

A photograph of two young children, a boy and a girl, smiling and washing their hands at a public water tap. The boy is on the left, wearing a light green shirt and dark pants. The girl is on the right, wearing a light green shirt and a dark skirt, with her hair styled in braids with green and black accessories. Water is flowing from the tap into their hands. The background is a chain-link fence with green foliage behind it. A large blue triangle is overlaid on the left side of the image, containing text.

# Infrastructure for Sustainable, Resilient and Inclusive Development

Online Training  
November 2021



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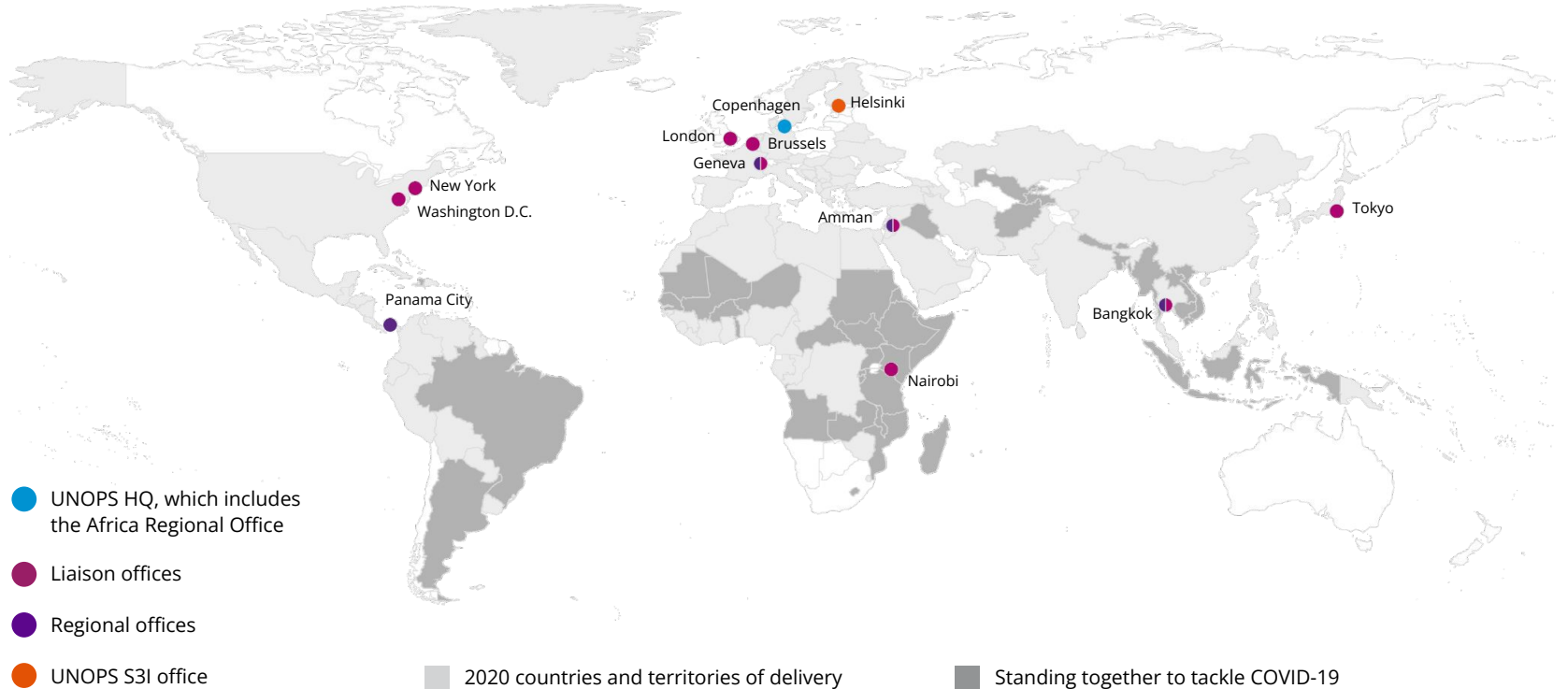
# UNOPS expertise

In addition to providing tailored services, we offer five core service lines in support of our partners objectives:

INFRASTRUCTURE    PROCUREMENT    PROJECT MANAGEMENT  
FINANCIAL MANAGEMENT    HUMAN RESOURCES



# UNOPS global footprint





# Activity - who is in the room?



What is your professional background?

To type your answer, go to [www.menti.com](https://www.menti.com) and use the code **7832 3183**

# Overview of the workshop

## Learning Outcome:

*Participants are able to understand the benefits to adopting an evidence-based approach to infrastructure development to underpin sustainable, resilient and inclusive development*

## Chapters:

1. The importance of infrastructure for development
2. Evidence-based infrastructure development
3. Evidence-based infrastructure development in practice:
  - Enabling environment
  - Strategic planning
  - Strategic financing

# Chapter 1: The importance of infrastructure for development

# Activity - The importance of infrastructure for development



To what extent do you think  
infrastructure is important for  
development?

To choose your answer, go to [www.menti.com](https://www.menti.com) and use the code **7832 3183**



**INFRASTRUCTURE  
UNDERPINS  
DEVELOPMENT**



# Infrastructure underpins Sustainable, Resilient and Inclusive Development

*Global  
Agenda*

## Sustainability



## Resilience



## Inclusiveness



# The Sustainable Development Goals

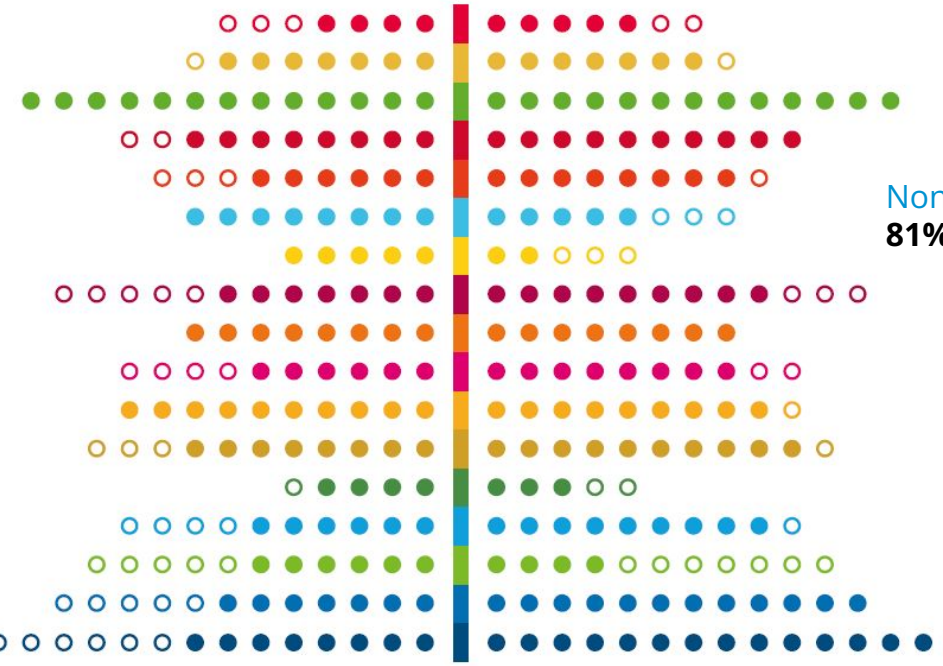


# Infrastructure influences all 17 SDGs

Overall 92% of targets

Networked infrastructure influence on targets of the SDGs

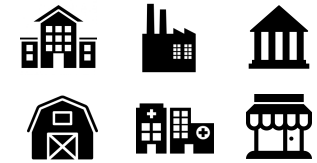
Non-networked infrastructure influence on targets of the SDGs



Networked infrastructure:  
72% of 169 SDG targets



Non-networked infrastructure:  
81% of 169 SDG targets

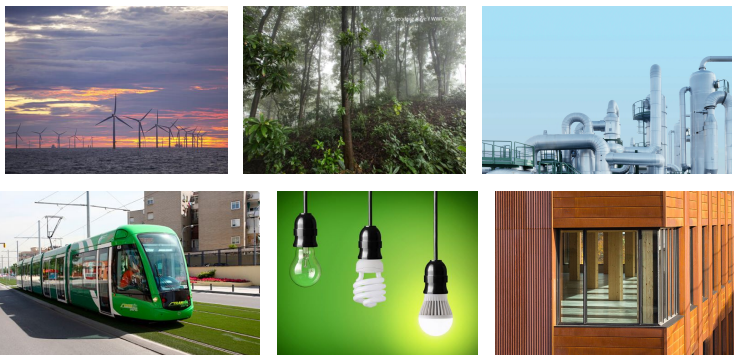


# Infrastructure for climate action

## Mitigation

- reducing climate change

Involves reducing the flow of heat-trapping greenhouse gases into the atmosphere



## Adaptation

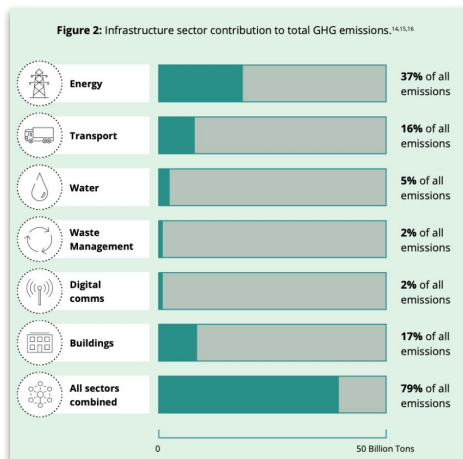
- adapting to life in a changing climate

Involves adjusting to actual or expected future climate



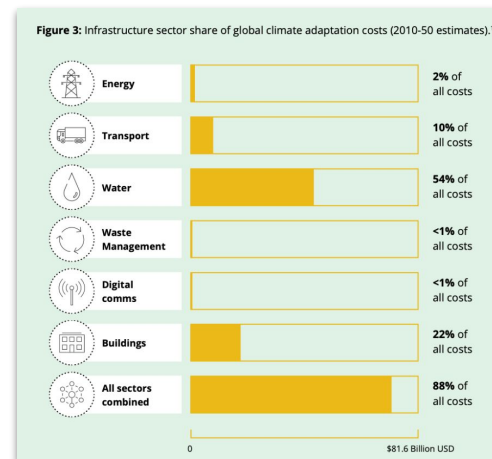
# Infrastructure for climate action

## Mitigation



Infrastructure is responsible for  
**79% of all GHG emissions**

## Adaptation



Infrastructure accounts for  
**88% of all adaptation costs**



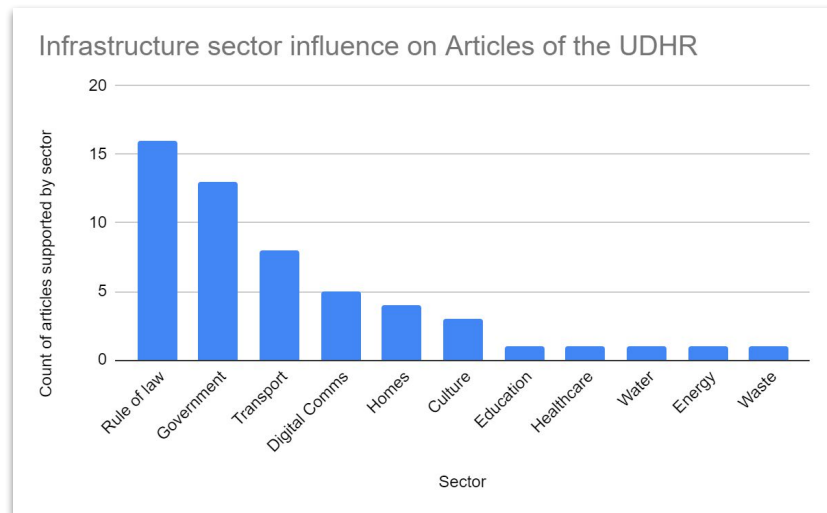
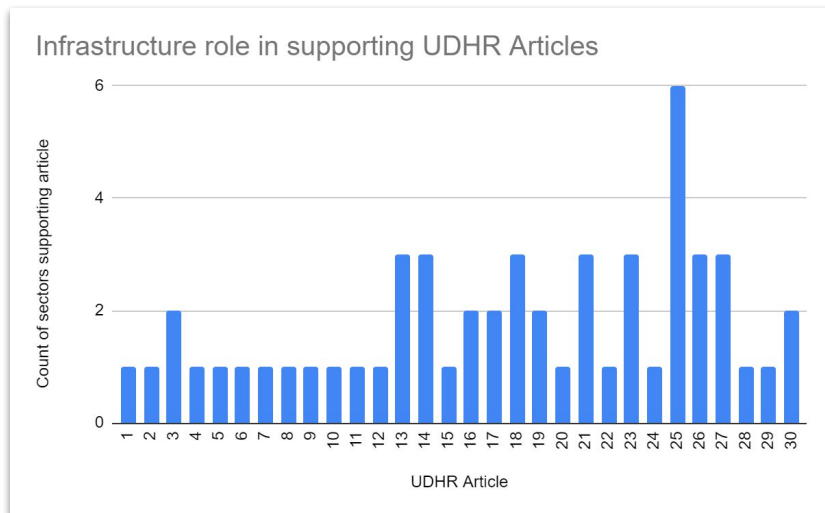
# Infrastructure that leaves no one behind

- The **universal principles of human rights** allude to the importance of universal, equal and non-discriminatory access to services by every individual
- Consists of **30 Articles** that describe our basic human rights



# Infrastructure that leaves no one behind

- **Infrastructure can influence all 30 articles** of the Universal Declaration of Human Rights



# Infrastructure access gap



**2.2 billion**

People lack access to drinking water



**4.2 billion**

People lack access to sanitation



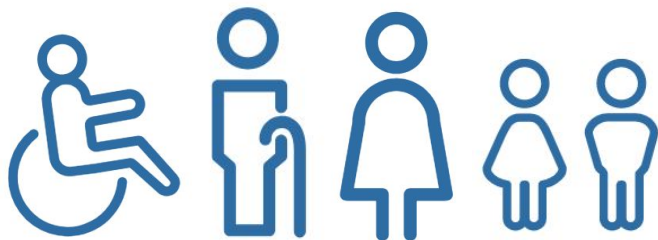
**940 million**

People lack access to electricity



**1 billion**

People lack access to all-weather roads





# INFRASTRUCTURE FUNDING CHALLENGE

# \$97 trillion

by 2040\*



# The infrastructure opportunity (and risk)

## RISK



## OPPORTUNITY



Highlighting the need to ensure we do the right infrastructure well - highlighting the need for an evidence-based approach



# Activity: Group Exercise (8 mins)

What has been the role of infrastructure in the national development of your country?

Item	Activity	Time
1	Go into your zoom breakout rooms, say hello to each other, <b>assign a representative</b> for your group.	1 min
2	Discuss the question and write down the key points, identifying the top three most common or most important.	6 mins
3	Each group's representative to report back <b>one key role</b> to the main room.	1 min each group

**Go to [menti.com](https://www.menti.com) code: 7832 3183**

**“What did you find most interesting about this chapter?”**

# Chapter 2: Evidence-based Infrastructure Development

# Activity - Evidence-based Infrastructure development



What do you consider to be  
infrastructure?

Go to [www.menti.com](https://www.menti.com) and use the code **7832 3183**

# Infrastructure types



- Networked infrastructure, e.g, energy, transport, water, etc.
- Non-networked infrastructure, e.g, hospitals, schools, housing, etc.



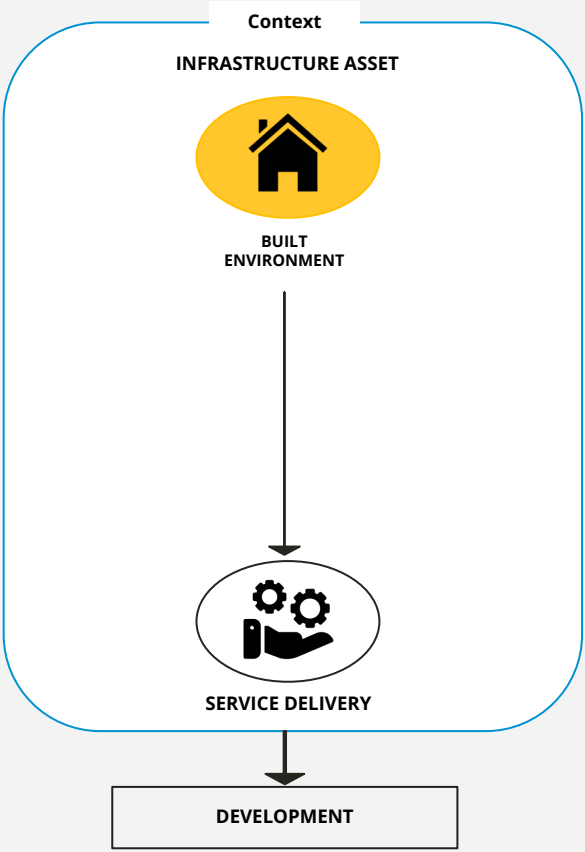
- Green infrastructure, e.g, forest, wetlands, parks, etc.
- Blue infrastructure, e.g, lakes, canals, etc.
- Hybrid or grey-green infrastructure, e.g, green roofs/walls, etc



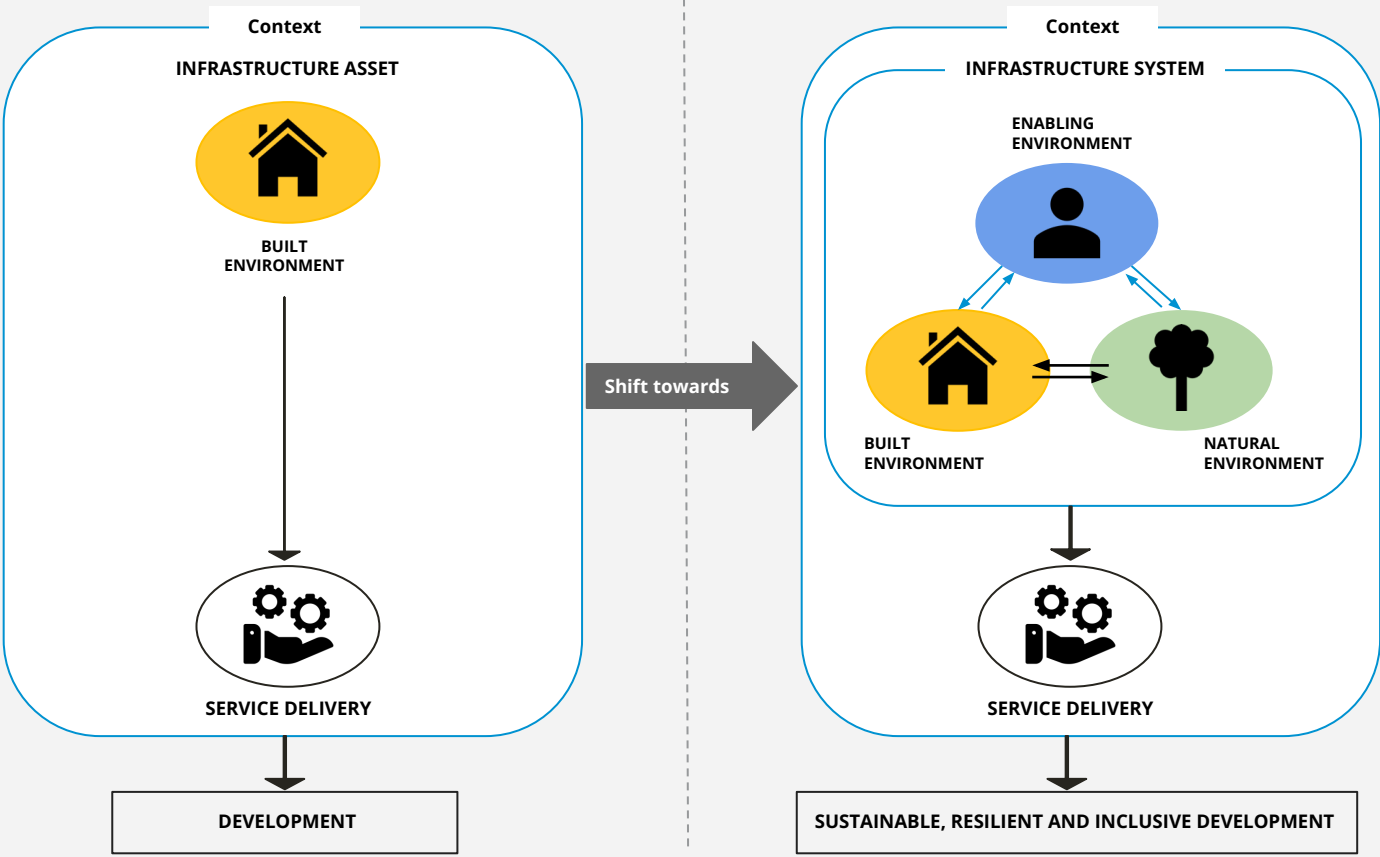
- Institutions, e.g, public and private sector, MDBs, academia, etc
- Knowledge, e.g, data, R&D, skills, etc.
- Guiding frameworks, e.g, policies, standard operating procedures, etc,
- Resources, e.g, tools, technology, experts, etc



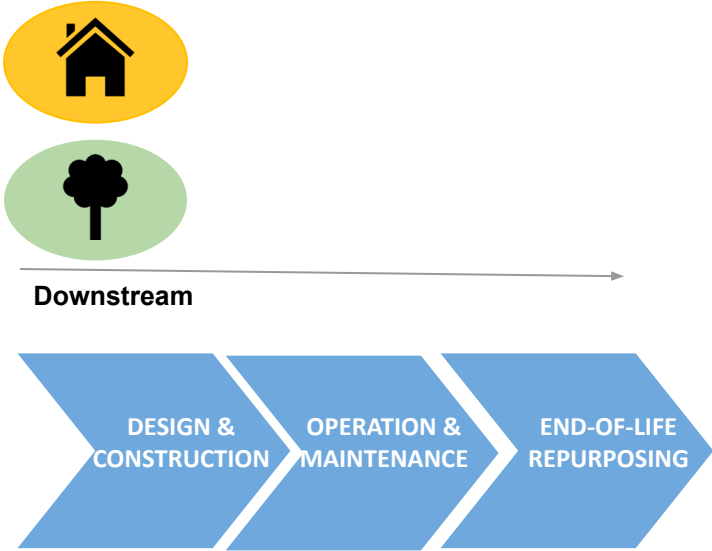
# Infrastructure as a system



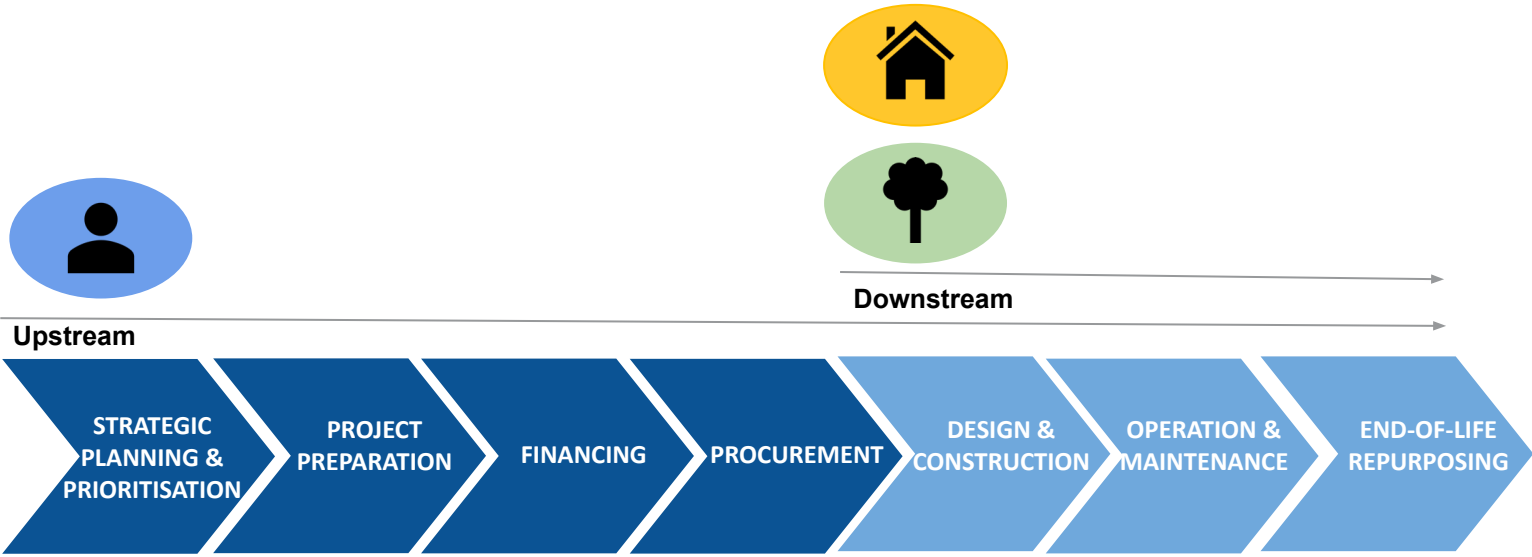
# Infrastructure as a system



# The infrastructure lifecycle

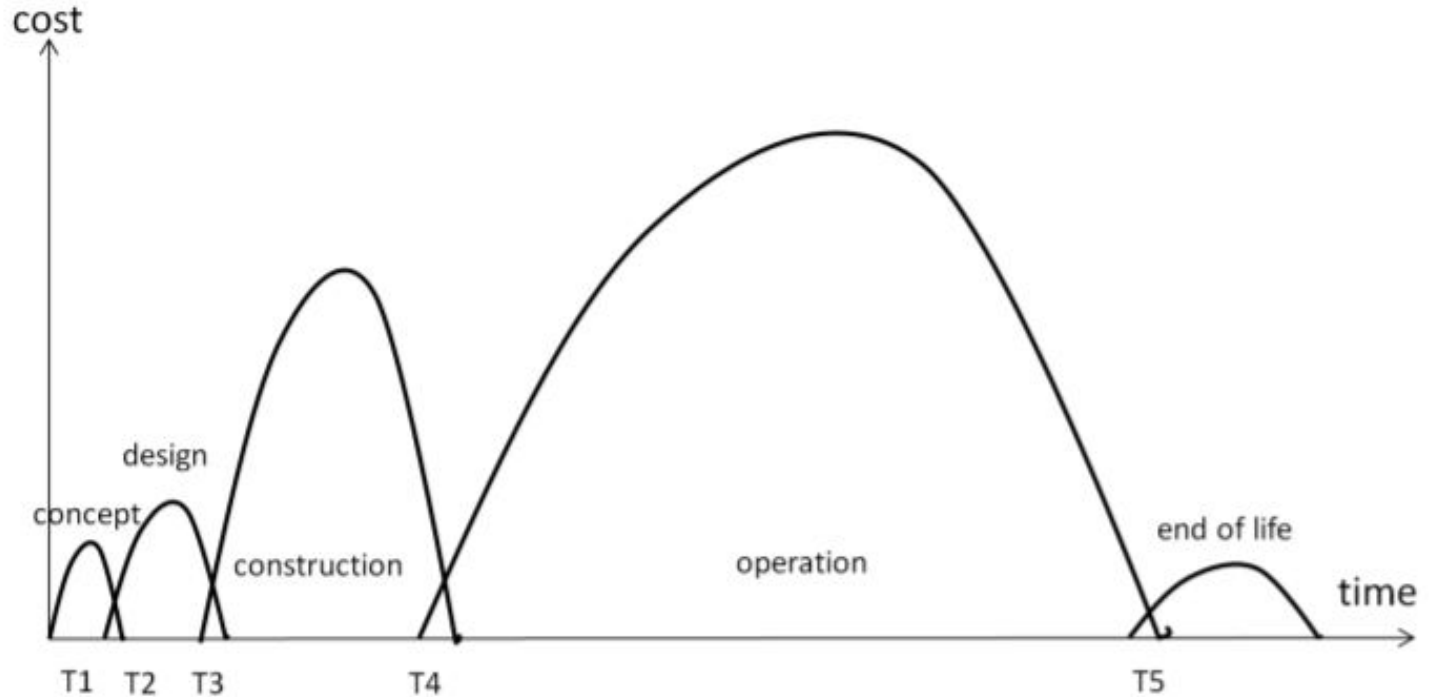


# The infrastructure lifecycle

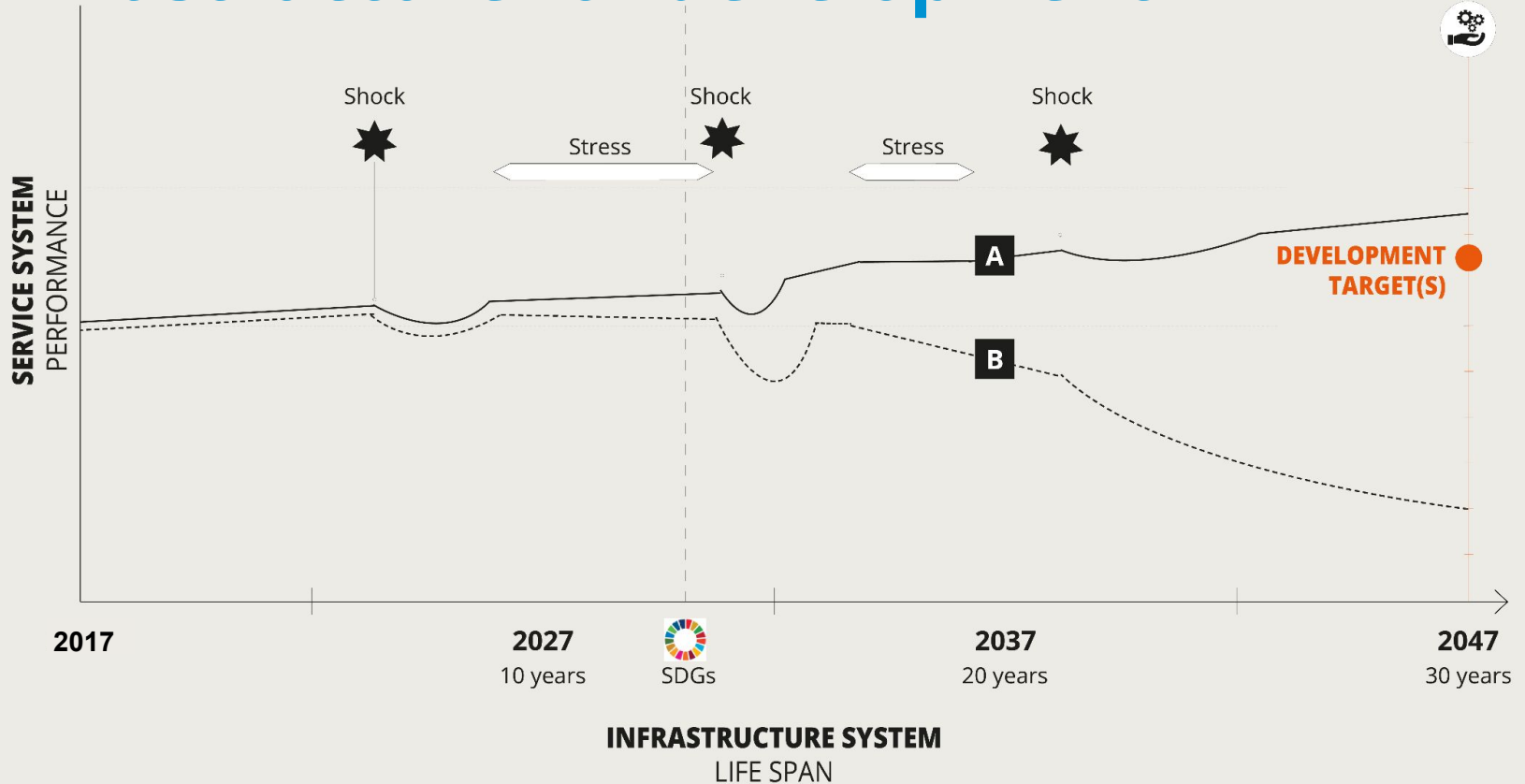


Sustainability, resilience and inclusion should be mainstreamed throughout the stages of the infrastructure lifecycle

# Physical asset lifecycle costs



# Infrastructure for development



# Evidence-based approach to infrastructure

## RISK



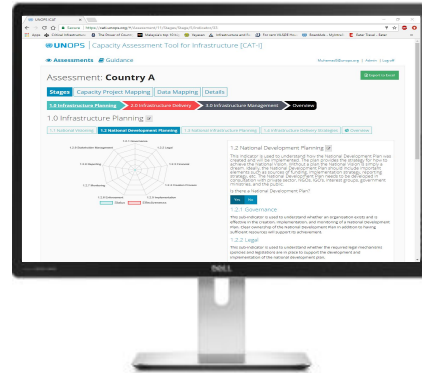
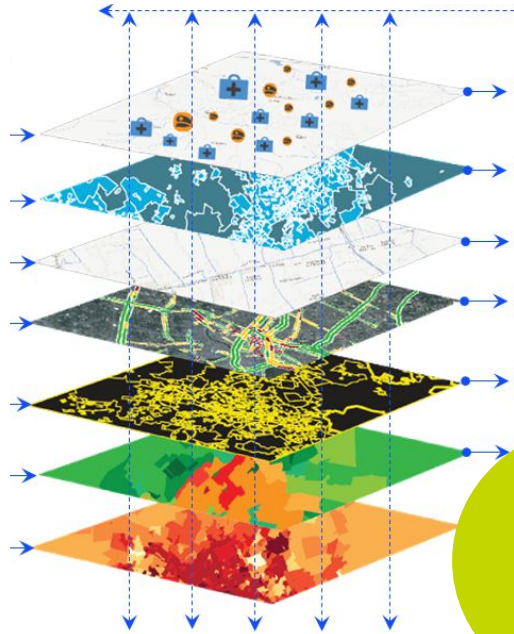
## OPPORTUNITY



Using evidence (data, methods and tools) to better inform infrastructure decision making in practice:

- Minimizing risks
- Maximising opportunities

# Evidence-based approach to infrastructure



Data,  
Tools  
&  
Analysis

Using evidence to better inform infrastructure decision making in practice

We will focus on:

- Strategic planning
- Financing

Though the whole lifecycle is essential



# Activity: Group Exercise (8 mins)

What are the major challenges to upstream infrastructure planning in your country?

Item	Activity	Time
1	Go into your zoom breakout rooms and <b>assign a representative</b> for your group (preferably a different person).	1 min
2	Discuss the question and write down the challenges, identifying the top three most common or most important.	6 mins
3	Each group's representative to report back <b>one key challenge</b> to the main room.	1 min each group

**Go to [menti.com](https://www.menti.com) code: 7832 3183**

**“What did you find most interesting about this chapter?”**

# **Chapter 3: Evidence-based infrastructure planning in practice**

# Evidence-based infrastructure development in Ghana

- 18 month project between project partners
- Using cutting-edge tools of project partners to pinpoint areas of climate vulnerability and to identify a prioritised portfolio of specific adaptation options to build and enhance long-term systemic resilience in Ghana - the resilient infrastructure roadmap
- Use of three cutting edge tools
  - CAT-I
  - NISMOD
  - SIFT



# The Capacity Assessment Tool for Infrastructure (CAT-I)

# Capacity Assessment Tool for Infrastructure (CAT-I)



# CAT-I Overview



Policies



SoP



Capacity



Institutions



Funding



Technology



Planning



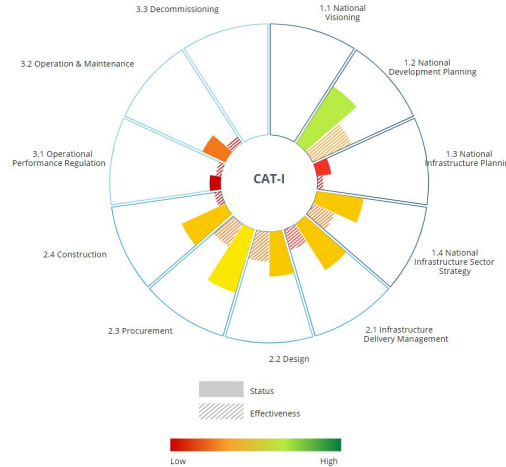
Data



Stakeholders



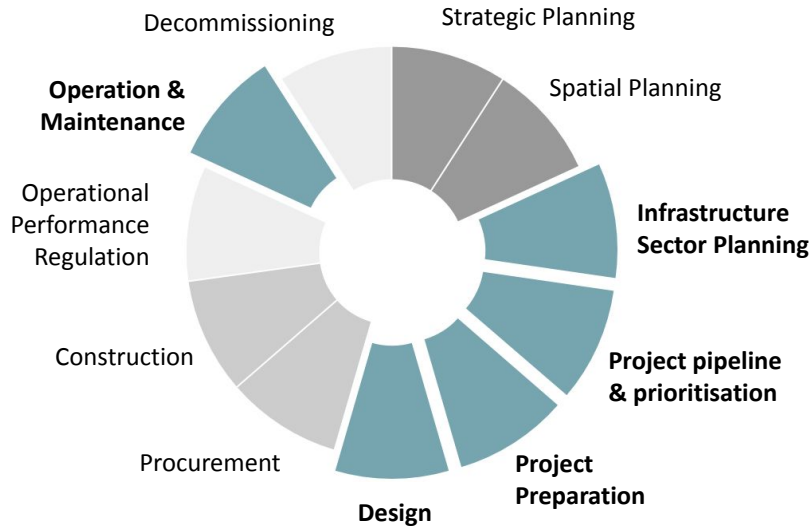
R&D






## CAT-I assessment

- 11 Indicators
- 93 subindictaors
- 200-800 questions
- Status and effectiveness

# CAT-I energy sector needs - Ghana



Adaptation needs	NDC thematic area addressed	SDG impacts
<p><b>Infrastructure sector planning</b></p> <ul style="list-style-type: none"> <li>Adaptation targets, implementation plan &amp; investment plan</li> </ul> <p> Representing gender-differentiated vulnerabilities</p>	<p> NDC#4 Resilience for gender &amp; vulnerable</p> <p>NDC#5 Mobilising investment</p> <p>NDC#7 Monitoring, report and verification</p>	<p></p>



# Solution 4.1: Develop localised design standards that incorporate climate adaptation

## Summary of key suggested actions:



Develop or update a policy to **ensure design codes and standards are locally relevant**, up to date, and enforced.



Policies



Institutions



Planning



SOPs



Develop and adopt **climate-resilient standards for large-scale energy infrastructure** (e.g. dams) and **renewable energy systems** (e.g. mini-grid development).



Capacity



Data



R&D



Leverage **climate risk and vulnerability data to update** design codes and standards.



Funding



Technology



Stakeholders



**Build capacity** to develop, adopt and use contextually relevant climate-resilient national standards.

# The National Infrastructure Systems Model (NISMOD)

# National Infrastructure Systems Modelling (NISMOD)

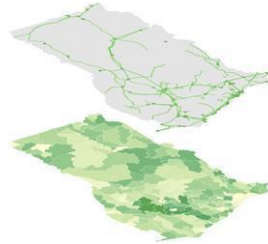


# NISMOD Overview



## Flooding

Medium, high scenario  
Current, future



## Landslide

Medium, high scenario  
Current



## Drought

Medium, high scenario  
Current, future



## River Runoff

Median reduction scenario  
Future



## Energy

29 Powerplants  
76 Substations

Wood fuel use (216 districts)

## Water

24 Dams

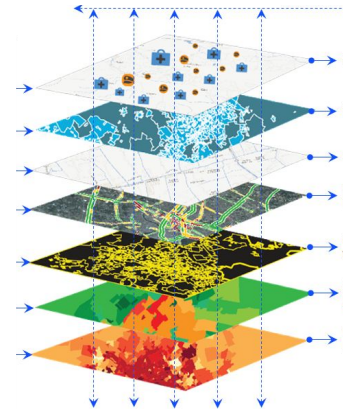
Surface water abstraction (216 districts)

## Transport

137,047 Road km  
9 Airports  
668 Railway km

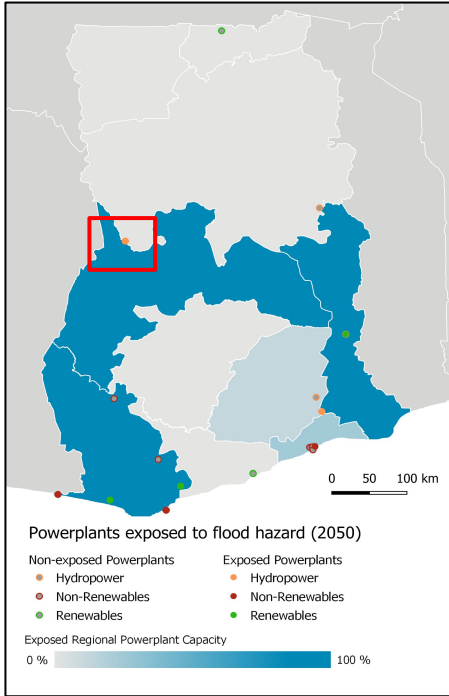
18 Ports and river traffic

**Geospatial infrastructure network risk analysis to characterise needs and evaluate solutions that address those needs**

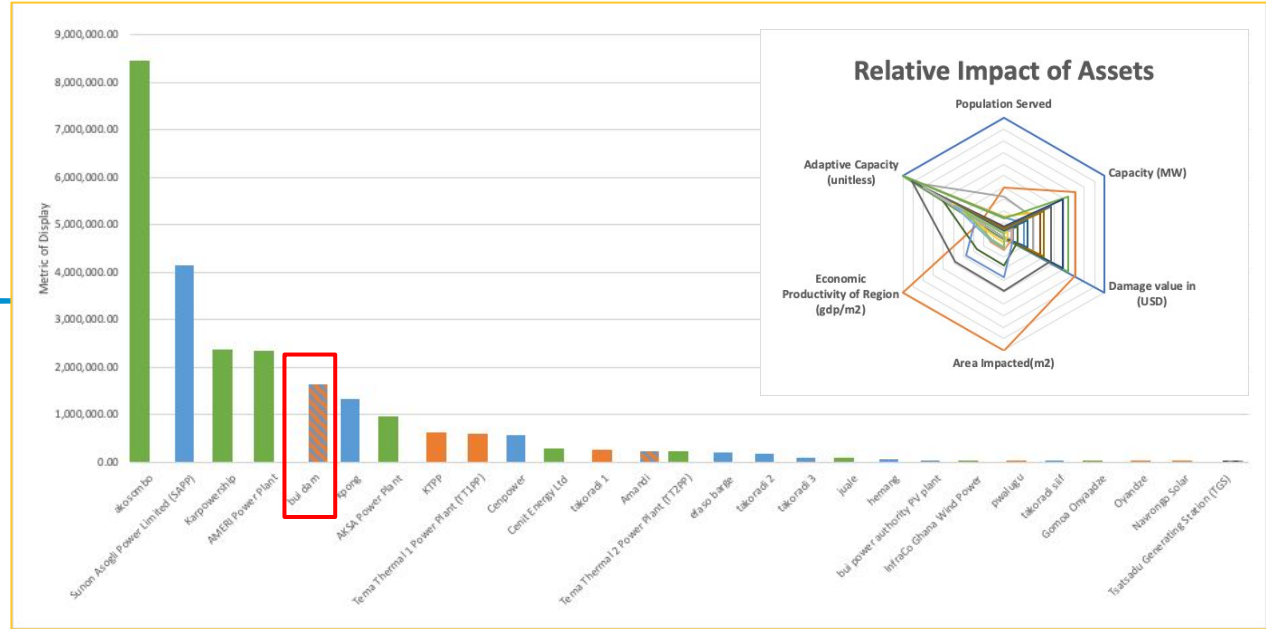


# NISMOD needs

## Energy hotspots

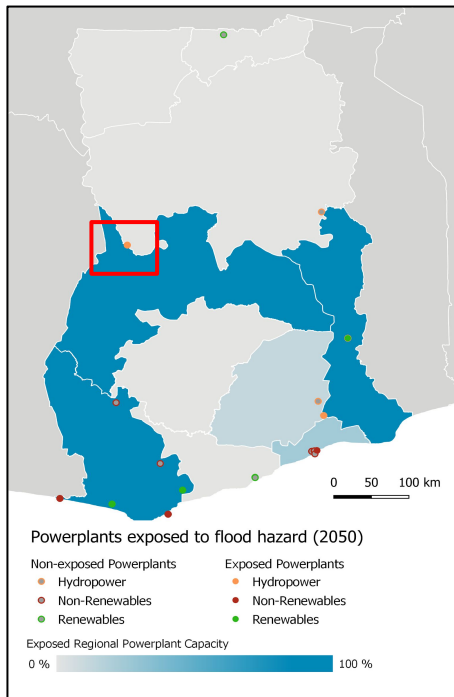


## Comparative analysis of assets: hazard exposure / impacts / adaptive capacity

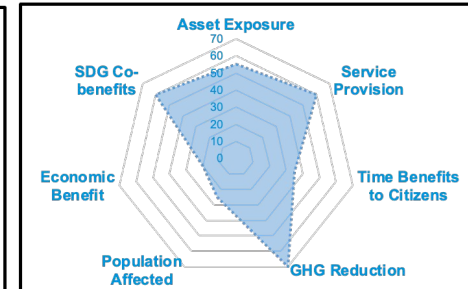
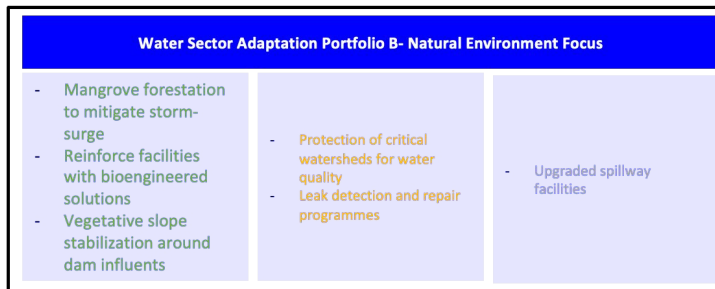
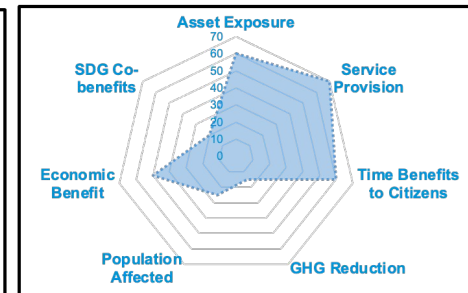
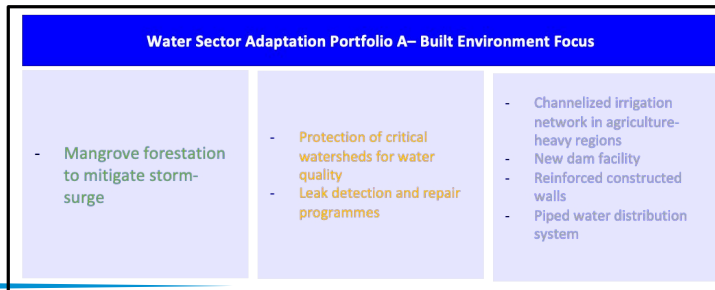


# NISMOD solutions

## Phase 1: Systems analysis



## Comparative analysis of adaptation options: social, economic and environmental





**BUILD  
THE FUTURE**

# The Sustainable Infrastructure Financing Tool (SIFT)

# Sustainable Infrastructure Financing Tool (SIFT)



**Built Environment**

**Natural Environment**

**Enabling Environment**

# SIFT overview



SIFT is a growing **global database** of infrastructure donors that supports governments by providing a structured and strategic approach to **identifying and prioritizing potential sources of financing** for sustainable infrastructure.

- ➔ **110+** donors
- ➔ **7** Financing mechanisms
- ➔ **15** Sectors
- ➔ **15** Financing criteria
- ➔ **237** Countries
- ➔ Additional information

Fund Information		Fund Information		Relationship Status		Sectoral Coverage										Financing Mechanisms					Financing Criteria					Financing Details				Contact Information				
Fund ID	Fund Name	Financier Name	Type of Organization	Is it your preferred donor?	Is it your preferred sector?	Is it your preferred country?	# of SIFTs	Total operations	Blended	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Co-fin	Fund Website	Fund Contact
AsedAfor	AsedAfor Facility	Agencia Francesa de Desarrollo	Government Agency				8																										<a href="http://www.afd.fr">www.afd.fr</a>	<a href="mailto:info@afd.fr">info@afd.fr</a>
AEP	Access to Energy Fund	Dutch Development Bank	National Development Bank				1																										<a href="http://www.aep.nl">www.aep.nl</a>	<a href="mailto:info@aep.nl">info@aep.nl</a>
EF	Ecological Fund	Global Environment Facility	Multilateral Development Fund				8																										<a href="http://www.gemf.org">www.gemf.org</a>	<a href="mailto:info@gemf.org">info@gemf.org</a>
AFD	Agence Française de Développement	Agence Française de Développement	Government Agency				12																										<a href="http://www.afd.fr">www.afd.fr</a>	<a href="mailto:info@afd.fr">info@afd.fr</a>
AgRI	Agriculture Financing Initiative	European Development Finance Institution	Development Finance Institution				1																										<a href="http://www.eufi.eu">www.eufi.eu</a>	<a href="mailto:info@eufi.eu">info@eufi.eu</a>
AUDRIT	Australia Department of Foreign Affairs and Trade	Australia Department of Foreign Affairs and Trade	Government Agency				19																										<a href="http://www.dfat.gov.au">www.dfat.gov.au</a>	<a href="mailto:info@dfat.gov.au">info@dfat.gov.au</a>
BCI	Belgian Investment Company for Developing Countries	Development Finance Institution	Development Finance Institution				4																										<a href="http://www.bci.be">www.bci.be</a>	<a href="mailto:info@bci.be">info@bci.be</a>
BNTFI	Bank-Netherlands Trust Fund	Caribbean Development Bank	Regional Development Bank				3																										<a href="http://www.caribank.org">www.caribank.org</a>	<a href="mailto:info@caribank.org">info@caribank.org</a>
Comdes IP	Comdes IP	Comdes IP	Government Agency				2																										<a href="http://www.comdes.es">www.comdes.es</a>	<a href="mailto:info@comdes.es">info@comdes.es</a>
Caribank IF	Caribbean Investment Facility	European Investment Bank	Regional Development Bank				7																										<a href="http://www.caribank.org">www.caribank.org</a>	<a href="mailto:info@caribank.org">info@caribank.org</a>
COB-OCR	COB Ordinary Capital Resources	Caribbean Development Bank	Regional Development Bank				13																										<a href="http://www.caribank.org">www.caribank.org</a>	<a href="mailto:info@caribank.org">info@caribank.org</a>
COF	Caribbean Development Fund	Inter-governmental Organization	Caribbean Community				2																										<a href="http://www.ccf.org">www.ccf.org</a>	<a href="mailto:info@ccf.org">info@ccf.org</a>
COF-ICDF	COF International Cooperator and Development Finance	Cassa di Risparmio di Pistoia	Development Finance Institution				2																										<a href="http://www.cof.it">www.cof.it</a>	<a href="mailto:info@cof.it">info@cof.it</a>
COFRF	Community Disaster Risk Reduction Fund	Caribbean Development Bank	Regional Development Bank				1																										<a href="http://www.caribank.org">www.caribank.org</a>	<a href="mailto:info@caribank.org">info@caribank.org</a>
COFDES	Compañía Española de Financiación de Desarrollo	Compañía Española de Financiación de Desarrollo	Development Finance Institution				6																										<a href="http://www.cofdes.es">www.cofdes.es</a>	<a href="mailto:info@cofdes.es">info@cofdes.es</a>
CTF	Clean Technology Funds	Multilateral Development Fund	Multilateral Development Fund				2																										<a href="http://www.ctf.org">www.ctf.org</a>	<a href="mailto:info@ctf.org">info@ctf.org</a>
CFC	U.S. International Development Finance Corporation	U.S. International Development Finance Corporation	National Development Bank				3																										<a href="http://www.dfc.gov">www.dfc.gov</a>	<a href="mailto:info@dfc.gov">info@dfc.gov</a>
DFCD-UF	DFCD Land Use Facility	Dutch Fund for Climate Development	Multilateral Development Fund				3																										<a href="http://www.dfc.gov">www.dfc.gov</a>	<a href="mailto:info@dfc.gov">info@dfc.gov</a>
DFCD-OF	DFCD Origination Facility	Dutch Fund for Climate Development	Multilateral Development Fund				6																										<a href="http://www.dfc.gov">www.dfc.gov</a>	<a href="mailto:info@dfc.gov">info@dfc.gov</a>



Data source: Donors' websites, reports, proposal templates and other relevant documents

# SIFT project concept presentation

Development of project concept sheets to communicate the most important aspects of projects - that are of interest to potential sources of financing

## TRANSPORTATION - PRIORITY PROJECT

### Metro / Light Rail Transit System

#### Description:

A Light Rail Transit (LRT) network composed of seven corridors, located in Kumasi, Ghana's second largest city. Kumasi is a converging point of commercial activity and a key transportation hub. It's economic progress and rapid urbanization have led to urban mobility challenges and traffic congestion, which inhibit the city's socio-economic growth. The Kumasi LRT aims to strengthen the city's transportation system.



Location: Kumasi
Subsector: Light Rail
Project Start: 2025
Operation Start: 2027
CapEx: \$5.8 Billion
O&M: \$137 Million
Agency: Ministry of Railways Development

#### Investment Details:

Project Structure: PPP  
 Financing: Debt (70%), Equity (30%)  
 Concession Period: 30 years  
 NPV: \$404 Million  
 FIRR: 15.6%  
 B/C Ratio: 1.12

#### Project impacts towards the SDGs

- 3. Good Health and Well-being:** Inexpensive, safe form of transport reduces **traffic jam and deaths** due to traffic incidents.
- 7. Affordable and Clean Energy:** Public transport options **reduce CO2 emissions** from vehicles.
- 11. Sustainable Cities and Communities:** Enhanced **satisfaction** with public transport safety, affordability, reliability and frequency.

#### Project impacts towards Paris commitments

- Scale up **sustainable mass transportation**.
- Resilient infrastructure planning** city-wide for improved movement of people and goods.

#### Potential impacts towards gender outcomes

- Build **resilience for gender** through equal employment opportunities in construction and O&M.
- Accessible transport options **enable women to participate in public life** and other activities.



Pre-Feasibility Study	Feasibility Study	Environmental Impact Assessment	Social Impact Assessment	Cost Benefit Analysis	Multi-Criteria Analysis	Procurement Plan	Planning Permissions
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# SIFT project financing options

Mapping of financing options for individual projects, including the sources of finance, their requirements and modalities

Finance Both Project Preparation and Project Delivery									
Fund	Fund Name	Transport*	Energy*	Water*	Climate*	Grants*	Loans*	Finances Enabling Environment*	Provided financing in past 10 years**
ADF	African Development Fund								
AIP	Africa Investment Platform								
AFD	Agence Française de Développement								
AfDB	African Development Bank								
BADEA	Arab Bank for Economic Development in Africa								
CDC	Commonwealth Development Corporation								
GCF	Green Climate Fund								
JICA	Japan International Cooperation Agency								
KfAEF	Kuwait Fund For Arab Economic Development								
NDF	Noritic Development Fund								
OeEB	Development Bank of Austria								
OFID	OPEC Fund for International Development								
SREP	Scaling Up Renewable Energy Program in Low-income Countries								
ARE Scale-Up	African Renewable Energy Scale-Up Facility								
BIO	Belgian Investment Company for Developing Countries								
COFIDES	Compañia Española de Financiación del Desarrollo								
DFC	U.S. International Development Finance Corporation								
DFCD WF	DFCD Water Facility								
DSIF	Danish Sustainable Infrastructure Finance								
EBID	ECOWAS Bank for Investment and Development								
FIP	Forest Investment Program								
GEF-7	Global Environment Facility Trust Fund								
IFU	Investment Fund for Developing Countries								
PIIG	Private Infrastructure Development Group								
PROPARCO	Promotion et Participation pour la Coopération économique (IFZ)								
SEFA	Sustainable Energy Fund for Africa								
EU-AITF	EU-Africa Infrastructure Trust Fund								
CDP ICDF	CDP International Cooperation and Development Finance								
EIB	European Investment Bank								
FMG	Finnish Development Bank								
IFC	International Finance Corporation								
Norfund	Norwegian Investment Fund								
AFC	Africa Finance Corporation								
AIIB	Asian Infrastructure Investment Bank								
CIJ	Climate Investor One								
DBSA	Development Bank of Southern Africa								
EAIIF	Emerging Africa Infrastructure Fund								
FinnFund	Finnish Fund								
REPP	Renewable Energy Performance Platform								
SDG IP	Danish SDG Investment Fund								
Africa50	Africa50 Infrastructure Fund								
AREF II	Africa Renewable Energy Fund II								

# Activity: Group Exercise (8 mins)

In your professional role, how can you promote evidence-based infrastructure development in your country?

Item	Activity	Time
1	Go into your zoom breakout rooms and <b>assign a representative</b> for your group (preferably a different person).	1 min
2	Discuss the question and write down the key points, identifying the top three most common or most important.	6 mins
3	Each group's representative to report back <b>one key point</b> to the main room.	1 min each group



**Go to [menti.com](https://www.menti.com) code: 7832 3183**

**“What did you find most interesting about this chapter?”**

# Key Learning Points

1. Infrastructure underpins sustainable, resilient and inclusive development
2. An evidence-based approach can help to minimize risks and maximise opportunities
3. There are a growing number of evidence-based approaches, including the three tools we mentioned, but more will be required to take this approach to scale

**Questions?**

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