Challenges and Opportunities in Evaluating Sustainable Infrastructure.

GIZ-Brookings Sustainable Infrastructure Roundtable Berlin,

March 24, 2017

Chris Behr (HDR), Emmanuel Sekyere (HSRC)

Sustainable Infrastructure Involves Two Key Questions

- Which project provides the best value?
- How can a good project be made better?

If a third is added, it would be:

- How to best communicate value?

Outcomes from Investments:

Expanded network; human interaction; low cost mobility

Access to opportunities, affordability

Efficient resource use; avoided impacts

Schools, communication networks

Policies, investments that induce healthy choices

Impacts on Sustainability:

Economy:
Entrepreneurship, profit motive

Equity:
Opportunities, reduce disparities

Environment:
Reduced impacts, efficiency

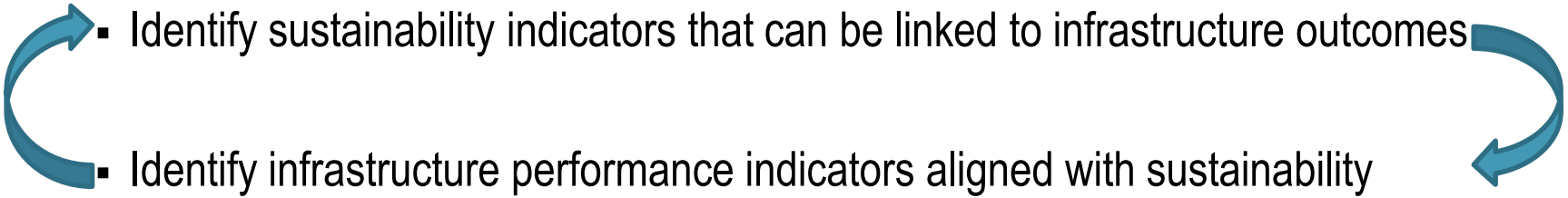
Education:
Human capital, innovation

Health:
Reduced long-term costs

Purpose of our work:

Improve the assessment of infrastructure for achieving sustainability goals

Approach:



First Steps:

Define “Sustainable Infrastructure”:

Infrastructure that ***enables*** a community or country to achieve a more sustainable form of economic development, without jeopardizing the wellbeing of future generations

Recognize the Micro / Macro dichotomy between infrastructure and sustainability

Sustainability: multi-dimensional and regional in scope that lasts generations

Infrastructure projects: direct impacts to users, non-users and nearby neighborhoods that last for only a relatively short planning horizons

Indicators of Infrastructure for Sustainability

Principles for Developing Indicators and Evaluation Framework

- **Minimum set of indicators:**
  - Represent key tenets of sustainability goals at project- and macro planning-levels
  - Differentiated indicators by sector that capture key outcomes
- **Measurable definition of sustainability:**
  - Tangible measures of sustainability, using triple bottom line framework
  - Communicate investment rationale, recognizing how project fall within sustainability goals
- **Short- and long-term project impact indicators:**
  - Short-term: Capture fundamental project purpose for users
  - Long-term: Develop *leading indicators* of impacts on communities, resources and the economy
- **Sound evaluation processes and analytical methods:**
  - Evaluation implemented *ex-ante* to identify best allocation of funds within region and diverse needs
  - Apply best practices in economics, decision theory and risk evaluation to choose best design

Sustainability of Infrastructure

Macro-scale, Cross-Cutting Outcomes

- Economic: **GDP**
  - Fundamental, widely recognized indicator of economic activity, jobs, and income
- Environmental: **Natural Accounting Valuation**
  - Monetary metrics that discount use of resources and pollutant loadings, GHG risk
- Social: **Gini Coefficient**
  - Correlated with many inclusive growth factors
  - Reduced inequality has been shown to increase GDP

Infrastructure Impact for Sustainability

Examples of short-run (SR) and long-run (LR) indicators

	Economic	Social	Environmental
Freight Transport	**SR: Productivity:** • Travel time savings **LR: Competitiveness:** • Local export / import ratio	**SR: Corridor location:** • # of low-income HH affected **LR: Employment:** • Change in manufacturing jobs	**SR: Air Quality:** • Air pollutant emissions **LR: Climate change:** • GHG emissions
Water Supply	**SR: Productivity:** • Water cost savings **LR: Growth potential:** • Supply shortage risks	**SR: Access to water:** • Reduced risk of contamination **LR: Watershed impacts:** • Reduced water downstream	**SR: Environmental Health:** • Streamflow volume reduction **LR: Ecosystem health:** • Change in species population
Energy Generation/ Distribution	**SR: Productivity:** • Energy cost savings **LR: Growth potential:** • % Industrial dev. growth	**SR: Access to energy:** • kWhs per low-income HH **LR: Employment:** • Change in manufacturing jobs	**SR: Natural resource:** • Volume of raw material **LR: Global Health:** • Air pollutant, GHG Emissions

Principles of Sustainable Infrastructure Evaluation Process

- **Baseline assessment**
  - Data driven needs, aligned with current data collection efforts
  - Identify data gaps, for streamlined data collection in future
- **National and sub-national level sustainability framework development**
  - Identify triple bottom line goals across sectors (minimum number of goals)
  - Formulate measurable indicators of success (minimum number of indicators)
- **Select and implement projects to meet cross-sector goals**
  - Leverage financing options to determine which project to build and account for long-run implications
  - Mitigate impacts to environmental and social outcomes
- **Project monitoring, adaptive management to inform new project planning**
  - Assess whether plans met actual outcomes
  - Track gaps and needs, especially in social development indicators

Thank You

Dr Emmanuel Sekyere
(Lead Researcher), Chief Research Specialist
Africa Institute of South Africa. Human Sciences Research Council
Pretoria South Africa. Email: esekyere@hsrc.ac.za

Chris Behr
Silver Spring, MD
cbehr@hdrinc.com