

Country	Ghana
Request ID#	
Title	The development of an electro-mobility policy for Ghana, incorporating implementation and market frameworks for the deployment and scale-up of Electric Vehicles
NDE	Mr. Joseph Amankwa Baffoe, +233 26237 3698, +233 0266 2465, jabaffoe@gmail.com
Proponent	Environmental Protection Agency, Ghana.

Summary of the CTCN technical assistance

Ghana is one of Africa’s fastest growing economies and transport, in all its modes, is an important catalyst and plays a strategic role in the economy of Ghana. While Ghana is endowed with substantial renewable energy potential, including solar, wind, biomass and hydro resources, the development of its transport sector has been short-term, modally based and lacked an enabling framework. Enhancing the sustainability of its transport infrastructure and associated services can aid the economic development of Ghana, curb its emissions growth and enable it to mitigate climate change. Ghana’s transport mobility was constrained by challenges, including high upfront capital cost, inadequate business models and a challenging and, relatively untested, regulatory and legal framework. Ghana has erratic power production, frequent outages, and insufficient power from the grid. In transport terms it has an over-reliance on low-capacity passenger vehicles, inadequate traffic management, heavy dependence on informal public transport services, and inadequate non-motorized transport facilities that have created severe traffic congestion. The Ghanaian’s Government has recently released a (draft) white paper on transport that identifies the following mission: *“To provide leadership and an enabling environment for the development and maintenance of Ghana’s transportation system through effective policy formulation, [and] market regulation”*.¹ This Response Plan is aligned to this mission and aims to:

1. Develop a cohesive electro-mobility policy, planning and market framework to transform Ghana’s transport sector into a modern, sustainable, effective, forward looking and results driven sector.
2. Assess the market readiness, measures and instruments to enable an uptake of Electric Vehicles and associated infrastructure in Ghana;
3. Deliver an action plan in the form of an implementation roadmap and business case for eVehicles and charging infrastructure deployment
4. Work with the Government of Ghana to build the capacity of stakeholders, to facilitate the development and implementation of Ghana’s electro-mobility roadmap and supporting charging infrastructure.

¹ This commitment includes a number of policy goals such as (4.2.3) Provide transport infrastructure and services without compromising the integrity of society, environment, health and the climate; (4.2.4) Create an enabling environment for public and private sector participation in transport infrastructure development and service provision; (4.2.5) Adopt and promulgate a transport planning framework based on effective use of policy, long term plans, medium term programmes; (4.2.6) Develop an institutional framework that separates functions of policy, regulation, asset management and service provision by transport sector and (4.2.10) Apply new and appropriate technology and innovations to transport infrastructure and service delivery

Agreement:

**National Designated Entity to the UNFCCC
Technology Mechanism**

Name:

Title:

Date:

Signature:

Proponent (signature of the Proponent is optional)

Name:

Title:

Date:

Signature:

UNFCCC Climate Technology Centre and Network (CTCN)

Name: Rose Mwebaza, mwebaza@un.org

Title: Director CTCN

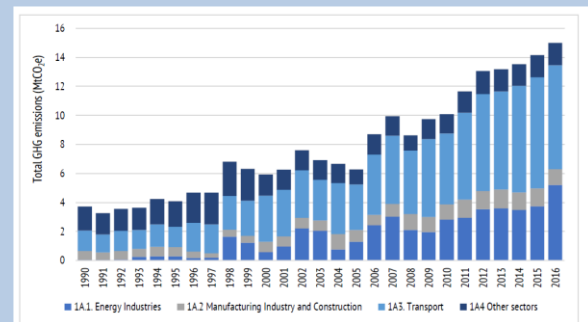
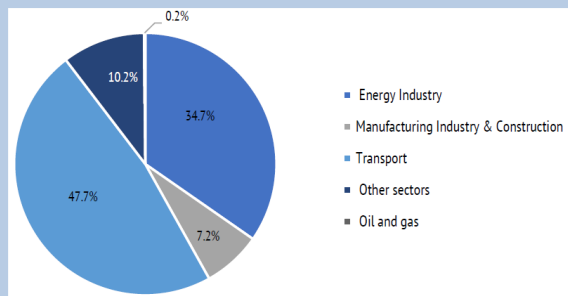
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1. Background and context

At the international and regional level Ghana is a signatory to conventions that are to be embedded in Ghanaian law and policy. These include the Paris Agreement (-15% in its GHG by 2030), Sustainable Development Goals (2016) and the African Union’s Agenda 2063 (2014), seeking to transform economies and ensure environmental sustainability and climate change resilience of its infrastructure. These commitments, supported by a number of recent national policy developments, have strengthened Ghana’s preparedness in terms of mitigating and adapting to climate change.² Ghana’s strategy tackle climate change has been articulated in its recent medium-term development policy framework (Agenda for Jobs: Creating Prosperity and Equal Opportunity for All, 2018-2021) and the National Climate Change Policy.³

Today, Ghana is one of Africa’s fastest growing economies and, despite the consistent steady economic growth over the last decade, climate changes poses a threat to future growth and development.⁴ Ghana continues to face challenges associated with rising population such as poverty, access to education and healthcare, pollution, environmental change and energy access. Ghana’s 4th GHG Inventory (2019) shows significant growth in the energy sector, contributing 35.6% of emissions in 2016, with transport at 47.7%. Transportation had a 7.3% rise in emissions since 2012 while overall energy had a 2% decrease over 2012 figures.



The Agenda for Jobs: Creating Prosperity and Equal Opportunity for All, (2018-2021) set the road-based mass transportation system, including extending Bus Rapid Transit (BRT) corridors, as one of the medium-term strategies to improve efficiency and effectiveness of road transport infrastructure and services. It committed to increasing the proportion of renewable energy into the national energy supply mix. It was followed by the Ghana Government’s Coordinated Programme of Economic and Social Development Policies (CPESD) 2017-2024 and Agenda for Jobs: Creating Prosperity and Equal Opportunity for All 2018-2021. More recently, the Government’s (draft) white paper on transport identifies the following mission: *“To provide leadership and an enabling environment for the development and maintenance of Ghana’s transportation system through effective policy formulation, [and] market regulation”*.⁵ Under this policy the Government further commits to develop quality, reliable, sustainable and resilient infrastructure that creates an enabling environment for multi-stakeholder consultation, private sector investment and an appropriate regulatory environment. Ghana’s

² Integrated Transport Plans (2008/ (2010), National Climate Change Adaptation Strategy (2012) UNFCCC Initial National Communication (2011/2015), Ghana National Climate Change Policy (2013), Ghana’s Intended Nationally Determined Contribution (INDC) (2015), National REDD+ Strategy (2015).

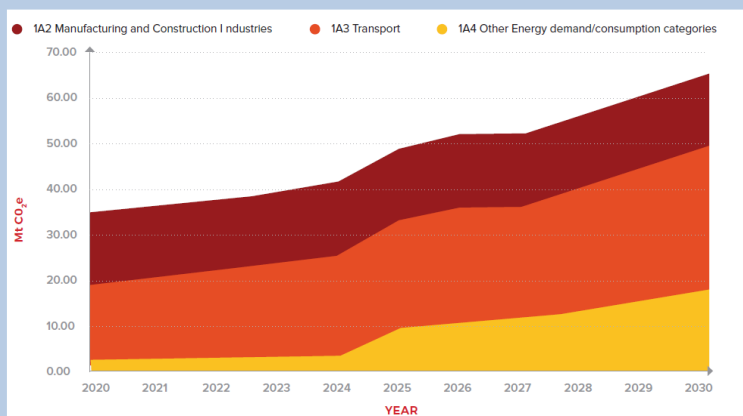
³ The Government has identified 4 key policy and measures including Renewable Energy Act, Renewable Master Plan, Scaling-up Renewable Energy-Investment Plan, SE4All Action plan, Energy Efficiency Regulations

⁴ Rising sea levels, drought, higher temperatures and erratic rainfall negatively impact infrastructure, hydropower production, food security and coastal and agricultural livelihoods. One-quarter of the population lives along the coast in rapidly expanding urban areas like Accra, and are especially vulnerable to flooding and waterborne disease. Despite the country’s recent transition to an industry and services-oriented economy, 45 percent of the workforce still depends on rainfed agriculture. Hydropower (Akosombo, Kpong and Bui dams) provides approximately 54 percent of national generation capacity.

⁵ This commitment includes a number of policy goals such as (4.2.3) Provide transport infrastructure and services without compromising the integrity of society, environment, health and the climate; (4.2.4) Create an enabling environment for public and private sector participation in transport infrastructure development and service provision; (4.2.5) Adopt and promulgate a transport planning framework based on effective use of policy, long term plans, medium term programmes; (4.2.6) Develop an institutional framework that separates functions of policy, regulation, asset management and service provision by transport sector and (4.2.10) Apply new and appropriate technology and innovations to transport infrastructure and service delivery

projected transport GHG emissions (2020-2030) are outlined below, with passenger vehicle ownership expected to increase by over 60% between 2020 and 2030, significantly contributing to the emissions profile of Ghana:

ENERGY SECTOR KEY AND IMPORTANT NON-KEY CATEGORIES				2020	2025	2030	CUMULATIVE EMISSIONS 2020-2030	% SHARE OF CUMULATIVE EMISSIONS
1A3	Transport			17,11	24,096	31,330	261,407	37.1%
	1.A.3b	Road transport		13,813	17,290	18,716	181,494	25.8%
		1.A3bi	Passenger cars	10,212	12,843	16,049	142,575	20.3%
		1.A3bii	Light duty diesel vehicles (LDDVs) truck	1,665	1,958	2,295	21,636	3.1%
		1.A3biii	Heavy duty diesel vehicles (HDDVs) & buses	1,630	2,151	Phased out	13,554	1.9%



2. Problem statement

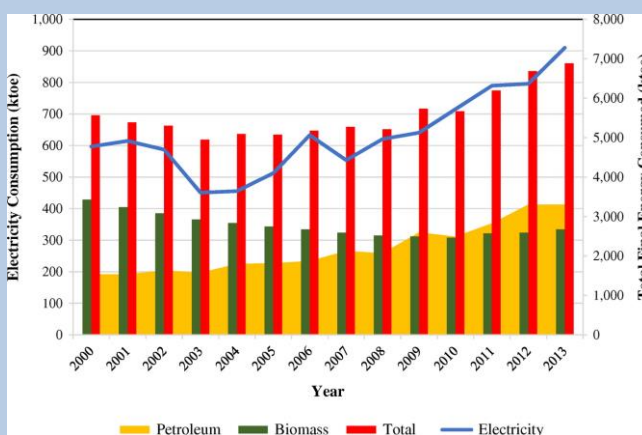
In 2010, the Government of Ghana described how the development of its transport sector has been identified as one of the key areas to accelerate development towards achieving and sustaining macro-economic stability. Yet over the past 10 years Ghana’s reliance on the exploitation of natural resources for economic development, against the backdrop of rising population, has instigated rapid urbanisation, deforestation and fossil-intensive energy consumption. This has negatively impacted the transportation sector. Such urbanization has resulted in erratic power production, frequent outages, and insufficient power from the grid. In transport terms, Ghana has an over-reliance on low-capacity passenger vehicles, inadequate traffic management, and a heavy dependence on informal public transport services. Inadequate non-motorized transport facilities have created severe traffic congestion. Ghana’s 3rd national communication reported how Ghana contributes over 33million tCO_{2e} to global emissions, with significant upward trajectory of emissions over the past two decades.

Transport is the predominant source of greenhouse gas in the energy sector. It accounted for 48% of the entire energy sector emissions, representing 17% of overall emissions. Transportation emissions recorded the sharp rise of 390% from 1990-2016.⁶ The main drivers for the increase in transport emissions were the continued growth in the number of vehicle population, along with a rise in fuel (diesel and petrol) consumption. Ghana’s predominant mode of transport is road transport – with an estimated market share of over 72% passenger traffic (cars, motorcycles and light duty) across its population of 29million (2017). The transport sector share of the total energy emissions saw a consistent rise at an average of 45.4% for 1990 and 2016. In terms of priority barriers to be overcome, Ghana’s third national communication cites the lack of clarity in regulation of the transport sector. A core objective of this Response Plan involves bending this curve of emissions growth.

⁶ Over the 26 years, fuel consumption in passenger vehicle constitutes an average 52% of all total fuel usage in road transport followed by heavy-duty and buses (28.6%), motorcycles (10%) and light-duty vehicles (8.8%).

Sector/Category	Total emissions (MtCO ₂ e)				Percentage change
	1990	2000	2012	2016	(2012-2016)
National Emissions with FOLU	25.34	27.26	41.62	42.15	1.3%
National Emissions without FOLU	11.32	14.53	28.66	29.28	2.2%
1 - Energy	3.75	5.96	15.35	15.02	-2.1%
Stationery combustion	2.31	2.77	8.65	7.83	-9.5%
Transport Mobile combustion	1.41	3.17	6.68	7.17	7.3%

Recent research⁷ reveals the import dependency facing Ghana in terms of fossil fuel. In 2016, while having its own fossil reserves⁸, Ghana’s was petroleum import-dependent of 17%, 37% for natural gas, and 78% for petroleum products. As of 2018, petroleum consumption (oil and gas sector) accounted for about 80% of final energy and the local petroleum production only contributes 5% of this total with importation share of 95%. Ghanaian final energy consumption is outlined below. The total electricity consumption increased from 6,367 GWh in 2000 to 9,355 GWh in 2013:



The Government of Ghana is considering the introduction of tax exoneration for Electric Vehicles in order to promote a technology shift from fossil fuel based vehicles and so enable the transition to low emissions transportation. This Response Plan would underpin such activities with an electro-mobility policy that, has at its core, an implementation framework to enable such transformation changes. Such a framework would involve an assessment of Ghana’s urban mobility situation and the current/ future supply of transport infrastructure and services. The development of an electro-mobility policy would provide signals for market action and a decarbonisation of the transport system. It would be underpinned by a market feasibility study and assessment to best determine the potential measures and instruments to unlock the GHG reductions.

Ghana’s Transport Policy prioritizes private sector innovation and technologies have the potential to improve many aspects of transport infrastructure and the provision of transport services. This Response Plan will build on such commitments and also reinforce policy objectives by developing an EV policy and market implementation framework that can operationalize activities and make a significant contribution to the NDC target (-15% relative to BAU). Working with the Government of Ghana, this Response plan will inform electro-mobility policy and deliver an operational and market framework that will create the enabling environment for enhanced electro-mobility penetration.

⁷ <https://www.sciencedirect.com/science/article/pii/S2352484719300708> and [Ghana Energy Commission, 2016](#)

⁸ Current installed capacity of over 4,600MW is significantly more than Ghana current peak demand of about 2,700MW.

may prevent the accelerated development of markets for electro-mobility. It will recommend an enabling frameworks to address identified barriers and recommend actions that enable the deployment of EVs

This Electro Mobility Policy and Market Readiness and Implementation framework will inform targets to achieve an appropriate level of alternative fuels infrastructure for transport, which is relative to national policy and market needs of Ghana. It includes:

- Market Readiness. A review of existing or new fiscal incentives aimed at overcoming or alleviating barriers to adoption; increasing awareness; and increasing confidence in new or unknown technology. Such assessment could include an understanding of Market forces; Regulations; Fiscal measures; Laws & enforcement mechanisms. Capacity of the Sector to carry out the necessary action, including the capacity of Institutions, Organisations and People. It include a market assessment (such as analysis of value chains, risks and overall barriers to implementation). Activities could include:
 - Assessment of the Financial Viability and funding strategies and so provide a sound basis for preparing the implementation framework
 - Financial and value for money analysis, lifecycle cost model, identification of mechanisms (business models) for financing
 - Incentive availability and appropriateness assessment (including measures such as EV Purchase Grant Scheme, Charging supports, Accelerated Capital Allowances, and Excise Relief)
 - Readiness to create a local market (Local assembly status, Manufacturing supports and exports)
- Public leadership. The public sector is often the early adaptor and exemplar concerning actions to stimulate uptake of EVs, enhancement of visibility of vehicles, demonstrators etc. The key aspects of this assessment could include:
 - A national public awareness campaign to raise the profile and understanding of EVs;
 - Widespread environmental Social Impact assessment
 - Highlight the benefits of public sector and commercial fleet adoption of EVs in terms of their sustainable transport strategy.
- Infrastructure, Energy Regulation and Pricing. Its overall objective is to devise a sustainable framework to ensure satisfactory, effective and efficient low emission vehicle charging and fuelling infrastructure. The key aspects of this assessment include:
 - Assessment of the type of Battery Electric Buses suited for Ghanaian cities (including Facility and Charging Infrastructure, site location and type (grid-connected vs. offgrid)
 - Operation and Maintenance, including identifying gaps to be address for managing a new technology
 - EV charging (Home charging; On-street charging, Location/ destination charging; and Fast charging)

Activity 2.2: Developing a number of concept notes for recommendations and priority actions for topics that could include:

- A. Citizen and User
 - Customer pricing options (for both infrastructure and battery replacement)
 - Public vs Private ownership models – risks, benefits, integration and funding options
 - Incentives for Domestic and Private chargers
- B. Regulator and Utility
 - EV infrastructure growth profile, planning metrics and cost required for growth scenarios to 2030
 - EV infrastructure readiness with regard to market size, battery size and future domestic demand
 - Appraise maintenance issues relating to deploying recharging infrastructure
 - Domestic tariffs and testing of control mechanisms to avoid critical loading of electricity network

<p>be invited from interested parties. This process will involve identifying programmes and projects that advance national priorities. This series of events will be supported by a city targeted/ nationwide Public Awareness Programme that will</p> <ul style="list-style-type: none"> (i) A national public awareness campaign to raise the profile and understanding of EVs; (ii) Highlight the benefits of public sector and commercial fleet adoption of EVs in terms of their sustainable transport strategy. 													
<p>Deliverables 5:</p> <ul style="list-style-type: none"> (i) Finalized Public Awareness Programme (ii) Finalized consultation workshop report (iii) Finalized public confidence/ awareness report on EV attitudes to deployment 													

4. Resources required and itemized budget:

Activities and Outputs	Input: Human Resources (Title, role, estimated number of days)	Input: Travel (Purpose, national vs. international, number of days)	Inputs: Meetings/events (Meeting title, number of participants, number of days)	Input: Equipment/Material (Item, purpose, buy/rent, quantity)	Estimated cost Please accumulate the costing at Activity and Output level and provide an estimated costing range for each activity and the total Response Plan	
					Minimum	Maximum
Output 1: Development of implementation planning and communication documents						
Activity 1.1: Formulation of i) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and Data Collection report.	International Consultant (4 days x 4 activities x \$500)				\$8,000	
Output 2: Development of a national EV Policy and Market Readiness and implementation framework.						
Activity 2.1: Supporting the improvement of low emission vehicle market readiness assessment, including policies, regulatory frameworks and investment decisions.	International Consultant (60 days x \$500) Local Consultant (100 days x \$250)	4 Trips (2 x \$1500 return airfare) for international consultant to travel to Ghana 40 Trips (40 x \$200) for local / international consultant in Ghana to deliver on activity 2.1 and 2.2			\$30,000 \$25,000 \$12,000 \$8,000 [\$75,000]	
Activity 2.2: Developing a number of concept notes for recommendations and priority actions				Publication of concept notes (5 x \$500)	\$2,500	
Output 3: Policy Roadmap on optimum mix of regulatory, taxation and subsidy policies to drive deployment of EVs.						
Activity 3.1: This activity focuses on data collection and stakeholder input to inform the development of the policy roadmap.	International Consultant (50 days x \$500) Local Consultant (80 days x \$250)	20 Trips (20 x \$200) for local / international consultant in Ghana to deliver on activity 3.1 and 3.2		Publication of draft Policy (Green Paper) Roadmap (\$1,000)	\$25,000 \$20,000 \$4,000 \$1,000 [\$50,000]	
Activity 3.2: Validation of the roadmap by key stakeholders in a series of national level workshops.			National Level Workshops (5 x \$1500) with stakeholders in terms of validation of roadmap		\$7,500	

Output 4: Market feasibility study of eMobility and EV deployment						
Activity 4.1: Assessing and incorporating the feasibility of technology supports and measures identified in the Planning Framework and Market Readiness report.	<i>International Consultant (40 days x \$500)</i>	<i>20 Trips (20 x \$200) for local / international consultant in Ghana to deliver on activity 4.1 and 4.2</i>		<i>Publication of Market feasibility study (\$3,000)</i>	<i>\$20,000 \$20,000 \$4,000 \$3,000 [\$47,000]</i>	
Activity 4.2: This activity involves the development of a number of feasibility informing project concept notes, including charging infrastructure options.	<i>Local Consultant (80 days x \$250)</i>			<i>Publication of concept notes (5 x \$500)</i>	<i>\$2,500</i>	
Output 5: Enhanced Public Awareness and understanding of the potential to promote and deploy electric vehicles						
Activity 5.1: Disseminating information and awareness raising material.	<i>International Consultant (20 days x \$500)</i>	<i>20 Trips (20 x \$200) for local / international consultant in Ghana to deliver on activity 5.1</i>	<i>Workshop (3 x \$1500) with stakeholders in terms of delivering awareness campaign and programme across stakeholders and public</i>	<i>Publication of Research Study on Ghanaian awareness of EVs (\$1,000)</i>	<i>\$10,000 \$12,500 \$4,000 \$4,500 \$1,000 [\$32,000]</i>	
	<i>Local Consultant (50 days x \$250)</i>					
Sub-total costing for the entire Response Plan					<i>\$224,500</i>	
Gender mainstreaming (1% total budget)					<i>\$2,245</i>	
Estimated range of costing for the entire Response Plan					<i>\$226,745</i>	
Highest ranging of costing (including 5% contingency)						<i>\$238,082</i>

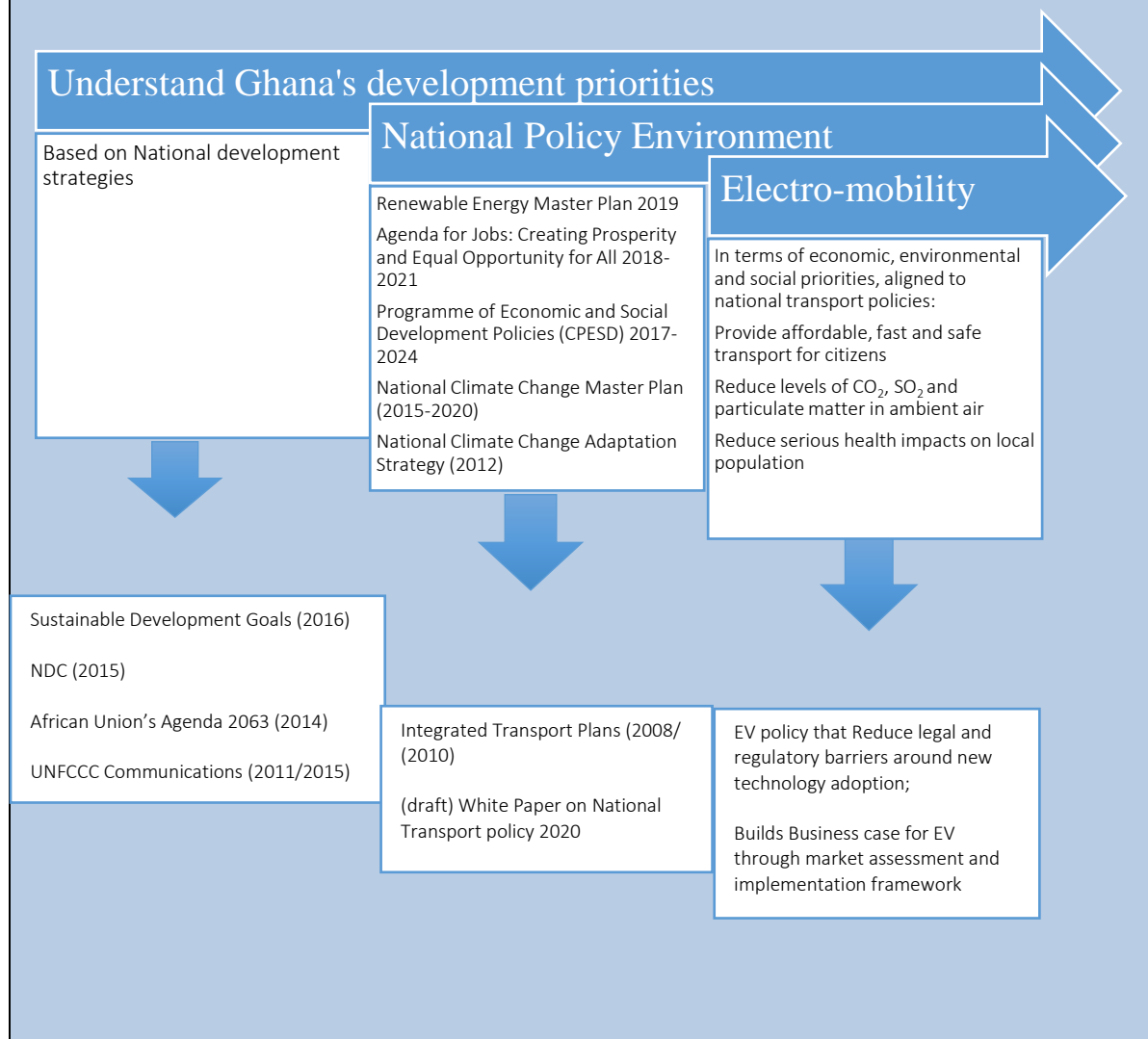
5. Profile and experience of experts

Experts required	Brief description of required profile
International consultant	<p><u>Essential</u></p> <ul style="list-style-type: none"> - Masters or equivalent degree in urban transport, urban studies, civil engineering, environment or related field - 10 years’ experience of providing technical services in urban transport and mobility, and experience related to electro-mobility/ climate mitigation projects - Experience of developing national plans that involve the assessment of policy measures at a country or regional level, including experience of completion of similar evaluation/review tasks in urban transport projects - Experience of engaging with multiple actors in the development of initiatives aimed at building regional/national capacity - Excellent English is required - Experience in the West Africa region - Facilitation skills in delivering training workshops on methodologies to stimulate enabling environments, urban transport and electro-mobility <p><u>Highly Desirable</u></p> <ul style="list-style-type: none"> - Understanding of policy measures and drivers to overcome barriers to the deployment of electro-mobility technologies - Experience of engaging with the private sector regarding market analysis of technologies - Knowledge of results-based monitoring and evaluation methodologies - Experience in transport demand modelling - Knowledge of UN procedures
Local consultant	<p><u>Essential</u></p> <ul style="list-style-type: none"> - Degree in urban transport, urban studies, civil engineering, environment or related field - 10 years’ experience within Ghana/ West Africa, including conducting market readiness assessments, action planning and/ or feasibility studies - Experience of developing, facilitating and delivering stakeholder workshops and group facilitating aimed at engaging multiple actors. - Understanding of policy measures and drivers to overcome barriers and create enabling environments to the deployment of electro-mobility technologies - Fluency in the English language - Experience of initiatives focussing on urban transport and electro-mobility <p><u>Highly Desirable</u></p> <ul style="list-style-type: none"> - Experience of completion of similar evaluation/review tasks in urban transport projects - Experience in transport demand modelling - Knowledge of UN procedures

6. Intended contribution to impact over time

Vehicle emissions contributed to more than 7.2 MtCO_{2e} emissions in 2016, representing over 17% of Ghana’s overall emissions. The intended contribution of this Response Plan is to curb this emissions growth trajectory and contribute directly to Ghana meetings its NDC commitments of a 15% reduction in GHG emissions (BAU) by 2030. Supporting this response Plan will:

- Establish an electric vehicle policy and robust business case for EV deployment that will reduce fuel consumption and provide enhanced fuel efficiency in Ghana,
- Ensure access to reliable, sustainable, and modern energy for all citizen,
- Reduce legal and regulatory barriers around new technology adoption;
- Provide affordable, fast and safe transport for citizens, aligned to national transport policies,
- Reduce levels of CO₂, SO₂ and particulate matter in ambient air,
- Reduce serious health impacts on local population, and
- Deliver on international commitments within Ghana’s NDC (GHG emissions by 15% relative to a business-as-usual scenario emission by 2030)



7. Relevance to NDCs and other national priorities

At a national level, In 2013, the Ministry of Environment, Science, Technology and Innovation (MESTI) and the National Climate Change Committee (NCCC) formulated both Ghana’s National Climate Change Policy (NCCP) and the National Environment Policy (NEP) to provide strategic directions and co-ordinate issues of climate change in Ghana, as well as to help the country achieve sustainable development through equitable, low carbon economic growth.⁹ Ghana launched its National Climate Change Master Plan (2015-2020) containing action programmes for implementation, including the requirement to minimize GHG emissions. One of its measures focuses on developing and implementing measures to reduce petroleum consumption and equivalent carbon emissions from the transport sector and discourage the importation and use of high-fuel-consumption vehicles.

In its NDC, Ghana committed to 20 mitigation and 11 adaptation programme of actions and priority economic sectors for implementation in the 10-year period (2020-2030). This has resulted in Ghana’s emission reduction goal to unconditionally lower its GHG emissions by 15% relative to a business-as-usual scenario emission by 2030.¹⁰ This means that by 2030, Ghana is expected to reduce its total national GHG from the projected 74 MtCO₂e to 41MtCO₂e when all 20 mitigation measures in the NDC are fully implemented.¹¹ Implementation of these measures began in 2016 and includes scaling-up renewable energy; decarbonising electricity supply; and promoting sustainable mass transportation. The NDC explicitly states that “Without the requisite technology, the technical capacity and favorable conditions that stimulate innovation, Ghana will not have the capability to fully implement its NDC. In this regard, Ghana will be looking for international partnerships to take advantage of the opportunities for technology development and transfer”. Emissions projections from 2016-2030 show 3 emission trajectories:



Key challenges, addressed in the NCCP framework, have been identified in Ghana’s technology needs assessment (2016) and policy dialogues, and in the climate change policy consultation process. They include inadequate technical and financial support for transfer of low-emission technologies (LETs), high initial cost, as well as inadequate technical and human resource capacities in estimating and certifying potential greenhouse gas reductions required in such technologies deployment. A further challenge identified was inadequate technology transfer policy and implementation planning.

⁹ This is supported through a National energy policy and Energy strategy and development plan (2010) and SE4All Action Agenda (2012).

¹⁰ An additional 30% emission reduction can be achieved if international (external) support is made available to Ghana to cover the full cost of implementing the mitigation action (finance, technology transfer, capacity building).

¹¹ This translates roughly into 33MtCO₂e emission reductions over the 10 years. The remaining 41 MtCO₂e are potential reductions that could be achieved with the mitigation actions outside the scope of the NDC.

To address the effects of such short-term planning of the overall development of the renewable energy sector, a Renewable Energy Master Plan (REMP2019)¹² has been developed with the goal to provide a renewable energy investment-focused framework. The broad strategies proposed for the successful implementation of the REMP include the Government to explore opportunities to develop a market and production hub for electric vehicles in Ghana. This is supported by UNDP's NDCSP Industrial Analysis Report which found how "Vehicle fuel efficiency, mass public transport and introduction of electric vehicles would help transform the road transport sector and offer significant benefits in terms of emission reductions." The World Resources Institute (2019)¹³ recently identified the city of Accra as one of the most suitable cities in Sub Saharan Africa for the transition to low carbon electric cities. This is based on its urban access to electricity and its carbon intensity of its electricity supply. Ghana's geographical location gives it a good exposure to solar radiation which is ideal for both electricity and thermal energy applications. The country receives an average solar radiation of about 4-6 kWh/m²/day and sunshine duration of 1,800 hours to 3,000 hours per annum.

8. Linkages to relevant parallel on-going activities:

Ghana has 3 GCF Readiness proposals which are approved. These proposals do not pertain to the development of strategic frameworks for low-emission investment. They focus on sustainable forestry, affirmative finance action for women in Africa and the Acumen Resilient Agriculture Fund. With increasing levels of wealth and mobility, urban transport has become an issue in many major city centres in Ghana, especially in Accra. The 'Ghana Urban Transport' (GEF/UNDP) project began in 2007 with the objective of improving mobility through a combination of traffic engineering measures, regulation of the public transport industry and implementation of a bus-rapid-transport (BRT) system. This project concluded in 2015 and developed the first Bus Rapid Transit (BRT) system in Sub-Saharan Africa. The project gave significant weight to strengthening the urban transport sector's institutional structure, which was a milestone considering that passenger transport was mainly covered by informal operators. The project contributed to the establishment of a solid foundation for the regulatory framework of urban transport, but these results were not part of the PDO, which focused only on improved mobility. This Response Plan can utilize the work conducted under this Urban Transport Project, especially in areas including strengthening policy, institutional, and regulatory framework for managing, coordinating, planning and monitoring urban transport in Ghana.

The Plan will also consider ongoing World Bank projects that include:

- i) Ghana Climate Innovation Center – GCIC (2016-2020)¹⁴. The GCIC a technology hub designed to help over 100 local clean technology businesses develop and commercialize innovative solutions to climate change. It is anticipated that this Response Plan would link with the GCIC in terms of stakeholder engagement. The GCIC provides local companies with the knowledge and resources they need to prototype, develop, and market innovative clean technologies in sectors including off-grid renewable energy.
- ii) Transport sector Improvement Project. A World Bank initiative focusing on road development.
- iii) Ghana Economic Transformation Project. The objective of the Ghana Economic Transformation Project is to promote private investments and firm growth in non-resource-based sectors. This includes (1) - Enabling investments, will focus on improving the enabling business environment, investment attraction capacity and the quality infrastructure support system for companies that want to invest and grow their businesses in Ghana. (2) - Enhancing the Government's programs in investment promotion and spatial development (including Special Economic Zones), thereby addressing the constraint to access quality industrial land in the country. Component (3) - Accelerating Entrepreneurship and MSME growth, including early stage financing.

The Plan aligns to the commitments outlined in SE4All Country Action Agenda (2015) and Renewable Energy Action Plan (2015).

¹² The REMP has the following 2030 targets: to provide renewable energy-based decentralised electrification options in 1,000 off-grid communities; and promote local content and local participation in the renewable energy industry. Under this Plan the Government commits to provide an enabling business environment and work to remove the bottlenecks that hinder growth in the private sector, including through incentives for renewable energy manufacturing and assembling firms.

¹³ <https://www.wri.org/blog/2019/02/electrification-doesnt-make-sense-everywhere-yet>

¹⁴ The GCIC is part of the World Bank's Climate Technology Program and its global network of Climate Innovation Centers. Other centers have been established in the Caribbean, Ethiopia, Kenya, Morocco, South Africa, and Vietnam.

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

This technical assistance involves the provision of preparatory support for the Government of Ghana to develop a National Electric Vehicle Policy and supporting Implementation and Market Readiness Framework. This will include a number of concept notes to aid policy and framework development and will also be supported through an awareness programme targeting key stakeholders and Ghanaian citizens.

It is anticipated that, once delivered, this Response Plan will positively impact Ghana’s economy by shaping an EV Policy and building the enabling regulatory measures and instruments necessary to deploy sustainable transport measures and subsequently curb emissions growth.

1. This Response Plan will aid Ghana to deliver on its international commitments enshrined in its NDC and UNFCCC national communication.
2. In terms of stakeholder engagement, a number of workshops are envisaged that will stimulate interest and enable potential adopters to see electric vehicle demonstrations and associated business models in action. This will be supported with consumer awareness initiatives that will build capacity and stimulate knowledge transfer. These initiatives aim to increase trust and overcome barriers associated with new environmentally sound technologies/new technology adoption.
3. Successful delivery of the Response Plan requires stakeholder segmentation (see Section 7): the government officials, national energy companies and transport sector businesses will be critical to provide input into the development of the electric vehicle policy. This involves the harnessing of knowledge concerning regulatory, taxation and subsidy measures and instruments to drive deployment of EVs. The knowledge (market potential and insight), energy infrastructure, procurement, fiscal and financial incentives that will guide the roadmap, concept note development and market readiness framework will involve engagement across multiple stakeholders. This will involve a validation exercise with the objective of providing input and identifying and achieving consensus.
4. It is anticipated that a Committee will be established to act as a steering group to manage the effective delivery of the project. This will enable Ghana to agree the response plan deliverables: namely, the Policy and Framework, concept notes, roadmap, and feasibility study on EV options. This Committee will be provided with the capacity to enable them to agree the response plan deliverables: namely, an assessment of the market readiness of different options to enable a selection of the most sustainable and suitable options in terms of shaping the implementation framework and roadmap.
5. The Response Plan should be endorsed by the Government of Ghana and a commitment made to prioritise its implementation. It is anticipated that the Ministry of Transport/ National Committee on Climate Change in Ghana will be the lead actor in project implementation and oversight of actions.

10. Gender and co-benefits:

<p>Gender and co-benefits intended as result of the activities:</p>	<p>In Ghana, women face inequalities in terms of education, control and access to land, technology, decision-making power, and financial resources. These inequalities stem from prevailing cultural norms as well as legal and regulatory barriers.¹⁵ Consequently, women in Ghana are more likely to be impoverished than men, less likely to participate in policy-making and implementation and are less able to adapt to climate change impacts. Conversely, women are powerful agents of change due to their important role in Ghana’s relevant sectors for development and climate change - energy and agriculture.¹⁶ Women are also the most important actors in the renewable energy sector due to their reliance on energy in the households and</p>
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¹⁵ Women’s illiteracy rate is at 30% compared to 17% of men. In addition, women are also affected by the gendered divisions of labor which limit women to spend the majority of their time in unpaid, time consuming, productive activities. Ghanaian women spend more than two times as much time on domestic work than men (UNECA 2004).

¹⁶ In Ghana, women produce 70% of the nation’s subsistence crops, account for 52% of the labour force and contribute to 46% of the total GDP (FAO, 2012).

communities. This contribution to the energy sector is usually unaccounted for as it is unpaid and women’s production and consumption patterns of energy are often not accurately reflected in national statistics.

This Response Plan will align and reflect Ghanaian commitments under UNDP’s NDC Support Programme where Ghana is mainstreaming gender equality and women’s empowerment in national climate action with three areas: (i) Institutional arrangements and coordination mechanisms (ii) NDC planning process such as national or sectoral roadmaps and (iii) Mitigation or adaptation policy instruments.

This proposal will increase women’s participation and strengthen capacities for mainstreaming gender so to ensure that women are part of the decision making process. The stakeholder engagement and consultation processes identified in this Response Plan will capture the knowledge and skills of women as primary energy consumers and enable all vulnerable groups to contribute to sustainable and clean energy solutions. It is critical that gender be mainstreamed in the formulation and composition of the project steering committee also. Promoting women’s leadership across the project activities, such as through enhancing awareness and engaging women entrepreneurs, will not only help women’s economic autonomy by providing a source of income, but will offer women the opportunity to actively drive sustainable development within their communities.

This Response Plan will integrate gender equality considerations in Ghana’s Electro-Mobility Policy, Implementation and Market Readiness Framework. Integrating gender equality in the existing core planning process of this Response Plan will ensure a comprehensive approach and provides an opportunity to broaden the scope for addressing gender differentiated objectives. Instead of seeing women from a vulnerable group’s perspective, the process put forward will offer an entry point for recognizing women’s role as agents of change and key actors within climate action. This can help identify gender data gaps and provide recommendations on current capacity needs. In the Government of Ghana’s (draft) Transport white paper, the needs of vulnerable groups as a core policy objective: *“4.2.1.8 Policy objective: Ensure that transport system responds to the socio-economic needs of women, children and the aged”*. As agents of change women will be provided with opportunities to analyse and prioritize relevant electric vehicle policies and strategies from a gender equality perspective and provide different perspectives to planning, policy, and reporting mechanisms and instruments.

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.

In country stakeholder	Role in implementation of the technical assistance
<ul style="list-style-type: none"> - National Committee on Climate Change / Ministry of Environment, Science, Technology and Innovation (MEST) - Ministry of Transport - Environmental Protection Agency (EPA) - The Ghana Statistical Service (GSS) - Ministry of Energy and Petroleum - Energy Commission - Public and private thermal power producers - Ghana Grid Company (GRIDCo) - The National Petroleum Authority (NPA) - Ghana National Petroleum Corporation (GNPC) - Electricity Company of Ghana (ECG) - Tema Oil Refinery (TOR), - The Public Utility Regulatory Commission (PURC), - The Electricity Company of Ghana (ECG), - Bulk Oil Storage and Transportation Company (BOST) - The Northern Electricity Distribution Company (NEDCo), - Total Petroleum Ghana Limited (TPGL) - Ghana National Petroleum Corporation - Ghana oil company - Ministry of Finance 	<ul style="list-style-type: none"> - Response Coordination - Action planning and implementation roadmap input - Data provision for market readiness and feasibility assessment - Data and research input. - Transport prioritization
<ul style="list-style-type: none"> - Private Enterprise Foundation (PEF) - Ministry of Trade and Industry - CSIR – Institute of Industrial Research Ministry of Trade and Industry - Industry associations - Road Transport Operators (GPRTU, GRTCC, VIP, GH-Express Transport, OA Transport etc.) - Metropolitan, Municipal and District Assemblies - Consumer Groups - Driver and Vehicle Licensing Authority - National Road Safety Authority - Ghana Revenue Authority, Custom Division - Ministry of Finance 	<ul style="list-style-type: none"> - Action planning and implementation roadmap input - Market readiness and feasibility assessment. - Private sector mobilization - Stakeholder engagement
<ul style="list-style-type: none"> - The Bank of Ghana (BoG), - African Development Bank - Ecobank Ghana Limited - GCB Bank Limited (formerly known as Ghana Commercial Bank) - Agricultural Development Bank of Ghana - AmalBank - Bank of Africa Ghana Limited - CAL Bank - Ghana News Agency - Home Finance Company (HFC Bank) 	<ul style="list-style-type: none"> - Private sector mobilization and stakeholder input. - Market readiness and feasibility assessment. - Assisting in the identification of market needs and exploring new business opportunities in electro-mobility technology. - Large industry across transportation, power and finance.

<ul style="list-style-type: none"> - Private Sector Transport Operators - Societe Generale Ghana - UniBank 	
<ul style="list-style-type: none"> - ENDA - Hatof Foundation - University of Ghana - KNUST - CARE Ghana - CSIR BBRI (Transport engineering) - TV3 Ghana 	<ul style="list-style-type: none"> - Stakeholder input

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	
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)	The anticipated outcome is an Electro-mobility Policy and accompanying Implementation and Market Readiness Framework that presents a number of strategic, long-term, transformational electro-mobility measures that will drive climate resilient and low carbon growth in Ghana
	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	The requested assistance will identify the environmentally sound technologies that will be integral to delivering on Ghana's Electric Vehicles policy (2019) and strategy, including required charging infrastructure.
	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	The anticipated outcome is an Electro-mobility Policy and Framework that presents a number of strategic, long-term, participatory transformational measures that will drive climate resilient and low carbon growth in Ghana.
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	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	<i>All TAs should indicate relevance to Goal 13 and at least one target below (13.1 to 13.b).</i>

	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	Stakeholder engagement, skills development and capacity building are central to the methodological approach to be defined within the Response Plan.
	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	
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	

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	X	<input type="checkbox"/>
<input type="checkbox"/> 3. Recommendations for law, policy and regulations	X	<input type="checkbox"/>
<input type="checkbox"/> 4. Financing facilitation	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 5. Private sector engagement and market creation	<input type="checkbox"/>	X
<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"/>	X
<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 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.

Deliverable by output	Assurance regarding country ownership and engagement
Finalized EV Policy, National Implementation and Market Readiness Framework for Ghana, Finalized concept notes	<p>Preliminary review of National Electro-mobility Policy, Implementation and Market Readiness Framework by NDE.</p> <p>A centralised steering committee (chaired by the NDE or a nominee) is proposed to coordinate the review of deliverables and the implementation of the project. Representative stakeholders would be included in the constitution of this steering committee. It would be the focus for stakeholder engagement (especially vulnerable groups), be a convening power for public, private and civil society stakeholders and ensure that the project implementation by the national and international consultants is delivered with the highest level of impact and best value for money considerations.</p> <p>Input into Framework by stakeholders including energy or market regulators, power companies/operators / financiers and private business and civil society representatives. Quality assurance of deliverables will be maintained and project management guidance will be applied. Final approval by the Steering Committee of National Implementation and Market Readiness Framework and move to implementation.</p>
Finalized Implementation roadmap Finalized consultation workshop report.	Validation of the roadmap by key stakeholders in a series of workshops with the objective of providing input and identifying and achieving consensus. The steering committee will liaise with the project implementers to ensure representation and guide input into the Framework. Priorities for fulfillment of the actions under the roadmap will be informed by representative groups. Inputs will be integrated into final roadmap by project steering committee and accepted.
Finalized feasibility study on electro-mobility options, including Finalized Concept notes	The proposal will validate, prioritize and assess a number of measures and instruments and ultimately result in an EV Policy and implementation framework. A market assessment of electro-mobility technology will underpin this process. The development of assessment will be monitored by the steering committee, ensure it adheres to the terms and agreed scope. It will be ultimately signed off by this Committee.
Finalized Public Awareness Programme Finalized consultation workshop report Report on awareness of electro-mobility- input to increase consumer understanding and public confidence	Relevant research concerning awareness of electro mobility and market availability options will inform the overall Framework. This will inform perspectives and aims to increase consumer understanding of the potential of electro-mobility. The results of various research endeavor will feed into the steering committee and inform and shape the final deliverables.

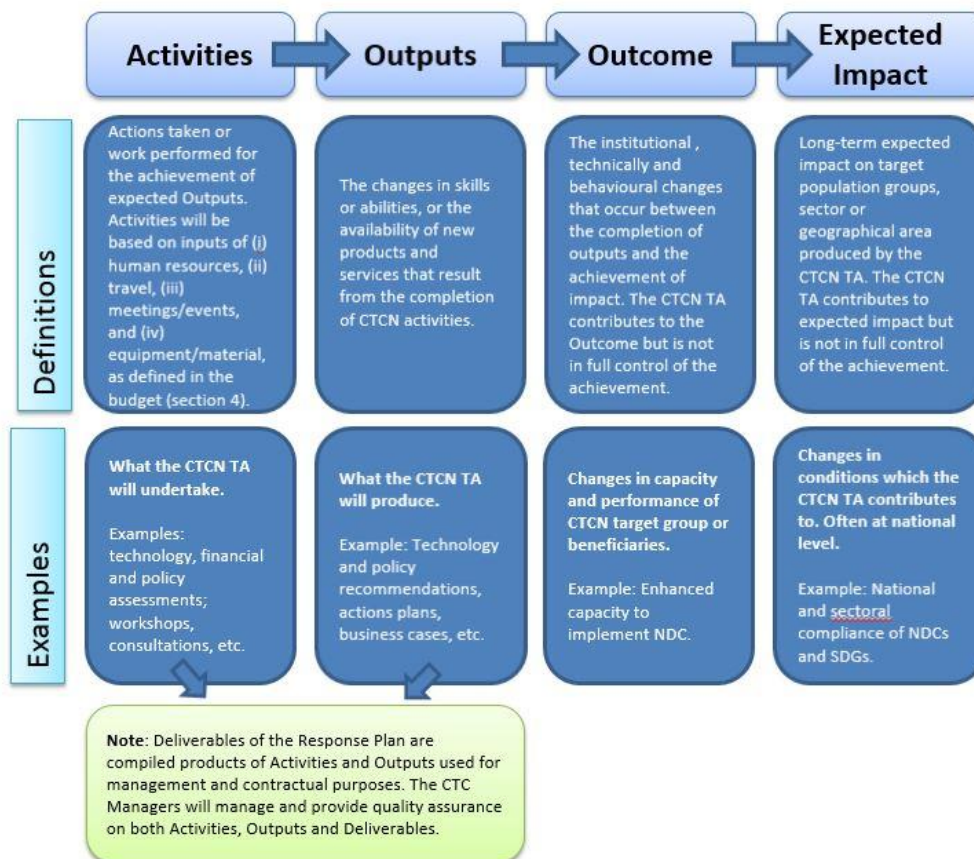
Annex 1: Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)

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.

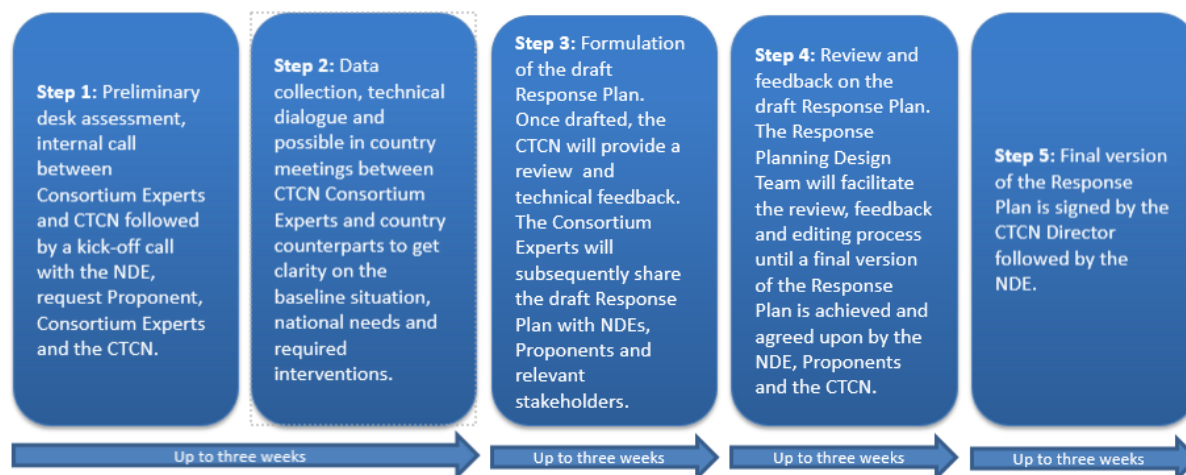
The role of CTCN Consortium experts is to lead the design of the Response Plan. The NDE will provide overall guidance on national context and priorities whereas the request Proponent will provide more detailed information on the sector, barriers and requested assistance. The Climate Technology Manager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