**Harnessing Investment for Sustainable Development Through Public–Private Partnerships (PPPs) in Infrastructure and Public Services: The economics and finance dimensions**

Joint IISD–UNCTAD workshop

InterContinental Nairobi – Nairobi, Kenya – February 6, 2018

**TRAINING MATERIAL – PRESENTATION SLIDES**

# Measuring Investment in Infrastructure and Public Services Sectors: A data overview and data challenges

**Harnessing Investment for Sustainable Development Through Public Private Partnerships (PPPs) in Infrastructure and Public Services**

A joint IISD–UNCTAD workshop with a special focus on agriculture and rural infrastructure

InterContinental Nairobi – Nairobi, Kenya – February 6, 2018

# Contents

- Issues of PPP information in light of the SDGs
- What PPP data can show
- Conclusions for PPP stakeholders

# Issues of PPP information in light of the SGD

# PPPs are common in two types of "infrastructure"

- "Economic infrastructure":
  - Electricity
  - Gas
  - Water and sewage
  - Transportation and storage
  - Telecommunications
- "Soft infrastructure" or "public services":
  - Education
  - Health and social services
  - Community, social and personal service activities
  - Public administration
- Economic infrastructure is more frequently monitored

# Why PPP data are important for sustainable development

- PPPs are key to various SDG goals
- SDG 17, Partnership
- Plus goals related to economic infrastructure development, as well as education and health, especially:
  - SDG 3, Good Health and Well-being
  - SDG 4, Quality Education
  - SDG 6, Clear Water and Sanitation, and
  - SDG 7, Affordable and Clean Energy
  - SDG 9, Industry, Innovation and Infrastructure,
  - SDG 11, Sustainable Cities and Communities (via PPPs in communal services)
- If investment is low and stagnant, we cannot reach the goals

# Major challenge: estimating needs and gaps

This challenge goes beyond data collection

- Gaps: needs-actual (or projected/forecasted) investments

- Data cover only actual investments

- Estimating needs and projected values requires <span style="color:red">more than</span> data collection:

- Econometric modelling etc.

# Estimates for investment gaps in infrastructure vary

Examples:

- UNCTAD (2014): $0.8–1.7 trillion annual gap (power, transport, communications and water)

- McKinsey (2016): $3.3 trillion annual global gap (power, transport, communications and water)

- World Economic Forum (2013): $ 5 trillion annual global gap (power, transport, buildings and industrial, communication, agriculture, forestry, and water)

- Note: UNCTAD also has estimates for health ($140 billion per annum) and education ($250 billion per annum)

# Why the variation

- Differences on underlying assumptions and projections for:
  - Economic growth
  - Policies
  - Technological changes
  - Scope of the sectors included
  - The treatment of difference between capital expenditure and other (operating) expenses
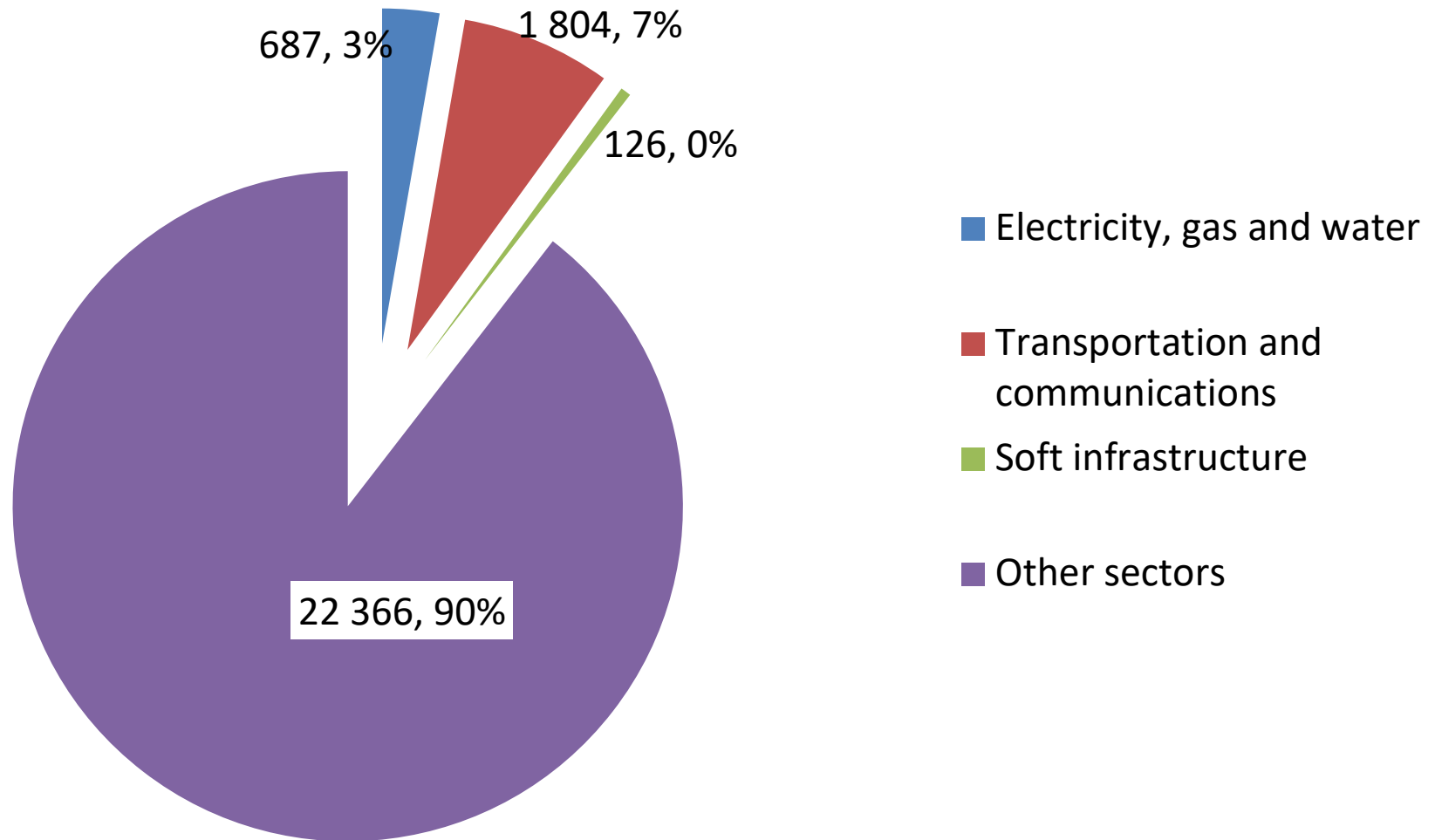
# What PPP data can show

# Most PPP data are outside the FDI universe that UNCTAD usually monitors

PPP universe includes:

- FDI:
  - Equity joint ventures between public and private entities
- Non-FDI:
  - Concessions, build-operate-transfer (BOT), design-build-operate (DBO) projects etc.
  - Management contracts
  - Leases
  - Affermage
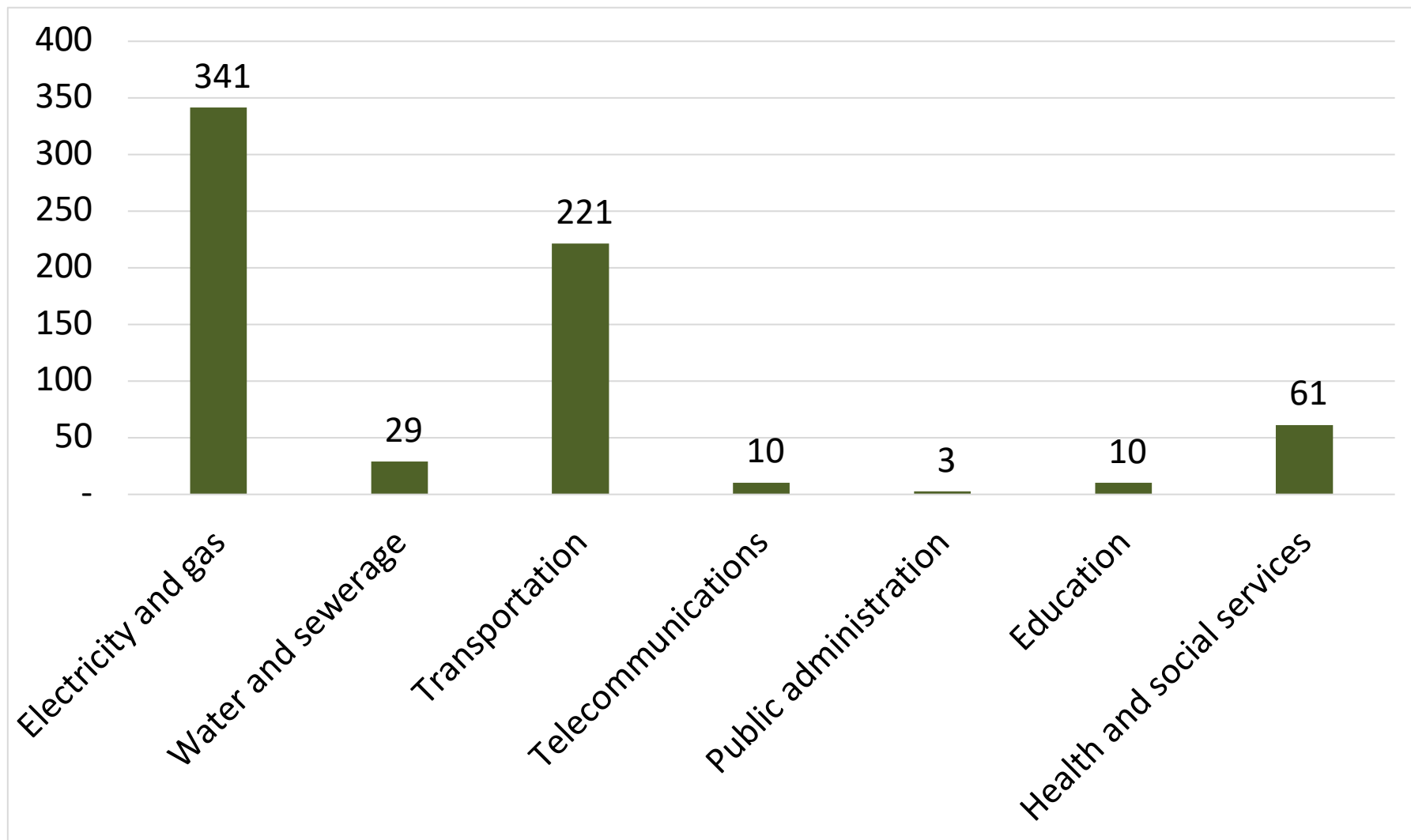- UNCTAD FDI data focus more on the first part (FDI)→ may lead to partial information

# FDI stock in selected sectors, 2015
## (Billions of dollars and per cent)



687, 3%    1 804, 7%

126, 0%

22 366, 90%

- Electricity, gas and water
- Transportation and communications
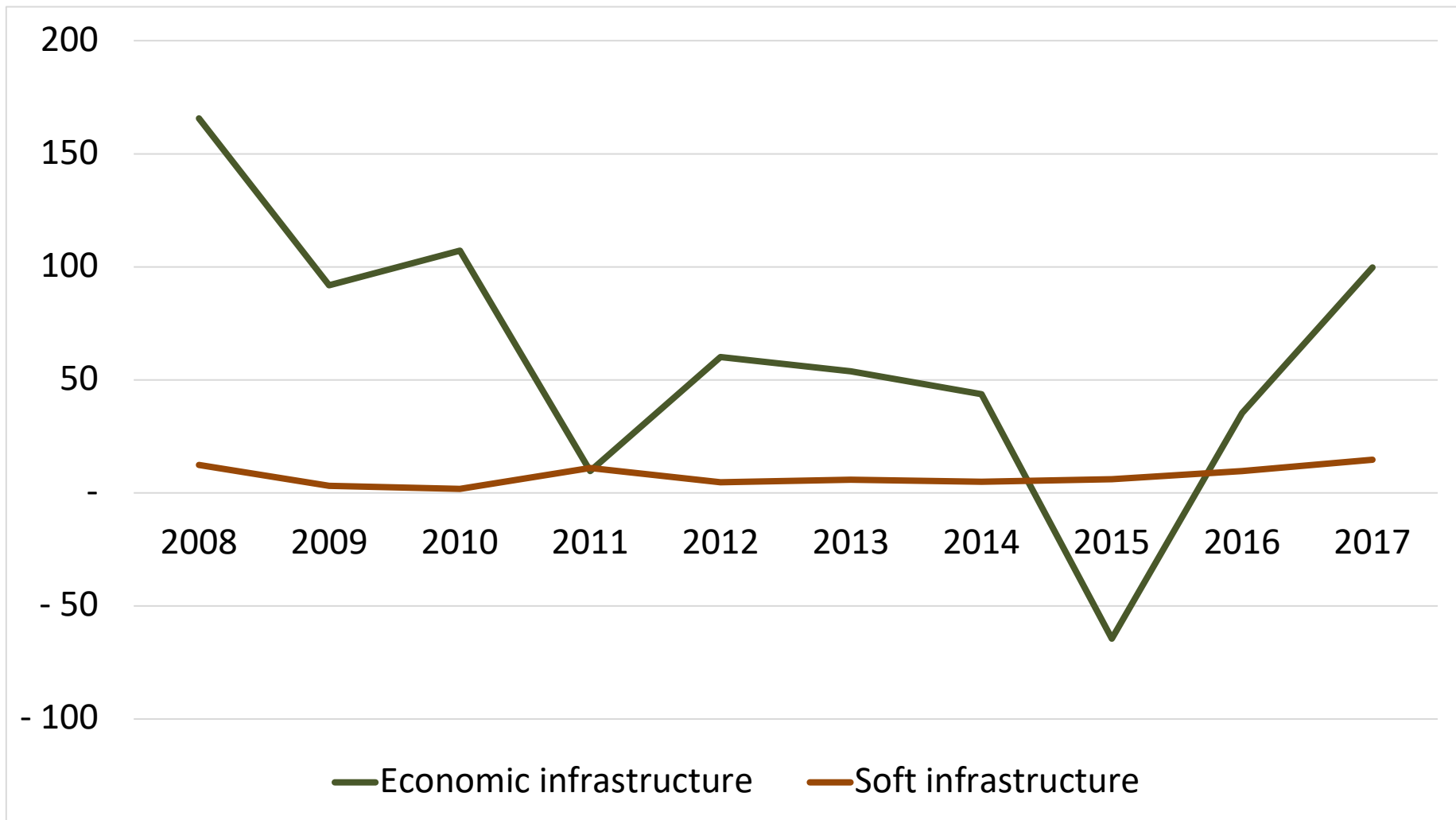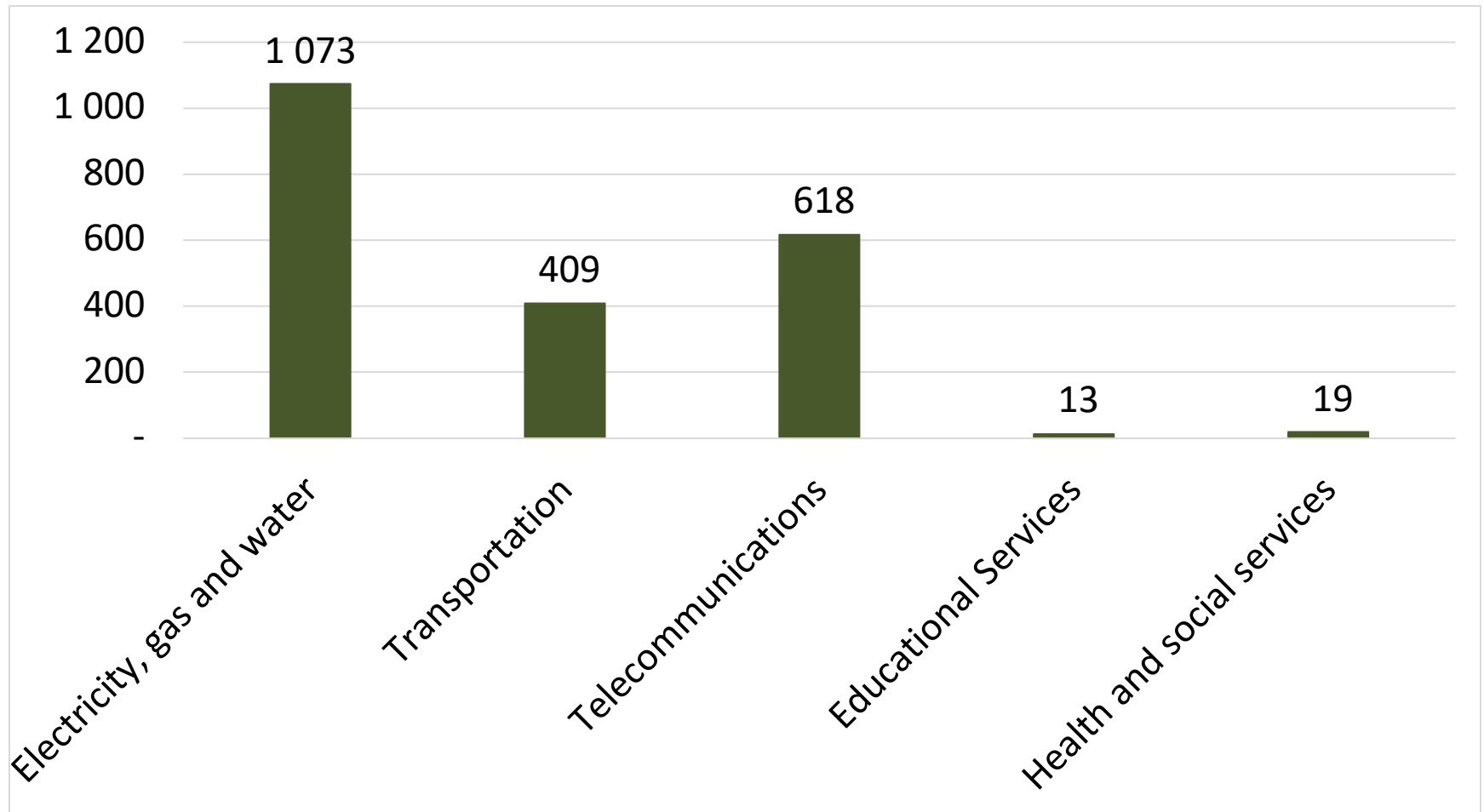- Soft infrastructure
- Other sectors

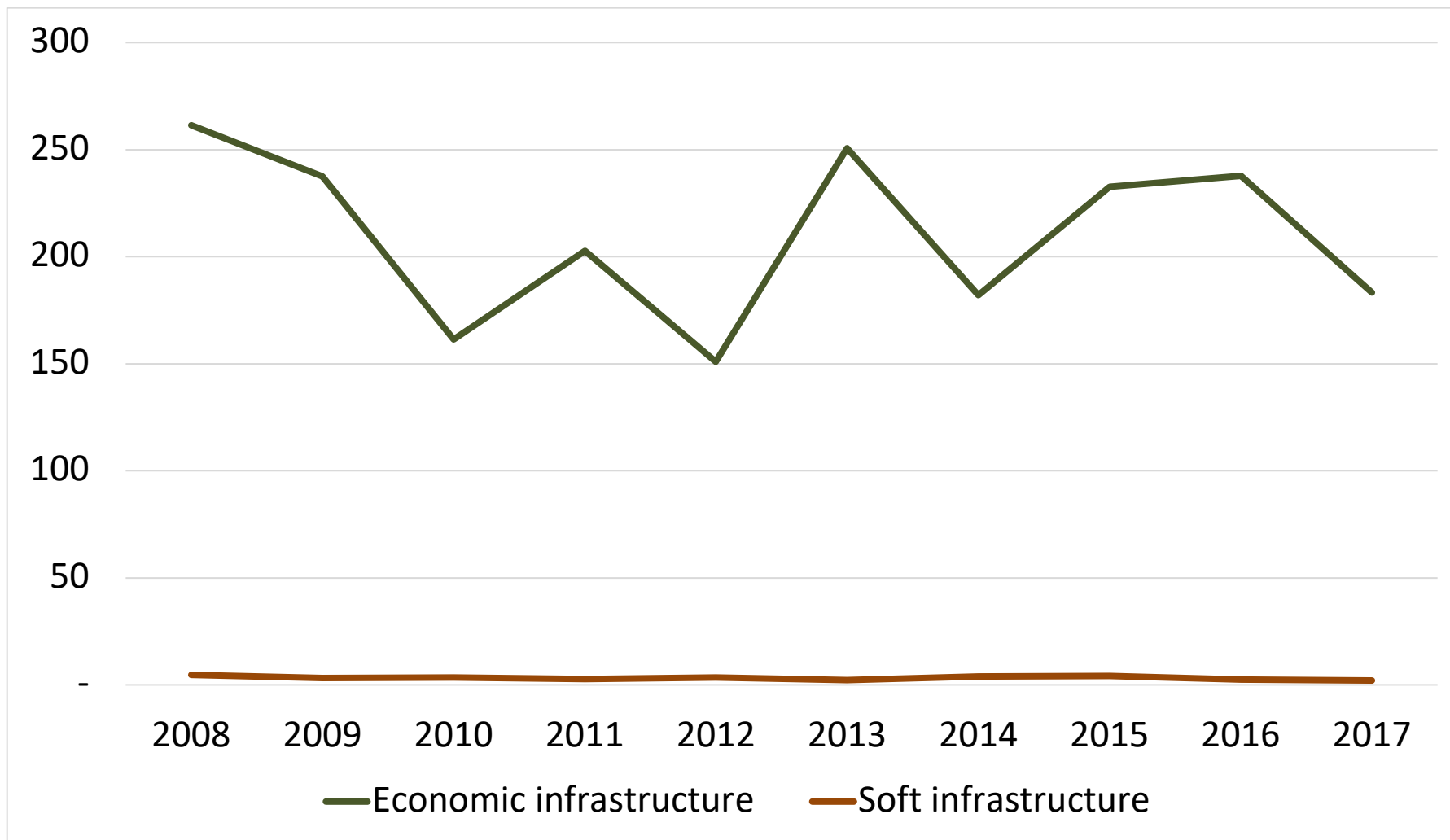# Cross-border M&As in selected sectors, 2008–2017 (billions of dollars)

# Cross-border M&As in selected sectors, 2008–2017 (billions of dollars)

# Announced greenfield projects in selected sectors, 2010–2016 (billions of dollars)

# Announced greenfield projects in selected sectors, 2010–2016 (billions of dollars)

# Conclusion on FDI data

- FDI in infrastructure is small, except in electricity and gas

- FDI in public services is even smaller

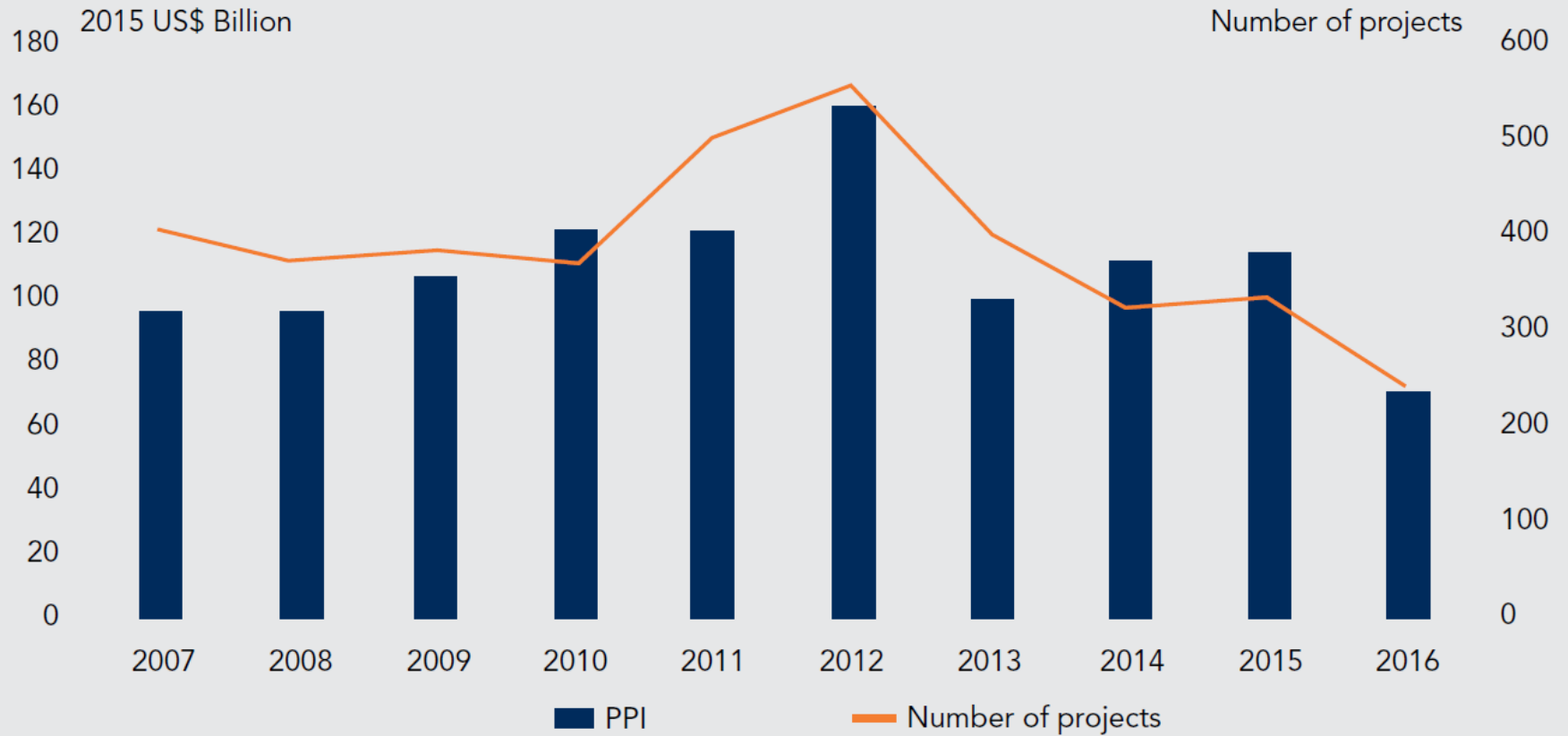- No clear-cut growth over the past decade

# World Bank PPI database

Commonly used for measuring investments in economic infrastructure

+ Fairly comprehensive and detailed:
  - 7,195 infrastructure projects in 139 low- and middle-income countries, 1990–2016
  - Total value: $2,595 billion (public + private components)

- Excludes soft infrastructure

- Not fully exact in separating commitments and realizations

- Stops reporting on countries that move to high income

## FIGURE 1

Investment commitments in infrastructure projects with private participation in EMDEs and number of infrastructure projects with private participation in EMDEs, 2007–2016

*Note: All investment is adjusted by US CPI.*

## FIGURE 2

Investment commitments in infrastructure projects with private participation in EMDEs without Turkey, Brazil, and India, 2006–2016
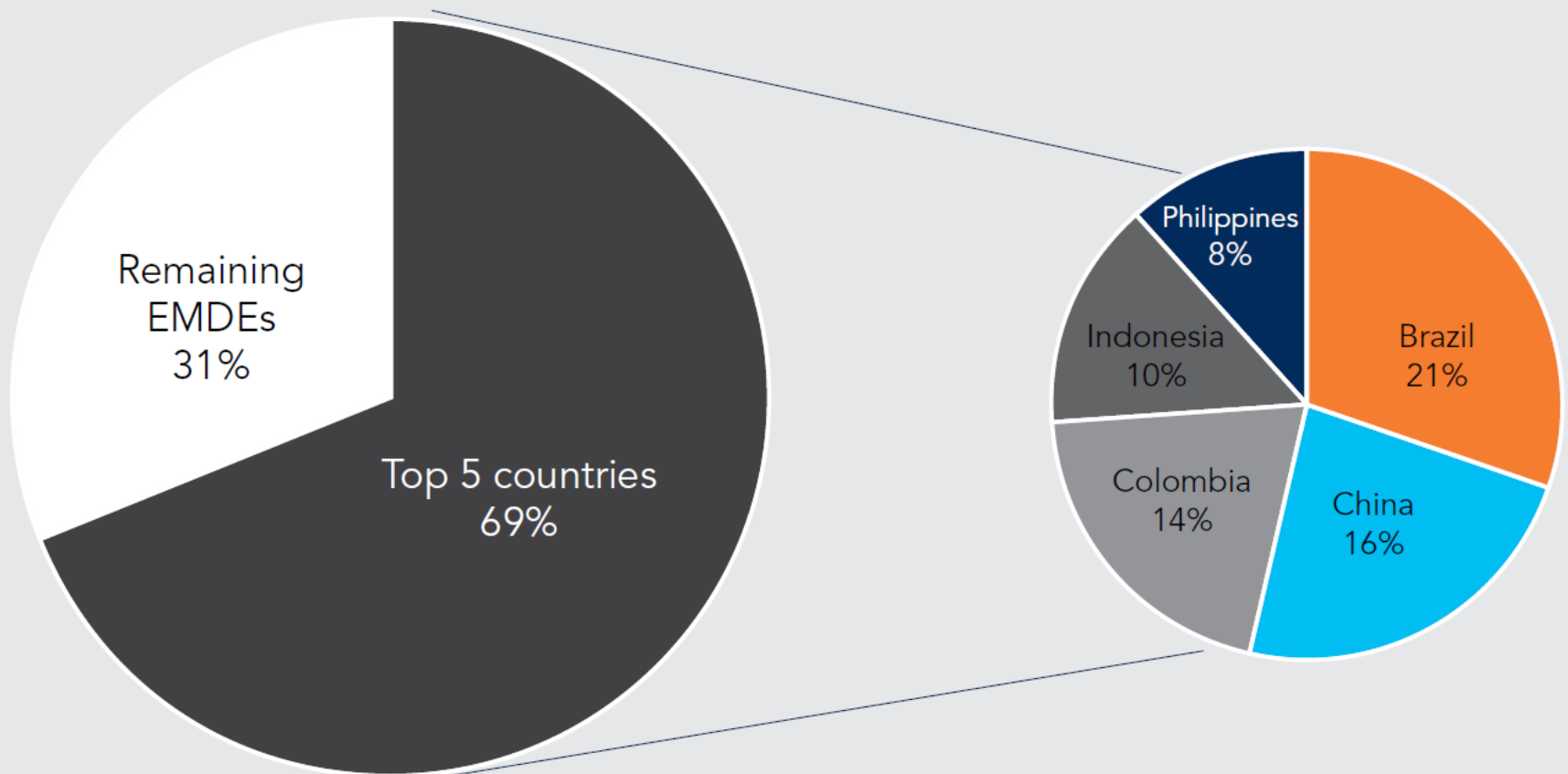


2015 US$ Billion

*Source: PPI Database, World Bank, as of June 2017*

*Note: All investment is adjusted by US CPI.*

## FIGURE 12

Investment commitments in infrastructure projects with private participation by the top five countries in 2016

# Conclusion of PPI data

- Waiting for a take-off of PPPs in infrastructure and public services
- Concentration in few countries

# Conclusions for PPP stakeholders

- Data indicate a major gap and slow growth in almost all activities

- PPP is particular laggard in soft infrastructure

- Challenge for all stakeholders: timeliness of your discussion

# IISD's Sustainable Asset Valuation (SAVi) Tool: The essentials

Martin D. Brauch
February 6, 2018

# The goal is to

## accelerate the deployment of Sustainable Infrastructure

IISD defines sustainable infrastructure assets that:

- Lower carbon and environmental footprints
- Provide for the stewardship of natural ecosystems in a manner that enhances the conservation of biodiversity
- Move beyond compliance on core labour standards and human rights
- Trigger green technological and industrial innovation across domestic and international value chains
- Spur investment in education, skills building and R&D
- Increase employment and the growth of green jobs
- Are financially viable
- Crowd in domestic investors and businesses
- Increase opportunities for foreign direct investment and domestic value-added
- Optimize value for money for taxpayers and investors across the asset life cycle

# The SAVi Value Proposition

**The Sustainable Asset Valuation (SAVi) methodology assesses how environmental, social and economic risks and externalities impact the financial performance of infrastructure assets.**

*The challenge investors and governments face today is that <u>conventional project finance valuation methodologies ignore a range of material risks, intangibles and externalities.</u>*

*We developed SAVi to address this issue.*

# Environmental, social and economic risks

- **Legal risks**: carbon taxes and levies; changes in-feed in tariffs and availability payments, litigation related to poor due diligence on environmental and social safeguards.
- **Technology risks**:  performance risks on new clean technologies that have no/low track record.
- **Market risks**: Shifting patterns in demand due to consumer preferences, automation, advance technology, artificial intelligence,  urbanization, population demographics, emerging human heath issues.
- **Reputation risks**: Bad press and falling shareholder value due to incidents of pollution and allegation of  human rights abuses.
- **Physical risks**: Increased severity and frequency of extreme weather and related revenue losses and hikes in operation costs.
- **Social risks**: Delays in construction or disruptions in operations due to public protests. Low public acceptance of the project.
- **Political risks**: Currency inconvertibility, expropriation, war, terrorism, civil disturbance.
- **Performance risks**:  higher operating costs and loss of asset value due to due to water stress, air pollution, land degradation, disruptions in ecological cycles, destruction of biological diversity.

**SAVi can be used to financially value risks and forecast their impacts on future costs and benefits, value-for-money, internal rates of return and credit risk ratios.**

# Environmental, social and economic externalities

- **Environmental externalities**: degradation or the rehabilitation of land; pollution of surface and ground water' higher or lower green house gas emissions; destruction or rehabilitation of habitats and wildlife; increases or decreases in air pollution.

- **Social externalities**: increases or decreases in wages, employment and productivity; contribution to education, innovation and skills building; contribution to green industries and cleaner production processes; affects on urban congestion and sprawl; effects on rural livelihoods; impacts on human health and healthcare costs.

- **Economic externalities**: contribution to economic indicators such as GDP and Green GDP, household incomes, and wages; affects on land and real estate prices; damage and lowered industrial output caused by floods, droughts, storms and other climate change related freak weather; increased volatility in natural resource, metals. minerals and agricultural commodity prices linked to changing weather and climate patterns.

**SAVi can be used to financially value these externalities, which have a direct impact on the efficiency and the financial feasibility of infrastructure projects. Governments, investors and citizens can use SAVi to assess the impacts of their infrastructure investment decisions.**

# What is the scope for SAVi applications?

**SAVi can be used to assess:**

- a single project or asset

- a portfolio of projects/assets

- an economic or industrial policy

- projects/assets at national scale

# Customization of SAVi

**SAVi is customized to each asset, portfolio or policy. Why is this necessary?**

- The financial feasibility and the economic, social and environmental risks and externalities of infrastructure assets are evaluated individually.

- Similarly, externalities and risks of portfolios and policies are most accurately calculated when they are calculated in a bespoke manner.

- SAVi is therefore customized to provide relevant and reliable results.

# The SAVi Infrastructure Asset Types

SAVi can be applied to 4 Infrastructure Asset Types: energy, roads, buildings and water. We selected these sectors based on the value of lending, see the table below on global lending by sector in 2016.

**Energy**

**Roads**

**Buildings**

**Water**

| Sector | Volume (US$m) |
|---|---|
| Power | 110,915.8 |
| Oil & Gas | 44,311.6 |
| Transportation | 43,278.6 |
| Petrochemicals | 14,485.2 |
| Leisure & Property | 7,683.7 |
| Industry | 6,557.5 |
| Mining | 4,058.5 |
| Water & Sewerage | 3,371.1 |
| Telecommunications | 942.7 |
| Waste & Recycling | 851.1 |
| **Total** | **236,455.8** |

# The SAVi Results

# What can SAVi calculate for each asset or portfolio?

**See the next slide for definitions**

## Extended Cost Benefit Analysis

- The financial value of climate and other environmental, social and economic risks on project costs and revenues
- Gross Margin
- The financial value of positive and negative environmental, social and economic externalities that are material to each asset

## Financial Feasibility

- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Debt Service Coverage Ratio (DSCR)
- Loan Life Coverage Ratio (LLCR)

# Definition of what SAVi can calculate for each asset or portfolio

- **Extended Cost Benefit Analysis**

- **Gross Margin:** an asset'ss total sales revenue minus its cost of goods sold (COGS), divided by total sales revenue, expressed as a percentage. The gross margin represents the percent of total sales revenue that the asset retains after incurring the direct costs associated with producing the goods and services it sells. The higher the percentage, the more the asset retains on each dollar of sales, to service its other costs and debt obligations.

- **Equity Internal Rate of Return (IRR):** It is an indicator for the profitability prospects of a potential investment. The IRR is the discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero. Cash flows net of financing gives us the equity IRR.

- **Debt Service Coverage Ratio (DSCR):** It is a measure of the cash flow available to pay current debt obligations. The ratio states net operating income as a multiple of debt obligations due within one year, including interest and principal.

- **Loan Life Coverage Ratio (LLCR):** It is a financial ratio used to estimate the ability of the borrowing company to repay an outstanding loan. It is calculated by dividing the NPV of the cash flow available for debt repayment by the amount of senior debt outstanding.

- **Equity Net Present Value (NPV):** It is the difference between the present value of cash inflows net of financing costs and the present value of cash outflows. It is used to analyze the profitability of a projected investment or project.

# The SAVi Target Audiences

# SAVi is of Value for Multiple Users

Governments & Cities

Investors

Citizens

# Questions SAVi can answer for Governments & Cities



- **How does environmental, social and economic performance increase value for money for tax payers?**

- **Is sustainable infrastructure systematically more expensive to build? Can these costs be recuperated during the user phase?**

- **Do sustainable assets trigger positive externalities such as higher GDP, Green GDP, employments, innovation, productivity, etc.?**

- **Will this asset help trigger sustainable development?**

# Questions SAVi can answer for Investors

- **How climate + ESG risks affect the project's Internal Rate of Return (IRR)**

- **How climate + ESG risks affect the project's credit ratios:**
  - **Debt Service Coverage Ratio (DSCR),**
  - **Loan Life Coverage Ratio (LLCR)**

# Questions SAVi can answer for Investors

- SAVi can also be used to assess and prepare disclosure statements the financial impact of climate change on assets and portfolio.

- Investors can use SAVi to prepare climate risk disclosure statements as recommended by the financial stability board.

# Questions SAVi can resolve for Citizens

SAVi will help citizens understand the extent to which an infrastructure asset will contribute to sustainable development.

- **How will a given infrastructure asset alter the quality of life?**

- **Will it bring new jobs? Will it help upgrade skills? Will it trigger the growth of new industries?**

- **Will it damage the environment? Will it reduce pollution? Will it affect human health?**

- **Will it contribute to increased prosperity in the future?**

# How SAVi is Built

# How can you use SAVi?

# IISD works with governments, cities, investors and citizens to customize and run SAVi. We work as follows:

1. Preliminary discussion with partners to understand and record the asset characteristics.

2. Determine performance indicators and externalities that are material to the asset and asset owners. IISD provides a listing of indicators and externalities that are bespoke to each asset category and its geographical location. We then liaise with clients/partners to determine which are the most material to build into SAVi.

3. Determine the comparative scenarios.

4. Obtain and verify data using purpose-built spreadsheets.

5. Customize SAVi and run the models.

6. Write up results as a power point report.

7. Present results at workshop. Explore how values change under altered risk scenarios or sustainability performance.

8. Finalize results and develop final power point report. Further collaboration as required.

# How long does a SAVi Assessment take?

Once data is obtained, IISD will take 2 months to

customize SAVi,

run the models and

write up preliminary results as a PowerPoint report.

## Contacts:

**SAVi was developed by the IISD Public Procurement and Infrastructure Finance Team:**

Oshani Perera, operera@iisd.org

David Uzsoki, duzsoki@iisd.org

Andrea Bassi, andrea.bassi@iisd.net

Liesbeth Casier, lcasier@iisd.org

Laurin Wuennenberg, laurin.wuennenberg@iisd.net

Marina Ruete, marina.ruete@iisd.org

Georg Pallaske, georg.pallaske@ke-srl.com

# Outline

1. **Introduction**
2. **The four Infrastructure assets**
   #1: Storage and Cold Storage Infrastructure
   # 2: Decentralized Renewable Energy (DRE)
            Infrastructure
   # 3: Feeder Roads
   #4: Irrigation infrastructure
3. **Conclusion**

# Introduction

✓ Context: SDGs: Goal #2: Ending Hunger!

✓ Investment in rural infrastructure indispensable for achieving this goal

✓ Most of the world's hungry live in rural areas, lacking basic services due to a lack of infrastructure.

✓ Global infrastructure deficit estimated to reach USD 90 trillion by 2030 (New climate report 2015).

# Intro: Objectives and approach

**Two central research questions**

- ✓ *What rural infrastructure investments can have the most direct positive impact towards ending global hunger?*

- ✓ *How can these infrastructure assets be sustainably financed?*

**Approach**

- ✓ *Extensive literature review and phone call interviews with experts*
- ✓ *"long list" of infrastructure assets that affect rural development, poverty, and food security*
- ✓ *"short list" of <u>four assets chosen</u>*

- ✓ Four assets chosen for an analysis on their pathways to food security and how to overcome the associated financing challenges: storage/cold storage, feeder roads, decentralized renewable energy and irrigation infrastructure

# Aim of the analysis:

To <u>assist donors and investors</u> who are dedicated to ending hunger <u>to target their financial resources to key high-impact infrastructure categories</u>, and to help them understand why.

# Methodological Challenges

✓ How to verify a precise causal links between an infrastructure investment and the impact on food security.

✓ Many studies confirmed causal chains – or pathways – between the chosen 4 types of infrastructure and food security or its proxies

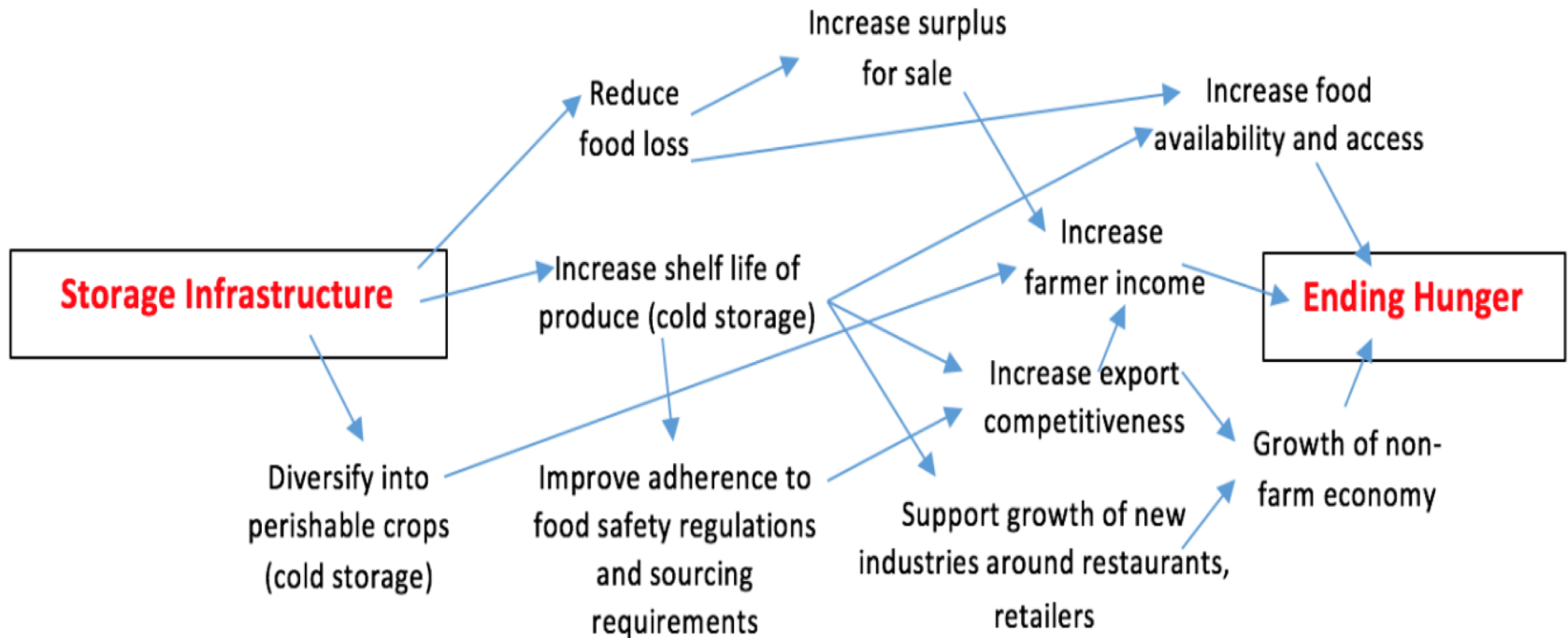✓ Methodologies have been are used in literature to make these correlations more robust.

# A focus on finance

- ✓ Donor funding

- ✓ Public spending

- ✓ Private Capital

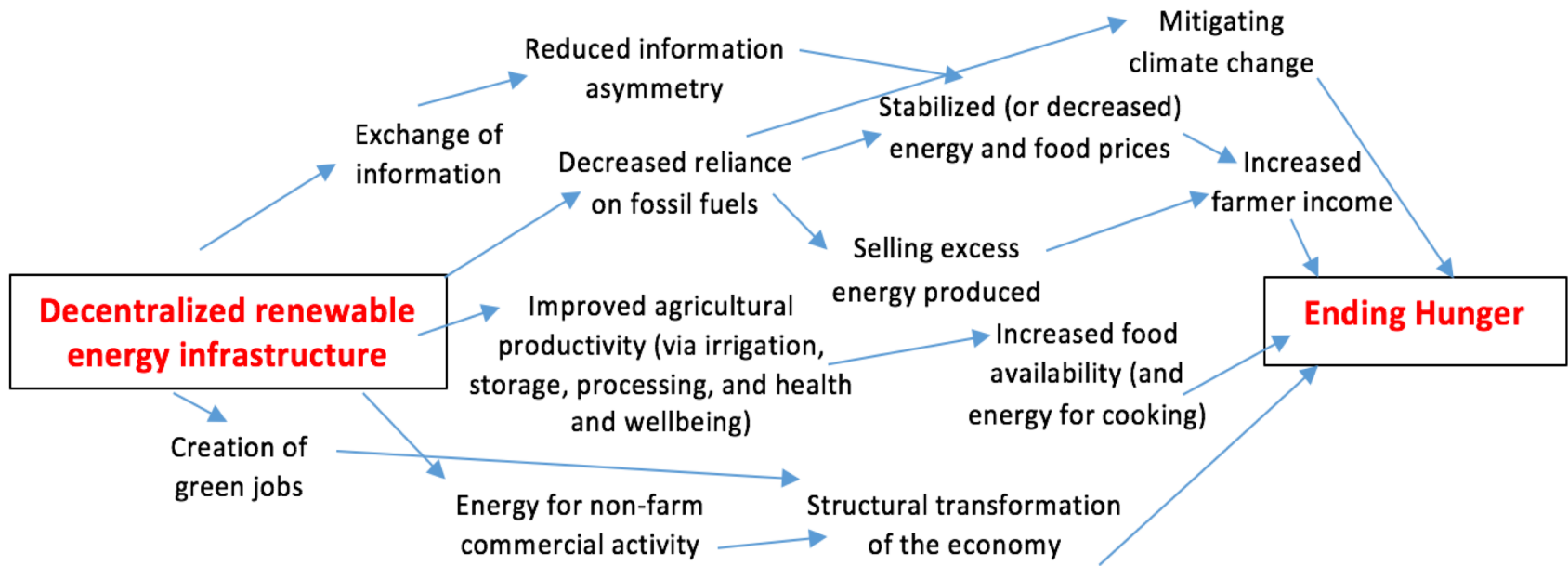# Investment Priority #1: Storage and Cold Storage Infrastructure



Pathways to Food Security: Storage Infrastructure

# Investment Priority #1: Financing approaches

| Financing approaches | Benefits/ Features |
|---|---|
| Public-Private Partnerships | ▪ Efficiency<br>▪ Government does not need to use its own limited resources<br>▪ Technical capacities and know-how transferred from private to public sector.<br>▪ Government can whether to keep the asset at the end of the commission period<br>▪ Project risks are allocated to the party who is best suited to manage and mitigate them. |
| Government incentives | ▪Dedicated Funds<br>▪Preferential Loans<br>▪Grants<br>▪Fiscal instruments |

# Investment Priority # 2: Decentralized Renewable Energy (DRE) Infrastructure



Pathways to Food Security: Decentralized Renewable Energy Infrastructure

# Investment Priority # 2: Financing Approaches

**Commercial challenges in DRE financing**:

✓ *Unit cost of off-grid energy significantly higher than price of electricity on the grid*

✓ *Installation cost, but also costs of operation and management of the projects over time.*

**Government's role more important here:**
- Investment incentives
- Tax Incentives
- Investment Grants
- Concessional Loans
- Blended capital
- => Policy support important!

# Investment Priority # 3: Feeder Roads
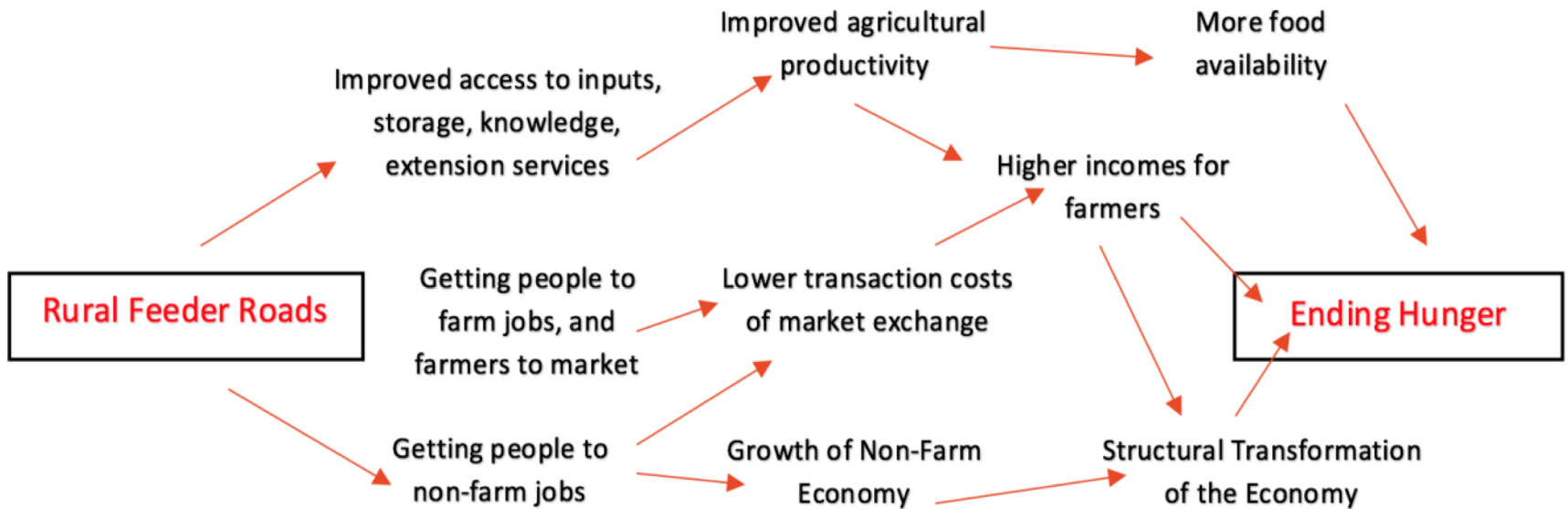


Pathways to Food Security: Rural Feeder Roads

# Investment Priority # 3: Feeder Roads
## Financing Approaches

**Difficult to have PPPs here**

✓impossible to charge tolls on feeder roads due to structural limitations and the users' unwillingness (and often inability) to pay

✓Need alternative financing options

**Alternative financing solutions**
- *Availability Payment*
- *Shadow Toll*
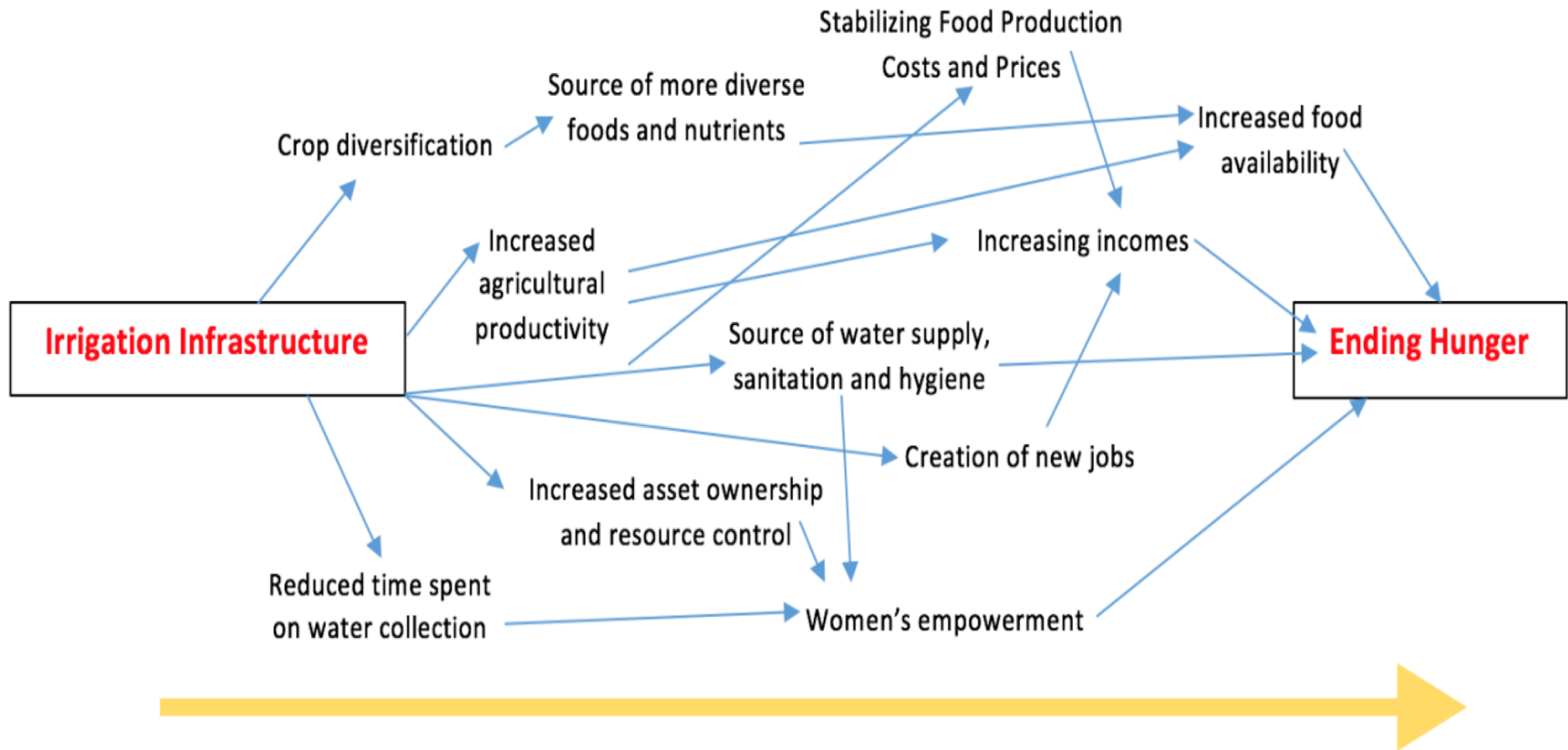- *Stakeholder Finance*

**Funding the alternative schemes**
- *Taxes*
- *Road fund*

**Other incentives and solutions**
- *Co-financing*
- *Viability gap funding*
- *Project bundling*

# Investment Priority #4: Irrigation infrastructure



Impact pathways to Food Security: Irrigation Infrastructure

# Investment Priority #4: Irrigation infrastructure Financing Approaches

- ❑ **What type of irrigation infrastructure to invest in?**
  - ▪ right investment will depend on
    - o proximity of the recipient farm(s) to a reliable water source,
    - o organizational structure of local community or farmers, and
    - o access to other infrastructure for energy, transport and storage.

- ❑ **Approaches**
  - ▪ Pricing & Public Subsidies for Irrigation
  - ▪ Separating capital expenditure and O&M
  - ▪ Identifying and targeting food security beneficiaries
  - ▪ Public Private Partnerships

# Conclusion

- ✓ No generalizations possible on whether or not specific projects represent a good investment or not, but lessons to guide financing decision

- ✓ Lack of investment particularly bad in rural areas. Challenges: limited resources of local governments, uncertainties surrounding revenue streams and high perceived risks of projects in those areas.

- ✓ But still wide range of financial instruments available to governments to leverage their limited funds available, to de-risk projects and to mobilize private capital.

- ✓ Need to assess carefully what projects have the highest economic and social multipliers

- ✓ Only commit funds to financially sustainable infrastructure.

# THANK YOU FOR YOUR ATTENTION!