

Key Trends in Asian Infrastructure Market and Roles of Banks and Public Funds

June 2017



Asian Infrastructure Market Overview



Private Participation in Infrastructure Database



The Global Competitiveness Report 2015-2016

McKinsey & Company



AIDB ASIAN DEVELOPMENT BANK



Asian Infrastructure Market Overview

Asia's Infrastructure Competitiveness¹

Index 1 (Inefficient And Extremely Underdeveloped) to 7 (Well Developed)

Inefficient and Extremely Underdeveloped Well Developed

| | Roads | Rail | Ports | Airports | Electricity |
|-------------|-------|------|-------|----------|-------------|
| China | 4.7 | 5.0 | 4.5 | 4.8 | 5.3 |
| HK | 6.7 | 6.4 | 5.1 | 6.6 | 5.9 |
| India | 4.1 | 4.1 | 4.2 | 4.3 | 3.7 |
| Indonesia | 3.7 | 3.6 | 3.8 | 4.4 | 4.1 |
| Malaysia | 5.7 | 5.1 | 5.6 | 5.7 | 5.8 |
| Philippines | 3.3 | 3.2 | 3.2 | 3.7 | 4.0 |
| Singapore | 6.2 | 5.7 | 5.7 | 6.8 | 6.7 |
| S. Korea | 5.6 | 5.6 | 5.2 | 5.5 | 5.7 |
| Sri Lanka | 5.2 | 3.9 | 4.3 | 4.9 | 4.9 |
| Taiwan | 5.8 | 5.5 | 5.5 | 5.5 | 6.2 |
| Thailand | 4.4 | 3.4 | 4.5 | 5.1 | 5.2 |
| Vietnam | 3.8 | 3.2 | 3.9 | 4.2 | 4.1 |

¹ Excludes Japan
Source: World Economic Forum's Global Competitiveness Report 2015-16; UN High Level Steering Committee, UN Infrastructure Development Credit Database (data as of 2014), except for Sri Lanka (UNEP AP, data as of 2011)

Large variance in quality of infrastructure assets across Asia, with greatest investment need in South and South East Asia

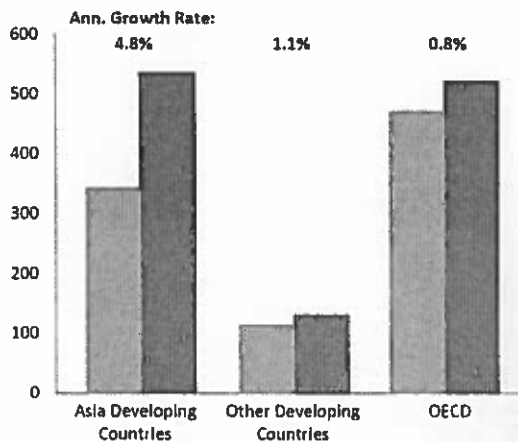
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Road Density and Annual Growth

Km per 1,000 km² of Land Area

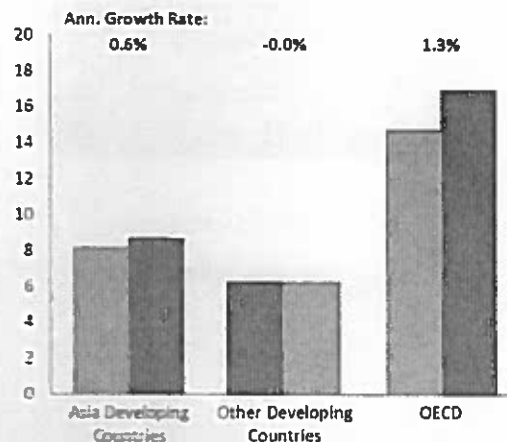
■ Initial Year¹ ■ Latest Year¹



Railroad Density and Annual Growth

Km per 1,000 km² of Land Area

■ 2000 ■ 2011



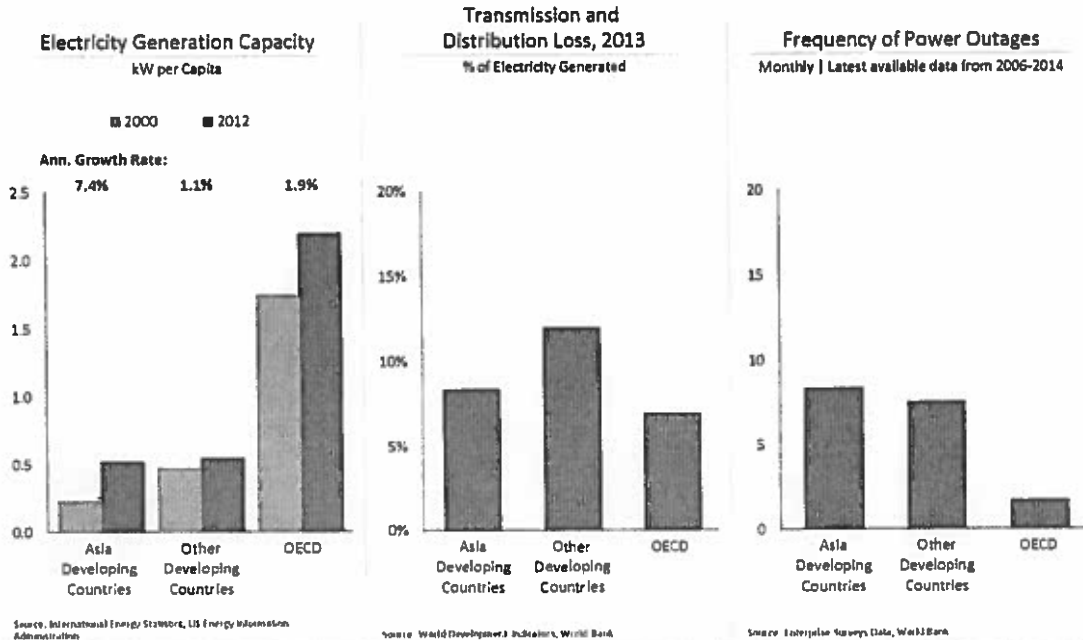
¹ Initial year is between 1996-2004 while latest year is between 2006-2010
Source: International Road Federation (2012); World Development Indicators; World Bank

Source: World Development Indicators; World Bank

Strong growth in road density across developing Asia relative to ROW and OECD, while rail density has stayed static

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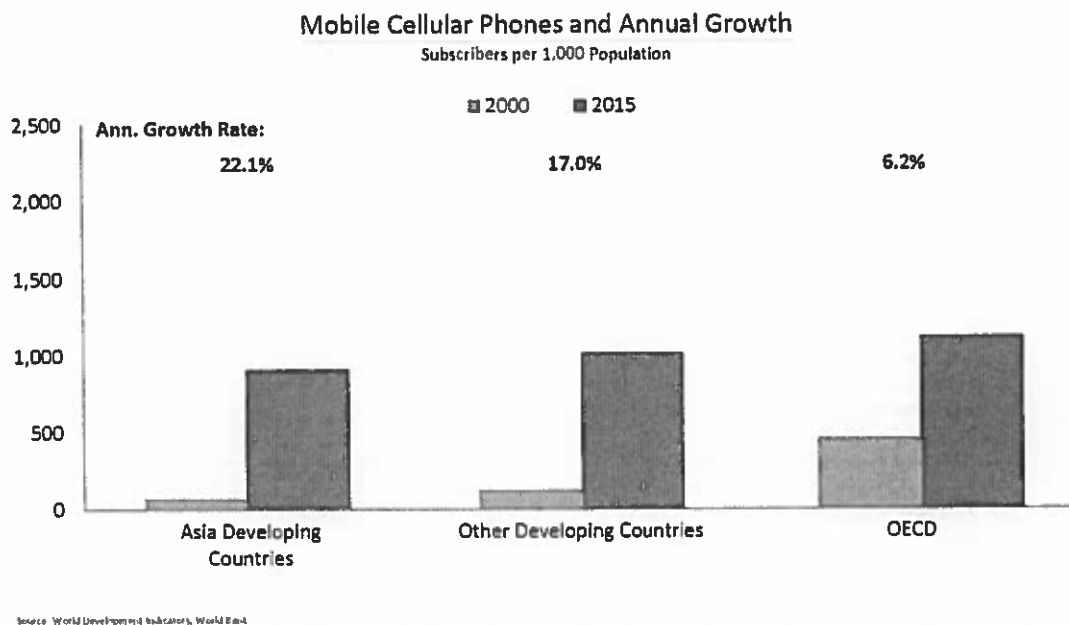
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Strong growth of 7% YoY in electricity generation capacity, but still notably lagging behind OECD in terms of generation capacity, T&D losses, and outages

FIGURE 4 - CONFIDENTIAL - NOT FOR DISTRIBUTION

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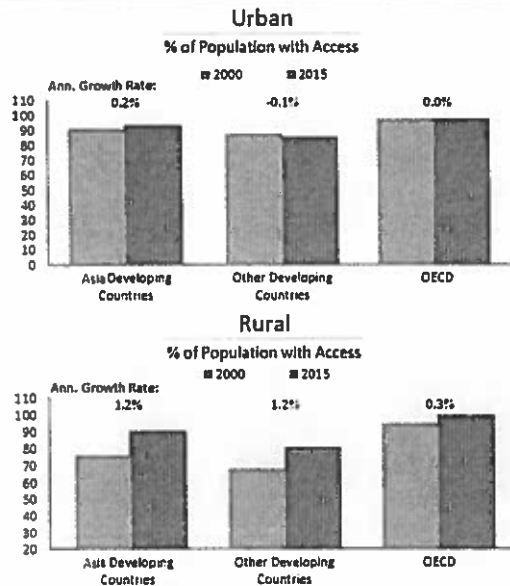


Rapid growth across Developing Asia in telecom services, especially in cellular use, although the subscriber level still remains slightly lower than other developing countries and OECD

FIGURE 5 - CONFIDENTIAL - NOT FOR DISTRIBUTION

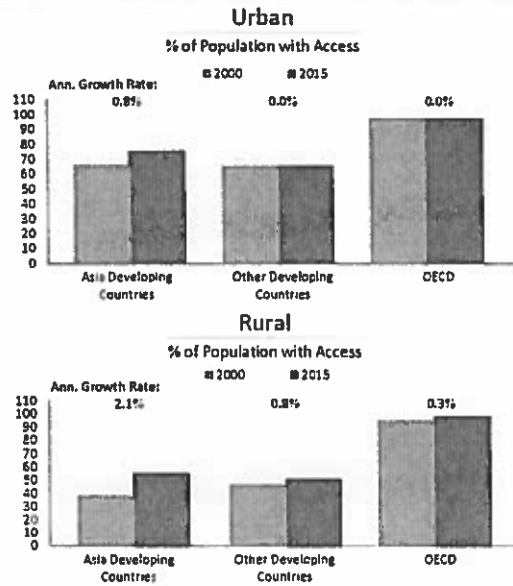
Asian Infrastructure Market Overview

Access to Improved Water Sources



Source: World Development Indicators, World Bank

Access to Improved Sanitation Facilities



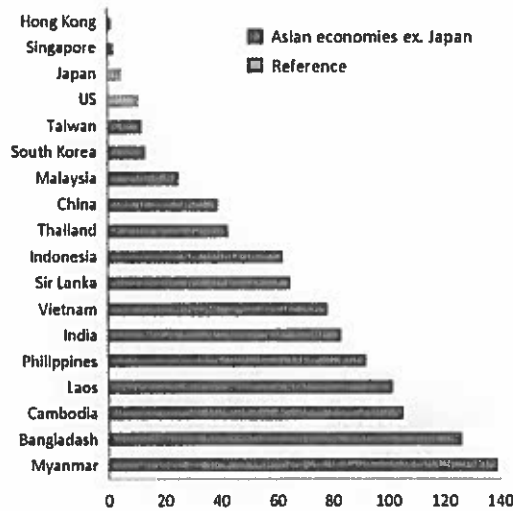
Asia developing countries' access to water and sanitation facilities are growing at a faster rate than other developing countries and OECD

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Solving the Infrastructure Spending Gap

Global Infrastructure Ranking, 2015-2016

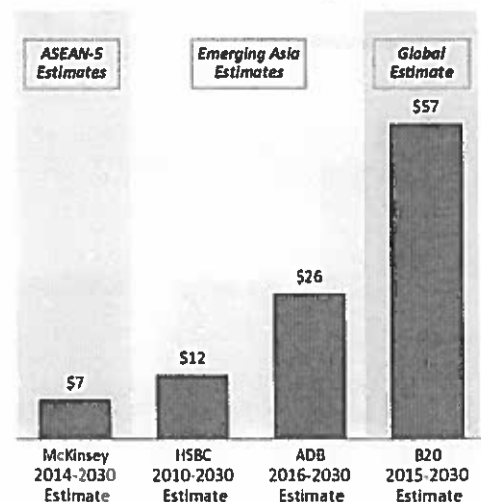
From 1 (Best) to 140 (Worst)



Source: World Economic Forum

Projected Infrastructure Need, by Source

US \$ Trillions



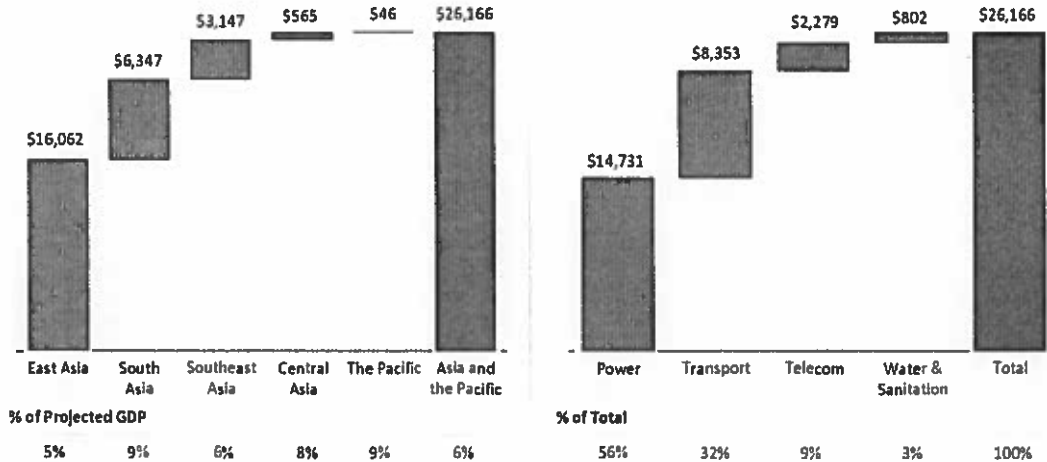
Source: Asia Infrastructure Survey, Deutsche Bank Research, January 2014

Ample need for infrastructure investment in emerging Asia

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Projected Infrastructure Investment Needs, 2016-2030
\$ Billion in 2015 Prices | Climate-adjusted Estimates¹



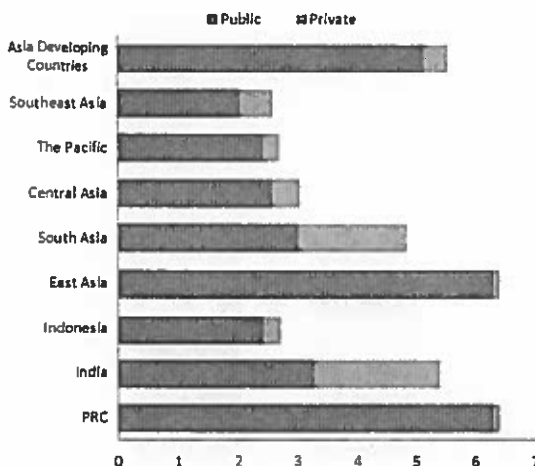
¹ Includes additional investments beyond baseline estimates required for the power sector of various economies and subregions to achieve the 2°C goal
Source: "Meeting Asia's Infrastructure Needs," Asian Development Bank 2017 Report
Note: Includes 25 developing member countries in Asia, which constitute 76% of the population and 45% of GDP of developing countries in the region, identified by Asian Development Bank as study targets that are able to provide reliable data for the purposes of this study. Totals may not sum due to rounding.

Future spend largely driven by East, South / SE Asia in power and transport

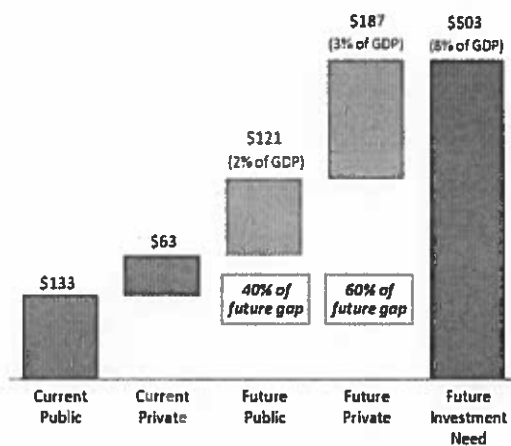
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Solving the Infrastructure Spending Gap

Public and Private Infrastructure Investment, Selected Economies, 2010-2014
% of GDP



Estimated Investment Amounts Required to Meet the Investment Gap, 2016-2020¹
Annual Averages, \$ Billion in 2015 Prices | Climate-adjusted Estimates²



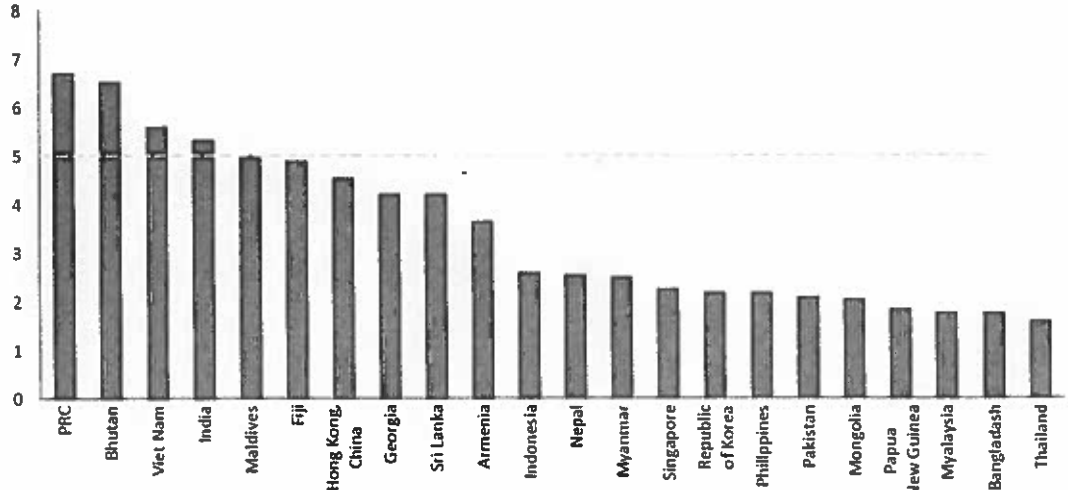
¹ Includes the 25 ADB FIMs minus the People's Republic of China, which constitutes over 75% of current infrastructure investment in the region and therefore would skew figures for the region
² Includes additional investments beyond baseline estimates required for the power sector of various economies and subregions to achieve the 2°C goal
Source: "Meeting Asia's Infrastructure Needs," Asian Development Bank 2017 Report
Note: Includes 25 developing member countries in Asia, which constitute 76% of the population and 45% of GDP of developing countries in the region, identified by Asian Development Bank as study targets that are able to provide reliable data for the purposes of this study. Totals may not sum due to rounding.

Current infrastructure spend is predominately funded by public sources, private sector must dramatically increase share to bridge current investment gap

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Solving the Infrastructure Spending Gap

Budget + PPI Infrastructure Average Investment Rate, Various Years
% of GDP



Note: Actual budget investments except Armenia, Nepal, Georgia, Maldives, Myanmar, and Thailand, which are planned or estimated budget investments. Periods covered are 2010-2014 average for Indonesia, 2011-2013 average for Bhutan, 2010-2014 average for the PRC, 2010-2014 average for Viet Nam, 2011-2013 average for Hong Kong, China, 2011 for Armenia, Bangladesh and Georgia, 2011-2012 average for Nepal, 2012-2013 average for Sri Lanka, 2011-2012 average for Maldives, 2011, 2012, and 2014 average for Singapore, 2011-2014 average for the Philippines, Sri Lanka, and Thailand and 2014 for Myanmar.
Source: "Meeting Asia's Infrastructure Needs," Asian Development Bank 2017 Report

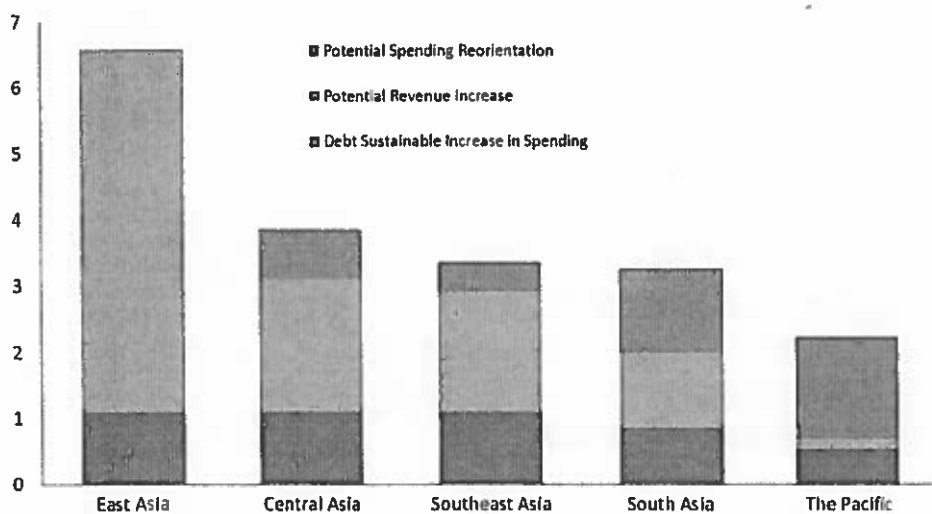
The majority of Asia developing countries are currently investing considerably less than 5% of GDP in infrastructure

THE HIGHLY CORRELATIONAL - NOT CAUSATION

11

Solving the Infrastructure Spending Gap

Fiscal Space in Developing Asia
% of GDP



Source: "Meeting Asia's Infrastructure Needs," Asian Development Bank 2017 Report

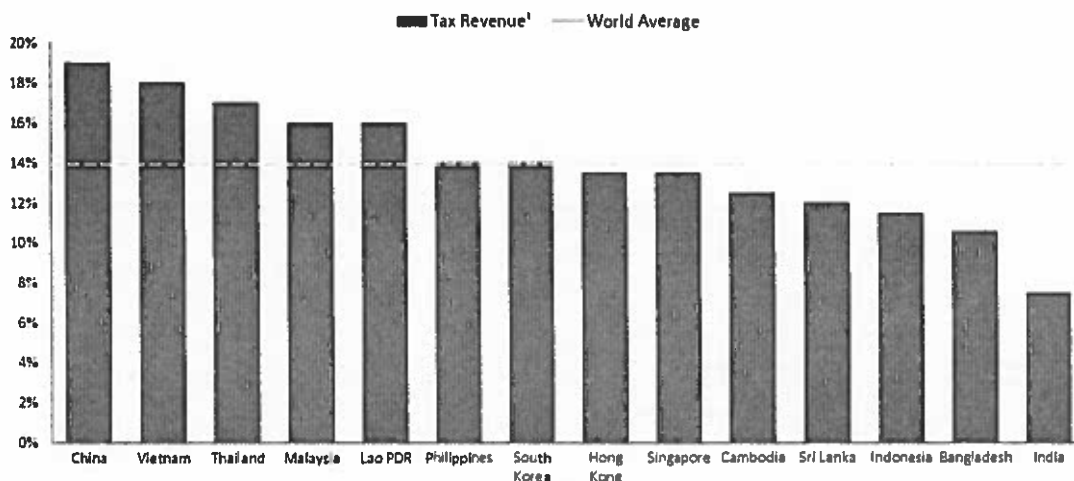
Opportunity for public sector to increase infrastructure spend through tax policy reform, reorienting other budget expenditures and sustaining the right amount of debt

THE HIGHLY CORRELATIONAL - NOT CAUSATION

12

Solving the Infrastructure Spending Gap

Tax Revenue Levels Across Asia
% of GDP



¹ Refers to general government tax revenues, except for Hong Kong, Korea, Indonesia and India (central government). Latest available, mostly 2014. World average as of 2013.
Notes: Country codes: CN China, VN Vietnam, TH Thailand, MY Malaysia, LA Lao PDR, PH Philippines, KR South Korea, HK Hong Kong, SG Singapore, KH Cambodia, LR Sri Lanka, ID Indonesia, BD Bangladesh, IN India
Source: AIC, WFP, IMF Staff Reports, World Bank, Deutsche Bank Research, national sources

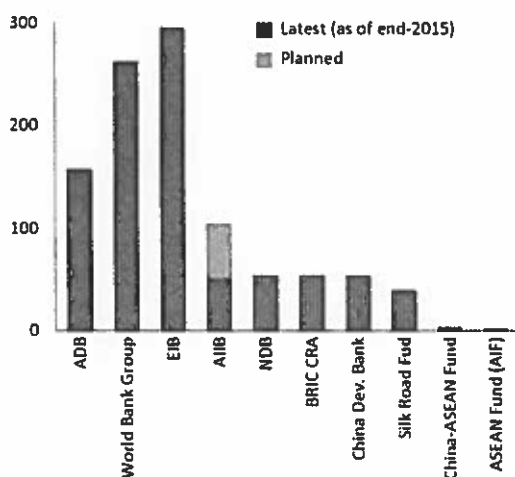
However, narrow tax base threatens to constrain the public sector's ability to use tax revenues to fund infrastructure projects

FIGURE 10 CONFIDENTIAL - NOT FOR DISTRIBUTION

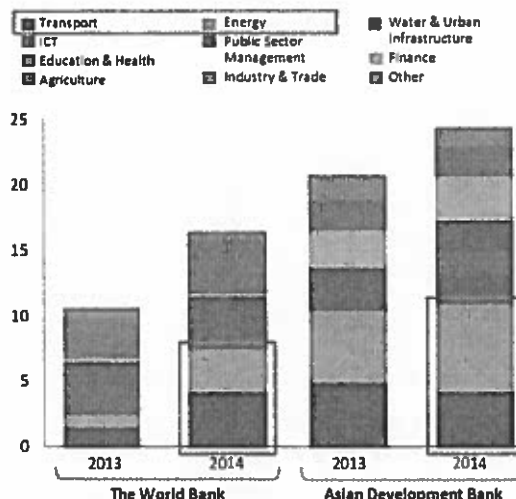
12

Solving the Infrastructure Spending Gap

Subscribed Capital
US \$ Billions



MDB Lending Amount
US \$ Billions



Note: Energy includes mining at the World Bank. World Bank lending data are fiscal year. In 2013, Information and Communications Technology (ICT) is included in Transport at ADB.
Source: The World Bank, ADB Annual reports, Deutsche Bank Research

MDBs collectively represent a large pool of potential financing capital, for energy and transportation projects in particular

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13

Players in Asia Infrastructure Financing

| | Role | Early / Late Stages? | Challenges |
|---------------------------------|---|----------------------|---|
| Public Sector | <ul style="list-style-type: none"> • Governments and SOEs • Responsible for tax and nontax revenues, borrowing via bonds and loans, official development assistance from donor countries, support from MDBs • Currently finances ~92% of Asia's infrastructure investment¹ | Early / Late | <ul style="list-style-type: none"> • Implement regulatory and institutional reforms to attract greater private participation • Use infrastructure expenditures more effectively • Generate a pipeline of bankable projects for public-private partnerships (PPPs) • Develop capital markets |
| MDBs | <ul style="list-style-type: none"> • Provide support for public sector finance • Share expertise and knowledge to identify, design and implement good projects • Promote investment friendly policies and regulatory and institutional reforms • Can offer loan guarantees | Early | <ul style="list-style-type: none"> • Relative insignificant scale vs needs (balance sheet limits, threshold of countries ability to guarantee) • Traditional financing products and impediments for innovations (nature of business model, culture) |
| Commercial Banks | <ul style="list-style-type: none"> • Private financial institutions that provide loans • Domestic private-sector banks play important role, given their ability to assess local project and sovereign risks and to provide lending in local currency • Ability to closely monitor project status through the loan agreement • Particularly crucial source of financing in project development (greenfield) phases | Early | <ul style="list-style-type: none"> • Less developed countries' banks struggle to offer the long tenors needed for sustainable-infrastructure projects, whose payback often comes later than in traditional projects • Post-GFCF regulations impede banks' ability to provide long-term project finance |
| Developers and Operators | <ul style="list-style-type: none"> • Private development / operating companies • Can achieve scale nationally or regionally by developing infrastructure that supports other business lines • Can shape the amount and timing of capital expenditure and assume construction risk • Get involved early in the life cycle, often at conception | Early | <ul style="list-style-type: none"> • Developer equity is risky, expensive, and scarce |
| Unlisted Infrastructure | <ul style="list-style-type: none"> • Private investment managers that invest in debt / equity • Higher returns expectations • Often partner with operators / developers | Early / Late | <ul style="list-style-type: none"> • Infrastructure investors tend to invest in their home region (due to unfamiliarity with a region / geographic distance to projects), resulting in skewed financing towards North American projects |
| Institutional Investors | <ul style="list-style-type: none"> • SWFS, insurance companies, pension funds • Tend to be brownfield investors • Invest primarily in telecom / energy | Late | <ul style="list-style-type: none"> • Tend to invest only when assets are operating to ensure they meet liquidity needs • Often do not have the capital to take on construction risk |

1. Includes 35 Asia developing market countries with adequate available data. Public sector infrastructure investment covers SOEs in India, Indonesia and the PRC, but may underestimate SOE infrastructure investment in other EMAs

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17

Assessing MDB's Role in Infrastructure Financing

- **What are the MDB's offering specifics?**
 - Mainly project-based lending (greenfield and upgrades), sovereign guarantee or preferred creditor status, some financing on project development expenses, certain advisory on regulations, deeper involvement on project execution during the loan tenor years
- **What are the MDB's unique values?**
 - Name Recognition: ability to convene, ability to influence regulations, halo effect
 - Project execution: comprehensive studies, environment impact assessment, procurement
 - Capital: longer tenor
- **What are the issues of MDB's business model?**
 - Relative insignificant scale vs needs (balance sheet limits, threshold of countries ability to guarantee)
 - Traditional financing products and impediments for innovations (nature of business model, culture)

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18