強靭性 革新 伝統

UNDERSTANDING RISK GLOBAL FORUM 2024

TRADITION • INNOVATION • RESILIENCE

ACCOUNTING FOR CLIMATE RISKS AND IDENTIFYING OPPORTUNITIES IN INFRASTRUCTURE PPPS

A New Suite of Climate Toolkits

Speakers:

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PPIAF Enabling Infrastructure Investment

Global Infrastructure Facility A G20 INITIATIVE

IFC International Finance Corporation WORLD BANK GROUP

Creating Markets, Creating Opportunities

PRACTICAL STEPS TO CLIMATE PPPS USING CTIP3 GUIDANCE

CLIMATE POLICIES

Alignment of the project with the global and national climate-change agenda and sector-specific development plans

CLIMATE RISK SCREENING

Characterizing hazards and climate-induced impacts, methodology for preliminary assessment of risks under changing climate conditions, stock take of sector-specific adaptation measures

DECISION-MAKING PROCESS

Guidance on stakeholder engagement, appraising monetary and non-monetary benefits of climate interventions; prioritizing climate strategies using multi-criteria methodologies

GHG FOOTPRINT

Preliminary estimation of the GHG emissions of the project; guidance on GHG reduction strategies and NBS solutions

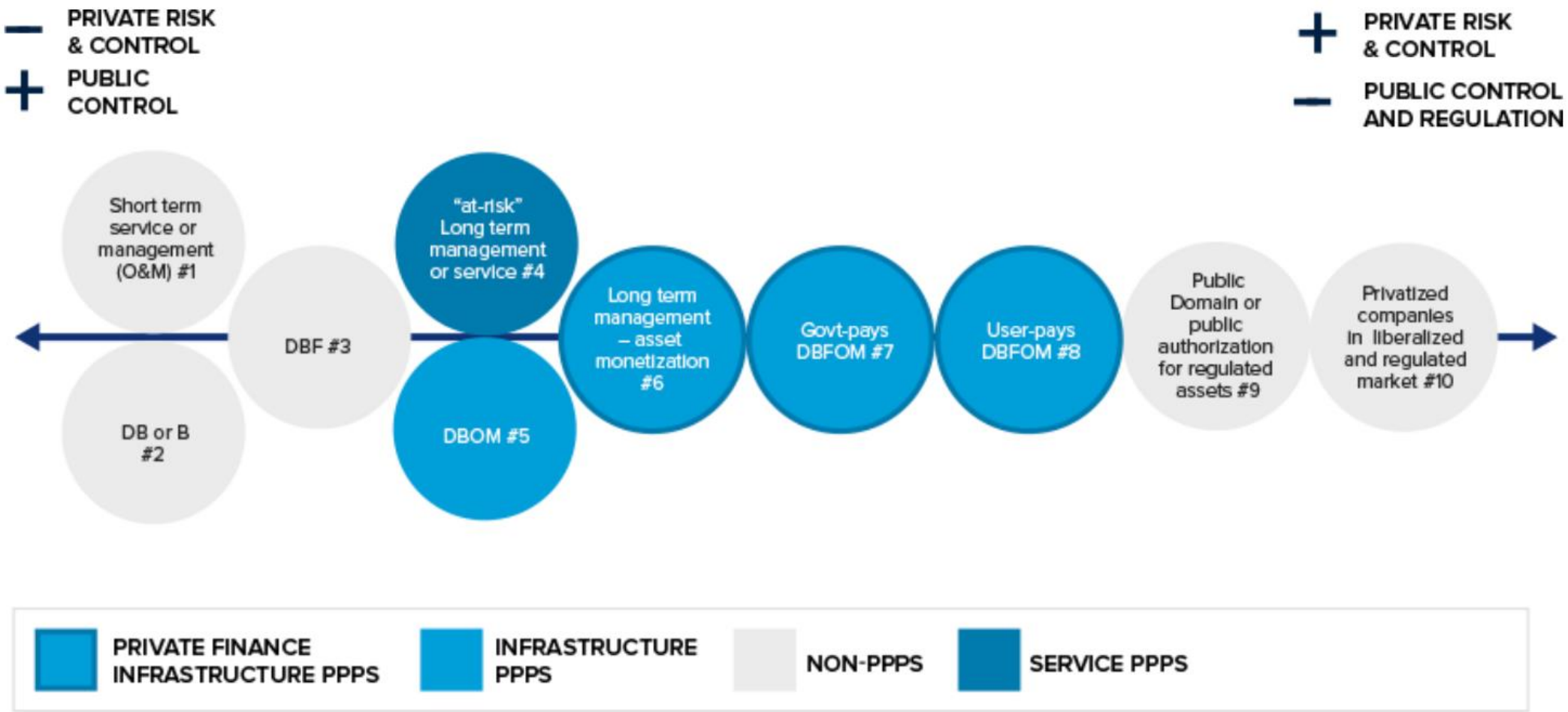
CONSIDERATIONS ON THE PROJECT'S ECONOMICS

Climate-related factors affecting the value of the investment and the PPP suitability (e.g., cost of mitigation and adaptation, cost of maintenance, tax reductions/penalties, use of new technologies)

CLIMATE KPIS

Sector-specific KPIs to support the climate objectives of the project

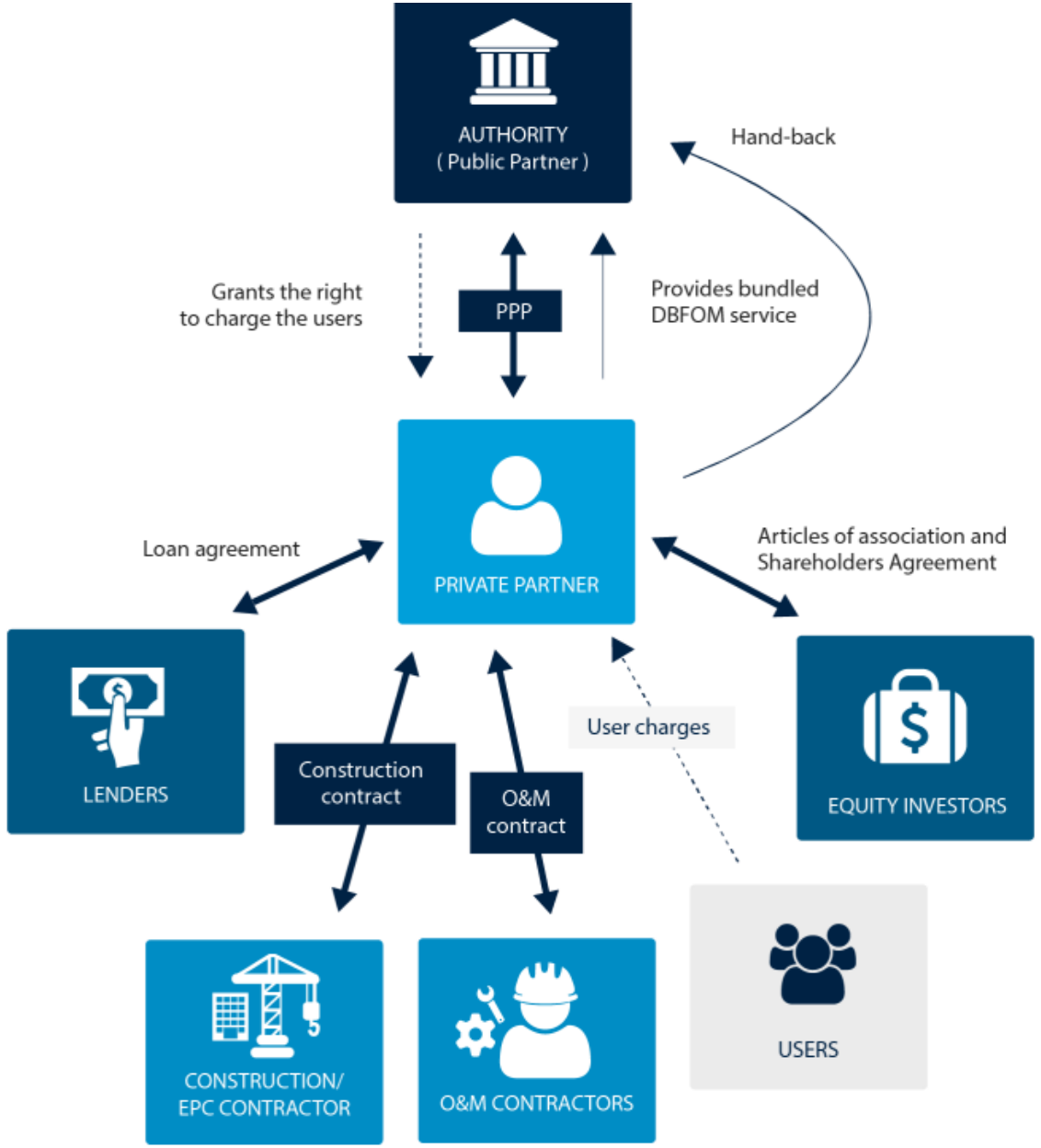
PRIVATE SECTOR PARTICIPATION IN INFRASTRUCTURE



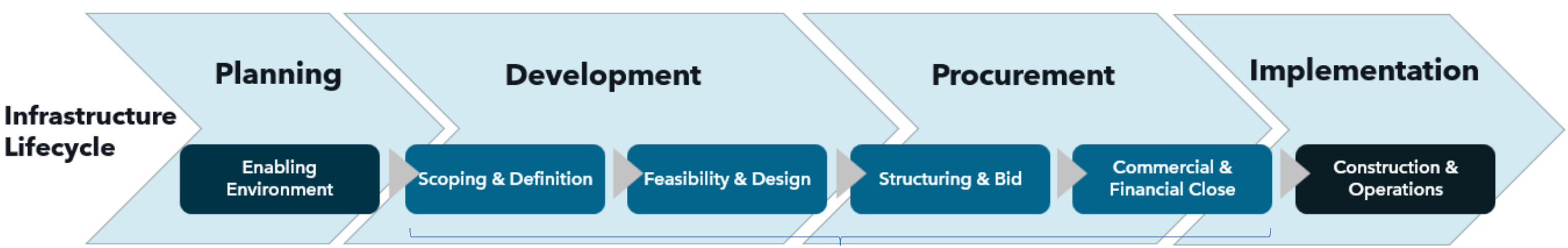
PPP STRUCTURE

Scheme of a DBFOM Contract Structure (user-pays)

- DBFOM= Design, Build, Finance, Operate and Maintain
- EPC= Engineering, Procurement and Construction
- O&M= operation and maintenance.



PPP LIFECYCLE



PPIAF Enabling Infrastructure Investment

QUALITY INFRASTRUCTURE INVESTMENT PARTNERSHIP

Global Infrastructure Facility
A G20 INITIATIVE

Enabling Environment & PPP Frameworks
- Strengthening policies and institutions, building capacity , and improving capability of subnational entities to access finance without sovereign guarantees
- Mainstreaming QIII implementation

GO-DEEP Assessment
- Diagnostics & examinations of policies and regulations for specific industries

PRA (Project Readiness Assessment)
- De-risking tool to assess "readiness for market" of an infra program or project

PDA (Project Definition Activities)
- Infra program/project planning and prioritization

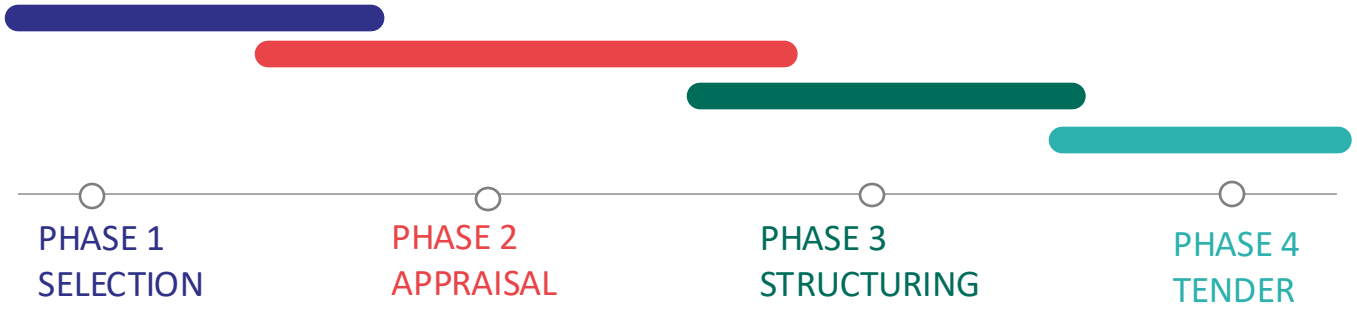
PDA
- Pre-feasibility studies (market, technical, E&S, climate, legal & regulatory, etc.)
- Cost-benefit and Value for Money analyses
- Design and appraisal
- Preliminary structuring
- Choice of procurement
- Early market soundings

PPSA (Project Preparation and Structuring Activities)
- Full feasibility studies
- Risk allocation and structuring
- Market soundings/ roadshows
- Contract development and tendering
- Support through commercial and financial closings

CLIMATE TOOLKITS
from multilevel, umbrella guidance to sector-specific guidance

UMBRELLA TOOLKIT

Oriented to support PPP units to incorporate climate actions throughout the process of **selecting, preparing, appraising and tendering** a new climate- smart infrastructure project. The provided guidance is **sector-agnostic.**



SECTOR TOOLKITS

ROADS | ICT | WIND & SOLAR | WATER | HYDRO POWER

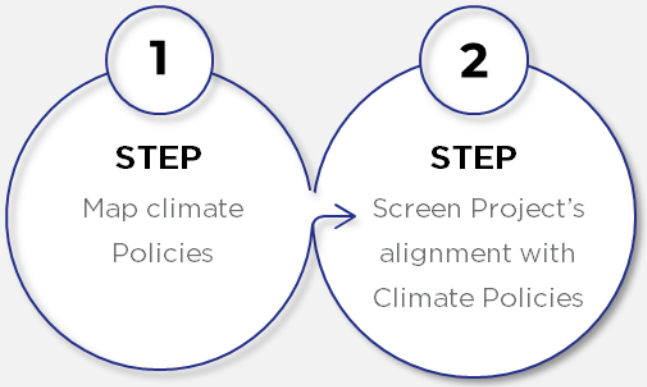
Oriented to assist **preliminary investment decisions** emphasizing the specific needs and challenges of **5 infrastructure sectors.**

- Focus on the early stages of PPP cycle where access to data and experts can be extremely limited.
- Implementation by PPP practitioners with varying capacities.

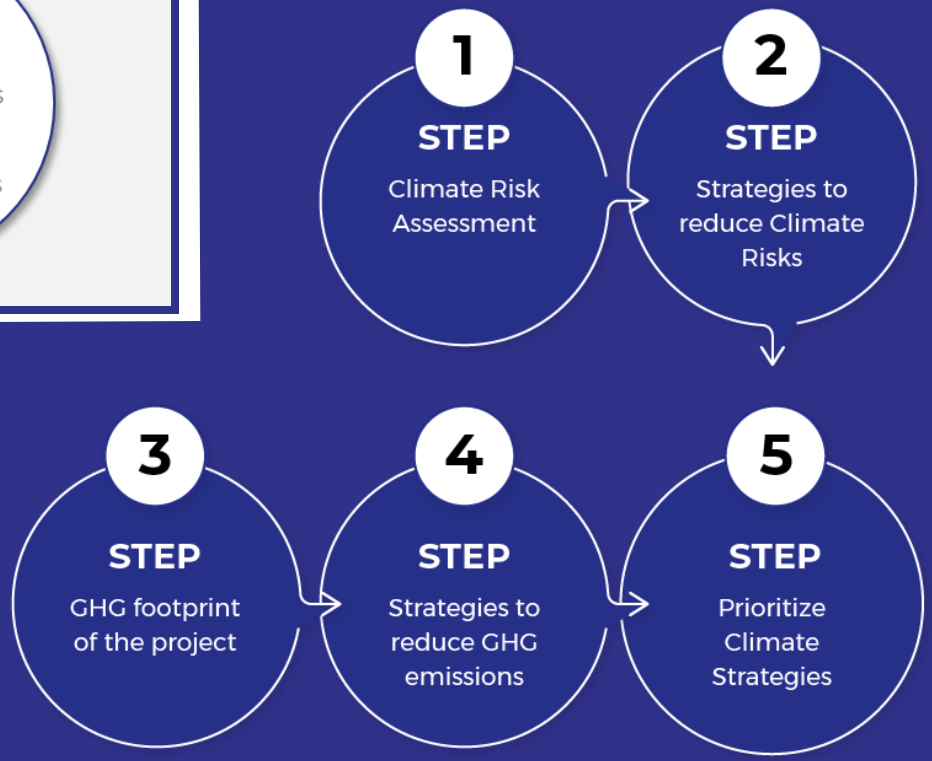
MODULAR ARCHITECTURE

* Small deviations exist among sectors

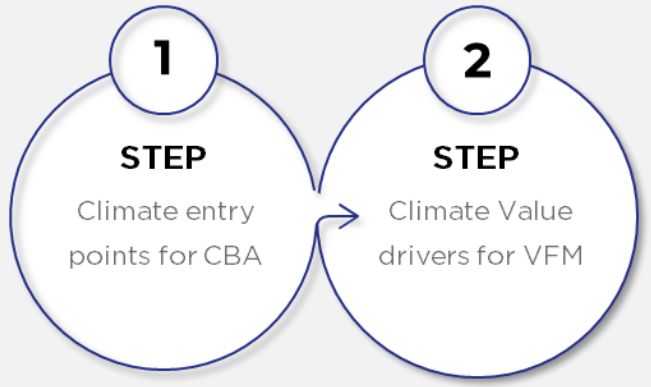
MODULE 1 PROJECT ALIGNMENT WITH CLIMATE POLICIES



MODULE 2 CLIMATE CONSIDERATIONS IN PROJECT SELECTION



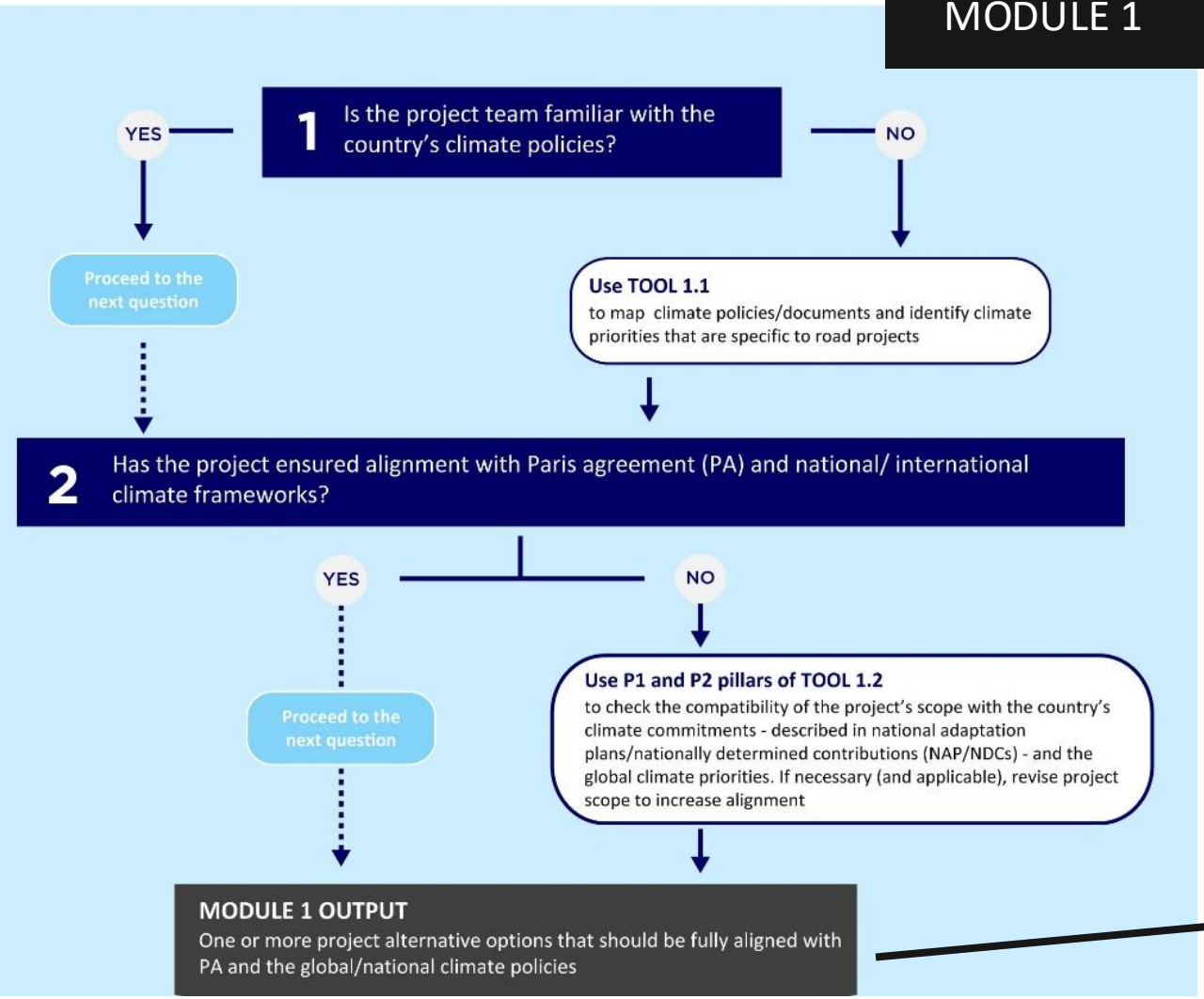
MODULE 3 CLIMATE CONSIDERATIONS IN PROJECT ECONOMICS



MODULE 4. CLIMATE KPIS

TOOLKIT NAVIGATOR : FLOWCHART

MODULE 1

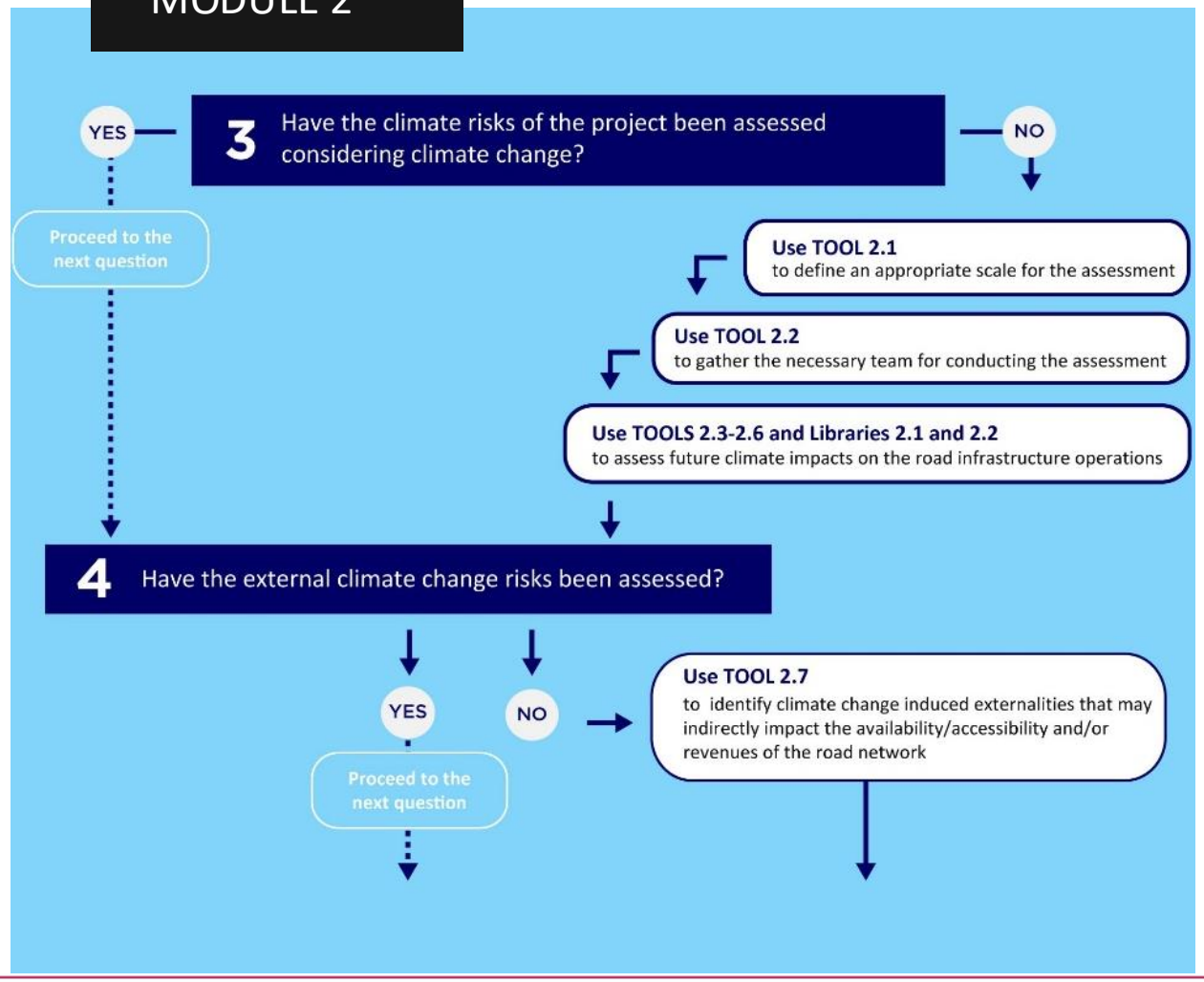


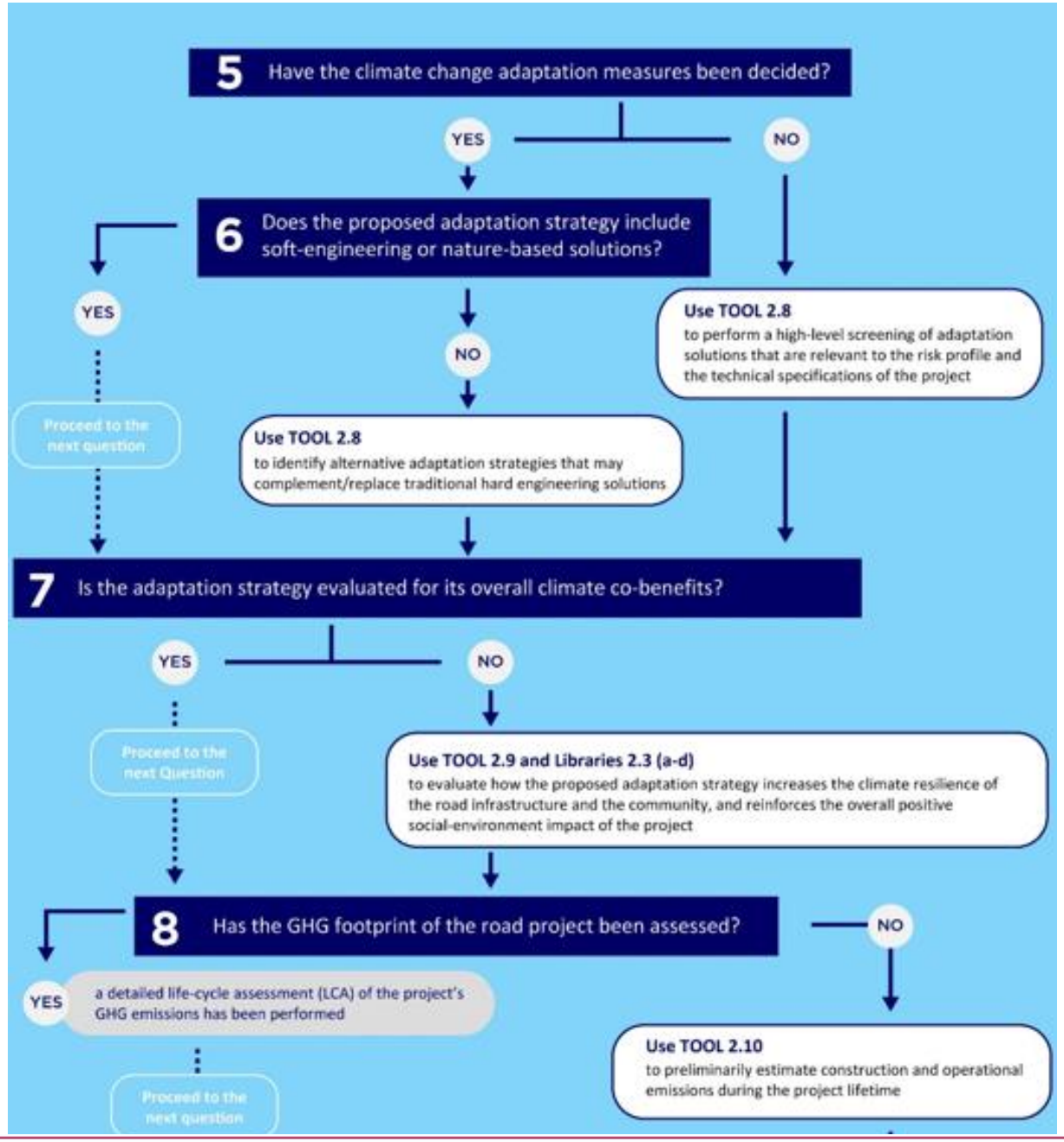
Continue to

MODULE 2

☑ MODULE 1

MODULE 2





Case study – Integrating Climate Guidance into Ghana's PPP Framework and Pipeline Development

- **Main objective:** mainstream considerations for identifying climate mitigation and adaptation risks and climate smart investment opportunities in the planning procedures for infrastructure PPPs in Ghana.

  - Ensuring climate risks and climate smart investment opportunities are appropriately integrated into PPP regulatory reform and project pipeline screening recommendations.

  - Preparing and delivering specific training on climate-smart considerations in PPP regulatory reforms, and project pipeline screening and prioritization approaches.

Case study – Support Integrating Climate Guidance into Ghana's PPP Framework and Pipeline Development

FINAL CLIMATE OUTPUTS/PRODUCTS:

- **Diagnostic report** to assess the enabling environment of climate-smart investments in Ghana including reviews of Ghana's
- Recommendations to mainstream climate considerations into the "Drafting Instructions for **Ghana's PPP Regulations**" (using guidance from Phases 1 – 4 of the Umbrella CTIP3).
- Definition of **climate related project screening criteria** for incorporation into the project screening methodology to be applied to the existing project pipeline.
- **Review of 22 projects in existing PPP project pipeline** and application of the climate screening criteria to prioritize and identify a short-list of "first-mover" PPP projects
- Preparation and delivery of climate **training materials**
- Climate inputs into the **PPP project pipeline assessment and five-year plan** to ensure climate considerations were appropriately incorporated.

TRANSPORT SECTOR

TYPOLOGIES covered by the Toolkit

- Inland and Coastal roads (and their components)
- Rural roads and Highways (and their components)

INDICATIVE EXAMPLES PROJECTS

- Urban Mobility Projects
- Rehabilitation/ expansion/change of alignment of the existing road network
- Construction of large highways
- Traffic congestion management
- Greening of transport corridors (e.g., e-mobility, NbS)

ROADS

MODULE 1
Enhancing Climate Mitigation

MODULE 2

MODULE 3

MODULE 4

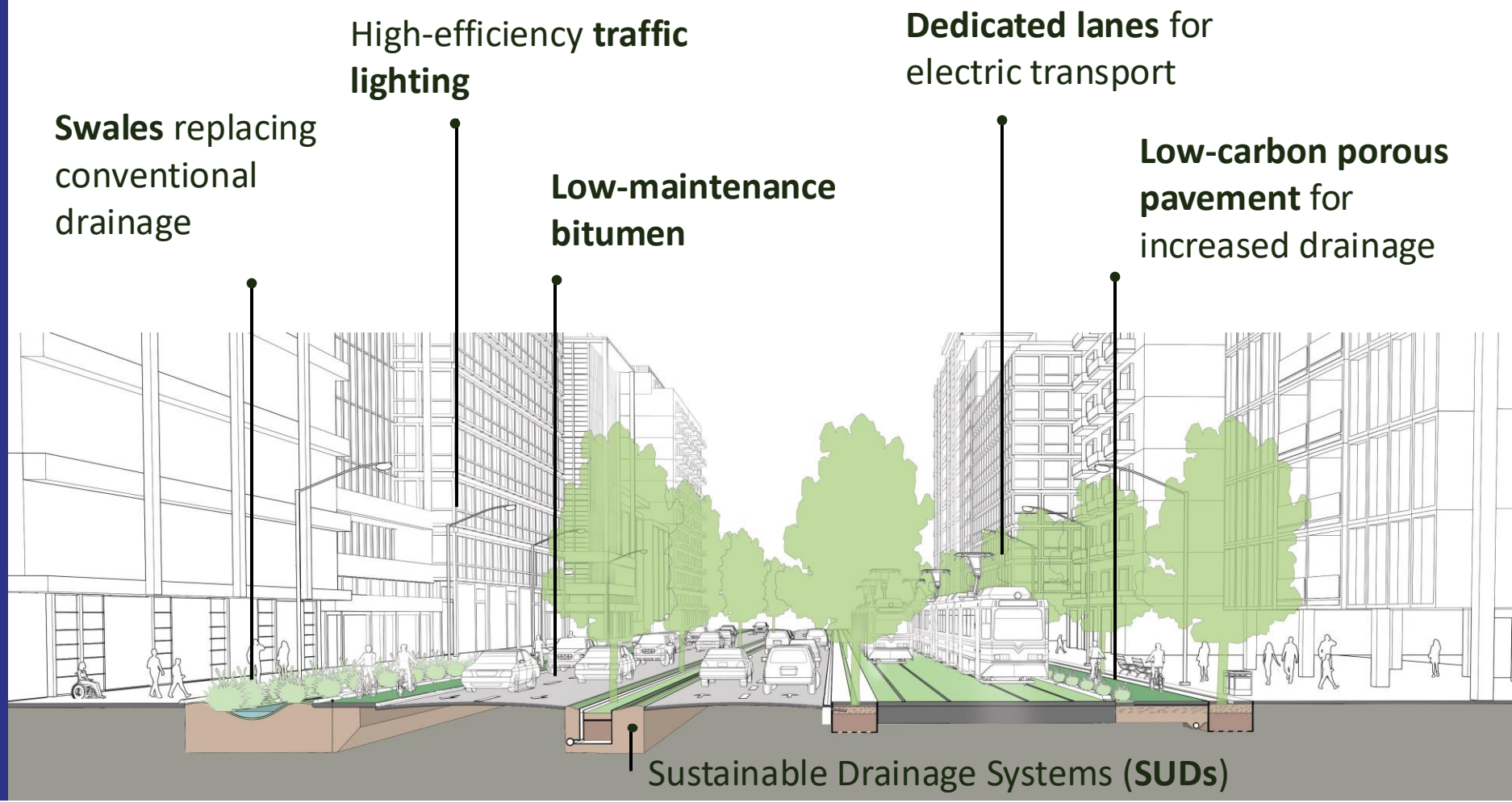
B Small-scale climate mitigation in transport projects

TYPES OF INTERVENTIONS	EXAMPLES
On-site renewables	Solar roads and roofs; photovoltaics integrated on noise barriers; solar powered toll booths
Activities to **avoid/reduce GHG** emissions	Low-carbon marking material for pavements; Low-maintenance bitumen or graphene-based surfacing; NBS solutions for drainage; Congestion charging or road pricing protocols, low-emission zones
Components that promote **low-carbon and efficient transport**	Charging stations and other infrastructure for electric vehicles; hydrogen or biofuel stations; City-wide green space network with connected corridors.
Energy-efficiency provisions during the construction and the operation	Energy-efficient appliances and equipment Electric vehicles/machinery during construction Segregated road section used for green transport modes
Circular economy principles during the construction process	Modified bitumen of recycled polyethylene and tires Warm mix asphalt or recycled asphalt
Sustainable use and management of **ecosystems**	Replantation of removed trees Provisions for wildlife crossing

ROADS

- MODULE 1
  Enhancing Climate Mitigation
- MODULE 2
- MODULE 3
- MODULE 4

B Integrating climate change considerations for reducing the climate footprint of roads



ROADS

MODULE 1

MODULE 2
Climate Considerations in Project Selection

MODULE 3

MODULE 4

Climate impacts on roads

Excerpt from the road toolkit libraries

Threat	(Internal) Impacts on Roads
CLIMATE HAZARDS	
 **Extreme Precipitation & Flooding**	• Operational disruption due to surface runoff and/or inundation • Scouring of bridge foundations and possible failures • Damage to road furniture; Potential accidents
 **Tidal Waves Storm Surge**	• Temporal coverage of coastal road assets located at low altitude • Damage of coastal road infrastructure (bridges, road furniture, etc.) • Potential accidents, injuries/deaths
 **Wildfires**	• Operational disruption of road network • Cascading impacts (flooding, ash transfer, loss of connectivity)
 **Dust storms & Cyclones**	• Dust transfer and consequent operational disruption • Tree falls, signpost failures, deterioration of driving conditions & accidents
CHRONIC CLIMATE THREATS	
 **Coastal Erosion**	• Deterioration of coastal road assets (e.g., bridge foundations, earthworks) • Untreated damages could generate serious malfunctions or collapses
 **Inland Inundation**	• Permanent coverage of road sections located at low altitude in close proximity to the seaside • Corrosion of infrastructure

ROADS

- MODULE 1
- MODULE 2 Climate Considerations in Project Selection
- MODULE 3
- MODULE 4

Climate adaptation measures for roads

Excerpt from the road toolkit libraries

Threat	Example Adaptation Measures
CLIMATE HAZARDS	
Extreme precipitation & Flooding	• Increased surface/subsurface drainage • Strengthening of embankment/scour protection and installation of fixed barriers (levees, dykes) • River/ Lake restoration (incl. NBS solutions for riverine ecosystem adaptation, detention/retention ponds) • Real-time flooding alerts and proactive road closures
Tidal Waves Storm Surge	• Change of /elevation of road alignment • Increased flood protection: flood barriers, shoreline hardening, caisson breakwaters, artificial reefs, groynes and protection of biodiversity
Wildfires	• Wildfire buffers, fire-hazard monitoring systems • Emergency-response and fire-management plans
Cyclones Extr. Winds	• Wind-proofing of lightweight equipment • Installation of wind breaks and early warning systems
CHRONIC CLIMATE THREATS	
Inundation	• Change of /elevation of road alignment • Measures to increase flood protection

ROADS

MODULE 1

MODULE 2

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MODULE 4

KPIs for climate resilient and sustainable roads

Climate KPIs

The toolkit contains a comprehensive list of KPIs specific for road projects:

2 Climate Adaptation KPIs

PHYSICAL PERFORMANCE

Measuring damages and traffic disruptions

EXAMPLES

- Weather-related disruptions (days p.a)
- Maintenance/repair cost (due to climate events)
- Percentage of closed roads (e.g., due to inundation, debris accumulation etc)
- Number of potholes per unit surface

OPERATIONAL PERFORMANCE

Measuring functional recovery, emergency protocols, redundancies

EXAMPLES

Intensity of climate threat :
- Max hourly rainfall (mm/h)
- Max wind speed (m/s)

Recovery time for 90% functionality of the network (hours or days)

Operational Preparedness

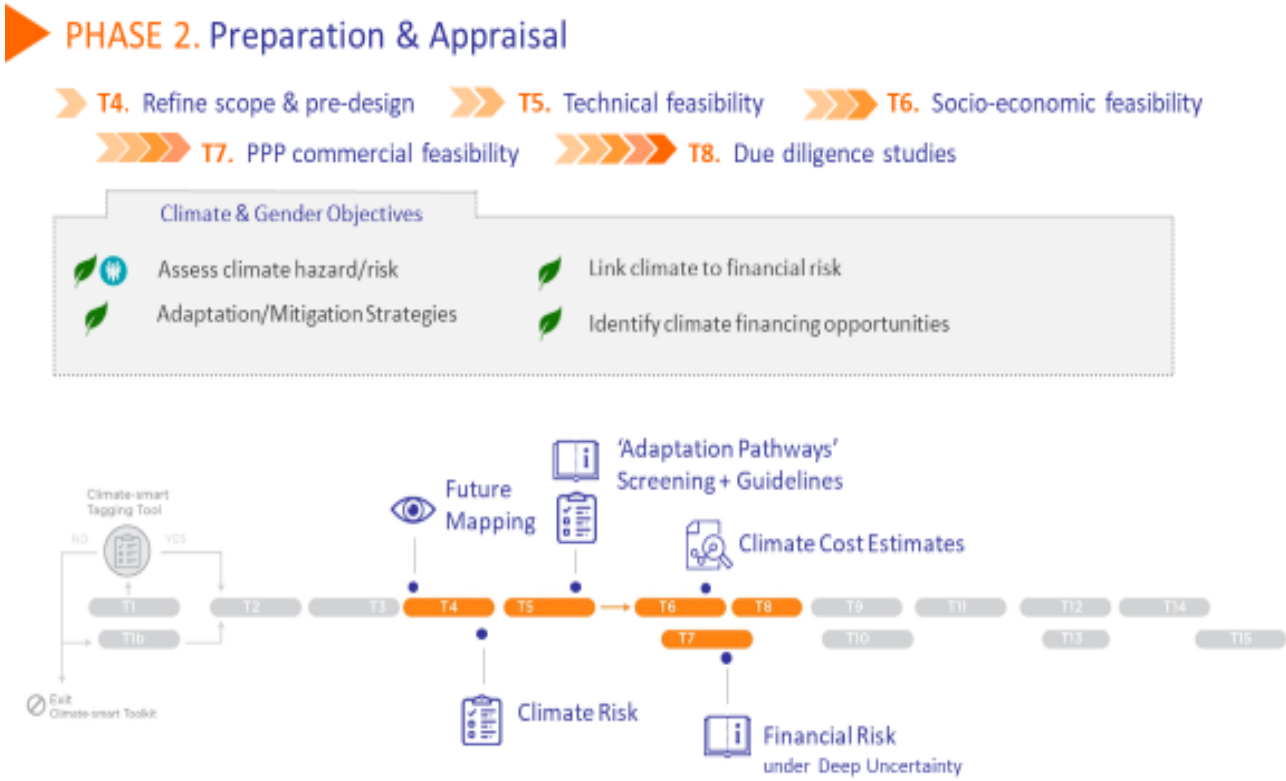
Frequency of preventive maintenance actions ◆Time-elapsed between a predicted event and warning announcement

ROADS

CASE STUDIES

Appraising and Preparing a Climate Resilient Urban Mobility PPP in Maputo, Mozambique

Objective: To appraise the impact of climate induced flooding and extreme heat on PPP operations in the investment rolling stock package of the Maputo Metropolitan Area Urban Mobility Project.



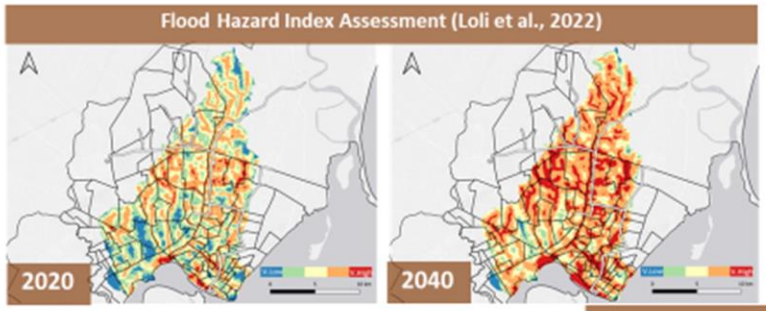
ROADS

CASE STUDIES

Methodology

Private sector returns were expected to be affected by both the decrease in fare revenue and the increase in operating costs, resulting in a decrease in cashflow available for debt service (CFADs) in excess of 3.1% before any corporate tax considerations.

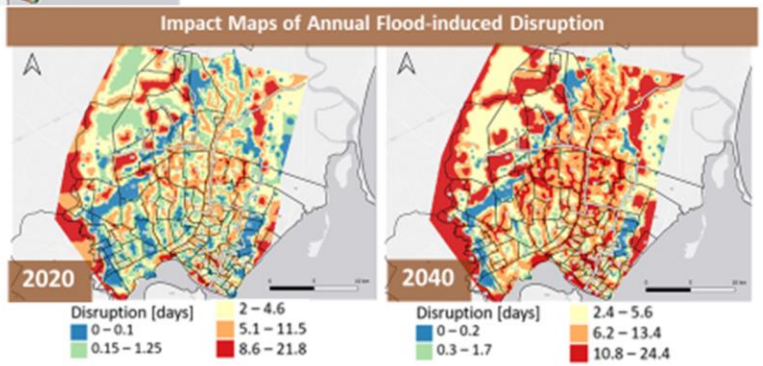
Methodology: Disruption Analysis Results



Resulting Total Annual Revenue Loss:

Baseline Scenario (2020):
1.3% - 3.1% or **4.1 – 9.9 days of full service loss/year**

Pessimistic Scenario (2040):
2.6% - 5.8% or 8.4 – 18.9 days of full service loss/year



ROADS

CASE STUDIES

Key Findings

- Due to the cost of contending with climate risks, as the operation is already economically “tight” (e.g. political unwillingness to raise fares, missed lease payments by operators, illiquid and expensive local lending market, lack of transport PPP precedents), it is unlikely that the private sector will be able to assume any major risks that may affect the economics of the PPP.

- Flood risk may not flip the VfM balance in the short-term; however, projections indicate that in the cases of extraordinary events, the Government should look at alternative PPP models (e.g., availability-based instead of demand-based) to minimize potential impacts on VfM analysis.

- Bankability may be enhanced through identification of potential support and **cover mechanisms that mitigate risk uncertainty**, such as insurance, credit enhancement (concessional co-lending alongside a commercial lender), and Grantor guarantee.

BULK WATER & TRANSMISSION

The Bulk Water & Transmission sector includes the infrastructure needed for the storage and transmission of treated or untreated water in large quantities for any utilization purpose

TYPOLOGIES covered by the Toolkit

- Water abstraction: process of extracting water from a natural source
- Water conveyance: transportation of water from the source to the treatment plant or reservoir
- Water treatment: alteration of a water source in order to achieve a quality that is safe for consumption
- Desalination: process of removing dissolved salts from seawater [Optional]

BULK WATER

MODULE 1
Enhancing Climate Mitigation

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MODULE 4

Opportunities for small-scale **climate mitigation**

TYPES OF INTERVENTIONS	EXAMPLES
On-site renewables	Energy needs of the facility partially covered by on-site renewable energy generation (e.g. through the installation of photovoltaic panels or small-scale wind turbines
Activities to **avoid/reduce GHG** emissions	Optimizing water management resources, Re-using wastewater, Efficient pumping systems, Enhanced energy savings (e.g. by minimizing water leaks),
Circular economy principles	Circular economy principles in the design of the water supply systems, sustainable-certified suppliers and contractors
Sustainable use and management of **ecosystems**	Exploit wetlands for water storage, Monitor habitat loss at coastal landforms and wetlands and design interventions

BULK WATER

MODULE 1

MODULE 2

MODULE 3

Assess climate risks and plan adaptation strategies

MODULE 4

Climate Impacts on Bulk Water Projects

Threat	(Internal) Impacts on Bulk Water Projects
CHRONIC THREATS	
Droughts	• Limited water availability and reduced production capacity of surface reservoirs • Increased pumping may cause saltwater intrusion into freshwater coastal aquifers, hence diminishing the quality of groundwater.
Salt water intrusion	• Diminished water quality **increases water treatment cost** • Increased operational cost for desalination
Soil erosion	• Sediment washing diminishes the quality of receiving water • **Increased filtration cost** is required for removal of contaminants
CLIMATE HAZARDS	
Flooding	• Damage of pumps, pipelines, and E/M equipment • Increased **maintenance cost** for repairs and replacements • **Episodic peak flows** may strain the system capacity
Fires	• Runoff and flash floods from burned areas **increase sedimentation** in reservoirs resulting reduced capacity and service lifespan of reservoirs • **Increased pollutant loads** in reservoirs, **algal growth**, higher treatment cost

BULK WATER

MODULE 1

MODULE 2

MODULE 3

Assess climate risks and plan adaptation strategies

MODULE 4

Climate Adaptation measures for Water Projects

Threat	Example Adaptation Measures
CHRONIC THREATS	
Droughts	• Build infrastructure for aquifer storage &recovery • Diversify options for water supply • Increase water storage capacity • Establish aid agreements with other utilities • Prepare drought contingency plans
Salt water intrusion	• Install low-head dams • Inject fresh water into aquifers • Practice aquifer management to monitor and control saltwater intrusion
Soil erosion	• Monitor and manage ecosystems • Preserve or restore vegetated land covers in watersheds to manage stormwater runoff and reduce soil erosion
CLIMATE HAZARDS	
Flooding	• Build flood defenses (e.g., seawalls and dikes) • Protect equipment (e.g. elevated tanks, surge protection etc.)
Fires	• Develop fire models and set provisions for fire management plans

BULK WATER

MODULE 1

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MODULE 3

Assess climate risks and plan adaptation strategies

MODULE 4

External Risks and Consequences

Excerpt from the toolkit' reference tables

External Factors	Example Consequences
Demographic changes	• Climate change affects the demographic projections and regional migration patterns. Such changes are expected to impact supply and demand requirements of water projects.
Agricultural production	• Climate change is expected to modify agricultural practices and hence water use patterns. Water facilities may be unable to provide sufficient water to cover increased needs.
Energy needs	• Energy security and cost of energy affect functionality and oprational cost of the facility. • Energy blackouts may become more frequent in response to increased demands, with cascading effects on the operation of the water facility.

BULK WATER

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KPIs for climate-resilient and sustainable water projects

Climate KPIs

The toolkit contains a comprehensive list of KPIs applicable to bulk water projects:

1 Climate Resilience Targets	Example Indicators
Reduced losses/disruptions	Climate-related energy-yield losses ◆ No of people and/or enterprises benefitting from measures to mitigate the consequences of floods and droughts
Quick Recovery	Total downtime ◆ Time to restore operations and service continuity ◆ Existence/Reliability of early warning system
Maintenance Works	Ratio of maintenance works completed vs planned ◆ No of new water leakages (No/year)
Emergency Response	Frequency of ERPs updates ◆ No of emergency drills ◆ Volume of emergency response fleet
Financial	Financial liabilities (i.e., contractual fines) ◆ Cost of uninsured climate related incidents over revenues (%)

BULK WATER

CASE STUDIES

Development of a Climate Resilience Screening Toolkit to Integrate Climate Guidance into the Angola Water Sector PPP Framework

Objective:

To (1) develop a project screening methodology that incorporates climate criteria; (2) application of said methodology to an existing infrastructure project pipeline as part of the pre-feasibility studies phase; and (3) the development of climate risk assessments and adaptation & mitigation strategies to be incorporated into project designs.

Expected outputs:

- A PPP Screening Tool and Methodology for the overarching Water PPP Program (including Climate Change screening criteria).
- Project Scope and Due Diligence reports for 4 eligible Projects that include climate considerations. This will include technical and financial feasibility analyses.
- A Water PPP Project Pipeline and Workplan (including a PPP Program Manual) that includes LCR water infrastructure projects.

ICT SECTOR

Information and communication technology (ICT) comprises the integrated networks, systems and components enabling the transmission, receipt, capture, storage and manipulation of information by users on and across electronic devices

TYPOLOGIES covered by the Toolkit

- Data management infrastructure: data centers
- Telecom and data transmission infrastructure:
  - Wireless networks
  - Fixed networks

ICT

MODULE 1
Project Alignment with Climate Policies

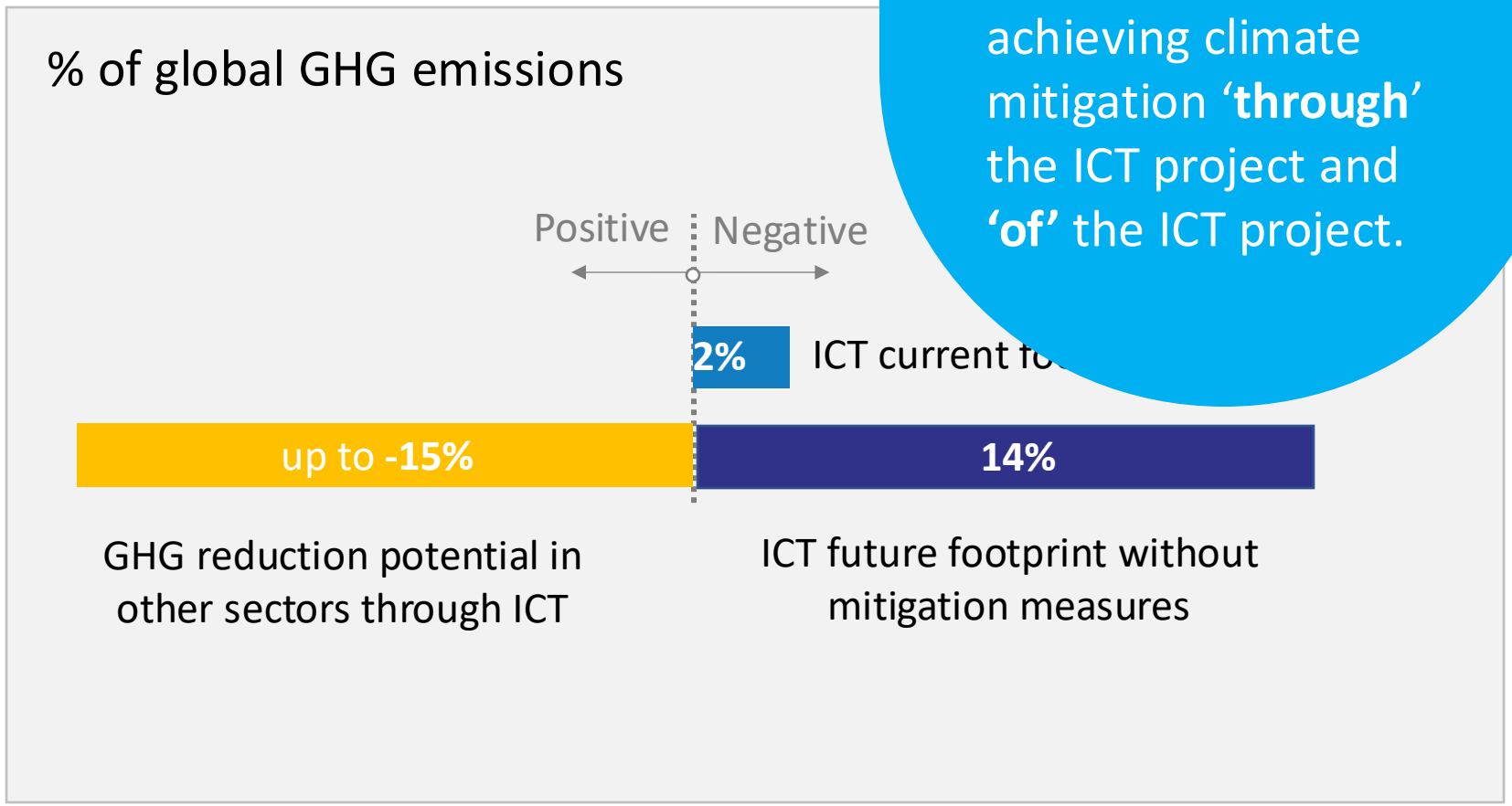
MODULE 2

MODULE 3

MODULE 4

The GHG footprint of ICT infrast…act

Significant opportunities for achieving climate mitigation '**through**' the ICT project and '**of**' the ICT project.



ICT

MODULE 1

Project Alignment with Climate Policies

MODULE 2

MODULE 3

MODULE 4

Opportunities for small-scale **climate mitigation of ICT projects**

TYPES OF INTERVENTIONS	EXAMPLES
Renewables & Energy-efficiency provisions during manufacturing, construction, and operation	- Telecom towers powered by hybrid energy systems that incorporate renewable energy resources - Photovoltaic panels on data center facilities' roofs - Energy efficient components in data centers - Low-carbon transportation of employees
Activities to **avoid/reduce GHG** emissions	- Monitoring and optimizing power consumption - Heat waste re-use for building's HVAC - Green supply chain management of ICT manufacturing industry
Circular economy principles	- E-waste management - Heat waste re-use
Sustainable use and management of **ecosystems**	-Mapping of pollution and air quality and timely reacting when deviations from the specified targets are observed

ICT

MODULE 1

MODULE 2

MODULE 3

Assess climate risks and plan adaptation strategies

MODULE 4

Climate Adaptation measures for ICT projects

PREVENTION

PREPARATION

RECOVERY

PLANNING

Ensure that key facilities are out of future storm paths and floodplains

HARD ENGINEERING

Place telecommunication cables underground

Raise equipment to higher floors

Trim trees near power and communication lines

SOFT ENGINEERING

Replace wired network segments with wireless solutions

Use climate-appropriate technology for cooling

Climate Adaptation measures for ICT projects

ICT

- MODULE 1
- MODULE 2
- MODULE 3

  Assess climate risks and plan adaptation strategies
- MODULE 4

PREVENTION

PREPARATION

RECOVERY

Alternative Telecommunication technologies

Free-space optics: use light propagating in free space to wirelessly transmit data

Power line communications: transmit data over electric power lines).

PLANNING

Plan redundancies in backbone network; introduce strategic/ dynamic nodes

HARD ENGINEERING

Use of microgrids to reduce dependence on electric grid: provide backup power; on-site water storage for cooling

SOFT ENGINEERING

AI energy management systems for increased energy efficiency; Operate “warm standby” or “hot standby” for data centers; invest in alternative telecommunication technologies for increased redundancy

ICT

MODULE 1

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MODULE 3

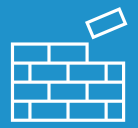
Assess climate risks and plan adaptation strategies

MODULE 4

Climate Adaptation measures for ICT projects

PREVENTION

PREPARATION



RECOVERY

PLANNING

Collaboration with local authorities to coordinate recovery actions

HARD ENGINEERING

Maintain backup supplies (e.g. poles, wires)

SOFT ENGINEERING

Weather event early warning systems; invest in novel technologies to enhance coverage in remote areas; Coordinate emergency crews and plan emergency routes

ICT

MODULE 1

MODULE 2

MODULE 3

Assess climate risks and plan adaptation strategies

MODULE 4

External Risks and Consequences

Excerpt from the toolkit' tables

External Factors	Example Consequences
Energy security	Overloading of the power supply system (exacerbated by climate change) may cause more frequent and more extended blackout
Water scarcity	Changes in water demand and conflicting uses may affect the water management system of the data center and even threaten the viability of the ICT project.
Transport vulnerability	• Inherent vulnerabilities of the road infrastructure to climate-induced hazards are interlinked with the associated ICT assets. • Challenges for the maintenance and repair activities associated with the ICT project.

ICT

MODULE 1

MODULE 2

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MODULE 4

KPIs for climate-resilient and sustainable projects

Climate KPIs

The toolkit contains a comprehensive list of KPIs applicable to ICT projects:

1 Climate Resilience Targets	Example Indicators
Reduced losses/disruptions	No of clients affected, No of strategic nodes that are out of service, area coverage of disruption
Quick Recovery	Total downtime, Time to restore operations and service continuity
Monitoring	No of installed sensors; data availability index
Redundancies	Battery back-up time
Emergency Response	Frequency of ERPs updates, No of emergency drills, No of emergency response fleet
Financial	Financial liabilities (i.e., contractual fines) – Cost of uninsured climate related incidents over revenues (%)

ICT

CASE STUDIES

Piloting the Digital/ICT Climate Toolkits in East Africa (Somalia, South Sudan, Tanzania, Djibouti, Ethiopia and Madagascar)

Objective:
To mainstream climate resilience in broadband and digital infrastructure planning to enhance climate adaptation in PPP telecommunications infrastructure investments to better connect unserved and underserved East African communities. Climate-focused support will be applied to further refine the in-depth analysis of 3 pre-selected projects and provide high level guidance following the WBG's CTIP3 Umbrella and Digital/ICT sector toolkits.

Expected outputs:

- Completion of CTIP3 Phases 1 and 2 for the 3 pre-selected PSP scenarios.
- Development of critical climate studies that will support the development of green and resilient digital infrastructure such as climate risk identification, development of mitigation and adaptation strategies for incorporation into project designs
- Capacity building workshop on the use and application of CTIP3 and the results from the overall climate exercise.

A Case Study of CTIP3 Implementation

Using the Umbrella Toolkit to improve PPP planning processes in Kaduna State, Nigeria

Adaptation of the CTIP3 for the **Kaduna State Investment Promotion Agency (KADIPA)**

- The PPIAF-funded activity, framed around implementation of the umbrella CTIP3 to better prioritize infrastructure investments, was used to:

  - Develop a ***gap assessment report*** that assessed KADIPA's regulatory framework and institutional capacity to identify, integrate and address climate risks and opportunities into PPP infrastructure projects

  - Develop a guidance note and ***excel-based tool*** tailored to the Kaduna state context and KADIPA's PPP priorities to enable them to screen for climate mitigation and adaptation risks and opportunities.

  - Develop a "***Clean, Green and Resilient PPP Pipeline Report***" with outcomes of the application of the tool to KADIPA's current PPP pipeline

Gaps and Recommendations Report

Conclusion

The climate toolkit is aimed at embedding a climate lens and approach into infrastructure PPP lifecycle in Kaduna State. It will outline a framework and describe specific actions to support the Kaduna State Government towards incorporating climate actions in the up and mid-stream phases of its PPP projects.

The following cross cutting recommendations are necessary to enable the full implementation and operationalisation of the Climate Toolkit in Kaduna State

Update to the PPP Policy and Manuals

- To enable the state fully implement the recommendations outlined in this report, there is a need to update the PPP policy, manuals, and regulations to drive the PPP process in the state.
- The updates to the PPP policy and manual will enable the inclusion of reinstatement mechanisms and climate risks considerations while conducting business case assessment for PPPs, allocating specific responsibilities for climate risks considerations to different MDAs involved in the PPP lifecycle, as well as provide for more gender inclusivity at all stages of the PPP lifecycle.

Put in a place a mechanism to:

- Develop state-wide climate targets and decarbonisation plan
- Invest in required tools and technology to boost the collection of primary climate data,
- aid proper documentation and analysis of climate trends,
- ensure the reporting of climate risks and vulnerabilities.

Capacity Building

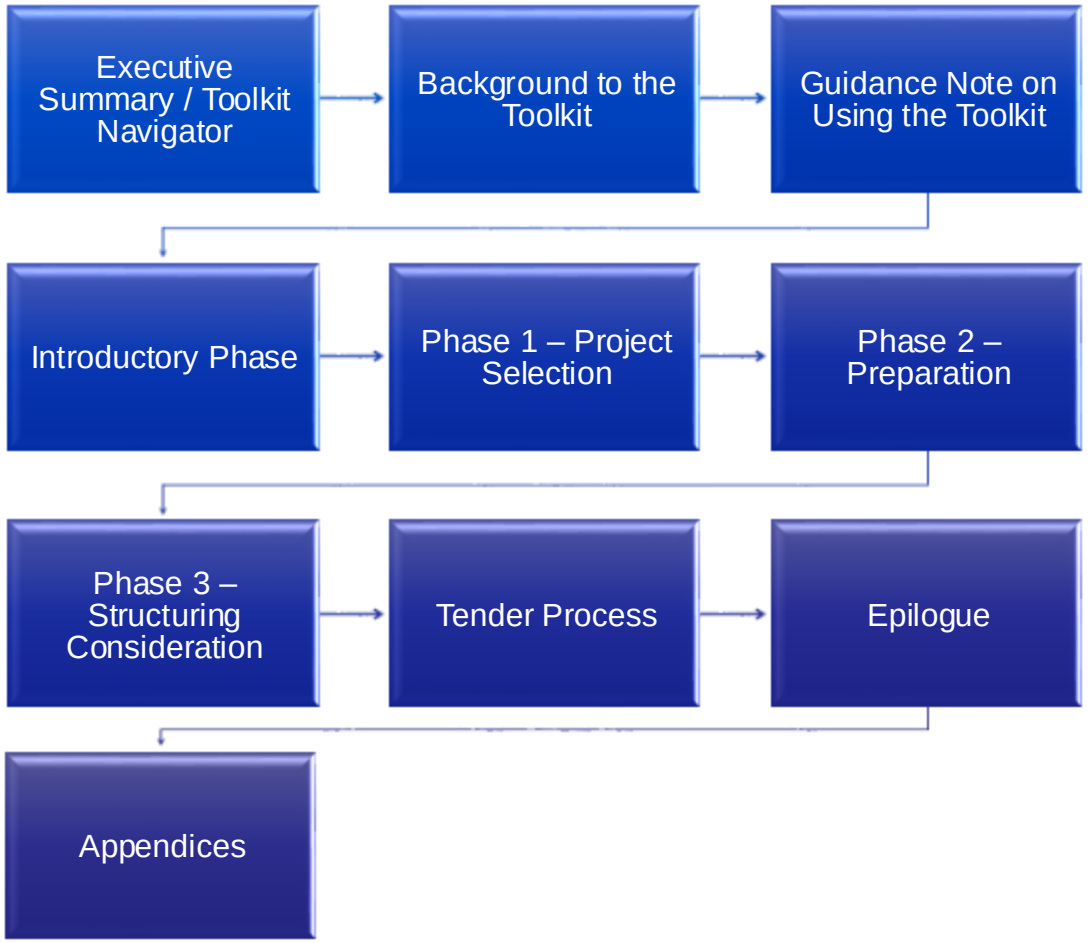
- Having experienced and qualified project teams and sufficient budgets for project development can enhance the bankability and climate performance of the project.
- Concerted efforts should be made to build the capacity and knowledge of staff in to enable them fully to operationalise the toolkit at all stages of the PPP lifecycle.
- Climate proofing infrastructure will lead to more resilience and adaptability to anticipated scenarios of climate change, as well as the risks associated with geological hazards, climate variability and extremes.
- If financed and built with climate risk in mind, infrastructure can be robust and provide its intended objectives over the coming decades of climate change.
- Flexibility should be built into PPP processes starting with the project selection, preparation, and procurement, through to implementation and contract management of these infrastructure projects.

Guidance Note on the Excel Based Tool

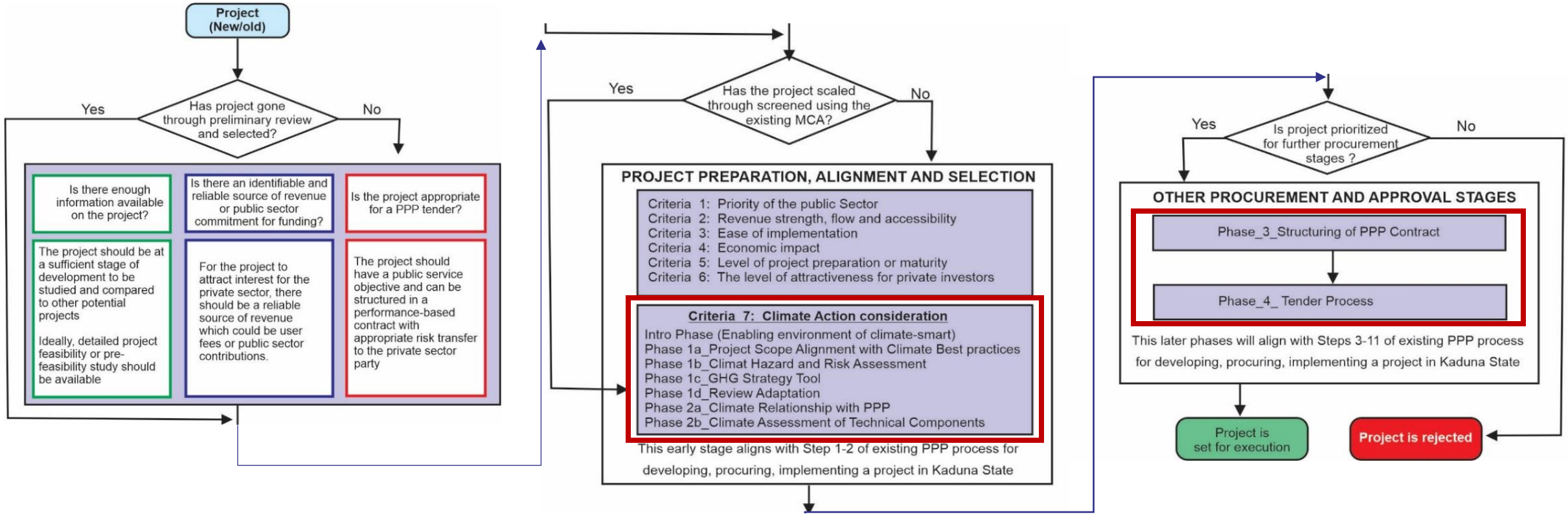
- In addition to the excel-based tool developed based on the toolkit's modules, a guidance note was provided to be utilized in conjunction **to support user-friendly implementation of the tool**

- The guidance note also explores the specific need for the tool in Kaduna State:
  - *"The need for accelerated infrastructure development in Kaduna State arises from **population growth that increases pressure on existing infrastructure**. According to the 2006 census, Kaduna State had a population of 6.1 million people, next only to Kano and Lagos States. The projection is that at around 3.18% growth, this population would reach 8.1 million in 2016, rising to 8.4 million by 2018, with further rise to 12.96 million by 2050. The high urbanization and urban agglomeration in Kaduna and Zaria which accounts for over 21% of the population, further reiterates the need for modern urban infrastructure development to curtail the expected pressure. The current level of infrastructure in the state falls far short of being sufficient to support the current level of population, let alone cater for the growing population. **Therefore, there is a critical need for increased investment in the development of climate resilient infrastructure projects in the state, and PPPs provide a key entry point for this**."*

The adapted toolkit's design



Integration of the CTIP3 into Kaduna State's PPP Multi-Criteria Analysis (MCA) Model

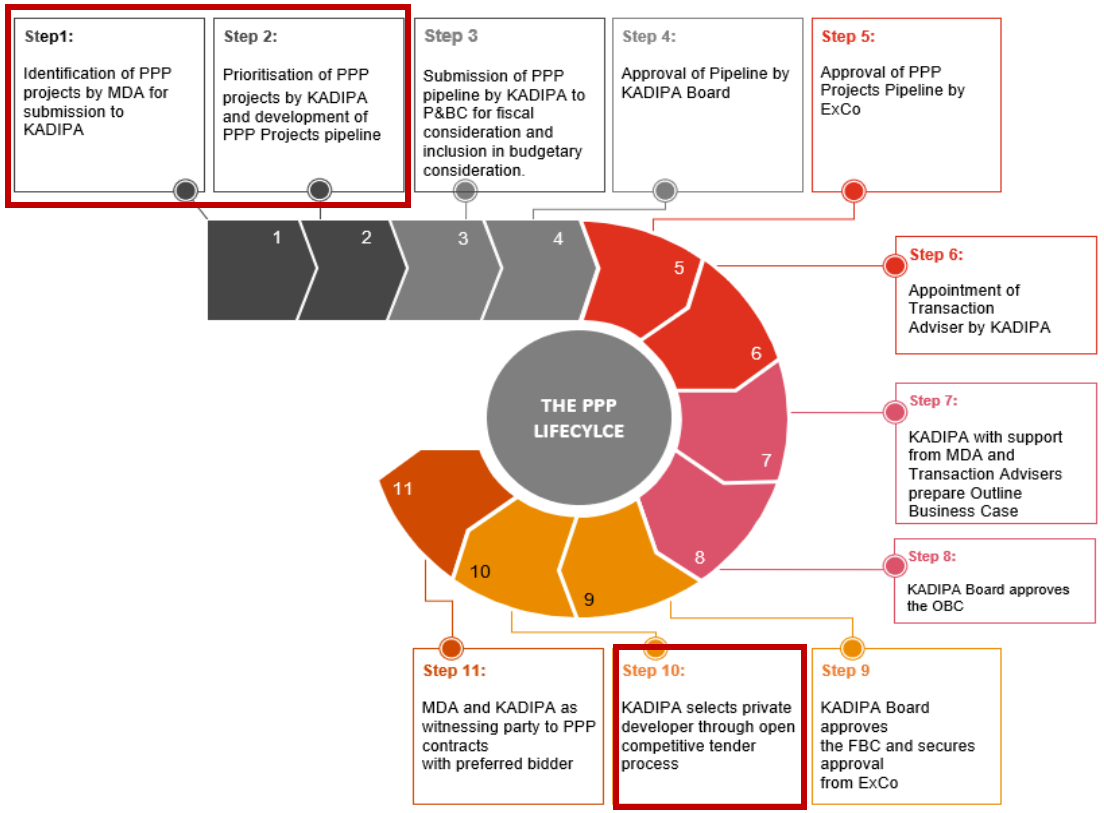


15 projects previously identified as priority through the MCA model reviewed through the lens of the CTIP3

Projects	Scores from climate lens	Cumulative rating	New Rating	Old (MCA) Rating
Operations and Maintenance of the CADP Grains Aggregation Centres	5.51	73.01	**1st**	**2nd**
6MW Embedded Solar Power Plant for Malali Water Plant	4.79	71.39	**2nd**	**3rd**
Development of Vehicle Testing Centres	3.13	70.63	**3rd**	**1st**
Implementation of Psychiatric and Drug Testing Centres	3.49	67.39	4th	4th
Phase 3 of Provision of Solar Power to Primary Healthcare Centers (PHCs)	4.88	62.48	5th	5th
Rail Mass Transit (Phase 1 - Red line)	2.69	57.59	6th	6th
Implementation of Towing and Pound Services across the State	2.61	51.21	7th	7th
Rehabilitation of Five Irrigation Centres	6.07	50.17	**8th**	**11th**
Bus Mass Transit	2.69	49.49	9th	8th
Water Sector Revenue Collection PSP Program	4.24	49.24	10th	9th
7.9MW Off-Grid Solar Power Project for Public Schools	4.92	49.02	11th	10th
Registration and Tagging of Commercial Vehicles	2.61	46.71	12th	12th
Kaduna Ring Road 3	2.69	44.99	13th	13th
Renovation of Five Engineering Outstations	2.53	43.03	14th	14th
Rehabilitation of School of Home Economics	3.49	37.69	15th	15th

Conclusions of CTIP3 Implementation in Kaduna State

- Notably, the outcome revealed how the toolkit can be used to integrate climate action into current PPP pipeline projects
- This assessment and list of priority projects can be utilized by the Kaduna State Investment Promotion Agency (KADIPA) to ***pioneer the construction of climate-resilient infrastructure*** in the State.
- The assessment tools and checklists can be used to assist in the screening of projects for climate-related risks and uncertainties and ***ensures mainstreaming of climate action during the earliest phases of PPP prioritization and planning***



Wrap up

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