHG emissions. These core principles could provide a guiding framework for considering what projects/projects might have sustainable outcomes. Other complementary frameworks with similar considerations could also be used to develop a definition, on the basis of which, sustainable transport projects may be appraised, implemented, and evaluated. Of course, the framework that is developed will need to be harmonized with the internal project prioritization processes of the MDBs.

National governments can play a crucial role in advancing the MDB commitment by financing and supporting sustainable transport systems that help meet the key challenges of the 21st

century. The primary need is to bridge the gap between the supply of international/MDB financing and demand from national and local governments for sustainable transport projects. National governments have an important role to play here by linking their national finance programs with international finance sources to promote a shift to more sustainable transport.

National financial support has shown itself to be essential in implementing sustainable transport on a wide scale. In India, for example, great strides have been made to implement mass transit systems that reduce travel time, improve safety, and avoid emissions. The Jawaharlal Nehru National Urban Renewal Mission (JnNURM), created in 2006, has provided funding and capacity building activities for Indian cities. One of the greatest achievements of the program has been the implementation of the Ahmedabad Janmarg (People's Way) BRT network, which is transforming mobility in one of the fastest growing cities in the country.

In this section, we discuss specific actions that can be taken by national governments in two areas, (i) leveraging the available and potential financing to achieve greater scale and impact; and (ii) increasing the effectiveness of sustainable transport financing. These are described below.

3.1. Leveraging Available and Potential Financing for Greatest Impact

3.1.1. Linking International with National Finance and Leveraging Climate Finance

A challenge that is often raised by MDBs in funding recommended sustainable transport projects and programs is that there is limited demand from their key lending clients, national governments, for these types of projects. Since MDBs fund projects based on national demand, which has often favored high-cost road infrastructure projects, the status quo of unsustainable urban transport has persisted.

To overcome the transport-related challenges being faced in urban areas, national governments therefore, must set strong policy frameworks that prioritize investment in projects per the Avoid-Shift-Improve paradigm. National funding programs must supplement and leverage the MDB funding, while providing incentives for local governments to plan, evaluate, and implement these projects. The national funding should also be accompanied by technical assistance to local governments. This would create the local demand for sustainable transport financing that would then funnel up to the national level and to MDBs. Greater demand from national governments with established pipelines of projects and supportive policies or funding programs would encourage higher levels of funding from the MDBs to meet transport challenges. In facilitating this linkage between international and national finance, knowledge experts and think tanks could serve as intermediaries between national governments and international MDBs. Further, international organizations, like the United Nations Centre for Regional Development with its convening role through the EST Forum in Asia, could help bring together stakeholders. MDBs could also jointly fund projects and share results from financing programs in different regions, enabling exchange of good practices across regions.

Another source of international finance that can be leveraged by national governments to fund sustainable transport projects is climate finance. Overall, climate finance has not been a widely

used mechanism to fund sustainable transport projects. For example, of the 6,660 registered projects under the Clean Development Mechanism (CDM) as of April 1 2013, only 28 (less than one percent) are transport projects and only 38 out of a total of almost 9,000 CDM projects in the pipeline relate to the transport sector.¹⁸ Therefore, there is a great opportunity to use this source for greater impact in coming years and look beyond CDMs to other potential instruments.

Climate finance instruments can contribute to climate change mitigation efforts by providing grants and concessionary financing to partially support transport system components development. Climate instruments can also help in improving local technical capacities and in facilitating co-ordination of activities by several agencies and government levels. At the same time, the integral transport plans and programs can address local needs, such as congestion, pollution and accidents making them very appealing for decision makers (Hidalgo et al., 2010).

International climate financing is channeled through national governments, and typically to ministries within the government that do not traditionally with urban transport issues – e.g. ministries of environment or finance. Some such instruments are the Climate Investment Funds, jointly implemented by five MDBs¹⁹, and financing for Nationally Appropriate Mitigation Actions (NAMAs) supported by developed countries. A detailed listing of climate finance instruments is provided in the Appendix. As part of the Climate Investment Funds \$6.3 billion has been pledged for climate investment across sectors in developing countries (World Bank, 2010b). These funds can be scaled up significantly through matching funds by national governments; however, they must be leveraged to have any catalytic effect given the much higher magnitude of current financial flows directed to unsustainable transport.

In Bangkok, the Clean Technology Fund (CTF), one of the financing instruments under the Climate Investment Funds, is providing \$70 million for urban transformation to co-finance the development of a bus rapid transit (BRT) system for the city, in addition to other energy efficiency investments in municipal facilities (World Bank, 2010a). These investments can create opportunities for replication. The success of BRT development in Bangkok would demonstrate viable low carbon transport solutions and models for replication to fast-growing secondary cities in Thailand that are facing increasing congestion (World Bank, 2010a). This investment was possible in Bangkok because the city had already developed an urban transportation plan and a peer-reviewed greenhouse gas emissions baseline that can be used to highlight mitigation progress by the city. The lessons learned from Bangkok will also be useful for replication and scaling up of investments in other cities in Asia and other developing regions of the world (World Bank, 2010a).

Another instrument to support GHG mitigation efforts and development goals by developing countries are the Nationally Appropriate Mitigation Actions (NAMAs) as agreed under the

¹⁸ UNEP Risoe CDM/JI Pipeline Analysis and Database, April 1st 2013, accessible at: <http://www.cdmpipeline.org>

¹⁹ The five MDBs are: African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, Inter-American Development Bank, and World Bank Group

Copenhagen Accord²⁰. Broadly defined, NAMAs are actions voluntarily proposed by developing countries that significantly reduce emissions below business-as-usual levels.²¹

NAMAs created around sustainable urban transport projects and policies can be financed in three general ways: general funding from different levels of government, general international financial flows, and specific climate funding mechanisms. Since the financial requirements for urban transport infrastructure are usually sizeable, a combination of local, state and national or federal funds is customary. Making explicit the GHG reduction potential, establishing quantitative goals for GHG emissions reductions and a mechanism for measurement, reporting and verification (MRV) of GHG emissions, will eventually increase the likelihood of receiving funding from national or federal government as the local plan helps achieving national goals in limiting GHG. It will also bring additional financing from international financial flows interested in climate change and development issues in the form of grants and loans. Finally it will provide the opportunity to use climate finance instruments.

Asian countries are already starting to tap into this source of finance, for example, Indonesia is the first country in Asia to have submitted a NAMA proposal to the UNFCCC in the transport sector for financing the Sustainable Urban Transport Initiative.²² The program is directed at two levels. At the national level, it is aimed at developing a policy framework for sustainable, low-carbon urban transport along with an appropriate regulatory framework, providing co-financing for local measures, capacity building, guidance for local planning, and overall MRV of the actions. At the local or provincial level, it is aimed at developing, implementing, and conducting MRV of the Comprehensive Urban Low-carbon Mobility Plans. The sustainable transport policies covered under these plans would include a mix of 'push' and 'pull' measures for each city, including investment in high quality public transport, non-motorized transport, parking management, traffic management, spatial planning, alternative fuels and vehicle efficiency. Indonesia is also working on policy reforms to reduce national fuel subsidies and has adopted a progressive 7/26 plan of reducing GHG emissions by 26 percent by 2020, while maintaining 7 percent economic growth.

Other development agencies like the Japan International Cooperation Agency (JICA) have increased funding towards climate mitigation and adaptation in Asian countries, which can be used towards sustainable transport projects. JICA has also created a Climate Finance Impact Tool (JICA Climate-FIT) so that quantitative evaluations can be conducted of transport projects aimed at reducing GHG emissions, reducing vulnerability to climate change, and increasing adaptive capacity and resilience (JICA, 2011). A similar system could be considered by other MDBs and by national governments.

²⁰ The Fifteenth Conference of the Parties –COP 15- of the United Nations Framework Convention on Climate Change –UNFCCC- took note of the Copenhagen Accord of 18 December 2009. For reflections from the Accord and the way forward please see <http://www.wri.org/stories/2009/12/reflections-copenhagen-accord-and-way-forward>.

²¹ Center for Clean Air Policy (2010), "Transportation NAMAs: A Proposed Framework," accessible at: <http://www.transport2012.org/bridging/ressources/files/1/613,CCAP-transport-NAMAs-paper-FINAL-DRA.pdf>

²² From the NAMA Database: http://www.nama-database.org/index.php/Sustainable_Urban_Transport_Initiative

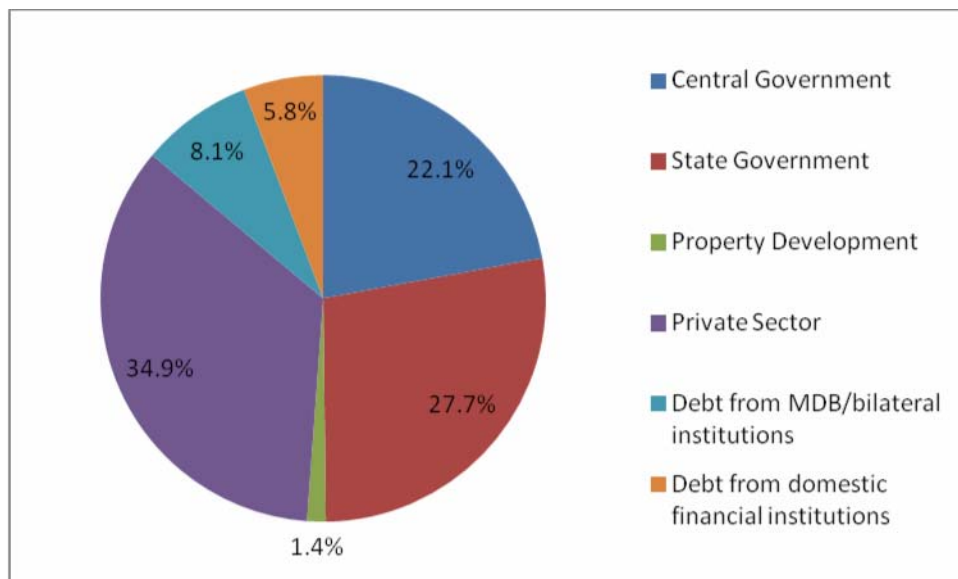
3.1.2. Engaging the private sector and creating supportive conditions for private investment

Engaging the private sector through Public-Private Partnerships (PPPs) is another way to leverage the public sector and international financing for sustainable transport to achieve greater scale and impact. National governments or MDBs alone cannot fulfill the vast infrastructure needs in the transport sector. However, they can attract private sector financing by ensuring a viable regulatory and legal environment, appropriate design and structure of markets, and long-term incentives for private investment.

PPPs utilize the governance advantages of the public sector and the operational efficiency, innovative technology, and managerial effectiveness of the private sector to deliver higher levels of service in a more cost-effective way. The application of PPPs for investment in and operation of transport systems allows the public sector to assume and mitigate the social, environmental, macroeconomic, and political risks, while the private sector assumes financing, construction, and commercial risks. Thus, risks are allocated to the partner better able to manage them (EMBARQ India, 2013). The role of national governments in this case is to provide a strong legal, institutional, and procurement framework, regulations, incentives and accountability, and oversight to effectively employ private participation.

India and Thailand are two countries in Asia where PPPs are often used in the transport sector. However, at least in India, PPPs and private investment are primarily in airports and ports, where their shares are greater than the public sector investment, at 64% private/PPP and 80% private share of investment in each of these sectors respectively. In the roads and rail sectors, the majority of investment is public, with PPP share being 16% in roads and 4% in rail (MGI, 2013).

Figure 15. Financing Plan for Total Investment in Urban Transport under India's 12th Five Year Plan (2012-2017)



Source: EMBARQ India (2013)

In India's current urban transport financing plan under the 12th Five Year Plan, of a total investment of about USD 72 billion required during the period 2012-2017, the largest proportion, about 35 percent is expected to be funded by private sources. Figure 15 shows the breakup of financing under the plan.

This sharing of financing responsibilities with the private sector will become necessary for more national governments in the coming years to meet the extensive needs in the transport sector. National governments can ensure an enabling environment for private participation by ensuring effective transport and urban governance at the national, state, and local levels. This would involve aligning the incentives of the different public agencies and authorities so that they interact effectively, while ensuring a common vision and goals for any project or program. Progress in achieving goals should be monitored and enforced through formal mechanisms. In addition, there should be a clear separation of political and technical responsibilities, where policy makers set strategic goals, while execution and delivery can be handled by the private sector (MGI, 2013). Institutional roles should be defined under clear contractual conditions and accountability to the public sector and to citizens. The private sector may also provide technical expertise and assistance in identifying and planning projects. In addition, once a PPP project begins and a relationship is established, transparent exchange of information and regular monitoring and evaluation can lead to more effective implementation.

3.1.3. Use of Local and Innovative Funding Sources for Sustained, Long-term Financing

In addition to private sector financing, another way for national governments to leverage their own finances and the funding received from international sources, is to tap into local funding sources and other innovative sources. The funding sources available to national governments in this category include:

- **User fees and application of economic instruments** -- these include strategies like congestion pricing, higher vehicle ownership taxes and quotas, parking fees. Roads have been considered the greatest untapped source of user fees (MGI, 2013). Cities of Guangzhou and Shanghai in People's Republic of China have implemented vehicle quotas and/or higher vehicle ownership taxes, similar to the situation in Singapore, to moderate the demand for private automobiles. Singapore also has electronic road pricing in effect for several years where the road user fees fund public transport improvements and operations in the country. Although politically challenging to implement, this is an effective model for other Asian countries to consider.

- **Land value capture and betterment levies** – Another under-used instrument for raising local finance is to capture property value increases resulting from infrastructure improvements. For example, in Hong Kong Special Administrative Region of China, the Mass Transit Railway (MTR) is one of the region's major property developers, using profits from new housing, commercial, and retail schemes to pay for part of the construction cost of new subway lines, allowing them to operate without any subsidy from the government. MTR has developed dozens of new housing projects along its urban rail lines (MGI, 2013). This instrument is used in Delhi as well as a revenue source to finance the operations of the

Delhi Metro rail public transit service. Also in India, the Pune Municipal Corporation has proposed the creation of an urban transport fund to raise about USD 480 million for financing a new metro rail project through raising density (additional floor-area-ratio) along the proposed metro corridor. The state government of Karnataka in India has also approved similar measures to finance the second phase of the Bangalore city metro rail project.

- Correction of fuel pricing and reduction of subsidies – this is an important measure to send the correct pricing signals to consumers and influence travel demand. Indonesia is actively pursuing reforms to reduce the distortion in the transport markets by reducing fuel subsidies. To finance India’s 12th 5 year plan, innovative sources of funding in the form of a “green surcharge” on petrol, “green cess” on personal vehicles, and “urban transport tax” on purchase of new cars and two-wheelers have been introduced.

Raising local financing through such sources is an important opportunity that national governments could pursue to find sustainable transport projects demanded by local areas. Doing so would also create greater local support, buy-in, and commitment to a project.

3.2. Increasing the Effectiveness of Sustainable Transport Financing

Once financing sources have been identified, there are several strategies that can be utilized by national governments to ensure that the financing is applied in the most cost-effective way and projects are implemented well to achieve the goals of sustainable transport. These are discussed below.

3.2.1. Enabling Institutional arrangements to streamline flow of funding to local level

Often accompanying national financial commitments, legislative changes are sometimes important for setting the stage for scaling up innovation, but long-lasting political support can be difficult to achieve. Over the past few years, the Latin American region has produced a number of notable examples of landmark legislation that provide an opportunity to identify key lessons learned that can be applied to Asia.

In Mexico and Brazil, legislation has facilitated greater focus on sustainable transport, and other low-carbon solutions to climate change. In Mexico, for example, sustainable transport was incorporated into the language of its 2012 climate change legislation, codifying improvements to come. In Brazil, the combination of new climate change policies that require a reduction in emissions with an urban mobility law that requires the prioritization of public and non-motorized means of transportation create the framework for investment of federal dollars into sustainable transport.

A key challenge is that financing intended for sustainable transport projects often may not reach the local level for the desired purposes. Targeting the financing from national ministry levels to local governments requires a strong, enabling planning and institutional framework. Such a framework can be created by the national government and may include some essential features, for example:

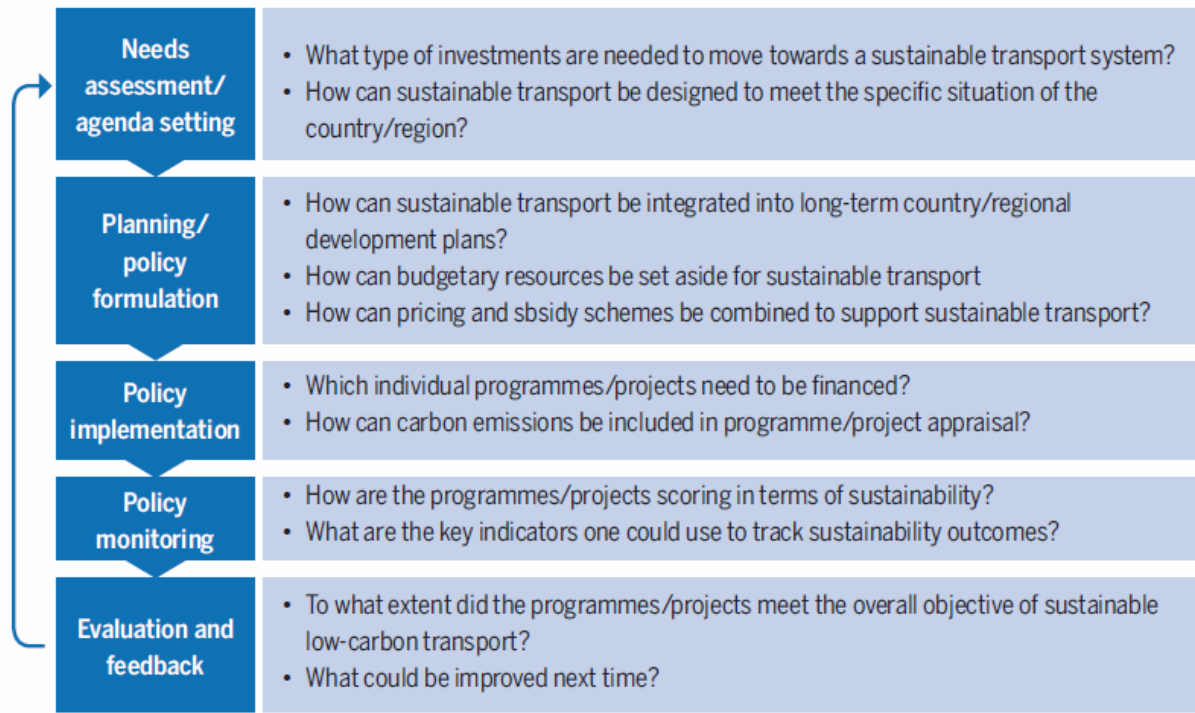
- Clear roles of national, sub-national/state, and local governments in generating funding as well as ensuring efficiency, equity, and transparency in use of resources and evaluation of impacts
- Involvement of local project sponsors as financing and risk-sharing partners, ensuring capacity for deliverability
- Coordination among multiple funding, planning, and operational agencies, and private actors
- Oversight by one agency providing consistent guidelines for budgeting and classifying transport projects and conducting evaluations
- Clear conditions and criteria for funding at sub-national and local levels – for example, in India, the National Urban Transport Policy mandates the preparation of comprehensive mobility plans integrated with urban development planning in all cities. This condition must be met for cities to receive national financing under the JnNURM scheme, discussed earlier, in Section 2.2.2. Sometimes, national governments may stipulate the provision of local financing as a condition for national financing.
- Sustainable transport funding programs also need to be envisioned and planned across modes and the programs should emphasize intermodal connectivity. This implies that mode-specific funding programs may well be obsolete and governments should look beyond this traditional way of functioning.

3.2.2. Impact-based Monitoring and Evaluation

There is a need for governments and MDBs to establish clear performance outcomes to assess the impacts of funded projects, using indicators of health, safety, equity, access, environmental quality, and economic productivity.

Current decision-making processes typically fail to take into account the full economic, social, and environmental consequences of policies, programs, and projects. National governments can increase the effectiveness of financing decisions by following a structured process starting with needs assessment, planning and policy formulation, implementation, monitoring, and finally ex-post evaluation. For each of these stages, key questions such as shown in Figure 16 need to be asked (Sakamoto et al., 2010).

Figure 16. Analyzing the Impact of Financing Decisions

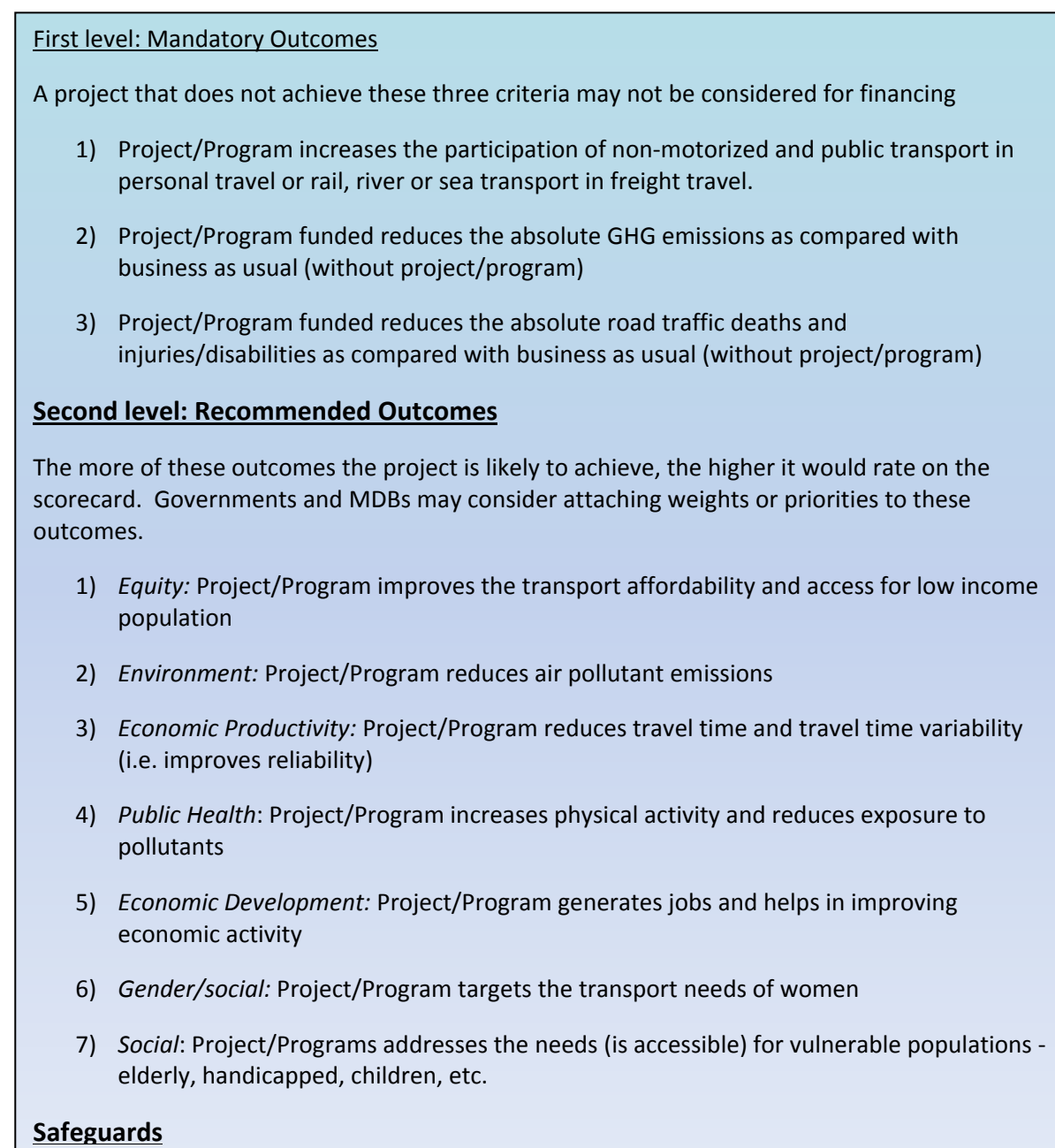


Source: Sakamoto et al. (2010)

In general, financing based on performance outcomes should be a practice followed by both national governments and MDBs. JICA already uses an approach like this, as discussed earlier, and has created the Climate Finance Impact Tool (Climate FIT) to evaluate financing decisions. There is often debate on the definition of “sustainable transport”, however, a government or MDB could use an operational definition for financing purposes that is expressed in terms of expected outcome from the projects. Then, financing decisions could be based on evaluating projects against specific criteria in a scorecard approach and estimating the values of performance indicators.

Figure 17 shows an illustrative scorecard of criteria and performance indicators for evaluating transport projects and programs.

Figure 17. Illustrative Scorecard for Evaluating Sustainable Transport Projects for Funding



Source: EMBARQ

The scorecard could consider two levels of expected outcomes – those that are mandatory and those that are recommended. In addition, the scorecard could include specific safeguards to ensure that certain environmental, social, and other risks are mitigated. In a more sophisticated form, the approach could also specify data sources used to conduct such analyses and standardized methodologies and tools that may be used. Where funding is directed at policies

and programs, financial incentives for local governments could be linked to implementation of reforms. For example, in India, local governments propose projects and funding awards are linked to governance reforms that encourage project sustainability.

3.2.3. Capacity building and policy guidance

In the previous section, we presented an illustrative scorecard approach for making financing decisions to support sustainable transport. However, it is clear that to operationalize this into process where local and national governments can engage with each other and with the MDBs regarding these outcomes, there would be a need to train and build capacity for such analysis and evaluation or alternatives. Furthermore, incorporating the long-term risks of climate change, and evaluating the expected future cost of additional transport-related operational, maintenance, and reconstruction, requires intensive modeling and expertise. This is where national governments can play another critical role in providing the required technical training, knowledge resources, and policy guidance to local governments. The financing for sustainable transport projects could specify as a condition that a fixed percentage of resources be used for capacity building (e.g., one percent or other amount mutually agreed by MDBs or other donors and national governments).

Several countries, including the U.S., India, Brazil, Mexico, and Germany require the creation of integrated transport and land use plans that can guide the region's growth in a sustainable way and avoid unintended consequences. The preparation of these plans and their evaluation requires a good level of technical resources and capacity at the local and national level, across agencies responsible for land use, transport, environmental planning, and financing.

The required training is important to help create local demand for sustainable transport financing that is then funneled up to the national level and to MDBs. Building technical, managerial, and financial capacity at the local level will ensure several other advantages -- more effective implementation of sustainable transport projects and programs, more effective partnerships with the national government, more effective local stakeholder engagement, and more effective ex-post evaluation that allows decisions to be made about replicating projects.

In addition, peer-to-peer knowledge exchange between local governments, facilitated by national governments and/or MDBs is another important way to build capacity by sharing results. Despite a growing sustainable transport knowledge base, knowledge sharing remains a potential challenge to scaling up. Knowledge sharing institutions play an important role in sharing best practices and implementation expertise as has been shown through the impact of the SIBRT in Latin America²³. Additional regional institutions, like the recently created Asia BRTS Association²⁴, could further facilitate knowledge sharing intra-regionally and inter-regionally.

²³ For additional information about SIBRT, please see: <http://www.sibrtonline.org/en/>

²⁴ For additional information about the Asia BRTS Association, please see: <http://asiabrts.org>

4. CONCLUSIONS

The rapid rate of urbanization in Asia, the high costs of externalities related to traffic fatalities, congestion, air pollution and public health, and the impending risks of climate change warrant urgent action and significantly increased investment in sustainable transport. The scale of these problems has grown over the past several years because existing investments have been directed at road and highway projects that exacerbate these externalities, not towards large scale public transport and non-motorized transport projects, that can help alleviate them. This has continued in line with traditional 20th century priorities, without considering issues of infrastructure resilience and climate adaptation. The continuing economic benefits and co-benefits of sustainable transport investments have also been ignored with the current investment paradigm and there is a strong case to be made that these could yield high returns to future investments in sustainable transport.

In addition, in contrast with traditional planning processes, this new agenda demands quicker decision processes and the inclusion of far greater flexibility in any major decision, as land values, land uses, and travel patterns are all changing over a much shorter period of time (Banister, 2012).

The international MDBs have pledged to shift \$175 billion of their lending portfolio towards sustainable transport in the next ten years and this is a significant opportunity. However, if past trends are an indicator, the investment can be misdirected towards projects such as roads and highways with limited or negative impacts, and this may lock cities and countries into unsustainable pathways. Highways, especially in urban areas, are highly capital-intensive projects that do not end up meeting the goals of sustainable transport with respect to reducing accidents, congestion, air pollution, emissions, or improving accessibility.

There is thus the need to not only target the pledged investment to more sustainable transport projects and programs, but also to leverage it to achieve enhanced scale and impact, since the resource needs in the transport sector are immense. High levels of financing from various sources is required in Asian countries for public transport and non-motorized transport infrastructure, integrating transport and urban development planning, technical capacity building, and evaluation of projects. However, the lack of demand for funding sustainable transport projects is a key challenge preventing available international financing from reaching cities and local governments that need it.

In this regard, national governments can play a significant role in bridging the gap between supply and demand of this financing and working with the MDBs to streamline the flow of financing to the local levels. A rating approach to score and prioritize sustainable transport projects or entire programs could be adopted by the national governments and MDBs, with some minimum criteria such as safety, emissions reduction, affordability, access for all, and decreased use of private motorized modes. Additional beneficial criteria such as travel time reduction and economic development may also be included. Safeguards that mitigate risks and negative impacts in environmentally sustainable areas and displacement impacts are also recommended.

International convening organizations, like the United National Centre for Regional Development (UNCRD), also have an important role to play in Asia and around the world in facilitating the adoption of sustainable transport projects and policies. They enable regional knowledge sharing by hosting conferences and workshops for practitioners and decision makers and provide a platform for discussing issues like transport finance and capacity building. In bringing government officials together, organizations like UNCRD can facilitate the development and acceptance of shared tools (like the scorecard proposed in this paper) by building consensus within the professional community. The continued engagement of the international community in regional forums, like the EST Forum in Asia, is fundamental to the advancement of the sustainable transport agenda.

In conclusion, we summarize in Figure 18 some key actions national governments can take to ensure the effective financing and implementation of sustainable transport projects so that the financing can achieve greatest benefits.

Figure 18. Actions National Governments can take to Leverage Financing for Sustainable Transport and Increase its Effectiveness

<p style="text-align: center;"><i>LEVERAGING SUSTAINABLE TRANSPORT FINANCING FOR GREATEST IMPACT</i></p>	<p style="text-align: center;"><i>INCREASING THE EFFECTIVENESS OF SUSTAINABLE TRANSPORT FINANCING</i></p>
<ul style="list-style-type: none"> ▪ Linking International with National Finance and Leveraging Climate Finance ▪ Engaging the private sector and creating supportive conditions for private investment ▪ Use of Local and Innovative Funding Sources for Sustained, Long-term Financing 	<ul style="list-style-type: none"> ▪ Enabling Institutional arrangements to streamline flow of funding to local level ▪ Impact-based Monitoring and Evaluation ▪ Capacity building and policy guidance

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Appendix

ANNEX. MAIN INSTRUMENTS FOR FINANCING CLIMATE ACTION IN THE URBAN CONTEXT (A=ADAPTATION; M=MITIGATION)

More details available from www.climatefinanceoptions.org

CLIMATE-SPECIFIC ADDITIONAL RESOURCES UNDER THE AEGIS OF UNFCCC

Adaptation Fund \$300–600 million by 2012 adaptation-fund.org	A	The overall goal of all adaptation projects and programs financed under the Adaptation Fund will be to support concrete adaptation activities that reduce the adverse effects of climate change facing communities, countries, and sectors. Can be implemented at the city level. Applications through national designated authorities and implementation through accredited Multilateral or National Implementing Entities.
Global Environment Facility (GEF) \$1.35 billion over 2011–14 gefweb.org	M (A)	Largest source of grant-financed mitigation resources. Strategic Pilot on Adaptation is a funding allocation within the GEF Trust Fund to support pilot and demonstration projects that address local adaptation needs and generate global environmental benefits in all GEF focal areas. Cities can initiate new projects or be implementation partners with national agencies.
UNFCCC GEF-administered Special Funds LDCF: \$223 million SCCF: \$148 million gefweb.org	A	Least Developed Countries Fund (LDCF): helps in the preparation and financing of implementation of National Adaptation Programs of Action to address the most urgent adaptation needs in the least developed countries. Special Climate Change Fund (SCCF): supports adaptation and mitigation projects in all developing countries, with a large emphasis on adaptation.

RESOURCES FROM THE CARBON MARKET

World Bank Carbon Funds and Facilities Size: 11 funds and facilities entrusted with \$2.5 billion carbonfinance.org	M	Cities can access CDM funds through the sale of certified emission reductions (CERs) to carbon funds. CPF can support cities in preparing CDM activities on a programmatic scale.
Carbon Partnership Facility (CPF) \$100 million		World Bank Carbon Finance Unit can support in monetizing CERs.

DEDICATED CONCESSIONAL FUNDING (ODA) FROM THE DAC COMMUNITY

Climate Investment Funds \$6.4 billion climateinvestmentfunds.org	M	The Clean Technology Fund (\$4.5 billion programmed for 13 investment plans): to finance scaled-up demonstration, deployment, and transfer of low-carbon technologies. Major urban mitigation (transport and energy) investments in Bangkok and Mexico City; others are possible provided more funds pledged for programming.
World Bank administered, implemented by MDBs	A M	The Strategic Climate Fund: Pilot Program for Climate Resilience (\$1 billion programmed for nine pilot countries and two regions) to help build climate resilience in core development; Forest Investment Program (\$587 million for eight pilot countries); Program to Scale up Renewable Energy for Low Income Countries (SREP, \$318 million for six pilot countries). Urban upstream planning support and city-based investments possible to integrate into national plans now being formulated in agreed pilot countries.
Reducing Emissions from Deforestation and Forest Degradation programs (REDD+) \$4 billion in pledges as Fast Start Finance following the Copenhagen Accord		Two major REDD funds fully or partially run by the World Bank, the Forest Carbon Partnership Facility and the Forest Investment Program (under the Climate Investment Funds), have already received over \$700 million in pledged funding for pilot programs in forested developing countries and are currently commencing implementation. Cook stove programs can still be integrated into reduced-deforestation country strategies and implementation plans. Their impact at the urban level is the reduction of GHG and black carbon emissions in low-income areas with corresponding health co-benefits.
Examples of other climate funds and their volumes:		Cities can get access to these funds through cooperation in the national programming process:
\$10 billion \$180 million p.a. \$160 million \$135 million	M & A M & A A M & A	Hatoyama Initiative (Japan) International Climate Initiative (Germany) Global Climate Change Alliance (European Commission) International climate Change Adaptation Initiative (Australia)

Source: World Bank (2010), Climate Finance in the Urban Context, Issue Brief #4

EXAMPLES OF NON CLIMATE-SPECIFIC SUPPORT FROM DONORS AND MDBS

Global Facility for Disaster Reduction and Recovery (GFDRR)	A	Partnership within the U.N. International Strategy for Disaster Reduction initiative, focusing on building capacities to enhance disaster resilience and adaptive capacities in a changing climate. About two-thirds of GFDRR's assistance has had a primary focus on climate change adaptation—that is, more than \$27 million in nearly 90 countries across the world. GFDRR support has leveraged an additional \$17 million of cofinancing from development partners and greater amounts from World Bank investments. The GFDRR Technical Assistance Fund is a global fund established through contributions of GFDRR partners into a multidonor trust fund. The Callable Fund is a fund-in-readiness to be activated when disaster strikes. This multidonor trust fund provides an innovative approach in that donors enter into an agreement with the World Bank ex ante a natural disaster to support the Callable Fund; however, actual funds are mobilized ex post a natural disaster through a Call for Funds.
International Development Association World Bank core concessional loans for low-income countries	A (M)	To be developed as part of national initiatives and with national authorities: - Development Policy Operations to build resilience into city budgets - Adaptation action at city level - Mitigation action at city level
IBRD, MDB, and bilateral core funds	A M	Stand-alone or in combination with climate-specific funds city-based adaptation and mitigation interventions as part of national programs and with national authorities
Trust Funds and Partnerships; Guarantees	M A	Grant financing for knowledge products, capacity building, upstream project work/pilots; partial risk guarantees to support development / adoption / application of clean energy technologies, including those not fully commercialized, in client countries.
Climate insurance products World Bank Treasury, etc. fee-based or donor-supported	A	Risk financing strategy development MultiCat products with cities with parameter-based triggers CAT swaps for extreme flood risk, etc. Multi-city insurance products for risk sharing and lower cost
Climate bonds World Bank Treasury, etc. fee-based or donor-supported	M A	Bonds against city CERs or Nationally Appropriate Mitigation Actions (NAMAs) Advice on monetizing carbon bonds
Public-Private Partnerships		World Bank Public-Private Infrastructure Advisory Facility or other similar schemes can provide technical assistance and matchmaking in the planning and operationalizing of urban NAMAs through the improvement of an enabling environment and strategic public intervention conducive to long-term private sector commitment
Private sector		International Finance Corporation and other MDB private-sector arms can provide technical assistance and financial support to investors in climate-resilient infrastructure or low-carbon technologies through a combination of risk management and other concessional instruments, bringing the cost to a level attractive for long-term private investment

Source: World Bank (2010), Climate Finance in the Urban Context, Issue Brief #4

National Public Transport Investment Programs

Country	Year of Program Initiation	Name of Program	Administering Entity	Eligible Modes	City Eligibility	Authorization	Types of Award
Chile	1950s	National System of Investment (SNI) – Urban Transport	Ministry of Social Development	BRT; LRT; Metro; Suburban Rail	Large cities only	Ongoing	Grant
The Netherlands	1960s	Multiple-year Program for Infrastructure, Spatial Planning, and Transport (MIRT)	Ministry of Infrastructure and Environment	BRT; LRT; Metro; Suburban Rail	Any size city (minimum project cost threshold)	Multiple-year	Grant
England	1968	Local Major Transport Schemes	Department of Transport	BRT; LRT	Any size city (capital city excepted)	Multiple-year	Grant
United States	1976	Capital Investment Program (New Starts and Small Starts)	Federal Transit Administration	BRT; LRT; Metro; Suburban Rail	Any size city	Multiple-year	Grant
France	1994	Public Transport in Dedicated Rights-of-Way (TCSP)	Ministry of Ecology, Sustainable Development, Transport and Housing	BRT; LRT; Metro	Any size city (capital city excepted)	Multiple-year	Grant; Loan
Colombia	1996	National Urban and Mass Transit Policy	National Department of Planning	BRT	Large cities only	Multiple-year	Grant
New Zealand	1997	National Land Transport Program	NZ Transport Agency	BRT; LRT; Metro;	Any size city	Multiple-year	Grant

Suburban Rail							
Poland	2004	Urban Transport in Metropolitan Areas	Ministry of Infrastructure	BRT; LRT; Metro	Large cities only	Multiple-year	Grant
India	2005	Jawaharlal Nehru National Urban Renewal Mission (JnNURM)	Ministry of Urban Development	BRT	Large cities only	Multiple-year	Grant; Loan; Combination
South Africa	2005	Public Transport Infrastructure and Systems Grant (PTIS)	Department of Transport	BRT	Large cities only	Multiple-year	Grant
Brazil	2007	Growth Acceleration Program – Mobility in Large Cities	Ministry of Cities	BRT; LRT; Metro; Suburban Rail	Large cities only	Individual calls for projects	Loan; Combination
Australia	2008	Reform and Investment Framework	Infrastructure Australia	BRT; LRT; Metro; Suburban Rail	Any size city (minimum project cost threshold)	Multiple-year	Grant; Loan
Mexico	2008	Federal Support Program for Mass Transit (PROTRAM)	National Bank of Public Works and Services (BANOBRAS)	BRT; LRT; Metro; Suburban Rail	Large cities only	Multiple-year	Grant; Loan

Source: EMBARQ, 2012²⁵

²⁵ EMBARQ, 2012. Evaluate, Enable, Engage – Principles to Support Effective Decision Making in Mass Transit Investment Programs. Online at: <http://www.embarq.org/en/evaluate-enable-engage-principles-support-effective-decision-making-mass-transit-investment-programs>