

<b>Country</b>	<b>Lao People’s Democratic Republic</b>
<b>Request ID#</b>	
<b>Title</b>	Technical Capacity Enhancement for Planning Urban Public Transport System in Vientiane, Lao PDR
<b>NDE</b>	Mr. Syamphone Sengchandala Director General, Department of Climate Change, Ministry of Natural Resources and Environment Lao PDR Dongnasoktai Village, Sikhottabong District, Vientiane Capital, Lao PDR Email: <a href="mailto:Syamphone_s@gmail.com">Syamphone_s@gmail.com</a>
<b>Request Applicant</b>	Dr. Bounta Onnavong Director General, Department of Transport, Ministry of Public Works and Transport of the Lao PDR Lane Xang Avenue, P.O. Bo Email: <a href="mailto:Bounta_ov@yahoo.com">Bounta_ov@yahoo.com</a>

#### **Summary of the CTCN technical assistance**

Vientiane is the capital city of the Lao PDR, a growing city of approximately 0.95 million residents (as of 2020) which is projected to grow to over 1.4 million by 2030. A popular tourism destination, tourism to the Lao PDR has been increasing significantly in recent years (with nearly 5 million overseas arrivals in 2015); the recently completed train line linking Vientiane to Kunming, China will likely bring in significantly more tourists from China to the Lao PDR including Vientiane.

As the population increases and tourists arrive in the capital, so does the demand for transport. Currently, fossil-fuel based private transportation options including privately owned cars, motorcycles, and publicly accessible tuk-tuks, songthaews, and taxis have been filling the gap. The existing public transport (bus-based) network is insufficient for the needs of the city and will continue to underserve the city as its population, economy, and tourist arrivals increase, post-pandemic. Therefore, an investment into a better public transport network, including with so-called smart public transport, is needed.

As such, the Lao PDR has requested the CTCN for Technical Assistance (TA) develop plans and pre-feasibility studies to improve the urban public transport network in Vientiane. The TA also requests capacity building, including the development of an administrative plan for, aspects of urban public transport in Vientiane.

**Agreement:**

**National Designated Entity to the UNFCCC  
Technology Mechanism, Lao PDR**

Name: Mr. Syamphone SENGCHANDALA,  
Title: Director General, Department of Climate  
Change, Ministry of Natural Resources and  
Environment of the Lao PDR

Date:

Signature:



**Request Applicant, Lao PDR**

Name: Dr. Bounta ONNAVONG  
Title: Director General, Department of Transport,  
Ministry of Public Works and Transport of the  
Lao PDR

Date:

Signature:



**National Designated Entity to the UNFCCC  
Technology Mechanism (providing *pro bono*  
support), Republic of Korea**

Name: Mr. Yoonji HWANG  
Title: Deputy Director, Climate Change R&D  
Team, Ministry of Science and ICT (MSIT),  
Republic of Korea

Date: November 22, 2022

Signature:



**UNFCCC Climate Technology Centre and  
Network (CTCN)**

Name: Dr. Rose Mwebeza  
Title: Director of the CTCN

Date:

Signature:

## **1. Background and context**

Vientiane, the capital of the Lao PDR, is expected to grow from 0.95 million people (according to the 2020 census) to a projected 1.4 million by 2030. Pre-pandemic, the Laotian economy experienced significant growth, and correspondingly increased demand for transport. Mobility in the city largely depends on semi-public transportation options such as bicycles, jumbo, songthaew, and taxis. The bus-based public transportation system in Vientiane is currently of low quality and investment into it has been lacking, and as result, ridership is low. Further, as the number of registered private cars continues to rise, they are causing serious traffic congestion and air pollution problems. As of 2018, Vientiane's vehicles accounted for 43% of 900,000 registered vehicles (of which 610,000 are motorcycles) in the country.

The Lao PDR was the first ASEAN member to join the Paris Agreement in 2016 and is striving to reduce GHG emissions in the transportation sector by increasing the penetration rate of two-wheeled and passenger electric vehicles by 30% by 2050 and reorganizing the public transportation system. As such, the Lao PDR has asked for assistance to develop plans and pre-feasibility studies to improve the urban public transport network in Vientiane.

Past plans for transport in Vientiane have focused on the public transportation network to cope with extreme traffic congestion, traffic accidents, and air pollution problems. Additionally, a BRT system that can transport large amounts of passengers at relatively low construction costs has been identified as a key project to improve the public transport system. Planning for the future Vientiane public transport may include the installation of ITS technologies including BIS/BMS, electronic payments, Smart bus stops as well as new governance structures, and ultimately technologies, policies, and administrative policies that contribute to the transition from personal transport to bus by providing an improved convenience for the end-user.

Other international organizations have contributed to the planning and construction projects related to the Vientiane transport system extensively, especially the Japan International Cooperation Agency (JICA), who have aided the Lao PDR for many years.

### **ADB BRT (VSUPT)**

JICA developed a Transportation Master Plan for Vientiane in 2008, which first recommended a BRT system for the city. Based on this, an initial 11.5 km BRT segment was studied, planned, and financed by the Asia Development Bank (ADB), European Investment Bank, Global Environment Facility, and OPEC. Known as the Vientiane Sustainable Urban Public Transportation (VSUPT), this BRT project is currently in pre-construction phase, and will include 11.5 km of dedicated lanes, 24 closed stations, a system operation center, electronic payment system, real-time bus operation information provision system (BIS), and of BRT vehicles that meet EURO emission standards. The BRT is estimated to be complete by 2024. However, a complementary feeder bus system has not been designed or implemented as of yet.

### **JICA**

JICA have been involved in providing aid and expertise to the Lao PDR for many years, including major studies have included the 2008 Transportation Master Plan, which is currently being updated

by JICA, as well as the recently completed "Vientiane Bus Construction Capability Improvement Project" (2016.8 - 2020.3). The latter study identified various activities that are being carried out to improve bus service by bus corporation's company management, service improvement, and public transportation system.

## **2. Problem statement**

While Vientiane has slower population growth than other Asian metropolitan cities such as Bangkok, Jakarta, and Manila and does not suffer from chronic large-scale traffic congestion in these huge cities, for a city of its size it is developing more traffic issues and there is an increasing trend of more fossil-fuel-based private car ownership. The Lao PDR has ambitious targets related to GHG emissions and will need to see large-scale reductions in GHG emissions across all sectors, including transport.

While much has been done in the way of planning the transport network in Vientiane over the last few years, much of the focus has been on the BRT system developed and financed by the ADB. This BRT project will surely benefit the people of Vientiane and will importantly help the Lao PDR reach its goals of reducing GHG emissions due to transport by targeting a switch from privately operated, fossil-fuel based, transport options to more environmentally friendly and efficient high-capacity buses.

However, a comprehensive feeder bus route plan and further expansions to this initial 11.5 km segment must be studied to further meet the goals of the Lao PDR. Lao PDR currently lacks the capacity to complete such studies including their detailed planning, feasibility studies, financial arrangements, and institutional arrangements for planning and operation of a modern public bus system.

As such, the Lao PDR has requested the CTCN for Technical Assistance (TA) to undertake a planning study to develop a detailed Plan for Vientiane Urban Public Transport System & Network, as well as an Implementation Plan for a specific intervention identified. The TA also requests capacity building and developing an Institutional Arrangement and Administration Plan for urban public transport in Vientiane.

## Technical Assistance Response Plan - Terms of Reference

### 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:

The objective of this technical assistance (TA) is to provide the Lao PDR assistance in planning their future urban public transport network and at the same time enable knowledge transfer from Korea. Outputs will include a review of plans for an urban public transport network and system, a review of Smart Public Transport, a pre-feasibility study for one specific intervention, a capacity building program and a plan for the administration and governance of the urban public transport network based on expert knowledge from Korea.

#### Outcome:

Once this technical assistance is complete, the Lao PDR will be able to utilize the documents created to better understand the future needs of Vientiane and its transport network, and thus be able to create more details plans, funding applications, and budgets for projects and policies related to the urban public transport network. Eventually, if funding and approval for the projects and policies identified is obtained, this will result in implementing these projects and policies which should lead to an improved public transport network, and a corresponding shift from other fossil-fuel-based modes which will lead to a reduction in GHG emissions from transport in the Lao PDR.

	Month (#)												
	2022			2023									
	1	2	3	4	5	6	7	8	9	10	11	12	
<b>Output 1: Development of implementation planning and communication documents</b>													
<b>Activity 1.1:</b> <i>All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.</i> 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													

## Technical Assistance Response Plan - Terms of Reference

	Month (#)											
	2022			2023								
	1	2	3	4	5	6	7	8	9	10	11	12
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); 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).												
<b>Activity 1.2:</b> Inception workshop <sup>1</sup> Meet with Lao PDR counterparts to understand goals, available data, work by other organizations, needs, including site visits.												
<b>Deliverable 1:</b> i) Detailed work plan <sup>1</sup> ii) Monitoring and evaluation plan iii) CTCN Impact Description iv) Closure and Data Collection report												
<b>Output 2: Review of the Planned Urban Public Transport Network for Vientiane</b>												
<b>Activity 2.1:</b> Review of related plans and data (existing conditions) Upon receipt of data and report (see Data Request Memo), summarize and understand the existing conditions and history of the transport network in Vientiane, including socioeconomic indicators, geographic information, and transport data.												
<b>Activity 2.2:</b> Review of the ongoing plan for the urban public transport network in Vientiane. Based on previous studies, network planning concepts, study and implementation of the Seoul/Korean-style bus networks, review network concepts and maps and include additional commentary. Special focus on the BRT expansion plans, Note any major issues and further recommendations.												
<b>Activity 2.3:</b> SP survey and related analysis. Undertake SP survey related to the implementation of BRT in the future. Analyze results to understand potential uptake of the BRT system, compared to other options including walking, tuktuk, songthaew, bus, and car or truck.												
<b>Deliverable 2:</b> Draft and Final review of the planned urban public transport network in Vientiane												
<b>Output 3: Smart Public Transport Plan (SmartCity), 2022 – 2030</b>												
<b>Activity 3.1:</b> Develop models including transport model												

## Technical Assistance Response Plan - Terms of Reference

	Month (#)											
	2022			2023								
	1	2	3	4	5	6	7	8	9	10	11	12
Develop an Emme or STRADA - based network transport model, and related models (see Model Framework) to understand ridership potential and difference between the network plans and baseline.												
<b>Activity 3.2:</b> Research of latest trends in ITS for public transport, including from Korean and other nations. Focus on Smart Public Transport for developing nations, including smart card (electronic payment system), in-vehicle safety (cameras), public Wi-Fi, smart signals for public transport vehicles, real-time tracking of transit vehicles (BIMS), demand-responsive transport, SmartPhone or web-based transit planning.												
<b>Activity 3.3:</b> Develop Smart Public Transport scenarios for Vientiane, with high-level details of technologies, high-level costs, high-level implementation considerations. Scenarios agreed with Lao PDR MPWT DOT.												
<b>Activity 3.4:</b> Develop evaluation criteria for Smart Public Transport scenarios. Evaluation criteria to be developed and agreed upon in conjunction with the Lao PDR MPWT DOT.												
<b>Activity 3.5:</b> Undertake evaluation of Smart Public Transport scenarios.												
<b>Output 3: Smart Public Transport Plan for Vientiane (Smart City), 2022 – 2030</b>												
<b>Output 4: Pre-Feasibility Study for One Intervention (e.g. DRT)</b>												
Activity 4.1: Choose intervention for further study Choose intervention based on the above-described evaluation of Smart Public Transport options. Choice of project to be considered in conjunction with Lao PDR MPWT DOT and agreed upon based on estimated feasibility, cost, feed, and alignment with existing planning documents.												
Activity 4.2: Develop estimated capital (CapEx) and operation (OpEx) expense costs Develop estimated capital expenses including construction costs, installation, equipment, and personnel.												
Activity 4.3: Develop socioeconomic benefit-cost analysis Using the above-developed estimated capital costs, develop a socioeconomic cost benefit analysis (CBA) including the estimated benefits of the interventions. The CBA may include the following components. <ul style="list-style-type: none"> <li>- Travel time savings benefits</li> <li>- Health benefits</li> <li>- Transport cost reductions</li> <li>- Environmental benefits (i.e. GHG reduction benefits)</li> </ul>												



**Technical Assistance Response Plan -  
Terms of Reference**

	Month (#)											
	2022			2023								
	1	2	3	4	5	6	7	8	9	10	11	12
<p>Capacity building relating to urban public transport.</p> <p>The Lao PDR currently lacks capacity in some regards relating to the public transport network. For example, in the administration of public transport and with operating higher order transit (like BRT). BRT has never before been operated in the Lao PDR. Given that Lao PDR intends to introduce a BRT system shortly (for the first time in Laos), capacity building will focus on transportation technologies and BRT-related knowledge. For example, the challenges faced by Seoul in the early 2000s and the history of BRT implementation in Seoul. Capacity building will also introduce other transport related institutions (including operators of Seoul BRT) and achievements from Korea which are believed to contribute to overcoming the obstacles facing Vientiane in Laos and their transport network.</p>												
<p>Activity 5.2: Capacity Building Session</p> <p>Capacity building program in Korea (dates TBD).</p> <p>Participants from the Lao PDR Ministry of Public Works and Transport (MPWT) Department of Transport (DOT), Lao PDR Ministry of Natural Resources and environment (MONRE), the Vientiane Department of Transport (DOT), or individuals from the Vientiane Capital State Bus Enterprise (VCSBE). Participant’s gender balance will be strongly considered when inviting individuals for capacity building sessions.</p> <p>Session(s) will take place in Korea.</p>												

<sup>1</sup> Workshop was held August 22-24, 2022

<sup>2</sup> Dates are subject to change

## Technical Assistance Response Plan - Terms of Reference

### 4. 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.

<b>Activities and Outputs</b>	<b>Input: Human Resources</b>	<b>Input: Travel</b>	<b>Inputs: Meetings/events</b>	<b>Input: Equipment/Material</b>	<b>Estimated cost</b>	
	<i>(Title, role, estimated number of days)</i>	<i>(Purpose, national vs. international, number of days)</i>	<i>(Meeting title, number of participants, number of days)</i>	<i>(Item, purpose, buy/rent, quantity)</i>	<i>Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan</i>	
					<b>Minimum</b>	<b>Maximum</b>
<b>1: Development of implementation planning and communication documents</b>	<b>\$2,600</b>	<b>\$5,500</b>	<b>\$150</b>		<b>\$8,250</b>	
Activity 1.1: Formulation of i) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and Data Collection report.	\$700				\$700	
Activity 1.2: Inception Workshop	\$1,200	\$5,500	\$500		\$7,200	
Deliverable 1: i) Detailed work plan ii) Monitoring and evaluation plan iii) CTCN Impact Description iv) Closure and Data Collection report	\$700				\$700	

## Technical Assistance Response Plan - Terms of Reference

<b>Activities and Outputs</b>	<b>Input: Human Resources</b>	<b>Input: Travel</b>	<b>Inputs: Meetings/events</b>	<b>Input: Equipment/Material</b>	<b>Estimated cost</b>	
	<i>(Title, role, estimated number of days)</i>	<i>(Purpose, national vs. international, number of days)</i>	<i>(Meeting title, number of participants, number of days)</i>	<i>(Item, purpose, buy/rent, quantity)</i>	<i>Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan</i>	<b>Minimum</b>
<b>2: Review of the Planned Urban Public Transport Network for Vientiane</b>	<b>\$14,000</b>	<b>\$0</b>	<b>\$0</b>		<b>\$14,000</b>	
Activity 2.1: Review of related plans and data (existing conditions)	\$3,500				\$3,500	
Activity 2.2: Review of the ongoing plan for the urban public transport network in Vientiane	\$3,500				\$3,500	
Activity 2.3: SP survey and related analysis.	\$3,500				\$3,500	
Deliverable 2: Draft and Final Plan for Vientiane Urban Public Transport System & Network	\$3,500				\$3,500	
<b>3: Smart Public Transport Plan (SmartCity), 2022 – 2030</b>	<b>\$43,722</b>					
Activity 3.1: Develop models including transport model	\$18,072					
Activity 3.2: Research of latest trends in ITS for public transport	\$12,500					
Activity 3.3: Develop Smart Public Transport scenarios for Vientiane	\$3,700					
Activity 3.4: Develop evaluation criteria	\$4,500					
Activity 3.5: Undertake evaluation	\$4,500					

## Technical Assistance Response Plan - Terms of Reference

<b>Activities and Outputs</b>	<b>Input: Human Resources</b>	<b>Input: Travel</b>	<b>Inputs: Meetings/events</b>	<b>Input: Equipment/Material</b>	<b>Estimated cost</b>	
	<i>(Title, role, estimated number of days)</i>	<i>(Purpose, national vs. international, number of days)</i>	<i>(Meeting title, number of participants, number of days)</i>	<i>(Item, purpose, buy/rent, quantity)</i>	<i>Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan</i>	<b>Minimum</b>
Output 3: Smart Transportation Plan	\$450					
<b>4: Pre-Feasibility Study for One Intervention (TBD)</b>	<b>\$54,450</b>	<b>\$0</b>	<b>\$0</b>		<b>\$54,450</b>	
Activity 4.1: Choose intervention for further study	\$5,000				\$5,000	
Activity 4.2: Develop estimated construction costs	\$12,500				\$12,500	
Activity 4.3: Develop socioeconomic benefit-cost analysis	\$8,500				\$8,500	
Activity 4.4: Develop GHG reductions quantifications	\$2,500				\$2,500	
Activity 4.5: Implementation evaluation	\$7,700				\$7,700	
Activity 4.6: Development of the pre-feasibility plan document	\$11,000				\$11,000	
Deliverables 4: Draft and Final Pre-Feasibility Plan for One Intervention (TBD)	\$7,250				\$7,250	
<b>5: Capacity Building and Administration of Public Transport in Vientiane</b>	<b>\$18,500</b>	<b>\$19,878</b>	<b>\$2,000</b>		<b>\$40,378</b>	

## Technical Assistance Response Plan - Terms of Reference

<b>Activities and Outputs</b>	<b>Input: Human Resources</b>	<b>Input: Travel</b>	<b>Inputs: Meetings/events</b>	<b>Input: Equipment/Material</b>	<b>Estimated cost</b>	
	<i>(Title, role, estimated number of days)</i>	<i>(Purpose, national vs. international, number of days)</i>	<i>(Meeting title, number of participants, number of days)</i>	<i>(Item, purpose, buy/rent, quantity)</i>	<i>Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan</i>	
					<b>Minimum</b>	<b>Maximum</b>
Activity 5.1: Capacity Building Session preparation	\$7,500	\$12,000	\$500		\$20,000	
Activity 5.2: Capacity Building Session	\$11,000				\$11,000	
<b>Total HR</b>	<b>\$133,272</b>					
<b>Overhead</b>	<b>\$7,200</b>					
<b>Total Travel/Meetings</b>	<b>\$27,528</b>					
<b>Grand Total (Estimated)</b>	<b>\$168,000</b>					

*Note that actual budget was assigned to the implementer in Korean Won (KRW), values listed in this document have been converted to United States Dollars (USD) for illustrative purposes only. Conversion factor was based on the international average rate reported by Google as of September 14, 2022 at 1,389 KRW/USD. Total budget is 233.33 million KRW.*

**5. 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.*

<b>Experts required</b>	<b>Brief description of required profile</b>
<i>Please use the same titles for all experts as applied in section 4.</i>	<i>Please provide a short description of expertise and experience needed (education, sectors of expertise, years of experience, country experience, language requirements, etc.).</i>
Project Director (Hyun Kim)	<ul style="list-style-type: none"> <li>• In charge of directing teams and general research</li> <li>• Doctor's degree in Transport engineering or equivalent</li> <li>• Ability in English</li> </ul> <p>The project director should have significant experience leading teams on R&amp;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.</p>
Transport Economist (Sung Won Lee)	<ul style="list-style-type: none"> <li>• Doctor's degree in Transport Economics or equivalent</li> <li>• Ability in English</li> <li>• In charge of the socioeconomic cost-benefit analysis/evaluation</li> </ul> <p>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.</p>
Capacity Building Specialist (In Sook Kim)	<ul style="list-style-type: none"> <li>• Doctor's degree in Educational Engineering or equivalent</li> <li>• Ability in English</li> <li>• In charge of capacity building (Educational)</li> </ul> <p>The capacity building specialist should have significant experience in developing capacity building programs, especially for knowledge sharing/policy learning applications with developing nations. The capacity building specialist should have experience working with developing nations. The capacity building specialist should have more than 10 years working in the field.</p>
Transportation ICT Specialist (Cheol Moon)	<ul style="list-style-type: none"> <li>• Doctor's degree in Information and Communication Engineering or equivalent</li> <li>• Ability in English</li> <li>• In charge of ITS technology-related research (BIMS or other ITS technologies)</li> </ul>

## Technical Assistance Response Plan – Terms of Reference

Experts required	Brief description of required profile
	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.
BIMS/ICT Researcher (Seung Hak Kim)	<ul style="list-style-type: none"> <li>• Master’s degree in Information and Communication Engineering or equivalent</li> <li>• In charge of BIMS</li> </ul> <p>The BIMS/ICT researcher should have 3 – 5 years working in the field and have experience working with the latest in transportation/ICT technologies.</p>
Transport Planning Specialist/Project Manager (Devon Robert Farmer)	<ul style="list-style-type: none"> <li>• Master’s degree in Urban Transport Planning or equivalent</li> <li>• Excellent ability in English</li> <li>• In charge of Public Transport Network Assessment</li> </ul> <p>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</p>
Researcher (Ki Young Sung)	<ul style="list-style-type: none"> <li>• Master’s degree in Transport Engineering or equivalent</li> <li>• Public Transport Network Assessment</li> </ul> <p>The researcher should have in depth knowledge and experience with transportation-related R&amp;D projects. The researcher should have 3 -5 years of experience.</p>
ITS Expert (Yeong Geun Ryu)	<ul style="list-style-type: none"> <li>• Doctor’s Degree in Transport engineering or equivalent</li> <li>• General research</li> </ul> <p>The expert ITS advisor should have significant experience working on transportation and ITS-related R&amp;D projects, including internationally. The Expert ITS Advisor should have more than 15 years’ experience.</p>
Gender Expert (In Sook Kim)	<ul style="list-style-type: none"> <li>• Doctoral degree</li> <li>• Ability in English</li> <li>• In charge of Gender Balance assessment</li> </ul> <p>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.</p>
Researcher (Min Seok Kim)	<ul style="list-style-type: none"> <li>• Master’s Degree in Transport Engineering or equivalent</li> <li>• In charge of demand forecasting</li> </ul>

**Technical Assistance Response Plan -  
Terms of Reference**

<b>Experts required</b>	<b>Brief description of required profile</b>
	The researcher should have in depth knowledge and experience with transportation-related R&D projects. The researcher should have 3 -5 years of experience.
Researcher (Chu Young Park)	<ul style="list-style-type: none"> <li>• Bachelor’s degree in Transport engineering or equivalent</li> <li>• In charge of investigation, analysis</li> </ul> <p>The researcher should have in depth knowledge and experience with transportation-related R&amp;D projects. The researcher should have 3 -5 years of experience.</p>
Researcher (Kyon Hoon Choi)	<ul style="list-style-type: none"> <li>• Bachelor degree in Transport engineering or equivalent</li> <li>• In charge of investigation, analysis</li> </ul> <p>The researcher should have in depth knowledge and experience with transportation-related R&amp;D projects. The researcher should have 3 -5 years of experience.</p>

## 6. Intended contribution to impact over time

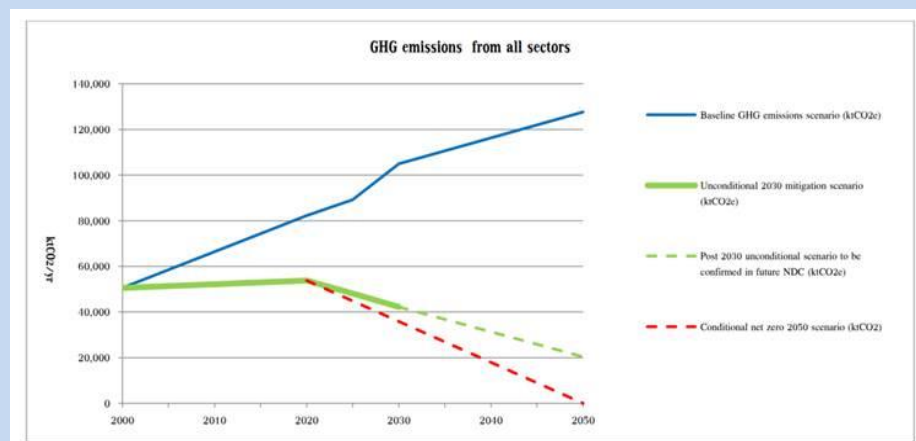
Upon completion of this TA, the Lao PDR can focus on implementing public transportation service improvement projects that apply information and communication technology, modern transport planning standards, and modern administration based on knowledge transfer from Korea. This will allow them to cope with their increasing traffic congestion and air pollution problems, set-up expanded BRT, BIMS (Bus Information and Management System), or Demand-Responsive Transport systems and, as a result, improve the public transportation mode share.

As part of this TA, we will also identify funding opportunities and develop a pre-feasibility study for one intervention, to be determined during this study. This TA will also identify the GHG emission reduction potential of several identified public transport network types, and the GHG emissions reduction potential of the chosen pre-feasibility study intervention. As such, this TA will aid the Lao PDR in understanding how its investment will aid in their NDCs and other goals, such as their goal of becoming a net zero country by 2050.

## 7. Relevance to NDCs and other national priorities

The Lao PDR was the first ASEAN country to join the Paris Agreement in 2016 and, like many other nations, aims to achieve net zero GHG emissions by 2050 according to the National Socio-Economic Development Plan and National Green Growth Strategy. These plans, while not codified as law, establish the Lao PDR's National Determined Contribution (NDC) and mitigation measures to achieve zero GHG emissions by 2050. The Lao PDR first set this plan in 2015 and second national greenhouse gas reduction target in 2021, as shown below:

Fig 1: Nationally Determined Contribution 09 March 2021, Lao PDR



To reduce greenhouse gas emissions, the Lao PDR will implement numerous projects in policies in consideration of developed countries' own resources and existing support levels, the transportation sector aims at average reduction of 25 to 300 kt CO<sub>2</sub>e/year between 2020 and 2030. Several mitigations have been identified already, including the introduction of a new express bus system (BRT), capital and related NMT components, and the Lao-China railway.

The Lao PDR's targets in the transport sector to further reduce greenhouse gas emissions are in line with the increased level of financial support from developed countries. First, the penetration rate of electric vehicles by 30%, including two-wheeled vehicles and passenger cars, and second, biofuels that meet 10% of transportation fuels are targeted for average reduction of 30ktCO<sub>2</sub>e/y and 29ktCO<sub>2</sub>e/y between 2020 and 2030, respectively.

This TA will contribute the Lao PDR's vision of achieving these goals and targets as it will develop a plan for the Lao PDR to target improvements to the public transport network that will allow for an increase in ridership and the relatively mode share of public buses, compared to the increasing rates of fossil-fuel-based private cars and motorcycle use, especially the intervention identified and further studied in the Pre-Feasibility plan.

## **8. Linkages to relevant parallel on-going activities:**

In terms of other planning projects, this TA to be undertaken will need to coordinate with other past and ongoing planning efforts related to the transport network in Vientiane, Lao PDR. Most importantly, these include the following:

### **ADB-funded Smart Bus Fare Project (part of Smart City Korea)**

ADB funded a loan for the Lao PDR to develop a smart public transport fare collection system for the public bus system, which is currently under construction and to be implemented soon.

### **ADB BRT (VSUTP)**

JICA developed a Transportation Master Plan for Vientiane in 2008, which first recommended a BRT system for the city. Based on this, an initial 11.5 km BRT segment was studied, planned, and financed by the Asia Development Bank (ADB) other international organizations. Known as the Vientiane Sustainable Urban Transportation Project (VSUTP), this BRT project is currently in pre-construction phase, and will include 11.5 km of dedicated lanes, 24 closed stations, a system operation center, electronic payment system, real-time bus operation information provision system (BIS), and of BRT vehicles that meet EURO emission standards. The BRT is estimated to be complete by 2024.

### **JICA**

JICA have been involved in providing aid and expertise to the Lao PDR for many years, including major studies have included the 2008 Transportation Master Plan, which is currently being updated by JICA, as well as the recently completed "Vientiane Bus Construction Capability Improvement Project" (2016.8 - 2020.3). The latter study identified various activities that are being carried out to improve bus service by bus corporation's company management, service improvement, and public transportation system.

Assistance will be required from the Lao PDR NDE and CTCN if possible, to engage in data sharing, or other engagement with these other projects and organizations, if necessary.

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

**Carbon Credit Trading**

The carbon emission trading system is a system that allows carbon emission rights to be bought and sold like products on the market. If a developed country can reduce greenhouse gases beyond their designated target, the excess can be traded with another country obligated to reduce greenhouse gases, and conversely, a country obligated to reduce greenhouse gases that fails to meet its obligation can purchase the shortage from another. Emissions trading secured through UNFCCC Clean Development Mechanism (CDM), as described above, can be used as a reduction in their own country or traded in the emission trading market.

This project plan to be developed by this TA, if implemented, is expected to contribute to economic and industrial development in Vientiane and reduce GHG emissions, as was the case with other successful public transport projects like the Bogota TransMilenio project. The TransMilenio secured funding through the sale of carbon offsets via the UNFCCC Clean Development Mechanism (CDM).

**Bus System Components and Technologies**

This TA will suggest an expanded public transport system, including BRT elements. BRT system generally include the following technologies, which this TA can help connect to Korean public transportation solution providers can contribute to the development of overseas markets in the future (e.g., Smart payment systems, BIM/S systems, etc.)

- Revenue system consulting
- Smart Card systems
- Bus Management/Information System
- Exclusive bus lane infrastructure, Station improvement infrastructure
- CNG buses, Low-floor buses, EV buses
- Demand responsive transport

**10. Gender and co-benefits:**

<p>Imbedded in design of the activities:</p>	<p>Transport networks are 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.</p> <p>In many countries, women are highly under-represented in decision-making with majority of the transport sector being managed and operated by men. A disruptive market change to cleaner and more efficient vehicles presents an opportunity to address this unequal distribution by increasing women's participation in the transport sector and provide socio-economic opportunities in new businesses and business models as drivers, charging solution providers, fleet operators etc.</p>
--	---

	<p>This transition will also contribute to reducing the negative public health implications from vehicles for women and children, which are more vulnerable to the impact of air pollution than men.</p>
<p>Gender and co-benefits intended as result of the activities:</p>	<p>Outcomes of this TA will enable several direct and indirect contributions to addressing gender in the Vientiane transport network. Improvements to the public transport network should consider the needs of different users and thereby offering equal levels of access to transport services to all different social groups. The need to adopt a gender-sensitive perspective is emerging as a challenging and impending task for urban mobility policy makers and planners.</p> <p>This exercise may potentially help the Lao PDR to understand gender disparities in public transport-related policies and could serve as a guidance for future policy developments to inform gender-specific policies.</p> <p>Ultimately, this TA will contribute to improving the service of public transport at large in Vientiane. Women suffer from significantly lower income than 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 many women hold.</p>

**11. 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.*

<b>In country stakeholder</b>	<b>Role in implementation of the technical assistance</b>
National Designated Entity (NDE) – Department of Climate Change/Ministry of Natural Resources and Environment Administration (MONRE)	Provide support and coordination
Department of Transportation (MoT)/Ministry of Public Works and Transport (MPTW)	Aid in all other aspects, including providing data where needed.

**12. 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	Ways to improve women’s representation and participation in public transport in Vientiane will be explored.
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 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	
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 Vientiane 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 the Lao PDR in reducing its increasing dependence of fossil-fuel-based private transportation while promoting more efficient usage of their roadways.
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
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	

### 13. Classification of technical assistance:

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

<i>Please tick off the relevant boxes below</i>	<i>Primary</i>	<i>Secondary</i>
<input type="checkbox"/> 1. Decision-making tools and/or information provision	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 2. Sectoral roadmaps and strategies	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3. Recommendations for law, policy and regulations	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4. Financing facilitation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 5. Private sector engagement and market creation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 6. Research and development of technologies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 7. Feasibility of technology options	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 8. Piloting and deployment of technologies in local conditions	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 9. Technology identification and prioritisation	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

### 14. 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.*

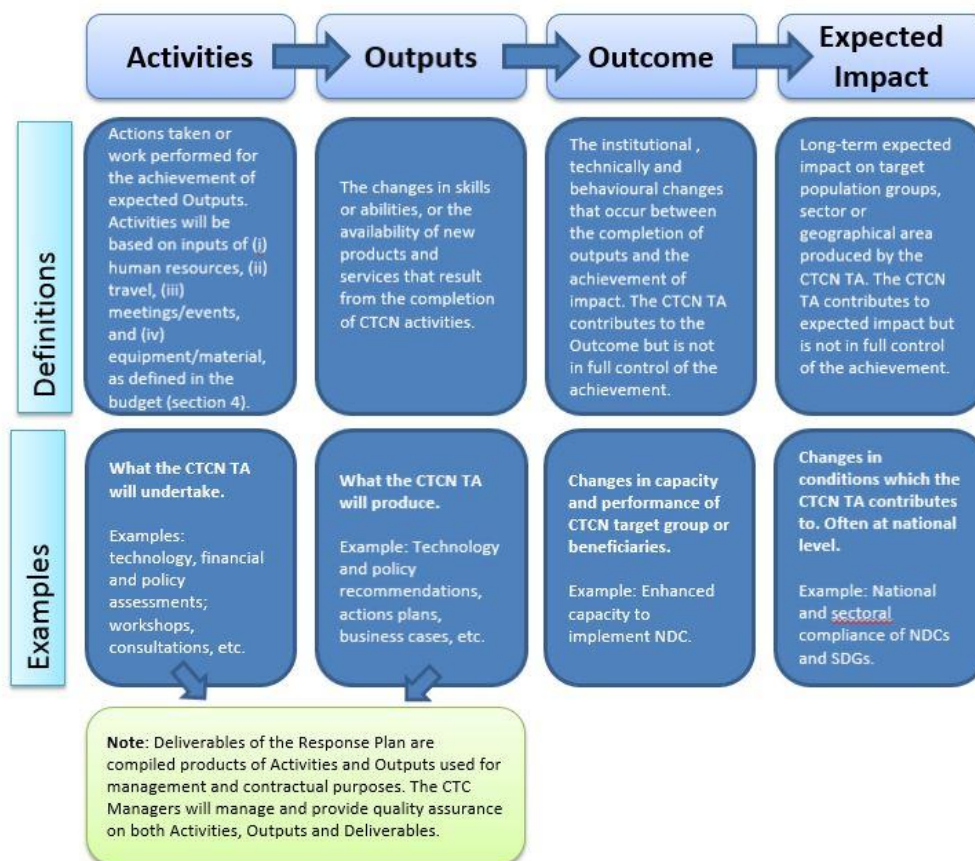
**Annex 1: Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)**

**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.

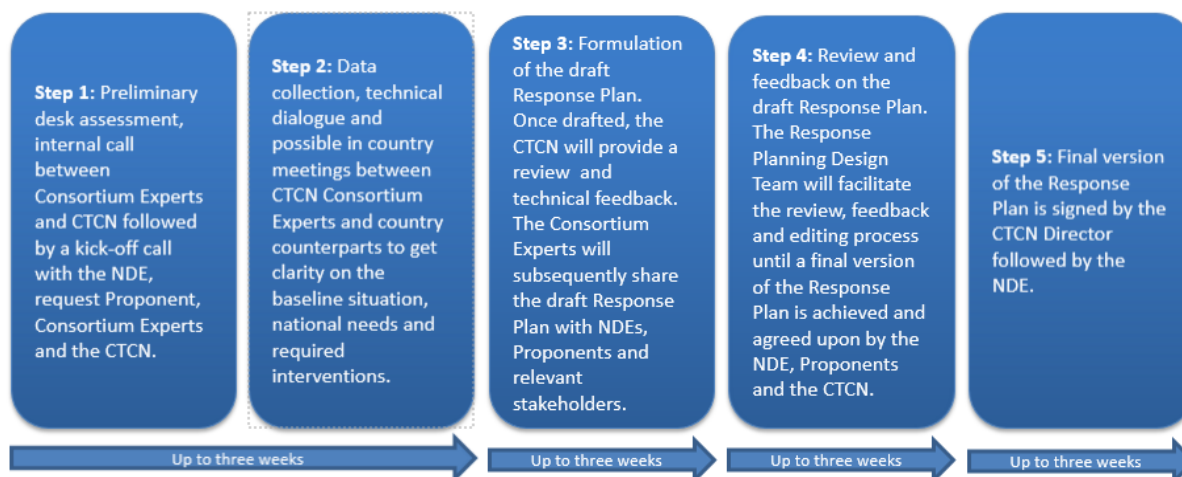
The role of CTCN Consortium experts is to lead the design of the Response Plan. The NDE will provide overall guidance on national context and priorities whereas the request Proponent will provide more detailed information on the sector, barriers and requested assistance. The Climate Technology Manager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