Programme design document form for small-scale CDM programmes of activities

(Version 05.0)

PROGRAMME DESIGN DOCUMENT (PoA-DD)	
Title of the PoA	Cable Propelled Mass Transit Projects in Nigeria
Version number of the PoA-DD	15
Completion date of the PoA-DD	28/09/2016
Coordinating/ managing entity	Ropeways Transport Limited, Nigeria
Host Party(ies)	Federal Republic of Nigeria
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	AMS-III.U: 'Cable Cars for Mass Rapid Transit System (MRTS)' version 1.0
Sectoral scope(s) linked to the applied methodology(ies)	Sectoral Scope 7 – Transport

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

Cable Propelled Mass Transit Projects in Nigeria
Version: 15
Date: 28/09/2016

A.2. Purpose and general description of the PoA

The goal of the PoA is to reduce carbon emissions relative to road transport in heavily trafficked urban areas in Nigeria by the introduction of innovative cable propelled mass transit that reduces CO2 emissions per passenger. The framework consists of providing a CDM vehicle to investors engaged in such transport initiatives. This technology used for mass transit will be the first time used[1] in Nigeria and is a significant technology transfer.

The population distribution in Nigeria reveals that the highest urban concentrations of population are located largely in the southern part of the country, particularly in Lagos, Ibadan and Port Harcourt. High density distribution can also be found in the Northern part especially in Kano and Zaria. The central issue of concern is the implications of these patterns of population distribution centres on resources, particularly on agricultural land, urban land use and infrastructure amenities, etc. whose availability are continuously diminishing[2]. One result of the increasing urbanization is that Nigeria is the development of several large metropolitan growth pole areas, which have high traffic volumes and problematic road transport infrastructure that is a challenge for sustainable development and contributes to GHG emissions.

For example, Lagos State (that consists primarily of the metropolitan area of Lagos) has become a megacity with over 16 million inhabitants[3]. Population projections estimate that it will soon become the world's third largest urban agglomeration in the near future. The existing roadway infrastructure is reaching a near breaking point as it is choked with increasing levels of traffic congestion. Although Metropolitan Lagos contains 632 km of road, supply of road space has not kept pace with demand. Nationally, Nigeria averages 11 vehicles per kilometer of road, but in Lagos this number skyrockets to 222 vehicles per kilometre[4]. The estimated 7 million daily commuters combined with 10.5 million daily motorized transport trips have caused severe hardship and hampers economic development within the city and negatively impacts the quality of life of its residents.

Prior to the implementation of the project activity, the existing scenario (also the baseline scenario) is the use of various types of inefficient vehicles mostly small and medium size buses (known locally as molue and danfo) for road-based transportation. The high number of gasoline and diesel powered vehicles and the inefficiency of the transport system, are the primary cause of transport CO2 emissions in Lagos State.

It should be noted that the topographical situation of some urban areas in Nigeria – such as

[1] http://www.nigerianwatch.com/news/5010-work-on-nigerias-first-urban-cable-car-network-in-lagos-to-begin-in-november- checked on 18/09/2014

[2] Migration, Poverty and Rural-Urban Habitats In Nigeria by Dr. Isah Mohammed Abbass of Department Of Political Science, Ahmadu Bello University, Zaria, Nigeria. http://www.abu.edu.ng/publications/2012-06-05-213714_5712.pdf

[3] CUP 2011: Lagos Cable Propelled Transit Preliminary Feasibility Study by Creative Urban Projects (CUP), Carlton Street, Toronto, Ontario Canada

[4] ESIA 2012: Environmental and Social Impact Assessment Studies for the Proposed Lagos Cable Car Transit System by Sustainability Limited, Nigeria

swamps and lagoons, as well as the high population density[5] – make cable cars that have a relatively small land-use foot-print a viable option.

Policy/measure or stated goal that the PoA seeks to promote

The proposed PoA seeks to promote efficient and less carbon intensive transportation in highly populated areas in Nigeria using cable cars. Cable cars can be a sustainable, carbon efficient component of urban mass transit policies and programs.

Framework for the implementation of the proposed PoA

The PoA will be implemented and managed by Ropeways Transport Limited, Nigeria. Each CPA will be implemented within the proposed PoA in accordance with the eligibility criteria outlined in this PoA-DD and seek to encourage investors in this sector. Under this PoA, cable car routes could be developed in several urban areas – albeit each such cable car system is strongly dependent on site-specific conditions.

Confirmation that the PoA is a voluntary action by the coordinating/managing entity

It is confirmed that the PoA is a voluntary action by the coordinating/managing entity (CME) – Ropeways Transport Limited, Nigeria. There are no mandatory requirements in Nigeria regarding the use of cable cars or mass transit transport system options encapsulated in this PoA.

PoA contributes to sustainable development

The PoA has an important positive environmental impact due to reduction in the usage of buses and thereby high carbon, fossil fuels that emit pollutants such as: particulate matter, carbon monoxide (CO), hydrocarbons (HCs), Sulphur dioxide (SO2) and Nitrogen oxide (NOx).

The fees for using the cable cars are expected to be comparable with the existing buses, thus allowing for commuters to travel the same distance at the same approximate cost and less time per distance to reach destination. This will provide lower cost transport and allow for more time to utilize for economic or other pursuits.

Considering the number of people that is expected to use the cable car on a daily basis, it is expected that all the cable car stations will attract business opportunities such as; facilities managers, traders and ticketing offices. The implication of this is creation of job opportunities for youths in the cities where the cable car is sited both at the construction and operations stages. It will also lead to reduced travel times as the cable car is not affected by traffic and is a high-speed means of transportation. Additionally the cable car users will experience less frustration and lost time due to traffic congestion, this improves the quality of their lives. Also, as the local air quality is improved, and there are less respiratory diseases.

Also if implemented it will be a vivid example of creative, technologically advanced ways to contribute to sustainable, lower carbon development; thereby acting as a stimulus throughout the continent. No public information exists on any similar project in West Africa indicating this will be its first introduction in the region.

[5] Lagos State Climate Change Policy 2012-2014, pg 2. http://developmentdiaries.com/wp-content/uploads/2013/03/Lagos-State-Climate-Change-Policy-First-Draft_27.03.2012.pdf checked on 18/09/2014

A.3. CME and participants of PoA

The CME of the PoA, who will communicate with the UNFCCC Executive Board, will be the Ropeways Transport Limited, Nigeria. Ropeways Transport Limited, Nigeria will have a written agreement with project developers who submit a CPAs as part of the PoA. Ropeways Transport Limited may work with Consultants in the office of the CME to manage the PoA.

A.4. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) project participants, CME (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Federal Republic of Nigeria	Ropeways Transport Limited, Nigeria	No

A.5. Physical/ Geographical boundary of the PoA

All CPAs associated with this PoA will be implemented within the geographical boundary of Nigeria.

A.6. Technologies/measures

The project activity will apply to technologies that conform to the following methodology:

- AMS-III.U: 'Cable Cars for Mass Rapid Transit System (MRTS)' version 1.0 (and subsequent versions), under Type III (Other Project activities), Sectoral Scope 7 – Transport.

The technology and measures to be employed by each CPA will involve:

- Transportation using cable technology mounted on fixed supports.
- Cabins deployed on each line to carry groups of people. The total capacity varies depending on the type of line and cabin used.

The system is electricity driven which would be provided using dedicated off-grid connected supply to ensure uninterrupted power supply.

A.7 Public funding of PoA

Ropeways Transport Limited, Nigeria declares that there is no public funding for the proposed PoA. See attached letter of declaration from the project participant.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

Following the standard on clause 4.1 of the EB65, Annex 03, "Demonstration of additionality, development of eligibility criteria and applications of multiple methodologies for programme of activities" and in accordance to the "Methodological tool on the demonstration of additionality on small scale project activities (version 10)" which states that project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers;

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

For the individual CPAs to be included under this Programme of Activities, the project participant shall provide a transparent description/explanation to show that the project activity would not have occurred due to at least one of the barriers listed above.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

The eligibility criteria for inclusion of a CPA in the PoA are based on the requirements of the "Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities", Version 4 (EB 65, Annex 03)[6]; further on referred to as "PoA Standard". By using this PoA Standard it is demonstrated that all the CPAs that are in compliance with the additionality-related eligibility criteria set below will ensure that all the relevant additionality related standards, tools or any requirements embedded in the methodologies are met.
A CPA is eligible for inclusion under the PoA, provided that the CPA fulfils the following criteria, demonstrated through the listed evidences for each eligibility criteria, as follows:

Eligibility Criteria	Means of Verification (checked by CME at CPA inclusion)	Fixed at:
(a) The CPA is within the **geographical boundaries** of Nigeria	Map showing location of project included in CPA	CPA
(b) The CPA must submit a unique identification of the proposed project activity to avoid **double counting**.	This is checked by the GPS coordinates of the project activity and Unique Identification Number (UIN) assigned to the CPA by the CME.	CPA
(c) The CPA **technology** is that of cable propelled transit	CPA provides engineering documentation or feasibility study with technical specifications that indicates: **the type** -- aerial rope transit (ART) or other ropeway technologies; **the design**-- cabins, towers, terminals/stations and **ropes** (mono, bi, tri or more); the **size/capacity** – (2 – 1000 persons per cabin).	CPA
(d) **Start date** conforms to Project Standard	The start date in the CPA will provide evidence of the either implementation, construction or	CPA

[6] http://cdm.unfccc.int/Reference/Standards/index.html

requirements	real action that is the determinant. As no cable cars exist in Nigeria, all future CPA requests will by definition be after the start date of the PoA	
(e) All the applicability criteria in the AMSIII.U **methodology** are met in the CPA	CPA documentation includes applicability criteria and the evidence that it conforms	CPA
(f) The CPA shall clearly **demonstrates its additionality** to be eligible for inclusion under the PoA in line with the Methodological tool on the demonstration of additionality of small scale project activities (version 10): • Investment barrier • Technological barrier • Barrier due to prevailing practice • Other barriers	Describe how the additionality of the project activity is demonstrated as per the "Methodological tool on demonstration of additionality of small scale project activities, (version 10)" taking into consideration the "Guidelines for objective demonstration and assessment of barriers (version 01)".	CPA
(g) EIA and local stakeholder consultations requirements by the Nigerian government must be respected. The Monitoring approval of the CPA by CME, inclusion of CPA and CER right transfer should be duly considered for this project activity.	The necessary documentation shall be provided to demonstrate that it satisfies the requirements.	
(h) Any Annex 1 **Donor Funding** will be disclosed by the CPA project developer.	Each CPA must submit a letter stating clearly the disclosure of public funding or other funding options.	CPA
(i) CME shall specify the **target group** of the project activity **(rural/urban)**.	The CPA-DD must clearly define the target group (rural/urban) by stating the location of the project activity or evidence shown from the feasibility studies.	CPA
(j) **Sampling** used in the CPA for passenger survey shall conform to "Standard for sampling and surveys for CDM project activities and programme of activities" See details in Appendix 5.	CME should assure that the sampling is in conformance with the sampling guidelines and standards.	CPA
(k) CPA must show that **Small scale limit** is not exceeded. Also, where applicable, it must ensure that every CPA	This shall be evident by the spread sheet submission for the ER calculation.	CPA

	(in aggregate if it comprises of independent sub units) meets the small-scale or microscale threshold and remains within those thresholds throughout the crediting period of the CPA.		
(l)	A CPA shall not be a debundled component of a large scale project activity in accordance to the "Methodological tool on assessment of debundling for SSC project activities" clause 5.3.	The project developer should provide a written statement attesting to this and include a map/schematic of any nearby cable car activity. The CME should compare this to other activities under the PoA.	CPA

B.3. Application of technologies/measures and methodologies

The PoA will apply the following approved baseline and monitoring methodology (ies):

• AMS-III.U: 'Cable Cars for Mass Rapid Transit System (MRTS)' version 1.0 (and subsequent versions), under Type III (Other Project activities), Sectoral Scope 7 – Transport.

The methodological tools relevant to this project (when applicable) are:

• Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 02)

Each CPA implemented under this PoA will involve the implementation of a cable car project using the technology in accordance with the technologies outlined in Section A.6.

The guideline for sampling plan for all CPAs included into this PoA has been included in appendix 5.

B.4. Date of completion of application of methodology and standardized baseline and contact information of responsible person(s)/ entity(ies)

The application of methodology was completed on 19/09/2014.

Carbon-Limits Nigeria is in charge of the preparation of the PoA documentation. Technical information was provided by Ropeways Transport Limited Nigeria. The contact information of responsible entities is:

Paul J. Parks
Carbon-Limits Nigeria, Ltd.
Plot 13/14 Ligali Ayorinde Street
Victoria Island, Lagos, Nigeria
Email: paul.parks@carbonlimits.no
Tel: + (234) 01 2798969

Archie Duke
Ropeways Transport Limited Nigeria
No. 1D Club road,
Ikoyi, Lagos, Nigeria
Email: archie@ropewaystransport.com
Tel: + (234) 01 8447797

SECTION C. Management system

Roles and Responsibilities

As the coordinating/managing entity, Ropeways Transport Limited, Nigeria will be responsible for the overall management of the PoA, collation of all relevant data and preparation of monitoring reports for verification purposes, and providing the interface with the DOE and UNFCCC EB.

Each project developer in Nigeria with a project that he believes fits the eligibility requirements of this PoA can submit a written request including a draft CPA to the CME. The CME will review the request and if appropriate will inform the project developer that it can be included in the PoA, dependent on the successful completion of the final CPA and agreement to the terms of the PoA. Upon completion of the final CPA, it will be reviewed by the CME, and if it meets the PoA requirements, a contract will be signed between the CME and the project developer of the CPA for its inclusion in the PoA.

In order to deliver each CPA in the most effective manner, the CME may enter into agreements with partner organisations and/or hire contractors to provide technical advice or services to the PoA subject to agreed terms and conditions.

Ropeways Transport Limited as the CME will use a management system to ensure all CPA Implementers under the PoA implement, operate, and monitor their respective CPAs in an effective and verifiable manner. The roles and responsibilities of the CME and CPA will cover the following aspects as shown in the table below:

Roles and Responsibilities of the CME	Roles and Responsibilities of the CPA
Approval of CPAs	Submit CPA DD form to the CME
Overall data collection and collation of the various CPAs	Collection and quality control of data
Quality control of monitoring and avoidance of double counting	Training and Capacity building
Submit monitoring report to the DOE	Submit monitoring report to the CME
Assign CERs to the CPAs	Calculation of CERs based on the methodology

It should be noted that if no more than one CPA is registered under the PoA, the CPA monitoring report will serve as that of the PoA. PoA involves small-scale activities with limited CERs, thus unnecessary monitoring costs must be avoided if CDM registration is to contribute to the projects' implementation.

Records of Training and Capacity Development

The CPA will as part of its monitoring plan assure proper training and will provide, as needed, to the CME all records of training and capacity development. The CME will also ensure their technical personnel are well trained on relevant skills for the project activity. The records of all these trainings will be kept in the office of the CME.

Procedure for technical review of inclusion of CPAs

The CPA will need to send a letter of intent of project participation and Project Idea Note (PIN) to the CME. The CME will therefore review the request letter and the CPA against the eligibility criteria. These criteria will be extensively reviewed and if the project qualifies based on the criteria as stated in section B.2, the CME will sign agreement with the participating entity and issue an ID for the project. The CME will therefore prepare the CPA-DD and submit to the DOE for review and when approved, the CPA gets registered and posted on the UNFCCC website.

Avoidance of double counting

All project activities will have specific GPS coordinates and CME will grant CPA implementers with ID number. As the project activities require significant fixed infrastructure, the CME can readily verify the projects using the coordinates to trace their locations.

Records and documentation control process for each CPA under the PoA

The CPA will be required to maintain all relevant monitoring data, which will be compiled in an electronic workbook, and will be supported by field notes/records (where applicable) and details of all instrument/equipment calibrations (including dates and copies of calibration certificates where available), as per the approved monition procedures. All data collected on each site will be provided to the CME in an agreed format to provide a central point for data management and archiving of all records applicable to the PoA.

Measures for continuous improvements of the PoA management system

The CME will review the performance of the CPAs at the end of each monitoring period, and if shortcomings are identified, improvements will be put in place.

Quality control of monitoring

Each CPA will be required to put in place a comprehensive monitoring plan and system of electronic data management prior to the commencement of the first crediting period that will follow a template that allows the information to be collated and reviewed by the CME. Both the CPA and the CME data and monitoring system will be accessible to the verifying Designated Operational Entity (DOE). Any CPA that does not maintain proper monitoring and reporting will be excluded from the PoA for the affected monitoring period. A manual will be developed to highlight roles and responsibilities for each CPA.

SECTION D. Duration of PoA

D.1. Start date of PoA

The start date of this PoA is the date of publication of the PoA-DD for Global Stakeholder Consultation – 29/10/2013 – as shown on the UNFCCC website.

D.2. Duration of the PoA

28 years

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

Environmental impact analysis will be done at the CPA level and will be undertaken to the degree that is required by the Nigerian Government and its agencies. The review and approval of such environmental analysis is the responsibility of the government agency involved.

In carrying out the impact assessment, Environmental Regulatory Agencies exist at various levels in Nigeria and these agencies have a common objective of protecting and preserving the environment and human health. This is in accordance with the EIA Act No. 86 of 1992, which mandates that public or private sector of the economy shall not undertake or embark or authorize projects or activities without prior consideration, at the early stage, of their environmental effects. The social impacts of the project activity is also considered and analysed.

E.2. Analysis of the environmental impacts

The current EIA required by Nigerian government agencies can include the following areas:

- Activities at the construction stage
- Activities at the operational stage

The EIA can include the following impacts:

- Impacts on water resources
- Waste generation
- Soil contamination
- Noise pollution
- Air quality impact
- Fire outbreak and explosions
- Security of passengers and properties
- Impact on vegetation
- Impact on transport routes
- Oil seepage from generators and other mechanical equipment

The Nigerian Government may change any of these items at its discretion.

SECTION F. Local stakeholder consultation

F.1. Solicitation of comments from local stakeholders

As the project activities under this PoA will be specific physical locations (the cable car routes) it is appropriate that the local stakeholder consultation process will be undertaken by the individual CPA as that is where the affected stakeholders are located. It should be noted that stakeholder consultations are usually required for medium to large scale of projects in Nigeria. It should be noted that the CDM status of the project has no impact on the physical project and thus on local stakeholders.

F.2. Summary of comments received

This will be recorded as required.

F.3. Report on consideration of comments received

All comments will be considered to the degree required under regulation.

SECTION G. Approval and authorization

Host government has been informed and the Designated National Authority (DNA) has conducted site visit thereafter a letter of approval for the PoA and the first CPA as well as letter of authorization for the CME has been requested and approved from the Nigerian Office of the Designated National Authority on 28/06/2014.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

The CPA will be a cable car project implemented in any urban area in Nigeria that displaces the existing use of less efficient and higher GHG emission emitting means of transportation. Under this CPA, a cable car route (s) can be implemented that will move passengers over a certain distance every year over the life of the project activity and in so providing this service, GHG emissions will be reduced from the baseline.

SECTION B. Application of a baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology(ies) and standardized baseline(s)

Approved baseline and monitoring methodology (ies) AMS III U "Cable Cars for Mass Rapid Transit System (MRTS)," version 1.0 (and subsequent versions). Additionally, the methodological tools relevant to AMS.III-U. (when applicable) are:

• Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 02).

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B.2. Applicability of methodology(ies) and standardized baseline(s)

AMS III U is an appropriate choice of methodology, because all of the projects under this PoA will comply with the applicability criteria as outlined in AMS III U. These include the following:

General Applicability Criteria	Project Activity
(a) A new cable car is built. Extensions of existing cable car routes are not eligible.	New cable car is built with no extension to existing cable car routes.
(b) Cable cars are only for passenger transport; the passenger performs partial or total trip on the cable car.	Designed solely for passenger use.
(c) Cable cars are established as a means of mass transit. The cable car must be built in an area that is accessible by road (origin and final destination of the cable car).	The lines on the CPA to be implemented are all accessible as they are all integrated into existing road network.
(d) The methodology is applicable if fuels used in the baseline and or project case are electricity, gaseous or liquid fossil fuels. If Bio fuel blends are used as liquid fuels, the specific fuel consumption value and emission factors used for determining baseline and project emissions shall be adjusted accordingly.	The types of fuel used in the baseline and project case are electricity and/or liquid fossil fuels as explained in Section B.6.3.

(e) The methodology is applicable if the analysis of possible baseline scenario alternatives leads to the result that a continuation of the current public transport system is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases (GHG) that would occur in the absence of the proposed project activity (i.e. the baseline scenario).	The baseline scenario for the CPA of the Cable Car is the continuation of the current road traffic system, which is what would occur in the absence of the proposed project activity.
(f) Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2e annually	The estimated emission reductions from the project activity are less than 60kt CO2e as shown in Section B.6.3.

B.3. Sources and GHGs

The spatial extent of the project boundary is the geographical area of trips of passenger using the cable car. As electricity from the grid is unreliable and characterized with low power generation and supply which has led to power rationing and outages, the project activity therefore will be connected to off-grid generators for the operation of the transport system. The project boundary include the off-grid (captive) generators connected purposely for the project activity.

	Source	Gas	Included?	Justification/Explanation
Baseline	Emissions from combustion of fossil fuels used directly for transportation (BE_y)	CO_2	Yes	Main emission source
		CH_4	No	Minor source. Neglected for simplicity
		N_2O	No	Minor source. Neglected for simplicity
Project Activity	Emissions from combustion of fossil fuels used directly (electricity utilisation) for transportation (DPE_y)	CO_2	Yes	Main emission source
		CH_4	No	Minor source. Neglected for simplicity
		N_2O	No	Minor source. Neglected for simplicity
	Emissions from combustion of fossil fuels used indirectly for transportation (IPE_y)	CO_2	Yes	Main emission source
		CH_4	No	Minor source. Neglected for simplicity
		N_2O	No	Minor source. Neglected for simplicity

B.4. Description of baseline scenario

Currently the only public mass transit in the central metropolitan areas in Nigeria is buses. The population density and topographical situation of the major urban areas (e.g. Lagos, Abuja and Port Harcourt) make mass transit schemes that rely on infrastructure other than road both expensive and difficult to implement[7]. For example, a light rail system is being implemented to connect more distant mainland areas to central Lagos[8], but this is not equivalent to the cable car

[7] http://rediscovernigeria.org/nigeria/transport-infrastructure Checked on 18/09/2014

[8] http://www.railway-technology.com/projects/lagosrailmasstransit/ Checked on 18/09/2014

system that is designed for the densely populated, central business area. (Indeed the light rail and cable car system will be complimentary). Other type of mass transit system currently under consideration is the light rail but this would take several years to actualize in densely populated central metropolitan areas of Nigeria. Therefore the feasible alternative to cable cars is an expansion of the road-based buses.

GHG emission reductions are achieved through an improved efficiency of transporting passengers with the cable car compared to the traditional transport mode that would have been used in the absence of the cable car. Currently and for the foreseeable future, the traditional transport mode using diesel and gas for fuels is dominated by small and medium sized buses, motorcycle taxis and three-wheeled mini-cars represent 78% of motorized traffic, of which 83% is bus-related.[9]. The most recent initiative on mass transit in Lagos also uses buses – Bus Rapid Transit (BRT) – Lite that began operations in 2008.[10] Given this reliance on bus based-transport in central Lagos, it is reasonable to assume that the base line is the continued expansion of this bus transport mode. This mode has never utilized CDM in Nigeria.

Baseline emissions are those, which would have been caused by passengers in the absence of the project activity using baseline modes of transport from their trip origin to their trip destination. Baseline emissions per PKM (Passenger Kilometre) per mode are fixed ex-ante and are annually decreased based on a technology improvement factor. Total baseline emissions are calculated based on the number of project passengers, the baseline emission factor per PKM, and the trip distance on the respective modes. The baseline emissions include total trip emissions of project passengers from their trip origin to their trip destination.

Steps followed to determine baseline emissions are:

1. Identify relevant vehicle categories
2. Determine emissions per kilometre of vehicle categories through fuel consumption data
3. Determine emissions per passenger-kilometre through occupation data per mode category through average trip distance per passenger per mode category
4. Determine trip modes and trip distances of cable car passengers in absence of the project based on a survey realised of cable car users
5. Calculate total baseline emissions based on the average baseline trip emissions and the number of passengers transported by the cable car.

B.5. Demonstration of eligibility for a generic CPA

A CPA is eligible for inclusion under the PoA, provided that the CPA fulfils the following criteria, demonstrated through the listed evidences for each eligibility criteria, as follows:

(a)	**Eligibility criterion:** The CPA is within the **geographical boundaries** of Nigeria
	Evidence for demonstration of CPA compliance with criterion: This is clearly demonstrated in the map showing location of project and the state (as shown in Section A.7) and the GPS coordinates.

(b)	**Eligibility criterion:** The CPA must submit a unique identification of the proposed project activity to avoid **double counting**.
	Evidence for demonstration of CPA compliance with criterion: This is confirmed by submission of the GPS coordinates for the CPA and CME assigns a unique identification number (UIN) to the project activity.

[9] Lagos Cable Propelled Transit Preliminary Feasibility Study, op cite , page 41.

[10] Integrated Transport Planning, 2009, op cite –page 3

(c)	**Eligibility criterion:** The CPA **technology** is that of cable propelled transit
	Evidence for demonstration of CPA compliance with criterion: The "feasibility report" submitted has in it the section "Scheme Overview page 12" with the CPA clearly documents that the technology fits that of Cable Propelled Transit as described in the PoA.

(d)	**Eligibility criterion: Start date** conforms to Project Standard requirements
	Evidence for demonstration of CPA compliance with criterion: The start date is the date that the major construction works of Ropeway terminals is anticipated to start.

(e)	**Eligibility criterion:** All the applicability criteria in the AMSIII.U **methodology** are met in the CPA
	Evidence for demonstration of CPA compliance with criterion: This is demonstrated in compliance to all the applicability criteria as shown in section D2.

(f)	**Eligibility criterion:** The CPA demonstrates **additionality** to be eligible for inclusion under the PoA in line with the methodological tool on the demonstration of additionality of small scale project activities (version 10).
	Evidence for demonstration of CPA compliance with criterion: This CPA satisfies the additionality conditions based on the technology barrier option as stated in the PoA. This is valid for the CPA as the cable car project is the first of its kind in the country with no technical expert on the cable car technology..

(g)	**Eligibility criterion:** EIA and local stakeholder consultations requirements required by the Nigerian government must be respected. The Monitoring approval of the CPA by CME, inclusion of CPA and CER right transfer should be duly considered for this project activity.
	Evidence for demonstration of CPA compliance with criterion: The EIA documentation for the proposed project activity is being undertaken and draft ESIA report submitted with this CPA. Monitoring of the project activity is defined as per the monitoring section (D.7.1). This is the first CPA and developed by the CME hence satisfies inclusion, requires no approval and CER right transfer.

(h)	**Eligibility criterion:** Any Annex 1 **Donor Funding** will be disclosed by the CPA project developer.
	Evidence for demonstration of CPA compliance with criterion: The CPA has not used any donor funding for the project activity. A letter to this effect is attached in Appendix 2.

(i)	**Eligibility criterion:** CME shall specify the **target group of the project activity (rural/urban).**
	Evidence for demonstration of CPA compliance with criterion: Target group for the project activity are passengers in urban areas. This is clearly defined in the feasibility study. The cable car will be installed across central business districts.

(j)	**Eligibility criterion:** Sampling used in the CPA for passenger survey shall conform to "Standard for sampling and surveys for CDM project activities and programme of activities" see details in Appendix 5.
	Evidence for demonstration of CPA compliance with criterion: The CPA applied the appropriate standard and guideline for sampling and survey for CDM project activities and programme of activities.

(k)	**Eligibility criterion:** CPA must show that **Small scale limit** is not exceeded. Also, where applicable, it must ensure that every CPA (in aggregate if it comprises of independent sub units) meets the small-scale or microscale threshold and remains

	within those threshold throughout the crediting period of the CPA.
	Evidence for demonstration of CPA compliance with criterion: Project participants provided an estimation of emission reductions of the project activity over the crediting period and show that the emission reductions every year will not go beyond the limits of 60 ktCO2e/y over the entire crediting period as included in the estimation of the annual emission reduction over the first 7 years.

(l)	**Eligibility criterion:** A CPA shall **not a debundled** component of a large scale project activity in accordance to the methodological tool on assessment of debundling for small scale project activities clause 5.3.
	Evidence for demonstration of CPA compliance with criterion: The schematic and GPS coordinates submitted in the CPA demonstrate that it is a self-standing project, and not within one km of any other such activity.

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

Baseline and project emissions are based on the emissions passengers cause from origin to destination based on modes and trip distances project passengers would have caused in absence of the cable car against actual emissions caused with project operation (direct project emissions of the cable car plus indirect ones caused to and from the cable car).

The indicator used to demonstrate and calculate emission reductions is based on emissions per passenger-kilometre (PKM). This implies that, the project emissions per PKM are compared to the baseline emissions per PKM. It is assumed that the passengers do not change origin and destination of their trip except in the case of induced trips[11], which would not have occurred in absence of the project. However, the project may change trip structures including the modes used or the total trip distance.

Baseline emissions are those that would have been caused by passengers using the cable car using baseline modes of transport. The baseline emissions include total trip emissions of project passengers from their trip origin to their trip destination.

The emission factor per passenger kilometre for each vehicle category is calculated *ex ante* and includes a fixed technology-improvement factor per vehicle category. It should be noted that according to the methodology, GHG emission per kilometre for each vehicle category is calculated *ex ante* and remains fixed for the project period. The value is based on specific fuel consumption data of the respective category and will be annually updated according to the technology improvement factor per vehicle category[12].

[11] Passengers (such as tourists) that may have been induced to travel because of the existence of the project activity and those trips are seasonal

[12] Introduction of technology improvement factor is due to the fact that under business as usual conditions emission factors per vehicle category per fuel type may change due to: a) Vehicles are replaced with more efficient ones; b) Vehicles in stock tend to increase emissions based on wear and tear.

Emission factor per kilometre per vehicle category

$$EF_{KM,i} = \sum_{x} \left[SFC_{x,i} \times NCV_x \times EF_{CO2,x} \times \frac{N_{x,i}}{N_i} \right] \times IR_i^t \qquad \textit{(Equation 1, AMS-III.U., Version 01)}$$

Where:

$EF_{KM,i}$	Emission factor per kilometre of vehicle category *i* ($grCO_2$/km)
$SFC_{x,i}$	Specific fuel consumption of vehicle category *i* using fuel type *x* prior project start (gr/km)
NCV_x	Net calorific value of fuel *x* (J/gr)
$EF_{CO2,x}$	Carbon emission factor for fuel type *x* ($grCO_2$/J)
$N_{x,i}$	Number of vehicles of category *i* using fuel type *x* prior project start (units)
N_i	Number of vehicles of category *i* prior project start (units)
IR_i^t	Technology improvement factor for the vehicle of category i per year t. The improvement rate is applied to each calendar year. The default value of the technology improvement factor for all vehicle categories is fixed as 0.99
t	Year counter for the annual improvement (dependent on age of data per vehicle category)

Emission factor per passenger-kilometre per vehicle category

$$EF_{PKM,i} = \frac{EF_{KM,i}}{OC_i} \qquad \textit{(Equation 2, AMS-III.U., Version 01)}$$

Where*:*

$EF_{PKM,i}$	Emission factor per passenger-kilometre of vehicle category *i* ($grCO_2$/PKM)
$EF_{KM,i}$	Emission factor per kilometre of vehicle category *i* ($grCO_2$/km)
OC_i	Average occupation rate of vehicle category *i* prior project start (passengers)[13]

Total Baseline Emissions

$$BE_y = \frac{\sum_{s} \sum_{i} P_{BL,i,s,y} \times TD_{BL,i,s,y} \times EF_{PKM,i}}{10^6} \qquad \textit{(Equation 3, AMS-III.U., Version 01)}$$

Where:

[13] In the case of taxis the driver is not included.

BE_y Baseline emissions in the year *y* (tCO_2e)

$P_{BL,i,s,y}$ Passengers transported by the project in the quarter *s* of the year *y* who would have used mode *i* in the baseline (passengers)

$TD_{BL,i,s,y}$ Average trip distance of passengers who would have used mode *i* in the baseline in the quarter *s* of the year *y* (kilometer)

$EF_{PKM,i}$ Emission factor per passenger-kilometre of vehicle category *i* ($grCO_2$/PKM)

$\sum_s$ Sum of the four (4) surveys realized[14]

Baseline Passengers per Mode

$$P_{BL,i,s,y} = P_{s,y} \times SP_{BL,i,s,y}$$ *(Equation 4, AMS-III.U., Version 01)*

Where:

$P_{BL,i,s,y}$ Passengers transported by the project in the quarter *s* of the year *y* who would have used mode *i* in the baseline (passengers)

$P_{s,y}$ Passengers transported by the project in the quarter *s* of the year *y* (passengers)

$SP_{BL,i,s,y}$ Share of passengers transported by the project in the quarter s of the year y who would have used mode i in the baseline (%)

Project Emissions

According to the selected methodology AMS-III.U., Version 01, paragraph 22-28, Project emissions are based on the fuel and/or electricity consumed by the project multiplied with the respective GHG emission factor. Indirect emissions caused by project passengers from their trip origin to the project entry station and from the project exit station to the final trip destination are also taken into consideration.

Direct project emissions (DPE) are based on the electricity consumption of the cable car. This is calculated based on the quantity of electricity consumed, an emission factor for electricity generation and a factor to account for transmission losses as per the procedure of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 02 as follows:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EF,j,y} \times \left(1 + TDL_{j,y}\right)$$ (Based on Equation 1 from the tool)

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (tCO_2/yr)

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)

$EF_{EF,j,y}$ = Emission factor for electricity generation for source j in year y (tCO_2/MWh)

[14] There are no seasonal variations in Nigeria to expect significant difference in the data, the figures were based on the study carried out. When the project activity starts, surveys will be carried out.

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y.

The captive power plant shall be sited at the point of consumption; close to the cable car hence the transmission and distribution losses should be considered to be zero ($TDL_{j,y}$ = 0).

This is based on Equation 1 of the "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation* Version 02".

The emission factor ($EF_{EF,j,y}$) for electricity generation based on the off-grid captive power plant is calculated according to equation below under Option B1 of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 02.

The emission factor for electricity generation based on the captive generation is determined as follows:

$$EF_{EL,d,\mathrm{y}} = \frac{\sum_i FC_{d,i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{d,y}}$$

$EF_{EL,d,\mathrm{y}}$ = Emission factor for electricity generation at plant *d* in year *y* (tCO_2/MWh)

$FC_{d,i,y}$ = Quantity of fossil fuel type *i* fired in the captive power plant at project plant *d* in year *y* (mass or volume unit) which at the submission of the PoA DD was based on preliminary specifications of the generators to be used.

$NCV_{i,y}$ = Average net calorific value of fossil fuel type *i* used in year *y* (GJ/mass or volume unit)

$EF_{CO2,i,y}$ = Average CO_2 emission factor of fossil fuel type *i* used in year *y* (tCO_2/GJ)

$EG_{d,y}$ = Quantity of electricity generated in the captive power plant at project plant *d* in year *y* (MWh) based on the design specifications of the energy requirements for the project activity.

The emission factor for the off-grid captive power plant will be calculated ex-post.

Indirect project emissions (IPE) are those caused by passengers from their origin point up to the project entry station and from the project exit station up to the final trip destination. This will be carried out by quarterly survey. The survey is expected to identify the origin, project entry station; project exit station and the final destination of the passenger plus the modes used between the different points e.g. bike from origin to project entry station and metro from project exit station to final destination.

Indirect Project Emissions

$$IPE_y = \frac{\sum_s \sum_i P_{PJ,i,s,y} \times TD_{PJ,i,s,y} \times EF_{PKM,i}}{10^6}$$ *(Equation 5, AMS-III.U., Version 01)*

Where:

IPE_y Indirect project emissions in the year *y* (tCO_2e)

$P_{PJ,i,s,y}$ Number of passengers transported by the project in the quarter *s* of the year *y* using mode *i* for trips to and from the project system (passengers)

$TD_{PJ,i,s,y}$ Average trip distance of passengers using mode *i* in the quarter *s* of the year

y to and from the project system (kilometer)

$EF_{PKM,i}$ Emission factor per passenger-kilometre of vehicle category *i* ($grCO_2$/PKM)

$\sum_s$ Sum of the four (4) quarterly surveys realized

Passengers per Mode

$$P_{PJ,i,s,y} = P_{s,y} \times SP_{PJ,i,s,y}$$ *(Equation 6, AMS-III.U., Version 01)*

Where:

$P_{PJ,i,s,y}$ Passengers transported by the project in the quarter *s* of the year *y* using mode *i* for trips to and from the project system (passengers)

$P_{s,y}$ Passengers transported by the project in the quarter *s* of the year *y* (passengers)

$SP_{PJ,i,s,y}$ Share of passengers transported by the project in the quarter *s* of the year *y* using mode *i* to and from the project systems (%)

Total Project Emissions

Total project emissions are the sum of indirect and direct project emissions.

$$PE_y = DPE_y + IPE_y$$ *(Equation 7, AMS-III.U., Version 01)*

Where:

PE_y Project emissions in the year *y* (tCO_2e)

DPE_y Direct project emissions in the year *y* (tCO_2e)

IPE_y Indirect project emissions in the year *y* (tCO_2e)

Leakage

Leakage is only considered if the total annual effect is to reduce estimated emission reductions. Hence, this is adjudged by the fact that any significant (10% or higher) change in the average occupancy rate of each of the vehicle category is considered as leakage of the project.

It is also noted that the impact of induced traffic (additional trips) provoked through the new transport system is addressed directly in the project emissions and is not considered part of the leakage. It is thus included as project emissions due to the trips of passengers, which, in absence of the cable car project, would not have realized the trip.

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$ *(Equation 8, AMS-III.U., Version 01)*

Where:

ER_y Emission reductions in year y (tCO_2e)

BE_y Baseline emissions in year y (tCO_2e)

PE_y Project emissions in year y (tCO_2e)

LE_y Leakage emissions in year y (tCO_2e)

B.6.2. Data and parameters fixed ex-ante

Data / Parameter:	$SFC_{PT,G}$,$SFC_{SB,G}$, $SFC_{BB,D}$
Data unit:	gr/km
Description:	Specific fuel consumed by Passenger car/Taxi and Small buses of fuel type gasoline and Big buses of fuel type diesel.
Source of data:	As per methodology requirement In the decreasing order of preference: 1. Local measured data not elder than 3 years (studies e.g. conducted by the project proponent or conducted by reputed institutions including relevant department of Universities); 2. National or international data from studies not elder than 3 years; 3. IPCC default values for the respective vehicle categories (latest year).
Value(s) applied:	**Type of vehicle** / **Specific fuel consumption gr/km** / **Unit** Passenger cars/Taxi / (-) / gr/km Small Buses / (-) / gr/km Big buses / (-) / gr/km
Choice of data or Measurement methods and procedures:	Individual CPAs shall apply either of the alternatives as stated above based on the methodology.
Purpose of data	Baseline and Project emissions calculation
Additional comment:	This value will be different for each CPA and will be determined at the time of CPA inclusion.

Data / Parameter:	$N_{x,i}$
Data unit:	Vehicles
Description:	Number of vehicles of category *i* using fuel type *x*
Source of data:	• Municipal or road transport authorities based on vehicle registration statistics from the respective city in year XXXX; or • Data from vehicle control stations (technical and emission control stations) in year XXXX; • If no city/municipal data is available; regional data of year XXXX (canton, state) or as the last option national data published in year XXXX shall be used.
Value(s) applied:	**Type of vehicle** / $N_{x,i}$ / **Fuel type** Passenger cars/Taxi / (-) / gasoline Small Buses / (-) / gasoline Big buses / (-) / diesel
Choice of data or Measurement methods and procedures:	The choice of data will depend on the CPA and any of the options for source of data stated above that is applicable.
Purpose of data	Baseline and Project emissions calculation
Additional comment:	In situations where the number of vehicles of category *i* using fuel type x prior project start equals number of vehicles of category *i* prior project start; that is $N_{x,I} = N_i$ then this parameter is considered negligible

Data / Parameter:	NCV_x
Data unit:	J/gr
Description:	Net calorific value of fuel *x*
Source of data:	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value(s) applied:	43.3×10^3 – diesel 44.8×10^3 – gasoline
Choice of data or Measurement methods and procedures:	IPCC default values
Purpose of data	Baseline and Project emissions calculation
Additional comment:	None

Data / Parameter:	$EF_{CO2,D}$, $EF_{CO2,G}$
Data unit:	$grCO_2/J$
Description:	CO_2 emission factor for diesel and gasoline
Source of data:	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value(s) applied:	74.8×10^{-6}- diesel 73.0×10^{-6}- gasoline
Choice of data or Measurement methods and procedures:	IPCC default values
Purpose of data	Baseline and Project emissions calculation
Additional comment:	None

Data / Parameter:	OC_{PT} , OC_{SB}, OC_{BB}
Data unit:	Passengers
Description:	Average occupation rate of passenger car/Taxi, small buses and big buses.
Source of data:	Data from the local transport authority in year XXXX (As per the AMS.III.U Methodology - Municipal transport authorities/specific studies done by the project proponent or a third party). Vintage of maximum 3 years.
Value(s) applied:	

Type of vehicle	**Ave. Occupancy rate OC**
Passenger cars/Taxi	(-)
Small Buses (Danfos)	(-)
Big Buses (BRT /LAG buses)	(-)

Choice of data or Measurement methods and procedures:	Based on boarding-alighting studies realized in the areas of study of the project for all types of vehicle categories from the stops where passengers are admitted for transit using all the vehicle categories.
Purpose of data	Baseline and Project emissions calculation
Additional comment:	This value will be different for each CPA and will be determined at the time of CPA inclusion.

Data / Parameter:	DD_B
Data unit:	kilometres
Description:	Total distance driven of buses of various sub-categories prior project start
Source of data:	Data from bus companies (company records), municipal transport authorities or specific studies done by the project proponent or a third party could be applied. Vintage maximum 3 years
Value(s) applied:	XX
Choice of data or Measurement methods and procedures:	The choice of data will depend on the CPA and any of the options for source of data stated above that is applicable.
Purpose of data	Baseline emissions calculation
Additional comment:	This data is applicable if various sub-categories of buses operate.

Data / Parameter:	EC_R
Data unit:	kWh
Description:	Quantity of electricity consumed by the baseline rail based transit system
Source of data:	Rail system operator; last available year
Value(s) applied:	XX
Choice of data or Measurement methods and procedures:	The choice of data will depend on the CPA and the source of data shall be stated above if applicable for subsequent CPAs.
Purpose of data	Baseline emissions calculation
Additional comment:	Required if the city has rail based transit systems that serve same geographical area.

Data / Parameter:	EF_{Grid}
Data unit:	$kgCO_2/kWh$
Description:	Emission factor for the grid electricity
Source of data:	Not applicable. The project does not use electricity from the grid
Value(s) applied:	Not applicable. The project does not use electricity from the grid
Choice of data or Measurement methods and procedures:	Not applicable. The project does not use electricity from the grid
Purpose of data	Not applicable. The project does not use electricity from the grid
Additional comment:	Not applicable. The project does not use electricity from the grid

Data / Parameter:	P_R
Data unit:	Passengers
Description:	Total passengers transported by baseline rail based transit system per year
Source of data:	Rail system operator; last available year
Value(s) applied:	-
Choice of data or Measurement methods and procedures:	The choice of data will depend on the CPA and the source of data stated above if applicable.
Purpose of data	Baseline emissions calculation
Additional comment:	Required if the city has rail based transit systems as PKM for rail based systems is calculated in general based on total passengers and average trip distance instead of average occupation rate

Data / Parameter:	TD_{PR}
Data unit:	Kilometres
Description:	Average trip distance of urban rail based transit passengers
Source of data:	Rail system operator; last available year
Value(s) applied:	-
Choice of data or Measurement methods and procedures:	Based on electronic ticketing system or on surveys
Purpose of data	Baseline emissions calculation
Additional comment:	Required only for rail trip distance not total trip distance. It is only used if the city has rail based transit systems as PKM for rail based systems is calculated in general based on total passengers and average trip distance instead of average occupation rate.

B.6.3. Ex-ante calculations of emission reductions

To demonstrate the calculation of emission reductions generated by a CPA included under the proposed PoA, the Cable Car CPA parameters is used as sample calculations for each equation used, substituting the data used for estimation in the cable car project in the equations below:

Emission factor per Kilometre per vehicle category

$$EF_{KM,i} = \sum_x \left[SFC_{x,i} \times NCV_x \times EF_{CO2,x} \times \frac{N_{x,i}}{N_i} \right] \times IR_i^t \qquad \textit{(Equation 1, AMS-III.U., Version 01)}$$

Where:

$EF_{KM,i}$ Emission factor per kilometre of vehicle category *i* ($grCO_2/km$)

$SFC_{x,i}$ Specific fuel consumption of vehicle category *i* using fuel type *x* prior project start (gr/km)

NCV_x Net calorific value of fuel *x* (J/gr)

$EF_{CO2,x}$ Carbon emission factor for fuel type *x* ($grCO_2/J$)

$N_{x,i}$ Number of vehicles of category *i* using fuel type *x* prior project start (units)

N_i Number of vehicles of category *i* prior project start (units)

IR_i^t Technology improvement factor for the vehicle of category i per year t. The improvement rate is applied to each calendar year. The default value of the technology improvement factor for all vehicle categories is fixed as 0.99

t Year counter for the annual improvement (dependent on age of data per vehicle category)

For the purpose of the generic component project activity, please note that the number of vehicles in each category *i* using fuel type *x* prior to the project start is assumed to be number of vehicles of category *i* prior project start considering the fact that all the vehicles in each category uses same type of fuel.

The specific fuel consumption of vehicle category prior to the project start was based on the extensive feasibility study carried out. The net calorific values and the emission factors of the fuel types used are calculated using the "2006 IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy.

Type of vehicle	**Specific fuel consumption gr/km**	**Unit**	**References**
Passenger cars/Taxi	(-)	gr/km	Data from the local State Transport Authority for the year XXXX
Small Buses	(-)	gr/km	Data from the local State Transport Authority for the year XXXX
BRT buses	(-)	gr/km	Data from the local State Transport Authority for the year XXXX

The passenger cars/Taxi and small buses use gasoline fuel while the big buses uses diesel fuel.

The net calorific values of the fuel types used are calculated using the "2006 IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy.

Type of fuel	**Net Calorific Values of fuel**	**Unit**	**References**
Gasoline	44.8 X 10^3	J/gr	*IPCC NCV value for gasoline at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. (Stated as 44.8TJ/Gg)*
Diesel	43.3 X 10^3	J/gr	*IPCC NCV value for diesel at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. (Stated as 43.3 TJ/Gg)*

The emission factors of the fuel types used are calculated using the "2006 IPCC Guidelines for National Greenhouse Gas Inventories", Volume 2, Energy.

Type of fuel	Carbon Emission factor for fuel types	Unit	References
Gasoline	73.0 X 10^{-6}	$grCO_2/J$	*"2006 IPCC Guidelines for National GHG Inventories", Vol. 2 Energy, CO_2 emission factor for gasoline at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 in Chapter 1 (Stated as 73000 kgCO2/TJ)*
Diesel	74.8 X 10^{-6}	$grCO_2/J$	*"2006 IPCC Guidelines for National GHG Inventories", Vol. 2 Energy, CO_2 emission factor for diesel at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 in Chapter 1 (Stated as 74800 kgCO2/TJ)*

The technology improvement factor, IR is given as 0.99 in the methodology

The Emission factor per kilometre of the vehicle categories ($grCO_2$/km) are therefore calculated ex-ante as stated below:

Vehicle categories	EF_{KM} (grCO2/km)
Pass. cars/Taxi	(-)
Small Buses	(-)
BRT buses	(-)

Emission factor per passenger-kilometre per vehicle category

$$EF_{PKM,i} = \frac{EF_{KM,i}}{OC_i}$$ *(Equation 2, AMS-III.U., Version 01)*

Where*:*

$EF_{PKM,i}$ Emission factor per passenger-kilometre of vehicle category *i* ($grCO_2$/PKM)

$EF_{KM,i}$ Emission factor per kilometre of vehicle category *i* ($grCO_2$/km)

OC_i Average occupation rate of vehicle category *i* prior project start (passengers)[15]

Average occupation rate of vehicle category prior project start were taken from the report of a feasibility study carried out.

[15] In the case of taxis the driver is not included.

Type of vehicle	Ave. Occupancy rate OC	References
Passenger cars/Taxi	(-)	Data from the local transport authority in year XXXX
Small Buses	(-)	Data from the local transport authority in year XXXX
BRT buses	(-)	Data from the local transport authority in year XXXX

Emission factor per passenger-kilometre of vehicle category

Emissions per PKM (grCO2eq/PKM)							
Mode	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Pass. cars/Taxi	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Small Buses	(-)	(-)	(-)	(-)	(-)	(-)	(-)
BRT buses	(-)	(-)	(-)	(-)	(-)	(-)	(-)

The Occupation rate of vehicle categories will be reviewed on an on-going basis using the data from the feasibility studies. The technology factor will be applied annually and thus emissions per PKM are expected to change over time.

Baseline Passengers per Mode

$$P_{BL,i,s,y} = P_{s,y} \times SP_{BL,i,s,y}$$ *(Equation 4, AMS-III.U., Version 01)*

Where:

$P_{BL,i,s,y}$ Passengers transported by the project in the quarter *s* of the year *y* who would have used mode *i* in the baseline (passengers)

$P_{s,y}$ Passengers transported by the project in the quarter *s* of the year *y* (passengers)

$SP_{BL,i,s,y}$ Share of passengers transported by the project in the quarter s of the year y who would have used mode i in the baseline (%)

Passenger Lines	No. of Passengers/year	Unit	References
Blue line	(-)	people	Data from the local transport authority in year XXXX
Red line	(-)	people	Data from the local transport authority in year XXXX
Green line	(-)	people	Data from the local transport authority in year XXXX

(The designations “Blue”, “Red”, and “Green” are those used in the initial CPA, but the lines are generic and any designation and number of lines can be used.)

Share of passengers transported by the project in the year *y* who would have used mode *i* in the baseline

Type of vehicle	% of Passenger use	Unit	References
Passenger cars/Taxi	(-)	%	Municipal or road transport authorities based on vehicle registration statistics from the respective city in year XXXX
Small Buses	(-)	%	Municipal or road transport authorities based on vehicle registration statistics from the respective city in year XXXX
BRT buses	(-)	%	Municipal or road transport authorities based on vehicle registration statistics from the respective city in year XXXX

During the project activity, the survey for share of passengers transported by the project will be carried out based on the questionnaire in appendix 5 (further background information on the monitoring plan).

Total Baseline Emissions

$$BE_y = \frac{\sum_s \sum_i P_{BL,i,s,y} \times TD_{BL,i,s,y} \times EF_{PKM,i}}{10^6}$$ *(Equation 3, AMS-III.U., Version 01)*

Where:

BE_y Baseline emissions in the year *y* (tCO_2e)

$P_{BL,i,s,y}$ Passengers transported by the project in the quarter *s* of the year *y* who would have used mode *i* in the baseline (passengers)

$TD_{BL,i,s,y}$ Average trip distance of passengers who would have used mode *i* in the baseline in the quarter *s* of the year *y* (kilometer)

$EF_{PKM,i}$ Emission factor per passenger-kilometre of vehicle category *i* ($grCO_2/PKM$)

$\sum_s$ Sum of the four (4) surveys realized

All Lines							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Number of passengers	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Total baseline emissions tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)

(These estimates are based on the data from Local Transport Authority. Surveys are an ex-post activity).

Project Emissions

Project emissions are based on the fuel and/or electricity consumed by the project multiplied with the respective GHG emission factor. There are two types of project emissions; direct and indirect project emissions. Direct project emissions (DPE) are based on the electricity consumption of the cable car while the indirect project emissions are caused by project passengers from their trip origin to the project entry station and also from the project exit station to the final trip destination.

The proposed CPA is expected to have its primary source of electricity by the captive generator. There is acute shortage and erratic supply of electricity in Nigeria and considering the power requirement of the project activity, the project participant will not consider the power supply from the grid , but rather captive power. Sources of fuel for captive power supply shall be monitored when the project activity is in operation to calculate the emission factor for the sources of electricity .

For the purpose of the estimation, the emission factor for the captive generator will be estimated for the project emissions calculations as per the procedures of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 02.

Direct project emissions (DPE)

Direct project emissions are based on the electricity consumption of the cable car. This is calculated based on the quantity of electricity consumed, an emission factor for electricity generation and a factor to account for transmission losses as per the procedure of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 02, as follows:

$$PE_{EC,y} = \sum_{j} EC_{PJ,j,y} \times EF_{EF,j,y} \times \left(1 + TDL_{j,y}\right) \qquad \text{(Based on Equation 1 from the Tool)}$$

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (tCO_2/yr)

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)

$EF_{EF,j,y}$ = Emission factor for electricity generation for source j in year y (tCO_2/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y.

The captive power plant is expected to be sited at the point of consumption, close to the cable car hence the transmission and distribution losses shall be considered to be zero ($TDL_{j,y}$ = 0).

This is based on Equation 1 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation version 02".

The emission factor ($EF_{EF,j,y}$) for electricity generation based on the off-grid captive power plant is calculated according to equation below under Option B1 of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" Version 02.

$$EF_{EL,d,\mathrm{y}} = \frac{\sum_i FC_{d,i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{d,y}}$$

Equation 4 from "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 02

Where:

$EF_{EL,d,\mathrm{y}}$ = Emission factor for electricity generation at plant *d* in year *y* (tCO_2/MWh)

$FC_{d,i,y}$ = Quantity of fossil fuel type *i* fired in the captive power plant at project plant *d* in year *y* (mass or volume unit) which at the submission of the PoA DD was based on preliminary specifications of the generators to be used.

$NCV_{i,y}$ = Average net calorific value of fossil fuel type *i* used in year *y* (GJ/mass or volume unit)

$EF_{CO2,i,y}$ = Average CO_2 emission factor of fossil fuel type *i* used in year *y* (tCO_2/GJ)

$EG_{d,y}$ = Quantity of electricity generated in the captive power plant at project plant *d* in year *y* (MWh) based on the design specifications of the energy requirements for the project activity.

The emission factor for the off-grid captive power plant will be calculated ex-post.

Indirect Project Emissions (IPE)

This is expected to be carried out as required in the methodology. In accordance with appendix 5 as per further background on the monitoring plan, the survey will identify the origin, project entry station; project exit station and the final destination of the passenger plus the modes used between the different points e.g. bike from origin to project entry station and metro from project exit station to final destination. The distances between origin and entry and between exit and destination are very close. Lagos is a very high density area and very flexible road transport. The distance travels to the stations are minimal and in all cases are walking distances to where the bus/taxi parks are located.

$$IPE_y = \frac{\sum_s \sum_i P_{PJ,i,s,y} \times TD_{PJ,i,s,y} \times EF_{PKM,i}}{10^6}$$ *(Equation 5, AMS-III.U., Version 01)*

Where:

IPE_y Indirect project emissions in the year *y* (tCO_2e)

$P_{PJ,i,s,y}$ Number of passengers transported by the project in the quarter *s* of the year *y* using mode *i* for trips to and from the project system (passengers)

$TD_{PJ,i,s,y}$ Average trip distance of passengers using mode *i* in the quarter *s* of the year *y* to and from the project system (kilometer)

$EF_{PKM,i}$ Emission factor per passenger-kilometre of vehicle category *i* ($grCO_2$/PKM)

$\sum_s$ Sum of the four (4) quarterly surveys realized

Passengers per Mode

$$P_{PJ,i,s,y} = P_{s,y} \times SP_{PJ,i,s,y}$$ *(Equation 6, AMS-III.U., Version 01)*

Where:

$P_{PJ,i,s,y}$ Passengers transported by the project in the quarter *s* of the year *y* using mode *i* for trips to and from the project system (passengers)

$P_{s,y}$ Passengers transported by the project in the quarter *s* of the year *y* (passengers)

$SP_{PJ,i,s,y}$ Share of passengers transported by the project in the quarter *s* of the year *y* using mode *i* to and from the project systems (%)

Total Project Emissions

Total project emissions are the sum of indirect and direct project emissions.

$$PE_y = DPE_y + IPE_y$$ *(Equation 7, AMS-III.U., Version 01)*

Where:

PE_y Project emissions in the year *y* (tCO_2e)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Direct project emissions tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Indirect project emissions tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Total project emissions tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Leakage

Leakage emissions are considered zero as it is not anticipated that there would be any significant (10% or higher) change in the average occupancy rate of each of the vehicle category as per the requirement in AMS.III.U methodology.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Leakage load factor tCO_2	0	0	0	0	0	0	0
Total leakage emissions in tCO_{2eq}	0	0	0	0	0	0	0

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$ *(Equation 8, AMS-III.U., Version 01)*

Where:

ER_y Emission reductions in year y (tCO_2e)

BE_y Baseline emissions in year y (tCO_2e)

PE_y Project emissions in year y (tCO_2e)

LE_y Leakage emissions in year y (tCO_2e)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Baseline emissions in tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Project emissions in tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Leakage emissions in tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Emissions reductions in tCO_{2eq}	(-)	(-)	(-)	(-)	(-)	(-)	(-)

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

Data / Parameter:	P
Data Unit:	Passengers
Description:	Total Passengers transported by the project
Source of data:	Cable car Operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	Passenger numbers based on entry statistics
Monitoring frequency:	Continuously, aggregated at least per quarter
QA/QC procedures:	Control with ticket sales
Purpose of data	Baseline and project emissions calculation
Additional comments:	None

Data / Parameter:	$SP_{BL,i,s}$
Data Unit:	%
Description:	Share of passengers in the quarter s of the respective year who would have used the baseline mode *i*
Source of data:	Cable car operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	This shall be based on survey at CPA level
Monitoring frequency:	Continuously, aggregated at least per quarter
QA/QC procedures:	The survey shall be realised at a 95% confidence interval with a maximum of 5% error margin
Purpose of data	Baseline emission calculation
Additional comments:	None

Data / Parameter:	$SP_{PJ,i,s}$
Data Unit:	%
Description:	Share of passengers using the project mode *i* in the quarter *s* of the respective year from trip origin to the project entry station and from project exit station to their final destination
Source of data:	Cable car operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	This shall be based on survey at CPA level
Monitoring frequency:	Continuously, aggregated at least per quarter
QA/QC procedures:	The survey shall be realised at a 95% confidence interval with a maximum of 5% error margin
Purpose of data	Project emission calculation
Additional comments:	None

Data / Parameter:	$TD_{BL,i,s}$
Data Unit:	Kilometre
Description:	Trip distance of passengers using the baseline mode *i* in the quarter s of the respective year
Source of data:	Cable car operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	This shall be based on survey at CPA level
Monitoring frequency:	Continuously, aggregated at least per quarter
QA/QC procedures:	The survey will be realised at a 95% confidence interval with a maximum of 5% error margin. To ensure a conservative trip distance and thus conservative baseline emissions of the lower boundary of the 95% confidence interval for the trip distance is taken i.e this ensures that with 95% probability the actual trip distance baseline is equal to or higher than the trip distance taken for project baseline emission calculations.
Purpose of data	Baseline emission calculation
Additional comments:	None

Data / Parameter:	$TD_{PJ,i,s}$
Data Unit:	Kilometre
Description:	Trip distance of passengers using the project mode *i* in the quarter s of the respective year from their trip origin to the project entry station and from the project exit station to their final destination
Source of data:	Cable car operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	This shall be based on survey of distance of the cable car station to the bus station at the CPA level
Monitoring frequency:	Continuously, aggregated at least per quarter
QA/QC procedures:	The survey shall be realised at a 95% confidence interval with a maximum of 5% error margin. To ensure a conservative trip distance and thus conservative baseline emissions of the lower boundary of the 95% confidence interval for the trip distance is taken i.e this ensures that with 95% probability the actual trip distance baseline is equal to or higher than the trip distance taken for project baseline emission calculations.
Purpose of data	Project emission calculation
Additional comments:	It should be noted that the stations are located very close to existing bus stations and such are walking distance from the cable car station to bus/taxi station. The distances considered in the table above are conservative as the maximum possible walking distance.

Data / Parameter:	EC_{PJ}
Data Unit:	kWh
Description:	Quantity of electricity consumed by the cable car for traction
Source of data:	Cable car operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	Calculated based on the name plate rating on the electric motors and the number of hours of operation of the cable car on daily basis.
Monitoring frequency:	Continuously, aggregated at least annually
QA/QC procedures:	Cross check measurement results with the amount of electricity supplied from the electricity supplier/captive generators.
Purpose of data	Project emissions calculation
Additional comments:	None

Data / Parameter:	$EG_{D,y}$
Data unit:	kWh
Description:	Quantity of electricity generated in captive power plant
Source of data:	Cable car operator
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	As per “Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (Version 02)
Monitoring frequency:	Continuously, aggregated at least annually
QA/QC procedures:	Based on UNFCCC procedures; as per “Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 02”
Purpose of data	Project emissions calculation
Additional comment:	None

Data / Parameter:	$FC_{n,i,t}$
Data Unit:	Volume unit per year (in m^3, ton or l)
Description:	Quantity of fossil fuel type *i* fired in the captive power plant *n* in the time period *t*
Source of data:	Cable car operator (Annual data during the crediting period: Onsite measurements)
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	Volume meter
Monitoring frequency:	Continuously, aggregated at least annually
QA/QC procedures:	The consistency of metered fuel consumption quantities is cross-checked with an annual energy balance that is based on purchased quantities and stock changes.
Purpose of data	Project emissions calculation
Additional comments:	None

Data / Parameter:	$NCV_{i,t}$
Data Unit:	GJ / litres
Description:	Average net calorific value of fossil fuel type *i* used in the period *t*
Source of data:	For this generic CPA, option d) of the tool (Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 02) was applied as option (a) is not available. This is the use of the IPCC values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value(s) applied:	To be determined at each CPA level as this is CPA specific
Measurement methods and procedures:	To be determined at each CPA level as this is CPA specific
Monitoring frequency:	To be determined at each CPA level as this is CPA specific
QA/QC procedures:	To be determined at each CPA level as this is CPA specific
Purpose of data	Project emissions calculation
Additional comments:	-

Data / Parameter:	$EF_{CO2,i,t}$
Data Unit:	t CO2 / GJ
Description:	CO_2 emission factor of fossil fuel type *i* used in the period *t*
Source of data:	For this generic CPA, option d) of the tool ((Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 02) was applied as option (a) is not available. This is the use of the IPCC values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. For this generic CPA, option d) was applied as option a) is not available.
Value(s) applied:	To be determined at each CPA level as this is CPA specific
Measurement methods and procedures:	To be determined at each CPA level as this is CPA specific. For this generic CPA, as option a) is not provided, option d) was applied
Monitoring frequency:	To be determined at each CPA level as this is CPA specific
QA/QC procedures:	To be determined at each CPA level as this is CPA specific
Purpose of data	Project emissions calculation
Additional comments:	-

Data / Parameter:	$EF_{off-grid}$
Data unit:	$kgCO_2/kWh$
Description:	Emission factor for the off- grid electricity
Source of data:	As per procedures in "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 02
Value(s) applied:	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures:	As per "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (Version 02)
Monitoring frequency:	annually
QA/QC procedures:	Based on UNFCCC procedures; as per "Tool to calculate baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 02"
Purpose of data	Project emissions calculation
Additional comment:	-

Data / Parameter	Occupancy rate of vehicle category *i*
Data Unit	Passengers
Description	Any significant (10% or higher) change in the average occupancy rate of each of the vehicle category is considered as leakage of the project
Source of data	Specific studies done by the project participant or third party
Value(s) applied	To be determined at each CPA level as this is CPA specific.
Measurement methods and procedures	Before project start and when new survey data is publicly available from the State Transport Authority. This shall be carried out at the CPA level
Monitoring frequency	This will be carried out in year 3 and 7 as a 7-year crediting period is the option chosen
QA/QC procedures	Based on 95% confidence interval where relevant
Purpose of data	Baseline, Project and Leakage emissions calculation
Additional comments	Details of Load Factor Study that should be considered by each CPA The frequency of the load study is: • If 100% of the project is implemented at the start: Year 2 to monitor short-term response of vehicle categories to the MRTS and years 5 and 10 to monitor medium-term response. Data of year 2 is used for years 3-5 and data of year 5 for rest of crediting period. To monitor the occupancy rate of the vehicle categories every year is not considered as necessary, as changes are expected either in the first years (short-term response) or then in the medium-term. In between only incremental annual changes are expected which would not justify the considerable expenses for realizing such surveys. • With gradual project implementation monitoring years may vary. It is proposed to monitor at a minimum every 3 years e.g. year 3, 6 and 10. If the load factor reduces less than 10 percentage points no leakage is included. If the load factor reduces by more than 10 percentage points relative to the measurement before project start (benchmark) then leakage is calculated and included. In this case the amount of leakage is the cumulative sum of all years since the last load factor survey was realized assuming that the reduction of the load factor occurred immediately since the last survey.

B.7.2. Description of the monitoring plan for a generic CPA

In the proposed PoA the Option (ii) is chosen, i.e. the CME opts for a verification method that does not use sampling but verifies each small scale CPA.

For each small scale CPA; a monitoring plan, Quality assurance and Quality control measures will be prepared and described in the CPA-DD. The operating manual will outline the procedures for monitoring and recording of parameters as described in the Section B.7.1 above. Please see in appendix 5 below, the sampling plan approach for the parameters ($\mathbf{SP_{BL,i,s}}$; $\mathbf{SP_{PJ,i,s}}$; $\mathbf{TD_{BL,i,s}}$; $\mathbf{TD_{PJ,i,s}}$ and *Occupancy rate of vehicle category i*) that requires survey expected to be carried at each CPA level.

The project proponent of CPA will be responsible for:

- Implementing the cable car project,
- Monitoring, recording and storing of their project data,
- Reporting of their project data to the CME,
- Arranging the maintenance and calibration of the monitoring equipment, as will be described in the monitoring plan of the CPA.
- Ensuring all data sources or other official sources for the emergency situations when the measurement equipment fails shall be specified in the CPA-DD.
- Sampling of relevant parameters

The Project proponent will prepare a detailed operating manual of the equipment. An organizational structure to manage the collection, processing and storage of data will be used to manage the monitoring of the project activity.

Appendix 1. Contact information of coordinating/managing entity and responsible person(s)/ entity(ies)

CME and/or responsible person/ entity	☒ CME ☐ Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Ropeways Transport Limited
Street/P.O. Box	1d Club Road, Ikoyi
Building	
City	Ikoyi
State/Region	Lagos
Postcode	
Country	Nigeria
Telephone	+234 (1) 2710823
Fax	
E-mail	ceo@ropewaystransport.com
Website	www.ropewaystransport.com
Contact person	Dapo Olumide
Title	
Salutation	
Last name	Olumide
Middle name	

CME and/or responsible person/ entity	☐ CME ☒ Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Carbon Limits Nigeria
Street/P.O. Box	13/14 Ligali Ayorinde
Building	
City	Victoria Island
State/Region	Lagos
Postcode	
Country	Nigeria
Telephone	+234 (1) 2798968
Fax	
E-mail	paul.parks@carbonlimits.no
Website	www.carbonlimitsngr.com
Contact person	Paul Parks
Title	
Salutation	
Last name	Parks
Middle name	

Appendix 2. Affirmation regarding public funding

Not applicable

Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

Not applicable

Appendix 4. Further background information on ex ante calculation of emission reductions

Not applicable

Appendix 5. Further background information on the monitoring plan

All CPAs are expected to carry out sampling and survey in accordance to the “Standard and guidelines for sampling and surveys for CDM project activities and programme of activities” to be included into the PoA.

The following steps shall be used to carry out sampling for every CPA included into the PoA:

1. The sampling size shall be determined by the 95% confidence interval and the 5% maximum error margin.
2. Sampling shall be statistically robust and relevant to the project activity i.e. the survey shall be a random distribution and will be a representative of the persons using the project transport system.
3. The methodology to select persons for interviews shall be made random
4. Only persons over age 18 shall be interviewed considering the percentage of people in Nigeria that usually will embark on such trips alone without a guardian.
5. The survey shall be realized on all week days and Saturdays with the sample size per day being proportional to the number of passengers transported by the project per corresponding week day. Sample size shall be determined using any of the options found suitable in line with “Standard for sampling and surveys for CDM project activities and programme of activities”.
6. The sample size upwards and downwards in the cable car is proportional to the number of passengers transported upwards/downwards on the cable car.

The survey will be realized as described in the methodology and in accordance with the survey plans by the transport authority for each cable car during one (1) calendar year. Thereafter the survey is not repeated.

Passenger Study – For Cable Car PoA

Interviewer:……

Date:…….

Time:…….

Point (station) where the interview was performed:……..

Identification of cable car line:……

Question 1

"Describe the trip you are currently realizing"

1.1. Your trip origin (starting point, e.g. my home):……

1.2. Your entry (boarding) station cable car (name of station):……

1.3. Your exit (de-boarding) station cable car (name of station):……

1.4. Your final trip destination (final point, e.g. office):…….

If 1.1. and 1.2. are different, then go to question 2; otherwise continue with question 3.

Question 2

"What mode of transport did you use from your trip start to the cable car? Please refer to the mode on which you performed the longest stretch if you used various modes"

☐ Bus ☐ Rail/Metro/Tram ☐ Taxi ☐ Passenger car ☐ Motorcycle ☐ Taxi tri-cycle ☐ Bike or per foot

If 1.1. and 1.4. are different, then go to question 3; otherwise continue with question 4.

Question 3

"What mode of transport will you use from the point where you leave the cable car until your final destination? Please refer to the mode on which you will perform the longest stretch if you intend to use various modes"

☐ Bus ☐ Rail/Metro/Tram ☐ Taxi ☐ Passenger car ☐ Motorcycle ☐ Taxi tri-cycle ☐ Bike or per foot

Question 4

"Assuming that the cable car you are currently using would not exist: Would you have made the trip you are currently doing anyway or would you have stayed at home/office/origin"

☐ I would have made the trip ☐ I would have stayed at home/office/origin

If you would have made the trip continue with question 5; otherwise the questionnaire is terminated.

Question 5

"Assuming that the cable car you are currently using would not exist: Would you have used 1 or various modes of transport for your entire trip from origin to destination?"

☐ I would have used 1 mode ➔ go to question 6

☐ I would have used more than 1 mode (e.g. taxi plus bus)

If you would have used various modes of transport identify the intermediate points where you changed the mode of transport except if between these points you walked less than 10 minutes. Example: From home I would have taken the bus to point XXY and from there I would have taken the taxi to my office.

Origin of trip (identical to 1.1.):……

Intermediate point 1:

Intermediate point 2:

Destination of trip (identical to 1.4.):……

Question 6

"What mode of transport would you have used between each identified point?" Please answer this question for each distance realized separately e.g. origin to XXY and XXY to destination.

Trip segment (based on question 5 e.g. origin to point XXY):……

Mode I would have used in absence of the cable car for this trip segment:

☐ Bus ☐ Rail/Metro/Tram ☐ Taxi ➔ go to 6A ☐ Passenger car ➔ got to 6B ☐ Motorcycle ➔ go to 6C ☐ Taxi tri-cycle ➔ go to 6D ☐ Bike or per foot

Question 6A

"Have you used a taxi for the purpose of this commute in the last 6 months?"

☐ Yes ☐ No

Question 6B

"Do you or your family own a car or do you have access to a car (e.g. car-sharing) or have you used a passenger car for the purpose of this commute in the last 6 months?"

☐ Yes ☐ No

Question 6C

"Do you or your family own a motorcycle or do you have access to a motorcycle or have you used a motorcycle for the purpose of this commute in the last 6 months?"

☐ Yes ☐ No

Question 6D

"Have you used a taxi tri-cycle for the purpose of this commute in the last 6 months?"

☐ Yes ☐ No

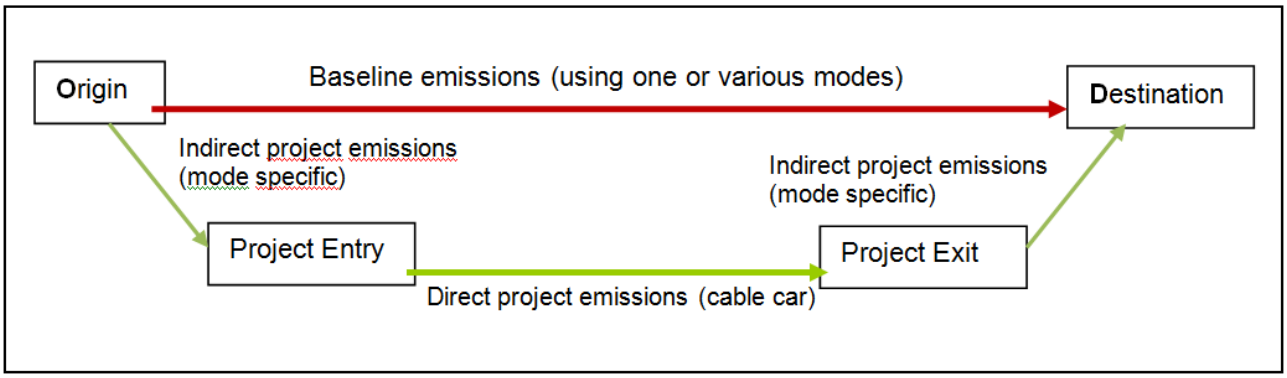
The conditions of the survey and explanations of the questions are those in the annex of the methodology.

SAMPLING REQUIREMENTS FOR CABLE PROPELLED TRANSIT PROJECT AT CPA LEVEL

In accordance with the methodology for Cable Cars for Mass Rapid Transit System (MRTS), the project proponent is required to ensure a robust sampling plan for the following parameters used for the estimation of emission reduction as a result of the use of cable cars:

- Survey on share of passengers on quarterly basis who would have used the baseline mode in every year ($SP_{BL,i,s}$);
- Survey on share of passengers using the different project modes identified in the project activity from trip origin to the project entry station and from project exit station to their final destination on quarterly basis for each respective year ($SP_{PJ,i,s}$);
- Survey on trip distance of passengers using the baseline mode in every quarter of each project year ($TD_{BL,i,s}$);
- Survey on trip distance of passengers using the project mode in each quarter of every year from their trip origin to the project entry station and from the project exit station to their final destination ($TD_{PJ,i,s}$)
- Survey on occupancy rate of vehicle category to check significant changes (10% or higher) in the average occupancy rate for each vehicle category (*Occupancy rate of vehicle category i*).

Baseline and Project Emissions



Sampling Design

Objectives and Reliability Requirements: The objective of the sampling plan is to ensure reliability of data used for the parameters required for the estimation of emission reduction and capture potential seasonal effects of passenger transport on the project activity.

The survey will be realized at 95% confidence interval with a maximum of 5% error margin as per the guideline on the sampling.

The sampling plan aims determining the follow monitoring parameters of interest:

Monitoring Parameter	Parameter of Interest
Share of passengers ($SP_{BL,i,s}$)	Proportion
Share of passengers ($SP_{PJ,i,s}$)	Proportion
Trip distance of passengers ($TD_{BL,i,s}$)	Mean value
Trip distance of passengers ($TD_{PJ,i,s}$)	Mean value
Occupancy rate of vehicle category (*Occupancy rate of vehicle category i*)	Mean value

Target Population
For the purpose of the project activity, the targeted population shall be based on the lifting of possible passengers within the districts in which a cable car is operating.

Sampling Method
For the purpose of CPA included into this PoA, the sampling plan to be employed shall be simple random sampling based on the "Standard and guideline for sampling and surveys for CDM project activities and programme of activities".
Sample Size

$SP_{BL,i,s}$: The sample size for this proportional value parameter of interest with share of passengers using the various vehicle categories at the baseline shall be calculated in line with "Standard and guideline for sampling and surveys for CDM project activities and programme of activities".

It should be noted that the primary focus of the sampling plan shall be on the vehicle categories identified at the baseline mode.

$$n \geq \left(\frac{1.96^2 \times NV}{(N-1) \times 0.05^2 + 1.96^2 V} \right)$$

Where,

$$V = \frac{P(1-P)}{P^2}$$

n= Sample size of passengers
N= Total number of passengers
P= Proportion mode (percentage share of passengers at the baseline mode)
1.96= 95% confidence interval
0.05= 5% relative precision level

$SP_{PJ,i,s}$: The sample size for this proportional value parameter of interest with share of passengers using the various vehicle categories at the project mode shall be calculated in line with "Standard and guideline for sampling and surveys for CDM project activities and programme of activities".

It should be noted that the primary focus of the sampling plan shall be on the vehicle categories identified at the project activity.

$$n \geq \left(\frac{1.96^2 \times NV}{(N-1) \times 0.05^2 + 1.96^2 V} \right)$$

Where,

$$V = \frac{P(1-P)}{P^2}$$

n = Sample size of passengers
N= Total number of passengers
P= Proportion mode (percentage share of passengers at the project-- indirect mode)
1.96= 95% confidence interval
0.05= 5% relative precision level

$TD_{BL,i,s}$: The sample size for this mean value parameter of interest of trip distances at the baseline mode shall be calculated in line with "Standard and guideline for sampling and surveys for CDM project activities and programme of activities" using the formula below with a 95% confidence interval and a 5% precision.

$$n = \left(\frac{1.96^2 \times NV}{(N-1) \times 0.05^2 + 1.96^2 V} \right)$$

Where,

$$V = \left(\frac{SD}{mean} \right)^2$$

n= Sample Size
N= Total number of journeys, since all journey are homogenous
Mean= Expected mean journey length
SD= Expected standard deviation for the journey length
1.96= 95% Confidence required
0.05= 5% relative Precision level

$TD_{PJ,i,s}$: The sample size for this mean value parameter of interest of trip distances at the project mode (indirect) shall be calculated in line with "Standard and guideline for sampling and surveys for CDM project activities and programme of activities" using the formula below with a 95% confidence interval and a 5% precision.

$$n = \left(\frac{1.96^2 \times NV}{(N-1) \times 0.05^2 + 1.96^2 V} \right)$$

Where,

$$V = \left(\frac{SD}{mean} \right)^2$$

n= Sample Size
N= Total number of journeys, since all journey are homogenous
Mean= Expected mean journey length
SD= Expected standard deviation for the journey length
1.96= 95% Confidence required
0.05= 5% relative Precision level

Occupancy rate of vehicle category i: The sample size for this mean value parameter of interest of Occupancy rate of vehicle category shall be calculated in line with "Standard and guideline for sampling and surveys for CDM project activities and programme of activities" using the formula below with a 95% confidence interval and a 5% precision.

Vehicle category shall be defined based on the categories in the CPA.

For the purpose of the vehicle passenger occupancy calculation, the capacity of each vehicle category as established for the CPA shall apply:

The vehicle capacity shall assume that the driver of the vehicle is not included in the total passenger count.

As the sample size for the trip distances at the project activity will be based on the vehicle passenger categories, the occupancy rate for each vehicle category can be surveyed simultaneously using the same design as that for the trip distances.

Sampling Frame/ assumptions
The sampling frame shall be limited to passengers who journey through operating stations of the cable car and satisfy the following conditions;

- Passengers who journey totally or partially through the stated route using any of the vehicle categories stated above;
- Passengers likely to have access to the route during peak hours which represents the major period where there are high percentages of vehicular movement.

Data to be collected

Field Measurement
The measurement shall include the counting of vehicles during the peak and off peak hours of the various categories of vehicle to determine their proportion. The trip distances and occupancy rate for the various vehicle categories shall also be estimated during the survey period. The field measurement shall be limited to quarterly basis during the annual operating days of the year.

QA/QC
To ensure quality of data obtained, a 95% confidence interval with a maximum 5% error margin shall be applied which is of higher accuracy to the 90%/10% confidence/precision expected for small scale projects as per sampling guideline.

Data Analysis
The data obtained shall be used to estimate the share of passengers transported by the project in the (4) quarters of the year. This shall be used to derive the parameters used for the emission reduction estimation of the project activity.

Implementation Plan
The project shall rely only on the most recent surveys done by public entity on the following variables; $\mathbf{SP_{BL,i,s}}$ **;** $\mathbf{SP_{PJ,i,s}}$ **;** $\mathbf{TD_{BL,i,s}}$ **;** and $\mathbf{TD_{PJ,i,s}}$. Survey for *Occupancy rate of vehicle category i* shall be determined at the third year and seventh year of the first 7 year crediting period.

The actual survey form shall be developed once the project becomes operational.

Appendix 6. Summary of post registration changes

Not applicable

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Document information

Version	*Date*	*Description*
05.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
04.0	9 March 2015	Revisions to: • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Editorial improvement.
03.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the programme design document form for small-scale CDM programme of activities (these instructions supersede the "Guideline: Completing the programme design document form for small-scale CDM programme of activities" (Version 03.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and **Error! Reference source not found.**; • Change the reference number from *F-CDM-SSC-PoA-DD* to *CDM-SSC-PoA-DD-FORM*; • Editorial improvement.
02.0	13 March 2012	EB 66, Annex 13 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities".
01.0	27 July 2007	EB33, Annex43 Initial adoption.

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