CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

Technical Assistance Response Plan – Terms of Reference

Country	**People's Republic of Bangladesh**
Request ID#	
Title	Development of Framework for Real-Time Transport Information Systems for Public Transport in Greater Dhaka area.
NDE	Dr Abdul Hamid Director General Department of Environment, Ministry of Environment, Forest and Climate Change Email: dg@doe.gov.bd
Proponent	Colonel Zahid Hossain Director (Technical) Bangladesh Road Transport Company (BRTC) Email: zahidbrtc@gmail.com
Prepared By	Prof. Sungwon Lee Korea Research Foundation Professor, Korea National University of Transportation (KNUT) Email: swl629@ut.ac.kr

Summary of the CTCN technical assistance

Greater Dhaka is a metropolitan area of the capital city of Bangladesh and home to 17 million people in an area of 1,528 km^2. The city is experiencing rapid urbanization (38% living in urban area) since its independence in 1971. The population is expected to rise to 20 million by 2020 and with rising population and economic growth, the GHG emission in Bangladesh from the transport sector has been increasing since 2013 (In 2005, the transport sector contributed to 15% of CO2 emissions from energy-related sectors). Bangladesh is committed to reducing GHG emissions in the power, industry, and transport sectors by 5% by 2030, or by 15% if sufficient and appropriate support is received from developed countries. The transport sector would contribute a 9% reduction in GHG emissions by 2030 or 24% if support is received from developed countries (Ministry of Environment, 2018). The country has updated its NDCs in August 2021 with plans to improve fuel efficiency (+5%) and road traffic congestion issues.

As such Bangladesh is requesting the following TA:

1. Establishing a baseline by collecting the information and data required
2. Design of the overall system architecture
    - Defining the technical and functional specifications of an integrated information system
    - Deciding on the information offered and format
    - Selecting locations and media where information should be offered
3. Development of the information services architecture in detail
    - Definition of the data to be acquired, managed, communicated, and displayed
    - Creating an operational scheme
    - Designing the software required
    - Defining the design and characteristics of how the data will be provided - interface for administrators and end-users
4. Costing but not limited to

Summary of the CTCN technical assistance

- **Equipment** (hard- and software) and design of websites, internet- and mobile-phone trip planning tools
- Equipment for installation at stops, in stations and vehicles, which inform the users (e.g. signs, touch-screens)
- **On-board equipment for buses and trams** (e.g. GPS) and a central real-time prognosis server to manage and provide real-time information (hard- and software)
- **Installation costs** (e.g. installing real time signs, touch-screens, electrical supply to bus stops)
- **Operation and management costs** (hardware maintenance, software license and operation, marketing and communication, costs for operations staff)

5. Webinar on Bus Reform (lessons from Korea) *(Date TBC but tentatively set for April 14, 2023)*
6. Concept Note for the next steps of this Project.
   To be based on Green Climate Fund (GCF) Concept Note template.

In this document, we will refer to two different and related technologies, the **Bus Management Systems (BMS) and Bus Information Systems (BIS)**. BMS are systems and technologies that are generally used by the bus operator. They include tracking devices, management systems, and software. BMS can be used by bus operators or government agencies to significantly improve efficiency in operation and mange headways, drivers, monitor for accidents and incidents and have many other benefits. BIS refers to the systems, technologies, and devices which communicate the location of buses to customers. Examples of BIS include digital roadside signage which may state the expected arrival time of various buses which use the stop. Additionally, BIS may refer to systems, software and technologies that communicate with customers virtually include through mobile phone applications or websites. Together, BIS and BMS make up the real-time tracking system for public transport buses.

While the technical team will work closely with the state-run bus company, the Bangladesh Road Transport Corporation (BRTC), the ultimate goal will be to design a system that will cover the whole bus network in Dhaka, including private operators.

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Agreement:

National Designated Entity to the UNFCCC Technology Mechanism, Bangladesh
Name: Dr. Abdul Hamid
Title: Director General
Department of Environment, Ministry of Environment, Forest and Climate Change

Date: 10 JULY, 2023

Signature:

Dr. Abdul Hamid
Director General
Department of Environment
Ministry of Environment, Forest and Climate Change

UNFCCC Climate Technology Centre and Network (CTCN) Signed for
Name: Dr. Rose Mwebeza
Title: Director of the CTCN

Date: 5 April 2023

Signature:

UN environment programme CTCN

Proponent

Name: Colonel Md. Zahid Hossain
Title: Director (Technical)
Bangladesh Road Transport Corporation (BRTC)

Date: 28.03.2023

Signature:

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1. Background and context

Greater Dhaka is a metropolitan area of the capital city of Bangladesh and home to 17 million people in an area of 1,528 km^2. The city is experiencing rapid urbanization (38% living in urban area) since its independence in 1971. The population of Dhaka has and will continue to rise significantly over the next years and decades. In addition, economic growth is on the rise in Bangladesh, with the annual increase in GDP as high as 7.5-8.0% in 2019. As a result of recent economic development, Bangladesh was promoted to a Developing Nation from a Least Developed Country in 2021, set to become official in 2026.

With rising population and economic growth, the GHG emission in Bangladesh from the transport sector has been increasing since 2013 (In 2005, the transport sector contributed to 15% of CO2 emissions from energy-related sectors). Bangladesh is committed to reducing GHG emissions in the power, industry, and transport sectors by 5% by 2030, or by 15% if sufficient and appropriate support is received from developed countries. The transport sector would contribute a 9% reduction in GHG emissions by 2030 or 24% if support is received from developed countries (Ministry of Environment, 2018). The country has updated its NDCs in August 2021 with plans to improve fuel efficiency (+5%) and road traffic congestion issues.

Around 70% of the CO2 emissions from the transport sector comes from roads. The major modes of transport in Dhaka City are motorcycles (41%), rickshaws, and public buses (BRTA, 2018). For people living in the city, buses and minibuses are the cheapest options, however, the level of satisfaction from users has been low due to long waiting and loading times, and long-distances from their point of residence to bus stops. The existing urban transport system poses many challenges to daily commuters due to operational inefficiency, increased costs, loss of time, air pollution, and psychological strain.

2. Problem statement

According to the records of the Bangladesh Road Transport Authority, as of 2010, 61 bus routes operated and either originated or terminated in the corridor around Greater Dhaka. The authorized fleet size is 3,356 buses and minibuses, out of which only 2,598 permits have been issued by the authority for 948 buses and 1,650 minibuses. The government realizes its need to incentivize the use of public transport system and control the permitted user of automobiles to materialize its mitigation goals and cater to the mobility needs of citizens. In particular, the service quality for public buses should be significantly improved by adopting information and digital technology in its operation and management. Encouraging use of the public transport system, over the use of a private transport, will require making the system more accessible, easier to use, and more convenient for users.

Against this backdrop, the government of Bangladesh has requested the CTCN to develop a framework for real-time transport information systems for public transport in the Greater Dhaka area. Implementation of GPS data monitoring for public transport can significantly increase service quality for its customers and give additional value to service providers. The project expects to optimize the use of public transport by providing real-time information on the vehicle location, waiting time, and route information and ultimately contributing to a reduction in vehicle emissions.

3. Logical Framework for the CTCN Technical Assistance:

(Guidance: Please note that multiple activities lead to one Output, and multiple Outputs lead to one Outcome. There can be several Outputs, but only one Outcome description capturing the CTCN technical assistance. Deliverables are the products or services to be delivered to the NDE/Proponent/CTCN based on the Activities and the Outputs.)

***Objective**: Please provide a one sentence description of the Objective of the technical assistance. The objective of the CTCN technical assistance reflects what the assistance aims to produce and impact.* The objective of this technical assistance is, in consultation with the Dhaka and Bangladeshi colleagues, develop all the necessary technical and functional system details and other design considerations including potential locations to implement a real-time monitoring system for the Dhaka public transport buses (Bus Management System, BMS) including potentially digital signs at stops displaying arriving times and other information (Bus Information System, BIS).
Outcome: *(Guidance: The Outcome articulates changes in the institutional and behavioural capacities for climate technology development or deployment. Activities and Outputs contribute to the Outcome but the Outcome is not within the direct control of the CTCN activities). (maximum 400 characters including spaces)* Upon completion, this technical assistance will allow Bangladesh to use the report and its details to develop documents for the acquisition (i.e. Tender documents). In addition, this Technical Assistance may If implemented, the real-time monitoring system for buses will allow Bangladesh to increase the utility of its bus system, potentially increase its patronage, and potentially reduce its reliance on private fossil-fuel based transportation.

	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Output 1: Development of implementation planning and communication documents												
Activity 1: *All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.* i) A detailed work plan of all activities, deliveries, outputs, deadlines and responsible persons/organizations and detailed budget to implement the Response Plan. The detailed work plan and budget must be based directly on this Response Plan; ii) Based on the work plan, a monitoring and evaluation plan with specific, measurable, achievable, relevant, and time-bound indicators used to monitor and evaluate the timeliness and appropriateness of the implementation. The monitoring and evaluation plan should apply selected indicators from the Closure and Data Collection report template and enable the lead implementer to complete the CTCN Closure and Data collection report at the end of the assignment (please refer to item iv below and section 14 in the Response Plan);											

	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
iii) A two-page CTCN Impact Description formulated in the beginning of the technical assistance and updated/revised once the TA is fully delivered (a template will be provided); iv) A Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).												
Deliverable 1: i) Detailed work plan ii) Monitoring and evaluation plan iii) CTCN Impact Description iv) Closure and Data Collection report												
Output 2: Baseline/Existing Conditions												
Activity 2.1: Summarize existing reports Summarize the existing reports related to the development and planning of the public transport system in Dhaka, including at minimum, reports related to the following: - United States (USAID) – Research priorities for low carbon transport in Bangladesh (2020) - Asia Development Bank (ADB) – Greater Dhaka Sustainable Urban Transport Project (BRT) - World Bank - Case studies for transport - Dhaka MRT Line-6 - Dhaka BRT												
Activity 2.2: Undertake data collection - Perform data collection, depending on data availability, for example, ridership data by stop. - Collect data related to ridership if not available - Undertake survey related to information signs needs and requirements, including SmartPhone availability - Budget includes possibility to hire a local consultant to undertake data collection on site in Dhaka												
Activity 2.3: Data Analysis - Analyze the data collected, summarize it and present in an understandable fashion												
Activity 2.4: Write Baseline/Existing Conditions Report												
Deliverable 2: Baseline/Existing Conditions Report												
Output 3: Develop System BIS/BMS Architecture												
Activity 3.1: Technical Specifications: BIS Develop technical specifications relating to the Bus Information Systems.												
Activity 3.2: Technical Specifications: BMS Develop technical specifications relating to the Bus Management System.												
Activity 3.3: Technical Specifications: Communications and ICT Architecture												

	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Develop technical specifications relating to Communications and ICT Architecture requirements and upgrades that may be required to existing infrastructure.												
Activity 3.4: Data and Information Review (BIS) Review the data and information to be collected by the BMS												
Activity 3.5: UX Design, Look and Feel Concept (Human Factors) In consultation with best practices (including in Korea), and with Bangladeshi counterparts, develop a general UX design of the BIS and other customer-facing information systems.												
Activity 3.6: GTFS-Realtime (Google Maps) Review Review and comment on the possibility of implementing the Google GTFS-realtime feed specification and the Google Transit Partner program.												
Activity 3.7: Geographic Review and Implementation Scenarios Using geographic data, and ridership information, develop implementation scenarios for the BIS systems. For example, roadside digital signs, web-access, mobile phone applications, etc.												
Activity 3.8: Administrative and Governance Review Review the existing legal systems and laws relating to ICT, ITS, and transportation. Develop a policy gaps exercise to determine where there are gaps in existing regulations and provide recommendations to improve regulations relating to												
Deliverable 3: System Architecture Plan for BIS Physical Signs and BMS												
Output 4: Costing Estimations												
Activity 4.1: Costing of the BIS and BMS equipment Estimate costs of the BIS and BMS equipment.												
Activity 4.2: Costing installation/construction Estimate costs relating to installation and construction.												
Activity 4.3: Costing of the software development & database maintenance Estimate costs relating to software development or database maintenance.												
Activity 4.4: Costing of the system operation, data management, and software maintenance. Estimate costs relating to system operation data management, and software maintenance.												
Deliverable 4: System Costing Report												
Output 5: Bus Reform (Lessons from Korea)												
Activity 5.1: Bus reform webinar preparation and actual webinar												
Output 6: Develop Concept Note for Next Steps of Project												
Activity 6.1: Prepare concept note for next steps of this project, based on the Green Climate Fund (GCF) fund												

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Resources required and itemized budget:

Please provide an indicative overview of the resources required and itemized budget required to implement the CTCN technical assistance, including for M&E-related activities, using the table below. Important to note that minimum 1% of the budget should explicitly target gender specific activities related to the technical assistance (please see section 10 for further information on gender). Once the Response Plan is completed, a Response Implementation partner(s) will be selected by the Climate Technology Centre (CTC). A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and selected Implementer.

Activities and Outputs	Input: Human Resources		Input: Travel		Inputs: Meetings/events	Input: Equipment/Material	Estimated cost	
					(Meeting title, number of participants, number of days)	*(Item, purpose, buy/rent, quantity)*	*Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*	
	Time	Cost	Description	Cost			**Minimum**	**Maximum**
1: Develop of implementation planning and communication documents	**5**	***$4,400***		***$10,000***			***$14,400***	
Activity 1.1: Detailed work plan of all activities, deliveries, outputs, deadlines	*5*	*$4,400*	*Inception workshop international, 3 days, 3 people*	*$10,000*			*$14,400*	
2: Establish a Baseline (Baseline/Existing Conditions)	**25**	***$22,000***		***$0***			***$22,000***	
Activity 2.1: Summarize existing reports	*2*	*$2,000*					*$2,000*	
Activity 2.2: Undertake data collection	*7*	*$6,500*					*$6,500*	

Activities and Outputs	Input: Human Resources		Input: Travel		Inputs: Meetings/events	Input: Equipment/Material	Estimated cost	
					(Meeting title, number of participants, number of days)	*(Item, purpose, buy/rent, quantity)*	*Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*	
	Time	Cost	Description	Cost			**Minimum**	**Maximum**
Activity 2.3: Data Analysis	*4*	*$3,200*					*$3,200*	
Activity 2.4: Write Baseline/Existing Conditions Report	*6*	*$5,000*					*$5,000*	
Deliverable 2: Baseline/Existing Conditions Report	*6*	*$5,300*					*$5,300*	
3: Design of the Bus Management System (BMS)/Bus Information System (BIS) Architecture	**155**	***$136,400***		***$0***			***$136,400***	
Activity 3.1: Technical Specifications: BIS	*28*	*$25,000*					*$25,000*	
Activity 3.2: Technical Specifications: BMS	*28*	*$25,000*					*$25,000*	
Activity 3.3: Technical Specifications: Communications and ICT Architecture	*28*	*$25,000*					*$25,000*	
Activity 3.4: Data and Information Review (BIS)	*17*	*$15,000*					*$15,000*	
Activity 3.5: UX Design, Look and Feel Concept (Human Factors)	*17*	*$15,000*					*$15,000*	

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Activities and Outputs	Input: Human Resources		Input: Travel		Inputs: Meetings/events	Input: Equipment/Material	Estimated cost	
					(Meeting title, number of participants, number of days)	*(Item, purpose, buy/rent, quantity)*	*Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*	
	Time	Cost	Description	Cost			**Minimum**	**Maximum**
Activity 3.6: Software and GTFS-Realtime Review	*18*	*$16,000*					*$16,000*	
Activity 3.7: Geographic Review	*11*	*$10,000*					*$10,000*	
Activity 3.8: Administrative and Governance Review	*2*	*$1,400*					*$1,400*	
Deliverable 3: Draft and Final System Architecture Report	*5*	*$4,000*					*$4,000*	
4: Costing (Estimation)	**95**	***$82,800***		***$10,000***			***$95,000***	
Activity 4.1: Costing of the BIS and BMS equipment	*20*	*$18,000*		*$10,000*			*$28,000*	
Activity 4.2: Costing installation/construction	*26*	*$22,500*					*$22,500*	
Activity 4.3: Costing of the software development & database maintenance	*14*	*$12,000*					*$12,000*	
Activity 4.4: Costing of the operation, data management, and software	*14*	*$10,300*					*$12,500*	
Deliverables 4: Costing Report	*23*	*$20,000*					*$20,000*	

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Activities and Outputs	Input: Human Resources		Input: Travel		Inputs: Meetings/events	Input: Equipment/Material	Estimated cost	
	(Meeting title, number of participants, number of days)					*(Item, purpose, buy/rent, quantity)*	*Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan*	
	Time	Cost	Description	Cost			**Minimum**	**Maximum**
5: Bus Reform	**5**	***$4,400***		***$0***			***$2,200***	
Activity 5.1: Preparation for Webinar on Bus Reform	*2.5*	*$2,200*					*$2,200*	
Activity 5.2: Webinar on Bus Reform: April 14 (TCB)	*2.5*	*$2,200*					*$2,200*	
6: Concept Note for the next steps of this Project	**6**	***$2,200***		***$0***			***$2,200***	
Activity 6.1: Prepare Concept Note, based on Green Climate Fund (GCF) target	*2.5*	*$2,200*					*$2,200*	
							$270,000	

4. Profile and experience of experts

Based on the required Human Resources identified in section 4 (Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

Experts required	Brief description of required profile
Please use the same titles for all experts as applied in section 4.	*Please provide a short description of expertise and experience needed (education, sectors of expertise, years of experience, country experience, language requirements, etc.).*
Principal investigator (Prof. Sungwon Lee)	• Doctor's degree in Transport Economics/Engineering or equivalent • Ability in English The project director should have significant experience leading teams on R&D projects with multi-disciplinary teams. The project director should have experience in the fields of transportation, transportation planning and the use of technology and transportation (convergence). Project director should have experience working in/with developing nations. Project director should have more than 20 years working in the field.
Transport Planning Specialist & Project Director (Prof. Hyun Kim)	• Doctor's degree in Transport Engineering or equivalent • Ability in English The transport economist should have experience working on projects related to transport planning, including socioeconomic cost-benefit analysis, planning for transport in developing nations, and experience in evaluation. The transport economist should have more than 15 years working in the field.
ICT & BIMS Specialist (Prof. Cheol Moon)	• Doctor's degree in Information and Communication Engineering or equivalent • Ability in English • In charge of ITS technology-related research (BIMS or other ITS technologies) The transportation ICT specialist should have experience with research and development projects utilizing the latest in ICT and transportation technology from Korea and abroad. Transport ICT specialist should have more than 10 years of experience in the field.
ICT Specialist (Seung-Hak Kim)	• Master's degree in Information and Communication Engineering or equivalent • In charge of BIMS The BIMS/ICT researcher should have 3 – 5 years working in the field and have experience working with the latest in transportation/ICT technologies.

Experts required	Brief description of required profile
Transport Planning Specialist & Project Manager (Devon Robert Farmer)	• Master's degree in Urban Transport Planning or equivalent • Excellent ability in English • In charge of Public Transport Network Assessment The Transport Planning Expert should have experience working on international projects relating to transport planning, transport modelling, and network planning. The transport planning specialist should have experience working with clients directly. The transport planning specialist should have approximately
Gender Expert (In Sook Kim)	• Doctoral degree • Ability in English • In charge of Gender Balance assessment The Gender Specialist should have experience working in developing nations. The Gender Specialist should have more than 10 years' experience in a social study context. Experience with transport is an asset but not essential.
Assistant Researcher	• Master's degree in Transport Engineering or equivalent • Public Transport Network Assessment The researcher should have in depth knowledge and experience with transportation-related R&D projects. The researcher should have 3 -5 years of experience.
Assistant Researcher	• Master's degree in Transport Engineering or equivalent • Public Transport Network Assessment The researcher should have in depth knowledge and experience with transportation-related R&D projects. The researcher should have 1-2 years of experience.

5. Intended contribution to impact over time

Bangladesh has committed to reduce greenhouse gas emissions, especially from transportation which accounts for a major portion of the emissions within the country. This TA will develop an architecture and implementation plan to introduce real-time bus information systems (BIMS) to the public transport network in Dhaka. As such, the plan will allow the entire public transport network to be greatly improved in terms of its accessibility and convenience, and therefore make it more competitive against other competing, generally fossil-fuel-based private or pseudo-private, modes such as CNGs, private cars, and motorcycles.

Over time, this could reduce the amount of GHG emissions from transport within the Dhaka area.

6. Relevance to NDCs and other national priorities

Bangladesh has updated its Nationally Intended Contributions (NDCs) as of August 2021. These include pans to improve fuel efficiency of transport by 5% and address road congestion issues. In addition, Bangladesh' NDC document projects its total GHG emissions to increase from 169.05 MT CO2e in 2012 to 409.4 MT CO2e in 2030, of which transport would account for around 9%, under the Business as Usual (BAU) scenario. With mitigation policies and projects in place, Bangladesh assumes projects a total reduction of up to 21.85 MT CO2e by 2030 compared to the BAU scenario.

This TA will contribute to the GHG reduction targets set by Bangladesh by targeting an increase in usage of the public transport network, which should lead to a "mode shift" from primarily fossil-fuel-based private or pseudo-private transportation to more efficient buses, as the public transport becomes more convenient and usable for potential users. At the same time, this TA will, because of the same reasons, help to tackle the extreme traffic conditions that consistently plague Dhaka.

7. Linkages to relevant parallel on-going activities:

In Dhaka, other planning and construction activities related to the transport network are ongoing, these include the following studies and/or construction projects:

- United States (USAID) – Research priorities for low carbon transport in Bangladesh (2020) Asia Development Bank (ADB) – Greater Dhaka Sustainable Urban Transport Project (BRT)
- World Bank - Case studies for transport
- Dhaka MRT Line-6 (under construction)
- DTCA – Bus Route Design Commission
- CNG Buses from Korea

These other projects will need to be considered for this project. During the first phase of this TA, an existing conditions study and report will be completed which will include summaries of other ongoing work and plans. Especially, the ADB-funded Greater Dhaka Sustainable Urban Transport Project (BRT), which will establish Dhaka's first BRT system in the city, to be functional in 2023.

In particular, the BRT corridor should have access to BIMS services and real-time information displayed to passengers. Additionally, the MRT under construction may have its own passenger information system, which would be specifically designed. However, design style/UX design, and information provided may be harmonized across rail and bus systems in the future, and therefore some coordination with the MRT team may be required. Coordination between the proponents of this CTCN TA and the ADB project (BRT) may also be required, for the same reasons listed above.

8. Anticipated follow up activities after this technical assistance is completed:

This TA is a planning study, to develop an architecture, software, and placement plans for a bus management systems/bus information system in Dhaka. As such, this study allows for follow-on work to be undertaken using the architecture plan developed. Since this TA will develop costing estimates, and potentially funding arrangements, Bangladesh departments will be well-prepared to develop budgets, estimates, and tender documents to get potential private sector bidders to undertake the actual installation and development of the BIS/BMS.

Additionally, Korean companies are well-poised to provide and install the equipment necessary for a modern and effective BIS/BMS system in Dhaka. Follow-on work involving our network of Korean companies could be undertaken.

9. Gender and co-benefits:

Imbedded in design of the activities:	Transport is one of the most important elements of a country's infrastructure, and they are key to reducing poverty and promoting equality. In low-income countries, gender differences in mobility needs are very pronounced, requiring gender sensitive policy responses. In this public bus system, both female/vulnerable group operators/users are more adversely affected in less accessible areas. Women and children faced difficulty to travel to school, work, and hospitals. In Dhaka, there has long been debate around Women's safety on public transport, and some women do report harassment and feeling unsafe o busy buses. In addition, women have different travel characteristics and needs. Hence, geographic targeting, and a more nuanced understanding of women's needs (including safety issues) is needed to increase the access of those users in designing and sharing this real-time information for wider adoption.
Gender and co-benefits intended as result of the activities:	This TA will contribute to improving the service of public transport at large in Dhaka. Women suffer from significantly lower income then men with poor access to labour market, will thus in particular benefit from more efficient mobility services in terms of increased access to employment, markets, education, and health services, but also to the caretaking and household responsibilities that most women hold.

	With careful planning and attention to women and other vulnerable groups' specific issues, this TA can help Dhaka better understand gender disparities in the public transport network and devise a plan for avoiding those issues when implementing a bus information system as much as possible. For example, BIS signs and real-time tracking could be prioritized on the special women-only buses, which do exist Dhaka.

10. Main in-country stakeholders in implementation of the technical assistance activities:

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance.

In country stakeholder	**Role in implementation of the technical assistance**
National Designated Entity (NDE) – Department of Environment, Ministry of Environment, Forest, and Climate Change	Project approval
Bangladesh Road Transport Corporation (BRTC)	**Provide overall coordination, project management (project ownership)**
Dhaka Transportation Coordination Authority (DTCA)	Major stakeholder and advisor
Dhaka City Corporation (North)	Stakeholder
Dhaka City Corporation (South)	Stakeholder
Bangladesh Road Transport Authority (BRTA)	Stakeholder and further assistance
World Bank (Bangladesh)	Assistance

11. SDG Contributions:

*Instructions: Please complete the grey section below for **a maximum of three SDGs** that will be advanced through this TA. A complete list of SDGs and their targets is available here: https://sustainabledevelopment.un.org/partnership/register/.*

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner	

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
	fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	This TA will identify infrastructure needs in Dhaka, and provide opportunity for the private sector to implement the solutions, and innovate while doing so.
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	The long-term impacts of this TA will bring the population in Dhaka both economic and health benefits.
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	
	13.2 - Integrate climate change measures into national policies, strategies and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	This TA will assist Bangladesh in reducing its dependence of fossil-fuel-based transportation while promoting more efficient usage of their roadways.
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

12. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

Please tick off the relevant boxes below	*Primary*	*Secondary*
☐ 1. Decision-making tools and/or information provision	☐	☐
☐ 2. Sectoral roadmaps and strategies	☐	☐
☐ 3. Recommendations for law, policy and regulations	☐	☐
☐ 4. Financing facilitation	☐	☑
☐ 5. Private sector engagement and market creation	☐	☑
☐ 6. Research and development of technologies	☑	☐
☐ 7. Feasibility of technology options	☑	☐
☐ 8. Piloting and deployment of technologies in local conditions	☐	☐

☐ 9. Technology identification and prioritization	☑	☐

Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.

13. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.

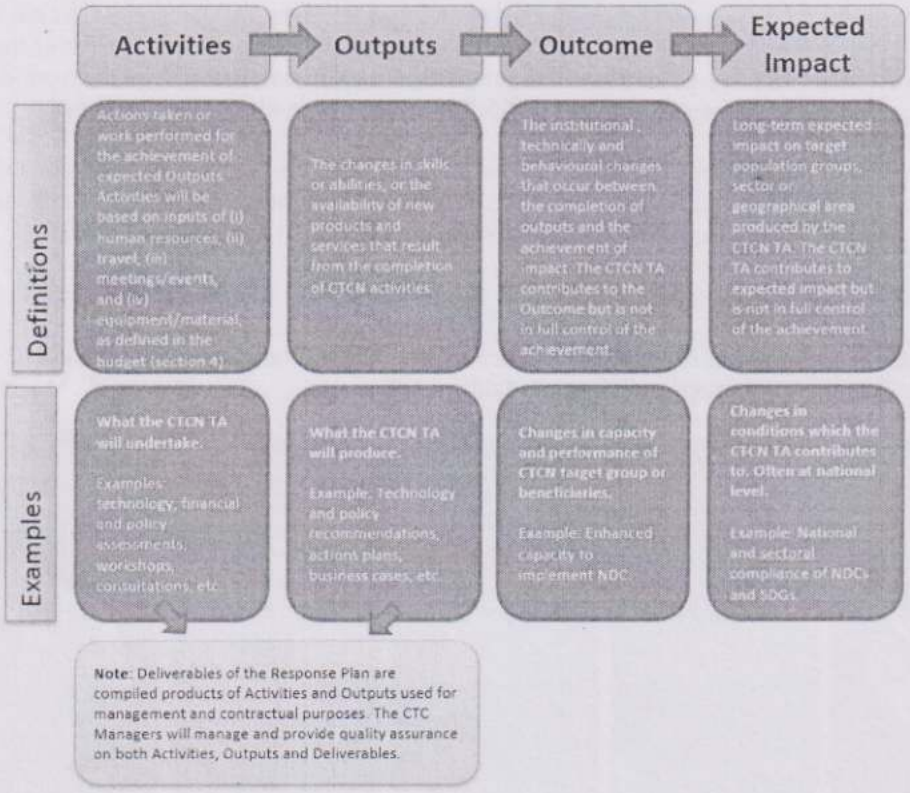
Annex 1: Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)

1. Objective of the Response Plan

The Response Plan is developed by CTCN specialists in response to a country request for technical assistance. It constitutes the Terms of Reference of the CTCN technical assistance that will be provided to the country and it provides the formulation of and subsequent basis for the monitoring and evaluation of the Response Plan implementation, as well as its expected outcomes and anticipated impacts.

2. Results chain and Logical Framework Approach to be defined in the CTCN Response Plan

The result chain is the causal sequence that stipulates the necessary flow of actions and processes to achieve desired objectives and results – beginning with inputs, moving through activities and outputs, and culminating in individual outcomes. The outcome will contribute to the desired impact in the society. The Logical Framework Approach is an analytical process used to support objectives-oriented project planning and management. It provides a set of pre-defined concepts which are used as part of an iterative process to aid structured and systematic analysis and management of the CTCN technical assistance.



3. Role of the Response Planning Design Team

The Response Planning Design Team is selected by the Climate Technology Centre (CTC). The composition of the team depends on each particular request but may include the National Designated Entity (NDE), the request Proponent, Climate Technology Manager of the CTCN, experts from the CTCN Consortium, UNIDO and UNEP experts from regional offices and other experts as needed.

The role of CTCN Consortium experts is to lead the design of the Response Plan. The NDE will provide overall guidance on national context and priorities whereas the request Proponent will provide more detailed information on the sector, barriers and requested assistance. The Climate Technology Manager of the CTCN will provide quality assurance of timeliness and appropriateness of the Response Plan.

The Response Planning Design Team will draft all sections of the Response Plan template building on the information contained in the CTCN Request, based on expertise on the given topic and potentially further data collection, as required. This will be done by the CTCN Consortium Experts in consultation with the NDE, request Proponent and relevant stakeholders. The Response Plan has to be agreed to and approved by the NDE and the CTCN Director. This Response Plan will serve as the basis to identify, select and engage an expert institution from the Climate Technology Network or Consortium to lead the implementation of the CTCN Response Plan in the requesting country.

To the extent possible, staff from UNEP and UNIDO Regional, Sub-Regional and/or National Offices should be involve in all stages of formulation of the Response Plan to maximize synergies and avoid overlap with ongoing initiatives, as well as ensure relevance to regional and national context.

4. Process for designing the Response Plan

The Response Planning process should be completed over a period of up to 60 working days (12 weeks). Indicative steps and related timelines are laid out below:

5. Design Considerations

In order to maximize the impact of the technical assistance provided by the CTCN and provide an effective M&E process, the Response Plan should integrate as much as possible the considerations below:

Climate Technology focus: The Response Plan should have a clear focus on climate technologies, and identify activities that enable the identification, development, deployment or diffusion of one or several specific technologies (including equipment, techniques, knowledge and skills).

Barrier removal / Problem solving: The activities should contribute to address the specific problem statement identified in the Request. The barriers identified should be those hampering the identification, development, deployment or diffusion of one or several climate technologies or climate actions. Therefore, it may be necessary to limit the CTCN Response Plan to a set of activities for technical assistance commonly agreed with the NDE (and Proponent when needed) compared to the original request submitted. The CTCN will liaise with NDEs and Proponent in case the scope of the technical assistance deviates from the original request.

Use of the CTCN assistance by stakeholders: The Response Plan should identify clearly how the products of the CTCN assistance will be used in the short term once support is delivered, by who and when, to ensure it will lead to specific impacts in the country. The activities should engage the stakeholders that will use the concrete results of the assistance to deploy the technologies, including from the private sector, the public sector, research institutions, etc.

Within the scope of CTCN resources: The cost of the technical assistance provided by the CTCN cannot exceed USD 250,000 per Response Plan. Therefore, it may be necessary to prioritize activities and limit the CTCN Response Plan to a set of priority activities commonly agreed with the Proponent and the NDE to remain under this value. Under section 4 of the Response Plan template, an indicative activity based budget should be presented. The proposed budget is indicative and should present an estimated costing range per activity, output as well as a total costing range for the delivery of the Response Plan. Once the Response Plan is finalised and published for tendering, interested parties will provide competitive offer against the indicative budget.

CTCN activities and outputs should be linkable to monitoring and evaluation indicators: All proposed activities and outputs must be linkable to monitoring and evaluation indicators that are specific, measurable, achievable, relevant, and time-bound. The monitoring and evaluation process and corresponding indicators will be developed by the Lead Implementer as part of the work plan and will allow the CTCN technology Manager to monitor the timeliness and appropriateness of the implementation.

Synergies with existing efforts: The Response Plan should focus on activities that are not already being fully supported or that are in the process of being fully supported by another national, regional or international organization. Synergies and complementarity also require that the CTCN assistance is not duplicating past activities. It is possible in the Response Plan to indicate co-financing from the government, the Proponent or another stakeholder, that will maximize the effectiveness of the CTCN assistance.

Gender mainstreaming: The CTCN mission is to build or strengthen developing countries' capacities to identify technology needs, to facilitate the preparation and implementation of technology projects and strategies taking into account gender considerations. The Response Plan must therefore describe how gender considerations will be included and monitored within the proposed activities, and any gender co-benefits that will be gained as a result of implementing the CTCN technical assistance.