



Department of Climate Change
Federal Ministry of Environment

Road Transport Sectoral Institutional MRV System



Initiative for Climate Action Transparency (ICAT) – Consultancy Project(s) Capacity Building on application of Measure, Report and Verify (MRV) Greenhouse Gas (GHG) Emissions for Mitigating the Impact of Climate Change in Nigeria

SEPTEMBER 2021



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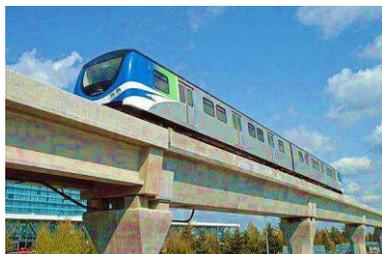
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Abbreviations

BRT	Bus Rapid Transit
BUR	Biennial Update Report
CBN	Central Bank of Nigeria
CDM	Clean Development Mechanism
CH ₄	Methane
CNG	Compressed Natural Gas
CO ₂	Carbon dioxide
DCC	Department of Climate Change
DRTS	Directorate of Road Traffic Service
FAAN	Federal Airports Authority of Nigeria
FERMA	Federal Road Maintenance Agency
FMoAv	Federal Ministry of Aviation
FMoFB&NP	Federal Ministry of Finance, Budget, and National Planning
FMoT	Federal Ministry of Transport
FMoW	Federal Ministry of Works
FMoW&H	Federal Ministry of Works & Housing
FRSC	Federal Road Safety Commission
GHG	Greenhouse Gas
HC	Hydrocarbon
ICAT	Initiative for Climate Action Transparency
IPCC	Intergovernmental Panel on Climate Change
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MRV	Measurement/Monitoring, Reporting, Verification
MDA	Ministries, Departments and Agencies
MRTS	Mass Rapid Transit System
MRV	Monitoring, Reporting and Verification
N ₂ O	Nitrous oxide
NADDC	National Automotive Design and Development Council
NAMA	Nigerian Airspace Management Agency
NARTO	Nigerian Association of Road Transport Owners
NASS	National Assembly
NBS	National Bureau of Statistics
NC	National Communications
NCAA	Nigerian Civil Aviation Authority
NCAT	Nigerian College of Aviation Technology
NCS	Nigeria Customs Service
NDC	Nationally Determined Contributions
NEMA	National Emergency Management Agency of Nigeria
NESDRA	National Environmental Standards and Regulations Enforcement Agency
NGO	Non-governmental Organizations
NIMASA	Nigerian Maritime Administration and Safety Agency
NIMET	Nigerian Meteorological Agency
NITT	Nigerian Institute of Transport Technology
NIWA	National Inland Waterways Authority
NNPC	Nigerian National Petroleum Corporation
NPA	Nigerian Ports Authority

NRC	Nigerian Railway Corporation
NSC	Nigerian Shippers Council
NURTW	National Union of Road Transport Workers
PEF	Petroleum Equalization Fund
PMS	Petroleum Motor Spirit
PPMC	Petroleum Products Marketing Company
QA	Quality Assurance
QC	Quality Control
RTS	Road Transport Sector
UNDP	United Nations Development Programmes
UNFCCC	United Nations Framework Convention on Climate Change

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Executive Summary

Tracking mitigation actions in Nigeria's Road Transport Sector (RTS) is challenging; given the lack of information collection systems in the sector, the multitude of small, dispersed source emitters (vehicles), the absence of technically sound and professionally competent experts on climate change issues (i.e., Greenhouse Gas (GHG) Emissions estimations/calculations, inventory management, Mitigation Actions, Quality Assurance (QA)/Quality Control (QC) etc.) and the non-availability of specifically tailored to Nigeria's circumstances and contexts, and (web-based) training materials on climate change mitigation actions.

Developing a well-designed/robust Monitoring, Reporting and Verification (MRV) framework will increase and enhance transparency in reporting mitigation efforts and the development of GHG inventories. It will improve transport planning, implementation, provide data and information for the reporting requirements of the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC).

This process will involve national experts and stakeholders who will be responsible for data flows and the Coordination of GHG inventories and Mitigation Actions across the sector. Experts/stakeholders must understand the processes of conducting GHG inventories and reporting Mitigation Actions in line with international standards and best practices.

These experts/stakeholders must clearly understand the data flows across the sector; that is who are the data providers, who have the mandates to collect the data, who verifies the data collected, and who reports the data. This must be considered critical as currently data from the RTS are fragmentary and only a few available data are stored in hard copies (in files); although these few available data are currently reported in a few tables and published in the Annual Abstract of Statistics by the National Bureau of Statistics (NBS) Road transport statistics.

The Federal Ministry of Transport (FMoT) that has the mandate to oversee all sectors' activities must, through the identified institutional arrangements and adequate stakeholders' engagement, with all experts and stakeholders work towards closing the data gap as mentioned above by aggregating data information that will be essential for building a robust GHG inventory and an enhanced, transparent reporting of mitigation actions.

It is recommended to develop sectoral GHG inventories, going forward, the FMoT should adopt the top-down approach of emissions estimation as this will cover for CO₂, CH₄ and N₂O emissions that will be generated across the sector. The FMoT must also identify appropriate methodologies to measure GHG impacts; design a data management system, develop reporting templates; and identify necessary legal arrangements.

Importantly, this report presents a proposed robust institutional arrangement designed to articulate the overarching climate goals, targets and the transparency outputs needed to track them. The structure shows the interactions between the institutions and the identified sector stakeholders. This will bring clarity in terms of communicating data information within the relevant stakeholders.

It is believed that a robust MRV system can be achieved if all recommendations in this report are considered. The proposed institutional arrangement when approved, implemented, and becomes functional will drive the achievement of the robust MRV process that will enable the RTS to aggregate data for GHG inventories and enhance transparent reporting of mitigation actions across all the sectoral levels. Data gathering and transparent reporting will to a very large extent close the data gap that is currently identified as a challenge in the RTS and help in building the much-needed MRV framework for the sector.

Other recommendations put forward in this report includes:

- **Data Reporting:**

Collating improved data through a top-down approach to improve GHG emission quantification at the sector level. Reporting on mitigation actions can be implemented by private and public level players.

FMoT which oversees all activities of the sector must clearly define the type of data that must be provided by the data providers while also creating a process that allows for the verification and validation of data from the data providers.

Given the dispersed nature of the data in the road transport sector, it is expected that data will be collected at institutional and hopefully sub-national levels and transmitted to the FMoT for collation and aggregation.

- **Data Collection and Storage:**

When the Road Transport Statistics Database proposed by the operators of the NDS is implemented, it will help to electronically store all data information aggregated from the sector stakeholders hence enhancing transparency in reporting.

- **Third party Verification:**

Third parties should be used for data verification and validation of submitted data to the FMoT who should be obliged to submit data to the Department of Climate Change (DCC) for national reports.

- **Capacity Building:**

There is need for continuous capacity building of all sector players both for conducting GHG inventories and in implementing mitigation actions. This will help the sector experts have a clear understanding on how GHG inventories and mitigation actions are carried out and what process are involved and can be adopted or tailored into the Nigeria RTS.

Chapter One - Introduction

1.0 MRV Overview

Tracking any mitigation action in the transport sector is challenging given the lack of information collection systems in the country and the multitude of small, dispersed source emitters (vehicles) however, a well-designed/robust MRV can increase the transparency of impacts of mitigation efforts. It will enhance and improve transport planning, implementation, provide data and information for the reporting requirements under the UNFCCC.

A robust MRV that entails good stakeholders' engagement will facilitate the sharing of information and allow assessing whether set targets have been achieved. It will enhance transparency which is the key function of any MRV process and show the continuity of a country's actions, which internationally strengthens trust of climate finance donors and other investors. Transparent MRV approaches will improve comparability at national and international level thus supporting coherence between domestic and international MRV systems.

MRV systems consists of three important processes: Measurement, Reporting and Verification (MRV). The process of MRV describes all measures used to gather emission data, mitigation actions and support received for carrying out these climate actions.

Concepts of MRV

For developing a robust MRV framework design for the RTS, the concepts of MRV are highlighted below:

- **Measurement/Monitoring (M):** This process involves the measurement/monitoring of data; data and information related to GHG emissions, mitigation actions and support. Measurement/Monitoring can be carried out at the national or sectoral level.

Measuring/Monitoring is considered very critical because road transportation activities typically increase with economic activity although it at the same time drives development and economic growth. Over time, every region has experienced the same evolution of transport activity as income levels have grown, resulting in increases in trip distances and people shifting to shared motorized transport and ultimately to private cars. Accordingly, transport planners have to understand effectiveness of options and decide on appropriate measures. Enhancing and improving data collection processes will enable sector stakeholders to provide high-quality sustainable transport and meet the national development objectives.

- **Reporting (R):** This process involves presenting the measured/monitored information in a transparent and standardised manner by the responsible sector stakeholders. Data to be reported includes GHG inventory, mitigation actions, effects, constraints, and gaps encountered, support needed and received, and any other relevant information. For the RTS reporting of data in line with international standards and requirements of the Paris Agreement is communicated through national reports such as the National Communications (NC), Nationally Determined Contributions (NDC) and the Biennial Update Report (BUR) submitted to the UNFCCC.

- **Verification (V):** This involves the process of assessing the completeness, consistency, and reliability of the reported information. The process should be carried out by third-party verifiers or external entities to ensure that the reported information follow established guidelines. Verification implements quality assurance and quality control procedures at national and sector level, and it must be carried out in line with the principles of MRV.

Principles of MRV

The principles that make up a robust MRV include Transparency, Accuracy, Consistency, Comparability and Completeness (TACCC). In setting up the RTS MRV framework, all five principles are followed.

- **Transparency:** all relevant issues are presented in a factual and coherent manner, based on clear audit. Relevant assumptions and appropriate references that concerns accounting and calculation methodologies and data sources used are all reported.
- **Accuracy:** GHG emissions quantification is reported systematically (neither over nor under actual emissions), as far as can be judged, and uncertainties are reduced as far as practicable. Sufficient accuracy in reported data enables users to make decisions with reasonable assurance as to the integrity of the reported information.
- **Consistency:** use of consistent methodologies allows for meaningful comparisons of emissions over time. Methodologies used and reporting standards are the same with that of previous years. Changes in data that may occur are documented.
- **Comparability:** inventory data is compared to previous data to check the level of differences in the current inventory.
- **Completeness:** reports on all GHG emission sources and activities within the chosen inventory boundary are completely reported. All specific exclusions are justified and reported.

1.1 MRV – Types and Relevance

MRV can mean a lot of different things, and accordingly, has been used in many ways. However, to help decision-makers identify the types of MRV that are most relevant and the methodologies that are right for their needs, the World Research Institute (WRI) had defined three types of MRV. They are:

- MRV of Emissions
- MRV of Mitigations
- MRV of Support

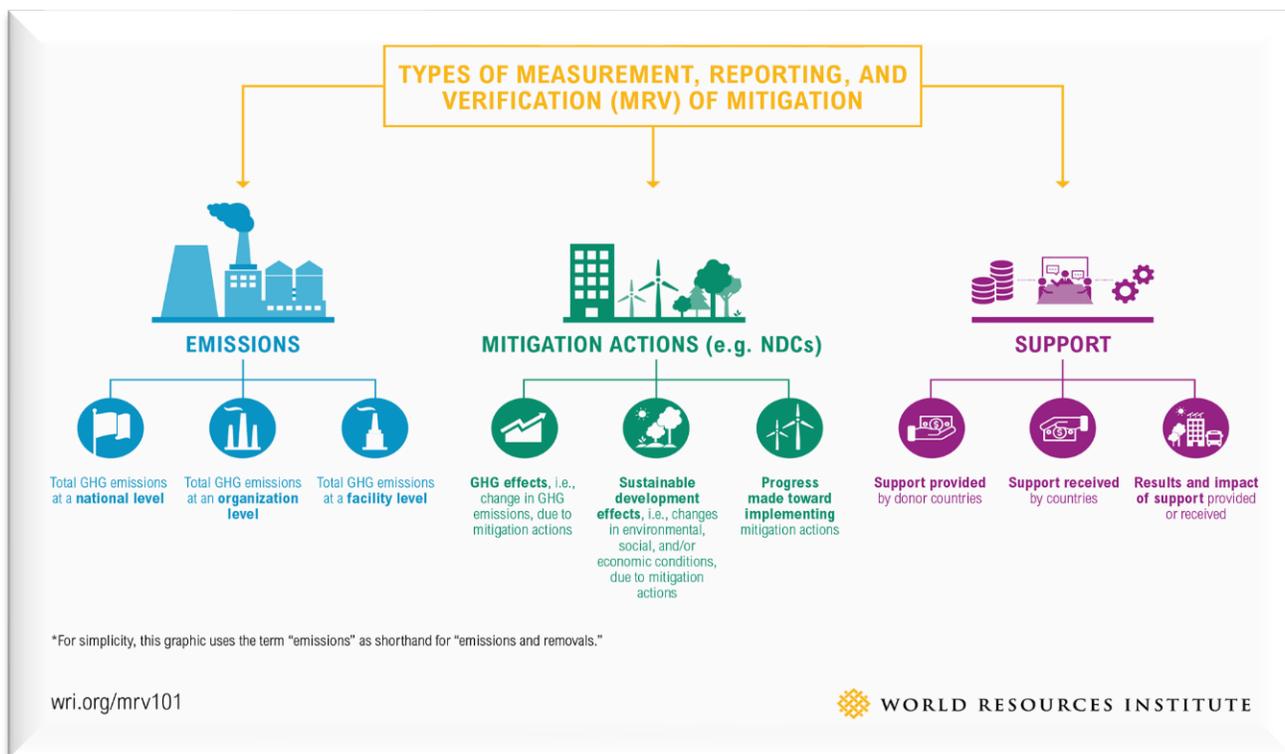
MRV of GHG emissions: MRV of GHG emissions is conducted at national, organizational levels to understand an entity's emissions profile and report it in the form of an emissions inventory. For instance, reporting transport sector emissions in a national inventory. MRV of GHG emissions allows reporting of inventory emissions on an annual basis.

MRV of mitigation actions: This MRV type relates to policies or projects, it is used to assess GHG effects and sustainable development (non-GHG) effects, as well as to monitor implementation. In this case, the focus is on estimating the *change* in GHG emissions or other non-GHG variables. For instance, assessing the effect of a sustainable transport policy on traffic congestion, air pollution, and mobility.

MRV of support: This type of MRV presents the level of support that is received for climate actions. This may include climate finance, technology transfer and capacity building. MRV of support helps to track provision and receipt of climate support, monitor results achieved and assess impact. For instance, countries track financial support provided towards mitigation efforts and building capacity. At the same time, the recipient countries also track support received for various climate and other initiatives.

This Figure 1 below shows the three (3) types of MRV and the different levels at which they can be undertaken.

Figure 1: Types of MRV



For stakeholders and Decision-Makers to determine the type of MRV to use, the following questions are considered very important.

Why: What are the objectives and purpose of undertaking MRV?

How: What are the methodological and technical guidelines and processes involved in performing MRV?

When: What is the appropriate timeframe for undertaking MRV?

Who: Which are the entities and individuals responsible for undertaking MRV?

While these answers provide decision makers with an implementing framework, the next step is to seek detailed guidance on the building blocks of a MRV system, including establishing institutional arrangements and data management systems, and enhancing capacity to carry out MRV.

Chapter Two – Organizational Mandates

The mandates of the RTS stakeholders are indicated in the Need and Gaps Analysis Report. These mandates clearly spell out the responsibilities of each stakeholder while also highlighting the need for continuous engagement between the stakeholders. It should be mentioned that there is growing clarity that transport modes and their infrastructure - seaports, airports, rail routes, roads, inland waterways - have a collective interdependence on each other. This interconnectivity and interdependence also apply to the sectors' stakeholder environment.

2.1 GHG Inventory

Stakeholder Groups/Coordination:

There are various stakeholder groups in the RTS who should be in charge of GHG inventory activities for the sector although the process of GHG inventories is not clearly defined and mandated however, the stakeholder groups who should be responsible for coordination and leadership of the RTS for inventory activities are:

- The Federal Ministry of Transport (FMoT) have the sole responsibility for supervision of parastatals such as the Nigerian Airspace Management Agency (NAMA), Federal Airports Authority of Nigeria (FAAN), Nigerian Civil Aviation Authority (NCAA), Nigerian Maritime Administration and Safety Agency (NIMASA), Nigerian Railway Corporation (NRC), Nigerian Ports Authority (NPA), Nigerian Shippers' Council (NSC), and National Inland Waterways Authority (NIWA), amongst others.

Other stakeholder groups and agencies who by mandates should be involved in GHG inventory processes include the following:

- NESREA: for emission control and in this regard, NESREA is ensuring that every vehicle has an emission reduction technology and is coming up with a programme; National Vehicular Emission Control Programme which will ensure that every vehicle flying Nigerian roads emits within a specified limit.
- National Automotive Design and Development Council (NADDCC): which is an institution promoting shift from the use of fossil fuels in vehicles to other forms of energy such as electricity, solar, and LPG.
- Federal Ministry of Works (FMoW): the ministry is charged with the coordination of design, planning, construction, and maintenance of all federal government roads.
- The Federal Road Safety Commission (FRSC): As it relates to inventories the FRSC coordinates.
 - the safety of motorists and road users.
 - Recommending works and devices designed to eliminate or minimize accidents on the highway and advising the federal ministry of works on the localities where such works and devices are required.
- National Union of Road Transport Workers: the NURTW is an independent agency, it is believed that the agency exercises leadership and coordination of the union members and other operators in the sector (mass transit, including luxury buses, fuel tankers and trailers).

Expert Teams:

The Expert teams in the RTS comprises of all sector stakeholders (Government and private players). It is expected that all sector experts are directly involved in GHG inventory activities. This could be done on the company level or on the sectoral level.

It must be mentioned that as it relates to GHG inventories, there is a need for building the capacity of the sector experts. This will help the sector experts have a clear understanding on how GHG inventories are conducted and what process are involved can be adopted or tailored into the Nigeria RTS.

Data Providers:

Collection of GHG inventory data is a very key aspect of building inventories. All sector stakeholders must be involved in the process of GHG inventory in order to have a robust GHG inventory for the sector.

Specific industry data based on the requirement of the Intergovernmental Panel on Climate Change (IPCC) will be provided by the respective data providers in the sector for inventories either as individual players or as joint ventures to the FMoT or other relevant agencies. However, the FMoT must clearly define the type of data that must be provided by the data providers while also creating a process that allows for the verification and validation of data from the data providers. This process will further enhance the transparency framework.

It should be mentioned that data from the RTS are fragmentary and statistical analysis consists of extraction, collation, and aggregation. The few available data are stored in hard copies (in files). Some of the data are usually reported in a few tables and published in the Annual Abstract of Statistics by the NBS on motor vehicle registration, and Statistical Abstract of the Federal Ministry of Works on infrastructure such as roads and bridges.

Developing a robust GHG inventory for the RTS will entail a good data collection and data flow mechanism between the above-mentioned sector stakeholders; also implementing the proposed Road Transport Statistics Database by the operators of the National Bureau of Statistics. The database will help to electronically store all data information aggregated from the sector stakeholders hence enhancing transparency in reporting.

Roles and Responsibilities:

The laws, acts and policies of the nation defines the responsibilities to the transport sector. In the RTS, the following organizational mandates exist for the stakeholders.

Federal Ministry of Works (FMoW)

The Federal Ministry of Works is mandated with the responsibility of highway construction, federal roads and making regulations as to the use of such roads. They are backed by various decrees such as the federal highway Decree No. 7 of 1971 and as amended by Decree No. 6 of 1977 and Decree No. 33. of 1988.

The Federal Road Safety Commission (FRSC)

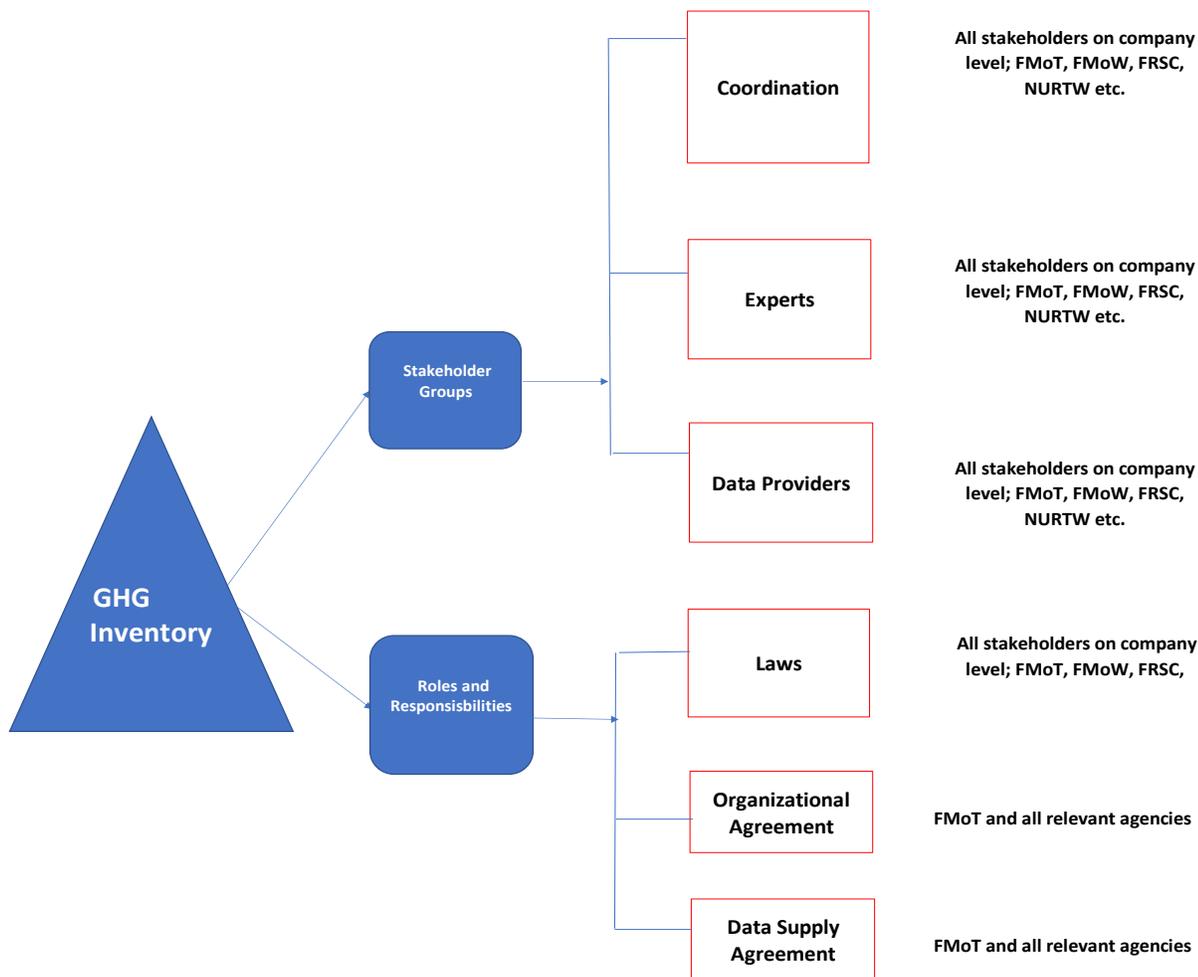
This government agency was set up by Federal Government Decree No. 45 of 1987 with the following functions: (a) Making the highway safe for motorists and road users; (b) Recommending works and devices designed to eliminate or minimize accidents on the highway and advising the federal ministry of works on the localities where such works and devices are required.

The National Conference of Road Traffic Services Directors/Chief Vehicles Inspection Officers of the Federation

This agency comprises of directors of road traffic services/chief vehicles inspection officers of the federation. The agency holds conferences to review sector policies with the aim of improving the current of the sector.

The Figure 2 below shows the organizational structure for GHG inventory in the RTS sector.

Figure 2: Organizational structure for GHG inventory



2.2 Mitigation

As stated in Nigeria's first NDC report submitted to the UNFCCC in 2015, the urgent need for a "modal shift" – moving passengers or freight from one form or mode of transport to another, less polluting one, is required. The coordination of these mitigation actions will be handled by the FMoT and other relevant agencies. The Ministry of Transport on all levels oversees mitigation policy formulation and coordination. It also has the mandate to issue, modify and cancel policies and laws relating to traffic efficiency.

The Ministry must also ensure that all mitigation measures are reported in line with best international reporting standards. Data for mitigation actions should be clearly reported, verified by a third-party and submitted to the FMoT who should be obliged to submit data to the DCC for the national reports.

Expert Teams:

This expert team are the sector players who are involved in implementing mitigation actions. It is important that all players are trained on how to be actively involved in mitigation actions; by this the carbon footprint of the sector will be reduced. Mitigation projects can be implemented on either company or on the sectoral level.

Expert team for Mitigation projects also comprises the coordinating and regulatory agencies. The regulatory agency FMoT and other agencies such as the National Environmental Standards and Regulations Enforcement Agency (NESREA), FRSC, The National Emergency Management Agency of Nigeria (NEMA), Traffic Compliance and Enforcement TRACE, State Traffic Management Authority, National Automotive Design and Development Council (NADDC), etc.; provide expertise in setting requirements for mitigation projects while also monitoring compliance of the sector players.

It must be mentioned that as it relates to GHG inventories there is a need for building the capacity of the sector experts. This will help the sector experts have a clear understanding on how GHG inventories are conducted and what process are involved can be adopted or tailored into the Nigeria RTS.

Data Providers:

Data on mitigation actions are provided by the sector stakeholders. This could be on the private or public level. Stakeholders are expected to provide data on mitigation actions to the relevant agencies.

It should be mentioned that currently there are no clear modalities on how mitigation data should flow. However, going forward, mitigation data should be obtained from the companies (all sector operators both public and private (Mass transit bus companies)) to the data verifiers and then to the relevant agencies who has the responsibility of archiving the data. The type of data that must be reported need to be defined by the FMoT and send across to all sector players while reporting standards must follow best international practices.

As it is for GHG inventory data, data on mitigation are also fragmentary. However, to improve this situation the FMoT must be involved in setting the marks i.e., develop frameworks for robust data collection and monitoring the compliance of the sector players.

Roles and Responsibilities:

It is not clear which agencies have the mandates to monitor mitigation actions in the existing institutional arrangement. However, going forward, the agencies listed below are recommended to monitor actions on mitigation in the RTS.

- Federal Ministry of Transport (FMoT)
- National Environmental Standards and Regulations Enforcement Agency (NESREA)
- Federal Ministry of Works (FMoW)
- The Federal Road Safety Commission (FRSC)

Mitigation measures that should be encouraged across the RTS includes some of the following:

Bus Rapid Transit (BRT) Scheme

As it is in Lagos, the adoption of BRT system model across the country will help achieve the following:

- Provide efficient level of service (low cost, high frequency, high speed, high occupation, high Safety, low emissions)
- Enhance adequate institutional framework and regulation.
- Provide high socio-economic benefits, especially for low-income population.
- Increase maximum level of private participation.
- Further help in mitigating environmental and social impacts.

The use of BRT in Lagos and in all major cities of the country will contribute to:

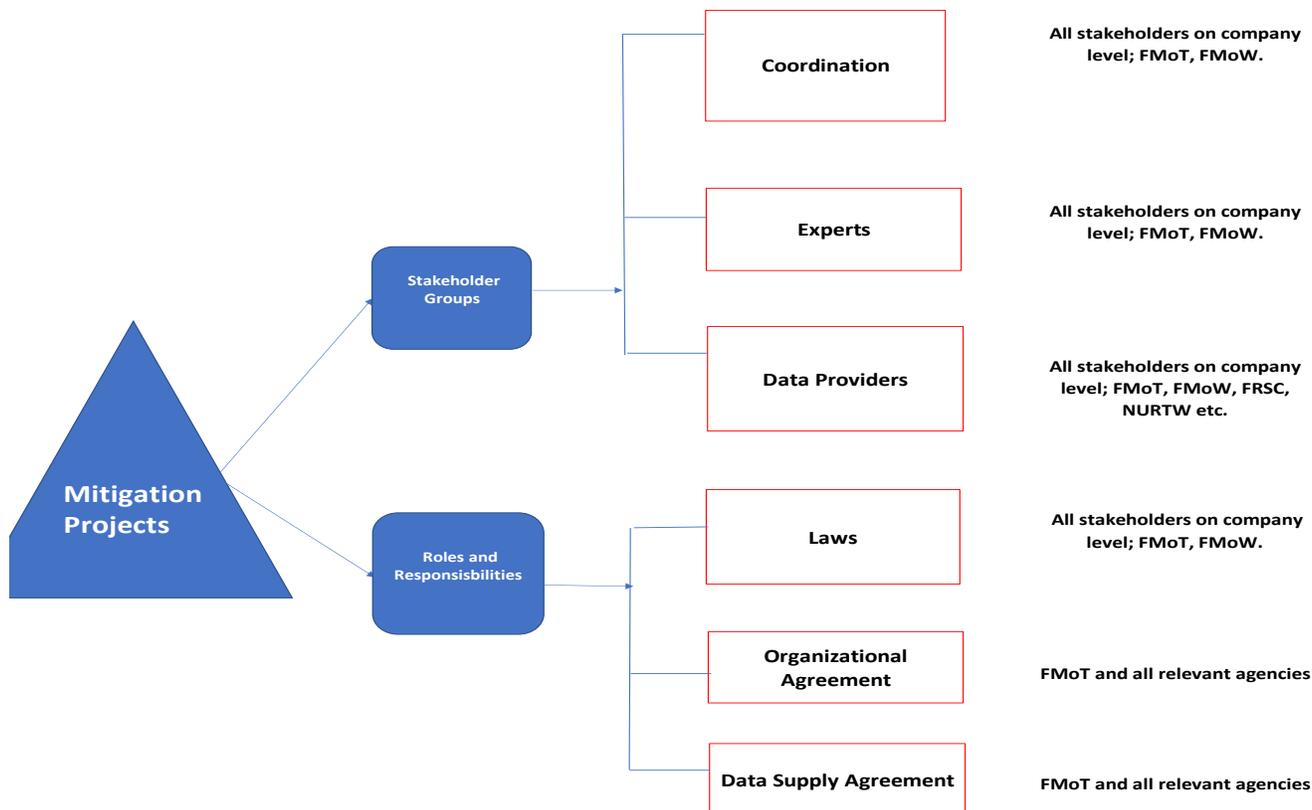
- Cleaner cities with reduced carbon monoxide emissions.
- It will be a major turning point in how the Cities deals with congestion, pollution and GHG emitted due to transportation.
- Dramatically improve the air quality of the cities.

Bus Rapid Transit Lane

Introducing dedicated paths for the BRT will help achieve travel speed by implication reduce the time spent on the road by travelers and as such reduce the emissions per travel time. This strategy of special path construction should be implemented on all major roads across the country.

The Figure 3 below shows the structure of organizational mandates for GHG inventory in the RTS sector.

Figure 3: Organizational structure for mitigation actions



Organizational mandates are critical pointers to having a robust GHG inventory and in implementing mitigation projects. The Table 1 below provides highlights considered very key for the sector going forward.

Table 1: Summary of Recommended points for consideration

S/N	Description
1	Data Reporting: Collating improved data on top-down approach to improve GHG emission at the sector level, mitigation action can be implemented by private and public level players. FMoT must clearly define the type of data that must be provided by the data providers while also creating a process that allows for the verification and validation of data from the data providers. Considering the disperse nature of the data in the transport sector, it is expected that data will be collected at sub-nationals and transmitted to the FMoT for collation and aggregation.
2	Data Collection and Storage: implementing the proposed Road Transport Statistics Database by the operators of the NBS. The database if implemented will help to electronically store all data information aggregated from the sector stakeholders hence enhancing transparency in reporting.
3	Third party Verification: Third parties should be used for data verification and validation of submitted data to the FMoT who should be obliged to submit data to the DCC for national reports.
4	Capacity Building: there is need for continuous capacity building of all sector players both for conducting GHG inventories and in implementing mitigation actions. This will help the sector experts have a clear understanding on how GHG inventories and mitigation actions are carried out and what process are involved and can be adopted or tailored into the Nigeria RTS.

Chapter Three – Expertise

3.0 Preamble

The absence of technically – sound and professionally – competent experts on climate change and its related issues (i.e., GHG Emissions estimations/calculations, inventory management, Mitigation Actions, QA/QC etc.; the non-availability of specifically – tailored, web-based training materials on mitigation of climate change, GHG Emission’ estimations, GHG Inventory and support being sought) is real in these transport agencies.

However, it is critical that the sector builds a strong team of national experts as this will ensure that expert resources are available to regularly generate technical outputs that inform decision making and wider audiences of upcoming challenges, and the country’s progress and climate ambition. Technical experts will be responsible for knowledge retention and transfer within the sector, continuous improvement, the smooth succession of national expert roles and training of junior experts (UNFCCC Handbook, 2020).

3.1 GHG Inventory

To have a robust GHG inventory for the Sector, the need for experts that understands the processes of conducting GHG inventories in line with international standards and best practices cannot be overemphasized. Experts must clearly understand their task at every stage of the inventory process.

- **Data Providers:** These set of experts must have a basic understanding of climate science, have good experience of the RTS and a full understanding of the types of data that is required for GHG inventories. There is also the need for experts that provide data to understand how GHG inventories are developed.
- **Data management and Coordination:** The level of expertise that is required of these experts is such that they have good fundamental knowledge and fully understand the basics of GHG inventory processes. As they will be involved in the general coordination and interpretation of data. They must also be abreast of international standards and industry best practices involved in carrying out inventories.
- **Third Party Verifiers:** this team of experts shall be involved in the verification and validation of collated data. By implication, these experts are involved in data QA to ensure that reported inventory data conforms with the right reporting standards as provided by the IPCC guidelines. QC will be carried out internally that is within the reporting entity.
- **Focal Points (Sectoral and National):** Experts who are recognized as focal points both on the sectoral or national knowledge shall have good understanding of climate related issues, policies and fully understand the GHG inventory trends in the RTS. Focal points shall be involved in direct or indirect negotiations with external bodies on behalf of the sector hence, they make have good representation of the sector; they must appreciate the issues of the sector.
- **Steering Committee (Sectoral and National):** Experts on the level of the steering committee either on the sectoral or national level must understand the climate policies in the sector and also have the technical ability to handle technical issues that may be raised.

The Table 2 below shows a summary of the experts required and the level of expertise required for GHG Inventory.

Table 2: GHG Inventory Experts and Expertise Required

Experts	Expertise Required
National Consultants (Drawn across the sector)	<i>Expertise Required: Climate Science, NDC Implementation, IPCC guidelines and best practices, GHG Inventory, Good knowledge.</i>
Steering Committees (Sectoral and National) (Drawn across the sector)	<i>Knowledge of Climate Policies, GHG Inventory and NDC tracking</i>
Focal Points (Sectoral and National) (DCC)	<i>Climate Policies, NDC Implementation, Climate Science, GHG Inventory</i>
Third Party Verifiers (External/private agencies/academia)	<i>Expertise Required: Climate Science, NDC Implementation, IPCC guidelines and best practices, GHG Inventory, Good knowledge</i>
Data Management and Coordination (FMoT, NESDRA, NADDC)	<i>Climate Science, Data Analysis, Excel Modelling, Basic knowledge on GHG Inventory Development, IPCC Guidelines and Applications, NDC Implementation and Tracking</i>
Data Providers All stakeholders (e.g., FRSC, NBS, NPL, NURTW, etc.)	<i>Climate Science, good Industry experience, Data recording, Ms Excel use, NDC Implementation plan for RTS, basics of GHG Inventory</i>

3.2 Mitigation

As mentioned earlier, the absence of technically – sound and professionally – competent experts on climate change issues in the RTS poses a challenge to the development of mitigation projects in the sector. However, through the identified institutional arrangement, building the capacity of sector stakeholders must be taken seriously. This will aid the identification of appropriate methodologies to measure GHG impacts, design MRV system, design data management system, developing reporting templates; and identifying necessary legal arrangements. This will facilitate a robust and continuous national MRV system.

Explained below are various level of experts required to develop mitigation actions and the level of expertise that is necessary for this process.

- *Data Providers:* These set of experts must have a basic understanding of climate science, have good experience of the RTS and a full understanding of the types of data that is required for mitigation actions. There is also the need for experts that provide data to understand how to develop sustainable mitigation projects.
- *Data management and Coordination:* The level of expertise that is required of these experts is such that they have good fundamental knowledge and fully understand the basics of mitigation actions. As they will be involved in the general coordination and interpretation of data. They must also be abreast of international standards and industry best practices deployed in the development of mitigation actions.
- *Third Party Verifiers:* this team of experts shall be involved in the verification and validation of collated data. By implication, these experts are involved in data QA to ensure that reported mitigation projects' data conforms with the right reporting standards as provided by the IPCC guidelines. Data QC will be carried out internally that is within the reporting entity.
- *Focal Points (Sectoral and National):* Experts who are recognized as focal points both on the sectoral or national knowledge shall have good understanding of climate related issues, policies and fully

understand the trends of mitigation actions in the RTS. Focal points shall be involved in direct or indirect negotiations with external bodies on behalf of the sector hence, they must have good representation of the sector; they must appreciate the issues of the sector.

- *Steering Committee (Sectoral and National)*: Experts on the level of the steering committee either on the sectoral or national level must understand the climate policies in the sector and have the technical ability to handle technical issues that may be raised while developing mitigation projects.

Table 3 below shows a summary of the experts required and the level of expertise required for GHG mitigation actions.

Table 3: Mitigation Experts and Expertise Required

Experts	Expertise Required
National Consultants (Drawn across the sector)	Expertise Required: Climate Science, NDC Implementation, IPCC guidelines and best practices, good understanding of GHG mitigation processes.
Steering Committees (Sectoral and National) (Drawn across the sector)	Knowledge of Climate Policies, GHG mitigation and NDC tracking
Focal Points (Sectoral and National) (DCC)	Climate Policies, NDC Implementation, Climate Science, Mitigation processes
Third Party Verifiers (External/private agencies/academia)	Expertise Required: Climate Science, NDC Implementation, IPCC guidelines and best practices, GHG Mitigation, Good knowledge
Data Management and Coordination (FMoT, NESDRA, NADDC)	Climate Science, Data Analysis, Excel Modelling, Basic knowledge on GHG Mitigation projects Development, IPCC Guidelines and Applications, NDC Implementation and Tracking
Data Providers All stakeholders (e.g. NBS, NPF, NURTW, etc.)	Climate Science, good Industry experience, Data recording, Ms Excel use, NDC Implementation plan for RTS, basics of GHG mitigation

Table 4 shown above explains the level of expertise that is expected in the RTS going forward. Below is a summary of recommendations for consideration.

Table 4: Summary of Recommended points for consideration

S/N	Description
1.	Data Reporting: Data reporting must be in line with IPCC guidelines and other internationally recognized reporting standards.
2.	Capacity Building: there is need for continuous capacity building of all identified experts both for conducting GHG inventories and in implementing mitigation actions across the sector
3.	There is a need for a handbook that clearly defines the responsibilities of the sector experts. The handbook should serve as guideline and should be mandated and available to all identified stakeholders.

Chapter Four – Data Flows

The importance of good data flows in the RTS cannot be overemphasized. As earlier mentioned, data from the RTS are fragmentary and only a few available data are stored in hard copies (in files); data are usually reported in a few tables and published in the Annual Abstract of Statistics by the NBS Road transport statistics. The fragmentary state of data within the RTS is due to the absence of a federal parastatal fully in control and/or coordinating road transport activities as in the case of the sub-sectors (Nigerian Railway Corporation, Nigerian Ports Authority or Federal Airports Authority of Nigeria).

However, since the responsibility of the Federal Road Maintenance Agency (FERMA) is to monitor and maintain Federal roads in the country, going forward, there should be a unit that should be set up under FERMA that will have the sole responsibility of data collection. However, should there be an existing unit for data collection and monitoring under FERMA, it should be mandated to effectively discharge its duties while also expanding the scope of data collection and monitoring. This will help to ensure that the data gap that have existed is resolved.

It should be mentioned that the RTS covers a wide scope of administrative data on road transport services however, the major source of RTS data is from the FMoT, NBS, the motor licensing authorities of the State ministries of finance, the NURTW and the operators of mass transit, including luxury buses, fuel tankers and trailers. The Nigeria Police is also the sole source of road accident statistics.

4.1 GHG Inventory

To estimate a GHG from the RTS for a robust GHG inventory, it is important to have good transport data, which is largely unavailable. However, information about vehicle fuel use by mode can be obtained from energy statistics (e.g., from oil companies who usually disaggregate data) or it can be assessed and calculated from transport data. To convert transport energy to transport GHG emissions involves using conversion factors that are provided for fuels and electricity by the IPCC.

RTS emissions data come from the burning of petrol and diesel from all forms of road transport which includes cars, trucks, lorries, motorcycles, and buses. A large percentage of the emissions come from passenger travel (cars, motorcycles, and buses); while others come from road freight (lorries and trucks). These data must be collected, verified, and reported in line with international standards.

Administrative Sources of Road Transport Data

The sources of administrative statistics on road transport include: the National Bureau of Statistics, Nigeria Police Force, Federal Ministry of Works, Motor Vehicle Divisions of the Local Government headquarters and the Federal Ministry of Transport.

The Motor Vehicle Divisions of the Local Government headquarters undertake registration of new vehicles and take the data of:

- Licensed motor vehicles.
- Licensed drivers and commercial transport operators.
- Process applications for change of ownership of motor vehicles.

Two important items of data produced by this exercise are the frequency distributions of motor vehicles registered and motor vehicles licensed with the following details: year; state; and types of vehicles. 'Types of vehicles' is further disaggregated into cars, commercial vehicles, motorcycles and 'Others'. Returns obtained from the Local Governments contain further disaggregation of the last categories of vehicles by make and type of body.

In recent years, the NBS has also used the Nigeria Police Force as a supplementary source of information on motor vehicle statistics (road accident statistics).

Another important source of administrative data on road transport is the Federal Ministry of Works. The items of data produced by the ministry, which are relevant to road transport activity, are those on infrastructure such as roads and bridges.

Several other useful items of administrative statistics which can be produced from the forms completed by households include:

- Age profile of registered/licensed vehicles by categories and State of operation/licensing.
- Distribution of newly licensed drivers/renewed drivers' licenses by age, gender, and State of issue.

Dataset and Data Providers

To maximize the accuracy of emissions calculations, it is important to have as much information as possible about vehicles. The following information are considered important:

- Fuel type
- Fuel use
- Distance traveled (for on-road vehicles)
- Fuel economy (if either fuel use or distance traveled is unavailable)
- Vehicle type
- Emissions control technology and/or model year

If vehicle-specific information is not available, the calculation methods can be applied to subtotaled fuel use data by fuel type, and to subtotaled distance data by vehicle type and model year.

The most preferred method (most accurate method of determining the amount of fuel combusted) is to gather data from fuel receipts or purchase records. If fuel is purchased at commercial fueling stations, fuel receipts can typically be obtained from the vehicle operators, or through records from centralized fuel card services. If fuel is delivered to the organization's facilities either to fill on-site fuel storage or to fill vehicles directly, fuel use can be determined through delivery records or fuel invoices. If natural gas vehicles are fueled on-site, fuel purchase data can be obtained from monthly natural gas bills.

It should be mentioned that the above method can be practicable on the long term where there is a database and a regulation that mandates all operators (private sector) to report their mileage data on the database.

However, what is practicable in the short to medium term is to obtain fuel consumption data from the Nigerian National Petroleum Corporation (NNPC) who sells/supplies fuel in bulk to the operators. This can be achieved through stakeholders' engagement (engagement between the FMoT and the NNPC or any bulk supplier).

The Table 5 below gives a summary of the type of datasets needed for mobile combustion and the data sources.

Table 5: Data sources of mobile combustion

Data	Data Source	REMARKS
Fuel consumption data	NNPC (from stock inventory documentation)	Through stakeholders' engagements, this data type can be obtained from the NNPC since the corporation is the bulk fuel trader.
Distance traveled data	Official odometer logs or other records of vehicle distance traveled	Policies can be developed that will oblige the "big" private sector operators to provide data on distance traveled. FRSC can also be obliged to collect the data both on the state and national level. Other best approaches to achieve this can be decided through stakeholders' engagement.
Heat contents and carbon contents used other than defaults provided	NNPC/ Industry Reports from the operators	This data can be gotten through engagements with the NNPC or the "big" private sector operators involved in bulk fuel sales
Prices used to convert amount of purchased to amount or energy content of fuel consumed	NNPC/Industry Reports from the operators	This data can be gotten through engagements with the NNPC or the "big" private sector operators.

Data Collection: It is important to mention that the FMoT needs to set up regulations that mandates all operators to submit their datasets to the ministry. This will aid an easy aggregation of data for national inventories. On the other the ministry should designate a unit that will be charged with the responsibility of collating data from all sector operators for the purpose of inventories. The data collected must be properly screened (verified) and archived and sent to other relevant authorities and agencies.

Data collected must be in line with the IPCC 2006 guidelines which by implication for the sector shows that the sector still applies the Tier 1 (estimation) method of quantifying emissions however, as the data gap continues to close, the sector must push towards the Tier 2 which entails the use of country specific emissions data.

Estimation Approach GHG Inventories

Carbon emissions from the RTS can be quantified based on two independent sets of data – "energy use" and "travel activity", this is also called, the top-down approach and bottom-up approach respectively.

Top-down accounting provides a snapshot of GHG emissions during a specified time period based on statistical data aggregated at a certain geographical level (e.g., the total energy consumption or total fossil fuels sold in a year). Bottom-up calculations are applied to estimate emissions in more detail and allow the identification of the causes of the emissions.

Top-down approach

This approach is based on the calculation of GHG emissions based on the amount of 'fuel combusted' or 'sold' (in litre or tons) and conversion factors of different fuel types (in $\text{gCO}_2\text{eq/litre}$). This method requires fuel consumption data, e.g., fuel sales or for a specific vehicle fleet (e.g., all lorries of a logistic company).

The top-down approach is needed for national GHG inventories as most of diesel and gasoline fuels are used in the transport sector.

It should be mentioned that this approach works well for CO_2 emissions, which are the most important source of emissions in the sector. However, it is not appropriate for CH_4 and N_2O emissions, which depend more strongly on the vehicle technology, fuel and operating characteristics.

Bottom-up

The bottom-up approach provides a mechanism to quantify emissions in much more detail. It allows monitoring carbon emissions from different policies, programs, and projects.

This approach does not have the objective to measure the effects of individual measures in a precise way, but to identify the overall effects of the sustainable transport policies on GHG emissions of the transport sector.

To develop a robust GHG inventory, it is recommended that the RTS could adopt the top-down approach covering CO_2 , CH_4 and N_2O emissions generated in the sector at the short-term. As the MRV structure is institutionalized, it is expected that the sector migrates to bottom-up approach to ensure comprehensive aggregation of all data

Figure 4 below shows GHG inventory data needs for the top-down approach.

Figure 4: Data needed for a top-down approach

ID	Area	Indicator
1	Overall	Vehicle registration data
2		Total fuel consumption per fuel type
3		Biofuel content per fuel type (bio-gas, bio-diesel, bio-gasoline)
4		Specific fuel consumption per category
5		Vehicle distance driven per category
6		CO ₂ emission factor per fuel/energy source and CH ₄ emission factor for gaseous fuels per km
7		GDP, population data, inhabitants of city
9	Vehicles	gCO ₂ /VKT separated per vehicle category
9	Freight	- gCO ₂ /tkm total and per freight mode - tkm per mode → is sum of various other indicators incl. average load, tons of freight, average load factor, distance driven of trucks; - mode split per tkm
10	Passenger inter-urban	- gCO ₂ /pkm total and per inter-urban mode - pkm per mode inter-urban → is sum of various other indicators incl. average trip length, number of passengers, average occupation rate, distance driven of cars and buses - mode split per pkm inter-urban
11	Passenger urban	- gCO ₂ /pkm total and per urban mode - pkm per mode urban → is sum of various other indicators incl. average trip length, number of passengers, average occupation rate, distance driven of various modes - mode split pkm urban
12		Emissions per inhabitant → is sum of various other indicators incl. average trip length per mode and emission per mode per km

4.2 Mitigation

In the RTS, results have shown that passenger cars are the main cause of CO₂, N₂O and CO emissions, while motorcycles are main source of hydrocarbon (HC) emissions, and light-/heavy-duty vehicles are the main contributors of particulate matters.

Dataset and Data Providers

Data sets for mitigation projects are provided by the industry players and are collated and archived by the relevant authorities and agencies. The sources of data for mitigation actions on road transport include: the National Bureau of Statistics, Federal Ministry of Works, and the Federal Ministry of Transport.

There are several mitigation measures. Depending on national circumstances and objectives, they are best combined for complementarity values.

- Alternative fuels and technologies,
- Land use improvements e.g., to reduce sprawl,
- Set targets for switch in transport modes and target - reducing the use of private cars for intracity commute; increasing the use of public bus transport; reducing noise levels; reducing road crashes; controlling parking and reducing the capacity of the main streets; developing “quiet zones”; keeping transit traffic out of the city centers; etc.
- Switch freight to rail.

Table 6 below presents approved methodologies that should be applied for mitigation projects. These methodologies are extracted from the UNFCCC’s Clean Development Mechanism (CDM) booklet.

Table 6: List of CDM Methodologies Relevant to Urban Transport¹

Measure	CDM methodology
Bicycles, tricycles, e-bikes, or e-tricycles	AMS-III.BM. Lightweight two and three wheeled personal Transportation
Bus systems	AM0031 Bus rapid transit projects
Mass rapid transit systems	ACM0016 Mass Rapid Transit Projects AMS-III.U. Cable Cars for Mass Rapid Transit System (MRTS)
Energy efficiency	AMS-III.C. Emission reductions by electric and hybrid vehicles AMS-III.AA. Transportation Energy Efficiency Activities using Retrofit Technologies AMS-III.AP. Transport energy efficiency activities using post - fit Idling Stop device AMS-III.BC. Emission reductions through improved efficiency of vehicle fleets
Fuel switch	AMS-III.S. Introduction of low-emission vehicles/technologies to commercial vehicle fleets AMS-III.T. Plant oil production and use for transport applications AMS-III.AK. Biodiesel production and use for transport applications AMS-III.AQ. Introduction of Bio-CNG in transportation applications AMS-III.AY. Introduction of LNG buses to existing and new bus routes
Transportation of cargo	AM0090 Modal shift in transportation of cargo from road transportation to water or rail transportation
Transportation of liquid fuels	AM0110 Modal shift in transportation of liquid fuels
Technology for improved driving	AMS-III.AT. Transportation energy efficiency activities installing digital tachograph systems to commercial freight transport fleets AMS-III.BC. Emission reductions through improved efficiency of vehicle fleets

Data Reporting Data Flow:

- Going forward, all sector stakeholders must be obliged by the FMoT to transparently report data of their mitigation actions. Report of mitigation actions should follow the identified institutional arrangement. The data flow will be from the sector stakeholders to the third-party verifiers who will be responsible for data QA. QC will be conducted internally.

Data will then be passed on to all other relevant ministries and agencies, however the FMoT will be obliged to forward the data to the DCC.

The FMoT must set the marks expected from the sector players; define what type of data will qualify for mitigation projects and what mitigative measures must be taken to ensure emission reduction while also ensuring compliance. The Ministry through its agencies will ensure that the capacity of the sector players is built by organizing/conducting trainings on all levels for sector players to gain better understanding of methodological and data requirement for mitigation processes.

Emission Factors for estimating emissions from the road transport must also be determined going forward. This will enhance accurate reporting of GHG emissions reduction from the implemented mitigation Projects. This can be achieved by adequate stakeholders' engagement through the identified institutional arrangement.

¹ https://cdm.unfccc.int/methodologies/documentation/1611/CDM-Methodology-Booklet_fullversion.pdf

Mitigation data could be from the underlisted mitigation projects.

- Promote aggressively the usage of Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) for transportation by 40% by 2030.
- Ensure attaining of blending of biofuel in vehicles for transportation by 30% in 2030.
- Encourage the replacement of Petroleum Motor Spirit (PMS) cars with electric cars at least by about 10% in 2030.
- Increase switch of human and freight movement from road to rail.
- Increase switch of human movement from personal use of vehicles to public mass transit.

Chapter Five – Coordination, Systems and Tools

5.0 Preamble

To have a well-functioning transparency framework, coordination, systems, and tools are considered very useful. This process entails the management of collected data, analyzing the data, data QA/QC, summarizing and archiving of the data. To achieve this, institutional arrangements need to provide for the development and maintenance of workplans, engagement tools, databases, data analysis, indicators, and reports.

In the RTS the coordination of activities is overseen by the FMoT. The ministry should therefore going forward ensure that a proper data collection mechanism is established while also ensuring that all sector stakeholders are properly engaged and managed. The ministry should also provide the stakeholders with the adequate information on the type of data that is to be submitted for the sectoral GHG inventories. Data must be reported in line with international standards as made available by the IPCC.

The ministry should also clearly state the role of third-party verifiers whose responsibility is QA. This process of data verification and validation should be finalized by the third-party verifiers before data is passed on to the Ministry and other relevant agencies.

To ensure that the data flow process is sustained, continuous capacity building and stakeholders' engagement that involves all sector stakeholders must be upheld.

5.1 GHG Inventory

For a coordinated and robust GHG inventory, it is proposed that the FMoT establish a separate unit (MRV Unit) within the ministry that will be dedicated to coordinate and monitor the process of data collection for inventories. The unit will be headed by the head of the ministry and all emission reductions from policies and actions which help to achieve sectoral NDC targets will be reported to this coordination unit by the data providers. The MRV coordination unit will pass on data to the FMoT after it has been QA by the third-party verifier. QC shall be conducted internally by the reporting entity. The FMoT will pass the data to the DCC who will need data for the purpose of national GHG inventories or submission to the UNFCCC. The Figure 5 below shows the coordination unit- main institutional elements.

Figure 5: MRV coordination structure

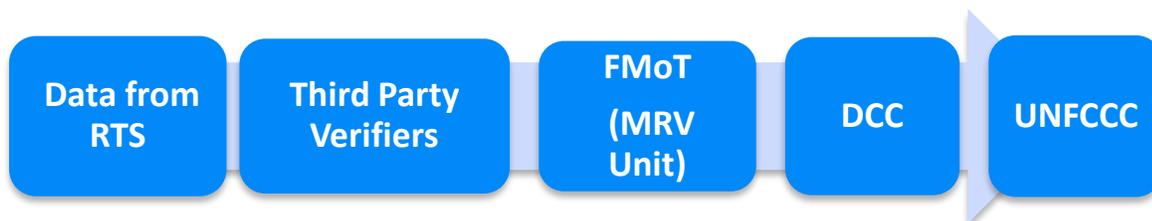


Table 7: Responsibilities of the MRV coordination unit

Responsibilities of the MRV coordination unit
1. Provide guidance and training to stakeholders for accurate data collection, data recording, data reporting, data analysis, and calculations of impact of policies or actions on GHG emission
2. Channeling technical and financial support for MRV of NDCs;
3. Establishment of extensive and effective communication with the stakeholders.
4. Plan and conduct all coordination and consultation activities with governmental and if appropriate non-governmental stakeholders in relation to MRV of policies, strategies, and mitigation actions
5. Capacity building and keep track of capacity-building efforts, domestic (unilateral) as well as international
6. Conducting an evaluation exercise to identify key lessons learned and areas for improvement.
7. Compiling and integrating all the sectoral MRV reports and transform into a cohesive document to be submitted to UNFCCC
8. Incorporation of reporting from all line ministries and their regulatory bodies and keeping an updated registry of relevant actions (e.g., policies and projects);
9. Collection and aggregation of information on new mitigation actions and directing those to the MRV process
10. Maintaining and updating the registry of all the mitigation actions in the country
11. Reflection on progress of NDC implementation and adjustment to new circumstances;
12. Keeping the MRV expert committee informed of progress and emerging issues;
13. Establishing guidelines for quality control and the quality assurance of collected data and developing and overseeing the implementation of a quality assurance/quality control strategy for the entire MRV process
14. Mediate between parties when concerns surface, for example, over a disagreement in terms of responsibilities or a potential conflict of interest

MRV Expert Committee

It is proposed that the Ministry set up a new committee consisting of sectoral experts and MRV experts to verify the emissions data and to provide necessary guidance to the sector.

Table 8: Roles and responsibilities of MRV expert committee

Roles and responsibilities of MRV expert committee
1. Verification of the emission reduction calculations.
2. Provide necessary guidance and feedback to on calculations and selected methodologies.
3. Make recommendations for improving the process for data collection
4. Provide recommendations on suitable methodologies to calculate the impact of the mitigation actions
5. Establishing systems and procedures for the verification of reported impacts of NDCs

5.2 Mitigation

The FMoT through its agencies and units should be responsible for coordinating all mitigation actions in the sector. Reports of all mitigation actions should therefore be transparently reported and submitted to the proposed MRV unit that will oversee the verification and validation process. This will be done in one or more of the following methods.

- Assess and rely on the existing QA process of the data collection of the specific data provider- As most of the data are originally collected for the purposes other than GHG emission calculations many institutions already have a process to ensure the quality of data. If the QA/QC team is satisfied with the existing QA process they can rely on that. However, if the QA associated with activity data is inadequate then the team must go for other methods of QA listed below.
- Comparison with independently compiled data sources - Many of the transport sector data are compiled by various international organizations. Comparison can be done by similar statistics published by the NBS.
- Comparison with samples – Data can be compared with sample data that are collected by institutions for academic purposes.
- Trend check - Activity data can be compared with the data from the previous years. Activity data normally shows consistent change from year to year. Therefore, if there are major changes those data should be further investigated.

The

Figure 6 below shows the flow of coordination for mitigation data while the

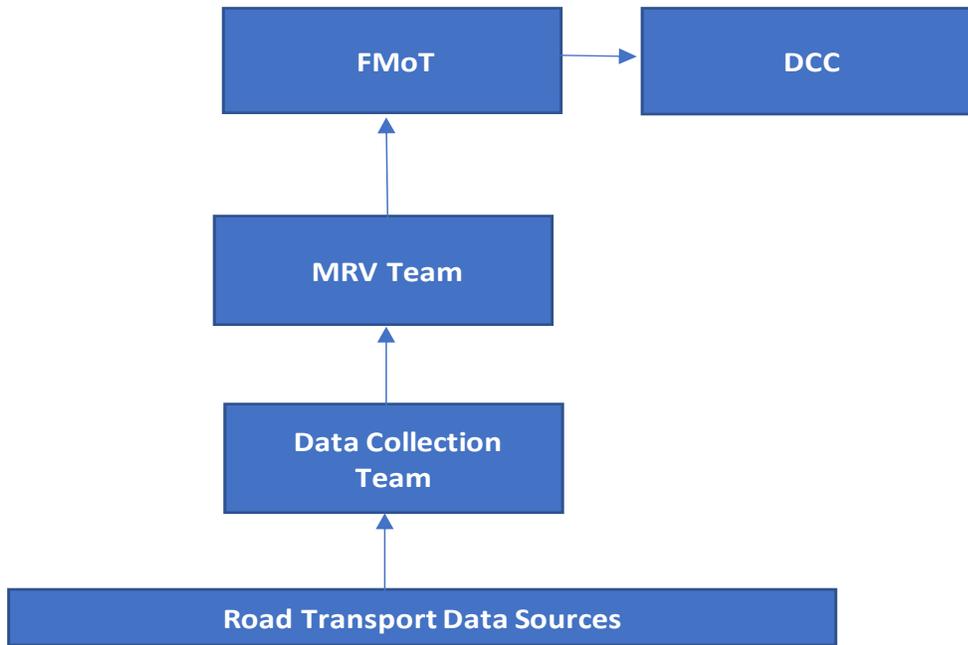


Table 9 below highlights the responsibilities of the coordinating units.

Figure 6: Coordination for mitigation data

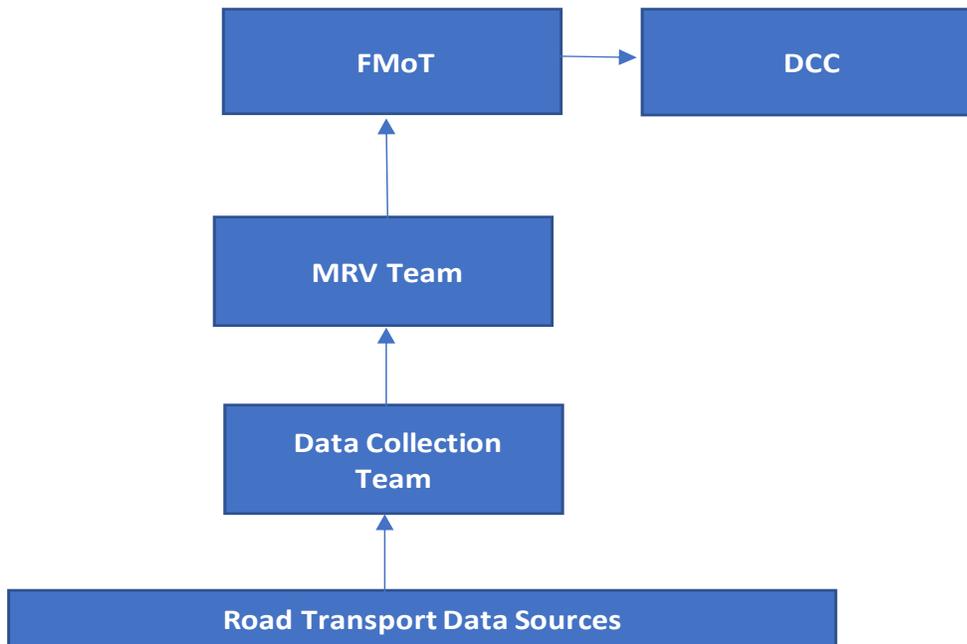


Table 9: Responsibilities of Coordinating Team

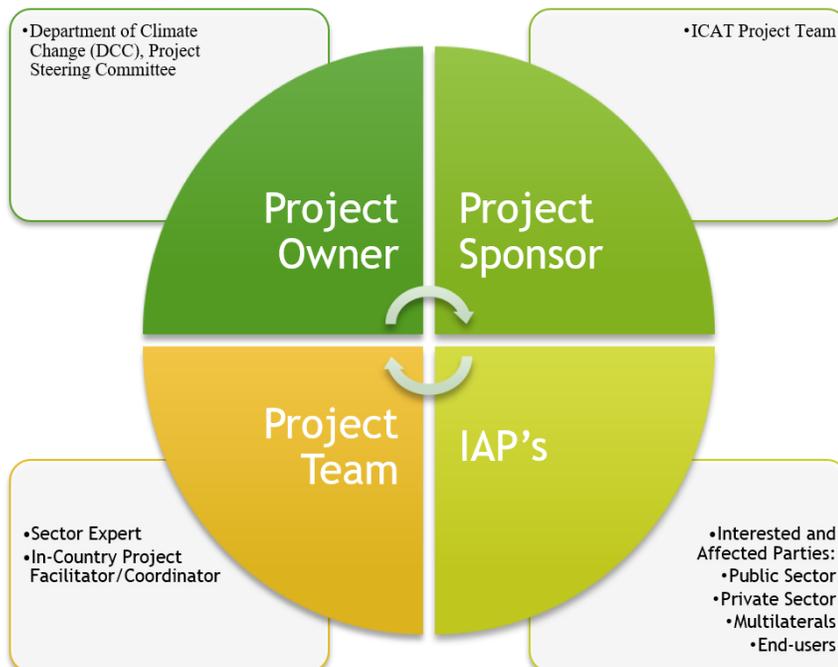
Responsibilities of Mitigation Action Coordinating Team
1. Coordination of the flow of information from individual institution and ministries for a collective assessment of impacts and multiple benefits of policies, strategies, and actions.
2. Calculation GHG impacts of transport sector policies strategies and actions
3. Quality assurance and quality control of data
4. Allocate responsibilities for all institutions ensuring that there is a clear lead for each institution, and establish an institutional level formal approval process;
5. Develop and monitor a time frame and schedule for the preparation and submission of necessary data including specific dates for deliverable.
6. Documenting systematically, as appropriate, all the assumptions, data and methods used;
7. Store and safe keep of data and calculations.

Chapter Six – Stakeholders’ Engagement

Transport is a “system of systems” and resilience of each transport mode to the impact of future GHG patterns along the entire network of global supply chains warrants consideration so that GHG impacts, risks, and vulnerabilities across transport modes especially in Road Transport Sector – the biggest emission contributor in the Transport Sector, are identified and sustainably addressed.

There is growing clarity that transport modes and their infrastructure - seaports, airports, rail routes, roads, inland waterways - have a collective interdependence on each other. This interconnectivity and interdependence also apply to the sectors’ stakeholder environment.

Figure 7: Project Stakeholder Environment



The project environment, the stakeholders (IAP’s) are batched and described as follows:

- **Cross-Cutting:** This includes institutions that have financial, coordination, regulatory, operating, impacting, and/or reporting responsibilities and/or influencing on the RTS as well as OTS.
 - Governmental MDAs such as FMoEnv, Federal Ministry of Transport (FMoT), Federal Ministry of Finance, Budget, and National Planning (FMoFB&NP), Federal Ministry of Works & Housing (FMoW&H), Central Bank of Nigeria (CBN), NBS, Department of Petroleum Resources (DPR), Petroleum Equalization Fund (PEF), the bicameral National Assembly (NASS), Nigeria Customs Service (NCS), etc.
 - Non-Governmental Aid/Multilateral such as ICAT, United Nations Development Programmes (UNDP), etc.
- **Governmental Sector-specific:**
 - **Aviation:** Federal Ministry of Aviation (FMoAv), Federal Airports Authority of Nigeria (FAAN), Nigerian civil Aviation Authority (NCAA), Nigerian Airspace Management Agency (NAMA), Nigerian College of Aviation Technology (NCAT), Nigerian Meteorological Agency (NIMET)

- Marine: Nigerian Ports Authority (NPA), Nigerian Maritime Administration and Safety Agency (NIMASA), Nigerian Shippers Council (NSC), National Inland Waterways Authority (NIWA)
- Rail: Nigerian Railway Corporation (NRC)
- Road: FRSC, NESDRA, Directorate of Road Traffic Service (DRTS more commonly known as VIO), National Automotive Design and Development Council (NADDC), Nigerian Institute of Transport Technology (NITT), etc.
- Non-Governmental (heavy road use operations) Private Sector such as Dangote Group, BUA Group, Nigerian Association of Road Transport Owners (NARTO), NURTW, etc.

The respective stakeholders (batched) and their roles are as shown below:

Table 10: Nigeria’s Road Transport Sector MRV – Broad Stakeholder Outlook

STAKEHOLDERS	ROLES
Executive Arm: The Presidency	<ul style="list-style-type: none"> ● Prepares Executive Bills, for legislation by National Assembly. ● Gives (or withholds) Assent to any bill passed by National Assembly. ● Sometimes, issue Executive Orders to address urgent issues that cannot, for a host of reasons, wait for the usually long process of being passed by the National Assembly.
Legislative Arm: The Bicameral National Assembly	<ul style="list-style-type: none"> ● Treats every bill (Executive Bill or Individual Bill) on climate change, environment, and ecology for passage or otherwise. Thereafter, sends bill to Executive Arm for assent or otherwise. ● Carries out oversight functions on Federal Ministry of Environment (FMEnv) and other Agencies under its control.
Principal Advisory and Implementing Arm: Ministries,	<p>FMEnv</p> <ul style="list-style-type: none"> ● Drives Policy Development ● Responsible for providing responses to climate change, through its specialized Divisions (DCC, I&FF, Mitigation, Adaptation, etc). ● Designated National Authority (DNA) for CDM Projects. ● Coordinate’s climate change arrangements nationally and internationally ● Responsible for the preparation and submission of National Communication (NCs) to UNFCCC ● Co-ordinates the activities of the Policy Advisory Body ICCC - ICCC a body empowered to assemble, on a single platform, multi-sector stakeholders including those in businesses, organizations, ministries, etc. to work together
Principal Advisory and Implementing Arm: Ministries (NRCC Members)	<ul style="list-style-type: none"> ● Federal Ministry of Transport (FMoT) ● Federal Ministry of Aviation (FMoAv) ● Federal Ministry of Finance, Budget, and National Planning (FMoFB & NP)
Advisory and Implementing Arm: Departments & Agencies (MDAs)	<p>Provides generalized data and currently nothing on sectoral and country specific GHG emissions or factors.</p> <ul style="list-style-type: none"> ● National Bureau of Statistics (NBS) ● Central Bank of Nigeria (CBN) <p>Can provide operating unit importation, shipment, and bulk movement volume data but currently does not provide any data on sectoral and country specific GHG emissions or factors.</p> <ul style="list-style-type: none"> ● Nigeria Customs Service (NCS) ● Nigerian Ports Authority (NPA)

	<ul style="list-style-type: none"> • Nigerian Shippers Council (NSC) • Nigerian Railway Corporation (NRC) <p>Provides more specialized data/information on aggregated energy consumptions, through annual bulletins useful for National Climate Action Policy formulation and implementation.</p> <ul style="list-style-type: none"> • Nigerian National Petroleum Corporation (NNPC) – plays dominant role • Department of Petroleum Resources (DPR) • Petroleum Equalization Fund (PEF) • Petroleum Products Marketing Company (PPMC)
Advisory, Reporting and Implementing Arm: Departments & Agencies (MDAs)	<p>Presently, not actively involved in climate Actions Policy or Climate Change issues and no MRV structures within</p> <ul style="list-style-type: none"> • Federal Road Safety Corps (FRSC) • Directorate of Road Traffic Service (DRTS more commonly known as VIO) • National Automotive Design and Development Council (NADDC) • Nigerian Institute of Transport Technology (NITT) • The National Environmental Standards and Regulations Enforcement Agency (NESREA)
Non-Governmental Organizations: International, Multilateral Donors	<p>Provides funding and/or Technical Support for the development of MRV Systems.</p> <ul style="list-style-type: none"> • ICAT • UNFCC
NGOs (Awareness): Local NGO's	<p>Pressure Groups creating awareness of Climate Change Actions' policies in the society and influencing Climate Policy Formulations and implementation through Legislative processes.</p> <ul style="list-style-type: none"> • Various Climate interested Non-governmental Organizations (NGO)
NGOs (Operating, Reporting, and Implementing): Private Sector Businesses	<p>Can support Government in Climate Actions' Policy implementation through investments and resource commitments/utilization e.g., investments in Green Business Projects aka GHG Emissions Abatement Projects</p> <ul style="list-style-type: none"> • BUA Group • Dangote Group • NARTO • NURTW

6.1 GHG Inventory

Stakeholders' engagement is considered very important to achieving a robust GHG inventories. Engagements could cut across all levels of the sector and could be either based on inventories on the company, sectoral or national levels. Sadly, stakeholder's engagement in terms of communication between the stakeholders has been weak.

Weak engagements among stakeholders have hindered sizable amount of progress that would have been made. Also, there has not been a place for a graphical representation of information and data as it relates to GHG inventory. This is an area that is considered important and can be achieved through good engagements among stakeholders through technical experts and data analysts. It is important that data sets are analyzed and made easily interpretable to those that may have a need for it. Now the sector does not have a website of its own however, going forward, to enhance the transparency framework, there is the need for a website that will allow the archiving of all datasets from the sector to enable the building of a robust GHG inventory.

The FMoEnV is placed on top of the stakeholders' chart as it relates to GHG inventory. The ministry has the responsibility as mentioned in the table above to regulate all GHG activities including national inventories for the sector. The FMoEnV is rightly followed by the FMoT which directly oversees inventory activities reporting in connected oversight institutions. All other above-mentioned stakeholders play one role or the other in the inventory processes.

6.2 Mitigation

Stakeholders' engagement for mitigation actions is critical and cannot be overemphasized. Engagement for mitigation actions should be done either on the company, sectoral or the national levels.

Weak engagements obviously observable among stakeholders involved in GHG mitigation actions. Just like in the inventory processes, the lack of good proper engagements among the sector stakeholders has a negative effect on the amount of progress that would have been made in implementing mitigation projects. Also, for mitigation projects in the sector, there is no graphical representation of information and data currently however, this must be critically considered as this can be achieved through good engagements among stakeholders with technical expertise in data analysis. It is important that data sets are analyzed and made easily interpretable to those that may have a need for it. Currently the sector does not have a database that aggregates mitigation projects, going forward, to enhance the transparency framework, there is the need for a database that will allow the aggregating and archiving of all mitigation projects.

For mitigation actions, the FMoT oversees the RTS. the ministry coordinates and monitors all mitigation projects, while also enforcing compliance. All arms and agencies of the ministry play their designated roles to ensure mitigation actions are developed in line with best practices and international guidelines.

Chapter Seven – Institutional Arrangements

7.0 Organizational Structure of Institutional Arrangements

Institutional arrangements are policies, systems, and processes used to legislate, plan, and manage activities efficiently and to effectively coordinate with others to fulfill their mandate. These arrangements are crucial as they provide government at all levels (federal, sectoral, and local) with the framework within which to formulate and implement policies; they provide the linkages between and among all the organizations and entities involved in the structure.

The structure of the institutional arrangements encompasses relevant institutions with clearly demarcated roles and responsibilities that will aid the effective implementation of the MRV system.

Existing Institutional Arrangements in Transport sector

Existing institutional arrangements in the RTS sector is relatively fragmented and not clearly defined. This has to no small measure impacted the implementation of actions. Table 11 below shows that has overtime been identified as existing institutional arrangement in the RTS.

Table 11: Existing Institutional Arrangements

Institutions	Nigeria's RTS MRV Institutional Arrangement
Coordinating body/Lead institution	The Federal Ministry of Environment, NESDRA, NADDC
Inter-ministerial body/Steering Committee	The MRV Focal Point and Steering Committee, DCC within the Federal Ministry of Environment coordinates
Technical Coordinator(s)	MRV Focal Point in the DCC and the National Project Coordinator
Sectoral Working Groups	No specifically defined, designed, setup, and standing/permanent Sectoral Working Group within the Road Transport Sector in most of the stakeholder entities – FRSC, DRTS/VIO, NITT, NESDRA, NADDC, NARTO, NURTW. Private sector stakeholders are yet to confirm status.

It must have been observed that the existing institutional arrangements lacks some very key and basic experts who are useful in building a robust system for inventories and mitigation actions however, the proposed institutional arrangement discussed below will give a full representation of what a robust institutional arrangement should be for the sector.

Proposed Institutional Arrangement

A robust Institutional arrangement is structured to define all the roles and responsibilities among the involved stakeholders and institutions. This proposed institutional arrangement is designed to articulate the overarching climate goals and targets and the transparency outputs needed to track them.

The

Figure 8 below shows the conceptual design for the Institutional Arrangement while the **Erreur ! Source du renvoi introuvable.** shows the interactions between the institutions and the identified sector stakeholders and will also bring clarity in terms of communicating data information within the relevant stakeholders.

Figure 8: Proposed Institutional Arrangement Conceptual Design



Figure 9: Interactions in Proposed Institutional Arrangement

Erreur ! Source du renvoi introuvable. above explains the roles and responsibilities of the stakeholders. The structure shows how data will be collected, verified, validated, and reported along the institutional arrangement. The roles and functions of the various institutions are discussed below:

- **National focal point:** According to the institutional arrangements, the national focal point is the Department of Climate Change (DCC) which is under the Federal Ministry of Environment. They are the institution responsible for interactions between the Federal government and the international communities (communications between the Nigerian Government and the UNFCCC on all climate change processes). The DCC shall engage national consultants who will ensure that the country's climate change activities from the RTS meet up with international standards.
- **Steering committee (National):** this committee will be responsible for reviewing activities on Climate Change while also collaborating and sharing ideas on climate issues, challenges, and actions. The committee will comprise of representatives of national ministries from the NDC sectors and other Departments as well as agencies relevant to the Climate Change activities.
- **Management and coordination:** The FMoT shall be responsible for coordinating all processes in the RTS (data gathering, tracking and improvements to the transparency system, data verification and validation, facilitating legal arrangements for data supply, ensuring good communications and engagements among stakeholders. The FMoT shall also coordinate and monitor financial activities in the RTS (national or international resources in the form of climate finance).
- **Quality Assurance/ Quality Control:** To ensure transparency of reporting, the private organizations, academia, and other national institutions should be involved and responsible for carrying out data QA. These agencies should provide the technical support data QA. While QA is conducted by a third party, QC for data **shall be conducted internally**.
- **Steering committee (Sectoral):** *It is important to mention that there is the need for this type of engagements on the sectoral level.* That is a steering committee on the sectoral level. On the sectoral level, the committee will be responsible for developing actions and measures that will bring about low GHG emissions **within the sector. The committee should comprise of representatives drawn across the sector capable of influencing decisions to implement climate action (e.g., technical, corporate planning and strategy, Costing and HSE team from FMoT, and private and public sector operators)**
- **Data providers:** Data providers comprises of all stakeholders in the RTS across all sectoral levels (local, sectoral, and national).

The major source of data is the Federal Ministry of Transport, National Bureau of Statistics, the motor licensing authorities of the State ministries of finance, the Nigerian Union of Road Transport Workers, and the operators of mass transit, including luxury buses, fuel tankers and trailers. The Nigeria Police is also the sole source of road accident statistics.

- **Legal frameworks:** Legal frameworks are important in institutional arrangements; this will enable the setting up of frameworks that are currently not in place. For instance, legal frameworks that allows the establishment of Steering Committees and data QA across all levels of the RTS. Frameworks will define and legalize the boundaries, roles, and responsibilities of newly set up institutions.

Chapter Eight – Work Plan and Road Map

8.1 Work Plan

Workplan will serve as a tool that will help to plan, manage implementation of, report on, evaluate and actualize a robust institutional arrangement.

It is therefore proposed that all activities that will enhance a robust MRV framework should be considered under the short, mid, and long term (Short-term – 3 to 8 months; Mid-term 8-12 months; Long-term 12-24 months).

Table 12: Workplan and Timeline

S/N	Components	Required Action	Time Schedule
1	Stakeholders' Engagement	<ul style="list-style-type: none"> • Identification of stakeholders across the sector and defining their terms and responsibilities. • Initiate Data gathering Process • Setting up steering committees across all the levels • Establishing and defining the Qat/QC team across all the sector (local, sectoral, and national). 	3 – 12 months. However, data gathering process shall be a continuous process.
2	Expertise	<ul style="list-style-type: none"> • Organize trainings, and capacity building for identified sector experts and foster engagement among the stakeholders. • Initiate transparency framework 	3- 12 months.

		<ul style="list-style-type: none"> Introduce guidelines that shall clearly define the responsibilities of all experts and stakeholders going forward. 	Capacity building shall be a continuous process across all levels.
3	Data Flows	<ul style="list-style-type: none"> Establish Legal and institutional frameworks for data flows across all levels of the sector. 	3 – 12 months
4	Institutional arrangement	<ul style="list-style-type: none"> Enhance the implementation of the Proposed institutional arrangement after it has been approved. This will improve the entire MRV process across the sector while also allowing Transparent data collection process. 	3 – 12 months
5	Coordination	<ul style="list-style-type: none"> Clearly define the coordination of the RTS MRV processes and ensure all stakeholders understand their roles. Put in place mandates that permits the Coordinating team to monitor compliance for all MRV process across the sector. 	3 – 12 months

8.2 Roadmap

The overall goal of establishing frameworks is to develop a road map for the establishment of a robust MRV system for the RTS. The RTS shall start with relatively simple approaches as identified in the workplan process (short, mid and long term) using default values and assumptions – before improving data availability, specific values and modelling capacity over time. This process shall involve all sector stakeholders and experts. Key aspects of the roadmap shall include:

- Stakeholders’ engagement
- Capacity building.
- Lowering the barriers to establish a robust MRV system.
- All stakeholders and experts will contribute to a common understanding of elements of MRV.
- Facilitate developing and implementing transport inventories and mitigation projects.

The Table 13 below presents a summary of the roadmap for the RTS. The Table shows the components, the actions to be taken and the time schedule for the road map. All activities of the roadmap will be implemented within the short term to the long-term. As explained in the Section 8.1 above, some activities will extend from the short to the mid-term while some others will go all the way to the long-term as they require a continuous implementation process.

Table 13: Roadmap and Action plan

S/N	Components	Actions to be Taken	Time Schedule
1	Robust Stakeholders Engagement	Initiate a robust Stakeholders’ engagement that all involve all sector stakeholders and also cut across all levels of the sector. This process will be considered to be a continuous process	3 months however this shall cover to the long-term.
2	Introduce improved Institutional Arrangement	Proposed Institutional arrangement shall be presented to all sector Stakeholders to ensure they fully understand what the process will involve going forward and to ensure the right methodologies for implementation are adopted.	3-4 months after approval.
3	Establish Legal Framework	Work towards introducing newly introduced legal frameworks to all Stakeholders. Mandates in the Legal Framework will guide and clearly spell out the responsibilities of each stakeholder in the	3 months after approval of Legal Framework to 24months (Short- Long term)

		sector. This process will take time considering the peculiarity of the RTS.	
4	Capacity Building to Study MRV Processes (Emission sources, trends, Methodologies etc.)	The process of Capacity is very important and hence shall be considered to be a continuous process. This shall aim at improving the skills and knowledge base of all sector Stakeholders involved in the MRV processes.	Continuous
5	Establish a robust MRV system for data collection and verification	Engage all data providers and other stakeholders to help identify all data sources and processes of measuring, archiving and transmission from one level to another.	3-8 months after the start of the MRV process
6	Data Validation	Introduce the process of data QA/QC to all Stakeholders for the validation of all implemented projects across the sector.	3 – 12 months from the start-up of the process however this process shall be carried out for all projects that shall be implemented
7	Data Improvement	Recommend ways data collection and verification processes can be improved after current data trends have been critically considered.	Continuous
8	Monitor Compliance	This process shall be carried out from the short to the long term to ensure that at all phases of the MRV process, Stakeholders carry out the processes in-line with acceptable methodologies and best practice.	Continuous

8.3 Conclusion

A robust MRV system can be achieved if all recommendations as stated in this report are critically considered. The recommendations as presented in the report are considered as key options that will going forward enable the RTS to develop and sustain a robust MRV Framework.

Importantly, the recommendation for a top-down approach is considered key for developing GHG inventories. It should be stressed that having considered and understood the trends of emissions from the sector the use of the top-down approach is best fit to developing a robust GHG inventory as this method is appropriate for covering major GHG emissions (CO₂, CH₄ and N₂O) generated in the sector. Other recommendations in relation to Data Reporting for mitigation actions and GHG inventories (who is responsible for data collection, what type of data to be collected, format for data reporting, who verifies and validates data, method of data storage); and on the continuous building of stakeholder's capacities across the entire sector must be considered serious. This is processes are believed to be key considerations for developing a sustainable MRV Framework.

It is expected that the proposed institutional arrangement will further bring clarity on data gaps, show the level of expertise required and at which level capacity of the experts needs to be built while also identifying areas where financial support is required. When approved, implemented, and becomes functional it will drive the

achievement of the overall MRV process that will enable the RTS to aggregate data for the GHG inventories and enhance transparent reporting of mitigation actions across all the sectoral levels.

The process of data gathering and transparent reporting in line with best practices will to a very large extent close the data gap that is currently identified as a challenge in the RTS and help in building the much-needed MRV framework for the sector.

It is important to note that achieving a robust MRV framework will take a stepwise progression (will be built gradually in the short-, mid-, and long-term) as shown in the Table 13 above however, all processes must be transparently carried out in line with international best practices and plans towards achieving all set targets must be well articulated.

Reference

2019 Refinement to 2006 IPCC Guidelines for National Greenhouse Gas inventories. *Introduction to National Greenhouse inventories*

CDM Methodology Booklet: Retrieved from:

https://cdm.unfccc.int/methodologies/documentation/1611/CDM-Methodology-Booklet_fullversion.pdf

Handbook on Institutional arrangements to support MRV/transparency of climate action and support

Federal Republic of Nigeria (2015): *Intended Nationally Determined Contributions (Extracts)*

IPCC. (2006). 2006 IPCC Guidelines for national Greenhouse Gas Inventories. Mobile Combustion. IPCC *Guidelines for National Greenhouse Gas Inventories (pp. 1–78)*. Geneva: International Panel on Climate Change
Major Policy plans in growing infrastructure retrieved from:

<https://oxfordbusinessgroup.com/overview/moving-forward-two-major-policy-plans-have-shaped-sector's-growing-infrastructure-and-mid-term>

UNFCCC Handbook, 2020: Handbook on institutional arrangements to support MRV/transparency of climate *and support*



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