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**EIGHTH REGIONAL ENVIRONMENTALLY SUSTAINABLE TRANSPORT  
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**Mobilizing Private Sector Financing for the Realization of Next Generation  
Solutions for Sustainable Transport in Asia**

**(Background Paper for Plenary Session 7 of the Programme)**

**Final Draft, 19 December 2014  
incorporate with input from the Eighth Regional EST Forum in Asia**

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This background paper has been prepared by the Secretariat of the Partnership on Sustainable, Low Carbon Transport (Cornie Huizenga, Karl Peet, Bernhard Reifeld and Alice Yiu) for the Eighth 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.

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## Table of Contents

<b>Executive Summary .....</b>	<b>6</b>
<b>I. Introduction.....</b>	<b>12</b>
A. Background.....	12
B. Potential Funding Sources for Sustainable Low Carbon Transport.....	14
C. Study Goals.....	16
<b>II. Public-Private Partnerships.....</b>	<b>16</b>
A. Background on PPPs .....	17
B. Types of PPPs.....	18
C. Global PPP Transport Policies and Projects.....	20
D. EST Region PPP Transport Policies and Projects .....	22
E. Conclusions .....	29
<b>III. Bond Financing .....</b>	<b>32</b>
A. Bond Financing Background.....	32
B. Traditional Bond Financing Strategies.....	32
C. Emerging Bond Financing Strategies for Sustainable Development.....	36
D. Interaction of Bond Financing with Other Financing Tools .....	39
E. Conclusions .....	40
<b>IV. Multilateral Development Bank Private Sector Operations .....</b>	<b>41</b>
A. Definitions of Private Sector Assistance .....	41
B. Indirect Role of MDBs in Private Sector Investment.....	42
C. Direct Role of MDBs in Private Sector Investment.....	43
D. MDBs and Other Private-Sector Financing Strategies.....	46
E. Conclusions .....	48
<b>V. Private Sector Financing of the Bangkok 2020 Declaration .....</b>	<b>49</b>
A. Potential of Private Sector Financing.....	49
B. Conclusions.....	50
<b>VI. Study Conclusions.....</b>	<b>52</b>

## List of Tables, Figures and Boxes

Table i: Projected Infrastructure Needs in EST Region .....	7
Table 1: Projected Infrastructure Needs in EST Region .....	13
Table 2: Benefits and Risks of PPPs .....	18
Table 3: Comparison of PPP Types .....	20
Table 4: PPP Policies in EST Participant Countries .....	24
Table 5: Summary of Select PPP Projects in the EST region.....	29
Table 6: Climate Bond Universe: Total and Transport Sector Amount Outstanding .....	33
Table 7: Evaluation of Bangkok 2020 Declaration Goals via Private Sector .....	52
Figure 1: Spectrum of PPP Agreements .....	19
Figure 2: Aggregate Transport Bond Outstanding in EST Countries .....	34
Figure 3: Individual Transport Bond Issuance by EST Countries .....	35
Figure 4: ADB Private Sector Share and Leverage.....	44
Figure 5: KfW develoPPP.de Leverage of Private Sector Financing.....	45
Box 1: How are Funding and Financing Distinguished?.....	14
Box 2: What is Private Sector Financing?.....	15
Box 3: Green Automobile Bonds .....	36
Box 4: Climate Bonds Initiative (CBI) Low Carbon Transport Working Group .....	37
Box 5: City of Gothenburg Electric Vehicles .....	37
Box 6: European Investment Bank Project Bond Initiative.....	38
Box 7: European Investment Bank and World Bank Green Bonds .....	47

## List of Abbreviations

2DS	2 Degree Celsius Scenario
4DS	4 Degree Celsius Scenario
ADB	Asian Development Bank
AFD	Agence Française de Développement
AfDB	African Development Bank
APMC	Agriculture Produce Marketing Committees
BAQ	Better Air Quality
BAU	Business-as-usual
BLT	Build-Lease-Transfer
BMA	Bangkok Metropolitan Administration
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BOT	Build-Operate-Transfer
BRT	Bus Rapid Transit
BT	Build-Transfer
BTO	Build-Transfer-Operate
BTSC	Bangkok Transit System Corporation
CAA	Clean Air Asia
CBI	Climate Bonds Initiative
CIF	Climate Investment Funds
CTF	Clean Technology Fund
DB	Design-Build
DBFM	Design-Build-Finance-Maintain
DBFO	Design-Build-Finance-Operate
DBOT	Design-Build-Operate-Transfer
DEG	Deutsche Investitions- und Entwicklungsgesellschaft
DoTC	Department of Transportation and Communication
EBRD	European Bank of Reconstruction and Development
EDSA LRT	Epifanio de los Santos Avenue Light Rail Train consortium
EIB	European Investment Bank
ESCAP	Economic and Social Commission for Asia and the Pacific
EST	Environmentally Sustainable Transport
EV	Electric Vehicle
FDI	Foreign Direct Investment
GEF	Global Environment Facility
GHG	Greenhouse Gas
GID	Gujarat Infrastructure Development
HSR	High Speed Rail
I/M	Inspection and Maintenance
ICT	Information and Communications Technology
IEA	International Energy Agency
IFC	International Finance Corporation
IIFCL	India Infrastructure Finance
IsDB	Islamic Development Bank
ITDP	Institute for Transportation and Development Policy
ITS	Intelligent Transportation Systems
JBIC	Japan Bank of International Cooperation
JICA	Japan International Cooperation Agency
JR	Japanese Railways
KfW	Kreditanstalt für Wiederaufbau
LRT	Light Rail Transit

LTA	Land Transport Authority
MDB	Multilateral Development Bank
MEI	Municipal and Environmental Infrastructure
MERE	Ministry of Environment and Renewable Energy
MOE	Ministry of the Environment
MOT	Ministry of Transport
MRT	Metro Rail Transit
NMT	Non-motorised transport
NSW	New South Wales
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PFI	Private Finance Initiative
PPP	Public-private partnerships
PSOD	Private Sector Operations Department
SIB	Social impact bonds
SLoCaT	Partnership on Sustainable, Low-Carbon Transport
SME	Small and Medium Enterprises
SOC	Social Overhead Capital
TDM	Transport Demand Management
TfL	Transport for London
TRL	Transport Research Laboratory
UNCRD	United Nations Centre for Regional Development
VFM	Value for Money
WB	World Bank
WRI	World Resources Institute

## Executive Summary

Global development currently confronts critical issues, including climate change, poor air quality, and pervasive poverty, and sustainable low carbon transport must play a key role in confronting these challenges. **Investments in sustainable transport within the Asian Environmentally Sustainable Transport (EST) Forum region must be scaled up and accelerated to meet the goals of the Bangkok 2020 Declaration** (proposing 20 goals to increase sustainability of transport infrastructure and services) and the subsequent Bali Declaration (envisioning zero congestion, pollution, and accidents from transport).

**Several complementary global commitments and frameworks within the global transport, development and climate community stress the urgency to scale up sustainable, low carbon transport;** these include:

- The Global Decade of Action for Road Safety (targeting a 50% reduction in road deaths by 2020);
- The draft Sustainable Development Goals (SDGs) currently being discussed by the United Nations General Assembly (calling for action on transport within seven of the proposed 17 SDGs);
- Voluntary commitments from the 2014 Secretary General's Climate Summit (setting goals in the areas of urban transport, intercity rail, electric mobility, aviation, fuel economy and green freight);
- The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (calling for drastic reductions in greenhouse gas emissions including from transport to keep global warming within a 2 degree Celsius scenario); and
- The Results Framework on Sustainable Transport by the Partnership on Sustainable, Low Carbon Transport (SLoCaT) (envisioning universal urban and rural access by sustainable transport by the year 2030, while reducing negative externalities related to road crashes, air pollution and climate change).

Considering the urgency and scope of change required by these commitments, **it is critical to quickly scale up current levels of funding for sustainable low carbon transport infrastructure and services.** Much of the additional funding will be required to develop transport infrastructure and services which currently does not exist. This offers unique opportunities to provide the EST region with sustainable transport infrastructure and services that enable economic and social development without the negative impacts that characterize many of the existing transport systems in the region.

Traditionally, the public sector has been the primary source of transport funding, but under current circumstances, **it is unrealistic for limited public sector funding to provide needed investments within the required timeframe, even if complemented by contributions from end users, official development assistance, and climate finance.** Thus, it is becoming increasingly important to find ways to mobilize private sector involvement to help to fill the funding gap.

This paper assesses the potential contribution of the private sector to scale up sustainable low carbon transport through three primary strategies: public-private partnerships, bond financing, and private sector operations of multilateral development banks. It focuses primarily on debt rather than equity financing (while acknowledging that much informal transport in Asia is equity financed), and on transport infrastructure rather than operations & maintenance (while acknowledging that the latter hold significant potential for private sector involvement).

The following eight questions can serve as a guide to help policy makers in EST countries formulate sufficiently ambitious national and sub-national policies on private sector financing to meet the pressing need to scale up sustainable low carbon transport infrastructure and services:

1. *How much money is needed to scale up sustainable low carbon transport in EST countries?*

Multiple studies have attempted to quantify annual transport investment needs both globally and within the EST region, with estimates ranging from up to US\$245bn for the Asia Pacific region, up to \$90bn for South Asia, or \$75bn for India alone, as shown in the following table.

Geographic scope	Total infrastructure need	Total transport infrastructure need	Timeframe	Annual transport infrastructure need	Source
Global	N/A	\$11trn	2009-2030	\$524bn	OECD (2011)
Global	\$57trn	\$24trn	2013-2030	\$1,412bn	The Economist (2014)
Global	N/A	\$45trn	2010-2050	\$1,125bn	IEA (2014)
Asia Pacific <sup>1</sup>	\$8trn	\$2.45trn	2010-2020	\$245bn	PWC (2014)
Asia <sup>2</sup>	\$8trn	\$2.25trn	2010-2020	\$225bn	ADB Institute (Wignaraja, 2013)
South Asia <sup>3</sup>	\$1.7-2.5trn	\$400bn-700bn	2013-2020	\$58-100bn	World Bank (2013a)
India	\$1.1- 1.7trn	\$340-595bn	2013-2020	\$75bn	World Bank (2013a)
Russia	N/A	\$753bn	2011-2020	\$84bn	EBRD

**Table i: Projected Infrastructure Needs in EST Region**

Variations among these estimates are likely due to differences in underlying modeling assumptions (e.g. definitions of infrastructure and transport, varying inflation rates, time frames, definitions of the ‘Asia region’, inclusion of operations and maintenance). The majority of these infrastructure needs estimates are produced as theoretical top-down projections at global, regional and national levels, and are downscaled to derive estimates for individual countries. While these figures have begun to drive global or regional transport policy discussions on the need for infrastructure investments, they offer limited utility in informing national and sub-national policies. **Thus, it is essential to generate country-specific bottom-up projections of transport investment needs**, which are currently limited among EST countries.

At the same time, studies from the Institute for Transportation and Development Policy (ITDP) as well as the New Climate Economy assert that **investment strategies that emphasize the sustainability of transport systems are likely to yield large savings (up to \$100trn by 2050)**

<sup>1</sup> Regions include East Asia, Southeast Asia, Pacific

<sup>2</sup> Countries include Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Cambodia, PR China, Cook Islands, Fiji, Georgia, India, Indonesia, Kazakhstan, Kiribati, Kyrgyz Republic, Lao PDR, Malaysia, Maldives, Marshall Islands, Micronesia (Federated States of), Mongolia, Myanmar, Nauru, Nepal, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Tonga, Turkmenistan, Tuvalu, Uzbekistan, Vanuatu, Viet Nam

<sup>3</sup> Countries include India, Pakistan, Sri Lanka, Nepal, Maldives, Bhutan, Bangladesh, Afghanistan

**as compared to business-as usual (BAU) investments** because of avoided investments in vehicles, fuel, parking, roads, etc. Changing BAU investment patterns will require shifts in the type of investments (e.g. enable public transport-oriented infrastructure rather than car-oriented infrastructure). In many cases, savings will accrue to households (reduced spending on vehicles and operating costs) while investments will have to be made by public or private sector entities (developing public transport systems). **Therefore, projected net costs must incorporate both required increases in transport investments from the public and private sectors, and potential savings from shifting from BAU to sustainable low carbon transport paradigms.**

2. *Is there enough money available in the EST region to achieve required transport investments?*

**There is still great uncertainty on the size and origin of investments in transport systems in the EST region and to the extent to which these investments can be labeled as investments in sustainable transport.**

The World Resource Institute (WRI) has estimated global transport-related annual capital expenditures (excluding consumer spending) between \$1.4trn and \$2.1trn annually. In aggregate, this investment consists of slightly more private investment than public. In 2010, 2 percent of public investment was international, mostly provided through official development assistance (ODA). Less than half a percent comes from climate-focused funds and institutions. Private investment, including both domestic and cross-border flows, is estimated to be between \$814bn and \$1.2trn per year. About three-quarters of private investment occurs in high-income countries.

The WRI numbers are global estimates and do not provide a regional, let alone national, level estimates for the EST region. It appears however, taking into account the investment estimates described in table 1, that **there is significant underinvestment in transport in the EST region.** Currently 60% of global annual transport infrastructure investment is directed to OECD countries, and 40% of investment is directed to non-OECD countries. Yet, per IEA, in order to meet a 2DS or 4DS scenario, it is necessary that 60% of investment be directed to non-OECD countries and 40% to OECD countries (i.e. the current ratio must be reversed). Thus, funding for needed investments in non-OECD countries must increase 50% from current levels, and it is unlikely that the public sector is in a position to increase funding by this amount. **Therefore, greater emphasis on private sector financing will be required to meet development goals in the transport sector.**

According to the Asian Development Bank (ADB), total investment flows into Asia totaled roughly \$4.59trn in 2011, with only 22.1% of this investment (\$1.02trn) coming from within the Asia region. ADB's projected annual transport infrastructure need of \$250bn (in 2008 dollars) accounts for roughly a quarter of ADB's projected annual infrastructure needs of \$800bn; yet, this figure equals nearly a quarter (24.6%) of the actual 2011 investment flows in Asia originating from within the region. Thus, raising required private sector investments in transport with EST regional resources alone is unrealistic, and therefore, **it is essential that the transport sector in the EST be better accessible to private investment from domestic and especially also from foreign sources.**

3. *Do private sector investors (both domestic and foreign) have sufficient access to transport investments in EST countries?*

**Despite the significant demand for private sector transport investments in the EST region, many current policies in the EST region limit the potential of the private sector to contribute to transport infrastructure and services.** Per McKinsey, various types of infrastructure investments in many EST countries remain effectively closed to private involvement due to several factors, including vaguely-defined PPP policies that inhibit private participation, capital controls that deter potential investors, and weak capital markets that can complicate investor exit strategies.

**Countries in the EST region show mixed progress in enabling foreign direct investment (FDI).** Though some EST countries have taken proactive steps to ease FDI contributions to transport infrastructure investments (e.g. India's recent proposal to allow 100% FDI for major rail projects, including high-speed services), in other countries obstacles remain to limit efficient foreign involvement in transport infrastructure and services (e.g. Viet Nam limits FDI below 50% for nearly all transport investments, while Indonesia and the Philippines impose similar restrictions on ports and airports).

The EST region is diverse, and there is no single, one-size fits all policy to maximize private sector involvement for all countries; however, **removing restrictions on FDI in infrastructure projects investment and operation and guaranteeing against nationalization of assets are important ways to reduce obstacles for domestic and foreign private sector investors.**

4. *Are proper incentives in place to make sustainable transport investments attractive to private sector and foreign investors?*

Scaling up private sector involvement in sustainable transport infrastructure and services hinges on having a stable set of enabling conditions and safeguards in place to make investments more attractive. **Critical elements include the presence of medium-term policies and investment plans, in addition to required public sector capacity to implement these policies, to ensure profitability of investments over a reasonable timeframe.** The International Transport Forum asserts that inconsistent behaviour of governments is one of the greatest deterrents to investor confidence, and thus achieving political stability is paramount to attracting private sector investment.

Transport investments must generate secure revenue streams to attract private sector investment (as well as public sector investment). **Not enough attention has been given in the EST region to realize successful revenue strategies for transport systems in general and sustainable transport in particular** (e.g. enabling legislation to allow for value capture).

Private sector financing of infrastructure in the EST region, according to some, is skewed toward the energy sector to date, which has provided more reliable generation of revenue streams; in contrast, **transport is a public good that requires ongoing public support to help to generate the necessary revenue streams to draw private sector investment.** By definition, sustainable transport provides development benefits that are not included in traditional assessment methodologies, decision makers' logic, and are not captured by revenue streams. To increase sustainable transport policy and investment options, it is essential to generate sufficient revenues from less infrastructure-heavy avoid-shift-improve strategies (e.g. BRT, bike/pedestrian infrastructure, road safety measures). **If social benefits from sustainable transport can be monetized and translated included in revenue streams (with the public sector bearing an appropriate degree of risk), private sector investment in these areas is likely to increase.**

5. What is the potential role for PPP in scaling up sustainable low carbon transport in the EST region?

PPPs are designed to leverage the expertise of the private sector to develop infrastructure and manage operations, in order to allow governments to scale up transport investments and services while focusing on the primary responsibilities of policy, planning and regulation. PPP offers the potential to allow rapid scale up under ideal conditions, but this strategy may also increase overall project costs if not done right.

**PPP transport investment trends in the EST region have been mixed.** According to the World Bank, investment levels for PPP projects in the East Asia and Pacific region increased 19 percent from 2011 to 2012; however, the number of newly-closed projects dropped from 112 to 64, with eight transport projects reaching financial closure with a total investment of \$3.5bn. In South Asia, total investment decreased by 20 percent in 2012, though 60 PPP transport projects reached financial closure with a total investment of \$18.9 bn. Thus, **to meet the goals of global transport related developmental commitments with required scale and speed, it is important that PPP leaders in the EST region deepen involvement, and that PPP followers make strides to catch up to leaders.**

Countries in the EST region must provide **stable legal frameworks** to help outline roles and responsibilities of all parties within PPP projects. OECD asserts that successful PPPs require **open procurement processes and transparent risk allocation. Enforceable dispute-resolution mechanisms** must be established to protect the rights of all parties. To ensure a greater use of PPP in transport there is a need for a **much larger pipeline of investment projects**. Finally, it is essential to ensure coordination among planning and operating entities to establish **robust revenue models** based on sound assumptions.

6. What is the potential role for bond financing in scaling up sustainable low carbon transport in the EST region?

Bond financing is a widely used approach to fund infrastructure development. **Dedicated “green” or “climate” bonds can help jump-start sustainable low carbon transport investments.** While the bond market for climate-themed projects (including sustainable low carbon transport) has grown quickly and continues to evolve, bond financing must be applied much more broadly over the next five years to meet sustainable development and transport targets across the EST region.

**The EST region has seen strong bond issuance in the transport sector, dominated by rail bonds from China,** and smaller rail bond issuances from the Russian Federation, the Republic of Korea, and Thailand, according to the Climate Bonds Initiative. More modest bond issuances in other transport subsectors (e.g. transit buses in the Republic of Korea, low-emissions vehicles in Japan, urban rail in Singapore) offer additional growth potential among EST countries.

For bond financing to have a significant impact on short-term sustainable transport investments in the EST region it is essential to (a) **replicate forthcoming China corporate green bond issuances** in other candidate EST countries; (b) to exploit the potential for sustainable low carbon transport projects among **municipal bond issuances** by strengthening cities’ credit ratings; (c) increase bond issuance in additional transport subsectors (e.g. urban transport, bus, EVs, e-bicycles), by using **aggregators to meet issuance thresholds**; and (d) **to use bond financing to**

**complement PPP projects** (e.g. through re-financing) after short-term risk has been reduced by initial investments to suit bond investors who typically seek long-term and low-risk investments.

7. *What is the potential role for the private sector operations of multilateral development banks (MDBs) in scaling up sustainable low carbon transport in the EST region?*

**Multilateral development banks (MDBs) can help to scale up private sector involvement in sustainable low carbon transport in the EST region by leveraging the resources and expanding the capacity of the private sector, by using MDBs' higher credit ratings and regional expertise to help reduce project risk and facilitate needed governance reforms.**

However, to achieve a transformative shift in the role of the private sector in realizing sustainable transport in the EST region, most MDBs will have to strengthen their capacity to engage with the private sector, collaborate with member countries on changes in MDB operational business processes to better balance public and private sector interests in project identification, processing and implementation. The European Bank for Reconstruction and Development, through its consistent emphasis on private sector engagement (including in its public sector lending), can serve as a useful example.

To achieve required scale-up of transport investments, MDBs working in the EST region must **increase technical assistance and capacity building in support of private sector involvement** as part of its transport-related public sector related project funding. MDBs will also have to **increase direct private sector funding for transport** as the absorption capacity of the private sector in the EST region increases. This can make currently unrealistic objectives (e.g. the ADB goal of 50% private sector involvement in all projects), a medium\_term reality.

8. *How can policy makers in EST countries optimize private sector involvement in realizing the Bangkok 2020 Declaration on Sustainable Transport?*

**Out of 20 goals of the Bangkok 2020 Declaration, there are few in which funding responsibility would be solely the task of government; for most however, costs can be either fully or partially transferred to end users or private-sector entities.** While financing needs to implement the Declaration are considerable, pursuing the sustainable transport paradigm and goals embodied in the Bangkok 2020 Declaration can help to lower BAU scenario costs to provide transport infrastructure and services in the EST region.

Experience shows that **application of private sector strategies to the Bangkok 2020 Declaration goals across EST member countries has been limited to date**; thus, it is crucial to increase ambition in these areas in the next five years to achieve the goals of Bangkok 2020 Declaration within the required timeframe, and thus to make needed strides toward decreasing emissions, improving air quality, and alleviating poverty across the EST region.

The public sector in the EST region must seek private sector involvement based on a given country, policy, and project context; yet, the current stance of policy makers in many EST countries is too tentative, with private sector access limited for both domestic and foreign actors. **Thus, more proactive public sector outreach is required in the EST region to attract private sector investment and allow both sectors to scale up sustainable transport, under proper conditions and with realistic expectations.**

**The primary justification for the use of private sector finance is its role to attract private entities to provide infrastructure and services at the lowest possible cost, through appropriate incentives and penalties.** Ultimately, the merit of private sector financing must be tested with a value-for-money analysis, which is substantially influenced by the degree to which risk can be transferred to the private sector, and which can help to determine the optimal degree of public and private sector involvement for transport investments with varying scope and scale.

## I. Introduction

### A. Background

Global development currently confronts critical issues, including climate change, poor air quality, and pervasive poverty, and sustainable low carbon transport must play a key role in confronting these challenges. The global population is projected to increase roughly 25% by 2030 (and as much as 13.7% in the rapidly developing countries participating in UNCRD’s Environmentally Sustainable Transport (EST) program<sup>4</sup>), which is likely to accelerate urbanization trends, perpetuate poverty, and increase regional transport demand (UNDESA, 2012). Yet, traditional models of transport infrastructure and services pose negative externalities, and thus, it is essential to quickly scale up sustainable low carbon transport infrastructure and services according to the goals of the Bangkok 2020 Declaration.

According to the International Energy Agency (IEA, 2014), meeting a two degree Celsius emissions scenario (2DS) will require an estimated annual finance requirement of \$1.1trn above business as usual, and the global transport sector share is estimated at more than \$500bn (Climate Bonds Initiative, 2014). The Economist (2014) estimates annual global infrastructure investment needs for transport at roughly \$1.4trn. Projected costs of expanding transport infrastructure and services in the EST region (and select EST countries) are comparably significant, as shown in

Geographic scope	Total infrastructure need	Total transport infrastructure need	Timeframe	Annual transport infrastructure need	Source
Global	N/A	\$11trn	2009-2030	\$524bn	OECD (2011)
Global	\$57trn	\$24trn	2013-2030	\$1,412bn	The Economist (2014)
Global	N/A	\$45trn	2010-2050	\$1,125bn	IEA (2014)
Asia Pacific	\$8trn	\$2.45trn	2010-2020	\$245bn	PWC (2014)
Asia	\$8trn	\$2.25trn	2010-2020	\$225bn	ADB Institute (Wignaraja, 2013)
South Asia	\$1.7-2.5trn	\$400bn-700bn	2013-2020	\$58-100bn	World Bank (2013a)
India	\$1.1- 1.7trn	\$340-595bn	2013-2020	\$75bn	World Bank (2013a)
Russia	N/A	\$753bn	2011-2020	\$84bn	EBRD

Table 1:

<sup>4</sup> 2014 EST countries include Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, People’s Republic of China, Indonesia, India, Japan, Lao PDR, Malaysia, The Maldives, Mongolia, Myanmar, Nepal, The Philippines, Pakistan, Republic of Korea, the Russian Federation, Singapore, Sri Lanka, Thailand, Timor-Leste, and Viet Nam

Geographic scope	Total infrastructure need	Total transport infrastructure need	Timeframe	Annual transport infrastructure need	Source
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Global	N/A	\$45trn	2010-2050	\$1,125bn	IEA (2014)
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India	\$1.1- 1.7trn	\$340-595bn	2013-2020	\$75bn	World Bank (2013a)
Russia	N/A	\$753bn	2011-2020	\$84bn	EBRD

**Table 1: Projected Infrastructure Needs in EST Region**

Variations among these estimates are likely due to differences in underlying modeling assumptions (e.g. varying inflation rates, time frames, definitions of the ‘Asia region’). The majority of infrastructure needs estimates are produced as theoretical top-down projections at global and regional levels, and are downscaled to derive estimates for individual countries. While these figures have begun to drive global discussions on transport policy, they offer limited utility in informing policies at national and sub-national levels. Thus, it is essential to generate more nationally owned bottom-up projections of transport investment needs, which are currently limited among EST countries.

According to the Asian Development Bank (ADB), total investment flows into Asia totaled roughly \$4.59trn in 2011, with only 22.1% of this investment (\$1.02trn) coming from within the Asia region. ADB’s projected annual transport infrastructure need of \$250bn accounts for roughly a quarter of ADB’s projected annual infrastructure needs of \$800bn; yet, this figure equals nearly a quarter (24.6%) of the actual 2011 investment flows in Asia originating from within the region. Thus, raising required private sector investments in transport in the EST region with regional resources alone is unrealistic, and therefore, it is essential that transport sector in the EST be accessible to private investment from both domestic and foreign sources.

At the same time, many current policies in the EST region limit opportunities for the private sector and foreign direct investment (FDI) to help meet these significant transport infrastructure needs. Though the environment is changing, the bulk of infrastructure investments will likely remain effectively closed to private investment. Many governments, for instance, have vaguely-defined PPP policies that inhibit private participation, while capital controls and illiquid capital markets frequently deter potential foreign investors. Finally, insufficient regulatory and legal systems can increase investor risk and thus reduce the attractiveness of potential private sector investments (Tahilyani, Tamhane, and Tan, 2011).

<sup>5</sup> Regions include East Asia, Southeast Asia, Pacific

<sup>6</sup> Countries include Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Cambodia, PR China, Cook Islands, Fiji, Georgia, India, Indonesia, Kazakhstan, Kiribati, Kyrgyz Republic, Lao PDR, Malaysia, Maldives, Marshall Islands, Micronesia (Federated States of), Mongolia, Myanmar, Nauru, Nepal, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Tonga, Turkmenistan, Tuvalu, Uzbekistan, Vanuatu, Viet Nam

<sup>7</sup> Countries include India, Pakistan, Sri Lanka, Nepal, Maldives, Bhutan, Bangladesh, Afghanistan

Sustainable, low carbon transport is more affordable, safe, equitable and resource-efficient than mainstream transport investments, and reduces private road-based travel of passengers and goods, as consistent with the capacity of transport and ecological systems. A reduced reliance on fossil fuels is likely to create new investment opportunities; for example, the IPCC projects annual investment increases of \$336bn for energy efficiency in transport, industry and buildings from 2010-2029, as compared to business-as-usual investment scenarios (Allen and Kidney, 2014).

A systemic shift to clean urban public transport and non-motorized modes could save more than \$100trn in public and private capital and operating costs between now and 2050 (Replogle and Fulton, 2014). More compact, connected and mass transport-centered urban development could reduce infrastructure capital needs by more than US\$3trn in the next 15 years (The Global Commission on the Economy and Climate, 2014). And sustainable transport commitments made at the Secretary General's 2014 Climate Summit in the areas of urban transport (UITP, 2014), intercity rail (UIC, 2014), electric mobility (UMI, 2014) and aviation (Aviation, 2014), are expected to yield savings of up to \$70trn by 2050 by reducing vehicle, fuel and infrastructure investments (SLoCaT, 2014b).

Before examining potential sustainable low carbon transport funding sources, it is useful to draw a clear distinction between funding and financing, as shown in エラー! 参照元が見つかりません。 :

**Box 1: How are Funding and Financing Distinguished?**

*Funding* constitutes the primary revenue streams used to offset costs or to support various financing options. Revenues can be provided by both the public and the private sector, with common sources including credit, grants, subsidies, and taxes. *Financing* is the means by which capital is serviced and the cost of borrowing is managed. This can be accomplished in a variety of ways (e.g. private finance initiatives can fund public infrastructure projects using private capital at the most advantageous rates).

## B. Potential Funding Sources for Sustainable Low Carbon Transport

Given the scale of required investments described in the previous section, it is clear that traditional financing sources for sustainable low carbon transport infrastructure and services – which include public sector funding, end user costs, official development assistance, and climate finance, among others – will be insufficient in themselves to achieve sustainable development goals and remain consistent with a 2DS scenario, as shown in the following sections.

- The **public sector** has traditionally provided the majority of funding for transport, but the challenge remains to redirect public sector funding from high carbon paradigms toward sustainable low carbon transport. There is general agreement that public sector funding (even aided by development assistance or climate finance) will fall far short of requirements to scale transport infrastructure and services to reduce poverty and expand prosperity.
- **End-user fees** hold significant potential for financing sustainable low carbon transport; for example, broad improvements in fuel economy and quality can be achieved with consumers footing the bill, and applying various Pigouvian taxes can also make crucial contributions to transport activities (SLoCaT, 2014a). However, measures to increase end-user fees are often met with political opposition, and they are considered to be difficult to implement.
- The world's eight largest multilateral development banks (MDBs) made a voluntary commitment of \$175bn to sustainable low carbon transport investments over ten years; yet, it is estimated that this pledge will cover at most 3-4% of required investments in the coming

decade (UN News Centre, 2014). Thus multilateral and bilateral channels for **official direct assistance** (ODA) must increasingly leverage funding from private sector and institutional funders to meet critical transport investment needs (ADB, 2014).

- The transport sector has received a small share of funding from **climate instruments**, which totals an estimated \$1.5bn to date (SLoCaT, n.d.) This is largely due to complex reporting requirements for climate projects, and high transaction costs for measuring and verifying transport projects tends to reduce financial attractiveness. At present, funding from climate instruments is simply too limited to create transformational change in the transport sector.

In sum, funding from each of the above sources will almost certainly be insufficient to meet the growing demand for transport-associated development ambitions in EST countries, and thus increased private sector financing will be required to bridge the transport investment gap.

The private sector contributes to economic development by generating jobs, investing in new technologies, and enhancing productivity. This is particularly true in the Asia/Pacific region, where much recent success in poverty reduction has been due to economic growth stimulated by the private sector; however, development challenges and investment needs of the region remain large and diverse (ADB, 2014). Box 2 establishes a basic context for private sector financing.

#### Box 2: What is Private Sector Financing?

The private sector can help to fund local government investments through a number of creative financing arrangements, particularly through commercial banks and institutional investors like insurance companies or pension funds. Private sector financing in sustainable low carbon transport is often undertaken in combination with financial and/or non-financial support from the public sector. Toll bridges are a common example of private sector financing, i.e. a bridge is built using private sector capital and expertise, and a toll is charged to pay back the private sector entity under a contract or franchise issued by the public sector.

Private sector involvement in sustainable low-carbon transport can be desirable for a number of reasons. First, the private sector can provide needed capital to help to fill global and regional investment gaps in sustainable transport. Next, the private sector can bring expertise and efficiency to build capacity in less-developed countries and sectors. Finally, the private sector can contribute to risk sharing in providing needed transport infrastructure and services.

Private sector involvement in sustainable low carbon transport can be applied in the EST region through a number of strategies, including the following:

- **Public-private partnerships (PPPs)** combine the skills and resources of the public and private sectors, which enables government entities to benefit from the expertise of the private sector, while focusing on policy, planning and regulation (PPPIRC, n.d.)
- **Bond financing** can help drive a broad modal shift to low carbon transport for several reasons: capital is available; interest rates are favorable, and required solutions to scale up low-carbon transport are well established (CBI, 2014)
- **MDBs private sector operations** can help to drive sustainable low carbon transport investments by supplementing private sector resources through grants, loans and equity, and by building organizational capacity through technical assistance

An investigation these three strategies to increase private sector involvement is the central focus of this paper. This paper focuses primarily on transport infrastructure rather than operations and maintenance (while acknowledging that the latter hold significant potential for private sector involvement). Similarly this paper focuses on debt rather than equity financing (while

acknowledging that much informal transport in Asia is equity financed) for two reasons. First, equity financing involves higher volatility and thus bears the potential for high return, while transport investments provide linear revenue models and thus more modest investor returns. Second, the biggest drivers of infrastructure investments are institutional investors, which typically seek long-term, low-risk returns. Finally, this paper focuses primarily on passenger transport, with an intention to cover freight transport more fully in forthcoming research.

For maximum impact, private-sector investment must also be leveraged through contributions by indirect beneficiaries (which often include the private sector) through the use of compulsory or voluntary fees to develop transit infrastructure and services (e.g. France's *versement transport* scheme, Business Rates Supplement to London's Crossrail) and thus drive behavior to reduce externalities. An exploration of this and other potential funding sources is also essential; these topics are expected to be addressed through the forthcoming SLoCaT Financing Framework.

Despite investment needs, barriers often limit private investment in sustainable transport, due to the often less attractive risk profiles of such projects as compared to BAU alternatives (due in part to government policies that fail to capture full costs of carbon-intensive road-based transport) (Ang and Marchal, 2013). In addition, the private sector requires a predictable and stable investment environment, and the high level of political involvement in the transport sector can be an obstacle to this requirement. These factors stress the need to increase ambition to incorporate private sector financing strategies to scale up sustainable low carbon transport in the EST region.

### C. Study Goals

This study contributes technical input to policy consultation and discussions at the Eighth Regional EST Forum by providing an overview of private sector funding for sustainable low carbon transport infrastructure and services in the EST region and a set of recommendations for achieving the goals of the Bangkok 2020 Declarations. Out of the twenty goals of the Declaration, few place sole funding responsibility on government; for the majority of the others, costs can be at least partially transferred to private-sector entities (Huizenga, 2011). However, the public sector cannot divest its responsibility for developing policies and creating enabling environments to facilitate an affordable transition to sustainable low carbon transport paradigms.

To help achieve the goals of the Bangkok 2020 Declaration, this study undertakes several primary tasks. First, the study gives an overview of PPP regulations among global leading countries, including specific case studies for select EST countries. Second, the study explores trends and opportunities for bond financing to drive transport development. Third, the study summarizes channels for financing sustainable low carbon transport through private sector operations of multilateral development banks. Finally, the study provides a set of questions to guide policy makers in EST countries in formulating more ambitious policies to expand the use of private sector financing in providing sustainable low carbon transport infrastructure and services.

## II. Public-Private Partnerships

Public-private partnerships (PPPs) are one potential strategy for scaling up sustainable low carbon transport infrastructure and services in the EST region, which allow the public sector to engage the private sector in sharing efficiency and expertise, managing project risks, and optimizing life cycle costs, in addition to helping to provide needed capital.

The following key questions can be used to guide the investigation and assessment of PPP policies and projects in the transport sector:

- How do PPPs operate, and what are the potential benefits and risks involved with this model of financing for transport?
- What are the different types of PPP and the context of their use, and what factors are most important in defining readiness or success of PPP policies and projects?
- How have PPPs been implemented through policies and projects within the EST region and beyond? Has substantial progress been made via PPPs in the past five years?
- Are PPPs suitable for realizing all modes of sustainable low carbon transport, or are some types of project better suited than others to this type of structure?
- What are the key learnings for EST countries from international best practices in PPP?

## A. Background on PPPs

### 1. General Principles of PPPs

PPPs are designed to combine the skills and resources of the public and private sectors to deliver facilities and services that are traditionally procured and delivered by the public sector. By harnessing the expertise and efficiencies of the private sector to develop transport infrastructure and manage transport operations, PPPs can enable governments to focus instead on the more primary responsibilities of policy, planning and regulation (PPPIRC, n.d.b).

A PPP is generally structured so that the public sector entity seeking to make a capital investment does not incur any borrowing; rather, PPP borrowing is incurred by the private sector entity implementing the project and therefore, from the public sector's perspective, a PPP is an "off-balance sheet" method of financing new or improved public sector assets through a shared set of responsibilities (EIB, 2011).

In general, a project is financially viable for a private entity if revenues generated provide a sufficient return on investment; on the other hand, PPP viability for the public entity depends on its efficiency in comparison with financing the project with public funds. Even if the public entity could borrow money on more favorable terms, other factors may offset this particular advantage.

Typically transport PPPs have been particularly suited to megaprojects such as expressways and motorways, bridges, high-speed rail and tunnels. However, there are a growing number of new style PPPs that are better suited to low carbon transport projects.

### 2. Benefits and Risks of PPPs

PPPs contain a number of wide-ranging benefits and risks, as summarized in the following table, which must be carefully considered before pursuing PPP strategies for sustainable low carbon transport infrastructure and services.

Importantly, the private sector entity is expected to bear a substantial part of common risks in a PPP project, including the following:

- *Political risk*, especially in countries that have less stable and predictable political systems
- *Technical risk*, especially construction difficulties (e.g. unforeseen soil conditions, equipment breakdown)
- *Financing risk*, including fluctuation in interest rates and raw material pricing, overly-optimistic cash-flow forecasts, and cost overruns (Denton Wilde Sapte LLP, 2006)

However, it is important to note that due to optimization bias, substantial cost escalation is a global trend, with an average cost overrun of 45% for rail projects, 34% for tunnels and bridges, and 20% for roadways. Public transport projects are particularly liable to overruns, as fares are usually set low to accommodate needs of the general public, which in turn restricts revenue generation and affects long-term operations and maintenance needs (Flyvberg, Holm, and Buhl, 2003).

Additional benefits and risks of PPP are shown in Table 2 (PPPITC n.d.a):

<b>Benefits of PPP</b>	<b>Risks of PPP</b>
Accelerating delivery of transport infrastructure that would take longer to deliver by public sector alone	Additional costs for PPP development, bidding, and procurement processes may affect VFM
Applying innovation and skill of private sector to increase quality of public transport services	Finance is only available when there is a sound revenue stream from the transport investment
Developing economic diversification in transport asset construction and operation	Status and quality of PPP transport projects are subjected to political and social contingencies
Increasing budgetary certainty and extracting long-term value-for-money (VFM) through risk transfer	Government remains accountable to quality of transport services/performance of private operator
Supplementing limited public sector capacities by leveraging local private sector capabilities	Increased private sector control over transport projects may cause imbalance between partners

**Table 2: Benefits and Risks of PPPs**

Furthermore, Sclar (2000) argues that there are additional drawbacks that frequently impact PPPs:

- *Institutional knowledge*: Private bus companies may be adept at operating intercity routes but may not be familiar enough with a transit system to integrate with core intracity routes
- *Cost of oversight*: Agencies frequently overlook the high cost of ensuring that work gets done correctly, as it is very difficult to capture each key detail in a PPP contract
- *Moral hazard*: Unlike public operating agencies, private sector companies may have little accountability to the riding public, who is not its ultimate client

In sum, PPPs can contribute to transport infrastructure and services by ensuring financial stability through risk allocation and economic diversification. This is especially beneficial in large-scale projects with high investment requirements for construction, operation, and maintenance (e.g. municipal-scale metro projects). Nevertheless, PPP quality is sensitive to political conditions as well as potential contingencies; thus, the preparatory stages of PPP projects are crucial in defining responsibilities of all participants, to compensate for unfavorable conditions or early termination.

## **B. Types of PPPs**

PPP are arranged under a number of different models, with varying levels of private sector involvement, and thus varying degrees of potential reward and risk, as shown in Figure 1:PPPIRC, n.d.c):



Figure 1: Spectrum of PPP Agreements

The following sections describe some of the more common types of PPPs:

### 1. Concessions

According to the Public-Private Partnership in Infrastructure Research Center, a concession gives an operator the long-term right to use all assets conferred on the operator, including responsibility for all investments. Asset ownership remains with the authority, and assets (including those purchased or improved by the operator) revert to the authority at the end of the concession period. Under a concession, the operator typically obtains its revenues directly from the consumer.

A concession generally covers an entire infrastructure system, and thus may involve an operator taking over existing assets, as well as building and operating new assets (PPPIRC, n.d.b). Long-term concessions are particularly effective in facilitating flexibility during development of projects in which the public is willing to pay directly for services (e.g. urban public transport) (Bitran, 2012). EST region examples of concession PPPs within the transport sector include the Delhi Noida Bridge in India and the expansion of the Colombo Port Facilities in Sri Lanka.

### 2. (Design) Build-Operate-Transfer ((D)BOT)

A (D)BOT model is typically used to develop a discrete asset (rather than an entire network), which is generally new or greenfield in nature. In a BOT project, the operator generally obtains its revenues through a fee charged to the utility or government rather than tariffs charged to consumers (Denton Wilde Sapte LLP, 2006). EST region examples of (D)BOT projects include the Republic of Korea's Seoul Metro Line 9 and Malaysia's KLIA Ekspres.

A build-own-operate-transfer (BOOT) structure differs from BOT in that the private company owns and operates the facility during the concession period, with the prime goal of recovering investment costs through a high margin of return. The specific characteristics of BOOT make it suitable for infrastructure projects like highways, roads, mass transit, and rail transport that have importance for social welfare but may not be attractive for other types of private investment (Gatti, 2007). Examples of BOOT include the Sydney Harbour Tunnel.

### 3. Build-Lease-Transfer (BLT)

Under a BLT model, a private entity builds a complete project and leases it to the government (or a third party); thus, project ownership remains with shareholders but operational purposes are leased. After the expiry of the leasing, ownership of and operational responsibility for the asset are transferred to the government at a previously agreed price. BLT may provide favorable conditions for foreign investors taking country risk into account, because the project company maintains property rights while avoiding operational risk (Partneritetet Kosova, n.d.). The BLT model was used to finance infrastructure investments for the Metro Rail Transit Line 3 in Manila, Philippines, with operations handled under a separate operating contract.

Table 3 provides a comparison of the PPP types described above:

<i>PPP Model</i>	Concession	(D)BOT	BOOT	BLT
<i>Asset Ownership</i>	Public	Public	Private	Private
<i>Contract Duration</i>	Long (20-30 years)	Long (20-30 years)	Long (20-30 years)	Medium (10-15 years)
<i>Private Sector Responsibility</i>	Design, finance, construct, manage, maintain	Design, finance, construct, manage, maintain	Design, construct, own, manage, maintain, transfer	Capital expenditures
<i>Private Sector Risk</i>	High	High	High	Low-Medium
<i>Compensation Terms</i>	Tariff Revenue	Tariff Revenue	Tariff Revenue	Pre-set lease from government
<i>Project Type</i>	Brownfield/ Expansions	Greenfield	Greenfield	Greenfield

**Table 3: Comparison of PPP Types**

For PPP projects in the transport sector, availability payments are commonly used as a means to reduce risk for the private sector. Availability payments are made by the public sector to the private concessionaire based on project milestones (e.g. completing construction by a given deadline) or performance standards (e.g. service quality, maintenance management). Under this arrangement, the private concessionaire bears less overall risk, as it no longer relies on achieving specified levels of ridership and/or revenue; instead, it expects a predictable, fixed payment over the life of the PPP contract. Availability payments have been used extensively in rail, bus, and BRT projects in Australia, Canada and Europe (AASHTO, n.d.).

### C. Global PPP Transport Policies and Projects

Australia and the United Kingdom have been early global leaders in PPP policies and projects, and thus have relevant lessons to share within and beyond the EST region.

#### 1. Australia

*Policy: National Public Private Partnership Policy (2008)*

PPP in Australia has evolved considerably since it was introduced in the 1980's and is now used to deliver services in a broad range of sectors, including roadways, railways, and airports. The Australian PPP market has a reputation for transparent procurement, which has resulted in greater opportunities for the PPP model to deliver value-for-money outcomes as compared to conventional procurement (Japan External Trade Organization, 2010).

The widespread use of PPP is now being facilitated with the National Public Private Partnership Policy of 2008, which is supported at the state and territory levels by dedicated PPP units to oversee non-federal infrastructure projects. Australia faces significant infrastructure investment needs from 2010 to 2020, estimated at up to \$645bn. Even if only 15% of these investments were to use PPP models, a market investment of approximately \$96.5bn would be required, which is beyond the reach of Australian PPP markets for both human and financial capital.

Thus, to deliver these planned investments, the Australian PPP market will depend upon greater involvement from international private sector entities (e.g. financiers, contractors, and operators). This need is likely to increase as the Australian PPP market continues to evolve toward new market sub-sectors (e.g. urban rail, renewables), which rely increasingly on more integrated technical solutions.

*Project: Sydney Harbour Tunnel (1987)*

One of the earliest examples of PPP in Australia, the Sydney Harbour Tunnel is a 1.4-mile underwater link between North Sydney and the Sydney Central Business District. The tunnel was built between 1987 and 1992 at a cost of \$646mn, and was financed and delivered through a BOOT arrangement, the first of its kind in the state of New South Wales (NSW), which was selected to close the gap between infrastructure requirements and financing ability.

In 1987, the NSW government selected a consortium consisting of the Australian conglomerate Transfield and the Japanese construction company Kumagai Gumi, each with a 50 percent stake in the joint venture. The contract provided for a five-year construction period and a 30-year operating period; thus, the tunnel will be handed over as an asset to the NSW government when the contract ends in 2022 (AECOM Consult, 2007).

*Project: Melbourne Train and Tram System (1999)*

In 1999, in pursuit of greater efficiency, the Victorian Government split Melbourne's train and tram system into five franchises, conducting a competitive tender for each franchise, and awarding them to three private sector franchisees for periods of 12-15 years. However, it soon became clear that some of the franchisees' revenue and cost targets had been unrealistic, and thus several franchisees experienced financial difficulties, which jeopardized their viability.

By 2002, the franchisees' financial difficulties had become acute, and one franchisee withdrew from its three franchises. The government immediately appointed receivers to operate these three businesses and negotiated interim operating agreements with the two other original franchisees. After a detailed process, the government restructured the metropolitan system into one train and one tram franchise, and awarded the two current franchises through bilateral negotiation rather than competitive tender, with the Department of Infrastructure managing these franchise agreements for the government (PPPIRC, n.d.d.).

## **2. United Kingdom**

*Policy: Private Finance Initiative (1992)*

In 1992, the UK embarked upon a new type of public-private partnership, known as the Private Finance Initiative (PFI). Under the PFI, private sector firms take on the responsibility for providing a public service, including constructing, maintaining, or enhancing necessary infrastructure. As of 2013, 725 PFI projects had been let in the UK with a total capital value of £85.9bn, including 665 projects in operation (HM Treasury and Infrastructure UK, 2013).

The success of PFI can be judged in relation to conventional public sector procurement projects, which are often stifled by incomplete cost projections, weak risk management procedures, and insufficient incentives for success (e.g. the public sector-led 1999 London Underground Jubilee Line extension was delivered two years late with cost overruns of \$2.2bn). One of the key benefits of PFI has been to focus attention on optimizing risk sharing between the public and private sectors (Corner, 2006).

*Project: London Underground (2003)*

Sound PPP policies do not always guarantee optimal project outcomes, as demonstrated by the attempted privatization of the London Underground.

In the late 1990s, there was general agreement to prioritize investment in the Underground to improve service and meet modern standards. The Labour Government that took office in 1997 proposed a PPP model to achieve these ends, facing opposition from unions, safety campaigners

and the then-Mayor of London, Ken Livingstone, who proposed an alternative financing strategy through bond issuance against future fare revenues, which was in turn rejected by the Treasury.

Mayor Livingstone was ultimately unsuccessful in his challenge, and the PPP proposal went forward in 2003. The project was considered successful in terms of improving day-to-day performance by renewing system assets (e.g. tracks, stations, lifts). However, the Metronet consortium admitted to having overspent more than \$1.23bn and sought an infrastructure service charge increase of \$872.8mn. In 2008, Metronet transferred the administration to Transport for London (TfL), and the PPP officially collapsed in 2010 when TfL bought out the private companies in the consortium to bring the system under public ownership, at a cost of \$7.07bn (Butcher, 2012).

In sum, robust PPP frameworks in Australia and the UK have facilitated many successful infrastructure projects, but still reveal limitations in human and financial capital, and in successful selection of private sector partners. Key learning is that successful PPPs need to have experienced managers in the public sector and joint risk sharing arrangements, in addition to a clear understanding of the different roles and responsibilities of various stakeholders.

#### D. EST Region PPP Transport Policies and Projects

Countries in the EST region have begun to recognize PPP as a policy priority. Japan, the Philippines, the Republic of Korea and Thailand were among the early adopters of PPP legislation in the EST region during the 1990's, and institutional and legislative development of PPP has continued to grow in subsequent decades. Today, more than 20 EST countries have incorporated PPP initiatives into national development policies and 13 countries have established central units to facilitate PPP projects for infrastructure development, as shown in Table 4:

Host Country	Type(s) of Partnership	Regulated Sector(s)	Regulation/Legislation	PPP Unit/Agency
<b>Afghanistan</b>	N/A	N/A	N/A	Ministry of Public Health-Public Private Partnership Unit
<b>Bangladesh</b>	BOT	Freight & Logistics, Port, Road Infrastructure	Policy and Strategy for Public Private Partnership (PPP) (2010)	National Private Infrastructure Committee
<b>Brunei Darussalam</b>	DB, PPP	Road Infrastructure	Wawasan 2035 Vision National Development Plan	Department of Economic Planning and Development
<b>Bhutan</b>	PPP	Road Infrastructure	Loans/grants from India /MDBs	N/A
<b>Cambodia</b>	PPP	Airport, Freight & Logistics, Rail, Road Infrastructure	Cambodia Build-Own-Transfer Law (1998)	N/A
<b>People's Republic of China</b>	BOT, PPP	Freight & Logistics, Rail, Road Infrastructure	Mid- and Long-Term Railway Development Plan (2004)	China Center for Public-Private Partnership (not centralized)

<b>Indonesia</b>	PPP	Airport, Port, Rail, Toll Roads	Presidential Reg. No. 67 (2005).Ministry of Planning Reg. No. 3 (2012)	PPP Directorate of Bappenas
<b>India</b>	BOT	Airport, Bus, Freight & Logistics, Port, Rail, Road Infra, Toll Roads		State PPP units under the Department of Economic Affairs
<b>Japan</b>	BOT, PFI	Port, Rail, Road Infra, Toll Roads	Private Finance Initiative Promotion Act (1999)	PFI Promotion Committee
<b>Lao PDR</b>	PPP	Road Infrastructure		Ministry of Public Works and Transport
<b>Malaysia</b>	BOOT, PPP	Airport, Port, Rail, Roads, Toll Roads	Guidelines on Public Private Partnership (2009)	Unit Kajasama Awan Swasta
<b>The Maldives</b>	N/A	Airport, Port, Road Infrastructure	N/A	Public-Private Infrastructure Advisory Facility (PPIAF)
<b>Mongolia</b>	BO(O)T, BT, BOO, DEFO, PFI	Road Infrastructure	Concession Law of Mongolia (2010)	Ministry of Economic Development
<b>Myanmar</b>	BOT, PPP	Airport	N/A	N/A
<b>Nepal</b>	BOT, PPP	Rail, Road Infrastructure	N/A	N/A
<b>The Philippines</b>	BOT, PPP	Airport, Rail, Road Infrastructure	The Philippine BOT Law (revised 2012)	Public-Private Partnership Center of the Philippines
<b>Pakistan</b>	BOT, PPP	Port	Pakistan Policy on Public Private Partnerships	Infrastructure Project Development Facility
<b>Republic of Korea</b>	BTL, BTO, DBFM/DEFO, PPP	Bus, Port, Rail, Road Infrastructure and Toll Roads	Act on Private Participation in Infrastructure (1998)	Public and Private Infrastructure Investment Management Center
<b>The Russian Federation</b>	BTO, PPP	Airport, Rail, Road Infrastructure	<u>PPP Federal Legislation on PPP</u>	PPP Center of Vnesheconombank (VEB) and the PPP Development Center (no central unit)
<b>Singapore</b>	DB, PPP	Road Infrastructure	PPP Handbook	Performance & Resource Management Directorate, Ministry of Finance
<b>Sri Lanka</b>	BOT	Freight & Logistics, Port, Rail, Road Infrastructure	Public Utilities Commission of Sri Lanka Act (2002)	PPP Unit under the Ministry of Finance
<b>Thailand</b>	BOT, BTO	Rail, Road Infrastructure	Private Investment in State Undertaking Act (2013)	Committee of Private Investment in State Undertakings

<b>Timor-Leste</b>	BOT, PPP	Airport, Port	RDTL Decree-Law 42 (2012)	Public Private Partnership Unit, Ministry of Finance
<b>Vietnam</b>	BOT, BTO	Port, Rail, Road Infrastructure	N/A	Ministry of Planning and Investment, PPP Task Force

**Table 4: PPP Policies in EST Participant Countries**

Due to the large variance of socio-economic and political conditions across the EST region, work to assess overall trends of PPP development in the region has been limited. For example, certain countries (e.g. China, Brunei Darussalam, and Myanmar), have a long history of public funding in development policies, and thus require a more gradual shift toward a PPP framework. In countries with sector-specific infrastructure needs (e.g. Maldives tourism, Afghanistan social sector), few projects have been developed in the transport sector. And while some countries have adopted PPP laws, not all legislation provides sufficient regulations on different stages of PPP development; for example, Cambodia’s Law on Concessions, enacted in 2007, provides little detail on contract standards, risk allocation requirements, and managerial measures in case of early termination (ADB, 2012a).

PPP transport investment trends in the EST region are mixed. In the World Bank’s East Asia and Pacific region, 2012 showed increased PPP investment levels of 19% over 2011 (and comprised nine percent of global investment); however, the number of newly closed projects dropped from 112 to 64. Eight transport projects in the region reached closure in 2012 with a total investment of \$3.5bn (e.g. China, Hangzhou Metro Line 1, \$1.31bn; Indonesia, Cikampek Palimanan Toll Road, \$1.30bn; Philippines, seaport terminal, \$50mn) (Infrastructure Policy Unit, 2013).

Similarly, in South Asia, total PPP investments decreased by 20% in 2012, though 60 PPP transport projects reached financial closure, with a total investment of \$18.9bn; all of these were road projects in India (e.g. Kishangarh Udaipur Ahmedabad Expressway, \$3.4bn; Ahmedabad Vadodara Super Express Tollway, \$1.8bn) (Infrastructure Policy Unit, 2013). Several bus rapid transit (BRT) projects are included among PPP projects, including proposed projects in Vientiane, Laos, and Karachi, Pakistan (ADB, n.d.c; ADB, n.d.e).

Despite shortcomings, PPP development offers potential for the EST region. As Asia continues to reinforce its role as a major economic force, many countries are transitioning to more transparent, open economies that are favorable for PPP development.

The following case studies present a broad survey of PPP policies and projects from the Republic of Korea, India, Malaysia, The Philippines, and Thailand, representing a diversity of geographies, economies, and project types.

### **1. Republic of Korea**

#### *Policy: Act on Private Participation in Infrastructure (1998)*

The Republic of Korea enacted the Act on Promotion of Private Capital Investment in Social Overhead Capital in 1994 to regulate implementation of PPP projects. This was followed by the Act on Private Participation in Infrastructure in 1998, which defines eligible infrastructure types, procurement processes, public and private responsibilities, and policy support (Kim/Lee, 2013).

In 1995, just after PPP projects were introduced, \$366,000 was invested in PPP projects (mostly BOT projects), equal to just 0.5% of the public investment in social overhead capital (SOC) projects (e.g. roads, schools, hospitals, public parks). However, from 1995 to 2010, \$24.2bn was invested in PPP, accounting for more than 10% of public investment in SOC projects annually.

*Project: Seoul Bus System Reform (2004)*

For several decades, bus services in Seoul were operated by competing private bus companies, with virtually no government oversight of bus routes, schedules, or other service features. Most private bus firms sought to maximize profits at the expense of rider safety and comfort; as a result, bus vehicles tended to be poorly maintained, and bus services were often uncomfortable and unreliable. The Seoul Metropolitan Government's subsidy for private bus services rose from \$9mn in 1999 to \$110mn in 2002, amidst an increased need for bus services (Kim/Lee, 2013).

In July 2004, the government introduced a “semi-public operation system,” and thus established a joint management system to integrate bus routes, schedules, fares, and system design. Revenues are now divided between each participating company's operational records, and bus firms are now reimbursed on the basis of vehicle kilometers instead of passenger trips (i.e. as simple form of availability payment which could be replaced by a more sophisticated performance indicator). The Seoul Bus Reform PPP is a unique joint-management model in which the government controls infrastructure planning and overall management, while the private sector helps to determine route adjustments, service schedules, and issuance of operator licenses, through a joint consultative body with the city government (Pletcher et al., 2005; Kim and Kim, 2012).

The reform has successfully revitalized the public transport market in Seoul by improving multi-modal connections between the bus and metro systems, reducing competition among private bus operators and providing financial stability. By centralizing management responsibility, the bus system was able to diversify services, extend operating hours, and maintain higher-quality infrastructure (Lee, 2014).

*Project: Seoul Metro Line 9 (2007)*

The Seoul Metro Line 9 is another notable application of PPP in the Republic of Korea. The city, which runs its eight existing metro lines by local administration, decided in 2005 to entrust the operation of its ninth metro line to the Seoul Metro Line 9 consortium, which includes a set of manufacturers led by the South Korean Hyundai-Rotem group, and a set of financial investors led by the Macquarie group. In June 2007, Veolia Transport signed a 10-year contract to operate line 9 of the Seoul metro, representing the first private operation of a metro line in Seoul (Veolia Transport, 2009).

## **2. India**

*Policy: Decentralized National Model, Strong State Programs*

PPP projects are well established in India, despite the fact that there is no PPP act at the federal level. This decentralized model leads to a certain amount of regional variation, as enabling legislation varies from area to area. Recently, several national bodies have increased involvement in defining PPP structure (e.g. Committee on Infrastructure, PPP Unit of the Department of Economic Affairs). While the overall framework is still evolving, risk allocation has been improving since the introduction of Model Concession Agreements in 2004, which emphasizes the importance of balancing obligations between parties, allocating risks and returns, formulating precise costs, and clarifying issues pertaining to risk reduction (EIU and ADB, 2011).

Following a Supreme Court ruling in 2009, awarding of PPP projects has been subject to additional transparency requirements (e.g. pre-feasibility analysis, financial viability, PPP suitability), which has created a more objective though more time-consuming process. Dispute resolution takes place through either “amicable settlement” or arbitration, and foreign bidders may make use of international arbitration. Government agencies have a relatively high level of proficiency in PPP projects, and multilateral agencies have provided additional assistance.

*Project: Gujarat State Rural Roadways (ongoing)*

Gujarat is one of India's most advanced states in terms of PPP arrangements, having established a project framework through the Gujarat Infrastructure Development (GID) Act of 1999. The GID Act provides clarity that is lacking in the emerging national framework, emphasizing oversight responsibilities and providing a dispute resolution mechanism under the 1992 Contract Disputes Arbitration Tribunal Act (EIU and ADB, 2011).

In July 2014, the Gujarat government announced an ambitious project to connect every village of Gujarat with a rural road network, and in the process has successfully leveraged an unprecedented degree of NGO engagement. In building a foundation for PPP, Gujarat has appealed to local sugar factories, dairies, co-operative societies and Agriculture Produce Marketing Committees to contribute toward road building efforts in their respective areas (Press Trust of India, 2014). The project, which involves widening roadway segments of a combined length of 85 km, is expected to increase rural accessibility and facilitate local development.

### **3. The Philippines**

*Policy: Republic Act 6957 (1990)/Republic Act 7718 (1993)*

In 1990, the Philippine government passed Republic Act 6957, which authorized public institutions to contract with private parties for the financing, design, construction, operation, and maintenance of infrastructure projects. In 1993, the government passed Republic Act 7718 (also known as the Philippine BOT Law), which revised and expanded the original Act, and a 1998 update revised procurement requirements and introduced competitive-bidding processes (Mandri-Perrott, 2010; EIU and ADB, 2011).

*Project: Manila Metro Rail Transit Line 3 (2000)*

Planning and procurement of Manila's Metro Rail Transit Line 3 (MRT-3) progressed in parallel with the Philippines' 1990 PPP legislation. In November 1991, the Department of Transportation and Communication (DoTC) signed a contract with the Epifanio de los Santos Avenue Light Rail Train consortium (EDSA LRT), the only qualified bidder under the project selection criteria.

Both Republic Acts 6957 and 7718 required a BOT concession structure because EDSA LRT was a foreign-owned entity and was therefore legally forbidden from operating the system, which it instead leased back to DoTC for operations. Hence, MRT-3's contract established that EDSA LRT would finance, design, construct, and maintain the MRT-3 system in exchange for regular lease payments from DoTC to service debt, provide equity returns, and fund maintenance.

The MRT-3 project attracted strong ridership when in July 2000, the Philippines' then-president directed DoTC to reduce MRT-3 fares in celebration of the system's full operational debut. This discount was intended to last only six months, but eight years later, MRT-3's fares remained virtually unchanged. As a result, growing operating losses and delayed government subsidies have regularly prevented DoTC from meeting its obligations, and by 2007, DoTC was behind \$35mn in equity rental and \$8mn in maintenance payments.

Although MRT-3 ridership exceeds its design capacity, system fares still do not allow DoTC to generate sufficient revenue to cover lease payments without government subsidies. The national government has taken over operation and maintenance and is working to buy back the MRT-3 concession to reduce future subsidies associated with MRT-3's private financing structure. (Calica, 2014; Mandri-Perrott, 2010).

Thus, although the Philippines was among the earliest adopters of PPP in the EST region, this project has suffered from political interference which has led to no further investment in the system by the private sector and much wrangling between the two parties.

#### 4. Malaysia/Singapore

*Policy: 10<sup>th</sup> Malaysia Plan PPP Initiative (2011-2015)*

PPP has existed in Malaysia since the 1980s as a result of a global economic recession that caused the government to seek assistance from the private sector. As of 2012, the government was undertaking 52 PPP projects with an estimated value of \$19.3bn. The 10th Malaysia Plan's PPP initiative focuses on improving basic infrastructure in Kuala Lumpur, including public transport (PricewaterhouseCoopers, 2012).

*Kuala Lumpur Mass Rapid Transit (2017, expected)*

The mass rapid transit (MRT) system in greater Kuala Lumpur is the largest infrastructure BOT project in Malaysia to date, with estimated private investment of \$12.3bn. Project implementation began in 2011, and project completion is expected in 2017. Malaysia's Land Public Transport Commission will act as the supervising agency, while government-owned asset owner Prasarana has appointed a separate system operator and project delivery partner (PricewaterhouseCoopers, 2012). In addition to alleviating traffic congestion, the MRT system will significantly improve regional access and coverage, and will create more than 130,000 local jobs (Economic Transformation Programme, 2011).

*Kuala Lumpur-Singapore High Speed Rail (2020, expected)*

In February 2013, Singapore and Kuala Lumpur announced plans to build a new HSR link to improve connectivity between the two countries, which is to be built on the basis of private sector funding with the respective governments providing structural support and participation (The Star Online, 2013). The link, which is expected to be operational by 2020, will reduce rail travel time between the cities from six hours to around 90 minutes. The 400km HSR project is estimated to cost \$12.5bn, including \$3.1bn for high-speed train sets. In April 2014, Singapore's Land Transport Authority (LTA) issued a call to conduct an engineering feasibility study, which is slated for completion in the first quarter of 2015, and should be informed by key learning from PPP projects to date in the EST region (Railway-technology.com, 2014).

#### 5. Thailand

*Policy: Act of Private Participation in State Undertakings (1992)*

In 1992, Thailand adopted the Act of Private Participation in State Undertakings, which offers a broad interpretation of PPP projects for any relevant activity with a value of over \$34mn. The Act does not deal directly with procurement methods, selection criteria, or risk allocation; the latter proved to be a problem in the case of the debt workout required to complete the Bangkok Skytrain project (EIU and ADB, 2011).

In 2013, Thailand passed a new law that aims to establish a clearer procedure for both foreign and domestic investors in PPP projects. The Thai government expects the new provisions to allow companies to break ground on new projects in 10-12 months on average (versus 20-30 months under previous legislation) (World Finance, 2013).

*Project: Bangkok Skytrain (1999)*

The Bangkok Skytrain was based upon a preliminary analysis concluding that an elevated network represented the lowest-cost solution to the city's extreme traffic congestion. The Skytrain opened in 1999, as a full concession among parties including the public Bangkok Metropolitan Administration (BMA) and the private Bangkok Transit System Corporation

(BTSC). Despite relatively high service quality, the Skytrain failed to meet expectations for several reasons:

- *Overly-optimistic ridership forecasts:* While original estimates predicted roughly 500,000 rides per day; initial ridership was roughly 150,000 daily rides, and two years later, ridership levels had reached only 300,000 daily rides. More than 10 years later, in August 2013, the Skytrain had finally reached an average daily ridership of roughly 600,000, due in part to the benefit of subsequent line extensions, improved station access and competition from the Bangkok Metro, in addition to 15 years of demographic change (The Nation, 2014).
- *Adverse macroeconomic conditions:* The Asian financial crisis of the late 1990s impacted revenues and increased borrowing costs. Prior to revenue service, BTSC negotiated an increase to offset the impact of the crisis, resulting in a distance-based fare, instead of the flat fare system proposed in the original agreement.
- *Poor integration with other transport modes:* During the time of Skytrain planning and implementation, coordinated planning between public entities in Bangkok was deficient or lacking entirely (e.g. The Ministry of Transport exercised control over the city’s bus system, the State Railway of Thailand controlled rail projects, and the City of Bangkok oversaw the Skytrain project) (Mandri-Perrott, 2010).

Debt and equity investors in the Skytrain project eventually suffered considerable losses, and the system underwent a court-supervised financial restructuring 10 years after the start of operation. Despite difficulties with Skytrain’s concession arrangement, the system continues to deliver high quality public transport services.

To summarize, Table 5 provides a synthesis of select PPP projects in the EST region, including project characteristics, successes, and challenges:

Host Country	India	Rep. of Korea	Malaysia	The Philippines	Thailand
Name of Project	Gujarat State Rural Roadways	Seoul Bus System Reform	Kuala Lumpur MRT	Manila MRT 3	Bangkok Transit System

<b>Public Partner</b>	State Govt of Gujarat	City Government of Seoul	Government of Malaysia	Department of Transportation/Communication	Bangkok Metropolitan Administration
<b>Private Partner</b>	TBA	Private bus firms	Prasarana	Metro Rail Transit Corporation	Bangkok Transit System Co.
<b>Type of Contract</b>	TBA	Joint Management	BOT	BOT	BOT
<b>Total Cost (mil USD)</b>	TBA	N/A	12,300	655 (initial)	1,300-2,000
<b>Status (Nov 2014)</b>	Announced	Operating	Constructing	Partnership terminated	Operating
<b>Start Year</b>	TBA	2004	2011	1991	1992
<b>Operation Year</b>	TBA	2004	2017	2000	1999
<b>Franchise Expiry</b>	TBA	N/A	TBA	N/A	2022
<b>Successes</b>	Encourage NGO involvement; Strengthen local private sector development	Enhance management and service quality; Improved customer service	Create more than 130,000 jobs; Contribute to local and national economy	High ridership; Low fare for public interest	Improve service quality; Alleviate air pollution; Reduce traffic congestion
<b>Challenges</b>	TBD (project in planning)	Increased public sector involvement in city transport (vs. greater private sector participation)	TBD (project under construction)	Lack of transparency; Insufficient revenue; Delayed govt subsidies; Mistrust between public/private	Optimistic ridership forecasts; Adverse economic conditions; Poor modal integration

Table 5: Summary of Select PPP Projects in the EST region

From these examples, it is clear that PPP projects in the EST region have shown mixed success to date. Thus, in order to increase private sector involvement in sustainable low carbon transport through PPP models, it is essential to refine government policies, resolve technical limitations, and maximize institutional flexibility using available PPP tools, frameworks and strategies.

## E. Conclusions

Though PPP is often seen as a quick fix for financing transport infrastructure and services, experience has proven that PPP can actually be an expensive strategy, as projects must gain public acceptance, while private sector investors must be reimbursed for their investments. A key factor in the success of PPP is that the public entity revenue scheme be built on the foundation of a sound business model, which must include solid public sector contributions, appropriate end-user fees, and crucially, contributions by private sector beneficiaries of sustainable low carbon transport investments (e.g. France's *versement transport* scheme, Business Rates Supplement to London's Crossrail).<sup>8</sup>

<sup>8</sup> Pourbaix, J., International Association of Public Transport. Oct. 6, 2014. Personal communication.

Australia and the UK have risen to the top of the PPP pack due to their sound mechanisms for handling compensation for early termination and efficient replacement of failed operators (PPP case studies in Latin America also offer key learnings in this area according to World Bank 2012). Although PPP is well established in some EST countries, many countries in the region have yet to establish a sophisticated policy and legislative framework. In contrast to the mechanisms in Australia and the UK, the EST region shows several of areas of concern, including bureaucratic hold-ups, dispute-resolution issues and judicial independence. Moreover, PPP in the region is still largely focused on the port, airport, and rail subsectors, while other sustainable transport modes, such as bus and BRT, still remain a small portion of PPP projects.

Nonetheless, the prospective growth of PPP in the region remains promising, as there have been concerted efforts to bolster institutional frameworks to more clearly define roles for public-sector agencies to enable PPP oversight and planning. New or forthcoming PPP-dedicated units are being established in Japan, Bangladesh, Indonesia, Mongolia, Pakistan, and Papua New Guinea; in addition, the Philippines has recently relocated its PPP unit, Indonesia is developing a new PPP entity within its development agency, and Thailand has adopted a new PPP law with streamlined procedures and clear guidelines for PPP (EIU and ADB, 2011).

To summarize, the following are key criteria for successful PPP policies and projects:

Key criteria for successful PPP legislation and regulation in the transport sector have been compiled by both MDBs and private sector entities, including the World Bank (WB), European Bank of Reconstruction and Development (EBRD), the Economist/Asian Development Bank (ADB), and the Organisation for Economic Co-operation and Development (OECD). These organizations all emphasize the roles of a sound legislative framework, enabling investment conditions, and PPP-focused institutional structure:

- *Sound Legislative Frameworks:*  
Countries should develop effective, stable legal frameworks that can help to outline the roles and responsibilities of all parties within PPP projects, including clear rules defining concessional eligibility, contracting authorities, and scope of application in various sectors. In addition, fair and accessible concession rules and procedures are necessary to ensure equal opportunities throughout a PPP process (Economist Intelligence Unit and Asian Development Bank, 2011; Public-Private Partnership in Infrastructure Research Center, 2012).
- *Enabling Investment Conditions:*  
Successful PPPs require a clear government policy to demonstrate government commitment to provide a stable investment and legal environment (PPPIRC, n.d.f; EIU and ADB, 2011). Clarity in rules, openness in procurement processes and negotiability of concession agreements are crucial in ensuring transparency and flexibility in risk allocation (Jackson, 2012). In addition, governments should offer provisions that allow state guarantees to increase PPP attractiveness through established government support (EBRD, 2012a). For example, removing restrictions on foreign direct investment (FDI) in transport projects, offering tax exemptions for private investors, and guaranteeing against nationalization of assets are key ways of enhancing investment environments for private sector entities.
- *Unifying Institutional Structure:*  
Countries should develop a clear, predictable and legitimate institutional framework supported by competent authorities for PPP, foreign/ private investment, and transport sector in order to minimize project assessment procedures and unify project standards, and

monitoring. Enforceable court or arbitral determinations should also be set up to protect the rights of all parties in the case of disputes (EBRD, 2012a; Jackson, 2012).

In addition, revenue strategies and value-for-money are key factors in determining decisions to go forward with PPP for both private and public sector parties:

- *Revenue Strategies*

Any successful PPP project must be based on secure revenue streams to reimburse private investment. To date, more private sector financing of infrastructure has gone to the energy sector, which provides higher returns on investment; on the other hand, transport is a public good that requires public support regardless of outside investments (e.g. UK example referenced above). Transport agencies must generate revenue streams to attract private sector investment in general (and PPPs in particular); thus, agencies require enabling legislation to allow for private involvement, including value capture strategies (i.e. the public sector may not be suited to play this role, and the private sector may not be allowed to play this role).<sup>9</sup>

- *Value-for-Money*

Institutions with a strong capacity to facilitate PPPs should also play a role in grounding project selections in value-for-money (VfM), which measures the risk-adjusted net present value of a PPP project as compared to the Public Sector Comparator, in order to assess whether the public sector has obtained the maximum benefit from a given investment relative to the resources available to it. Therefore, the heart of any decision to go with a PPP project is whether the risk-adjusted benefits compensate for the higher cost of capital.<sup>10</sup>

In general, it can be said that inconsistent behavior and inexperience in managing the complexities by the public sector is one of the greatest deterrents to investor confidence in PPPs, and one of the main reasons for failure. Having trained and experienced independent advisors and stability at national and sub-national levels is paramount to attracting private sector investment.<sup>11</sup>

Recommendations for increasing the likelihood of success among PPP policies and projects in the EST region include the following:

- Create transparent enabling frameworks for PPP built upon stable governance and dispute resolution mechanisms, to manage risk for the private sector (e.g. Korea's Act on Private Participation in Infrastructure (1998) and India national court ruling, Gujarat State GID Act)
- Ensure coordination among planning and operating entities, and build buffers into technical feasibility studies (e.g. Bangkok Skytrain ridership models)
- Establish robust and diverse project revenue models (including non-farebox revenue) to reduce need for significant government subsidies (e.g. Manila MRT-3)
- Reduce risk from external factors (e.g. macroeconomic shocks) by clearly defining contingencies in initial revenue models (e.g. Bangkok Skytrain fare agreement)
- Increase involvement of local businesses and associations in order to leverage private sector investment for transport infrastructure and services (e.g. Gujarat State rural roadways project)
- Improve access for foreign entities and FDI in PPPs to ensure efficient coordination of transport infrastructure and operations (e.g. Manila MRT-3)

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<sup>9</sup> Allen, H., Transport Research Laboratory. Sep. 26, 2014. Personal communication.

<sup>10</sup> Sayeg, P., Policy Appraisal Services Pty Ltd. Oct. 28, 2014. Personal communication.

<sup>11</sup> Makovsek, D., International Transport Forum. Oct. 1, 2014. Personal communication.

### III. Bond Financing

Bond financing is another potential strategy to engage the private sector in scaling up sustainable low carbon transport in the EST region. The potential contribution of bond financing to sustainable low carbon transport can be framed by the following key questions:

- What is bond financing, and how can it be applied to transport projects?
- How can traditional bond financing help fund a transition to sustainable low carbon transport? What are the potential limitations of traditional bond financing?
- What is the potential for bond financing to fund sustainable low carbon transport in combination with other financing strategies (e.g. PPP, MDB private sector operations)?

#### A. Bond Financing Background

A bond is an instrument of indebtedness under which the bond issuer owes bond holders a debt to generate external funds to finance long-term investments, and is obliged to pay them interest at fixed intervals and/or to repay the principal at a later date. Very often the bond is negotiable (i.e. ownership can be transferred in the secondary market) making it a highly liquid financial instrument (e.g. examples of bonds from the Kowloon-Canton Railway and the State Railway of Thailand show bond prices being traded at extremely low volatility (i.e. less than 2% over tenure of bond)) (O’Sullivan and Sheffrin, 2003; Onvista, 2014; Stock Exchange of Thailand, n.d.).

Bonds and stocks are both securities, the major difference being that stockholders have an equity stake in the company, whereas bondholders have a creditor stake in the company. Bondholders (as lenders) will be repaid before stockholders (as investors) in the event of bankruptcy (O’Sullivan and Sheffrin, 2003). With over \$100trn outstanding, the global bond market is significantly larger than the \$63trn equity market; however, bonds funding sustainable (or “climate-themed”) transport projects (e.g. rail, bus, electric vehicles, bicycles) made up a mere \$358mn (less than 1%) of the outstanding global bond market in 2014 (CBI, 2014). Additional research is required to determine the transport sector share of the global bond market.

The following sections describe the potential and limitations of bond financing to fund a transition to sustainable low carbon transport through both traditional and emerging strategies.

#### B. Traditional Bond Financing Strategies

Traditional bond financing has shown success to date in a number of specific transport subsectors especially heavy rail, with more limited application to highways, tollways, and ports (IAIR, 2014; Chappatta, 2014; WPPA, n.d.). Sustainable low carbon transport has unique attributes that pose additional challenges for the application of traditional bond financing on a broad scale and long-term basis. The recent interest in green or climate bonds presents an interesting opportunity to access additional capital for sustainable transport.

##### 1. Traditional Application of Bond Financing to Transport

The CBI (2014) profiles the existing universe of so-called “climate-themed bonds,” which are defined as bonds whose proceeds are directly or indirectly used for financing a transition to a low carbon economy. As of July 2014, CBI estimates the universe of climate-themed bonds at \$503bn outstanding (i.e. bonds issued but not yet paid to bondholders), with the transport sector making up more than 70% of this universe, with \$358bn outstanding. Table 6 gives an overview of

outstanding bond issuance in key countries, showing a significant share of bond issuance outstanding in the transport sector, relative to total issuance outstanding<sup>12</sup>:

Country	Total Outstanding	Transport Outstanding	% Transport Outstanding
China	\$164bn	\$154bn	94%
UK	\$59bn	\$56bn	95%
US	\$51bn	\$35bn	69%
France	\$49bn	\$40bn	82%
Canada	\$25bn	\$5bn	20%
S. Korea	\$24bn	\$11bn	46%
Russia	N/A	\$16bn	N/A

**Table 6: Climate Bond Universe: Total and Transport Sector Amount Outstanding**

This dominance of the transport sector is mostly due to the inclusion of a number of large rail issuers that have a long history of using bonds to raise finance.

#### *Railway Bonds*

The IEA underscores the importance of rail investment to reduce transport sector emissions, stating that annual rail passenger-km must increase nearly 30% over current trajectories, and that global rail infrastructure would be expected to increase to a total of 1.5mn track-km by 2050 to meet a 2DS scenario (CBI, 2014). National governments must play a major role in meeting this challenge, by creating comprehensive policies to invest in new rail projects and to upgrade existing rail infrastructure. The private sector must also respond to this challenge by providing innovations to drive down costs of future rail investments.

China alone is expected to account for roughly 10% of all global track-km, and up to 60% of high-speed rail track-km through 2030. Despite declining rail investment in other parts of the world, China added 7,000km of track from 2000 to 2010, and by 2011, China had 6,000km of high-speed track, double the rest of the world.

Chinese rail bonds have been an essential component to financing its booming rail infrastructure. China remains the single largest bond-issuing country due to the inclusion of China Railway Corporation, one of the world's largest builders of rail infrastructure, with an outstanding issuance of \$141bn. Due to the density of its urban areas, China has the most intense rail passenger flow in the world (WB, n.d.). Rail investment is equally important for China's freight subsector as a more efficient way to link markets and promote economies of scale (WB, n.d.).

In January 2007, supervisory authorities in China's Central Finance Work Conference called for an increase in the share of direct finance, especially in the area of corporate bonds. Government officials and industry representatives have stepped up efforts to promote alternatives to bank financing, with the expectation of increasing activity in the corporate bond market (Asian Bonds Online, n.d.).

Transport bond issuance in EST countries is on the rise: the aggregate amount of outstanding transport bonds has been growing continuously since 2005, and had reached a volume of over US\$200bn in 2013, as shown in Figure 2:

<sup>12</sup> Data from the Climate Bonds Initiative. Provided Sep. 15, 2014.

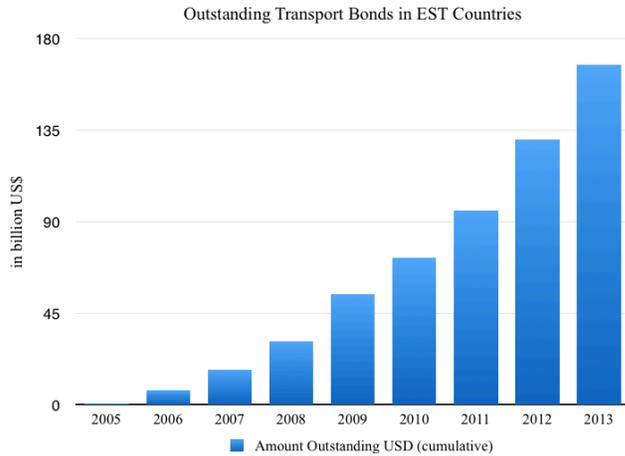
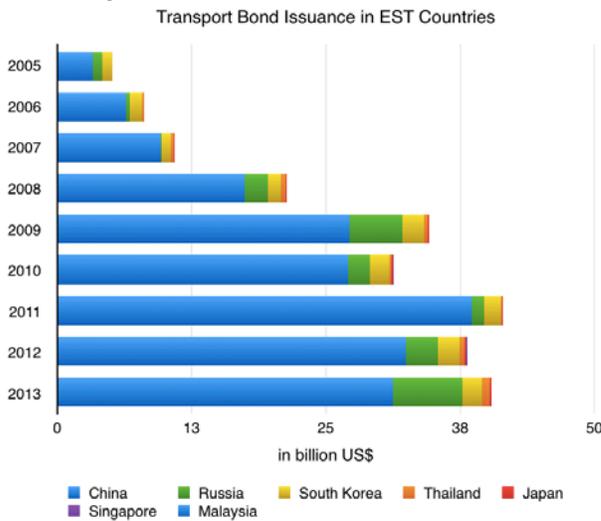


Figure 2: Aggregate Transport Bond Outstanding in EST Countries<sup>13</sup>

Despite China’s dominance in the issuance of transport bonds, Russia, South Korea, Thailand, Japan, Singapore and Malaysia also use transport bonds to finance transport infrastructure investments. The Russian Federation is another major issuer of railway bonds in the EST region due to a significant number of BBB-rated Russian Railways bonds, which account for an issuance of \$16 bn outstanding as of September 2014, and the Republic of Korea accounts for \$11 bn outstanding.

Transport bond issuance in EST countries has grown from \$5bn in 2005 to more than \$40bn in 2013. Figure 3 shows annual bond issuance broken down among individual EST countries



<sup>13</sup> Data from the Climate Bonds Initiative. Provided Sep. 15, 2014.

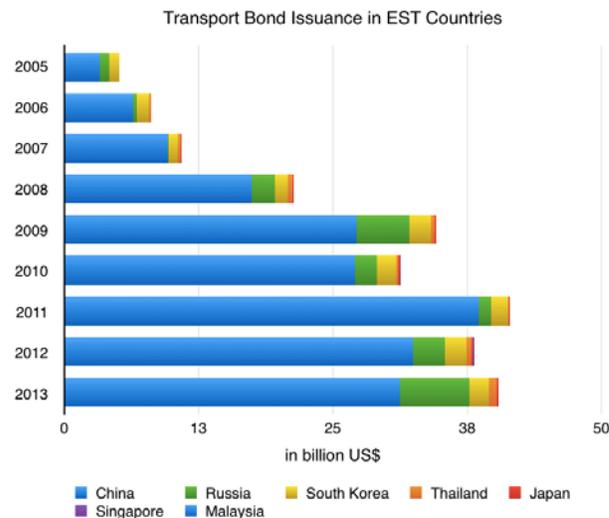


Figure 3: Individual Transport Bond Issuance by EST Countries<sup>14</sup>

### Other Transport Bonds

Traditional bond financing has also been applied in other sustainable transport subsectors in the EST region, including the following, as referenced by CBI data:<sup>15</sup>

- Urban rail (e.g. China, Shanghai Shentong Metro; Singapore, SBS Transit)
- High-speed rail (e.g. Hong Kong, Kowloon-Canton Railway)
- Bus (e.g. China, Yutong Bus; Rep. of Korea, Dongyang Express Bus Corp)
- Low-emission vehicles (e.g. Japan, Toyota; Rep. of Korea, AD Motors)

To date, however, these issuances have been dwarfed by issuances in conventional rail; thus, it is necessary to explore additional avenues for applying bond financing to these subsectors.

## 2. Limitations of Traditional Bond Financing for Sustainable Low Carbon Transport

Despite historical levels of bond issuance in key transport subsectors, climate-themed transport investments still makes up a relatively small share (\$358bn) of the total global outstanding bond issuance (\$100trn), and thus additional bond financing will be required to help scale up sustainable low carbon transport infrastructure and services. Traditional bond financing has so far had limited application to the sustainable low carbon transport sector for several reasons.

First, not all transport bonds are suitable generic investments (e.g. per CBI, bonds issued in restricted currencies, such as Chinese renminbi, are generally excluded from mainstream portfolios). Second, potential revenue streams from several key sustainable low carbon transport subsectors (e.g. public transport, cycling, pedestrian facilities) are more limited than for intercity rail, thus constraining the potential for bond financing. Third, strengthening the market for additional climate-themed bonds requires robust public sector involvement in the following areas:

- *Kick-starting markets:* Restricted currencies must be bolstered with bond issuance backed by governments or development banks (e.g. recent International Finance Corporation (IFC) green bond issuance of Peruvian PEN42m (\$15mn)) (Kidney, 2014c).

<sup>14</sup> Data from the Climate Bonds Initiative. Provided Sep. 15, 2014.

<sup>15</sup> Data from the Climate Bonds Initiative. Provided Sep. 15, 2014.

- *Public sector support*: (e.g. guarantees, credit enhancement, tax incentives) is required to lift bond investment ratings to attractive levels for investors (e.g. UK government guarantee for green power bond) (Kidney, 2014d)
- *Planning and regulatory steps*: Most bond investment opportunities depend on supportive regulation ranging from energy market management to financial regulation (e.g. China’s push for a corporate bond market, as referenced above).

Thus, to bridge the financing gap required to scale up sustainable low carbon transport in the EST region and beyond, it is necessary to explore additional and innovative bond financing strategies to complement more traditional transport bond issuance.

### C. Emerging Bond Financing Strategies for Sustainable Development

Several emerging bond financing strategies show promise for funding sustainable low carbon transport, including green bonds, municipal and provincial bonds, and project bonds.

#### 1. Green Bonds

A green bond (also known as a “labelled bond”) is a bond issued by a government or corporate entity in order to raise financing specifically for sustainability-focused projects or programs. Most green bonds are asset-backed, with investors promised that all funds raised will only go to specified programs, such as renewable energy generation or sustainable low carbon transport investments (Mathews et al., 2010). However, as of yet there is no clear definition of the “green” or climate requirements of these bonds, and this fact is especially challenging for transport.

In June 2014, the labeled green bonds market stood at \$35.8bn outstanding, with issuance in the past two years accounting for over 80% of the total outstanding. The strong growth of green bonds market in the past 18 months indicates increased investor demand and a broader issuer base. CBI expects 2015 issuance of labeled green bonds to reach \$100bn, with significant growth likely in newer markets such as Germany (catalyzed by a recently-announced KfW bond) and established markets such as China (driven by forthcoming corporate green bonds) (CBI, 2014).

In the transport sector, green bonds have so far been applied primarily to the auto subsector (as shown in the following box), with some exceptions, notably through the World Bank Green Bond program (as described later in this paper) (World Bank Treasury, n.d.).

#### Box 3: Green Automobile Bonds

Following the issuance of an unlabelled \$600m bond by electric vehicle (EV) manufacturer Tesla in May 2013, Toyota was the first auto manufacturer to issue a labelled green bond with a \$1.75bn issuance in early 2014. The bond proceeds will be used to acquire retail sale and lease contracts to finance Toyota and Lexus gas-electric hybrid or alternative powertrain vehicles, to accelerate the adoption of energy-efficient cars by a broader market (Lester, 2014). Potential exists for green bond issuances from other EV manufacturers (e.g. Nissan, Chevrolet) as well. The IEA projects EV to reach 7.2m units globally per year by 2020, resulting in potential annual EV loan volumes of over \$250bn (CBI, 2014).

At present, there is no standard definition or universal approach to green bond issuance, and thus a science-referenced classification of green bonds will be important to the next stage of growth. CBI is working with various partners to create common standards for labelled green bonds, including in several transport subsectors.

#### **Box 4: Climate Bonds Initiative (CBI) Low Carbon Transport Working Group**

CBI's Low Carbon Transport Working Group was established in January 2014 and consists of representatives from CBI, the European Investment Bank (EIB), the International Energy Agency (IEA), the Institute for Transportation and Development Policy (ITDP), the Partnership for Sustainable, Low Carbon Transport (SLoCaT), Transport Research Laboratory (TRL), the World Resources Institute (WRI), and others, with the goal of creating common standards for green bonds in the transport sector. The Working Group examines issues such as what sorts of rail transport should be included in a green bond; whether low-emission cars should be included (i.e. what levels of fuel efficiency); and whether there are eligibility exceptions for electric rail/vehicles (e.g. in countries with high-carbon electric grids) (CBI, n.d.).

The growing green bonds market provides an opportunity for transport developers to package investments that meet institutional investor needs (e.g. long-term, low-risk fixed-income instruments). Clearer transport sector criteria for green bonds will reduce transaction costs and facilitate greater allocation of investor capital to this area. The sustainable, low carbon transport sector must be proactive in defining these criteria to ensure that it does not miss this opportunity to engage private sector investment on a potentially significant scale (Allen and Kidney, 2014).

### **2. Municipal and Provincial Bonds**

Sub-sovereign entities (especially in emerging markets) must raise finance to meet sustainable low carbon transport infrastructure requirements, and thus are an important area for future growth. The US state of Massachusetts issued the first labelled municipal-focused green bond (\$100mn) in June 2013, and the City of Gothenburg followed with a \$79m bond in September 2013 (see box 5). Finally, the City of Johannesburg issued a \$136mn bond in June 2012, making it the first C40 city to exercise this financing mechanism (C40 Cities, 2014). Municipal bonds have been used for the direct funding of transport projects, as shown in the following box:

#### **Box 5: City of Gothenburg Electric Vehicles**

Gatubolaget, a municipal provider of sustainable low carbon transport services in Gothenburg, Sweden, has purchased electric vehicles (EVs) for city committees and companies as part of a series of municipal bond issuances used to fund transport, water, EVs into the city fleet by 2015, a goal achieved well ahead of schedule with the delivery of the 100th EV in December 2013 (Gatubolaget, n.d.; City of Gothenburg, n.d.).

Provincial issuers are also getting into the green bond game, as shown in a recent issuance from the Canadian province of Ontario, which was nearly five times oversubscribed. Proceeds of this issuance will fund a broad set of sustainability investments, including sustainable low carbon transport (e.g. the Eglinton Crosstown Light Rail Transit (LRT) with near-zero emissions vehicles) as well as green buildings, smart grid infrastructure, sustainable forest management, and climate resilience measures. The LRT project has been identified as the first mass transit project to receive funding through green bonds (Ontario Financing Authority, n.d.).

### **3. Project Bonds**

Project bonds are special type of bond in which debt is paid back from cashflow generated directly from a specific project rather than from an issuers' overall balance sheet. Project bonds were introduced during the 1990s to finance infrastructure projects, particularly in Europe and the US. The 2008 financial crisis caused a recession in project bond financing, but since 2011, ADB and the African Development Bank (AfDB) have set up significant project bonds departments, and the European Investment Bank (EIB) and European Commission (EC) launched the Project Bonds Initiative (see Box 6). Though further issuance is expected in 2015, the project bond market is likely to remain small, due to investor aversion to construction risks (CBI, 2014).

#### Box 6: European Investment Bank Project Bond Initiative

The Project Bond Initiative (PBI) is a joint effort of the EIB and the European Commission. The PBI is designed to enable eligible infrastructure projects (e.g. transport, energy, ICT), which are often backed by PPPs, to attract finance from institutional investors (e.g. insurance companies, pension funds). The EU's infrastructure needs to meet Europe 2020 objectives in these sectors could reach as much as \$2.48trn.

In March 2014, the PBI agreed to support construction of a new 12km-long A11 motorway link in Belgium, to replace an existing roadway with heavy congestion for passenger and freight traffic. The A11 motorway is the first transport project (and the first greenfield PPP in Europe) to benefit from the PBI (EIB, n.d.; EIB, 2014).

Project bonds have the potential to be applied more broadly in the transport sector if project revenue streams are sufficiently robust. A collaboration between the ADB and India Infrastructure Finance (IIFCL) has raised \$128mn to strengthen the project bond market in India and leverage investment for five highway transport projects. ADB and IIFCL are jointly providing an unconditional first-loss default guarantee (e.g. making the provider of the guarantee liable for all losses up to a specified limit) to cover 24% of the principal; however, the lack of sufficiently high bond credit ratings has posed challenges for project execution (Dalal, 2013).

#### 4. Social Impact Bonds

Social impact bonds (SIBs) have traditionally been used to finance social development projects (e.g. homelessness, prison recidivism). This strategy is generally used by a government intermediary that will find investors to fund a non-profit service project with the support of an SIB. An independent evaluator will determine the success of the project on completion, and if pre-determined criteria are met, the government will 'reimburse' investors (Pettus, 2013).

SIB investors thus have a strong incentive to help ensure project success, since they risk losing the investment should the social impact be insufficient. Since government spending is exclusively used for successful initiatives, SIBs typically finance NGOs with proven and scalable project concepts (Pettus, 2013; McKinsey on Society, 2012.). The SIB model has potential application to financing social equity aspects of sustainable low carbon transport (e.g. programs to increase road safety or to ensure equitable gender access to transport), though this model is untested to date.

#### 5. Sukuk Securities

*Sukuk* securities are structured to comply with the investment principles of Islamic law, which prohibits the charging or paying of interest. *Sukuk* securities are generally issued by giving partial ownership of an asset to the bond owner, who is then able to collect his profit as a rent, which is allowable under Islamic law (Islamic Development Bank, n.d.).

*Sukuk* securities have been issued by majority-Muslim countries within the EST region (e.g. Malaysia, Brunei Darussalam), as well as non-majority Muslim countries (e.g. Singapore, Hong Kong). Indonesia's potential to be involved in the climate-themed bonds market hinges on *sukuk* compliance, and there is an estimated \$1.5bn potential market for *sukuk* bonds if they can be mobilized to fit the needs of local investors.<sup>16</sup>

<sup>16</sup> Olsen-Rong, T., Climate Bonds Initiative. Sep. 17, 2014. Personal communication.

## D. Interaction of Bond Financing with Other Financing Tools

Bond financing can be used to complement other financing tools (e.g. official direct assistance, public-private partnerships) to implement successful transport projects.

### 1. Bond Financing and Public-Private Partnerships

Bond financing can be a complementary financing source for PPP projects for several reasons. Both rely upon regulatory frameworks that reduce the risk of private investment and measures that help reduce risk exposure through government guarantees. Green infrastructure projects are commonly subject to greater risk and thus are often dependent upon government subsidies. Thus, policies that reduce general risk for green PPPs are also likely to improve the environment for bond financing (e.g. Kansai Rapid Railway project funded through both PPP and bond issuance) (Fukui et al., 1994).<sup>17, 18</sup> In addition, bond financing can complement traditional PPP, by issuing bonds after projects are up and running and risk has been reduced by initial investments, in order to provide additional capital to the public sector for further expansion (Allen and Kidney, 2014).

However, the combination of bond financing and PPPs may also be at odds within a given project for the following reasons (European PPP Expertise Centre, 2012):

- Bonds are generally most suitable for very large projects (e.g. greater than \$127mn) due to high fixed administration costs (e.g. public offering, obtaining credit rating, marketing, legal considerations, documentation).
- There is a common mismatch in credit quality, as bond investors generally seek higher (AAA) credit ratings, while PPP projects typically have lower ratings (BB+/BBB-). This can lead to the use of “credit-enhancing” instruments, which may distort bond creditworthiness.
- There is a discrepancy between the duration and risk level of bond financing for PPPs, wherein bond investors typically seek long-term and risk-free investments (hence, bonds are often applied in later stages of a PPP project, after risk has been reduced).<sup>19</sup>

For these reasons, bond financing may be a useful tool to enhance established public-private partnerships, but may not suit the needs of every PPP project.

### 2. Bond Financing and Official Direct Assistance

The 1961 construction of Japan’s Shinkansen high-speed railway is a prime example of a successful railway bond, yet this project is unique as one of the earliest examples of mixed financing involving railway bonds, government borrowing, direct finance via Japanese Railways (JR), and MDB loans. The total cost of the first Tokaido line was around \$1bn 1964 USD (\$18bn in 2011 USD), and the WB provided an \$80mn 1964 USD loan toward this total, with an agreement that the Japanese government would service debt in case of bankruptcy (Albaladejo and Germa, 2012).

Though accumulated debt led to the eventual privatization of JR in 1987, Shinkansen trains continue to serve a dense and affluent customer base. Many factors caused the accumulation of debt leading to the privatization of JR, primarily strong competition from the rapidly growing auto and air transport sectors, which caused JR to invest heavily in facilities and equipment, which led to runaway labor and capital costs. The subsequent privatization revitalized JR by increasing labor productivity and customer service (e.g. limiting fare increases, providing flexible responses to customer demands) (Konno, 1997). In addition, the privatized JR Central has sought to maximize land value capture by generating real-estate revenue streams, chiefly from

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<sup>17</sup> Makovsek, D., International Transport Forum. Oct. 1, 2014. Personal communication.

<sup>18</sup> Data from Climate Bonds Initiative. Provided Sep. 15, 2014.

<sup>19</sup> Olsen-Rong, T., Climate Bonds Initiative. Sep. 17, 2014. Personal communication.

commercial property development around the Nagoya Shinkansen station, with development proceeds rising dramatically in recent decades from \$210mn in 1999 to \$576mn in 2009 (Murakami and Cervero, 2012).

## E. Conclusions

Bond financing is a useful tool to jump-start sustainable low carbon transport investments, thus increasing mobility and generating future revenue streams.<sup>20</sup> However, like PPPs, bond financing can add considerable expense to long-term project costs. While the bond market for climate-themed projects (including sustainable transport) has grown quickly and continues to evolve, a broader application of bond financing is needed to meet sustainable development targets.

Bonds in the EST region have shown impressive issuance in the transport sector, dominated by rail bonds from China, in addition to significant issuance from the Russian Federation, the Republic of Korea, and Thailand. More modest bond issuance to date in other transport subsectors (e.g. bus, automobile, urban transport) offers significant growth potential among EST countries which have made forays in these subsectors (e.g. Japan, Singapore, Hong Kong).<sup>21</sup>

A key issue is the ability of local governments to take on debt. For example, China's fiscal configuration (i.e. national government finances large projects while local government finances smaller projects) means that local governments do not always have the capacity to finance investment out of revenues or by issuing debt. The central government has proposed the use of municipal bonds to broaden sources of funding for local governments, and Chinese authorities have also highlighted the need to reform revenue sharing between the central and local governments (Wilkins and Zurawski, 2014). In other countries, bond financing is limited by credit ratings, as only 4% of the world's 500 largest cities in developing countries are investment grade by international standards (WB, n.d.). This is a critical issue, as local governments often have the greatest need for bond financing of transport projects (e.g. mass transit systems).

Key recommendations for the application of bond financing to sustainable low carbon transport projects in the EST region include the following:

- Exploit potential to include additional sustainable low carbon transport projects among forthcoming municipal and provincial bond issuances (e.g. Gothenburg, Ontario)
- Exploit potential to increase bond issuance in transport subsectors other than heavy rail (e.g. urban transport, bus, EVs, e-bicycles), using aggregators to meet issuance thresholds
- Support and emulate forthcoming China corporate green bond issuance in other candidate EST countries (e.g. Republic of Korea, Japan)
- Enhance green credentials of EIB Project Bond Initiative, explore potential for similar programs among MDBs in EST countries (e.g. Asian and Islamic Development Banks)
- Develop framework policies to issue labeled *sukuk* transport bonds among EST countries (e.g. Indonesia, Malaysia)
- Determine optimal combination of bonds, government borrowing, and MDB loans, considering potential for (e.g. Japan Shinkansen)
- Continue efforts to define certification standards for green transport bonds (e.g. through activities of CBI Transport WG)

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<sup>20</sup> Kidney, S, Climate Bonds Initiative. Oct. 3, 2014. Personal communication.

<sup>21</sup> Data from Climate Bonds Initiative. Provided Sep. 15, 2014.

## IV. Multilateral Development Bank Private Sector Operations

Multilateral development banks (MDBs) can also help to scale up sustainable low carbon transport by leveraging the resources and expanding the capacity of the private sector. Though MDBs are not private sector entities in themselves (and though many private transactions facilitate financing of transport projects without MDB involvement), MDBs can play a key role in scaling up private sector investment in sustainable transport in the EST region, by leveraging higher credit ratings, reducing project initial risk, and applying regional expertise through targeted private sector operations departments.

This section gives an overview of sustainable low carbon transport financing through the private sector operations of multilateral and bilateral development institutions. These contributions may include indirect support, direct assistance, and facilitation of complementary private sector financing strategies. This section is organized around the following key questions:

- How do MDBs define private sector assistance? Are various MDBs using common definitions to quantify private sector involvement?
- In what ways can MDBs provide indirect leverage for private sector investment (e.g. risk reduction, governance standards, social equity)?
- How do MDBs provide direct leverage to private sector projects (and private sector transport projects in particular)?
- What are the motivations for quantitative targets for private sector involvement among MDBs? What are the potential challenges in meeting these targets?
- How can MDBs help to facilitate a range of complementary private sector financing strategies (e.g. PPP, bond financing, climate instruments)?

### A. Definitions of Private Sector Assistance

While the private sector is generally defined as the economic sector in which all businesses and entities are non-state-owned and for-profit, there is a lack of consensus on the line between private and public sector projects. A traditional approach would differentiate the sectors by service function, ownership, or level of public/corporate control, yet a growing number of public-private partnerships and increasing private sector involvement in infrastructure investment seem to only further blur the boundary between public and private (Lienert, 2009).

MDBs also define private sector assistance in a number of ways, which vary according to core agency philosophies and desired project outcomes. Efforts to establish joint MDB definitions of private sector assistance remain under development.

#### 1. ADB Definitions

ADB has recently announced a target for private sector involvement in 50% of the total number of its projects (in contrast to a 50% share of total assistance). Sovereign projects may be included in this 50% goal if private sector components are incorporated (e.g. Vientiane BRT, details below). Thus, it is not the case that half of all ADB projects are administered by its Private Sector Operations Department (PSOD), and are thus non-sovereign (ADB, n.d.c.).

In this context, 67% of ADB's completed non-sovereign operations between 2011 and 2013 were rated successful, as compared to roughly 80% of sovereign operations (ADB, 2013). While these numbers measure original intentions, they do not necessarily reflect long-term project impacts.

## 2. EBRD Definitions

EBRD places a greater emphasis on sub-sovereign lending than other MDBs (due in large part to its regional focus on the transition economies of Eastern Europe and former Soviet Republics) with half of its transactions going directly to private sector clients. Of the remaining EBRD transactions, half again are in subsectors that tend to operate as private entities (e.g. railways, ports). In 2013, private sector projects accounted for 79% of EBRD's annual investments (EBRD, 2014a).

EBRD's focus on the private sector is less exclusive in its Municipal and Environmental Infrastructure (MEI) program, which funds mostly urban transport projects, though active efforts are made to increase private sector involvement among these projects with municipal clients.<sup>22</sup>

## 3. WB Definitions

WB defines private sector activities clearly as those that are “designed, constructed, operated, and/or owned by a private entity established for a business purpose and is operating on a commercial basis.” WB also provides a definition of its PPP activities as “a contractual arrangement between a public entity or authority and a Private Entity, whereby risks from construction, and/or operations, and/or financing are fully or partially transferred to the Private Entity” (WB, 2013).

## 4. MDB Joint Definitions

In the MDB 2013 Joint Report on Climate Finance, public and private projects are distinguished based on the status of the first recipient/borrower of MDB finance; where the first recipient is considered public-sector when at least 50% of the entity is publicly-owned. MDBs have acknowledged that the public/private determination is not straightforward, as the status of the first recipient may not be the same as the final beneficiary (e.g. a loan to national development bank for energy efficiency in SMEs), and the question is further complicated in the case of PPPs (EIB, 2014).

These wide-ranging definitions of private sector involvement among MDBs underscore the need to clarify methodology to determine the existing as well as potential contribution of the private sector to scale sustainable low carbon transport in Asia.

## B. Indirect Role of MDBs in Private Sector Investment

MDBs can indirectly leverage private sector investment through a number of strategies including risk reduction, governance reform, and social equity assurances.

### 1. Risk Reduction

A key role of MDBs is to reduce political risk by contributing feasibility studies, issuing guarantees, or taking first losses for certain aspects of a project, in order to build confidence for subsequent private sector investment by adding a “stamp of approval.”

#### *Case Study: Financing PPPs through the India Infrastructure Finance Company Ltd*

The IBRD arm of the World Bank is currently disbursing a \$1.195bn financial intermediary loan to support India Infrastructure Finance Company Ltd (IIFCL). The loan specifically provides long-term funds to the IIFCL for PPP-based infrastructure projects, creating a pipeline to finance selected power, roads, and ports projects. Additionally, the program has a technical cooperation

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<sup>22</sup> Jordan-Tank, M., European Bank for Reconstruction and Development. Oct. 2, 2014. Personal communication.

component promoting procurement and capacity building to support sustainable development through the private sector in India (WB, 2014b).

## 2. Governance Standards

MDBs can help to increase the attractiveness of projects to private sector investors by establishing corporate governance standards (e.g. modern business practices, independent board structures) in order to avoid potential conflicts of interest.<sup>23</sup>

*Case Study: Danube Logistics - Giurgiulesti Port, Moldova* (EBRD, 2012b)

The EBRD is considering a senior loan to Danube Logistics SRL, which owns and operates the Giurgiulesti International Free Port, the only port in Moldova. The loan will partly finance the completion of port infrastructure, specifically building a mixed-gauge rail terminal and roll-on-roll-off ramp. A key aspect of the project is setting standards of business conduct through the introduction of improved energy management practices at a corporate level; the project will also demonstrate new and replicable behavior by supporting a foreign investor in an early transition country, and the financial restructuring of the port will advance sustainable financial conditions.

## 3. Social Equity Assurances

MDBs can help to attract private investments by increasing social equity in projects and supporting institutions. EBRD's Strategic Gender Initiative seeks ways to ensure equitable access to transport services for both customers and employees (EBRD, n.d.b).

*Case Studies:*

*Bishkek Bus System, Kyrgyz Republic and Istanbul Ferry Operator, Turkey*

EBRD has increased access to the Bishkek bus system by addressing perceived safety issues (e.g. bus stop lighting), increasing physical access (e.g. low-floor buses), and maintaining gender equity (e.g. unisex toilet facilities). EBRD has also helped a Turkish ferry operator increase its female staff from five to 100 in two years, with the addition of unisex toilet facilities on its ferries (EBRD, n.d.c).<sup>24</sup>

In sum, MDBs can offer important indirect contributions to make transport projects more attractive for private sector involvement. For instance, ADB's private sector development strategy focuses on creating enabling conditions for long-term private sector viability through enhancing policy environments, generating business opportunities in the domestic private sector, and catalyzing private investments through direct assistance to the private sector (ADB, n.d.a). Since ADB assistance covers only 3% of investment needs for each member developing country, an ongoing challenge is to use limited financing to attract broader private sector involvement.

## C. Direct Role of MDBs in Private Sector Investment

Direct MDB assistance to private sector projects (and/or sovereign projects with private sector components) can be delivered either through dedicated private sector financing windows or through integrated financing structures. The following profiles summarize private sector lending strategies, portfolios, and case studies for a number of multilateral and bilateral financing institutions active in the EST region.

### 1. ADB: Private Sector Operations Department

*Strategy*

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<sup>23</sup> Jordan-Tank, M., European Bank for Reconstruction and Development. Oct. 2, 2014. Personal communication.

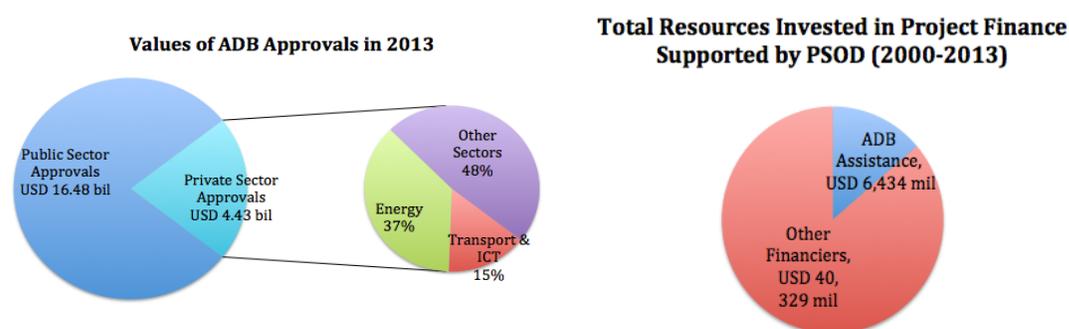
<sup>24</sup> Jordan-Tank, M., European Bank for Reconstruction and Development. Oct. 2, 2014. Personal communication.

ADB's Private Sector Operation Department (PSOD) was established to implement its direct private assistance policies, to mobilize funds for private sector activities, and to serve as a funding arm to support various PPP projects (ADB, 2014b).

### *Investment Portfolio*

In 2013, ADB channeled a total of \$4.7bn to the private sector, including \$4.43bn of approvals, \$1.8bn of ADB's own financing and \$2.9bn of co-financing (ADB, 2014b). This total of \$1.8 bn, includes \$275mn (roughly 15%) for private sector transport and ICT projects, as compared to roughly 25% of total assistance allocated to transport and ICT (ADB, 2014d).

ADB private sector share and leverage are shown in Figure 4 (ADB, n.d.a; ADB, 2014d):



**Figure 4: ADB Private Sector Share and Leverage**

### *Case Study: Loan Program for Clean Bus Leasing, China (2013)*

ADB will provide term loans of up to \$100mn (or CNY equivalent) per borrower of a total project cost of \$275mn to finance leasing of clean buses in China (ADB, n.d.d). Subject to demand, up to 10% of loan proceeds per borrower can be used to finance the leasing of IT and management systems to increase fleet operating efficiency.

### *Case Study: Vientiane BRT, Laos (forthcoming)*

ADB is supporting a sovereign BRT project with private sector elements in Vientiane, Laos (i.e. a private entity is to operate BRT services and manage parking). Additional details of this proposed project are forthcoming (ADB, n.d.c).

## **2. WB: International Finance Corporation**

### *Strategy*

The International Finance Corporation (IFC) is the private sector-lending arm of the WB, with a network of more than 2,000 private sector clients among 184 member countries. The role of IFC as the dominant private-sector financing window for the WB is increasing, as it commits about \$12bn for long-term finance and about \$7bn for its mobilization, for a volume growth of 4-5% in 2014 (IFC, 2014b).

### *Investment Portfolio*

As one of the largest international financial institutions in the world, the WB has committed \$25bn to the private sector through IFC (IFC, 2014a). In 2013, IFC approved \$18.3bn for its new investment commitments, while mobilizing more than \$942mn for PPP projects, and providing \$232mn for technical assistance to promote capacity building and long-term private sector viability. In FY 2014, IFC has committed \$4bn to power, transport, and utilities projects, and has financed more than 40 port construction and expansion projects totaling \$1bn from 2000-2014 (IFC, 2014a).

*Case Study: Hajia Railway, China (approved 2014)*

IFC is funding a \$5.6bn project to increase rail passenger and freight capacity, alleviate congestion, and reduce travel times along the Harbin-Jiamusi corridor in Northern China. With IFC committing \$300mn (approximately 5.4% of total project cost), the development of Hajia Railway is expected to provide rural services to the region and contribute to private sector development in China (WB, 2014b).

### 3. AFD: PROPARCO

*Strategy*

PROPARCO, the private sector lending arm of the Agence Française de Développement (AFD), has expanded to emerging countries in Asia (e.g. India, China, Southeast Asia) (PROPARCO, 2014b). PROPARCO has an active partnership with the European Development Finance Institutions (including EIB), which has yielded two co-financing facilities: the European Financing Partners, and the Interact Climate Change Facility.

*Private-Sector Investment Portfolio*

PROPARCO provided \$4.4bn in total and committed \$1.09bn to new private sector projects in 2013, with 13% of its total portfolio committed to Asia and 25% to infrastructure development (PROPARCO, 2014a).

*Case Study: Improve Port Infrastructure in Ho Chi Minh City, Vietnam (2008)*

AFD provided a \$15mn loan to build and operate a container yard and infrastructure in Ho Chi Minh City to reduce congestion of existing port infrastructure and improve environmental conditions in neighboring cities (PROPARCO, n.d.).

### 4. Kreditanstalt für Wiederaufbau (KfW): Deutsche Investitions- und Entwicklungsgesellschaft

*Strategy*

Deutsche Investitions- und Entwicklungsgesellschaft (DEG) is the private-sector lending arm of the KfW, and one of three public partners for the develoPPP.de program offering private sector companies long-term financing through equity, loans, and other instruments (develoPPP.de, n.d.b). From 1999 to 2012, DEG provided roughly \$16.5mn to the transport and ICT sectors, with cumulative private contributions of \$605mn for develoPPP.de projects, about 1.7 times greater than public contributions in this period, as shown in Figure 5 (develoPPP.de, n.d.a).

Cumulative Contribution for develoPPP.de Projects (1999-2012)

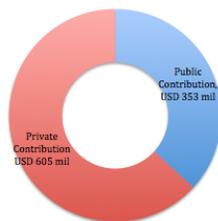


Figure 5: KfW develoPPP.de Leverage of Private Sector Financing

*Private-Sector Investment Portfolio*

KfW invested a total of \$6.8bn in 2013, of which \$259.7mn (less than 4%) was provided to the transport and services sector (KfW Development Finance, n.d). Within DEG’s private sector

investment portfolio, \$577mn was committed to the climate finance sector, accounting for about 30% of total new business commitments in 2013 (KfW-DEG, n.d.).

*Case Study: Commuter Railway System, Jabotabek, Indonesia (in implementation)*

KfW provided \$29.4mn to support the construct a public commuter railway system in Jabotabek, Indonesia to alleviate congestion and reduce emissions. Ten new commuter trains are being constructed by an Indonesian-German joint venture, in addition to efficiency enhancements to power supply, signals, and repair shops (KfW, n.d.).

## 5. EBRD (Integrated Structure)

### *Strategy*

EBRD is unique among MDBs in that virtually all decisions on project selection, development and review are guided by “transition thinking” toward emerging market economies, which helps to promote energy efficiency in EBRD projects, including in the transport sector. EBRD’s strategy requires that at least 60% of lending (e.g. loans, equity, and guarantees) be channeled to the private sector by providing project financing to new ventures, investing in existing companies, and working with publicly owned companies to support privatization (EBRD, 2014a).

### *Private-Sector Investment Portfolio*

Private sector projects accounted for 79% of share of EBRD’s investment in 2013.<sup>13</sup> As of August 2013, there were 245 transport projects in operation, receiving \$15bn of EBRD’s investment, of which 23% were private sector projects (EBRD, 2014d).

*Case Study: Rail Freight Diversification, Kazakhstan (pending board approval)*

The EBRD is considering a facility for Eastcomtrans LLP, the Kazakhstan-based rail wagon leasing and freight-forwarding company.

loans with an aggregate amount of up to \$140mn. The operation will enable the company to finance the acquisition of rolling stock and other capital expenditures, restructure outstanding commercial bank loans, and enhance modern business practices (EBRD, 2014e).

The facility consists of a

EBRD has proposed steps for increased coordination among MDBs, including private sector operations. EBRD has developed a private-sector driven mechanism for climate finance and energy efficiency investments, and its Sustainable Energy Financing Facilities have financed more than 50,000 loans in 19 countries where EBRD operates. Since financing demands exceed EBRD’s sphere, the Bank plans to transfer this model to global partners to maximize impact through proven tools, staff and resources without reinventing in every region (Williams, 2014).

## D. MDBs and Other Private-Sector Financing Strategies

In addition to providing direct leverage (e.g. providing grants and loans, acquiring equity stakes) and indirect leverage (e.g. issuing guarantees, taking first losses) for private sector involvement (as described in previous sections), MDBs can play a key role in facilitating other private sector financing strategies, including public-private partnerships, bond financing, and climate financing.

### 1. MDBs and PPPs

MDBs contribute to PPP development at the policy level as well as the project level. ADB has launched an advisory service to provide governments with independent advice on shaping public-private partnerships. The new office will provide strategic input on project marketing, deal structuring, and bid packaging; these services will be distinct from the office’s work to support the development of legal and regulatory frameworks to promote PPPs (ADB, 2014e).

### *Case Study Philippines: North Luzon Expressway*

Through the issuance of a \$45mn private sector loan (as well as a \$25mn B-loan by the ADB), the Manila North Tollways Corporation has been able to finance the rehabilitation and expansion of the North Luzon Expressway. The PPP has provided the private company sufficient funding to implement the project, while allowing for capacity building and institutional strengthening (Morales, 2013; ADB, n.d.b).

## **2. MDBs and Bond Financing**

MDBs have issued green bonds to be used in climate-focused projects, which to date include major issuances from the European Investment Bank and the World Bank, as described in the following box:

### **Box 7: European Investment Bank and World Bank Green Bonds**

The EIB had its first 2014 transaction in the European green bond market with a \$ 434mn increase in its Climate Awareness Bond (CAB), which is now worth \$1.86bn, the largest climate-themed bond in any currency (Climate Change Policy & Practice, 2014). In October 2014, EIB followed with a \$1bn CAB issuance (on the heels of a \$1.5bn issuance from KfW), with the goal to tap a new set of global investors (Kidney, 2014a; Kidney, 2014b).

The World Bank Green Bond raises funds from fixed-income investors to support lending for eligible projects for climate change mitigation or adaptation. The product was designed to respond to investor demand for an AAA-rated fixed income product that supports climate change projects. Since 2008, the World Bank has raised \$6.4bn in green bonds through 68 transactions and 17 currencies (Kidney, 2014e).

## **3. MDBs and Climate Instruments**

MDBs can help to leverage additional private sector investment in cooperation with climate instruments. A climate instrument is a fund that enables co-financing for projects with an MDB or other agency sponsor. Climate instruments leverage additional private sector investment through a variety of means, including establishing enabling environments for the private sector, and encouraging public-private engagement to harmonize regulation with project execution.

### *EBRD and the Global Environment Facility (GEF)*

The GEF has contributed more than \$80mn to support climate mitigation and adaptation activities, which include policy dialogue, regulatory reform, technology transfer, and support for project implementation. This funding includes \$10mn to promote climate resilient infrastructure in cooperation with EBRD in Tajikistan and the Kyrgyz Republic (EBRD, n.d.a). Joint MDB and GEF financing can help reduce project risk and attract additional private sector investment, thus linking global climate change objectives to national and regional development goals.

### *Case Study: Green Shipping in Russia*

A dedicated EBRD project on Green Shipping in Russia is under preparation for submission to GEF, which is intended to reduce GHG emissions through the transformation of the Russian shipping industry by supporting commercial investments in the sector (GEF, n.d.). In this project, EBRD share is \$100mn and GEF share is \$8mn. GEF technical assistance funds of \$2mn will be used to facilitate best practices in investment planning, and a larger portion of GEF funds to demonstrate market potential and best practices to local financial institutions (GEF, 2013).

### *ADB and the Climate Investment Funds (CIF)*

CIF funding attracts significant co-financing to increase investment potential in climate-friendly enterprises, with roughly 26% of CIF financing allocated to the private sector through MDBs and dedicated financing programs (CIF, n.d.a). A refined approach is being developed to encourage countries and MDBs to allocate a greater share of CIF funding to private sector investments and to promote diverse financial instruments and potential use of local currencies (CIF, n.d.b).

ADB will administer 61% of the \$1.6bn in CIFs allocated to Asia and the Pacific through government investment plans prepared with ADB and other MDB partners. The plans call for a combination of loans, grants and technical assistance to leverage private sector contributions to meet global targets for climate change funding. A key goal of the plan is to encourage sustainable low carbon transport and urban development (e.g. urban rail and BRT, non-motorized transport, inland waterways) (ADB, 2014a).

#### *Case Study: Electric Tricycles in the Philippines*

The Philippine government, with assistance from ADB and CIF's Clean Technology Fund (CTF), plans to introduce 100,000 electric tricycles to reduce the greenhouse gas (GHG) impact of traditional tricycles by over 50%, and to improve air quality for drivers, passengers, and residents. Total project cost is \$504mn, including \$105mn from CTF, \$300mn from ADB, and \$99mn from central government.

ADB, with private sector stakeholders, has developed an innovative financing model that could leverage funding to build more than 3 MW of charging capacity to support more than 3,000 e-tricycles. This project will mobilize commercial investments for scale-up by fostering local battery supplier and vehicle maintenance industries. (ADB, 2014a).

## **E. Conclusions**

MDB private sector involvement in sustainable low carbon transport comes in various forms, including indirect support, direct assistance, and application of complementary private sector financing strategies. As shown the preceding sections, risk reduction is paramount to attracting private sector investment, and MDB involvement can play a key role in packaging projects to manage risk, while building up sustainable revenue streams to ensure long-term project success.

EBRD and WB have both demonstrated strong commitment in increasing the share of private sector assistance of their respective investment profiles, with EBRD committing about 79% and WB committing 58% of total assistance to the private sector in 2013. In addition, EBRD has contributed 24% of its private sector portfolio to the transport sector in 2014, accounting for a total estimation of \$2.04bn, while WB has committed \$4bn to transport, power and utilities projects in 2014 through IFC (EBRD, 2014d).

At the same time, this analysis suggests that transport is generally less well represented in MDB private sector operations than in public sector operations to date. With rapid expansion of cities and growing needs for transport infrastructure and facilities, the share of MDB private sector operations in the transport sector has the potential to grow significantly in the coming decades.

Recommendations for increasing the leverage of MDB private sector operations in the EST region include the following:

- Create common definitions of public and private sector assistance to assess existing and potential impacts of MDB private sector activities in EST region

- Apply indirect MDB support to push investment in additional sustainable low carbon transport subsectors (e.g. non-motorized transport)
- Increase leverage of direct assistance to private sector projects by increasing coordination of MDB activities (e.g. EBRD proposal to increase MDB coordination) (EBRD, 2014b)
- Assess usefulness of extending quantitative targets for private sector involvement to additional MDBs (or refining targets among existing MDBs)
- Increase opportunities for private sector application of climate instrument funding to sustainable transport (e.g. green shipping in Russia, electric tricycles in the Philippines)

## V. Private Sector Financing of the Bangkok 2020 Declaration

Full implementation of the Bangkok 2020 Declaration on Sustainable Transport will have a tremendous impact on the financing of sustainable low carbon transport infrastructure and services in the EST region. Private sector financing must play a significant role in realizing key goals of the Bangkok 2020 Declaration (and the subsequent Bali Declaration/Vision Three Zeros). This section is organized around the following key questions:

- What is the potential of private sector financing to realize key goals of the Bangkok 2020 Declaration (and the Bali Declaration/Vision Three Zeros)?
- What is the relevance of private sector strategies to the goals of the Bangkok 2020 Declaration, and what criteria should be used to determine application of these strategies?
- How can the implementation of Bangkok 2020 Declaration goals be accelerated based on the application of private sector financing strategies?

### A. Potential of Private Sector Financing

Private sector involvement is essential in financing the transport needs of the EST region, and must supplement the constrained resources of the public sector, climate instruments, and MDBs. As noted, estimated annual transport investment needs across the Asia Pacific region exceed \$200bn. The Bangkok 2020 Declaration is the ultimate benchmark for measuring the success of the EST program, and out of the 20 goals of the Declaration, there are few in which funding responsibility would be solely the task of government; for the majority of the others, costs can be either fully or partially transferred to end users or private-sector entities (Huizenga, 2011).

SLoCaT's background paper from the 6<sup>th</sup> EST Forum asserts that the majority of goals in the Bangkok 2020 Declaration are candidates for funding from industry and/or the private sector (Huizenga, 2011). These goals are explored in more detail in Table 7, by first evaluating the relevance of private sector financing to each goal, and then by examining recommended applications of private-sector financing strategies to each of these goals:

Bangkok 2020 Declaration Goal	Relevance of Private Sector Financing (0–3)	Recommended Application of Private Sector Financing Strategies
<i>I. Strategies to Avoid unnecessary travel and reduce trip distances</i>		
1) Integrate land-use and transport planning, processes and related institutional arrangements at the local, regional, and national	0	• N/A

levels		
<b>2. Achieve mixed-use development and medium-to-high densities along key corridors within cities</b>	2	<ul style="list-style-type: none"> <li>• Increase use of value capture through PPP, with support of sound enabling legislation</li> <li>• Issuance of municipal bonds to raise capital for sustainable transport-focused land use projects</li> <li>• Increase MDB capacity building assistance via municipal programs (e.g. EBRD MEI)</li> </ul>
<b>3. Information communication technologies (internet, teleconferencing, telecommuting)</b>	1	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> <li>• Issue project bonds for ICT investments after reducing risk through technology scale-up</li> <li>• Leverage MDB expertise to facilitate ICT industry market transition (where appropriate)</li> </ul>
<b>II. Strategies to <u>Shift</u> towards more sustainable modes</b>		
<b>4. Non-motorised transport (NMT) components in transport master plans and prioritize NMT transport infrastructure investments</b>	1	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> <li>• Use MDB leverage to increase application of climate financing to NMT infrastructure and services</li> </ul>
<b>5. Implement high-quality public transport services on dedicated infrastructure along major city corridors</b>	2	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> <li>• Issuance of municipal bonds to raise capital for urban transport investments (e.g. Ontario)</li> <li>• Shift MDB investment priorities from roadway to mass transport (e.g. ADB 2010 Sustainable Transport Initiative)</li> </ul>
<b>6. Transport Demand Management (TDM) measures, including pricing measures that internalize congestion and pollutant costs, measures aimed at gradually eliminating subsidies</b>	1	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> </ul>
<b>7. Significant shifts to more sustainable modes for inter-city passenger and goods transport</b>	2	<ul style="list-style-type: none"> <li>• Leverage MDB investments in freight infrastructure and governance standards (e.g. EBRD Eastcomtrans)</li> </ul>
<b>III. Strategies to <u>Improve</u> transport practices and technologies</b>		
<b>8. Diversify towards more sustainable transport fuels and technologies</b>	2	<ul style="list-style-type: none"> <li>• Expand issuance of green bonds to finance development of ultra-low emissions vehicles</li> <li>• Leverage MDB investments in refining industry to increase supply of alternate fuels</li> </ul>
<b>9. Progressive standards for fuel quality, fuel efficiency, and tailpipe emissions</b>	2	<ul style="list-style-type: none"> <li>• Expand issuance of green bonds to finance sale/lease of ultra-low emissions vehicles</li> <li>• Leverage MDB investments among refining industries to increase fuel quality</li> </ul>
<b>10. Annual vehicle inspection and maintenance (I/M)</b>	2	<ul style="list-style-type: none"> <li>• Explore PPP potential, with investment and operating costs covered by inspection fee</li> <li>• Leverage MDB technical assistance to identify best practices from regional peers in this area</li> </ul>

<b>11. Intelligent Transportation Systems (ITS), such as electronic fare and road-user charging systems, transport control centers, and real-time user information</b>	2	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> </ul>
<b>12. Improved freight transport efficiency through policies, programmes, and projects on freight vehicle technology, fleet control and management systems, and logistics and supply chain management</b>	1	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> <li>• Apply bond financing for green freight investments (e.g. railways, ports, inland waterways)</li> <li>• Use MDB leverage to expand private sector financial and technical assistance for green freight implementation</li> </ul>
<i>IV. Cross-cutting strategies</i>		
<b>13. Zero-tolerance policy with respect to roadway safety</b>	1	<ul style="list-style-type: none"> <li>• Expand issuance of green bonds to finance development of safer vehicle technologies</li> <li>• Use MDB leverage to expand private sector financial and technical assistance to design and build safer streets for all users</li> </ul>
<b>14. Monitoring of the health impacts from transport emissions and noise</b>	0	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>15. Establish progressive and enforceable air quality and noise standards and mandate monitoring and reporting</b>	1	<ul style="list-style-type: none"> <li>• Expand issuance of green bonds to finance development of ultra-low emissions vehicles</li> <li>• Apply MDB leverage to include reporting requirements in standard business practices of transitional industries (e.g. Eastcomtrans)</li> </ul>
<b>16. Mitigate the causes of global climate change to fortify national energy security, and conduct a full inventory of all GHGs emitted from the transport sector</b>	1	<ul style="list-style-type: none"> <li>• Expand issuance of green bonds to finance development of ultra-low emissions vehicles</li> <li>• Apply MDB leverage to include inventory requirements in standard business practices of transitional industries (e.g. Eastcomtrans)</li> </ul>
<b>17. Adopt social equity as a specific design criteria in the development and implementation of transport initiatives</b>	1	<ul style="list-style-type: none"> <li>• Incorporate social equity criteria into terms of PPP transport infrastructure agreements</li> <li>• Use MDB leverage to ensure equitable access to transport for both users and workforce (e.g. EBRD Strategic Gender Initiative)</li> </ul>
<b>18. Create innovative financing mechanisms for sustainable transport infrastructure and operations (e.g. carbon markets, parking levies, fuel pricing, time-of-day automated road-user charging, and PPPs such as land value capture</b>	0	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>19. Ensure wide-spread distribution of information and awareness on sustainable transport to all levels of government and to the public</b>	1	<ul style="list-style-type: none"> <li>• Leverage expertise and efficiency of private sector through PPP arrangements</li> </ul>

20. Develop dedicated and funded institutions that formally address sustainable transport and land use policies and implementation	0	• N/A
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**Table 7: Evaluation of Bangkok 2020 Declaration Goals via Private Sector**

This broad analysis is intended to help EST member countries to focus private sector financing strategies to each of the goals of the Bangkok 2020 Declaration with maximum impact.

## B. Conclusions

The above analysis illustrates the optimal application of private sector financing strategies to a number of key goals of the Bangkok 2020 Declaration. Yet, experience shows that successful application of private sector strategies to these goals across EST member countries has been mixed to date. Thus, it is crucial to make progress in these areas in the next five years to achieve the goals of Bangkok 2020 Declaration within its established timeframe, and to make needed strides toward decreasing emissions and improving air quality across the EST region.

Recommendations to more effectively leverage private sector financing to achieve the goals of the Bangkok 2020 Declaration include the following:

- Establish sound government policies to reduce investor risk, while maintaining flexibility to attract a broad range of market-driven financing strategies
- Build stable revenue streams via public sector fiscal commitments, while clearly specifying responsibilities of private sector partners to ensure project success
- Remove bureaucratic barriers to PPP and FDI, by strengthening regulatory frameworks, and providing sound enabling legislation, and increasing institutional support
- Apply the following private sector financing strategies to sustainable low carbon transport infrastructure and services, as summarized in Table 7:
  - Use PPPs to disseminate expertise and efficiency of private sector in areas such as urban transport and green freight, ensuring that sustainable and socially equitable principles are captured in PPP agreements
  - Expand issuance of green bonds to finance development of transport industry efforts to reduce emissions and increase safety, and to facilitate broader sale and lease agreements of efficient vehicles
  - Apply MDB leverage to increase efficiency of private sector industries, to instill modern business practices, and to ensure equity of access across a range of sustainable low carbon transport subsectors (e.g. green freight, NMT)

## VI. Study Conclusions

Multiple studies have attempted to quantify annual transport investment needs within the EST region, with estimates ranging from up to \$245bn for the Asia Pacific region, up to \$90bn for South Asia, and nearly \$75bn for India alone. While these figures have begun to drive global policy discussions, they offer limited utility in informing national policies; thus, it is essential to generate bottom-up projections of investment needs, which are currently limited among EST countries. At the same time, complementary studies assert that sustainable transport investments are likely to be less expensive than comparable BAU investments, and thus that a broad shift to sustainable low carbon transport promises long-term economic benefits.

Despite the need for increasing investment in sustainable transport, current global funding flows are insufficient to achieve quantitative targets at the required scale and speed, and thus, it is unlikely that the public sector will be able to take on the additional investment required to scale up sustainable transport. Increased private sector involvement will be required to meet projected transport needs, which is not realistic under current market conditions in EST countries with regional resources alone. Therefore, it is essential that transport sector infrastructure and services be accessible to private investment from both domestic and foreign sources.

Despite the significant demand for transport investments and limited investment resources, many current policies in the EST region limit the potential of the private sector to contribute to transport infrastructure and services. The EST region is diverse, and there is no single policy to maximize private sector involvement for all countries. However, it is established that removing restrictions on foreign direct investment in infrastructure projects and guaranteeing against nationalization of assets are key ways to reduce obstacles for domestic and foreign private sector investors.

Scaling up private sector involvement in sustainable transport infrastructure and services also hinges on having a stable set of enabling conditions and safeguards in place to make investments more attractive. In addition, transport investments must generate secure revenue streams to attract private sector investment. Finally, if social benefits from sustainable modes of transport can be monetized, with the public sector bearing an appropriate degree of risk, private sector appetite for investment in sustainable transport infrastructure and services is likely to increase.

Public-private partnerships are designed to leverage the expertise of the private sector to develop infrastructure and manage operations, and thus to allow governments to scale up transport investments and services while focusing on the primary responsibilities of policy, planning and regulation. Though PPP has potential to allow faster scale up, this strategy may also increase overall project costs that must be managed through contingency planning. PPP transport investment trends in the EST region have been mixed in recent years; thus, to meet the demands of global commitments with required scale and speed, it is important that PPP leaders in the EST region deepen involvement, and that PPP followers make strides to catch up to leaders.

Bond financing is a useful tool to jump-start sustainable transport investments, and while the bond market has grown quickly and continues to evolve, broader application is needed to meet sustainable development targets in the EST region over the next five years. In order for bond financing to have a significant impact on near-term transport investments, it is essential to expand corporate green bond issuance among EST countries, to exploit the potential for sustainable transport in municipal bonds by strengthening city credit ratings, and to increase bond issuance in subsectors other than heavy rail, using aggregators as needed to meet issuance thresholds.

Multilateral development banks can play a role in scaling up sustainable low carbon transport in the EST region by leveraging the resources and expanding the capacity of the private sector, through MDB's high credit ratings and regional expertise. To achieve required scale-up of sustainable transport in the EST region, MDBs must increase the effectiveness of their private sector operations by focusing on technical assistance and capacity building, by increasing private sector access to climate finance, and by increasing the range of sustainable transport options by expanding private sector operations into additional low-carbon transport subsectors.

In sum, private sector investment in sustainable transport has significant potential under ideal conditions, but key obstacles remain. Sustainable transport funding needs are poorly documented in part because they are divided among national and local levels. Another major unknown is the

degree of equity funding in transport. Furthermore, not even global transport policy makers have given sufficient thought to transport sector funding flows, which has led to an undue focus on climate finance and ODA, rather than more substantial private sector funding sources. A general conclusion is that discussions on transport funding and financing are still in early stages, and that it will require much additional effort to properly understand projected needs, so that they can be addressed in a meaningful way.

Out of 20 goals of the Bangkok 2020 Declaration, there are few for which funding responsibility would be solely the task of government; for most, costs can be either fully or partially transferred to end users or private-sector entities. While financing needs to implement the Declaration are considerable, pursuing a more sustainable transport paradigm and goals embodied in the Bangkok 2020 Declaration can help to lower BAU scenario costs to provide needed transport infrastructure and services across the EST region.

Experience shows that application of private sector strategies to the Bangkok 2020 Declaration goals across EST member countries has been limited to date; thus, it is crucial to increase ambition in these areas in the next five years to achieve the goals of the Declaration within the required timeframe, and thus to make needed strides toward decreasing emissions, improving air quality, and alleviating poverty across the EST region.

Public sector entities in the EST region must engage the private sector according to a given country, policy, and project context; yet, the current stance of policy makers in many EST countries is too tentative, with private sector access limited for both domestic and foreign actors. Thus, more proactive public sector outreach is required in the region to attract private sector investment and allow both sectors to scale up sustainable transport, under proper conditions and with realistic expectations.

The primary justification for the use of private sector finance is its role to attract private entities to provide infrastructure and services at the lowest possible cost, through appropriate incentives and penalties. Ultimately, the merit of private sector financing must be tested with a value-for-money analysis, which is substantially influenced by the degree to which risk can be transferred to the private sector, and which will help to determine the optimal degree of public and private sector involvement for sustainable transport investments of varying scale and scope.

## REFERENCES

- AASHTO. N.d. *Availability Payments*. [http://www.transportation-finance.org/funding\\_financing/financing/other\\_finance\\_mechanisms/availability\\_payments.aspx](http://www.transportation-finance.org/funding_financing/financing/other_finance_mechanisms/availability_payments.aspx). Accessed Nov. 5, 2014.
- AECOM Consult. 2007. *Case Studies of Transportation Public-Private Partnerships around the World*. [http://N.d.fhwa.dot.gov/ipd/pdfs/int\\_ppp\\_case\\_studies\\_final\\_report\\_7-7-07.pdf](http://N.d.fhwa.dot.gov/ipd/pdfs/int_ppp_case_studies_final_report_7-7-07.pdf). Accessed Sep. 25, 2014.
- Albalade, D., and B. Germa. 2012. *The Economics and Politics of High-Speed Rail: Lessons from Experiences Abroad*. UK: Lexington Books.
- Allen, H., and S. Kidney. 2014. *Climate Bonds Breaking New Ground for Investing in Sustainable Transport*. Call for papers, UN Sustainable Development Journal. Natural Resources Forum. Draft.
- Ang, G. and V. Marchal. 2013. *Mobilising Private Investment in Sustainable Transport: The Case of Lan-Based Passenger Transport Infrastructure*. OECD Environment Working Papers, No. 56, OECD Publishing. <http://doi.org/10.1787/5k46hjm8jpmv-en>. Accessed Sep, 25, 2014.
- Asian Bonds Online. N.d. *General Supervisory Framework*. <http://asianbondsonline.adb.org/china/structure/rules/supervisory.php>. Accessed Sep 10, 2014.
- Asian Development Bank. 2014a. *ADB and the Climate Investment Funds*. <https://N.d.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/adb-climate-investment-funds.pdf>. Accessed Oct. 15, 2014.
- . 2014b. *ADB and the Private Sector: An Effective Partnership*. <http://N.d.adb.org/features/adb-and-private-sector-effective-partnership>. Accessed Aug. 25, 2014.
- . 2014c. *Asian Capital Market Development and Integration: Challenges and Opportunities*. <http://N.d.adb.org/sites/default/files/pub/2014/asian-capital-market-development-integration.pdf>. Accessed Oct 24, 2014.
- . 2014d. *Development Effectiveness Report 2013: Private Sector Operations*. Development Effectiveness Reports. <http://N.d.adb.org/documents/development-effectiveness-report-2013-private-sector-operations>. Accessed Oct 5, 2014.
- . 2014e. *New ADB Office to Provide Independent PPP Transaction Advisory Services*. <http://N.d.adb.org/news/new-adb-office-provide-independent-ppp-transaction-advisory-services>. Accessed Sep. 4, 2014.
- . 2013. *Progress Report (2012-2013) of the MDB Working Group on Sustainable Transport*. <http://N.d.adb.org/documents/progress-report-2012-2013-mdb-working-group-sustainable-transport>. Accessed Aug. 30, 2014.

- . 2012a. *Assessment of Public-Private partnerships in Cambodia: Constraints and Opportunities*. <http://N.d..adb.org/sites/default/files/pub/2012/assessment-of-ppp-cambodia.pdf>. Accessed Sep. 26, 2014.
- . 2012b. *Private Sector Operations: Innovation, Impact, Integrity*, <http://N.d..adb.org/sites/default/files/pub/2012/psod-brochure.pdf>. Accessed Sep. 24, 2014.
- . 2008. *Strategy 2020: The Long Term Strategic Framework of the Asian Development Bank (2008-2020)*. <http://N.d..adb.org/sites/default/files/Strategy2020-print.pdf>. Accessed Aug. 21, 2014.
- . N.d.a. *Private Sector Financing Overview*. <http://N.d..adb.org/site/private-sector-financing/main>. Accessed Oct. 20, 2014.
- . N.d.b.. *Project Data Sheet: 33924-014: PHI: North Luzon Expressway Rehabilitation and Expansion (Formerly Manila North Toll ways Corporation)*. <http://N.d..adb.org/projects/33924-014/main>. Accessed Sep. 17, 2014.
- . N.d.c. *Project Data Sheet: 45041-022: Vientiane Sustainable Urban Transport Project*. <http://N.d..adb.org/projects/45041-002/details>. Accessed Oct. 5, 2014.
- . N.d.d. *Project data sheet: 46928-014: PRC: loan program for clean bus leasing - Far East Horizon Limited*. <http://N.d..adb.org/projects/46928-014/details>. Accessed Oct. 1, 2014.
- . N.d.e. *Project Data Sheet: 47279-002: Karachi Bus Rapid Transit Project*. <http://N.d..adb.org/projects/47279-002/details>. Accessed Oct. 5, 2014.
- Aviation. 2014. *Transport: Aviation Action Plan*. <http://N.d..un.org/climatechange/summit/wp-content/uploads/sites/2/2014/09/TRANSPORT-Aviation-Action-plan.pdf>. Accessed Oct. 28, 2014.
- Wignaraja, G. 2013. *Asian Infrastructure Development: Needs and A Way Forward*. Asian Development Bank Institute. <http://N.d..adbi.org/files/2013.09.04.cpp.wignaraja.asian.infrastructure.dev.way.forward.pdf>. Accessed Oct. 23, 2014.
- Bitran, E. 2012. *Public Private Partnership in Transport Infrastructure Projects: Lessons from the Chilean Experience*. <http://N.d..transportes.gov.br/public/arquivo/arq1336655345.pdf>. Accessed Sep. 15. 2014.
- Butcher, L. 2012. *London Underground After the PPP, 2007—Commons Library Standard Note*, <http://N.d..parliament.uk/briefing-papers/SN01746/london-underground-after-the-ppp-2007>. Accessed Sep. 26, 2014.
- C40 Cities. 2014. *Johannesburg the First C40 City to Issue Green City Bond*. <http://newswatch.nationalgeographic.com/2014/06/12/johannesburg-the-first-c40-city-to-issue-green-city-bond/>. Accessed Sep. 10 2014.
- Calica, A. 2014. *Palace: Plan to Shut Down MRT-3 Needs Careful Study*.

- <http://N.d..philstar.com/headlines/2014/10/11/1378841/palace-plan-shut-down-mrt-3-needs-careful-study>. Accessed Oct. 12, 2014.
- Chappatta, B. 2014. *Illinois Tollway Sets Biggest Sale Since Pension Fix: Muni Deals*. <http://www.bloomberg.com/news/2014-01-27/illinois-tollway-sets-biggest-sale-since-pension-fix-muni-deals.html>. Accessed Nov. 8, 2014.
- City of Gothenburg. N.d.. *Projects*. <http://finans.goteborg.se/en/greenbonds/projects/>. Accessed Sep. 10, 2014.
- Climate Bonds Initiative. 2014. *Bonds and Climate Change: The State of the Market in 2014*. <http://N.d..climatebonds.net/files/files/-CB-HSBC-15July2014-A4-final.pdf> Accessed Oct. 5, 2014.
- . N.d.. *Transport*. <http://N.d..climatebonds.net/standards/standard/transport>. Accessed Sep. 10 2014.
- Climate Change Policy & Practice. 2014. *EIB's Climate Awareness Bond Increases to € 1.5 Billion*. <http://climate-l.iisd.org/news/eibs-climate-awareness-bond-increases-to-e1-5-billion/>. Accessed Sep. 18, 2014.
- Climate Investment Fund. N.d.a. *About the Climate Investment Funds*. <http://N.d..climateinvestmentfunds.org/cif/aboutus>. Accessed Sep. 10, 2014.
- . N.d.b.. *Private Sector*. <https://N.d..climateinvestmentfunds.org/cif/content/information-private-sector>. Accessed Sep. 10, 2014.
- Corner, D. 2006. The United Kingdom Private Finance Initiative: The Challenge of Allocating Risk. *ORCD Journal of Budgeting*, Vol. 5, No. 3, pp. 37- 55. <http://N.d..oecd.org/unitedkingdom/43479923.pdf>. Accessed Sep. 25, 2014.
- Dalal, M. 2013. *Joint Venture to Boost Infrastructure Bonds*. <http://N.d..ifrasia.com/joint-venture-to-boost-infrastructure-bonds/21081282.article>. Accessed Sep. 17, 2014.
- Denton Wilde Sapte LLP. 2006. *Public Private Partnerships: BOT Techniques and Project Finance*. London: Euromoney Books.
- Deutsche Investitions- und Entwicklungsgesellschaft. N.d. *Key Data: Corporate Data At A Glance*. <https://N.d..deginvest.de/International-financing/DEG/Die-DEG/Kennzahlen/>. Accessed Sep. 11, 2014.
- develoPPP.de. N.d.a. *Facts and Figures*. <http://N.d..developpp.de/en/content/facts-figures>. Accessed Sep, 10. 2014.
- develoPPP.de. N.d.b.. *Our Programme*. <http://N.d..developpp.de/en/content/developppde>. Accessed Sep. 10, 2014.
- Economic Transformation Programme. 2011. *About ETP: Mass Rapid Transit*. [http://etp.pemandu.gov.my/11\\_January\\_2011-@-Mass\\_Rapid\\_Transit.aspx#sthash.qjZ37Ep7.dpuf](http://etp.pemandu.gov.my/11_January_2011-@-Mass_Rapid_Transit.aspx#sthash.qjZ37Ep7.dpuf). Accessed Oct. 2, 2014.

- Economist Intelligence Unit and Asian Development Bank. 2011. *Evaluating the environment for public-private partnerships in Asia-Pacific: The 2011 Infrascopes*. <http://N.d..adb.org/sites/default/files/pub/2012/evaluating-environment-ppp-2011-infrascopes.pdf>. Accessed Oct. 1, 2014.
- European Bank for Reconstruction and Development. 2014a. *About the EBRD: We Invest in Changing Lives*. <http://N.d..ebrd.com/downloads/research/factsheets/about.pdf>. Accessed Aug 21, 2014.
- . 2014b. *EBRD President Calls for Fresh Approach for Development Bank Cooperation*, Oct. 2014. <http://N.d..ebrd.com/pages/news/press/2014/141009.shtml>. Accessed Oct. 9, 2014.
- . 2014c. *EBRD President Optimistic Ahead of 2015 Paris Climate Summit*. <http://N.d..ebrd.com/pages/news/press/2014/141021b.shtml>. Accessed Oct. 21, 2014.
- . 2014d. *Factsheet: Transport*. <http://N.d..ebrd.com/downloads/research/factsheets/transport.pdf>. Accessed Sep. 15, 2014.
- . 2014e. *Project Summary Documents: Eastcomtrans Loan*. <http://N.d..ebrd.com/pages/project/psd/2014/43675.shtml>. Accessed Sep 25, 2014.
- . 2012a. *Core Principles*. [http://N.d..ebrd.com/pages/sector/legal/concessions/core\\_principles.shtml](http://N.d..ebrd.com/pages/sector/legal/concessions/core_principles.shtml). Accessed Sep. 15, 2014.
- . 2012b. *Danube Logistics – Giurgiulesti port*. <http://N.d..ebrd.com/english/pages/project/psd/2012/44144.shtml>. Accessed Sep. 21, 2014.
- . N.d.a. *EBRD Climate Finance Global Partnership: Accelerating the Response to Climate Change*. [http://N.d..ebrd.com/downloads/news/EBRD\\_534\\_SEI\\_EECC\\_12p\\_FINAL\\_LoRes.pdf](http://N.d..ebrd.com/downloads/news/EBRD_534_SEI_EECC_12p_FINAL_LoRes.pdf). Accessed Sep. 23, 2014.
- . N.d.b. *Gender Equality*. <http://N.d..ebrd.com/pages/about/principles/gender.shtml>. Accessed Sep. 21, 2014.
- . N.d.c. *Governance and Sustainability*. <http://N.d..ebrd.com/pages/about/principles.shtml>. Accessed Sep. 21, 2014.
- European Investment Bank. 2014. *Joint Report on MDB Climate Finance 2013*. <http://N.d..eib.org/projects/documents/joint-report-on-mdb-climate-finance-2013.htm>. Accessed Sep. 21, 2014.
- . 2011. *Risk Distribution and Balance Sheet Treatment: Practice Guide*. <http://N.d..eib.org/epc/resources/epc-risk-distribution-and-balance-sheet-treatment.pdf>. Accessed Aug 29, 2014.
- . N.d. *The Europe 2020 Project Bond Initiative – Innovative Infrastructure Financing*. <http://N.d..eib.org/products/project-bonds/>. Accessed Sep 12, 2014.
- European PPP Expertise Centre. 2012. *Financing PPPs with Project Bonds: Issues for Public*

- Procuring Authorities*. [http://N.d..eib.europa.eu/attachments/thematic/epec\\_financing\\_ppps\\_with\\_project\\_bonds\\_en.pdf](http://N.d..eib.europa.eu/attachments/thematic/epec_financing_ppps_with_project_bonds_en.pdf). Accessed Sep. 15, 2014.
- Fang, X.J., J. Meng, N. Soriano, and K. Hanagami. N.d.. *Suvarnabhumi Airport, Bangkok Thailand*. [http://web.eng.hawaii.edu/~panos/444\\_09\\_3\\_2.pdf](http://web.eng.hawaii.edu/~panos/444_09_3_2.pdf). Accessed Sep. 21, 2014.
- Flyvbjerg, B., M.K.S.Holm, and S.L. Buhl. 2013. How common and how large are cost overruns in transport infrastructure projects? *Transport Reviews*, Vol. 23, No. 1, pp. 71-88.
- Fukui, K., K. Nakamura, T. Ozaki, N.D.. Sakamaki, F. Mizutani.1994. Institutionalizing Major Policy Change and Examining Economic Implications. [http://N.d.-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/1994/12/01/000009265\\_3970716144024/Rendered/INDEX/multi0page.txt](http://N.d.-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/1994/12/01/000009265_3970716144024/Rendered/INDEX/multi0page.txt). Accessed Sep. 15, 2014.
- Gatti, S. 2007. *Project Finance in Theory and Practice*. <http://wafaa-sherif.com/new/ar/wp-content/uploads/2012/11/Project%20Finance%20in%20Theory%20and%20Practice.pdf>. Accessed Sep. 15, 2014.
- Gatubolaget. N.d.. *Homepage*. <http://N.d..gatubolaget.goteborg.se/hem.aspx>. Accessed Sep. 18, 2014.
- Global Environment Facility. 2013. *Project Identification Form: Green Shipping Programme for Russia*. <http://goo.gl/qzJ9hC>. Accessed Sep. 25, 2014.
- . N.d.. *Detail of GEF Project #5530*. [http://N.d..thegef.org/gef/project\\_detail?projID=5530](http://N.d..thegef.org/gef/project_detail?projID=5530). Accessed Sep. 23, 2014.
- HM Treasury and Infrastructure UK. 2013. *Private Finance Initiative Projects: 2013 summary data*. [https://N.d..gov.uk/government/uploads/system/uploads/attachment\\_data/file/267590/PU1587\\_final.pdf](https://N.d..gov.uk/government/uploads/system/uploads/attachment_data/file/267590/PU1587_final.pdf). Accessed Sep. 25, 2014.
- Huizenga, C. 2011. *Implementing the Bangkok 2020 Declaration Towards Promoting Environmentally Sustainable Transport in Developing Asia*. United Nations Centre for Regional Development. <http://N.d..uncrd.or.jp/content/documents/6EST-1-BGP1.pdf>. Accessed Oct. 20, 2014.
- IAIR. 2014. *A7 Federal Highway Project Bond Financing with EIB Credit Enhancements*. [http://www.iaireview.org/scheda\\_legal.php?idl=126](http://www.iaireview.org/scheda_legal.php?idl=126). Accessed Nov. 8, 2014.
- Infrastructure Policy Unit. 2013. *2012 East Asia and the Pacific PPI Data Update*. <http://ppi.worldbank.org/features/December-2013/2012-EAP-Regional-Note-Final.pdf>. Accessed Aug. 27, 2014.
- International Association of Public Transport. 2014. *Press Release: Public Transport Sector Demonstrates Will to Act on Climate Change At New York Summit*. [http://N.d..slocat.net/sites/default/files/u13/pr\\_public\\_transport\\_demonstrates\\_will\\_to\\_act\\_on\\_climate\\_change.pdf](http://N.d..slocat.net/sites/default/files/u13/pr_public_transport_demonstrates_will_to_act_on_climate_change.pdf). Accessed Oct. 28, 2014.
- International Energy Agency. 2014. *World Energy Investment Outlook: Special Report*.

- <http://N.d..iea.org/publications/freepublications/publication/weio2014.pdf>. Accessed Oct. 5, 2014.
- International Finance Corporation. 2014a. *Annual Report FY13: The Power of Partnerships*. [http://N.d.-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/10/11/000442464\\_20131011120841/Rendered/PDF/817900WBAR0v1000Box379841B00PUBLIC0.pdf](http://N.d.-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/10/11/000442464_20131011120841/Rendered/PDF/817900WBAR0v1000Box379841B00PUBLIC0.pdf). Accessed Sep. 15, 2014.
- . 2014b. *IFC & Infrastructure Fact Sheet*. [http://N.d..ifc.org/wps/wcm/connect/e692c80045edcb21bcdebd9916182e35/AM2014\\_IFCIssueBrief\\_Infrastructure.pdf?MOD=AJPERES](http://N.d..ifc.org/wps/wcm/connect/e692c80045edcb21bcdebd9916182e35/AM2014_IFCIssueBrief_Infrastructure.pdf?MOD=AJPERES). Accessed Oct. 24, 2014.
- . 2014c. *IFC Road Map FY 15-17: Implementing the World Bank Group Strategy*. [http://N.d..ifc.org/wps/wcm/connect/be82a00044d7b68091c09dc66d9c728b/Road+Map\\_FY15-17\\_redacted.pdf?MOD=AJPERES](http://N.d..ifc.org/wps/wcm/connect/be82a00044d7b68091c09dc66d9c728b/Road+Map_FY15-17_redacted.pdf?MOD=AJPERES). Accessed Sep. 15, 2014.
- International Railway Association. 2014. *Transport: Low Carbon Rail Transport Challenge Action Plan*. <http://N.d..un.org/climatechange/summit/wp-content/uploads/sites/2/2014/09/TRANSPORT-Action-Plan-UIC.pdf>. Accessed Oct. 28, 2014.
- Islamic Development Bank. N.d.. *What is Sukuk?* <http://thatswhy.isdb.org/irj/go/km/docs/documents/IDBDevelopments/Internet/thatswhy/en/sukuk/what-is-sukuk.html>. Accessed Sep. 5, 2014.
- Jackson, P. 2012. *Value for Money and International Development: Deconstructing Myths to Promote A More Constructive Discussion*. The OECD Development Assistance Committee. <http://N.d..oecd.org/development/effectiveness/49652541.pdf>. Accessed Sep. 15, 2014.
- Japan External Trade Organization. 2010. *Public Private Partnerships in Australia and Japan: Facilitating Private Sector Participation*. [https://N.d..jetro.go.jp/en/reports/survey/pdf/2010\\_01\\_other.pdf](https://N.d..jetro.go.jp/en/reports/survey/pdf/2010_01_other.pdf). Accessed Sep. 25, 2014.
- Kreditanstalt für Wiederaufbau. N.d.a. Sector: 2013. <http://transparenz.kfw-entwicklungsbank.de/en/sectoren/index.html>. Accessed Sep. 11, 2014.
- . 2012. *Project Examples: Indonesia – Commuter Trains*. <https://N.d..kfw-entwicklungsbank.de/International-financing/KfW-Entwicklungsbank/Sectors/Transport/Projektbeispiele/Indonesien-S-Bahn/>. Accessed Sep. 11, 2014.
- Kidney, S. 2014a. *EIB issues first USD Climate Awareness (green) bond, and it's another big one: \$1bn, 10yr, 2.5% coupon. Note the tenor. That takes 2014 issuance over \$32bn*. <http://N.d..climatebonds.net/2014/10/eib-issues-first-usd-climate-awareness-green-bond-and-it-s-another-big-one-1bn-10yr-25>. Accessed Oct. 27, 2014.
- . 2014b. *Germany's KfW issues largest ever USD green bond - \$1.5bn! (AAAe, 1.75%, 5yr) and it's still 1.6x oversubscribed*. <http://N.d..climatebonds.net/2014/10/germany-s-kfw-issues-largest-ever-usd-green-bond-15bn-aaa-175-5yr-and-it-s-still-16x>. Accessed Oct. 27, 2014.

- . 2014c. *IFC Issues First Peruvian Soles-denominated PEN 42m (\$15m) green bond, for domestic investor RIMAC Seguros, AAA, 20 yr. A Fantastic Kick-start For A Domestic Green Bond Market in Peru?* Climate Bonds Initiative.  
<http://N.d..climatebonds.net/2014/08/ifc-issues-first-peruvian-soles-denominated-pen-42m-15m-green-bond-domestic-investor-rimac>. Accessed Oct. 10, 2014.
- . 2014d. *UK Govt Guarantees £48.5m Green Power Bond – Excellent Example of Role Public Sector Can Play in Boosting The Green Bonds Market.*  
<http://N.d..climatebonds.net/2014/08/uk-govt-guarantees-£485m-green-power-bond---excellent-example-role-public-sector-can-play>. Accessed Oct. 10, 2014.
- . 2014e. *World Bank Goes Retail with 3 Small Green Bonds for \$5m, EUR 10m & \$30m – All with Complex Coupon Structures. Last One was 3x Oversubscribed,* Oct. 2, 2014.  
<http://N.d..climatebonds.net/2014/09/world-bank-has-issued-another-two-small-green-bonds-5mn-and-eur10mn---new-bond-structures>. Accessed Oct. 4, 2014.
- Kim, J.N.D., and S.N.D.. Lee. 2013. *Lessons from Korea on Institutional Arrangements and Performance*, <https://N.d..kdevelopedia.org/mnt/idas/asset/2013/06/13/DOC/PDF/04201306130126672075914.pdf>. Accessed Sep. 26, 2014.
- Kim, K.S., and G.C. Kim. 2012. *Korea's Best Practices in the Transport Sector: Bus System Reform in Korea*, The Korea Transport Institute.  
[http://N.d..koti.re.kr/mail/pdf/KOTI\\_2011\\_04.pdf](http://N.d..koti.re.kr/mail/pdf/KOTI_2011_04.pdf). Accessed Sep. 30, 2014.
- Konno, S. 1997. *JNR Privatization—JR's First 10 Years and Future Perspectives.*  
[http://N.d..jrtr.net/jrtr13/pdf/f34\\_kon.pdf](http://N.d..jrtr.net/jrtr13/pdf/f34_kon.pdf). Accessed Sep. 10, 2014.
- Lee, S.M. 2014. *Seoul's Challenge for Bus System Reform.*  
<https://N.d..kdevelopedia.org/mnt/.../04201407090132868075911.pdf>. Accessed Sep. 28, 2014.
- Lester, J.. 2014. *Toyota Issues Green Bonds to Drive Efficient Vehicles.*  
<http://cleantechnica.com/2014/05/03/toyota-issues-demand-green-bonds-drive-efficient-vehicles/>. Accessed Oct. 10, 2014.
- Lienert, I. 2009. *IMF Working Paper: Where Does the Public Sector End and the Private Sector Begin?* <http://N.d..imf.org/external/pubs/ft/wp/2009/wp09122.pdf>. Accessed Sep. 26, 2014.
- Mandri-Perrott, C. 2010. *Private Sector Participation in Light Rail-Light Metro Transit Initiatives.* <http://N.d..ppiaf.org/sites/ppiaf.org/files/publication/PSP-LightRail-CMandri-Perrott.pdf>. Accessed Oct. 5, 2014.
- Mathews, J.A., S. Kidney, K. Mallon, and M. Hughes. 2010. Mobilizing private finance to drive an energy industrial revolution. *Energy Policy*, Vol. 38, Issue 7, pp. 3263-3265.
- McKinsey on Society. 2012. *From Potential to Action: Bringing Social Impact Bonds to the U.S.*  
<http://mckinseyonsociety.com/social-impact-bonds/>. Accessed Sep. 15, 2014.
- Ministry of Finance, Government of India. N.d.. *PPP Toolkit for Improving PPP Decision-*

- Making Processes: Overview of PPP Modal Variants.*  
<http://N.d..toolkit.pppinindia.com/ports/module1-oopmv-tmpmf.php?links=oopmv1b>.  
 Accessed Sep. 25, 2014.
- Miyazaki, K. 2011. Ex-Post Evaluation of Japanese ODA Loan: “Second Bangkok International Airport Development Project (I)(II)(III)(IV)(V)(VI)(VII).”  
[http://www2.jica.go.jp/en/evaluation/pdf/2011\\_TXXV-4\\_4.pdf](http://www2.jica.go.jp/en/evaluation/pdf/2011_TXXV-4_4.pdf). Accessed Sep. 21, 2014.
- Morales, J.A.. 2013. *Why ADB is Providing More Support to PPPs in the Philippines.*  
<https://N.d..devex.com/news/why-adb-is-providing-more-support-to-ppps-in-the-philippines-81588>. Accessed Sep. 17, 2014.
- Murakami, J and R. Cervero. 2010. *High-Speed Rail and Economic Development: Business Agglomerations and Policy Implications.* University of California Transportation Center, UC Berkeley. [http://N.d..its.berkeley.edu/volvo-center/Cervero/California\\_High\\_Speed\\_Rail\\_and\\_Economic\\_Development\\_Paper\\_-murakami\\_cervero2.pdf](http://N.d..its.berkeley.edu/volvo-center/Cervero/California_High_Speed_Rail_and_Economic_Development_Paper_-murakami_cervero2.pdf). Accessed Sep. 25, 2014.
- O’Sullivan, A. and S.M. Sheffrin. 2003. *Economics: Principles in Action.* New Jersey: Pearson Prentice Hall.
- Ontario Financing Authority. *Undat Projects.* <http://N.d..ofina.on.ca/greenbonds/projects.htm>.  
 Accessed Sep. 10, 2014.
- OnVista. Kowloon-Canton Railway Corp. 2014. Anleihe: 5,125% bis 20.05.2019.  
[http://N.d..onvista.de/anleihen/snapshot.html?ID\\_INSTRUMENT=24805029&PERIOD=9&ID\\_NOTATION=82620729#chart](http://N.d..onvista.de/anleihen/snapshot.html?ID_INSTRUMENT=24805029&PERIOD=9&ID_NOTATION=82620729#chart). Accessed Oct. 14, 2014.
- Organisation for Economic Cooperation and Development. 2011. *Strategic Transport Infrastructure Needs to 2030: Main Findings.* <http://N.d..oecd.org/futures/infrastructure-to2030/49094448.pdf>. Accessed Oct. 23, 2014.
- Partneritetet Kosova. N.d. *Public-Private Partnerships.*  
[http://N.d..pppkosova.org/repository/docs/public\\_private\\_partnerships.pdf](http://N.d..pppkosova.org/repository/docs/public_private_partnerships.pdf). Accessed Sep. 16, 2014.
- Partnership on Sustainable, Low-Carbon Transport. 2014a. *Concept Paper: Developing a Financing Framework for Sustainable, Low-Carbon Transport.*  
[http://N.d..slocat.net/sites/default/files/slocats\\_role\\_in\\_developing\\_a\\_financing\\_framework\\_for\\_sustainable\\_transport\\_-\\_concept\\_paper.pdf](http://N.d..slocat.net/sites/default/files/slocats_role_in_developing_a_financing_framework_for_sustainable_transport_-_concept_paper.pdf). Accessed Jun. 3, 2014.
- . 2014b. *Transport: Joint Action Statement*, Sep. <http://N.d..slocat.net/sites/default/files/u10/transport-joint-action-statement-final.pdf>. Accessed Oct 5, 2014.
- . N.d.. *Climate Instruments for the Transport Sector (CITS).* <http://N.d..slocat.net/key-slocat-prog/355>. Accessed Oct 5, 2014.
- Pettus, A. 2013. *Social Impact Bonds.* <http://harvardmagazine.com/2013/07/social-impact-bonds>.  
 Accessed Sep. 12, 2014.
- Press Trust of India. 2014. *Gujarat to Adopt PPP Model for Rural Area Road Construction.*

- [http://N.d.business-standard.com/article/pti-stories/gujarat-to-adopt-ppp-model-for-rural-area-road-construction-114072401612\\_1.html](http://N.d.business-standard.com/article/pti-stories/gujarat-to-adopt-ppp-model-for-rural-area-road-construction-114072401612_1.html). Accessed Oct. 15, 2014.
- PricewaterhouseCoopers. 2014. *Developing Infrastructure in Asia Pacific: Outlook, Challenges and Solutions*. <http://N.d.pwc.com/sg/en/capital-projects-infrastructure/assets/cpi-develop-infrastructure-in-ap-201405.pdf>. Accessed Oct. 23, 2014.
- . 2012. *Public Private Partnerships in Malaysia*. <http://N.d.pwc.com/my/en/assets/services/ppp-projects-in-malaysia.pdf>. Accessed Oct. 1, 2014.
- PROPARCO. 2014a. *Financing Investments In Developing Countries*. [http://N.d.proparco.fr/lang/en/Accueil\\_PROPARCO/Activite](http://N.d.proparco.fr/lang/en/Accueil_PROPARCO/Activite). Accessed Oct. 1, 2014.
- . 2014b. *Geographical Coverage, 2013*. [http://N.d.proparco.fr/webdav/site/proparco/shared/ELEMENTS\\_COMMUNS/IMAGES/Cartes/Planisph%C3%A8re%20Proparco%202013-12.pdf](http://N.d.proparco.fr/webdav/site/proparco/shared/ELEMENTS_COMMUNS/IMAGES/Cartes/Planisph%C3%A8re%20Proparco%202013-12.pdf). Accessed Oct. 1, 2014.
- . N.d. *Improve Port Infrastructure In Ho Chi Minh City*. [http://N.d.proparco.fr/lang/en/Accueil\\_PROPARCO/Activite/PageCacheeAnte2011/Tous-les-projets/Vietnam-2009-Ameliorer-les-infrastructures-portuaires-a-Ho-Chi-Minh](http://N.d.proparco.fr/lang/en/Accueil_PROPARCO/Activite/PageCacheeAnte2011/Tous-les-projets/Vietnam-2009-Ameliorer-les-infrastructures-portuaires-a-Ho-Chi-Minh). Accessed Oct. 1, 2014.
- Public-Private Partnership in Infrastructure Research Center. 2012. *Regulation of Sectors and Regulatory Issues Impacting PPPs*. World Bank Group. <http://ppp.worldbank.org/public-private-partnership/legislation-regulation/regulatory>. Accessed Sep. 15, 2014.
- . N.d.a. *About Public-Private Partnerships*. World Bank. <http://ppp.worldbank.org/public-private-partnership/overview>. Accessed Sep. 16, 2014.
- . N.d.b. *Concession, Build-Operate-Transfer (BOT) and Design-Build-Operate (DBO) Projects*. <http://ppp.worldbank.org/public-private-partnership/agreements/concessions-bots-dbos#overview>. Accessed Sep. 15, 2014.
- . N.d.c. *PPP Arrangements/ Types of Public-Private Partnership Agreements*. <http://ppp.worldbank.org/public-private-partnership/agreements>. Accessed Sep. 15, 2014.
- . N.d.d. *Franchising Melbourne's Train and Tram System*. <http://ppp.worldbank.org/public-private-partnership/library/franchising-melbourne-train-and-tram-system>. Accessed Nov. 7, 2014.
- . N.d.f. *Government Objectives: Benefits and Risks of PPPs*. <http://ppp.worldbank.org/public-private-partnership/overview/ppp-objectives>. Accessed Sep. 15, 2014.
- Putcher, J., N.D., Park, and M.N.D., Kim. 2005. Public Transport Reforms in Seoul: Innovations Motivated by Funding Crisis. *Journal of Public Transportation*, Vol. 8, No. 5, pp. 41-62.
- Railway-technology.com. 2014. *LTA Invites Bids for Feasibility Study of Kuala Lumpur-Singapore HSR Link*. <http://N.d.railway-technology.com/news/news/ta-invites-bids-for-feasibility-study-of-kuala-lumpur-singapore-hsr-link-150414-4214884>. Accessed Oct. 3, 2014.

- Replege, M. A. and L. M. Fulton. 2014. *A Global High Shift Scenario: Impacts And Potential For More Public Transport, Walking, and Cycling With Lower Car Use*. [https://N.d.itdp.org/wp-content/uploads/2014/09/A-Global-High-Shift-Scenario\\_WEB.pdf](https://N.d.itdp.org/wp-content/uploads/2014/09/A-Global-High-Shift-Scenario_WEB.pdf). Accessed Oct. 5, 2014.
- Sclar, E. 2000. *You Don't Always Get What You Pay For: The Economic Privatization*. New York: Cornell University Press.
- Sina Finance. 2014. 发改委酝酿千亿规模交通投资. <http://finance.sina.cn/?sa=t74d13174015v2357&fromsinao=1&vt=4>. Accessed Oct. 23, 2014.
- Stock Exchange of Thailand. N.d.. *Bond Info: SRT169F*. [http://marketdata.set.or.th/tfx/bondprofile.do?symbol=SRT169F&locale=en\\_US](http://marketdata.set.or.th/tfx/bondprofile.do?symbol=SRT169F&locale=en_US). Accessed Oct. 6, 2014.
- Tahilyani, N., T. Tamhane, J. Tan. 2011. *Asia's \$1 trillion infrastructure opportunity*. [http://N.d.mckinsey.com/insights/financial\\_services/asias\\_1\\_trillion\\_infrastructure\\_opportunity](http://N.d.mckinsey.com/insights/financial_services/asias_1_trillion_infrastructure_opportunity). Accessed Oct. 5, 2014.
- The Economist. 2014. *Investing in Infrastructure: The Trillion-Dollar Gap*. <http://N.d.economist.com/news/leaders/21599358-how-get-more-worlds-savings-pay-new-roads-airports-and-electricity>. Accessed Oct. 5, 2014.
- The Global Commission on the Economy and Climate. 2014. *The New Climate Economy*. <http://newclimateeconomy.report>. Accessed Oct. 5, 2014.
- The International Bank for Reconstruction and Development and World Bank. 2011. *Railway Reform: Toolkit for Improving Rail Sector Performance: China*. [http://N.d.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways\\_toolkit/ch7\\_3\\_3.html](http://N.d.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/ch7_3_3.html). Accessed Aug. 28, 2014.
- The Nation. 2014. *Skytrain passengers hit 600,000 in August*. <http://nationmultimedia.com/breakingnews/Skytrain-passengers-hit-600000-in-August-30215214.html>. Accessed Jun. 26, 2014.
- The Star Online. 2013. *Malaysia-Singapore high-speed rail link*. <http://N.d.thestar.com.my/News/Nation/2013/02/20/MalaysiaSingapore-highspeed-rail-link/>. Accessed Oct. 3, 2014.
- UN News Centre. 2012. *Rio+20 Development Banks to Invest \$175 billion in Sustainable Transport*. <http://N.d.un.org/apps/news/story.asp?NewsID=42287>. Accessed Oct. 25, 2014.
- United Nations Department of Economic and Social Affairs: Population Division, Population Estimates and Projections Section. 2012. *World Population Prospects: The 2012 Revision*. [http://esa.un.org/wpp/unpp/panel\\_population.htm](http://esa.un.org/wpp/unpp/panel_population.htm). Accessed Oct. 5, 2014.
- Urban Mobility Initiative. 2014. *Transport: Action Plan*. <http://N.d.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/09/TRANSPORT-Action-Plan-UEMI.pdf>. Accessed Oct. 28, 2014.

- Veolia Transport. 2009. *Seoul Metro Line 9*. <http://N.d..veolia-transport.com/ressources/files/1/890,DP-Seoul-US.pdf>. Accessed Sep. 30, 2014.
- Washington Public Ports Association. n.d. *Port Financing*. <http://washingtonports.org/washington-ports/about-our-ports/port-financing>. Accessed Nov. 8, 2014.
- Wilkins, K. and A. Zurawski. 2014. *Infrastructure Investment in China*. <http://N.d..rba.gov.au/publications/bulletin/2014/jun/pdf/bu-0614-4.pdf>. Accessed Sep 17, 2014.
- Williams, A. 2014. *EBRD President Calls for Fresh Approach For Development Bank Cooperation*. <http://N.d..ebrd.com/pages/news/press/2014/141009.shtml>. Accessed Oct. 9, 2014.
- World Bank Group. 2014a. *Infrastructure Gap in South Asia: Infrastructure Needs, Prioritization, and Financing*. <http://documents.worldbank.org/curated/en/2014/09/20210647/infrastructure-gap-south-asia-infrastructure-needs-prioritization-financing>. Accessed Oct. 23, 2014.
- . 2014b. *Projects and Operation: Hajia Railway*. <http://N.d..worldbank.org/projects/P117341/hajia-railway?lang=en>. Accessed Sep 16, 2014.
- . 2014c. *Projects and Operations: Financing Public Private Partnerships (PPPs) in Infrastructure Through Support to the India Infrastructure Finance Company Ltd*. <http://N.d..worldbank.org/projects/P102771/financing-public-private-partnerships-ppps-infrastructure-through-support-india-infrastructure-finance-company-ltd?lang=en&tab=overview>. Accessed Sep. 21, 2014.
- . 2013. *Operational Manual: OP 4.03 – Performance Standards for Private Sector Activities*. <http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTOPMANUAL/0,,contentMDK:23408394~menuPK:64701637~pagePK:64709096~piPK:64709108~theSitePK:502184,00.html>. Accessed Sep. 10, 2014.
- . 2012. *Best Practices in Public-Private Partnerships Financing in Latin America: the Role of Guarantees*. [http://einstitute.worldbank.org/ei/sites/default/files/Upload\\_Files/BestPracticesPPFinancingLatinAmericaguarantees.pdf](http://einstitute.worldbank.org/ei/sites/default/files/Upload_Files/BestPracticesPPFinancingLatinAmericaguarantees.pdf). Accessed Nov. 8, 2014.
- . N.d. *Low-Carbon Livable Cities Initiative*. [http://unfccc.int/files/bodies/awg/application/pdf/01\\_wb\\_james\\_close.pdf](http://unfccc.int/files/bodies/awg/application/pdf/01_wb_james_close.pdf). Accessed Oct. 20, 2014.
- World Bank Treasury. N.d.. *World Bank Green Bonds: Green projects From Around the World*. <http://treasury.worldbank.org/cmd/htm/MoreGreenProjects.html>. Accessed Oct. 10, 2014.
- World Finance. 2013. *PPPs in the Pipeline for Thailand*. <http://N.d..worldfinance.com/infrastructure-investment/project-finance/ppps-in-the-pipeline-for-thailand>. Accessed Oct. 7, 2014.