

INFRASTRUCTURE FINANCING

Dr. Kusum Lata

Global Infrastructure Requirements and Gap

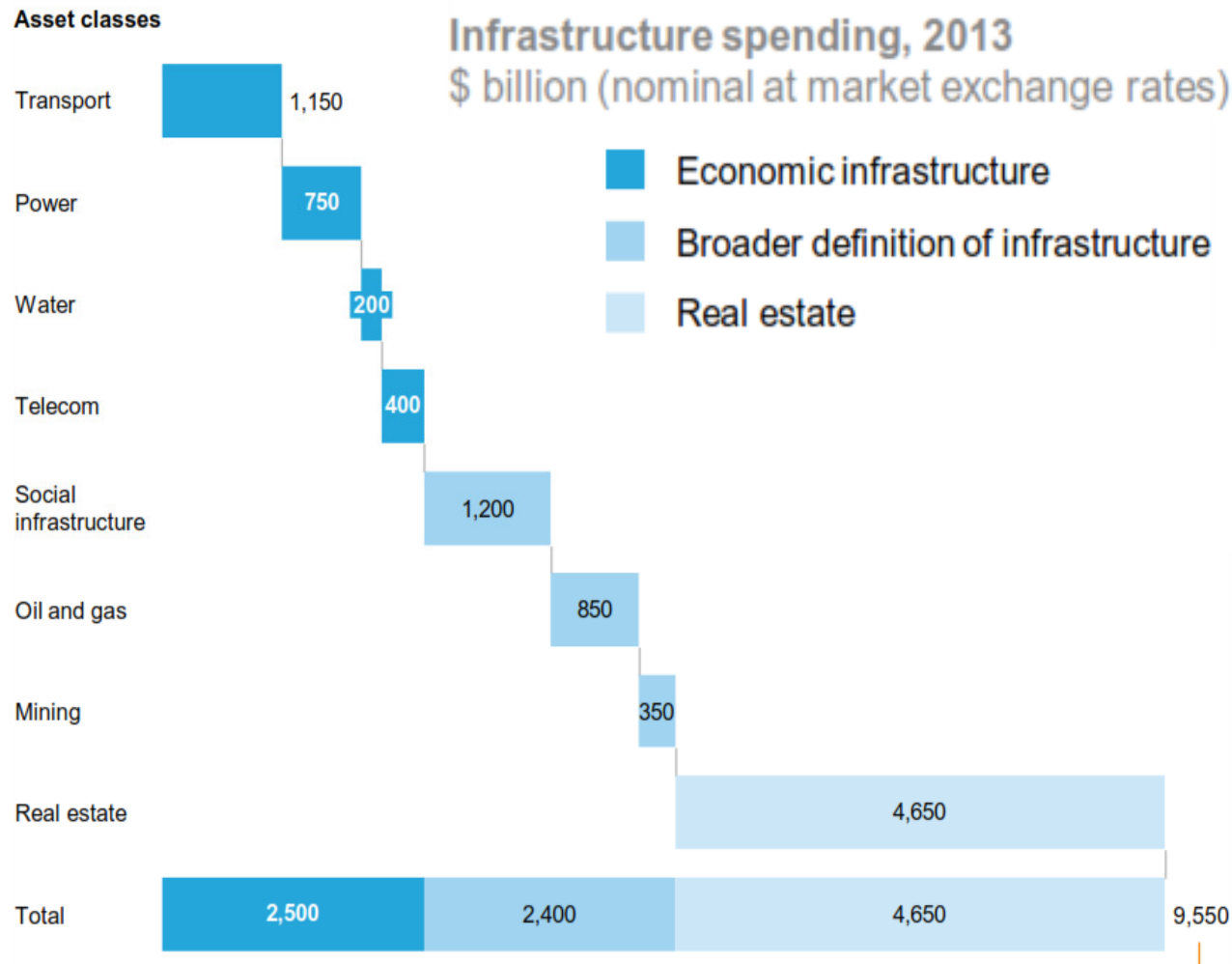
➤ **A few of the numerous research studies on Infrastructure Investment requirements produced by Organisations/ Institutions / Researcher are :**

- **Asian Development Bank, Meeting Asia's Infrastructure Needs (Manila, 2017);**
- **McKinsey Global Institute, Bridging Global Infrastructure Gaps : Has the World made progress (2017);**
- **PwC and Oxford Economics, Capital project and infrastructure spending outlook: Agile strategies for changing markets (2016);**
- **McKinsey Global Institute, Bridging Global Infrastructure Gaps (2016);**
- **OECD, Strategic transport infrastructure needs to 2030, main findings (Paris: OECD, 2011);**
- **Marianne Fay and Tito Yepes, Investment in infrastructure: what is needed from 2000 to 2010 (World Bank Policy Research Working Papers, 2003).**

Bridging Global Infrastructure Gaps (2016)

- **World invested \$2.5 trillion annually in transport, power, water, & telecom as of 2013**
- **To bridge the world infrastructure gap, world needs to invest \$3.3 trillion annually just to meet growth forecasts during 2016- 2030**
- **How to attract the \$120,000,000,000,000 under management by banks & institutional investors to finance the infrastructure has been explored by the McKinsey Global Institute, in their report “Bridging Global Infrastructure Gaps” (2016)**

Global Infrastructure Spending 2013 - MGI



➤ Using the broadest definition of infra. (real estate, social infra. & backbone systems for oil, gas, mining, & processing industries) **world spent \$9.6 trillion**, (14 % of \$68.6 trillion global GDP) **in 2013**

➤ MGI research focused on networked economic infra. [Transport (roads, railways, airports & ports), water, power, & telecom systems (including digital infra.)]

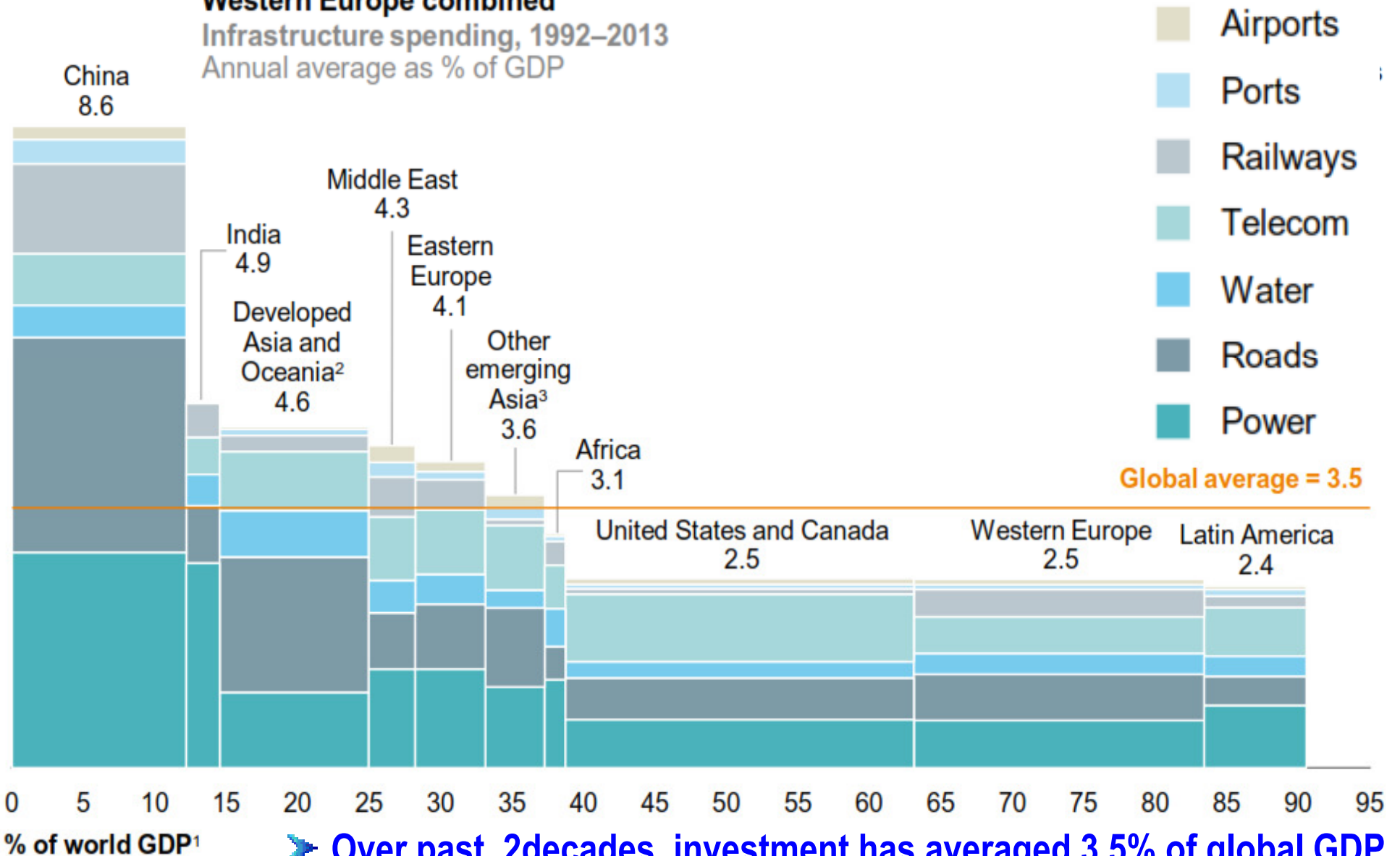
➤ These asset accounted for \$2.5 trillion of global investment in 2013. Over past two decades, investment has averaged 3.5 % of global GDP

➤ Infrastructure is a Multi-trillion Dollar Market

Global Infrastructure Spending 2013

China spends more on economic infrastructure annually than North America and Western Europe combined

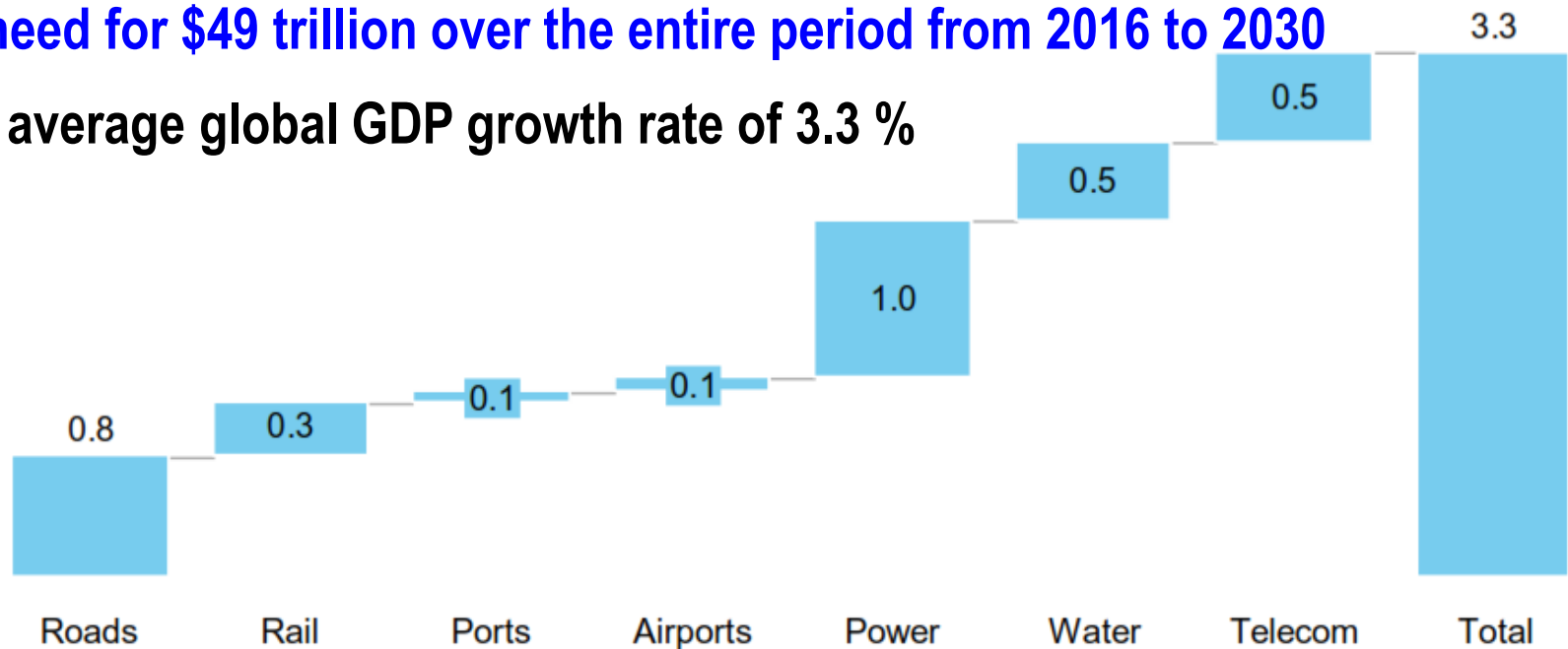
Infrastructure spending, 1992–2013
Annual average as % of GDP



Global Annual Avg. Need 2016-30 - \$3.3trillion

Cumulative need for \$49 trillion over the entire period from 2016 to 2030

Based on an average global GDP growth rate of 3.3 %

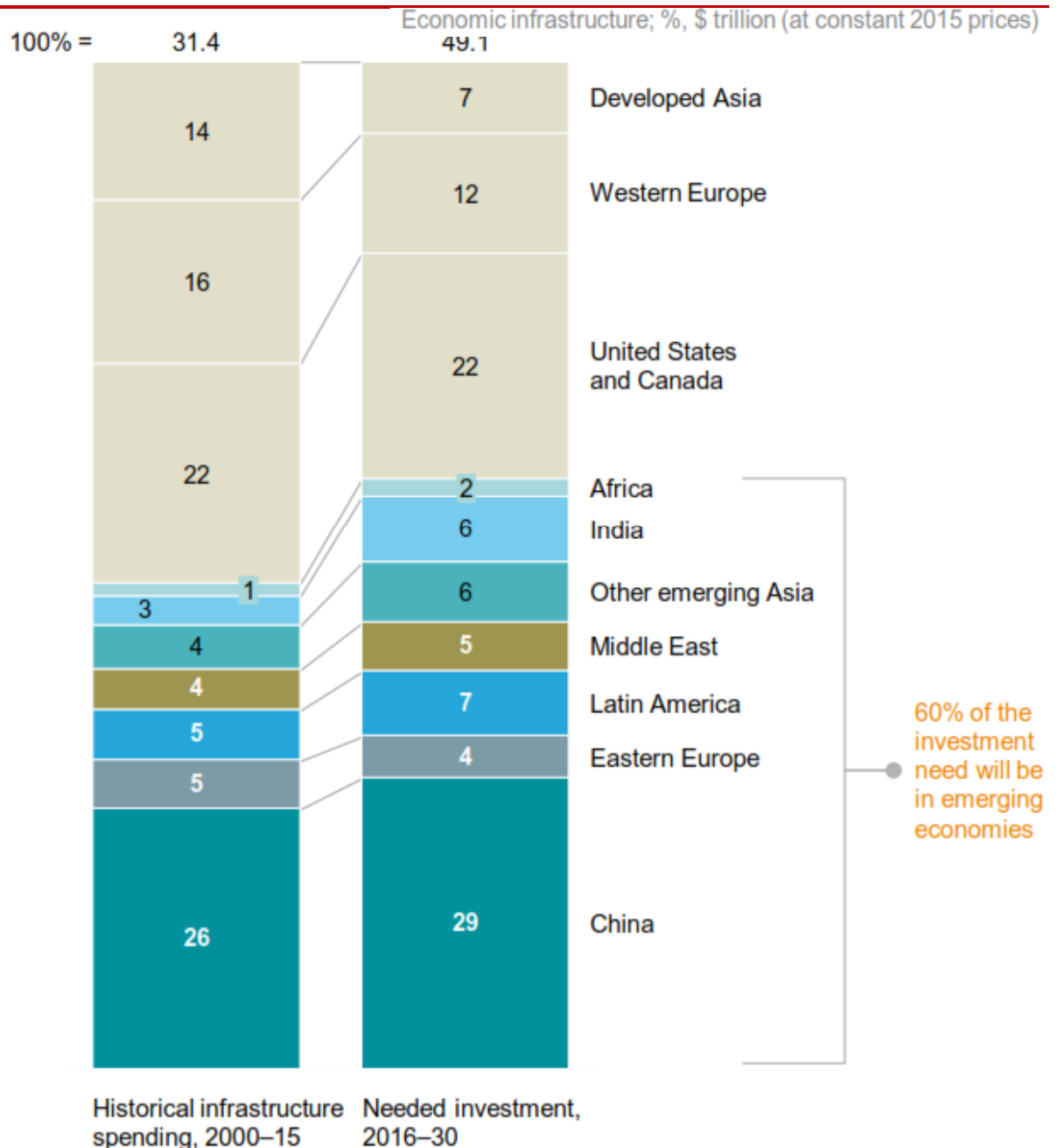


	Roads	Rail	Ports	Airports	Power	Water	Telecom	Total
Annual spending % of GDP	0.9	0.4	0.1	0.1	1.1	0.6	0.6	3.8
Aggregate spending, 2016–30 \$ trillion	11.4	5.1	0.9	1.3	14.7	7.5	8.3	49.1 ¹

- If global growth averages 1% point slower, the total investment need would fall by about \$13 trillion.
- If it exceeds that rate by 1% point, the total investment need would be about \$14 trillion higher.

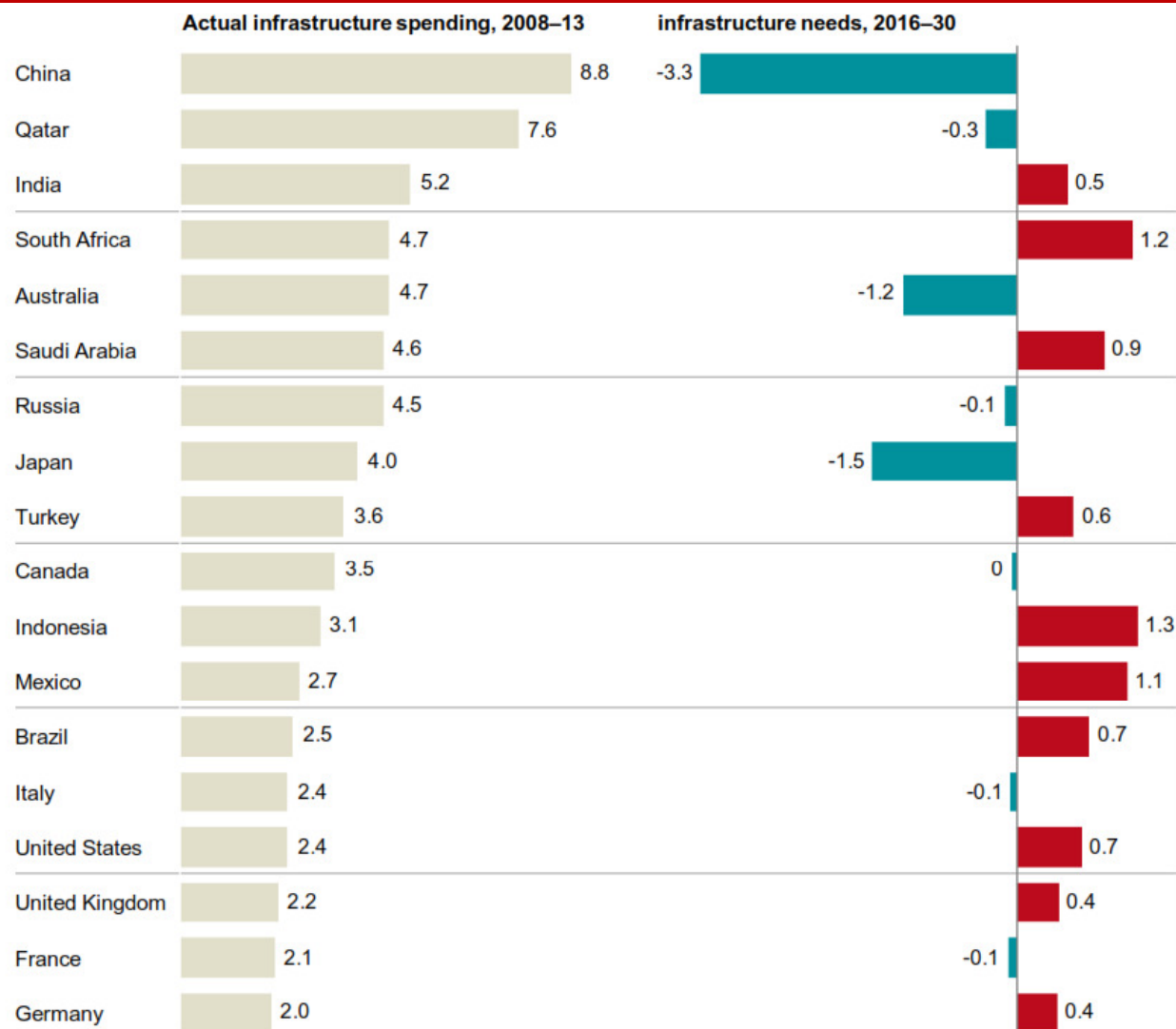
Economic Infrastructure Investment Needs

- Though United States & Europe have substantial needs,
- Majority of investment will be required in emerging economies.
- China's needs remain vast despite its recent overinvestment;
- Its estimate is based on average GDP growth of 5.7% across this period,
- India's need would be 6% during 2016-30 rising from 3% during 2010-15



Varying Infrastructure Investment Gap

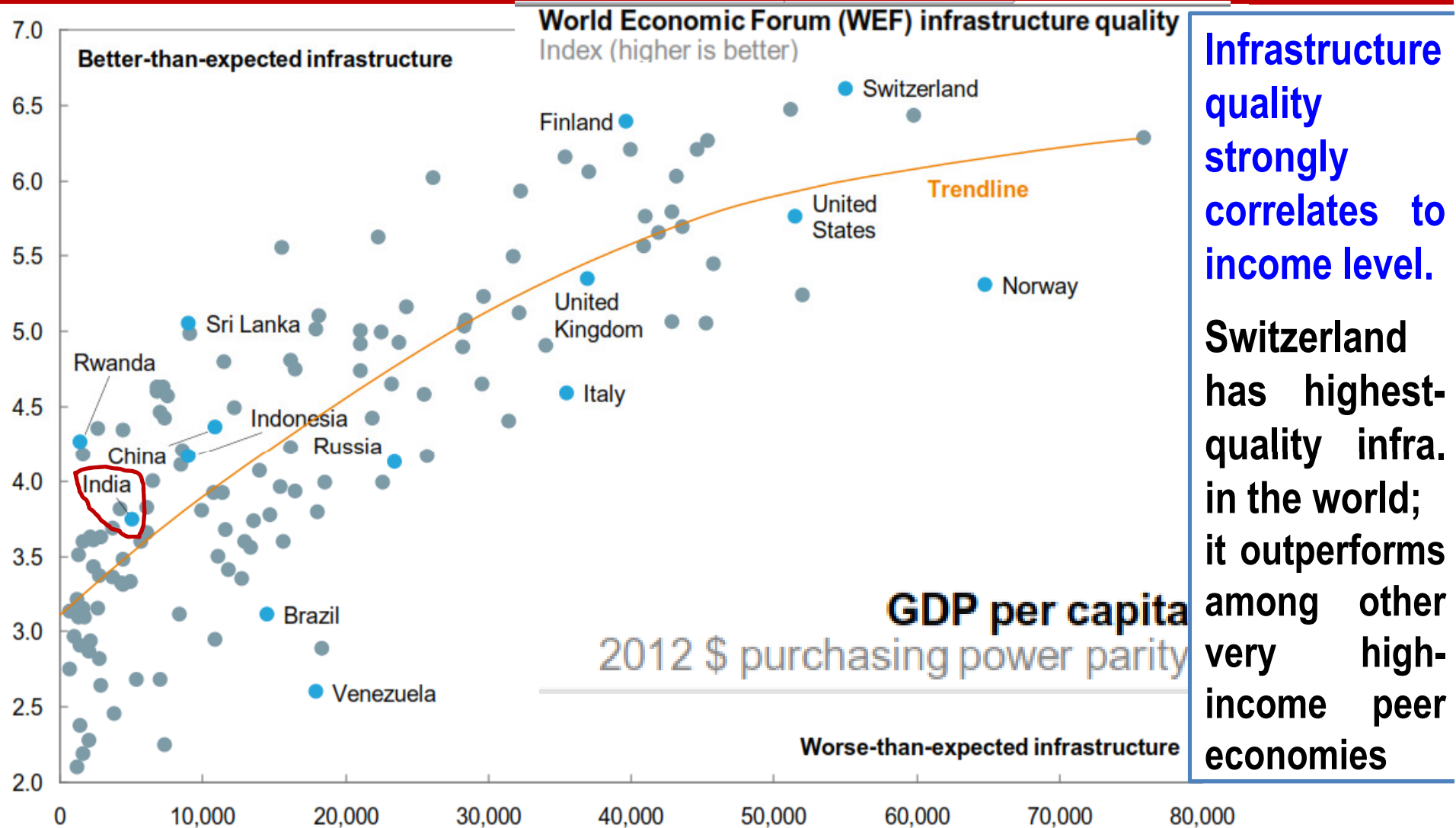
- At prevailing investment rates, world will fall far short of projected needs.
- Baseline needs exceed investment by around 0.4% of global GDP (\$350 bn annually).
- In Cumulative terms, gap totals \$5.2 tn globally during 2016-30.
- World's largest economies, emerging & developed alike, are on trajectories that will produce notable shortfalls.
- As per UNCTAD current spending on economic infra. will need to increase by a further \$1.1 tn/year to fulfill the SDGs in developing economies
- This roughly triples the size of the spending gap



Global gap¹ = 0.4%, or \$5.2 trillion

¹ The global gap for 2016–30 as a share of GDP is calculated by adding negative values, converting to dollar terms, then dividing by cumulative world GDP. Without adjusting for positive gap, the value is 0.2 percent. This has been calculated from a set of 49 countries for which data are available for all sectors. This gap does not include additional investment needed to meet the UN Sustainable Development Goals.

Infrastructure Quality vs GDP per capita

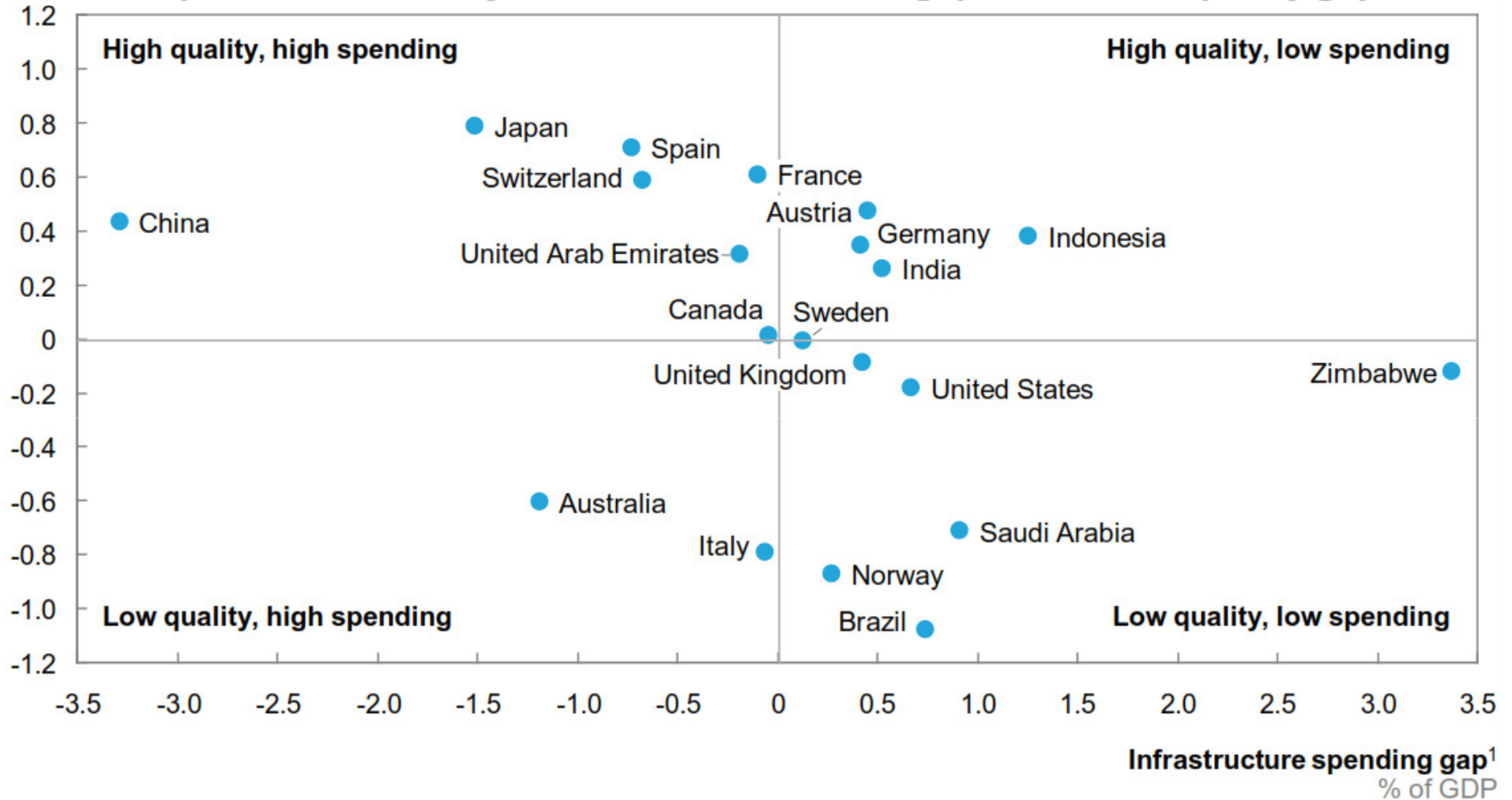


➤ **India & Indonesia, are still at very low income levels despite expectations of growth. Considering their actual GDP per capita, their infrastructure is better than might be expected**

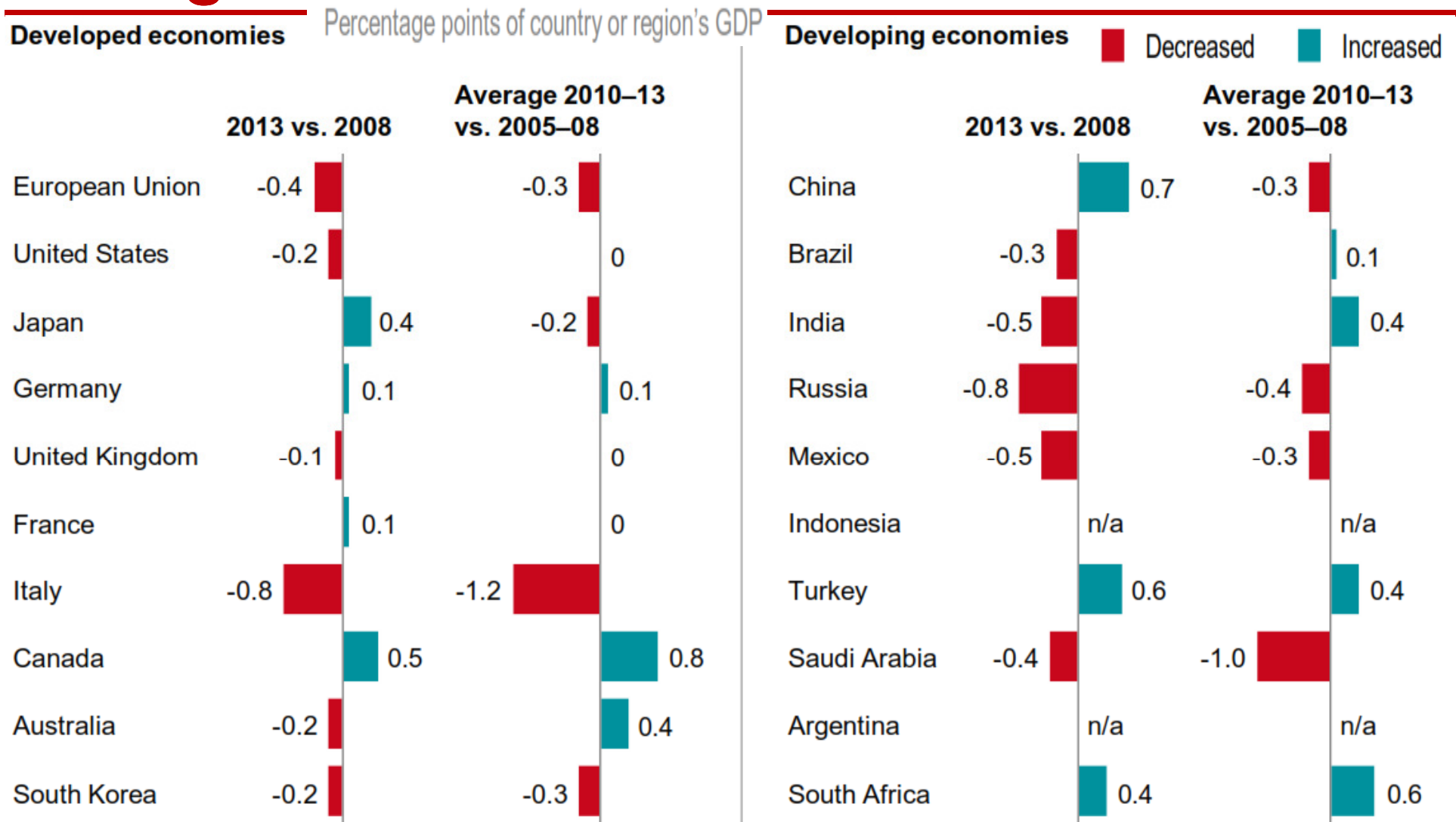
Infrastructure Quality vs Spending

Quality relative to income
Index

Countries perform differently in terms of investment gaps as well as quality gaps



Change in Infrastructure Investment Rate



- ▶ Despite high-level attention & past commitments Infra. Investment rate declined in many parts of world during 2013 as compared to 2008
- ▶ since the global financial crisis, number of large advanced economies among G20 undertook stimulus spending that peaked around 2009 but have since cut back

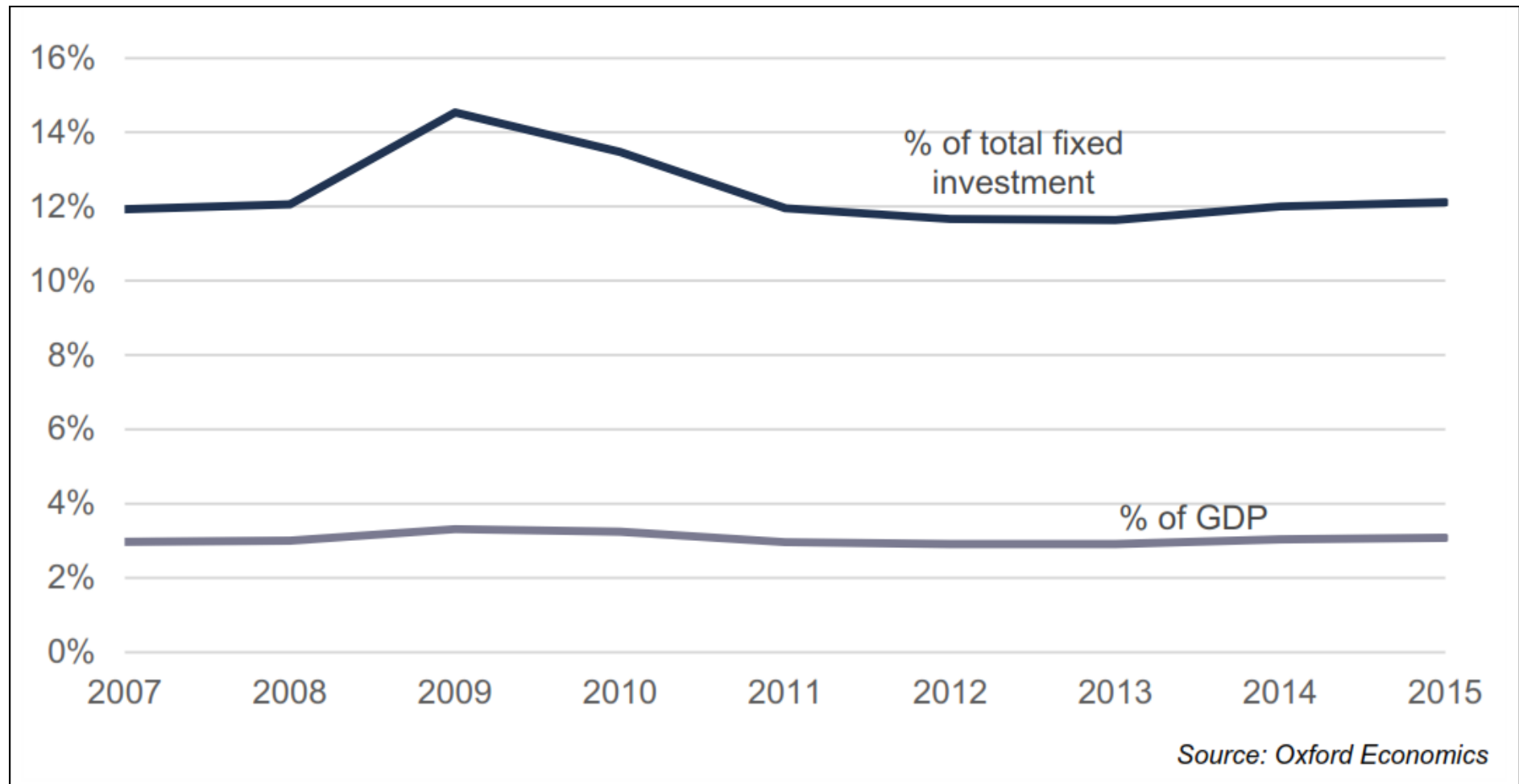
Oxford Economics, Global Infrastructure Outlook, 2017

Oxford Economics (a commercial venture with Oxford University since 1981) & Global Infra Hub (A G20 Initiative) published their research titled “Global Infrastructure Outlook, (GIO) 2017” .

- Researched & produced an analytical tool that can be used by Govt, Business & infra. organisations across the Globe to comprehensively analyse & predict infra. investment requirements by 2040 (next 25 yrs)
- Research covered 7 infra. sectors in 50 countries (categorised in 3 Income groups & 5 regional groups) which accounted for > 85% of world GDP.
- Infra. sectors being:
 - Roads, including bridges
 - Railways: urban rail networks & fixed assets which are integral part of rail networks- tracks, signalling & stations
 - Airports : fixed infra. such as terminals, runways, aprons, etc.
 - Sea ports: fixed infrastructure for sea ports
 - Electricity, including generation, transmission and distribution
 - Water, including infra. used for collection, treatment, processing & distribution of water & sewerage
 - Telecommunications: physical infra. required for the provision of fixed line, mobile and broadband services

GIO-2017 *contd.*

Global Infrastructure spending as a proportion of GDP & total fixed investment, 2007-2015



GIO-2017 *contd.*

- **Estimated Global Infra. investment - \$94 trillion - 2016-40 i.e. \$3.7 tn/yr.**
- **Its 19% higher than would be required under current trends.**
- **To meet this need, world will need to increase the proportion of GDP it dedicates to infra. from 3.0% (expected under current trends) to 3.5%,**
- **Asia will continue to dominate Global infra. market in the coming yrs.**
- **Asia accounts for ~54% of Global infra. investment needs to 2040, compared to 22% for the Americas, the next largest region.**
- **Just 4 countries namely, China, US, India & Japan, account for above 50% of global infra. investment requirements till 2040**
- **Infra. investment gap is proportionately largest for America & Africa.**
- **Electricity & roads together account for ~66% of global investment 2016-40**
- **For meeting SDGs for universal access to drinking water, sanitation & electricity by 2030, increases global infra. need by a further \$3.5 tn by 2030.**

GIO-2017 *contd.*

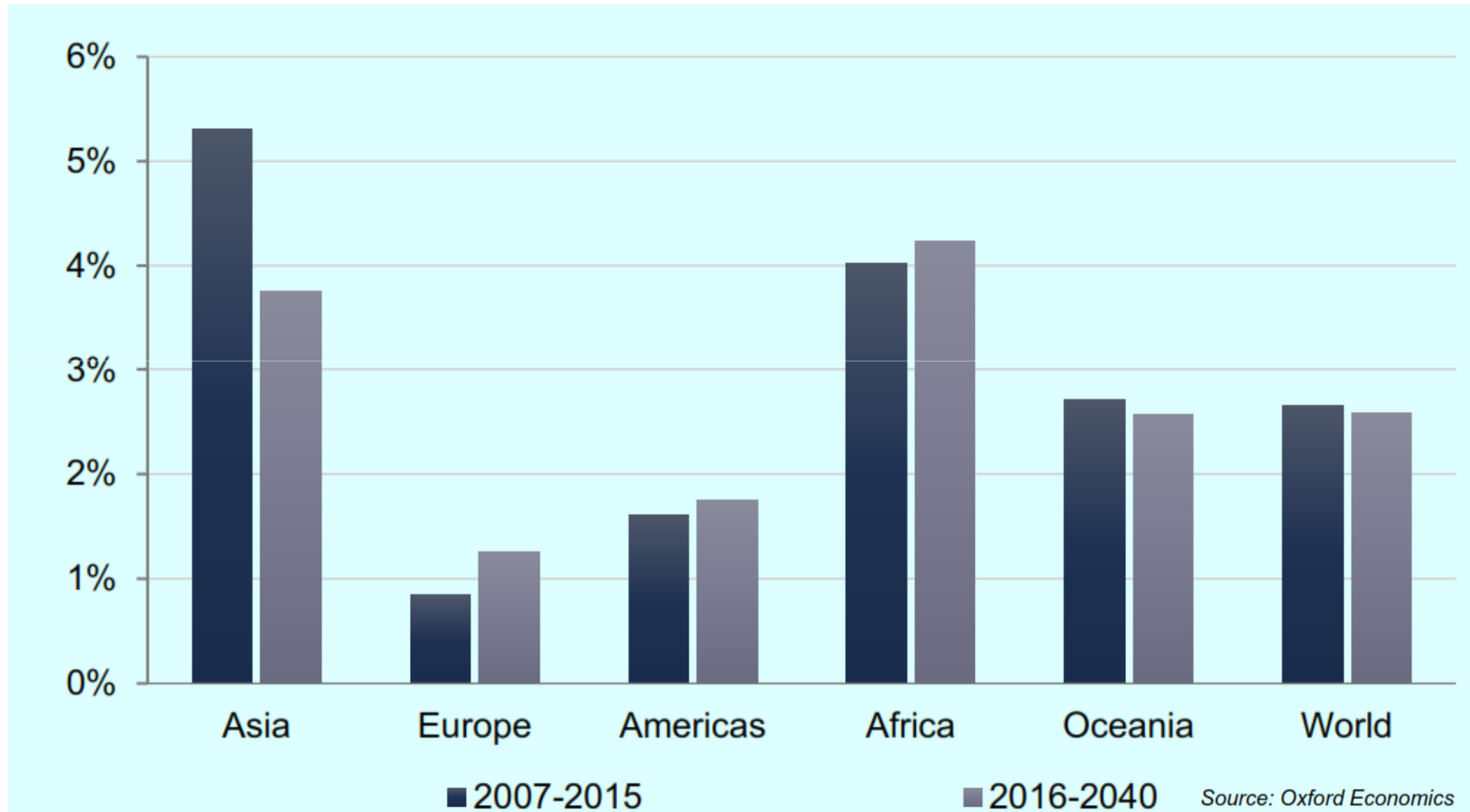
Global Infra. investment needs 2016-40

* 2016-30

% OF GDP	CURRENT TRENDS (CT)	INVESTMENT NEED (IN)	GAP (IN - CT)	SDG (REQUIREMENT OVER AND ABOVE IN)*
ROAD	1.0%	1.3%	0.3%	
ELECTRICITY	1.0%	1.1%	0.1%	0.2%
RAIL	0.4%	0.4%	0.0%	
TELECOMS	0.3%	0.3%	0.0%	
WATER	0.2%	0.2%	0.0%	0.1%
AIRPORTS	0.1%	0.1%	0.0%	
PORTS	0.1%	0.1%	0.0%	
ASIA	4.0%	4.4%	0.4%	0.3%
AMERICAS	1.7%	2.5%	0.8%	0.1%
EUROPE	2.3%	2.6%	0.4%	0.0%
AFRICA	4.3%	5.9%	1.7%	3.4%
OCEANIA	3.5%	3.8%	0.4%	0.0%
WORLD	3.0%	3.5%	0.6%	0.3%

GIO-2017 *contd.*

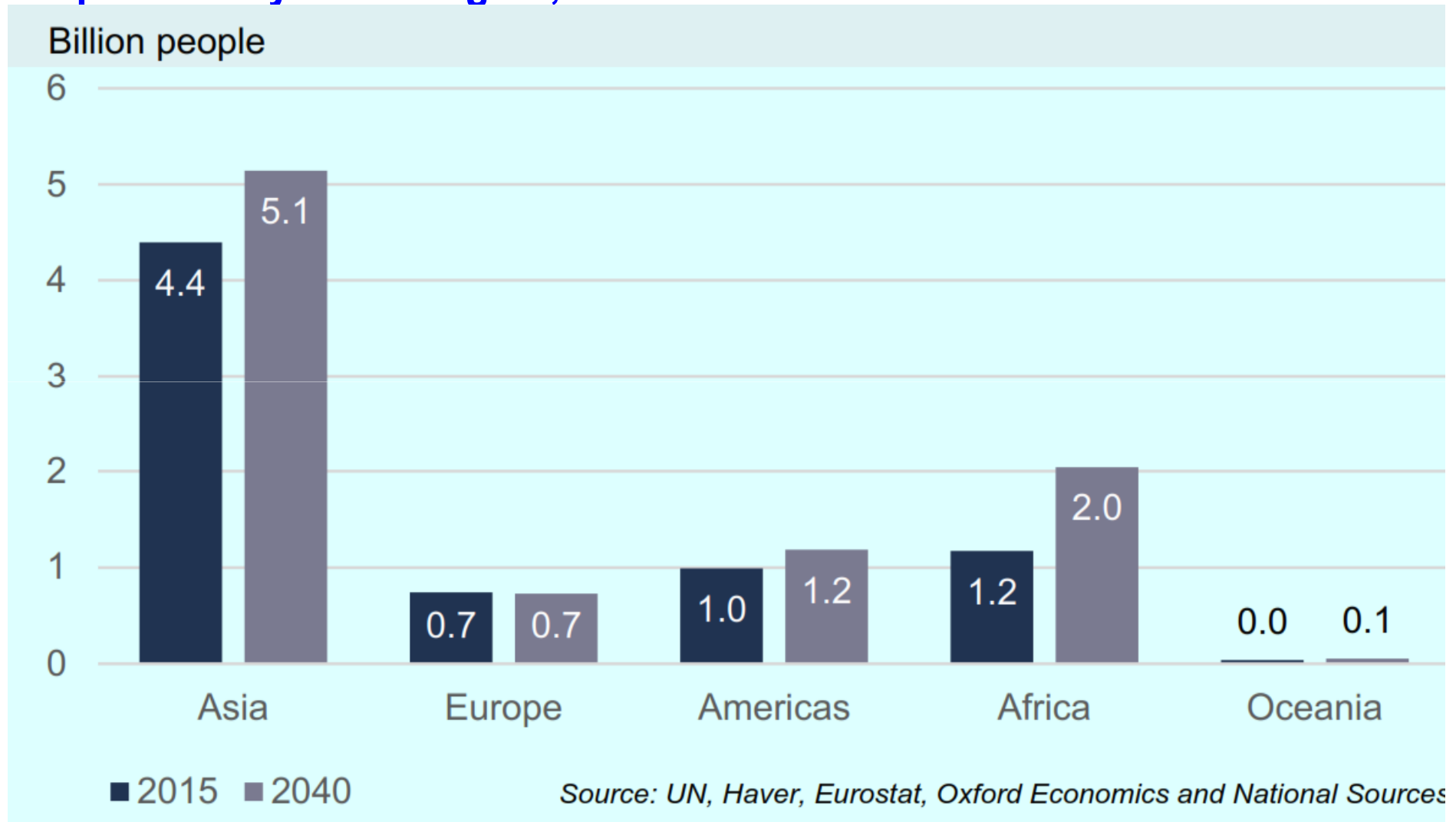
Average annual GDP growth by world region 2016-40



Avg. Annual GDP growth rates in Asia outstrip other regions during 2007-15

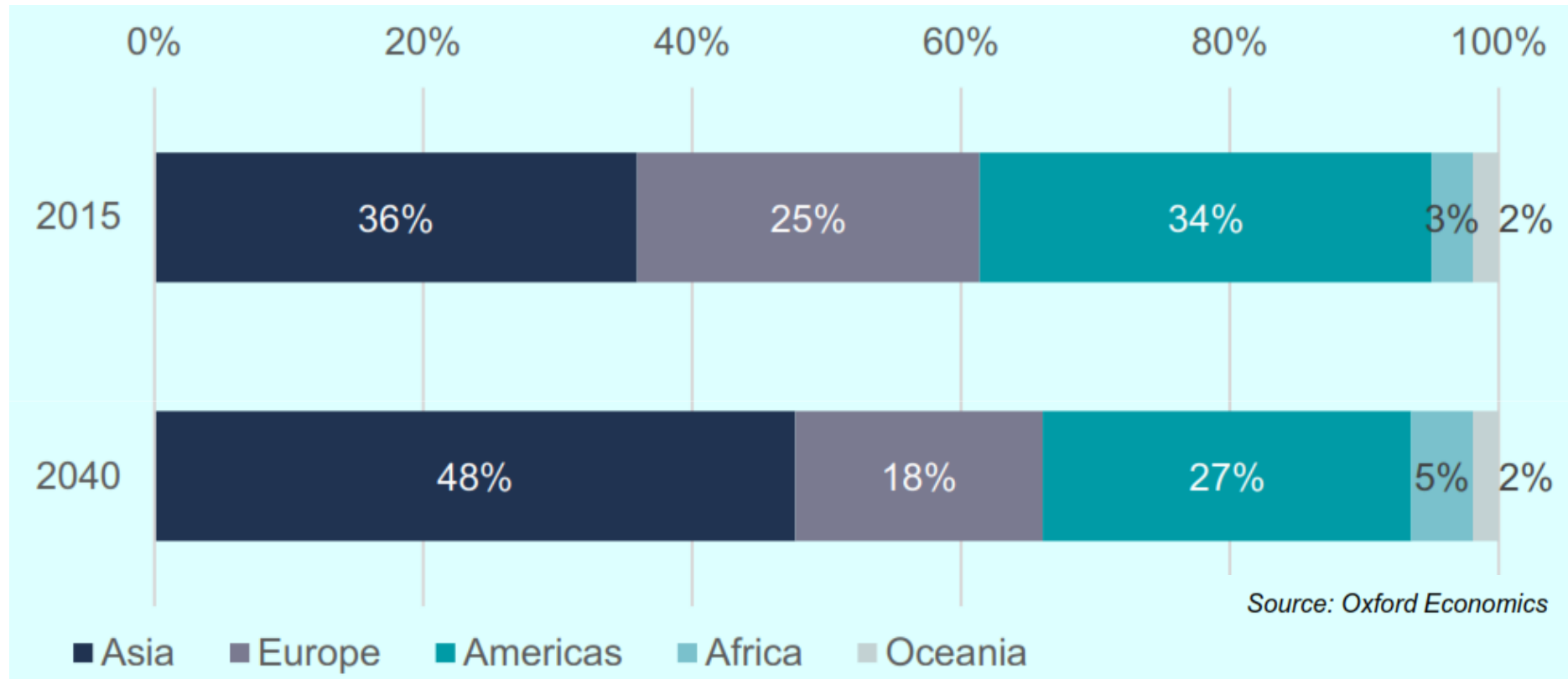
GIO-2017 *contd.*

Population by World region, 2015 & 2040.



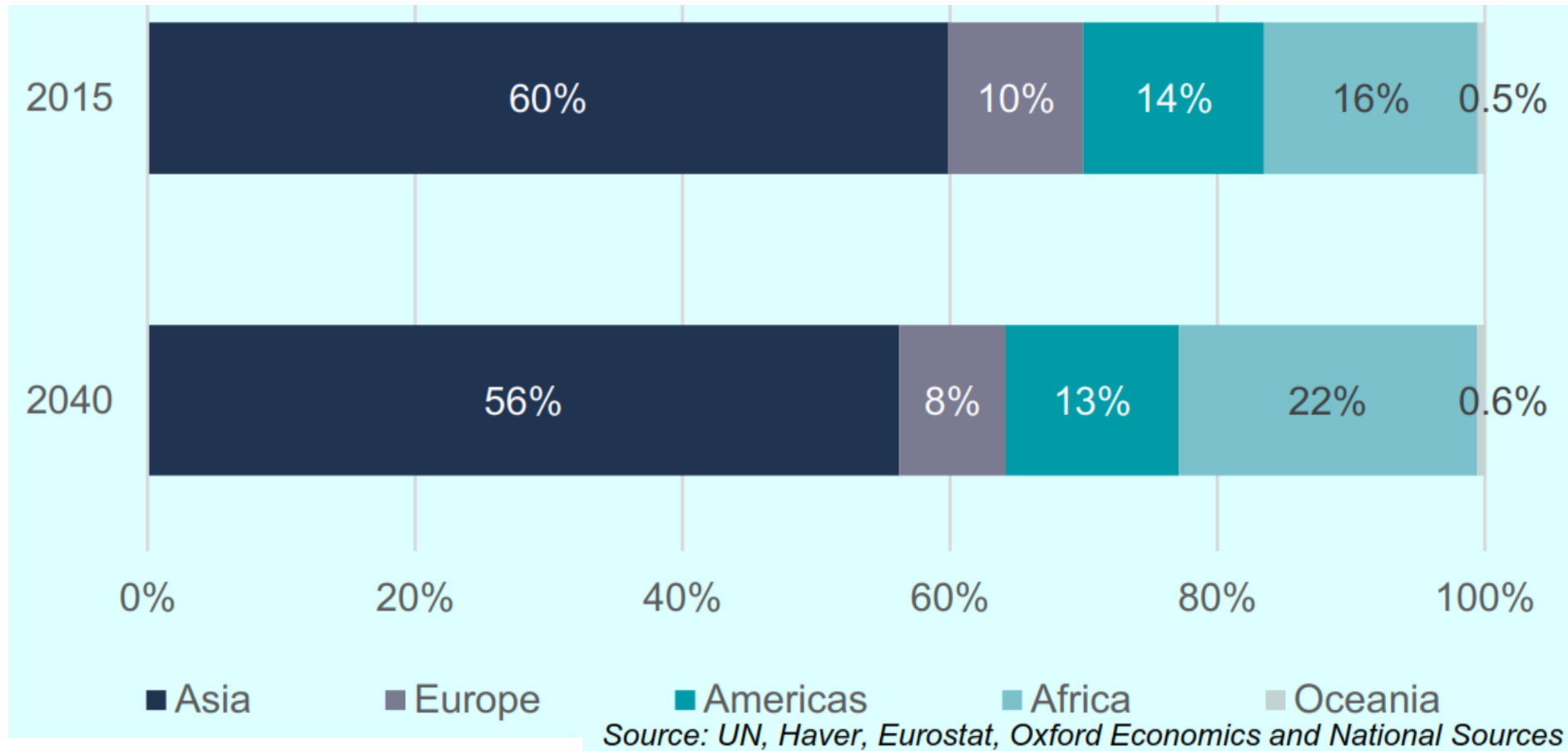
GIO-2017 *contd.*

Regional Shares of world GDP. 2015 & 2040



GIO-2017 *contd.*

Share of Population by World region 2015-40

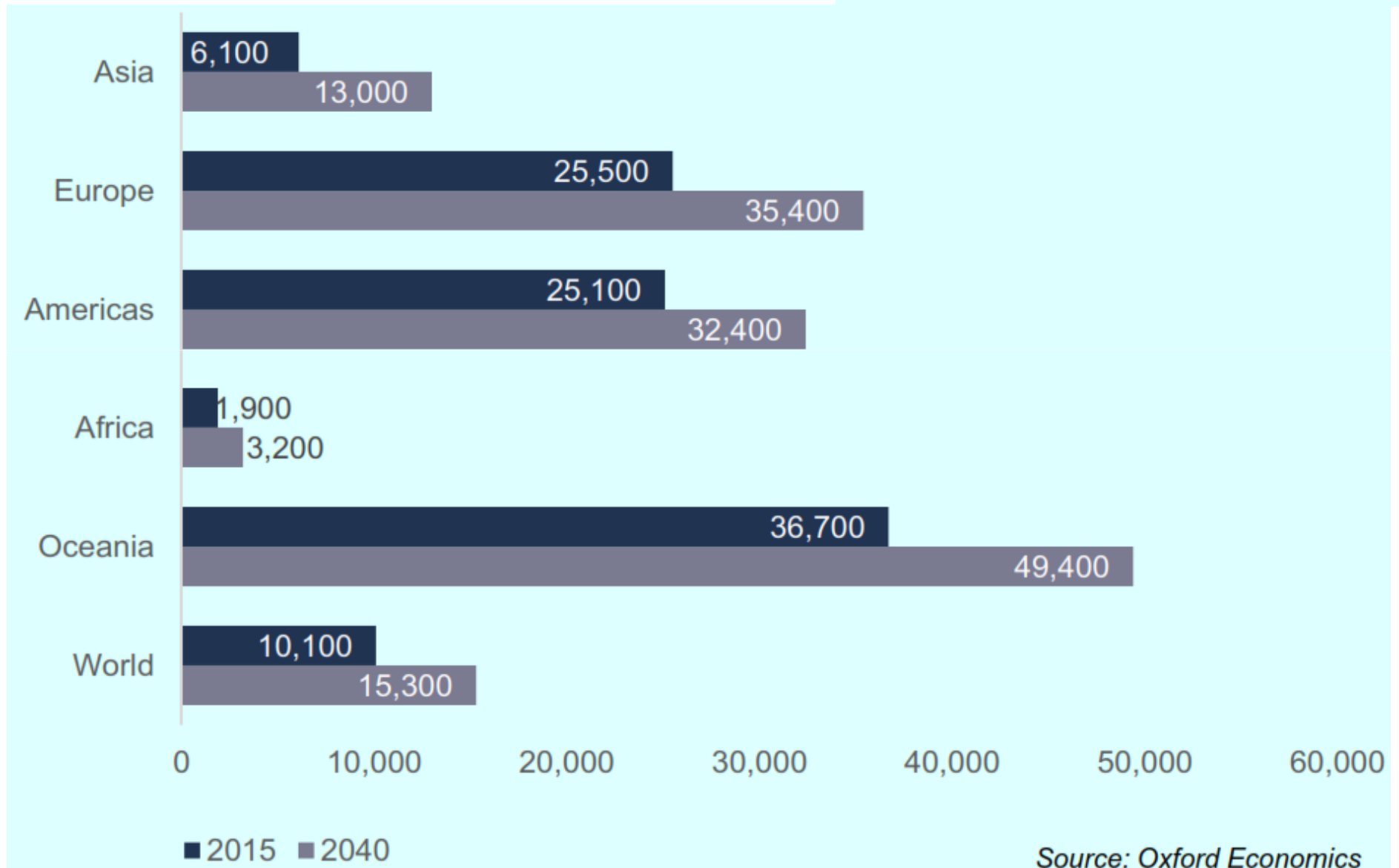


- Combining forecasts for GDP & population, one can derive GDP/head.
- Strongest rate of growth is expected in Asia, where GDP per head is forecast to double over the next 25 yrs, but by 2040 the avg for Asia will still only be around half of the current level in Europe.

GIO-2017 *contd.*

GDP per capita by World region, 2015 & 2040

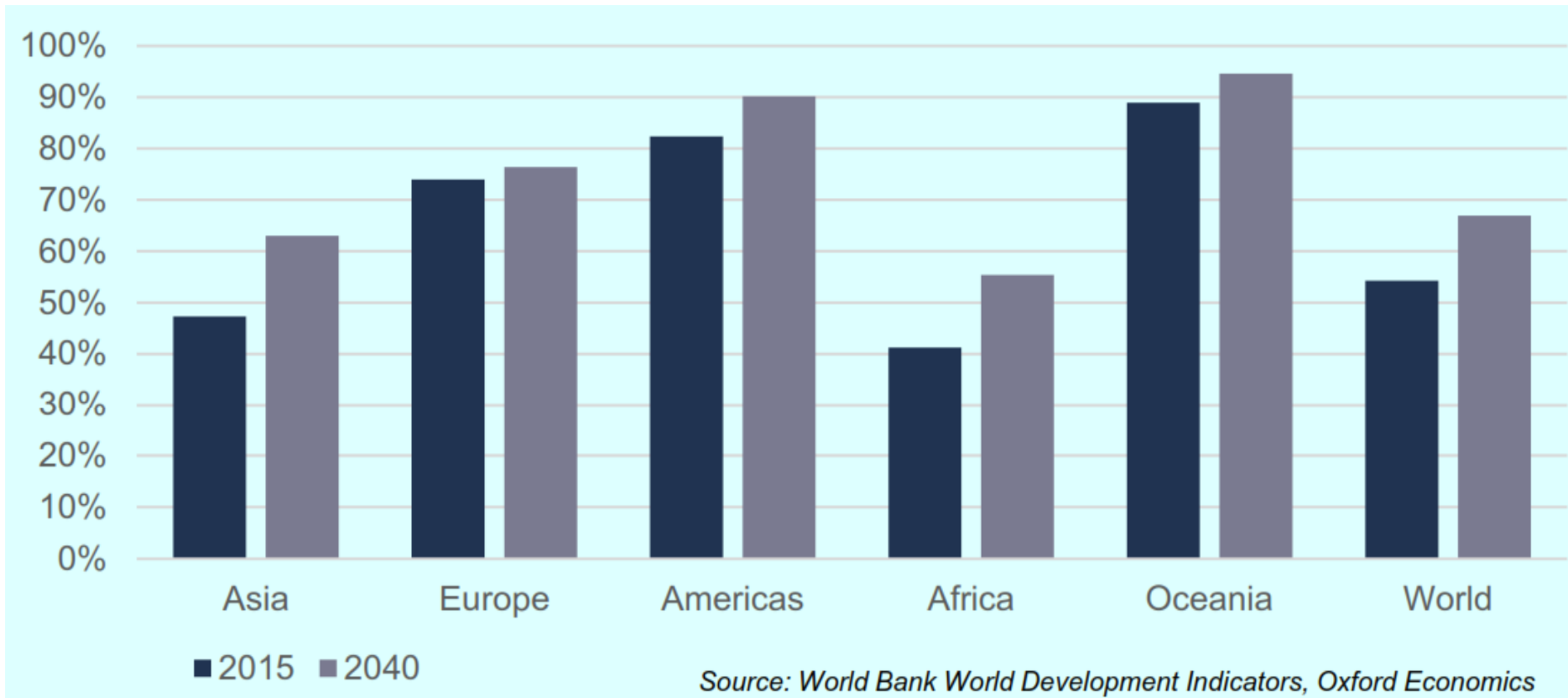
US\$, 2015 prices and exchange rates



Source: Oxford Economics

GIO-2017 *contd.*

Level of Urbanisation (share of population living in urban areas) 2015 & 2040



- **Urbanisation results in higher population densities which reduce the cost of supplying utilities - reliable electricity & water supply, to each household & city dwellers benefit from higher wages & better paying capacity for access to utilities.**
- **Rising urban population stimulates city planning activity, leading to increased investment in road & public transport infrastructure.**

GIO-2017 *contd.*

- **Population growth rate & its distribution over space plays an important role in determining the amount & type of infra. needed.**
- **As countries prosper, residents tend to gravitate towards urban areas to take advantage of economic & social opportunities offered in these areas.**
- **Urbanisation is projected to continue across all the 5 regions, but will be strongest in regions where income levels are lower as the proportion of the population living in urban areas increases towards the high urbanisation rates observed in the America & Oceania.**

GIO-2017 ; Country Profile -India

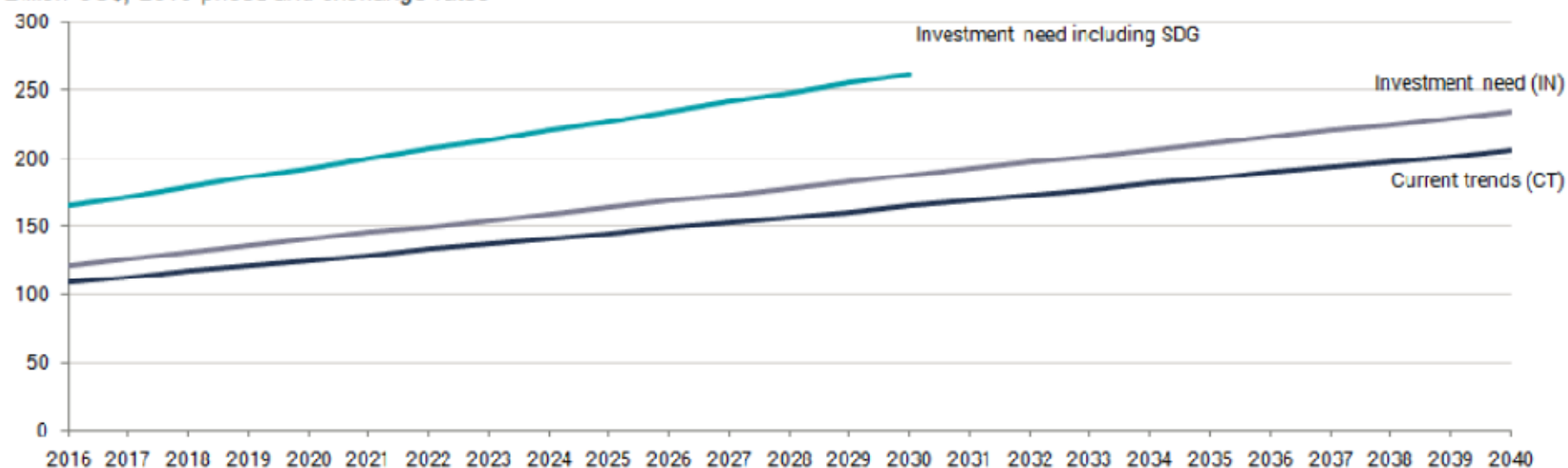
Key Assumptions

	2040	2015	Av. annual growth
GDP (Billion \$US)*	7,865	2,063	5.5%
GDP per head (\$US)*	4,811	1,571	4.6%
Population (000s)	1,634,820	1,313,030	0.9%
Urban population (% of total)**	42.0%	32.8%	1.0%
Population density (persons per km ²)	550	442	0.9%

*2015 prices and exchange rates; ** Av. annual growth shows average annual change in urban share of population

Total Infrastructure Investments 2016-2040

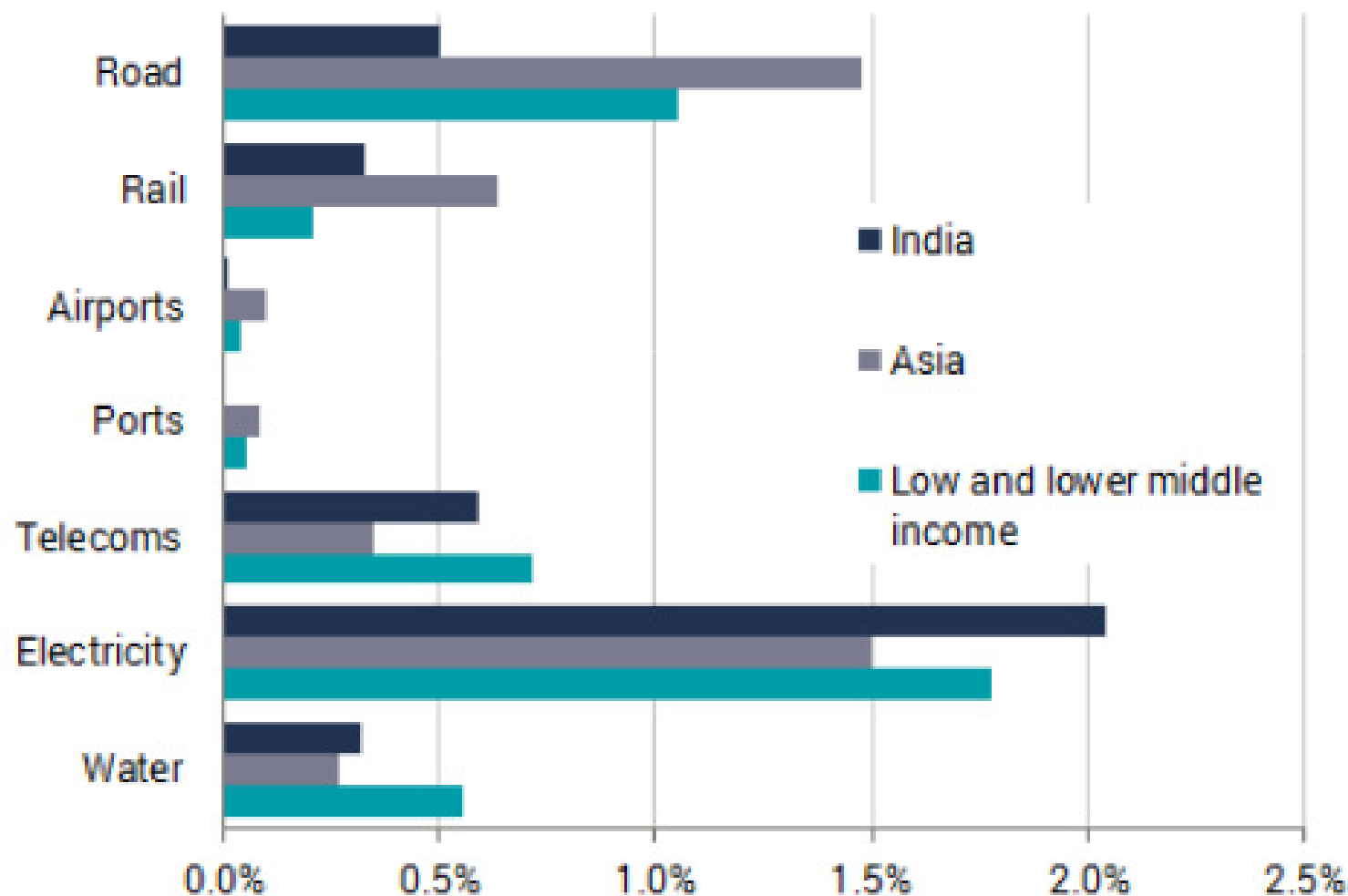
Billion US\$, 2015 prices and exchange rates



GIO-2017 ; Country Profile –India, *contd.*

Infrastructure investment need 2016-2040

Percent of GDP

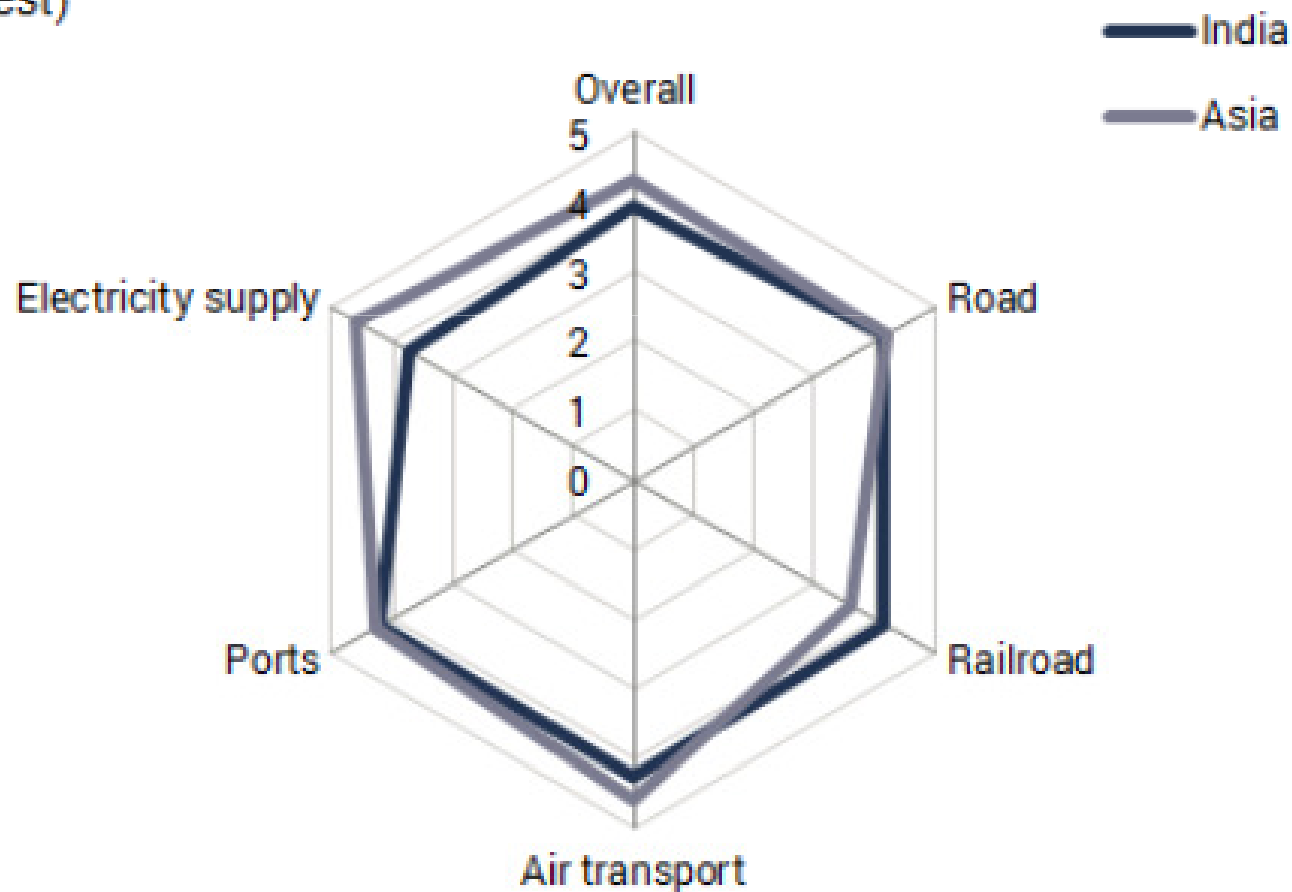


Source: Oxford Economics

GIO-2017 ; Country Profile –India, *contd.*

Radar Chart depicting Infrastructure Quality of India & Asia region

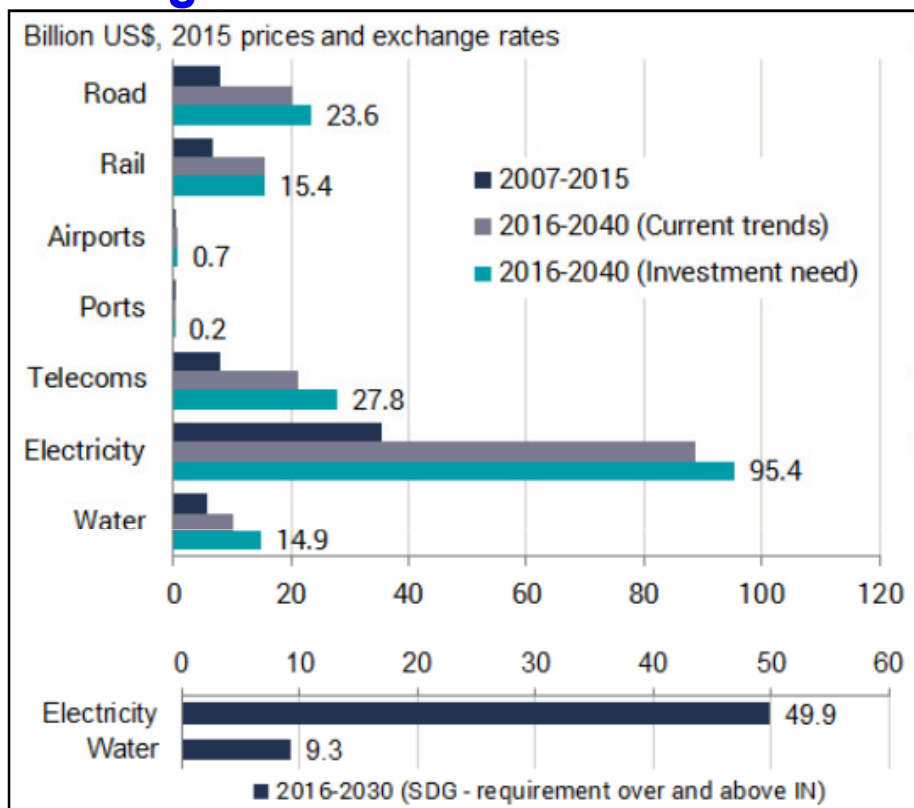
1-7 (best)



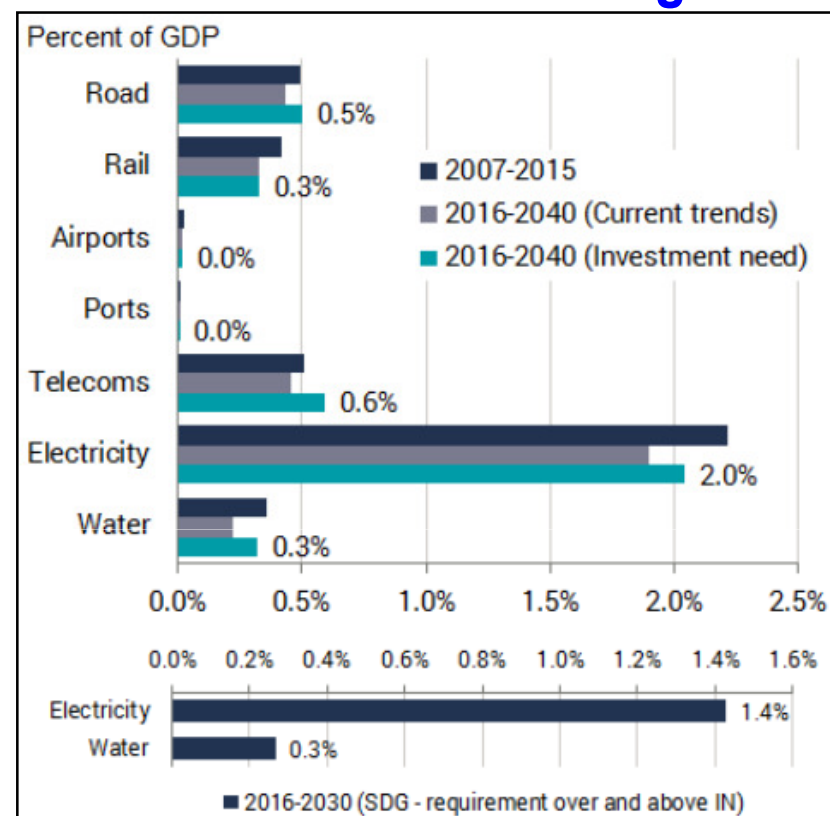
Source: The Global Competitiveness Index Historical Dataset © 2005-2015 World Economic Forum

GIO-2017 ; Country Profile –India, *contd.*

Average Annual Investment



Infrastructure Investment as %age of GDP



Cumulative Infrastructure Investment

<i>Billion \$US, 2015 prices and exchange rates</i>	Road	Rail	Airports	Ports	Telecoms	Electricity	Water	Total
2016-2040 (Current trends)	510	385	18	5	529	2,222	256	3,926
2016-2040 (Investment need)	589	385	18	5	696	2,385	373	4,452
2016-2040 (Gap between IN and CT)	79	0	0	0	167	163	117	526
2016-2030 (SDG - requirement over and above IN)						748	140	

SDG results only shown where the SDG requirement would not be delivered under the investment need scenario

Key Investments in India's Infrastructure

- India has a requirement of investment worth Rs 50 trillion (US\$ 777.73 billion) in infrastructure by 2022 to have sustainable development in the country.
- India is witnessing significant interest from international investors in the infrastructure space.
- **Some key investments in the sector are :**
 - Large investment in infrastructure have provided momentum to overall Private Equity / Venture Capital investments into India which touched an all-time high where infrastructure recorded US\$ 14.5 billion during 2019.

Key Investments in India's Infrastructure

- **Some key investments in the sector are (contd.) :**
- **Largest deal was Abu Dhabi Investment Authority, Public Sector Pension Investment Board, and National Investment & Infrastructure Fund (NIIF) investment of USD 1.1 billion in GVK Airport Holdings Ltd. Mumbai**
- **As on 31 March, 26.02 million households have got electricity connections under the Saubhagya Scheme.**
- **In June 2018, the Asian Infrastructure Investment Bank (AIIB) announced USD 200 million investment into NIIF.**
- **Indian infrastructure sector witnessed 91 Merger & Aquisition deals worth USD 5.4 billion in 2017**

Features of Infrastructure Projects

- **Highly capital intensive, requires multiple sources of funding;**
- **Long gestation & life-cycle: 20 - 30 years concessions/contracts common in road & power sector projects;**
- **Mostly undertaken in Special Purpose Vehicles (SPVs; developers)**
 - **companies incorporated for developing a specific infra project;**
- **Requires long term, low-cost capital to generate required returns (12-15%) for developers/sponsors;**
- **Inherent risks & uncertainties: demand risks, political stability/regulatory risks, land clearance/other approvals can get delayed leading to cost overruns & negative impact on returns;**
- **Establishing 'bankability' of an infra. project is a key challenge**

Characteristics of Infrastructure Financing

➤ Demand Side (Developers/Sponsors)

- Project finance provides balance sheet insulation - transfer of risk to a project SPV instead of Sponsors;
- Most projects awarded through competitive bidding – lowest tariffs (power); sharing of revenue (road); lowest construction cost;
- Tying up of senior debt takes time owing to multiple stakeholder involvement;
- Revenue/Counter party risk; Political/Regulatory risk;

Demand Side - Characteristics

- **Negotiating a financing structure with lenders is a key challenge - ballooning repayment vs front ended repayment structures;**
- **Can entail multiple refinancing of senior debt to achieve expected returns (IRRs) – debt may have to be refinanced at a lower cost post project stabilization;**
- **PPP models typically include Built Operate Transfer (BOT), and Engineering, Procurement & Construction (EPC)**
 - **BOT (Toll) – Private party assumes funding, construction; O&M & revenue risk**
 - **BOT (Annuity) - Private party assumes funding, construction; O&M risk; while government authority assumes revenue risk**
 - **EPC – Private party only assumes construction and O&M risk**

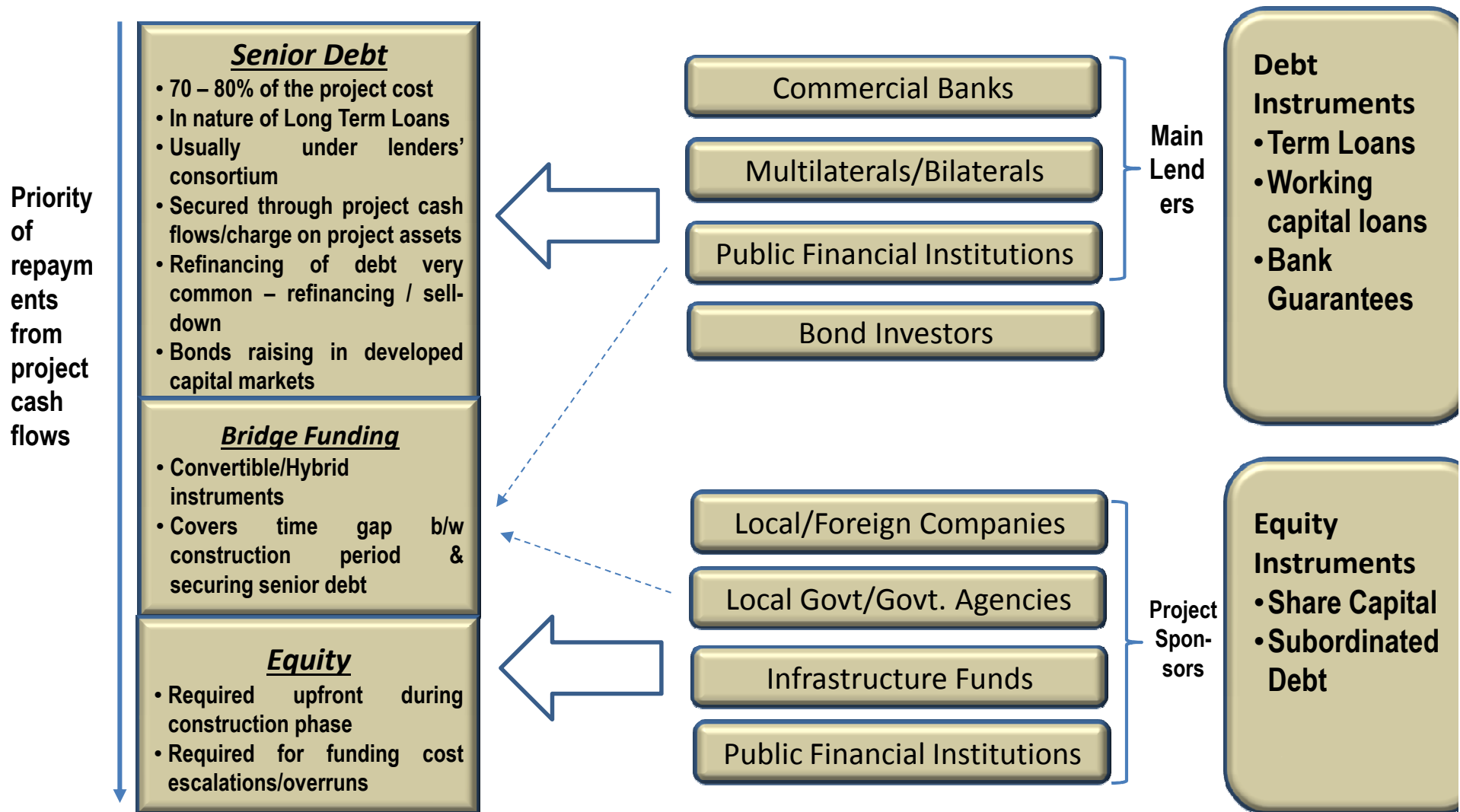
Supply Side (Lenders) - Characteristics

- **Asset-Liability mismatch is a key constraint – longer loan tenor vs shorter sources of funds;**
- **Funding carries higher risk of default during construction phase when there is no revenue generation – hence interest costs are mostly built into project costs;**
- **Cost overrun risk; cash flow volatility over the long life cycle;**
- **Continuous post disbursal monitoring required to check if actual performance is meeting assumptions/projections;**
- **Extensive due diligence/negotiations with multiple stakeholders (banks, multi-laterals, developers, Govt authority, legal firms)**

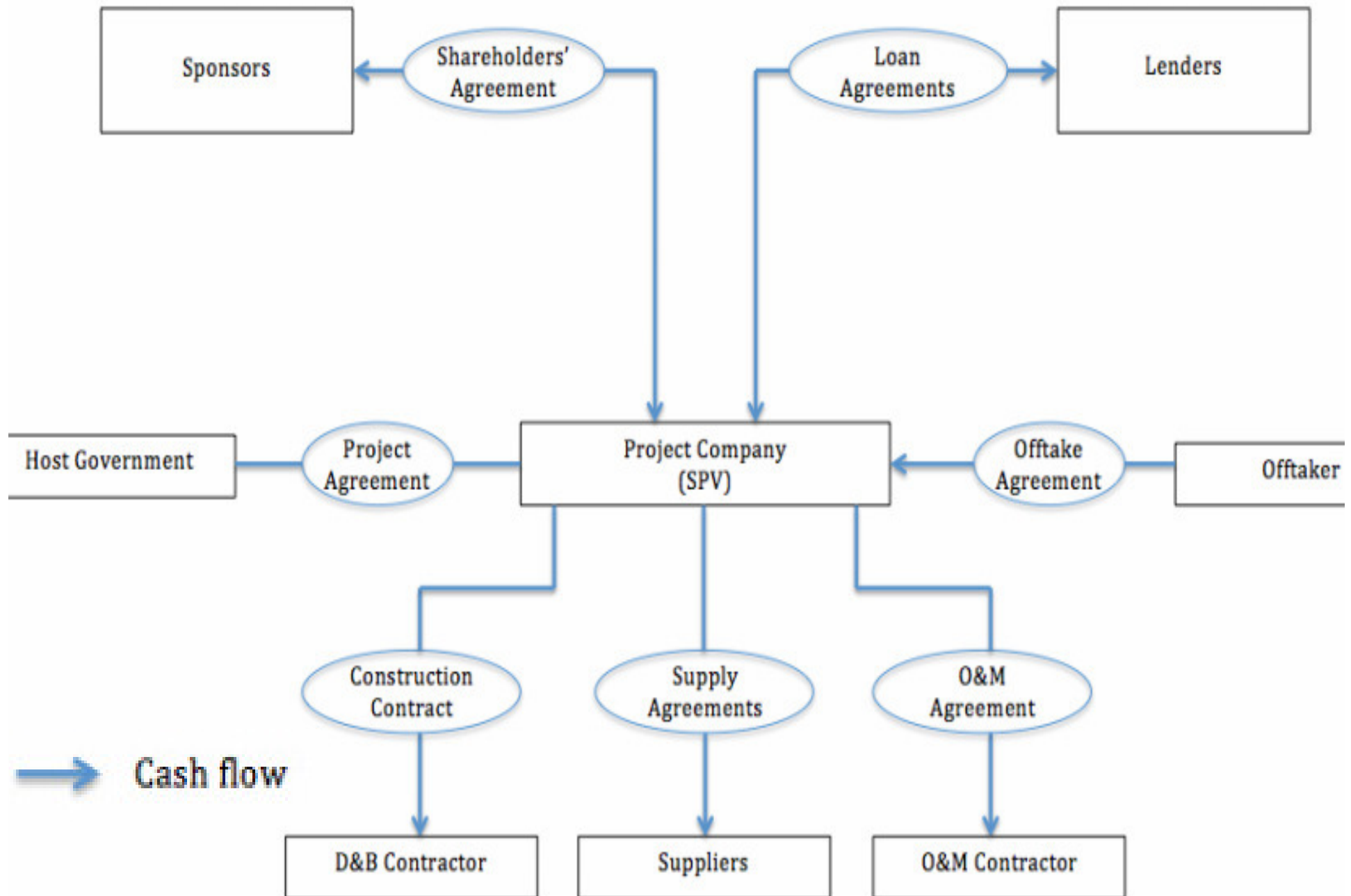
Supply Side (Lenders) – Characteristics

- **Extensive due diligence/negotiations with multiple stakeholders**
(banks, multi-laterals, developers, govt authority, legal firms)
 - **Track record of the developer, supplier & contractor**
 - **Financial risk modelling, projections, sensitivity analysis**
 - **Detailed off-taker risk assessment required – government power discoms, other utilities that often have weak credit profile/track record (especially in developing nations)**
 - **Documentation is complicated & time consuming**
- **Banks often subsidize interest by cross selling products like employee salary accounts, escrow accounts, treasury products;**

Key Components & Sources of Funding



Infrastructure Project Financing Structure



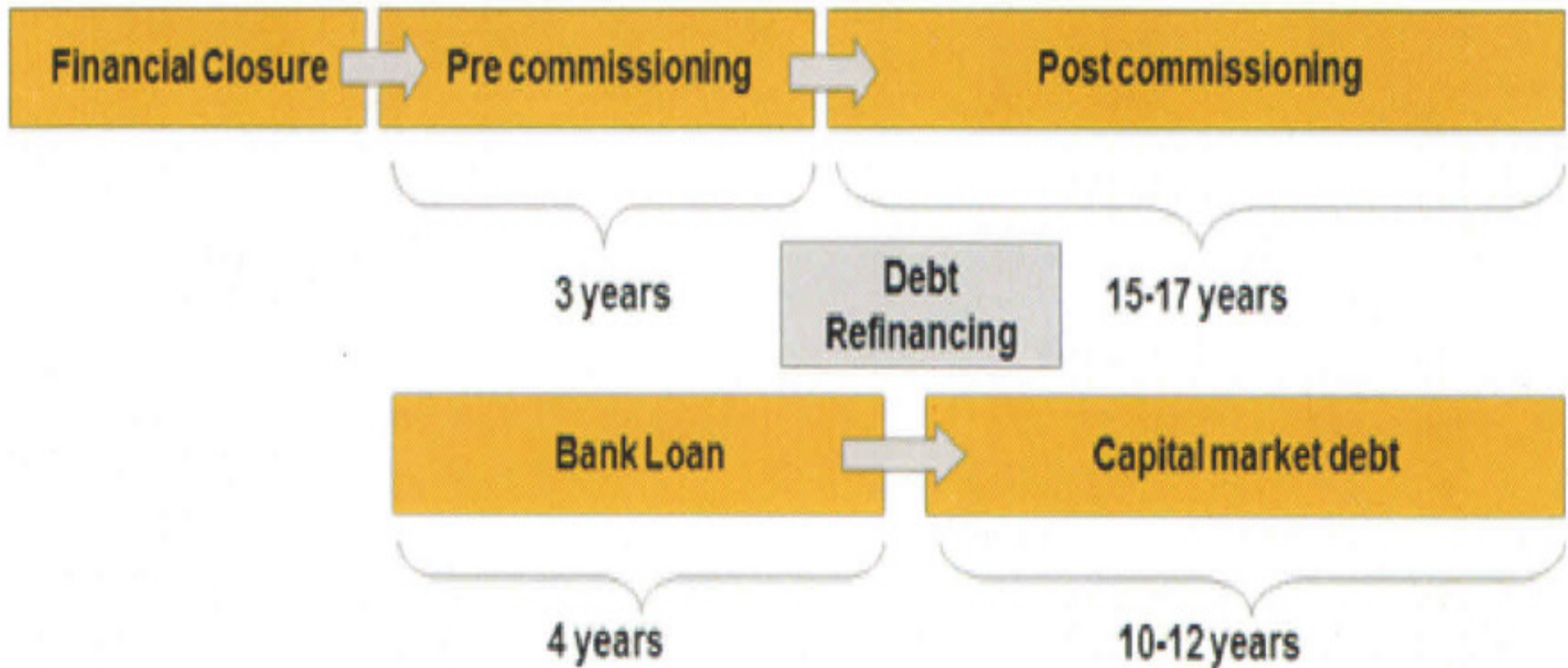
Concepts of Infra Financing

- **Cash flow financing.**
- **Usage of government guarantees to induce private financing.**
- **Escrow mechanism to ensure that lenders get first charge on project's cash flows.**

Limited Resources

- **Essence of Project Finance in SPV/PPP is that the banks to the project sponsors are limited if project is owned by a company.**
- **Indian Banks have been shy in providing longer tenor loans, working capital and medium term loans.**
- **However, of late Renewable Projects, Road Hybrid Annuity Model Projects, etc have attracted longer tenure financing upto 19-20 years**

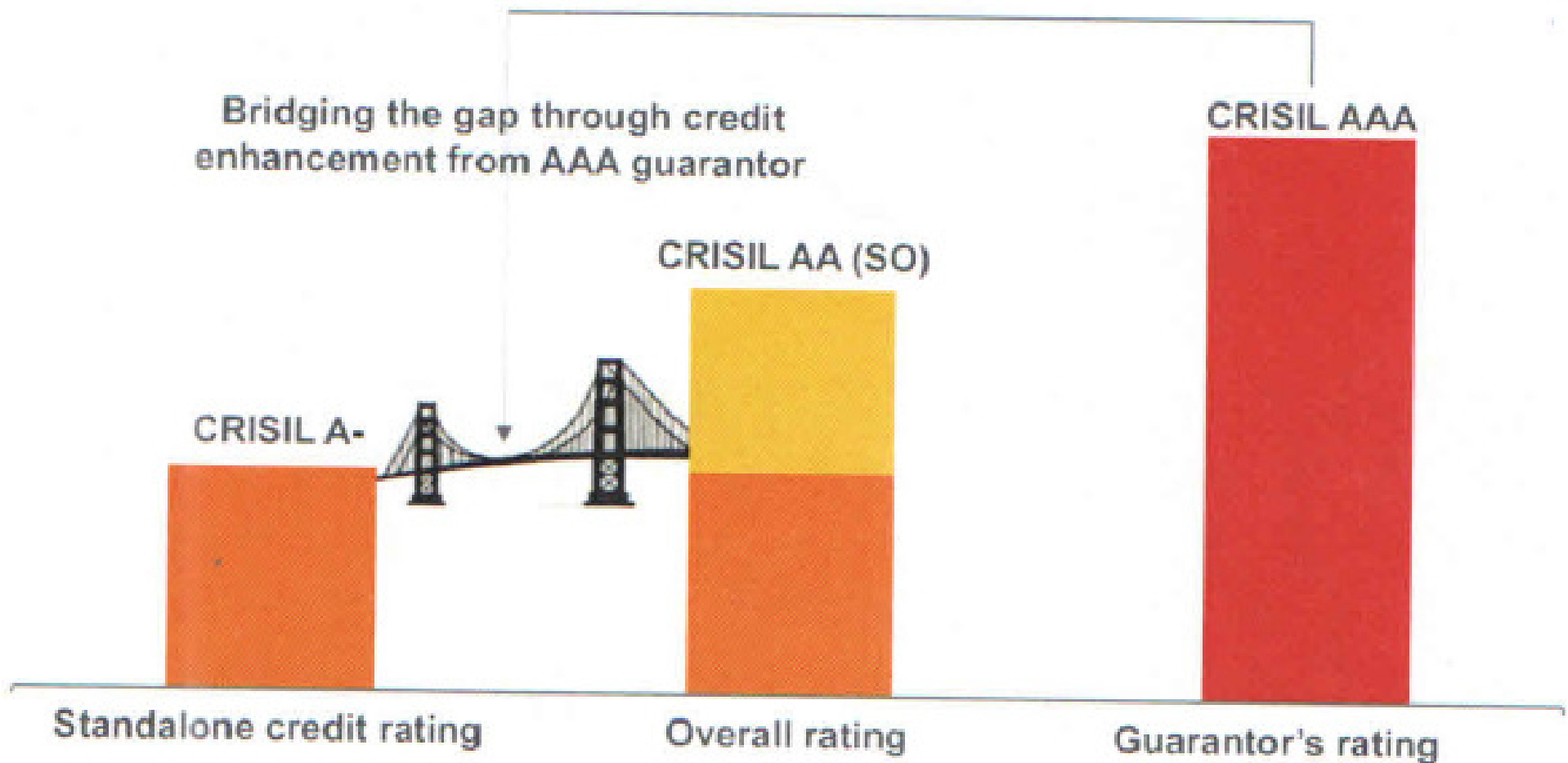
Ideal Model for Funding Infrastructure



- However, not many developers have been able to tap the Capital Markets for debt funding the Projects

Model for Funding Infrastructure

Partial guarantee



Possible Funding Options

➤ RBI Scheme of partial Credit Enhancement

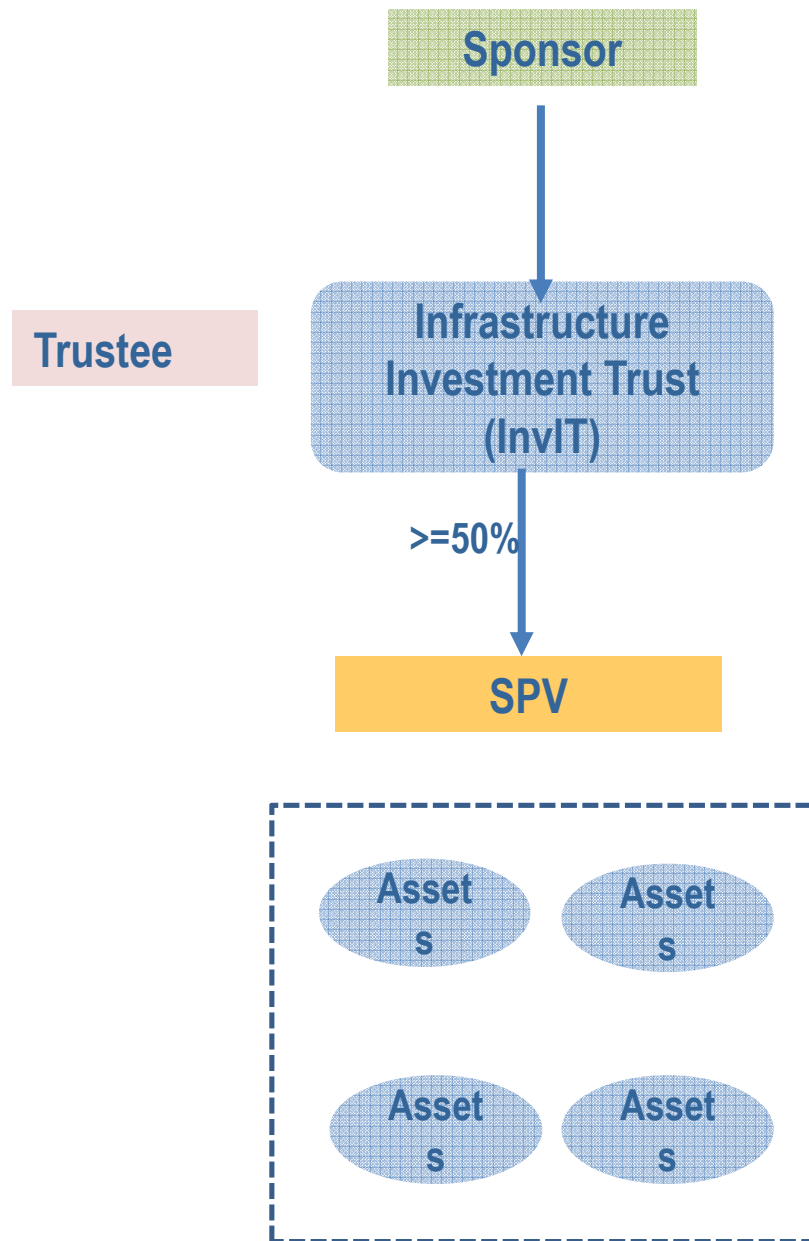
➤ It is expected to facilitate raising of funds by Non-Banking Financial Companies at an attractive interest rate

➤ Also expected to improve liquidity of the NBFCs

➤ Infrastructure Investment Funds InvITs

Projects eligible for Investment		
PPP Projects		Non PPP Projects
Achieved COD	Not Achieved COD	
<ul style="list-style-type: none">▪ All Approvals in place▪ Generating operational revenues for minimum 1 year	<ul style="list-style-type: none">▪ Should have achieved at least 50% of the construction or capital expenditure should be 50% of total cost	<ul style="list-style-type: none">▪ Should have received all requisite approvals

Infrastructure Investment Trusts InvITs



➤ **Infra. Investment Trusts (InvITs) are mutual fund like institutions that enable investments into the infrastructure sector**

➤ **InvIT can directly invest in Projects or through SPV but should hold at least 50% at the SPV level.**

➤ **InvIT may invite for subscriptions & allot units to any person (resident or foreign)**

➤ **Sponsors together shall hold minimum 25% of the units for a minimum period of 3 years from date of listing**

**Thanks for
kind
Attention**