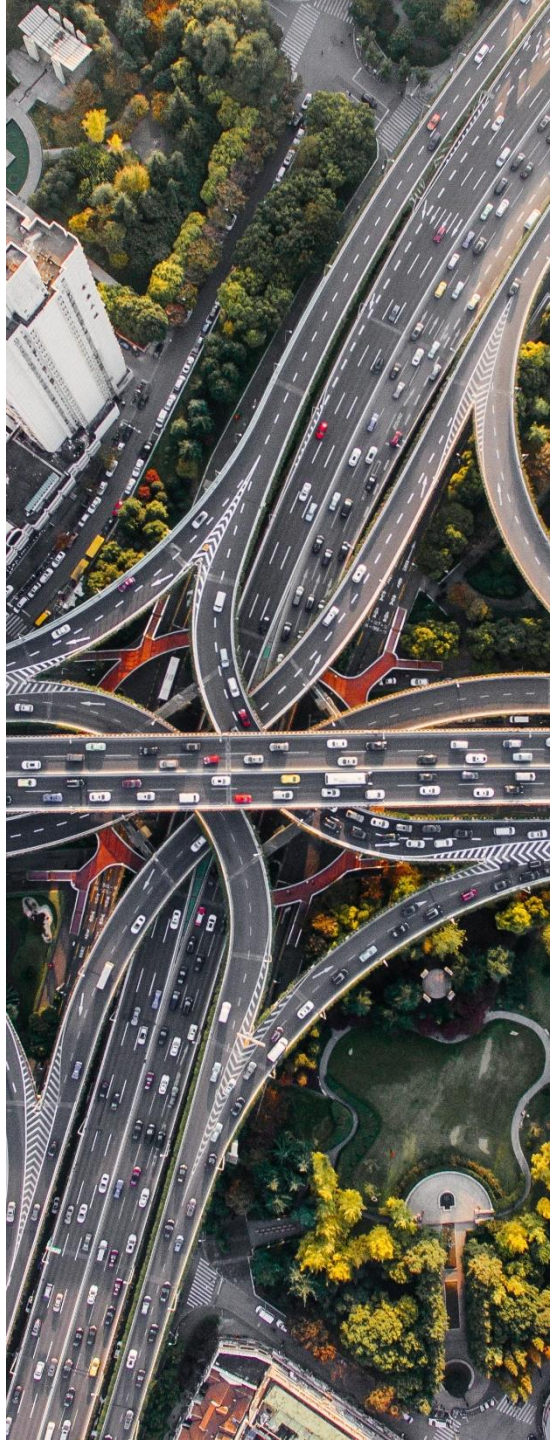
WORLD BANK GROUP

INFRASTRUCTURE for INCLUSIVE & SUSTAINABLE DEVELOPMENT

Job Creation & Growth

Governance

Technology



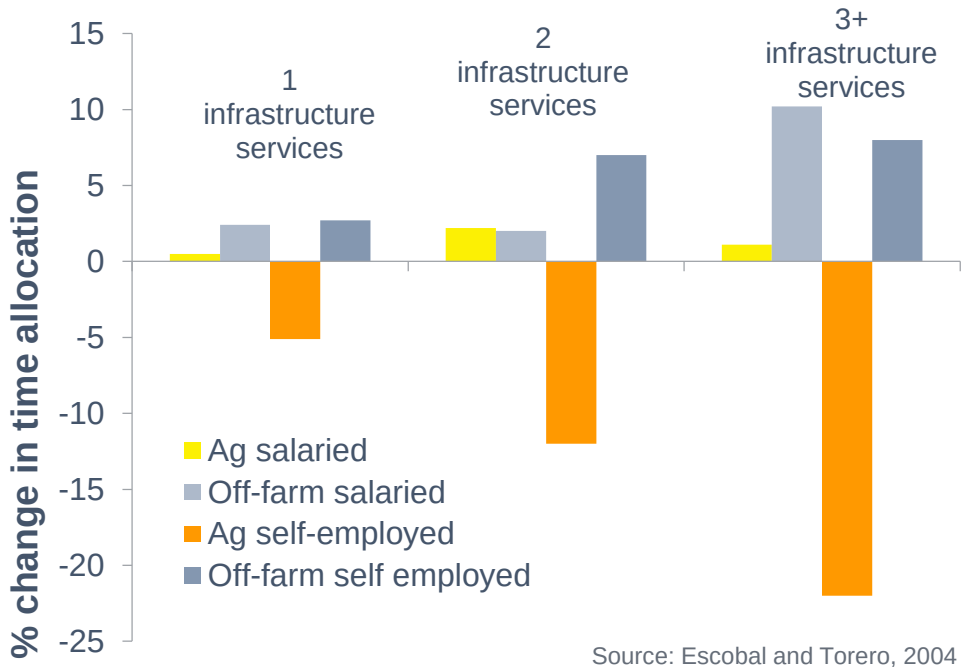
Connectivity

Private Investment in Infrastructure

WB IPG Unit

JOB CREATION & GROWTH THROUGH INFRASTRUCTURE

INFRASTRUCTURE & JOB CREATION – SHORT & LONG-TERM

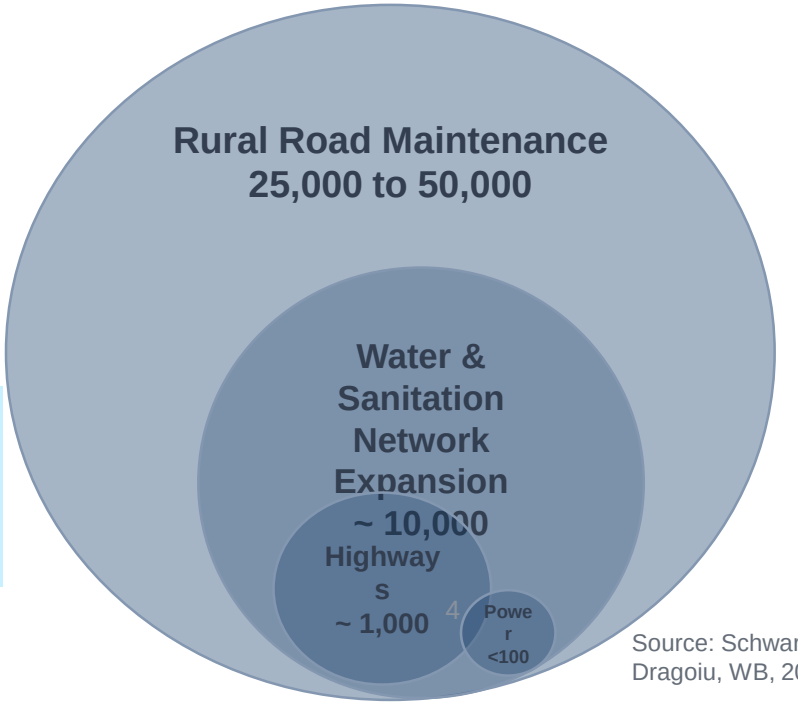


Source: Escobal and Torero, 2004

Long-term Employment Impacts

- Labor market shifts
- Network effects and productivity gains

Annual short-term jobs per $100 million investment



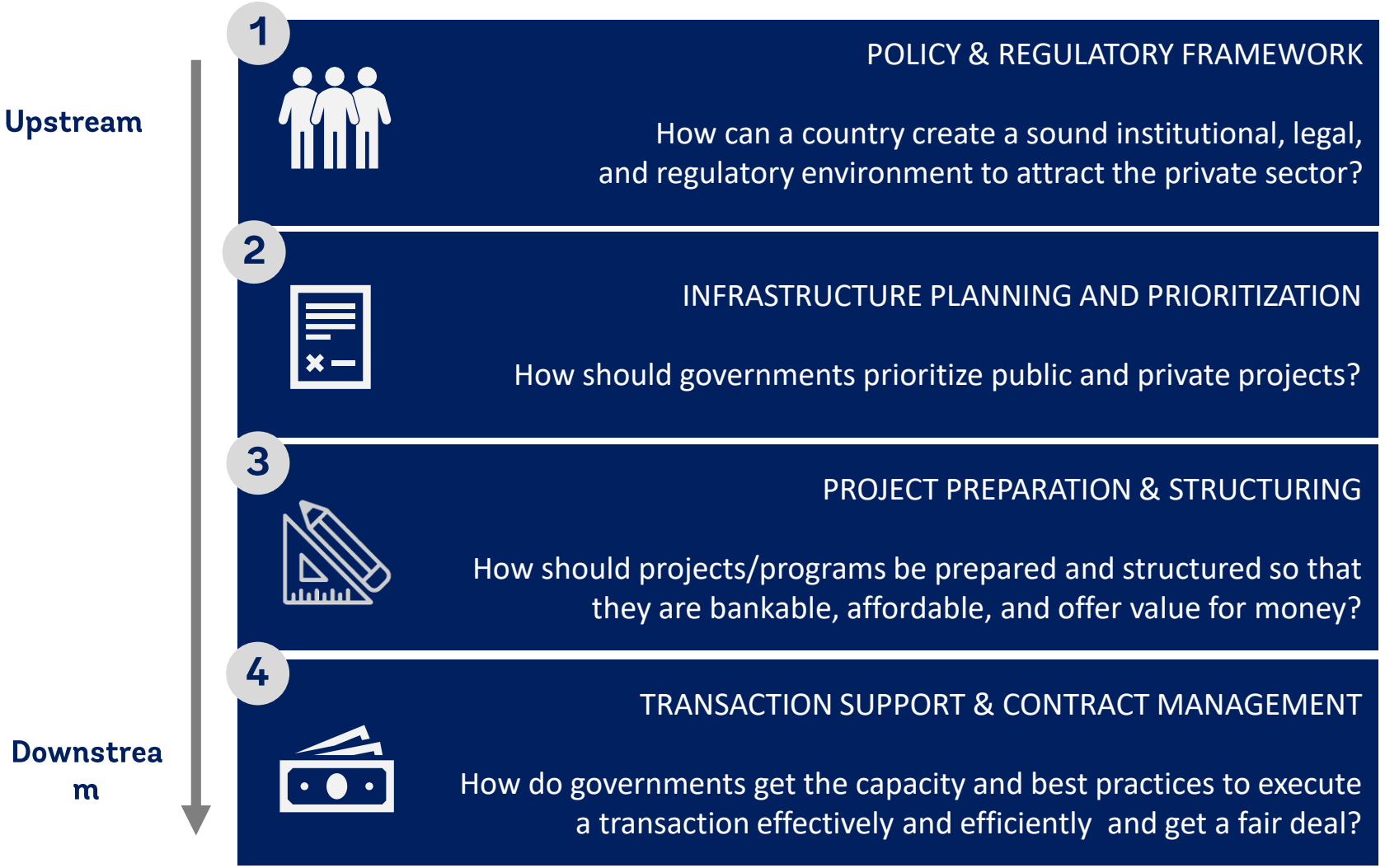
Source: Schwartz, Andres, Dragoiu, WB, 2009

Short-term Employment Impacts

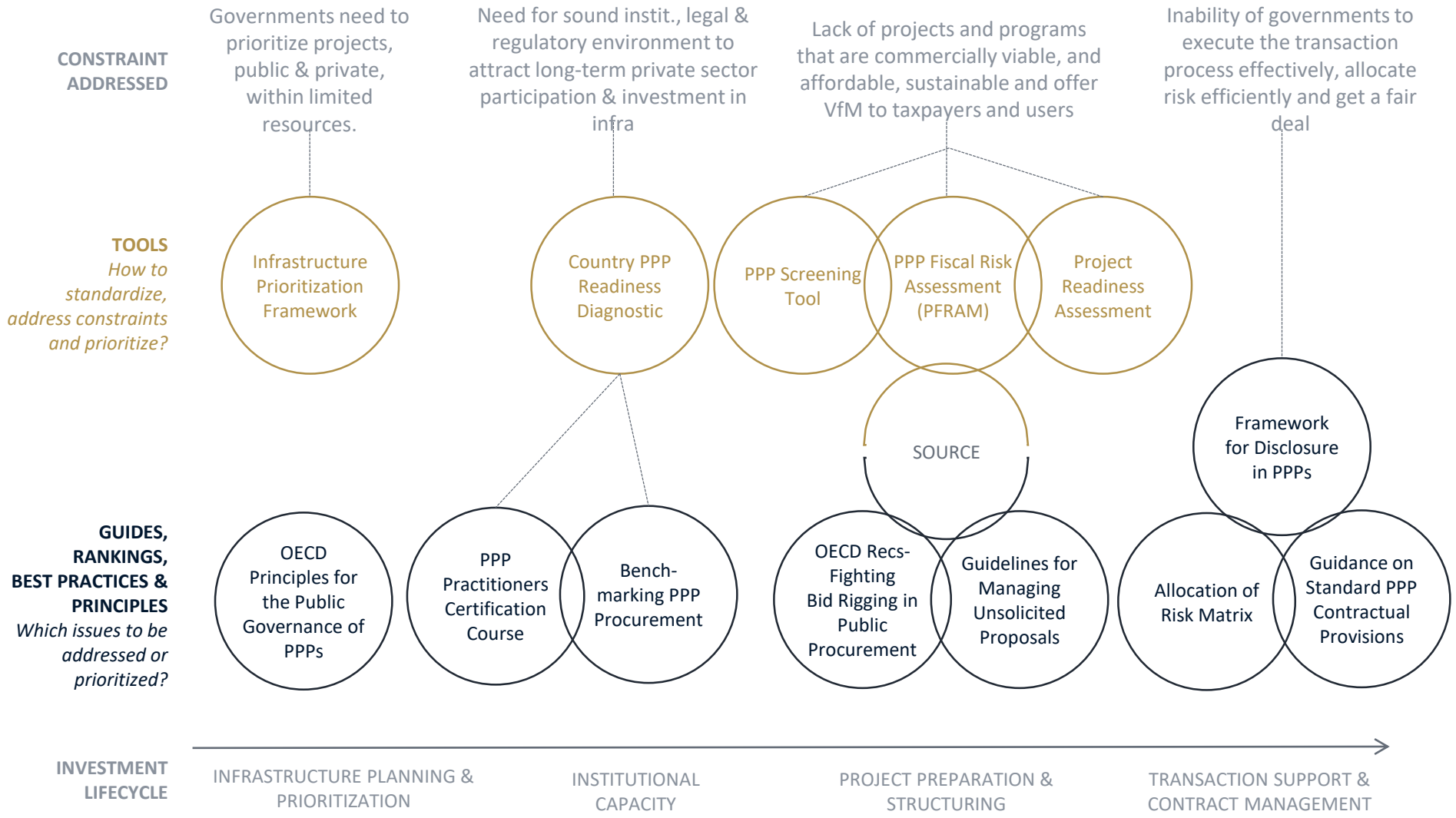
- Demand Stimulus
- Adj by Leakage, Wages & Technology

GOVERNANCE OF INFRASTRUCTURE

SUPPORTING INFRASTRUCTURE DELIVERY ALONG PROJECT LIFECYCLE



TOOLS, GUIDES, RANKINGS, BEST PRACTICES & PRINCIPLES



TECHNOLOGY

HARNESSING TECHNOLOGY TO IMPROVE INFRASTRUCTURE QUALITY

- Technology needs to be integrated into design and implementation of DFI support to infrastructure projects to improve quality and efficiency across the project cycle

- New technologies have the potential to transform how infrastructure is delivered—contributing to several "quality" elements such as:
  - Economic efficiency
  - Safety
  - Resilience against natural disasters

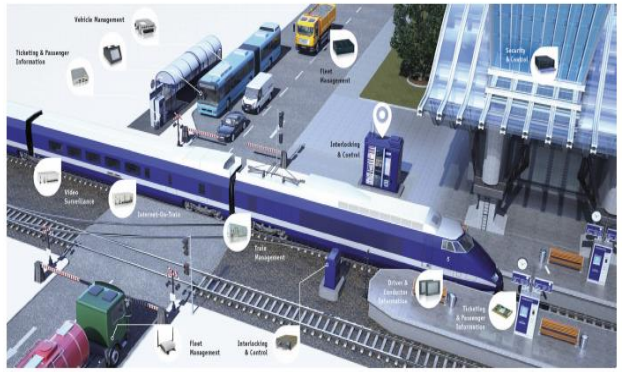
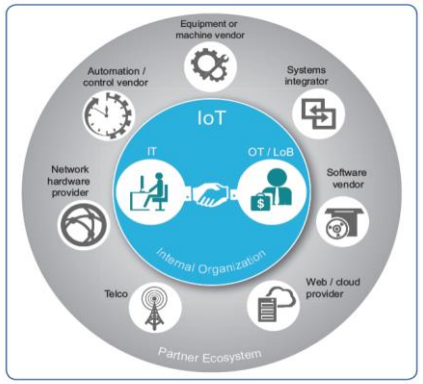


Figure 1. Examples of Electronic Systems Used in Transportation



Source: Cisco Consulting Services, 2014

INTEGRATING TECHNOLOGY IN PROJECT CYCLE: DESIGN

New technologies for collecting data to improve project design can be faster and cheaper than traditional approaches (and can spread quickly to other client projects):

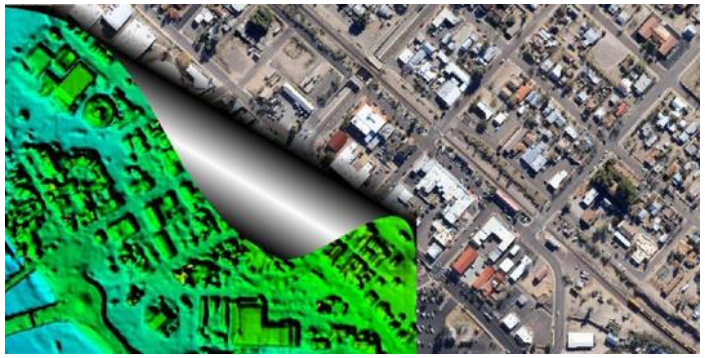
- **Transport teams trained** counterparts to quickly and cheaply prepare rural road inventories using crowdsourcing techniques, combined with open-source mobile and desktop applications and satellite imagery;
- **Energy teams** identified power access and reliability using night-time satellite imagery and common GIS software;
- Teams **across the practice groups** have been experimenting with using mobile phone call details records (CDR) to complement household survey information
- **Disaster Risk Management teams** are using handheld data collection and mapping tools, drones, satellite imagery and communication technologies in operations to identify risks and ensure investment decisions are risk informed.

INTEGRATING TECHNOLOGY IN DFI PROJECT CYCLE:
CONSTRUCTION & OPERATION

- **New approaches to data collection for construction supervision:** Teams have been experimenting with social media analytics, drones and smartphones for capturing imagery, deployment of low-cost sensors
- **Innovative data collection and analytics for more efficient operations monitoring & management** has included:
  - **Water teams** have prepared real-time well-condition maps using inexpensive open-hardware sensors;
  - **Transport teams** have trained counterparts in the use of mobile phones for street imagery capture for use in routine monitoring programs.
- **Advances in mechanical technologies and new materials** can improve the sustainability of infrastructure projects, connecting counterparts to the right solutions for their projects.

TECHNOLOGY FOR RESILIENT INFRASTRUCTURE

- Technology can provide information on **what investments are at risk and where, ensuring investment planning is risk informed** (e.g. advances in risk modelling and satellite imagery).
    - The **ThinkHazard! platform allows decision–makers to quickly and robustly assess the level of hazard risk** (from flood, earthquake, drought, cyclone, tsunami, volcano, and landslide) in a project area
    - Big data and open data available from **satellites, drones and crowdsourcing**, **provide critical information for infrastructure planning**



CONNECTIVITY & INFRASTRUCTURE

GLOBAL INFRASTRUCTURE CONNECTIVITY ALLIANCE (GICA)

Connectivity: Improving the Flow of Goods, People, Data and Capital

Focus on Impacts, Flows, Replicable Mechanisms, Measures of Success, Integrations

GICA Pillars	Planning for Scale Economies	Developing Sustainable Infrastructure Capacity	Enhancing Efficiency	Ensuring Economic Inclusion

Key Components	• **Foster agglomeration**
	  • Economic corridors
	  • Cluster development
	  • Logistics zones
	  • Inland clearance depots
	• **Develop hub and spoke systems**
	• **Leverage comparative advantage (hydropower..)**
		Across sectors (transport, ICT, power & water):
		• Develop missing links and nodes
		• Upgrade capacity
		• Embed resilience and greening considerations
			• **Harmonize legal & regulatory framework**
			• **Modernize border and customs management**
			• **Facilitate service diversity, competition & integration**
			• **Enhance transit management**
				• **Connect lagging regions**
				• **Enhance connectivity for small holders, SMEs and poor households**
				• **Leverage broadband digital connectivity**

How	**Regional planning for synergies across regional markets, investment promotion aligned with regional plans**	**Master-planning based on demand and regional plans, prioritization, cross border mechanisms for sharing costs/benefits**	**Agreements, audits & reengineering of business processes, automation, shared e-platform for trade and logistics, regulations**	**Public investment and PPP mechanism to enhance universal access**

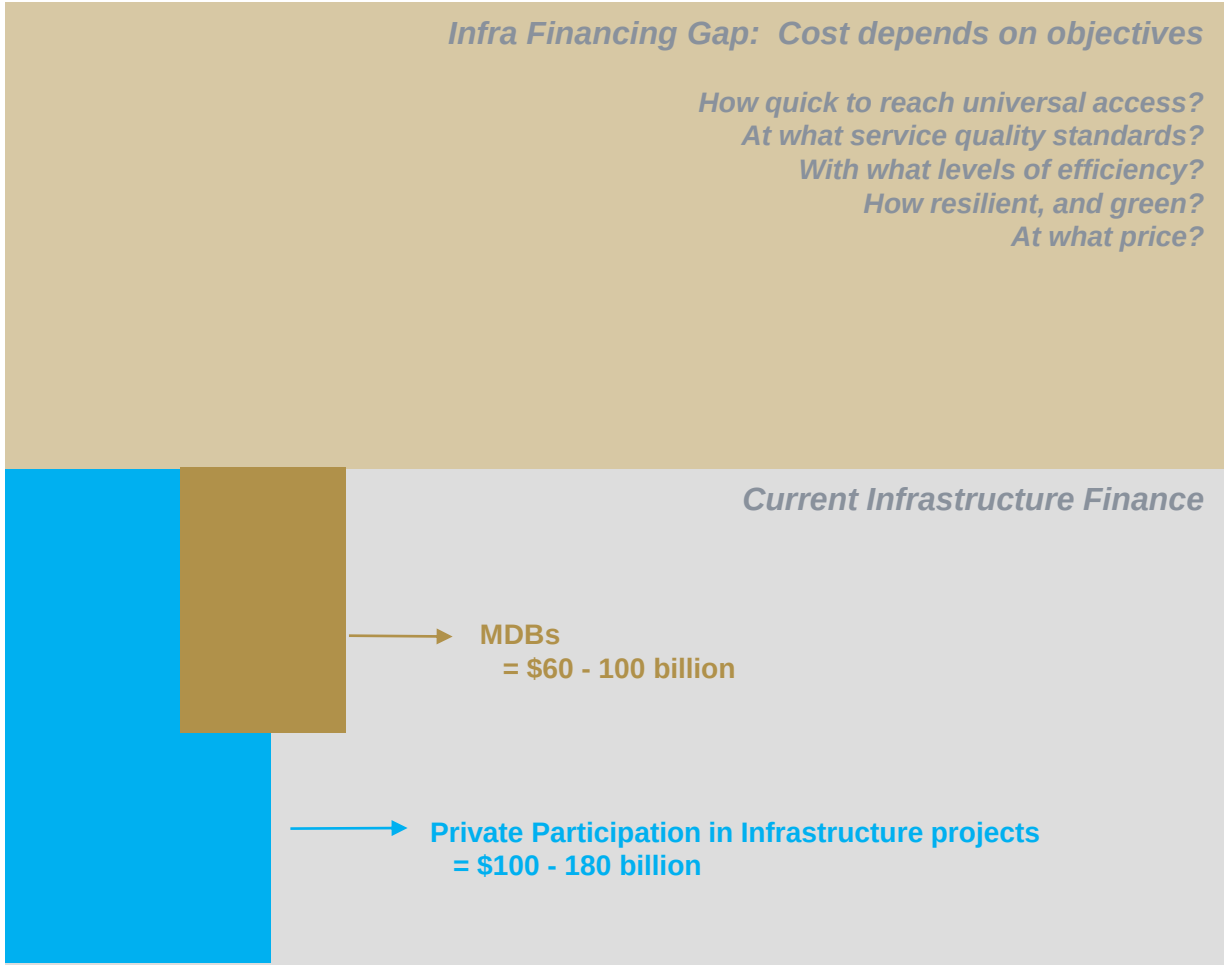
Policy, legal and regulatory framework, strategies, institutional arrangements, capacity building, public private dialogue, public and private financing cascade, measurement & evaluation using big data/data analytics

GICA is a G20 initiative that aims to enhance cooperation and synergies of cross-border infrastructure and trade facilitation programs to improve connectivity within, between, and among countries

PRIVATE INVESTMENT IN INFRASTRUCTURE

HOW INFRASTRUCTURE IS FINANCED ACROSS EMERGING MARKETS

Yearly Infra Finance Sources and Needs
Emerging Markets and Developing Economies (EMDEs)



Approximately $1.5 trillion per year across all EMDEs

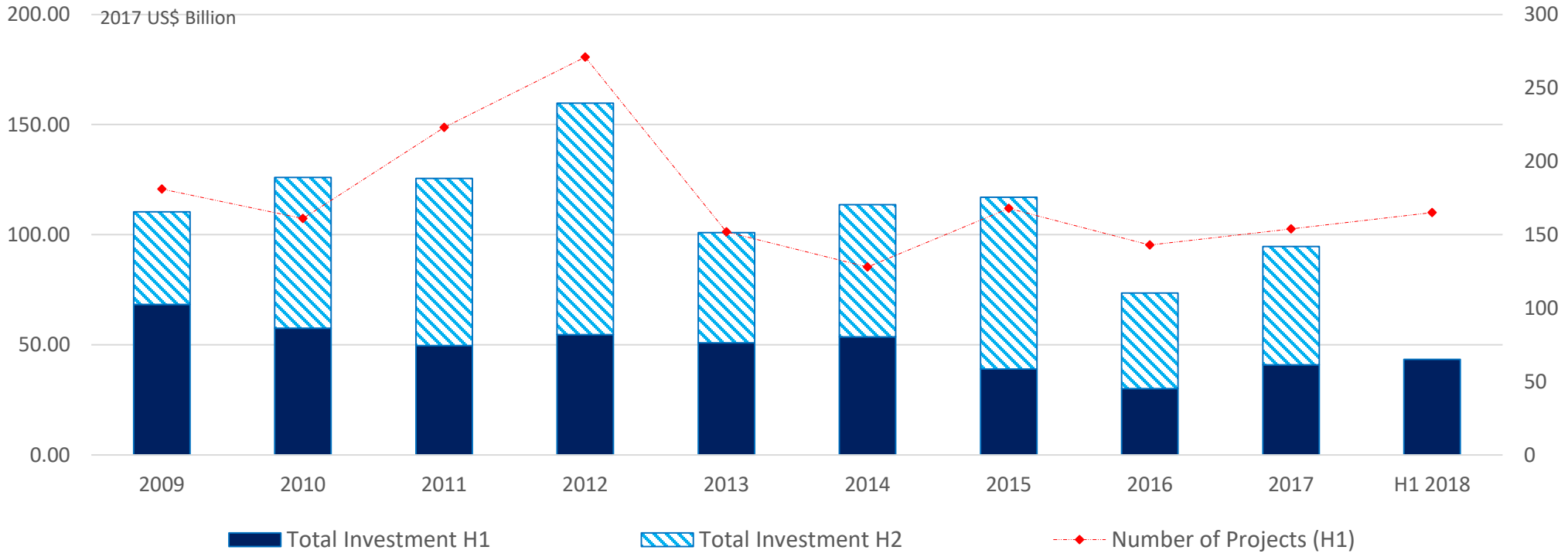
GLOBAL PPI INVESTMENTS IN EMDES, VOLUMES & NUMBERS, 2009-18H1

1. Private investment commitments in the first half (H1) of 2018 totaled **US$43.5 billion**, a **7 percent increase** over investments in H1 2017 and 44 percent over H1 2016 investments.

2. The H1 2018 investment is two percent higher than the past five years' H1 average of US$42.9 billion, but still the fourth lowest half-year investment in past 10 years.

3. **165 projects** were recorded in H1 2018, an increase of seven percent from 154 projects in H1 2017 and 11 percent over the past five years' H1 average of 149.

Investment commitments in infrastructure projects with private participation in EMDEs, 2009–H1 2018



Source: PPI Database, World Bank, as of September 2018

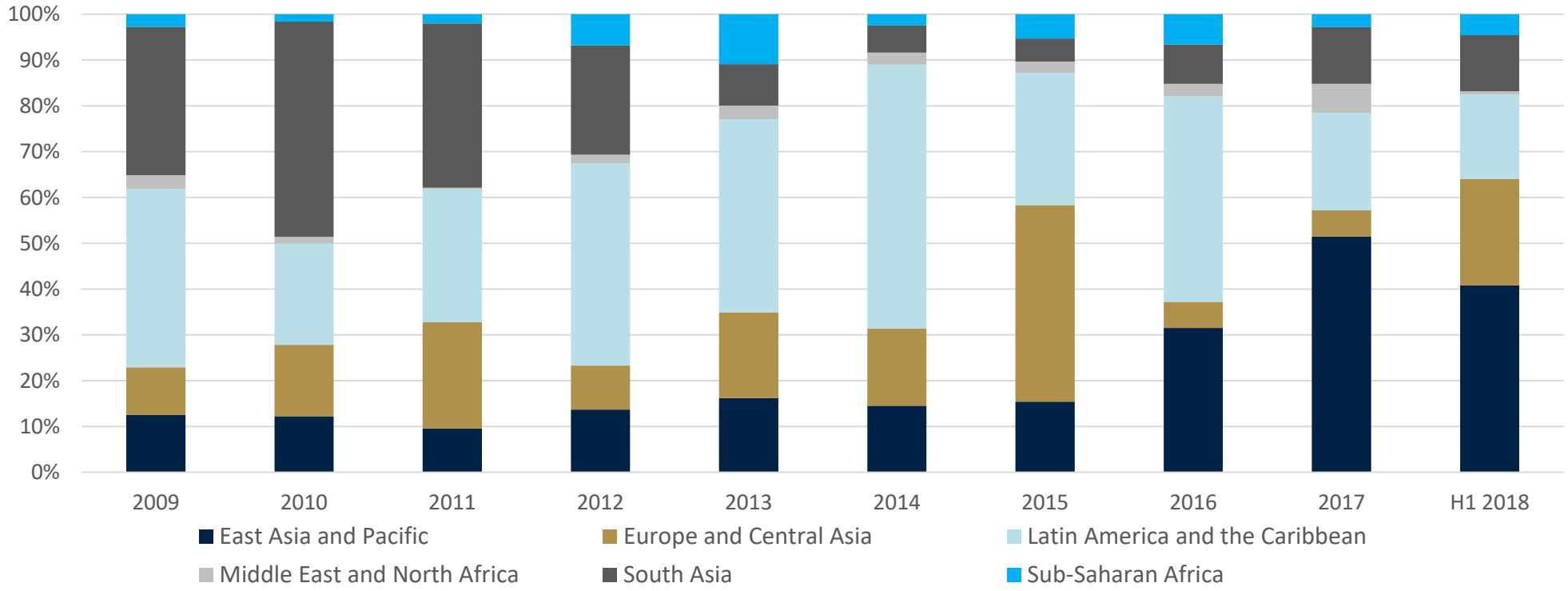
REGIONAL TRENDS

1. EAP continued to dominate global investments accounting for 40 percent of global investments in H1 2018, although it dropped from its peak share of 51 percent in 2017.

2. ECA climbed to second place garnering almost a quarter of total investment, while LAC, which used to be the leader in attracting private investment in 2016, dropped to third place.

3. Similar to ECA and LAC, the share of SSA rose in H1 2018, whereas investment commitment in MENA declined compared to 2017. Share of SAR remained consistent.

Regional share of investment commitments in infrastructure projects with private participation in EMDEs, 2009–H1 2018



Source: PPI Database, World Bank, as of September 2018

TOP FIVE COUNTRIES IN H1 2018

1. **China: US$11.6 billion across 37 projects**

   A surge of road projects in the country- Twenty-two road projects totalling US$9.3 billion accounted for 80 percent of total investments in China.

2. **Turkey: US$7.2 billion across 8 projects**

   A three-fold increase in investment from the H1 2017 levels- attributed to 4 highway megaprojects which r accounted for 95 percent of investments in Turkey

3. **India: US$3.8 billion across 24 projects**

   Majority of investments was in transport (mostly roads), accounting for 55 percent. Only top five country with no megaprojects.

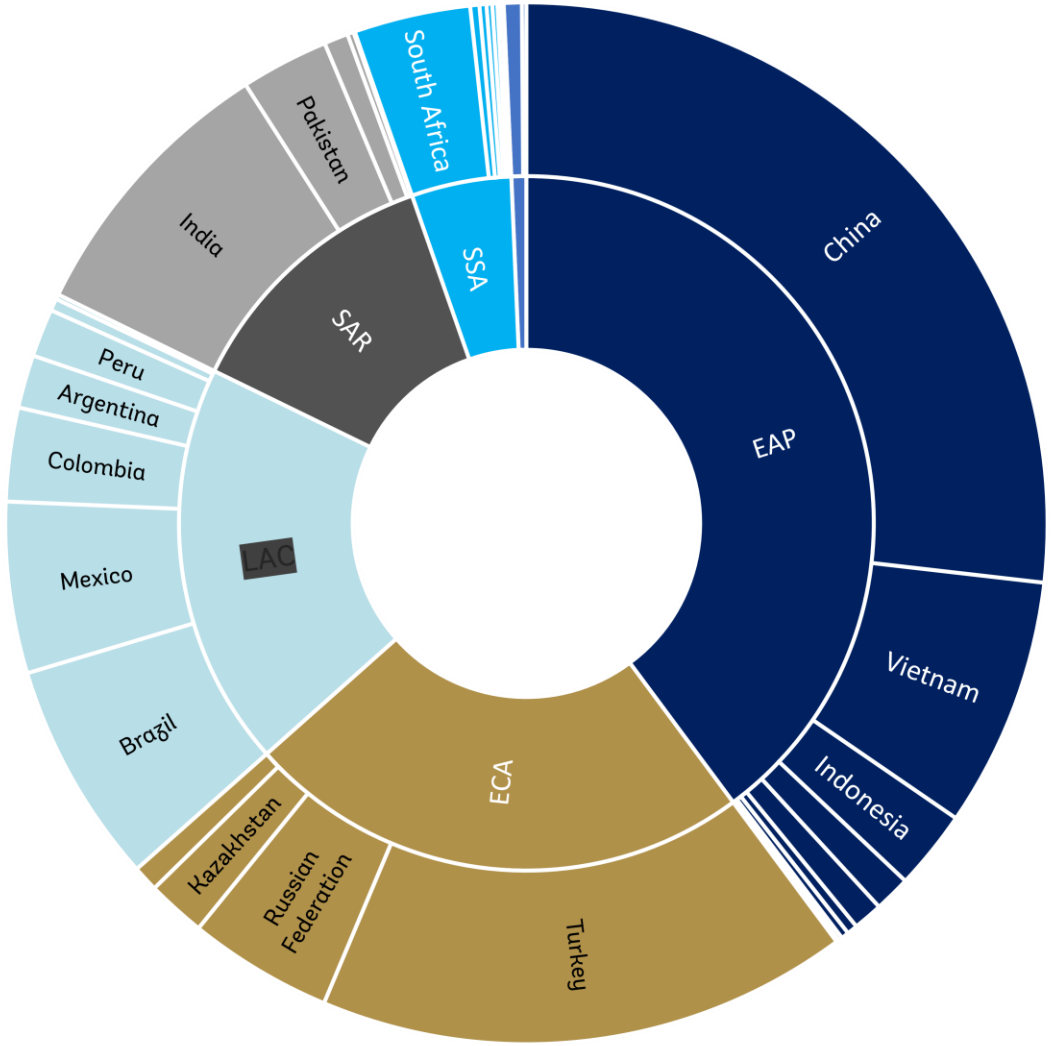
4. **Vietnam: US$3.4 billion across 10 projects**

   All the projects were electricity generation projects, with 9 renewable energy projects and a US$1.9 billion coal megaproject.

5. **Brazil: US$3.0 billion across 11 projects**

   Although Brazil made it to the top five, H1 2018 investments in the country were half of H1 2017 levels

Investment commitments in infrastructure projects with private participation in EMDEs by region and country, H1 2018



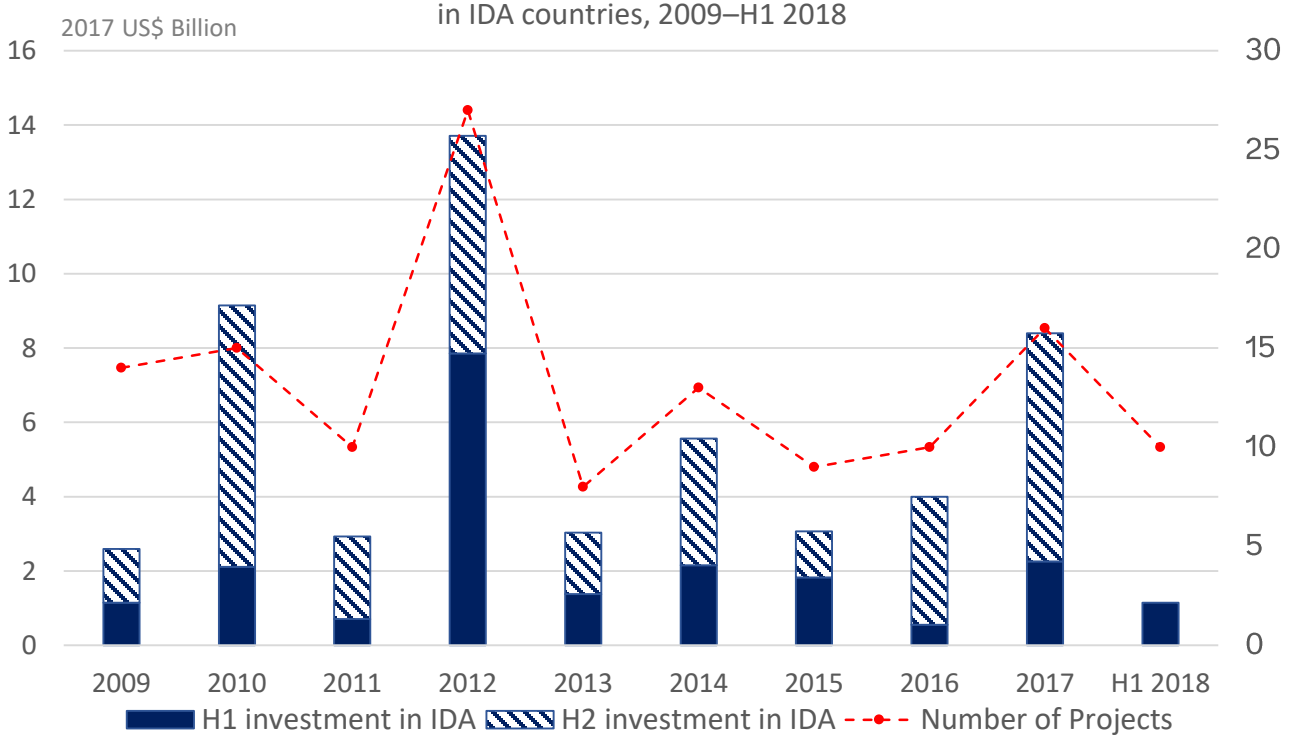
INVESTMENTS IN IDA COUNTRIES

1. Private investment commitment in IDA countries in H1 2018 totaled **US$1.1 billion** across **10 projects** and **8 countries**.

2. The investment amount is a two-fold increase from the H1 2016 level but is only half of H1 2017 investment and 30 percent lower than the five-year average investment.

3. Myanmar received the highest level of investment across 3 projects while the other countries had 1 project each. Bangladesh saw a large investment for a greenfield water treatment plant.

Investment commitments in infrastructure projects with private participation in IDA countries, 2009–H1 2018



Source: PPI Database, World Bank, as of September 2018

Investment Commitments and Number of Infrastructure Projects with Private Participation in IDA Countries in H1 2018

Country	Total Investment (US$ millions)	Number of Projects
Myanmar	397	3
Bangladesh	327	1
Guinea	121	1
Cambodia	100	1
Mali	96	1
Zambia	45	1
Sierra Leone	40	1
Nepal	21	1
IDA Total	1,147	10

Source: PPI Database, World Bank, as of September, 2018

SECTOR TRENDS

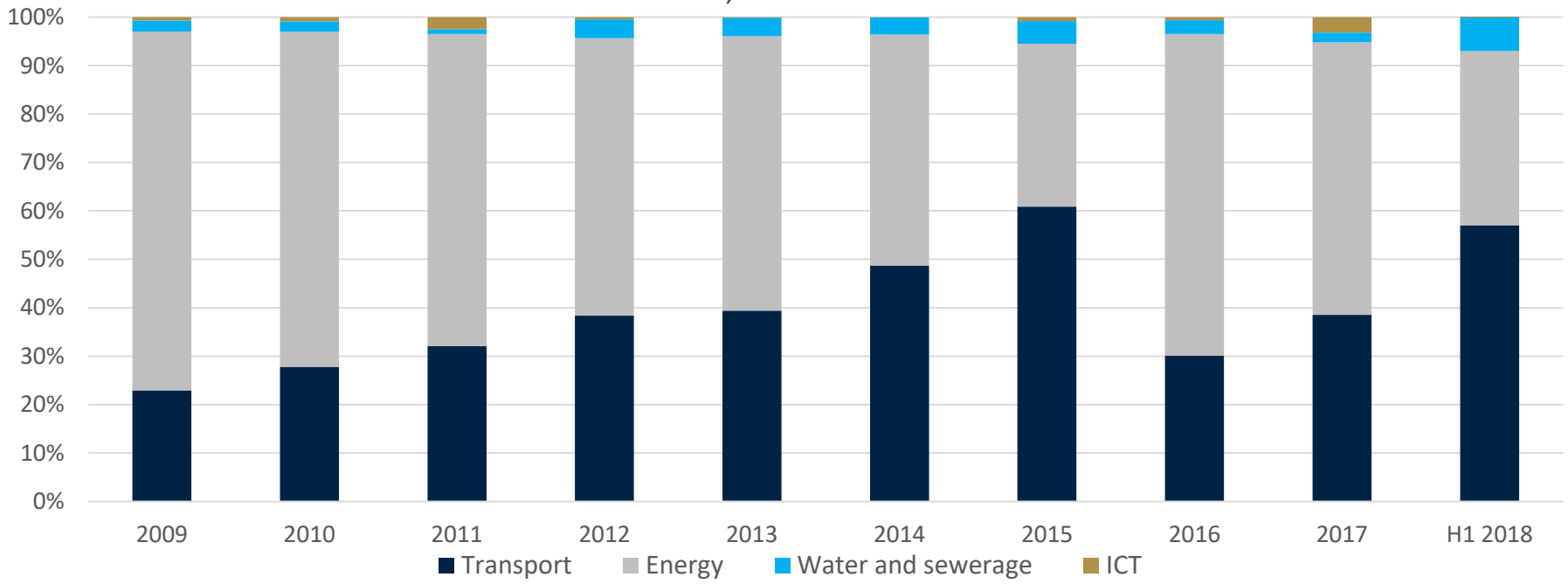
1. Transport was the most dominant sector in H1 2018 accounting for 57 percent of global investment and totaling US$24.4 billion- a 64 percent increase from H1 2017

2. 80 percent of transport investments was roads- China leading with US$9.3 billion followed by Turkey, India, and Colombia with US$6.8 billion, US$1.9 billion, and US$1.2 billion

3. At US$3.1 billion, water sector investment saw a three-fold increase over the H1 2017 amount of US$1.1 billion. China, India and Mexico accounted for two-thirds of investment in the water sector.

4. Energy sector investments at US$15.7 billion across 88 projects was ~ half of H1 2017 investments. H1 2017 investments were high due to 6 multi-billion-dollar projects in Indonesia, Pakistan and Jordan.

Share of sectoral investment commitments in infrastructure projects with private participation in EDMEs, 2009–H1 2018



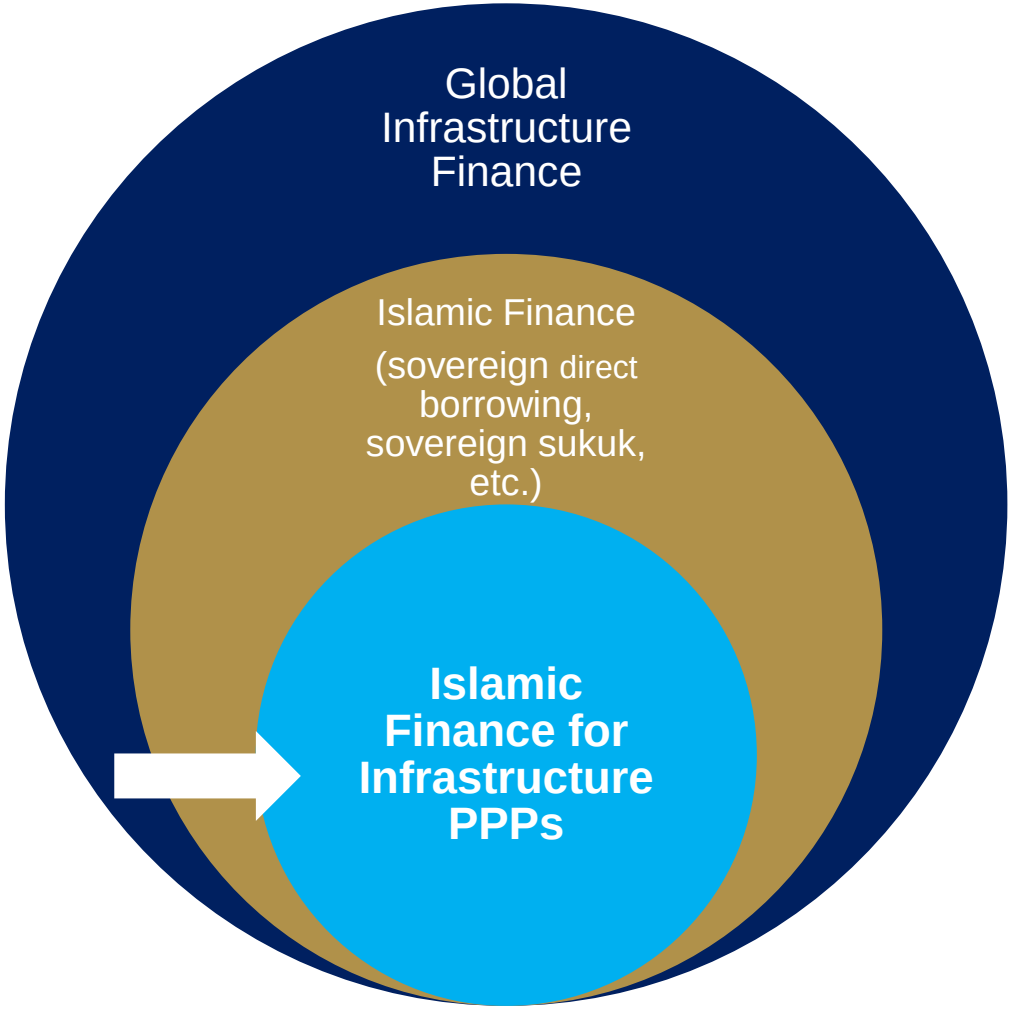
Source: PPI Database, World Bank, as of Sepetember 2018

MOBILIZING ISLAMIC FINANCE FOR INFRASTRUCTURE:
GLOBAL ISLAMIC FINANCE INDUSTRY

- US$ 2.05 trillion of Islamic finance assets in 2017
  - Islamic banks US$ 1.55 trillion
  - Sukuk US$ 400 billion
  - Islamic funds US$ 67 billion
  - Takaful US$ 26 billion

- Over the past decade, Shariah-compliant assets have expanded at over 10% per annum.

- **However, the sector is small in relative terms and is still developing.**



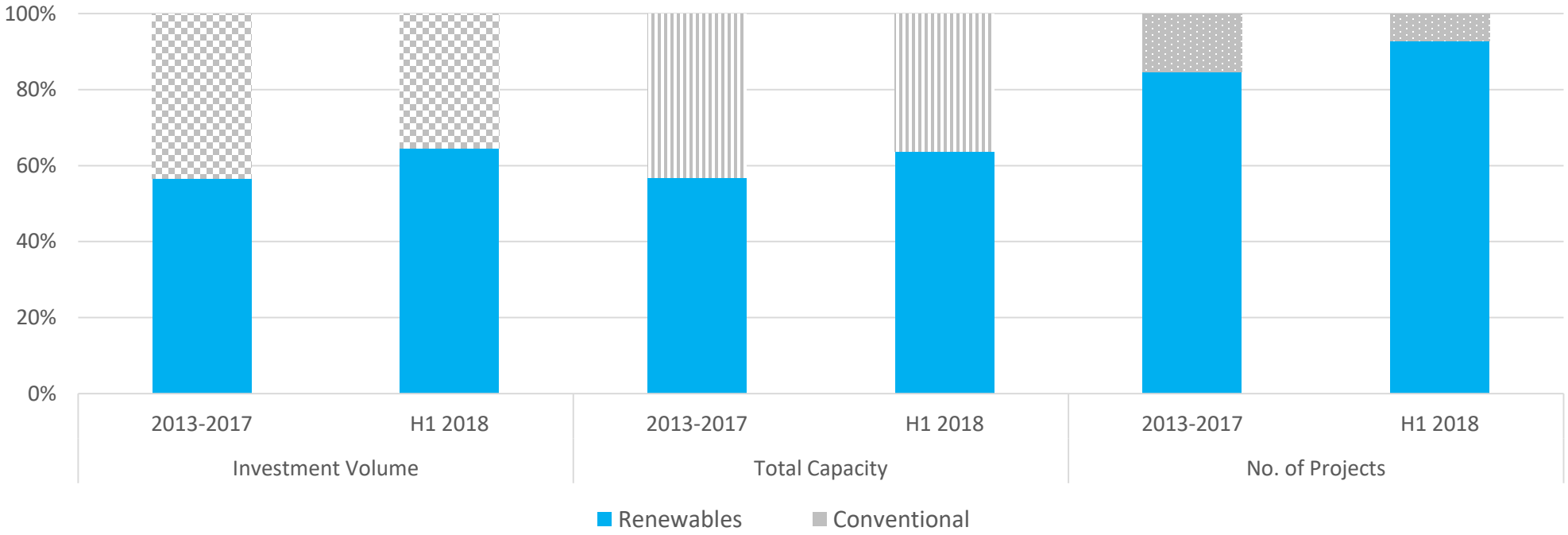
PRIVATE RENEWABLES TREND: SHARE OF PROJECTS VS. CAPACITY/VALUE

1. Renewable energy captured 93 percent of electricity generation projects (78 out of 84) though they spread over many small-sized projects (US$125 million on average) compared to non-renewable (US$897 million on average).

2. By investment value and generation capacity, renewable energy captured only 64 percent of total electricity generation investment and capacity- it is higher than the H1 2017 average of 51 percent and past five-year average of 57 percent

3. Overall, Vietnam led the energy sector investment with US$3.4 billion but in terms of renewable energy investment, Mexico was the leader with US$1.8 billion. South Africa and India were the other renewable energy champions in H1 2018

Electricity generation project using renewables and conventional resources by investment volume, capacity and number of projects, H1 2018 and 5-year average (2013-2017)



***Renewables** = 93% of private energy projects versus 64% of private energy by $ and capacity*

Source: PPI Database, World Bank, as of September 2018

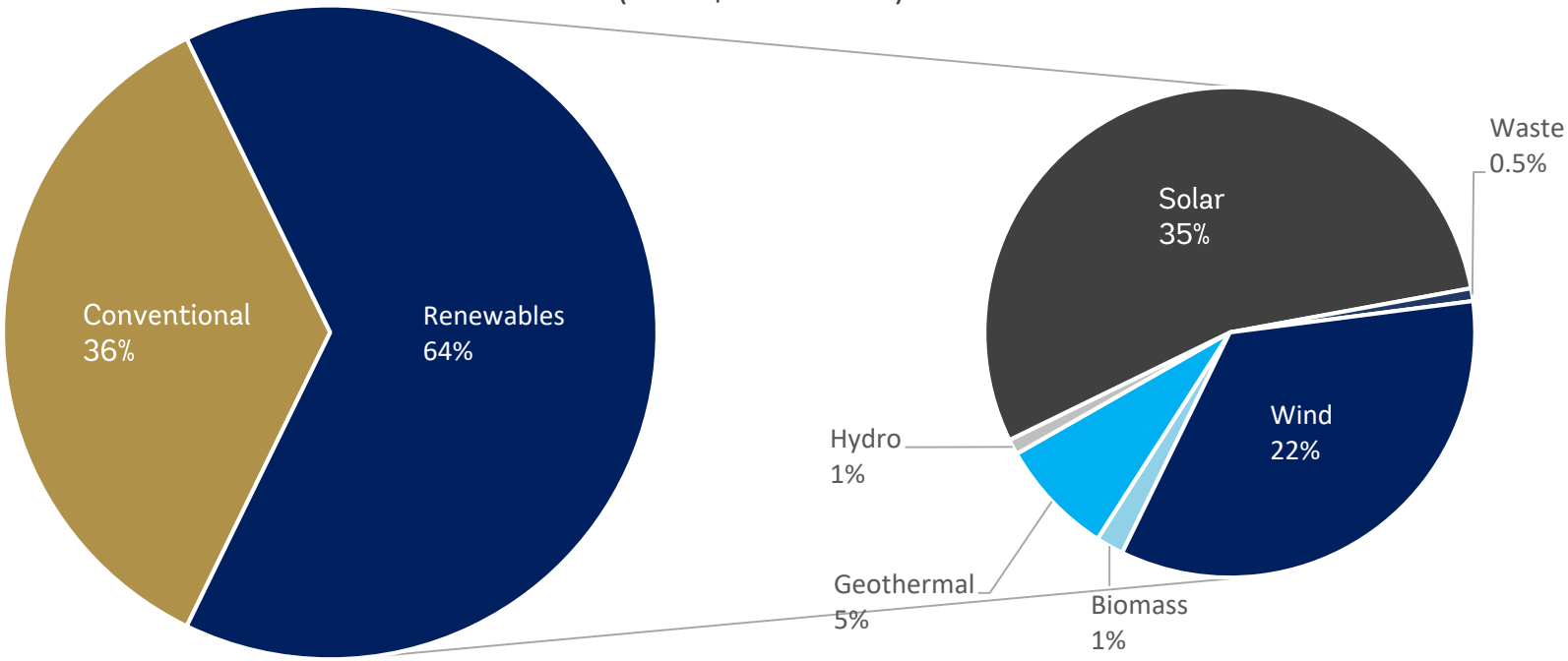
PRIVATE RENEWABLES TREND: BY TECHNOLOGY, BY VALUE, 2018H1

1. **Solar** was the most dominant form of renewable energy, attracting more than one-third of private investment.

2. Out of 49 solar energy projects, India led the way with six projects followed by Brazil, Ukraine, and Vietnam with five each.

3. The second most prominent type of renewable energy is **wind** accounting for 20 percent electricity generation investment.

Investment commitments in infrastructure projects with private participation in the energy sector in EMDEs in H1 2018, by technology
(N=US$15.1 billion)



Source: PPI Database, World Bank, as of September 2018

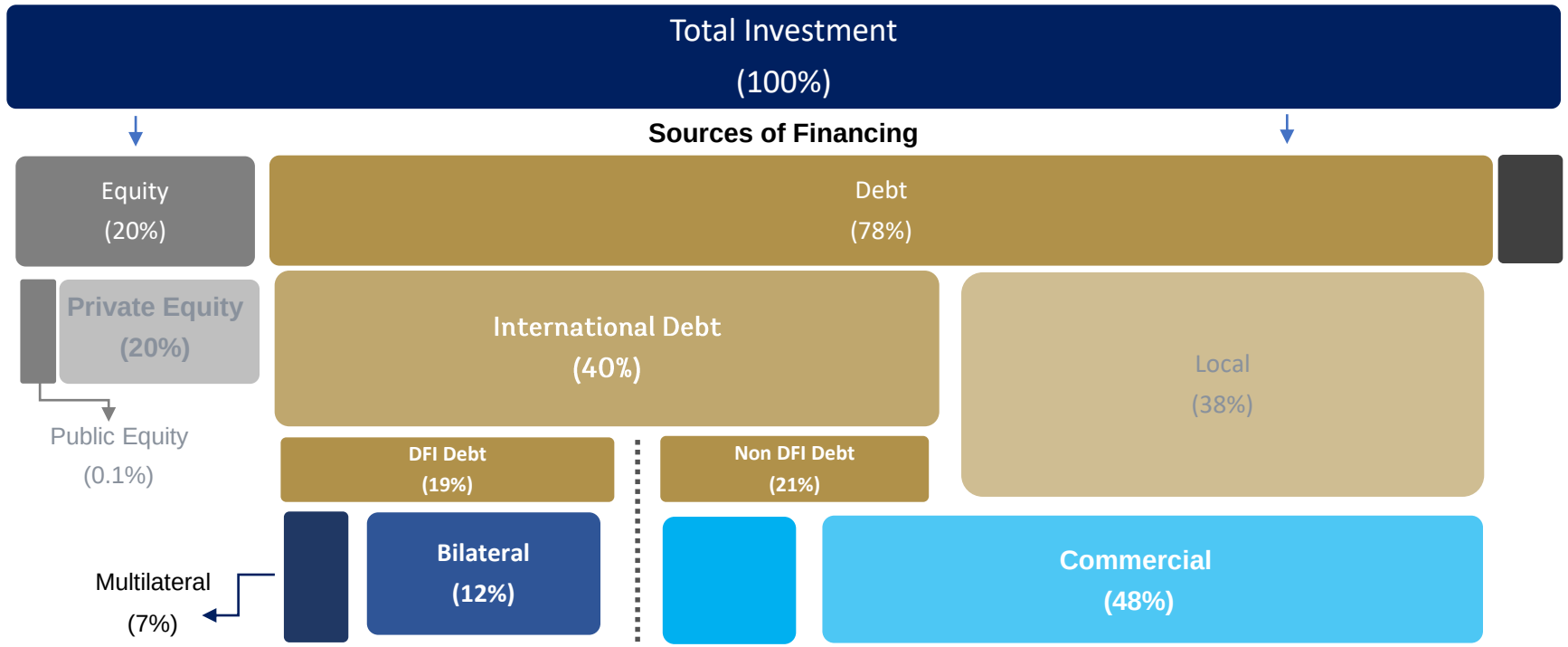
INFRASTRUCTURE FINANCE TRENDS - BEYOND MDBS (FINANCING OF PPPS): 2017

1. Out of the US$24.7 billion, public, private, and development finance institution constituted 13, 68, and 19 percent respectively

2. **Commercial lenders financed almost half of the total H1 2018 investments.** 40 percent of total commercial debt came from Turkey where 2 megaprojects raised three quarters of the country's commercial debt. Brazil and Vietnam, each, accounted for over 10 percent of the global commercial debt.

3. Local banks played a more active role accounting for almost half of total debt raised. The increase was attributable to Turkish and Indian banks financing road projects.

Sources of financing for infrastructure projects with private participation in EMDEs in H1 2018*



2018 so far compared with 2017:

- Higher leverage from 26% to20%
- High Local finance from 15% to 38%
- DFI contribution dropped from 30% of debt to 19% of debt (see country dispersion of PPI)

** All figures as a percentage of total investment*

All info on this slide is based on projects where detailed financing information was available i.e. for approximately 82 percent of total private investment projects ex. China (104 out of 128 projects)

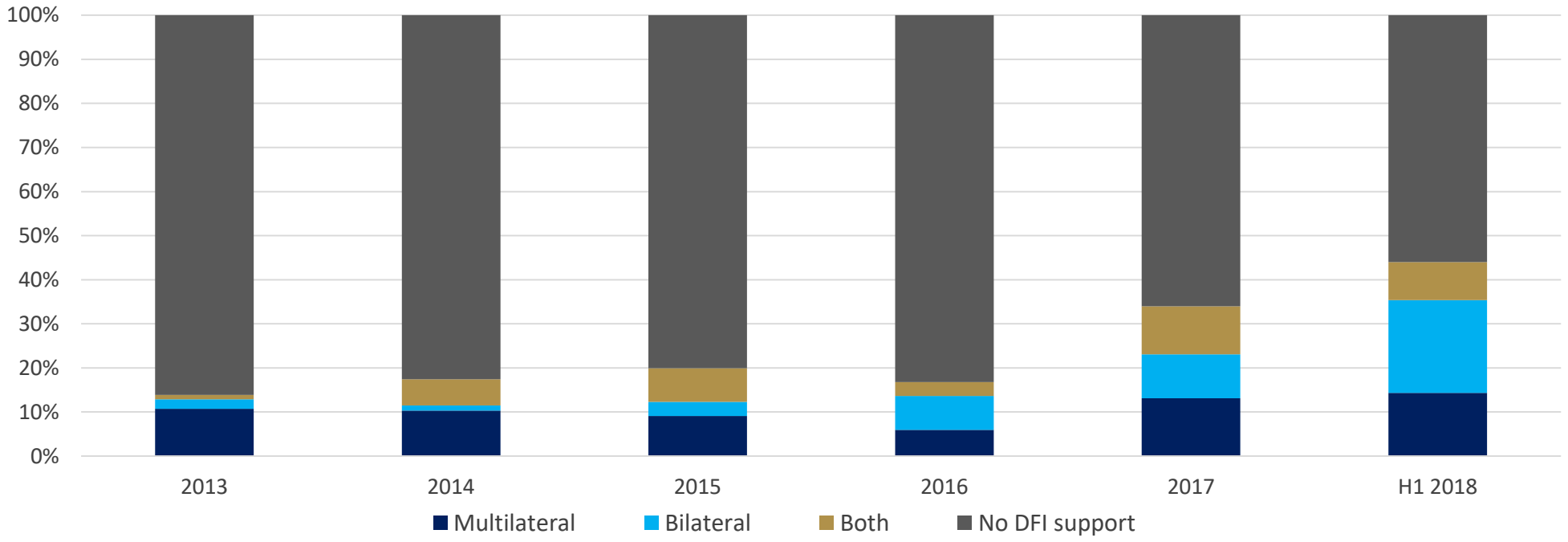
ROLE OF DFIs GROWING

1. H1 2018 saw the highest number of projects receiving DFI support in over five years, - 44 percent of projects* received DFI support.

2. As for share of total investment, however, DFIs played a reduced role compared to 2017. However, DFIs' roles expanded to providing syndication support, guarantees, and other risk mitigation facilities. Eight projects received such support in H1 2018.

3. Multilateral institutions provided US$1.7 billion of which 68 percent was given by IFC, ADB, and IDB.

Share of number of infrastructure projects with private participation in EMDEs that received multilateral, bilateral and joint support from DFIs, 2013–H1 2018



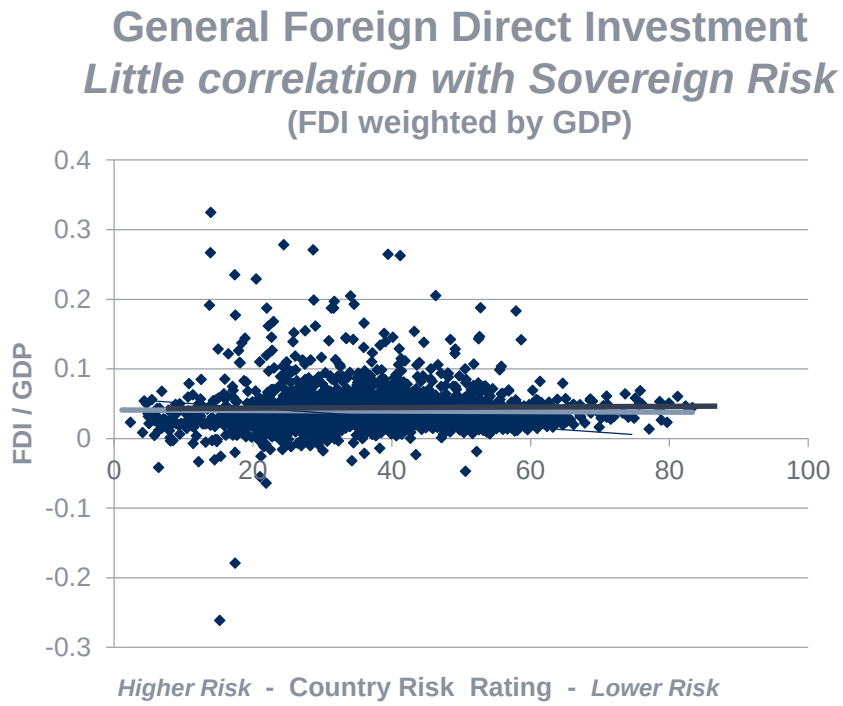
Source: PPI Database, World Bank, as of September 2018

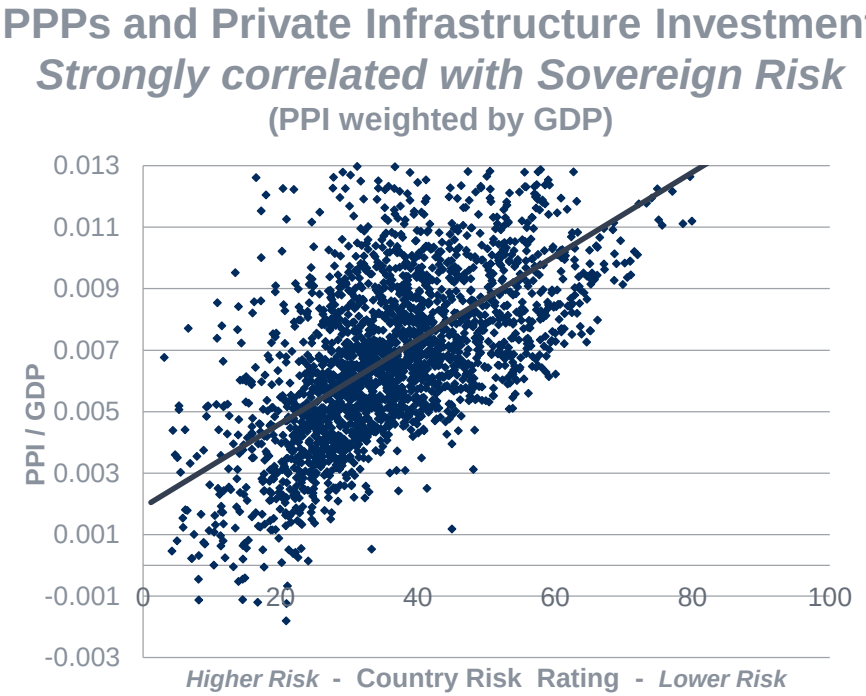
Even as DFI contribution dropped from 30% of debt to 19% of debt (see country dispersion of PPI), share of DFI involvement continued to rise sharply as a share of number of PPI projects, from less than 1 in 5 three years ago to nearly half of all projects in the first half year of 2018.

** Based on projects where detailed financing information was available i.e. for approximately 82 percent of total private investment projects ex. China (104 out of 128 projects)*

SOVEREIGN RISK AND PRIVATE INFRASTRUCTURE INVESTMENT

- **Strong correlation between sovereign risk and private participation in infrastructure (PPI) as compared with FDI overall.**
- **PPI volumes increase with freedom from corruption, rule of law, quality of regulations, and 3rd party oversight. Decreases with court disputes. Not too sensitive to forms of government.**



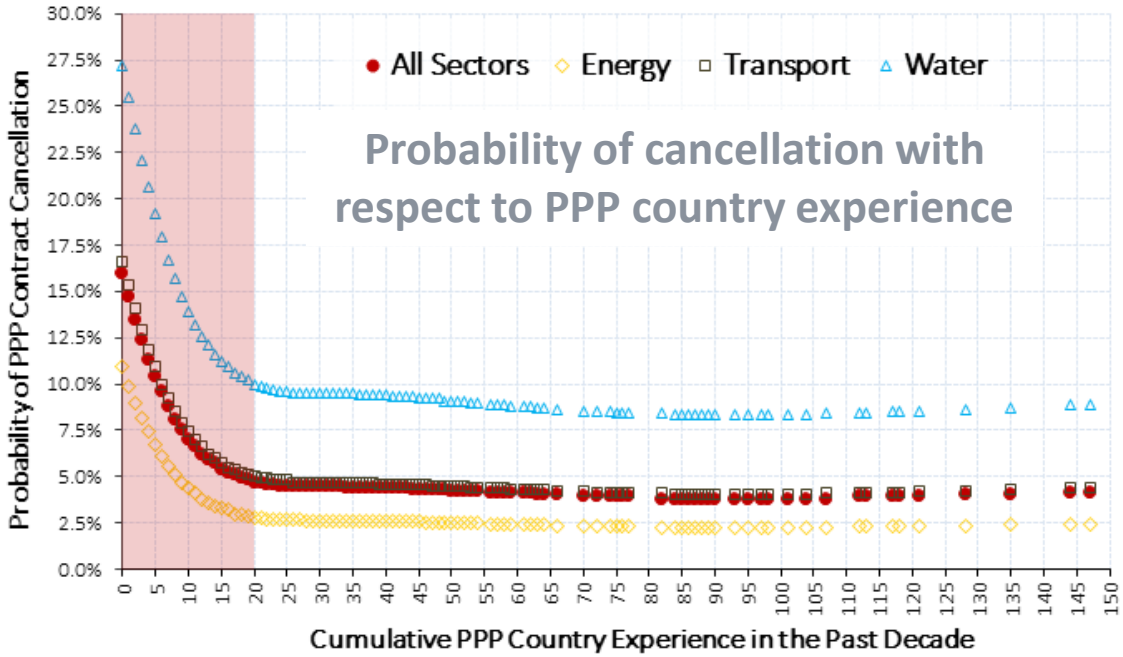


Source: "Effects of Country Risk & Conflict on Infrastructure PPPs," Araya, Schwartz, Andres, World Bank (2013).
See also: "Institutional and Political Determinants of PPI," Moszoro, Araya, Ruiz-Nunez, Schwartz. (2015) .

Replication & Standards / MDB support also drives positive outcomes

The Value of Replication & Standard Approaches

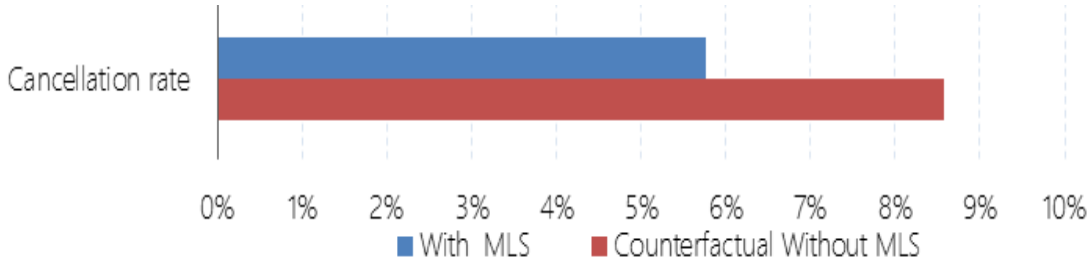
- Cancelation probabilities decrease sharply across first 10- 15 transactions
- All sectors
- Energy already most commoditized
- Water most in need of replication



The Value of MDB Support

- MDB involvement decreases likelihood of cancelation
- Role of guarantees, insurance products, direct financing
- MDB "presence"

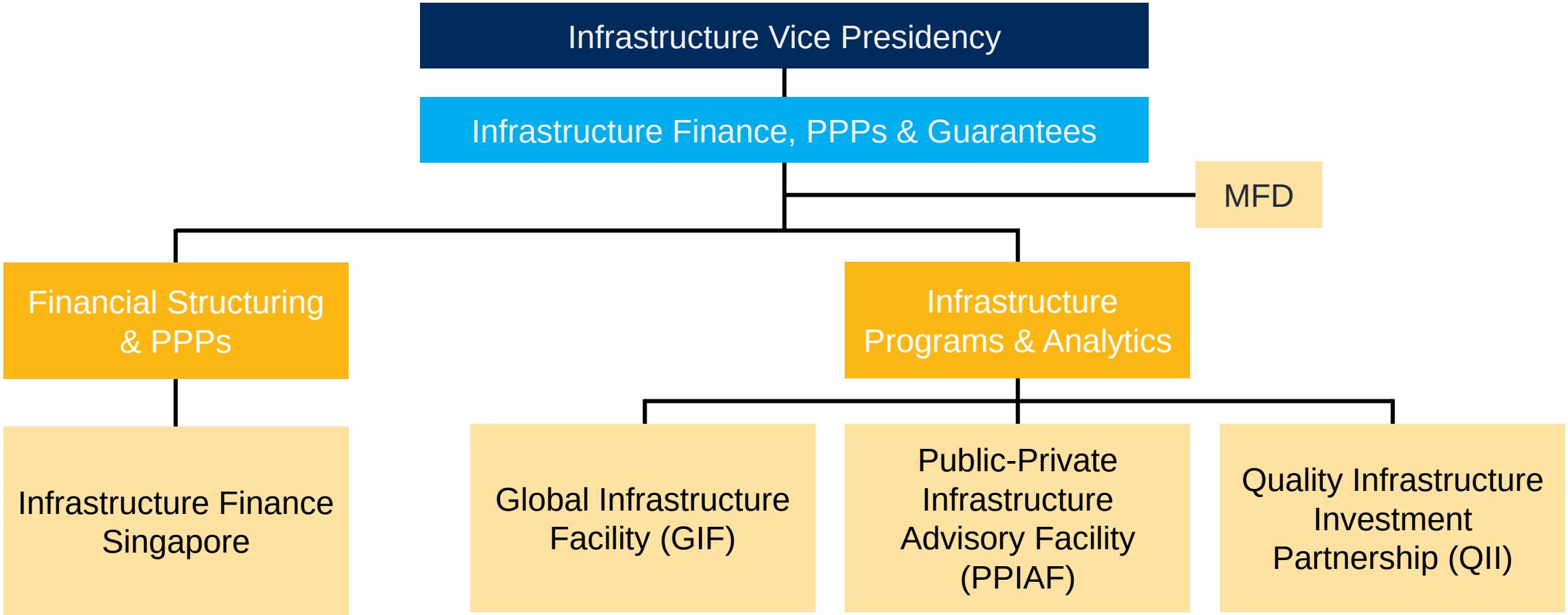
Cancellation rates of MDB-supported (MLS) vs. non-MDB-supported projects (based on propensity matched sample)



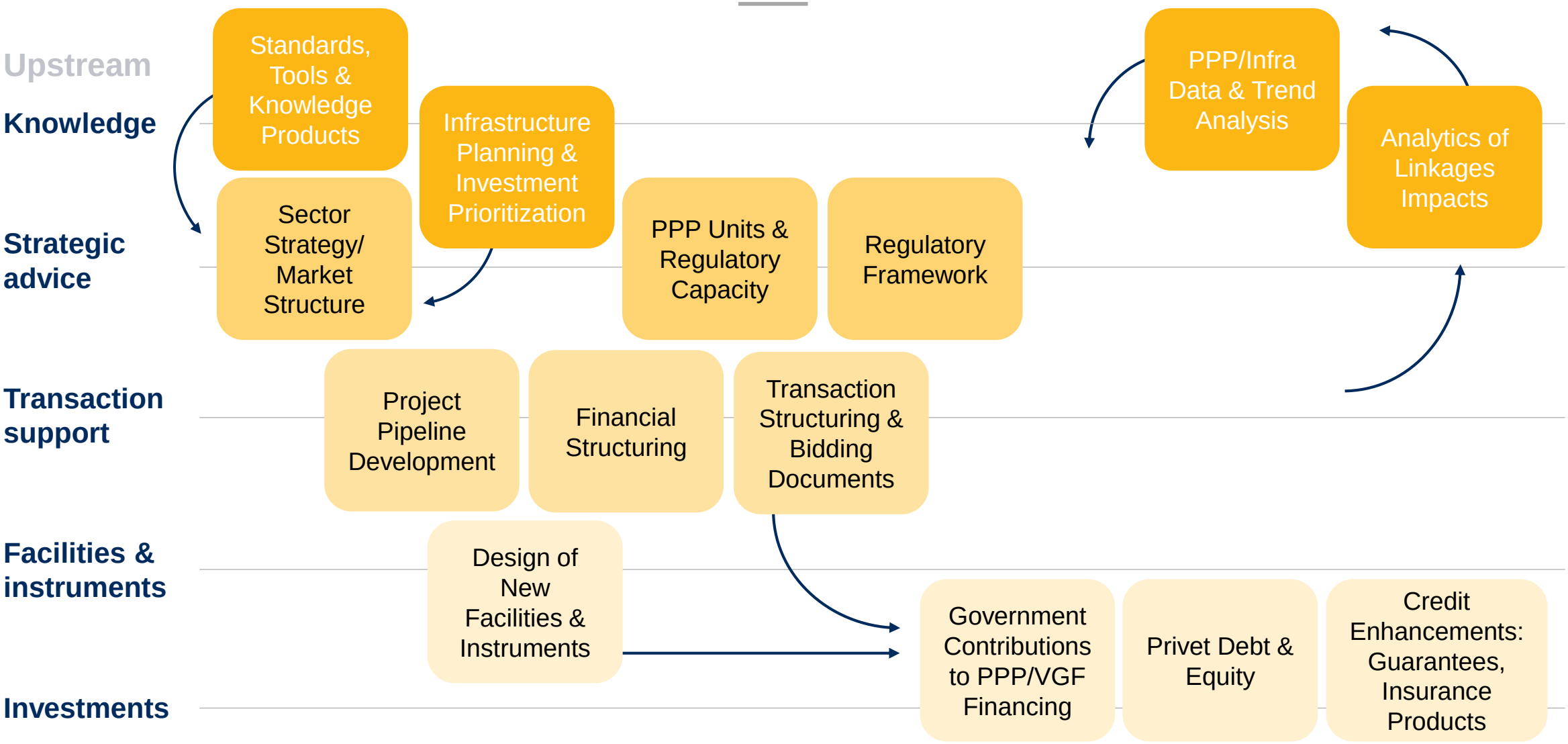
Source: PPI Database, IPG, World Bank 2017. Marcelo, et al, World Bank, 2017.

WORLD BANK INFRASTRUCTURE FINANCING, PPP AND GUARANTEE UNIT

INFRASTRUCTURE FINANCE, PPPs & GUARANTEES GROUP
ORGANIZATIONAL CHART



IPG GROUP WHAT WE DO



FINANCIAL STRUCTURING & PPPs

WHO WE ARE

32 professionals with complementary skills acquired in the private sector, commercial banks, law firms, governments, other MDBs

Close collaboration within IPG, with Global Practices and CMUs to deliver MFD operations and financial innovation

Track record of delivering upstream advice, infrastructure diagnostics and innovative financial solutions, working with IFC and MIGA

Underpinned by PPP best practice recommendations; thorough risk analysis, market sounding, fiscal analysis and financial/ legal due diligence and structuring

Houses Bank's guarantee program; Fiduciary responsibility to advise on designing, structuring and monitoring projects utilizing WB guarantees; Product agnostic in approach

IPG GROUP
GLOBAL ENGAGEMENT

G20 Infrastructure Agenda

MDB Infrastructure Cooperation Platform

Infrastructure Finance Fora

WORLD BANK GROUP

Thank You!