Project no.: MoWE/CONS/2022-2023/00024

Consultancy Services for Development and Implementation of a Nationally Determined Contribution (NDC) Tracking and Monitoring Framework for Transport and Waste Sector Policies and Measures

Deliverable I: NDC Tracking and Monitoring Framework for Transport and Waste Sector Policies and Measures

Revised Draft Report

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5 February 2024

Technical support provided by:
ghg management institute

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PREPARED UNDER

The Initiative for Climate Action Transparency (ICAT), supported by Austria, Canada, Germany, Italy, the Children's Investment Fund Foundation and the ClimateWorks Foundation.

The ICAT Secretariat is managed and supported by the United Nations Office for Project Services (UNOPS)

Document control

DOCUMENT CONTROL	
CLIENT:	MINISTRY OF WATER AND ENVIRONMENT
CLIENT ADDRESS:	Kampala, Luzira
PROJECT TITLE	Expansion of the National GHG Inventory Management System and Operationalization of NDC Tracking Framework
PROJECT NUMBER:	MoWE/CONS/2022-2023/00024
DELIVERABLE TITLE	Revised Draft Nationally Determined Contribution (NDC) Tracking and Monitoring Framework for Transport and Waste Sector Policies and Measures
DELIVERABLE:	Nationally Determined Contribution (NDC) Tracking and Monitoring Framework for Transport and Waste Sector Policies and Measures
REVIEWED BY:	Luanne Stevens – 9/01/2024 CCD – 11/01/2024
CCD ACCEPTANCE:	Name: Date:
REPORT SIGN-OFF	Name: Date:
SUBMISSION DATE TO UNOPS	

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Abbreviations

BFP	Budget Framework Paper
CAA	Civil Aviation Authority
CCD	Climate Change Department
CFU-MoFPED	Climate Finance Unit-Ministry of Finance, Planning and Economic Development
DAC	Development Assistance Committee
DWRM	Directorate of Water Resources Management
GHG	Greenhouse Gas
GHGMI	Greenhouse Gas Management Institute
GKMA	Greater Kampala Metropolitan Area
GLASS	UN Water Global Analysis and Assessment of Sanitation and Drinking Water Survey
ICAT	Initiative for Climate Action Transparency
iMRV	Integrated Monitoring Reporting and Verification
IPCC	Intergovernmental Panel on Climate Change
KCCA	Kampala Capital City Authority
MoES	Ministry of Education and Sports
MoFPED	Ministry of Finance, Planning and Economic Development
MoH	Ministry of Health
MoLG	Ministry of Local Government
MoLHUD	Ministry of Lands, Housing and Urban Development
MoTIC	Ministry of Trade, Industry and Cooperatives
MoWT	Ministry of Works and Transport
MEMD	Ministry of Energy and Mineral Development
MRV	Monitoring Reporting and Verification
MtCO2e	Metric tons of carbon dioxide equivalent
MWE	Ministry of Water and Environment
MWE-CCD	Ministry of Water and Environment, Climate Change Department
NAMA	Nationally Appropriate Mitigation Action
NEMA	National Environment Management Authority
NIE	NAMA Implementing Entity

NDC	Nationally Determined Contribution
NDP	National Development Plan
NMT	Non-Motorised Transport
NWSC	National Water and Sewerage Corporation
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OPM	Office of the Prime Minister
RGCs	Rural Growth Centres
SMART	Specific, Measurable, Achievable, Realistic, Time-bound
SDG	Sustainable Development Goal
SGR	Standard Gauge Railway
STs	Small Towns
UBOS	Uganda Bureau of Statistics
URC	Uganda Railways Corporation
URF	Uganda Road Fund
UNRA	Uganda National Roads Authority
UNICEF	United Nations Children's Fund
WESIP	Water and Environment Sector Investment Plan

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Executive summary

This report was initially prepared as a companion to the Nationally Determined Contribution (NDC) Tracking and Monitoring Framework for Transport and Waste Sector Policies and Measures, under **Activity 2.1** of this project. It has been updated to also provide a background to the data collection templates for activity data to track the identified NDC actions in the Transport and Waste sectors (**Project Activity 2.2**).

The report provides a brief background of the project, the project objectives, and the project deliverables; and describes the structure and organisation of the draft NDC tracking frameworks for both the transport and waste sectors.

The draft NDC tracking and monitoring frameworks, and the respective data collection templates for both the transport and waste sectors are attached to this report as two separate annexures in the Excel file format. These drafts will continuously be updated by the Consultant, based on feedback from the Client, as well as new available information, throughout the duration of the project.

1 Introduction

Project background

The Government of Uganda, through the Ministry of Water and Environment - Climate Change Department (MWE-CCD) has received financing from the Initiative for Climate Action Transparency (ICAT) through the United Nations Office for Project Services (UNOPS). Part of these funds have been earmarked for the development of a Nationally Determined Contribution (NDC) Tracking and Monitoring Framework for Transport and Waste Sector Policies. The project's main objective is to strengthen Uganda's capacity to expand its National Greenhouse Gas (GHG) Inventory Management System and operationalize an NDC tracking framework, allowing the country to track progress towards its NDC targets under the 2015 Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC).

The primary aim of the Paris Agreement is to hold "the increase in global average temperature to well below 2°C above pre-industrial levels" and to pursue measures "to limit the temperature increase to 1.5°C above pre-industrial levels" (UNFCCC, 2015). To achieve this goal, each country is required to develop and implement its national climate action plan, known as NDC, with specific targets and actions to reduce greenhouse gas (GHG) emissions and adaptation measures to the impacts of climate change. Uganda, as a party to the Paris Agreement, filed its Intended NDC (INDC) in October 2015, its first NDC in September 2016 and its Updated Nationally Determined Contribution in September 2022, in accordance with Article 4 of the Paris Agreement.

Achieving the collective target set by the Paris Agreement (PA) relies on the effective implementation of consecutive and increasingly ambitious Nationally Determined Contributions (NDCs). Regular tracking of progress toward implementing and achieving each NDC is a key step in assuring effectiveness. This regular tracking is needed to identify implementation gaps and needs for achieving NDC targets.

According to the requirements of the Modalities, Procedures and Guidelines (MPGs) under chapter III section C, tracking the progress of an NDC shall be based on the indicator(s) that each country identifies as relevant to its NDC targets. Indicators may be either qualitative or quantitative. The MPGs also recommend that for each relevant indicator associated with the implementation of mitigation actions, the corresponding potential GHG emissions reduction should be calculated.

Project objectives

The objectives of this project are:

i. To strengthen the national capacity to track and monitor NDC actions in the Transport and Waste sectors;

ii. To develop an NDC tracking and monitoring framework for the Transport and Waste sectors;

iii. To develop a roadmap for the implementation of the NDC tracking framework;

iv. To conduct training workshops to build awareness on the operationalisation of the tracking framework; and

v. To utilise the NDC tracking and monitoring framework to oversee and evaluate Uganda's progress towards meeting its NDC targets in the transportation and waste sectors.

Scope of deliverables

This assignment comprises four main components which are as follows;

i. Project inception;

ii. Developing an NDC tracking and monitoring framework for transport and waste policies and measures;

iii. Piloting the implementation of the developed NDC tracking and monitoring framework at the national and local government levels; and

iv. Project validation and close-out.

Project deliverables

The seven key deliverables are outlined in Table 1-1. For each deliverable, the main tasks and the sub-tasks have been listed.

Table 1-1: Summary of the project deliverables

Task	Sub-task	Deliverable
1. Project inception	1.1. Inception meeting	Inception report
2. Development of a NDC tracking and monitoring framework for the Transport and Waste sectors	2.1. Identify the adaptation and mitigation activities in the NDC associated with the Transport and Waste sectors. Develop, together with stakeholders and other project consultants, a draft set of indicators for tracking adaptation and mitigation actions and develop a NDC tracking framework for the Transport and Waste sectors	NDC tracking framework for the Transport and Waste sectors
	2.2. Develop data collection templates for activity data to track the identified NDC actions in the Transport and Waste sectors.	Data collection templates
3. Implement NDC tracking and monitoring framework at national and local government level	3.1. Create a database of adaptation and mitigation activities/actions associated with the Transport and Waste sectors and incorporate actions into iMRV system.	Database of key adaptation and mitigation activities
	3.2. Assess the availability of relevant data and existing institutional arrangements for collecting them; identify data, institutional and resource gaps to track the NDC actions; evaluate how the existing MRV platform can be used to manage data collection and processing for the indicator sets; develop a draft roadmap for tracking NDC actions and indicators for the Transport and Waste sectors; conduct a validation workshop for the roadmap; and finalise the roadmap. Pilot and test the applicability of the developed roadmap for both sectors	Roadmap for the implementation of the NDC tracking system in the Transport and Waste sectors
	3.3. Hold 2 training sessions with relevant stakeholders and present the tracking framework and build awareness and assist government in operationalising the framework.	NDC tracking framework training workshop reports
4. Validation and project close-out	4.1. Facilitate and participate in a 1-day project validation workshop and work with MWE-CCD and other project Consultants to compile a workshop report along with a final project report highlighting the lessons learnt.	Project validation workshop report and final report highlighting lessons learnt

Purpose of the report

This report is a result of activity 2.1 of this project Identify the adaptation and mitigation activities in the NDC associated with the Transport and Waste sectors. Develop, together with stakeholders and other project consultants, a draft set of indicators for tracking adaptation and mitigation actions and develop a NDC tracking framework for the Transport and Waste sectors (see Table 1-1).

The report is a companion to the NDC tracking framework for the Transport and Waste sectors which has been developed by the Consultant, in the Microsoft Excel file format.

2 Contextual background

Justification for the NDC tracking framework

Achieving the collective target set by the Paris Agreement (PA) relies on the effective implementation of consecutive and increasingly ambitious Nationally Determined Contributions (NDCs). Regular tracking of progress toward implementing and achieving each NDC is a key step in assuring effectiveness. This regular tracking is needed to identify implementation gaps and needs for achieving NDC targets.

The NDC tracking and monitoring framework has been conceptualised as a complementary tool to the iMRV tool developed by the Ministry of Water and Environment in 2021. The iMRV tool was designed with the objective to transparently demonstrate progress made towards Uganda's climate change targets defined in the national policies and frameworks such as the Climate Change Action Plan (CCAP), and the Nationally Determined Contributions. Besides measuring ex-post emissions, baseline and mitigation actions, the iMRV system also aimed to track the progress of implementation in terms of other impacts such as co-benefits, progress in implementation of Sustainable Development Goals (SDG), and the means of implementation such as tracking of climate finance flows, technology transfer and capacity building.

The present version of Uganda's integrated MRV tool covers following key elements:

i. National GHG Inventory (limited to key sector and sub-sectors)

ii. Monitoring and Tracking: Climate Change Mitigation Actions/Projects and GHG emission reductions

iii. Monitoring and Tracking: Climate Change Adaption Actions/Projects and Impacts;

iv. Monitoring and Tracking: Climate Finance Flow towards Climate Actions;

v. Monitoring and Tracking: SDG impact of climate actions

According to the requirements of the Modalities, Procedures and Guidelines (MPGs) under chapter III section C, tracking the progress of an NDC shall be based on the indicator(s) that each country identifies as relevant to its NDC targets. Indicators may be either qualitative or quantitative. The MPGs also

recommend that for each relevant indicator associated with the implementation of mitigation actions, the corresponding potential GHG emissions reduction should be calculated.

2.1.1 iMRV system in Uganda

The Integrated Monitoring, Reporting, and Verification (iMRV) system is a tool used to manage and track the progress of the climate actions as stipulated in the updated Nationally Determined Contributions (NDC). This system was designed to improve the management and reporting of greenhouse gas inventories, streamline the assessment of climate action impacts, and support the consistent monitoring of progress towards international commitments under the Paris Agreement. By integrating various data parameters from the waste and transport sector, among other sectors, the iMRV system ensures comprehensive analysis and fosters transparency in Uganda's climate initiatives. The MWE-CCD as the custodian of the iMRV system, is mandated to ensure its alignment with national and international standards for climate action reporting.

For the waste sector, the iMRV system currently allows for the input of activity data that allows for the estimation of tier 1 greenhouse gas emissions from the four key IPCC sub-sectors under waste. These include: emissions from solid waste disposal, from biological treatment of solid waste; incineration and open burning of waste; and wastewater treatment and discharge. The iMRV system is being updated currently to allow the use of nationally determined emission factors, instead of the IPCC defaults, to allow progression from tier 1 to tier 2 approach to calculation of emissions.

For the transport sector's iMRV system enables the input of activity data for estimating greenhouse gas emissions for the sub-sectors such as road transportation, including passenger cars, light-duty trucks, heavy-duty trucks, buses, and motorcycles, as well as railway transportation. The planned update to incorporate nationally determined emission factors for a more accurate tier 2 approach in emissions calculation, transitioning from the default tier 1 IPCC methodology, will significantly support tracking and managing the transport sector's contribution to the nation's greenhouse gas emissions.

Policy and legal framework for the NDC tracking and monitoring framework

At the national level, the NDC tracking and monitoring framework, is aligned with Uganda's NDC Implementation and Resource Mobilisation Plan (2021), the Uganda Vision 2040, the third National Development Plan (NDP III) (2020/21-2024/25); the National Climate Change Act (2021); the National Climate Change Policy (2015); the Costed Implementation Strategy of the National Climate Change Policy (2013); the Uganda Green Growth Development Strategy (2017/18-2030/31); the National REDD+ Strategy (2014); and other related policies, regulations, plans and strategies of the government of Republic of Uganda.

The sector-specific policy and legal instruments which are relevant to the completion of this assignment are detailed in the following sections.

2.1.2 Transport Sector

The Ugandan government has put in place policies and strategies to guide the transport sector towards

a sustainable direction in line, with the country's Nationally Determined Contributions (NDCs). Below these instruments that highlight Uganda's dedication to improving its transportation sector are presented.

2.1.2.1 The National Transport Master Plan

The Uganda National Transport Master Plan developed in 2009 is centred on uplifting the Country's transport sector infrastructure and services. However, it also includes sections encouraging sustainable and environmentally friendly transport solutions. It highlights the integration of climate resilience and low-carbon strategies in transport planning and investment, contributing to Uganda's commitments to reduce greenhouse gas emissions. The plan also addresses institutional and legal frameworks, promoting policies that support environmentally friendly transport solutions, crucial for achieving Uganda's climate action goals (Enriquez et al., 2018).

2.1.2.2 Non-Motorized Transport (NMT) Policy

The Non-Motorized Transport (NMT) Policy centres on the enhancement of the safe walking/ cycling spaces. It encourages the road safety of pedestrians and cyclists by promoting the integration of NMT considerations into national and urban road designs. The policy was developed in consultation with the United Nations Environment Programme (UNEP) and is aligned to Uganda's Transport goals of NDP III. The policy includes designated NMT corridors, greening of streets, public seating, and provision of bicycle parking facilities.

2.1.2.3 Green Mobility Strategy

The Government of Uganda through the Ministry of Energy and Mineral Development (MEMD) has developed a Green Mobility Strategy that aims to transform the transport sector by integrating environmentally friendly practices and technologies. It is ultimately steering the nation towards a greener, more sustainable mobility future. This strategy includes adopting clean energy vehicles, fuel diversification, etc. The strategy is based on a long-term vision of significant e-mobility adoption by 2024, however, there are immediate actions that are under way. These include; building charging infrastructure, offering incentives to manufacturers, and training technicians are underway. It also faces challenges such as infrastructure development, skills enhancement, and policy formulation that are being addressed.

2.1.2.4 National Transport and Logistics Policy

The National Transport and Logistics Policy of Uganda was approved by the Ugandan executive arm in 2021. The policy is focussed at the establishment of a safe, accessible, and sustainable intermodal transport system for the country. It recommends the promotion of safe and sustainable mobility. It further encourages green growth in the transport sector of Uganda. Similarly, the policy incorporates innovative technologies for constructing and maintaining transport infrastructure, enhancing resilience and reducing vulnerability to climate change impacts.

2.1.2.5 Alignment of the policies within transport sector with National Climate

Goals

Uganda's transportation sector policies and strategies, such as the Non-Motorized Transport (NMT) Policy, National Transport and Logistics Policy are, in harmony with the country's climate objectives. These policies support a transportation system that integrates climate resilience and eco-strategies key for meeting Uganda's climate goals. This involves encouraging, NMT practices, reducing vehicle emissions and increasing infrastructure resilience to climate impacts as outlined in the 2015 National Climate Change Policy and the Nationally Determined Contribution.

The focus of the Green Mobility Strategy on adopting technologies for transportation such as electric vehicles showcases Uganda's dedication to sustainability as part of its development agenda. By advocating for eco-mobility while promoting environmentally friendly growth in the transportation industry Uganda presents a holistic approach, to addressing climate change challenges. This strategic direction not only aligns with Uganda's climate commitments but also underscores the vital role of the transportation sector in country wide efforts to combat climate change. .

2.1.3 Waste Sector

The waste sector is governed by a number of policies and regulations, the primary legislation being the 1995 Constitution of Uganda and the amendments thereof. All the identified policies and regulations are aligned with Uganda's Nationally Determined Contributions for the waste sector and include the following:

2.1.3.1 The National Environment Act, 2019

Established in 2007, its mandate is derived from the National Environmental Act, 2019 and the National Environment (Waste Management) Regulations, 2020. The Act gives the Ministry of Water and Environment the mandate to develop and manage regulations on water and environment resources, including waste management in Uganda.

2.1.3.2 The National Energy Policy, 2019

The Ministry of Energy and Mineral Development is responsible for the implementation of the National Energy Policy, 2019, which advances the use of waste-to-energy products like briquettes, power generation from waste incineration and biogas. These provide alternative energy sources while propping effective waste management. Some of the mitigation measures proposed in the NDC such as biogas recovery from solid waste treatment, are therefore directly aligned with this policy.

2.1.3.3 National Environment (waste management) Regulations, 2020, and Guidelines for the Management of Landfills in Uganda (2020)

National Environment Management Authority (NEMA) is mandated with developing environmental policy, rules, legislation, standards, and recommendations, as well as advising the government on environmental management. Its key role is regulatory, compliance and oversight of environmental conservation and protection, including on waste management.

2.1.3.4 The Local Government Act

The Local Government at Act, implemented by the Ministry of Local Government, gives the Ministry the mandate to manage decentralized services to district / urban authorities across Uganda, which include Solid Waste Management.

2.1.3.5 National Industry Policy.

Ministry of Trade and Industry is responsible for the National Industry Policy. The Policy promotes cleaner production practices, recycling of waste, appropriate waste management and disposal as well as efficient resource management programmes.

2.1.3.6 Alignment of waste sector policies with the National Climate Goals

All the waste sector policies and guidelines outlined above including the National Environment Regulations, the Local Government Act, the National Energy Policy and others, are aligned with the country's climate objectives as outlined in NDP III and the National Climate Change Policy. These policies support initiatives that contribute to mitigation of waste sector emissions and therefore in support of Uganda's climate goals.

Institutional framework for the NDC tracking and monitoring framework

A government can manage climate change through the use of formal organizational structures, regulations, and unwritten conventions that make up an institutional framework tailored to the issue of climate change.[1]

The institutional framework for the NDC tracking and monitoring framework consists of institutions and/or organisations which are responsible for performing a specific function with respect to tracking and monitoring NDC mitigation and adaptation actions in the transport and waste sectors of Uganda. The definition of the specific roles and responsibilities of the key institutional/organizational actors under each core function has been informed largely by the NDC Implementation and Resource Mobilisation Plan (2021), as well as the Consultants evaluation of the different institutions' mandates, and ongoing activities. The institutional framework provided by the NDC implementation plan relied largely on indications from NDP III and the mandates of these respective institutions. Institutional mandates are provided in sectoral policy and legal framework work documents, that include acts of the Parliament; and statutory instruments such as regulations, guidelines, and plans. The Institutional Framework for this NDC Implementation Plan is anchored in relevant policy and legal framework as

[1] Riva, M., Hodes, G.S., Comstock, M., Huyer, S., Chao, V., Bakhtiari, F., Desgain, D.D., Hinostroza, M.L., Puig, D., Levin, K., Rich, D., Northrop, E., Elliott, C., Dinshaw, A., & Mogelgaard, K. (2020). Implementing nationally determined contributions (NDCs), https://backend.orbit.dtu.dk/ws/files/208988312/implementing_ndcs_report.pdf

elaborated upon in the subsequent sections.

Higher level functions in NDC implementation include:

i. Coordination: This refers to the process of overseeing the performance of all the roles and responsibilities under each of the core functions under the NDC Implementation Plan. The institutions responsible for coordination include the Office of the Prime Minister (OPM), the National Planning Authority (NPA) and the Climate Change Department of the Ministry of Water and Environment (MWE).

ii. Execution: This refers to the process of turning the priority NDC mitigation and adaptation actions into concrete projects of activities which extend to the lowest administrative level i.e. the village. This function is largely the responsibility of government Ministries, Departments and Agencies (MDAs) which are responsible for formulating and implementing NDCs through sectoral and cross-cutting programmes, liaising with Sector Working Groups to ensure technical soundness of sector-specific NDC-aligned projects, among other functions.

iii. Resource mobilisation: This is the process of searching for and acquiring the requisite volumes of climate finance for the implementation of various activities that contribute towards achieving the goals set in the updated NDC. This function is primarily the responsibility of the National Planning Authority, Ministry of Finance Planning and Economic Development, Ministry of Justice and Constitutional Affairs, and the Climate Change Department of the Ministry of Water and Environment.

iv. Monitoring, Reporting and Evaluation: This process involves supporting institutions that are assigned various roles and responsibilities under each function to undertake monitoring and evaluation of NDC mitigation and adaptation actions/activities. Monitoring, Reporting and Evaluation is also spearheaded by the National Planning Authority, Ministry of Finance Planning and Economic Development, the Office of the Auditor General, and the Climate Change Department of the Ministry of Water and Environment.

The Office of the Prime Minister (OPM) and the Uganda Bureau of Statistics (UBOS) support evaluation by backstopping evaluation, and guiding data collection respectively. The MoFPED, NPA, and CCD then act as the iMRV control centre which reports NDC implementation progress through Annual Monitoring Reports to Parliament, Development Partners and Private Partners.

In this NDC tracking and monitoring framework, the Monitoring, Reporting, and Evaluation process, specifically under the MRV management system, has been further subdivided into the key activities in the tracking and monitoring process including data collection, data analysis and synthesis, and data storage, management and dissemination.

The responsible institution(s) for each function, for each NDC mitigation or adaptation action has been clearly provided in the NDC tracking frameworks for each sector.

2.1.4 Transport Sector

This section focuses on the institutions that will be responsible for the realization of the key mitigation and adaptation measures within the transport sector, as outlined in the NDC tracking framework. They will transform these actions into tangible projects and initiatives at all levels of administration for Uganda. The subsequent tables detail the roles and responsibilities of institutions tasked with the execution of these NDC Actions for the transport sector.

Institutions responsible for the NDC Transport Sector Adaptation Actions

Table 2-1: Institutions responsible for the NDC Transport Sector Adaptation Actions

No.	NDC Adaptation action	Indicator	Responsible Organization
1	Increasing the stock of transport infrastructure while also considering their resilience to climate change.	Length of Paved National Roads	MoWT, UNRA, URF, MoFPED, MoLG, KCCA
		Domestic (Ro'Pax) Passenger Ferries	MoWT, UNRA, MoFPED
		Ferry Crossings	MoWT, UNRA, MoFPED
		Length of Permanent Railway Lines	MoWT, URC, SGR, MoFPED
		Number of resilient bridges	MoWT, UNRA, URF, MoFPED, MoLG, KCCA
2	Revise design codes, regulations and guidelines to climate proof strategic transport infrastructure	Revised Transport Regulations and Design Codes	MoWT
3	Promote modes of transport that consider greenhouse gas emissions reduction such as use of non-motorised transport and increased access to high-volume public transport options to replace single-car commuter trips in cities and urban areas	Length of Non-Motorized Transport (NMT) corridors	MoWT, KCCA

Table 2-2: Institutions responsible for the NDC Transport Sector Mitigation Actions

No.	NDC Mitigation action	Indicator	Responsible Organization
1	Road Transport Fuel Efficiency	Rate of Adoption of Fuel-Efficient Vehicles	MoWT, MEMD
2	Alternative Fuel Switch	Volume of Alternative Fuels Consumed	MoWT, MEMD
		Alternative Fuel Infrastructure Development	MoWT, MEMD

No.	NDC Mitigation action	Indicator	Responsible Organization
3	Development of Non-Motorised Transport (NMT) infrastructure	Length of NMT Infrastructure	MoWT, KCCA
		Integration of NMT in national road design standards	MoWT
4	MGR – Meter Gauge Railway rehabilitation for freight transit	Length of Meter Gauge Railway (MGR) rehabilitated per year,	MoWT, URC
		Fuel Economy of Locomotives	URC
5	Efficient operation of public transportation	Public Bus Fleet Expansion	MoWT, URA, KCCA
		Public Transport Infrastructure	MoWT, KCCA
		Transportation System Modernization	MoWT, KCCA
6	Residential trip avoidance through town planning and transport orientated development	Transit-Oriented Development (TOD) Planning	MoWT, KCCA
7	Bus Rapid Transit (BRT)	BRT Network Expansion	MoWT, KCCA
8	Metro rail	Metro Rail Network Development	MoWT, KCCA
9	LRT – Light Rail Transit	LRT Network Expansion	MoWT
10	SGR – Standard Gauge Railway	Length of SGR network	SGR
11	Electric Road Vehicles	Adoption of electric vehicles	MoWT, URA
12	Construction of Oil Pipeline	Progress in oil pipeline construction	PAU, MEMD
13	Utilisation of water transport	Increase in water transport capacity and usage	MoWT, UNRA
14	E-commuting	Adoption of remote work practices	MGLSD, UBOS
15	Electrification of Rail	Percentage of Passenger Rail Network Electrified	MoWT, SGR

2.1.5 Waste Sector

This section focuses on the institutions that will be responsible for the realization of the key mitigation and adaptation measures identified for the waste sector NDC Tracking Framework. The subsequent tables detail the roles and responsibilities of institutions tasked with the execution of the various mitigation and adaptation actions identified in the NDC Tracking Framework.

Table 2-3: Institutions responsible for Adaptation Actions in the NDC relevant to Waste Sector.

No.	NDC Adaptation Action relevant to Waste Sector	Indicator for tracking progress of NDC Action Implementation	Responsible Organization for collecting indicator data of NDC Action	Responsible Organization for Indicator data Compilation
1	Increase to sanitation and wastewater treatment infrastructure and services	Population with access to basic sanitation	MoH; UNICEF-Uganda	UBOS
		Population using safely managed sanitation services, including a hand-washing facility with soap and water	MoH; UNICEF-Uganda	UBOS
		Amount of water-and sanitation related official development assistance that is part of a government-coordinated spending plan	NDP Programme Secretariat-OPM; NPA; MoFPED	CFU-MoFPED
		Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management	MoLG	Water and Environment Sector Liaison Department-MWE
		Sewerage coverage	NWSC	NEMA; DWRM
		Total kilometers of Sewerage Network coverage	NWSC	NEMA; DWRM
		Number of new sewerage connections achieved annually	NWSC	NEMA; DWRM
2	Improve solid waste management	Number of municipalities/cities with sustainable waste management facilities	KCCA; MoLG; Urban Authorities	NEMA
		Efficiency of solid waste collection	KCCA; MoLG; Urban Authorities	NEMA
3	Promote sustainable urbanization and housing	Length of drainage channels constructed/improved in Greater Kampala Metropolitan Area	KCCA	NEMA; DWRM

Table 2-4: Institutions responsible for the NDC Waster Sector Mitigation Actions

No.	NDC Mitigation Action for Waste Sector	Indicator for tracking progress of Waste NDC Mitigation Action Implementation	Responsible Organization for collecting indicator data of NDC Action	Responsible Organization for Indicator data Compilation
1	Efficient Solid and Wastewater Management in Planned Green Cities	Infrastructure improved or constructed for Solid Waste and Wastewater management in Cities	Urban Authorities; KCCA; MoLHUD; MoLG	NEMA
		Methane Emissions or reductions from disposal of landfills or managed waste disposal sites	Urban Authorities; KCCA; MoLHUD; MoLG	NEMA
		Total amount of solid waste handled at solid waste management facilities	Urban Authorities; KCCA; MoLHUD; MoLG	NEMA
		Length of sewer line or number of wastewater management systems constructed in the new cities	NWSC; Urban Authorities; KCCA; MoLG	NEMA; DWRM
		Proportion of wastewater generated that is collected for treatment including decentralized sanitation facilities	NWSC	Water and Environment Sector Liaison Department-MWE
		GHG emission reduction from methane avoidance or recovery from improved wastewater treatment or methane recovery	NWSC	NWSC; NEMA
2	NAMA-Schools bio-latrines (NAMA on Integrated Sustainable Energy Solutions for Schools in Uganda)	Emissions reductions achieved from the use of Biogas from bio-digesters constructed under the schools bio-latrine-NAMA	MoES; NIE	Waste Sector Task Sector Working Group, CCD-MWE
		Operational Biogas Digesters constructed under the Schools bio-latrine NAMA	MoES; NIE	Waste Sector Task Sector Working Group, CCD-MWE

No.	NDC Mitigation Action for Waste Sector	Indicator for tracking progress of Waste NDC Mitigation Action Implementation	Responsible Organization for collecting indicator data of NDC Action	Responsible Organization for Indicator data Compilation
3	Sugarcane waste management	Emissions avoided by diversion of solid waste for energy production	MoTIC	NEMA
		Amount of sugarcane solid waste diverted for energy generation	MoTIC	MEMD
4	NAMA-Integrated Wastewater Treatment for Agri-process water in Uganda (NAMA on Integrated Waste Management and Biogas in Uganda)	Number of people benefitting from improved organic waste management	NIE	NEMA
		Amount of electricity generated from biogas recovery and utilization for energy generation	NIE	MEMD
		Achieved direct GHG emission reductions by pilot biogas energy plants and biogas utilization	NIE	MEMD
5	Wastewater Treatment	Proportion of domestic and industrial wastewater flows safely treated	NWSC	Water and Environment Sector Liaison Department-MWE
		Emissions resulting from wastewater treatment	NWSC	NWSC
6	Energy Recovery	Number of wastewater plants with Methane Recovery and utilization for captive energy requirements	NWSC; KCCA; MoLG; ERA; MEMD	NEMA
7	Energy Efficiency	Energy consumption per cubic meter (m3) of sewage or freshwater treated	NWSC; KCCA; MoLG	NWSC; NEMA

No.	NDC Mitigation Action for Waste Sector	Indicator for tracking progress of Waste NDC Mitigation Action Implementation	Responsible Organization for collecting indicator data of NDC Action	Responsible Organization for Indicator data Compilation
		Percentage reduction in GHG intensity (Reduction in tCO2e/m3 of water produced or wastewater treated)	NWSC	NEMA
8	Renewable Energy	Baseline fossil fuel displaced with introduction of renewable energy sources in wastewater treatment or management	NWSC; KCCA; MoLG	NWSC
		Emissions reductions from displacement of fossil fuels with renewable energy sources in wastewater treatment or management	NWSC; MoLG; KCCA	NWSC

3 Development of a NDC tracking and monitoring framework for the Transport and Waste sectors

NDC Tracking Framework for the Transport and Waste sectors

The development of the NDC tracking framework for the Transport and Waste sectors was guided by the mitigation and adaptation actions stipulated in Uganda's updated NDC and developed based on the indicators provided in the NDC, and additional indicators from literature review. The development of this NDC tracking and monitoring framework was guided by the deliverable 3.1 of this project, i.e., the database of adaptation and mitigation activities/actions associated with the Transport and Waste sectors.

It is important to note that tracking framework, specifically any data sources identified, and the methods recommended for data collection will be validated by the relevant stakeholders on an ongoing basis, and during the validation phase of the project. As a result, new information will be obtained from stakeholders on an ongoing basis, and the tracking framework will be continuously updated until the end of the project.

The general structure of the NDC tracking framework for the both the transport and waste sectors is similar, as described in the sections below.

3.1.1 Components of the framework

The draft monitoring and tracking framework for the NDC actions in transport and waste sectors is Excel-based, and includes the following major entries:

- NDC mitigation and adaptation actions,
- Performance indicator for the respective mitigation and adaptation actions,
- Brief description of each indicator,
- Data inputs/requirements for each indicator and their respective data sources or data collection methods, and
- Analysis necessary to calculate or obtain information on the indicator from the data inputs.

Under the data collection section, the transport framework also assessed whether the data is currently being collected at the national or regional level, at the time of developing this NDC tracking framework. This assessment was made based mainly on the information available from stakeholders and public databases.

This same exercise will subsequently be conducted for the waste sector NDC tracking framework, but sufficient information has currently not been obtained to have this completed for the waste sector.

In addition to the elements described in the general structure of the tracking framework, other additional parameters which are unique to the tracking framework for the waste sector include the classification of the key performance indicators, the Sustainable Development Goal (SDG) to which the adaptation indicators are aligned, and the rationale for the adaptation performance indicators which were included in the tracking framework.

3.1.2 NDC mitigation and adaptation actions and their respective indicators

The development of the NDC tracking framework was guided by the mitigation and adaptation actions in the transport and waste sectors, as provided in Uganda's updated NDC, and their respective indicators as complied in the draft database of mitigation and adaptation actions (ICAT deliverable K).

However, the list of indicators for each action was expanded to include other relevant indicators, as obtained from review of international best practice, consultation with key stakeholders in the respective sectors, and indicators in related programmes or projects under implementation.

For both the transport and waste sectors, new indicators which were previously not included in the NDC but have been added to the tracking framework. These are presented in Table 2-1 for the transport sector and Table 2-2 for the Waste sector. The feasibility of collecting data on each of the indicators

specified will be assessed during the project validation stage, along with the key stakeholders in each sector.

During the process of selecting indicators, efforts were made to ensure that the performance indicators incorporated in the NDC tracking and monitoring framework, for the different NDC mitigation and adaptation actions were Specific, Measurable, Achievable, Realistic and Time-bound (SMART). According to the United States Bureau of Educational and Cultural Affairs (ECA)[2]

- Specificity refers to the ability of the indicators to be translated into operational terms, with a narrow focus on the 'who', 'how', 'where' and 'what' of the intervention, in relation to the outcome being monitored.
- Measurability refers to the capacity to be counted, observed, analysed, tested, and challenged or have the results replicated.
- Achievability refers to when the performance indicator and the target accurately specify the amount or level of what is to be measured to meet the result/outcome. The indicator should be achievable both because of the intervention (in this case the NDC mitigation and/or adaptation action), and as a measure of realism.
- Realism or relevance of indicators refers to the ability of indicators to be a valid measure of the result/outcome and to be linked through research and professional expertise. It is important to ensure that there is a relationship between what the indicator measures and the theories that help create the outcomes for NDC mitigation or adaptation actions.
- Time-bounded performance indicators allow the NDC tracking and monitoring framework to track progress in a cost-effective manner, at the desired frequency for a set period, with clear identification of the particular stakeholder group(s) to be affected by each mitigation and action.

Table 3-1: New indicators incorporated in the NDC tracking framework for the transport sector

No.	NDC mitigation or adaptation action	New indicators added
1.	Road Transport Fuel Efficiency	1. Rate of adoption of fuel-efficient vehicles
2.	Alternative Fuel Switch	1. Volume of Alternative Fuels Consumed 2. Alternative Fuel Infrastructure Development
3.	Development of Non-Motorised Transport (NMT) infrastructure	1. Integration of NMT in national road design standards
4.	MGR – Meter Gauge Railway rehabilitation for freight transit	1. Length of MGR rehabilitated 2. Fuel Economy of Locomotives

[2] United States Bureau of Educational and Cultural Affairs (n.d), "A good start with S.M.A.R.T. (indicators)", https://eca.state.gov/files/bureau/a_good_start_with_smart.pdf

[iii] Enriquez, A., Tun, T. H., & Platzer, L. (2018). Uganda's National Transport Master Plan: Potential for Low-Carbon Development. World Resources Institute Ross Center for Sustainable Cities.

5.	Efficient operation of public transportation	1. Public Bus Fleet Expansion 2. Transportation System Modernization
6.	Residential trip avoidance through town planning and transport orientated development	1. Transit-Oriented Development (TOD) Planning
7.	Bus Rapid Transit (BRT)	1. BRT Network Expansion
8.	Metro rail	1. Metro Rail Network Development
9.	Light Rail Transit (LRT)	1. LRT Network Expansion
10.	Standard Gauge Railway (SGR)	1. Length of the SGR network
11.	Electric Road Vehicles	1. Adoption rate of electric vehicles
12.	Construction of Oil Pipeline	1. Progress in oil pipeline construction
13	Utilisation of water transport	1. Increase in water transport capacity and usage
14.	E-commuting	1. Adoption of remote work practices
15.	Build climate resilient roads, bridges, water, and Rail transport infrastructure systems.	1. Length of Paved National Roads 2. Domestic Passenger Ferries 3. Ferry Crossings 4. Length of Permanent Railway Lines 5. Number of resilient bridges
16.	Revise design codes, regulations and guidelines to climate proof strategic transport infrastructure	1. Revised Transport Regulations and Design Codes

Table 3-2: New indicators incorporated in the NDC tracking framework for the waste sector

No.	NDC mitigation or adaptation action	New indicators added
1.	Efficient Solid and wastewater Management in Planned Green Cities	1. Km of sewer line constructed 2. Number of solid or wastewater management systems in new cities 3. Methane emissions avoided 4. Proportion of wastewater generated that is collected for treatment including to decentralized sanitation facilities

		5. Total amount of solid waste handled at solid waste management facilities
2.	NAMA - Schools bio-latrines (NAMA on Integrated Sustainable Energy Solutions for Schools in Uganda)	1. Emissions reductions achieved from the use of Biogas from biodigesters 2. Operational Biogas digesters constructed under the Schools biolatrine-NAMA
3.	Sugarcane waste management	1. Amount of sugarcane solid waste diverted for energy generation. 2. Emissions avoided from diversion of sugarcane waste for energy production from solid waste.
4.	NAMA Integrated Wastewater Treatment for Agro-process water in Uganda (This NAMA has been revised and named the NAMA on Integrated Waste Management and Biogas in Uganda)	1. Amount of electricity generated from biogas recovery and utilization for energy generation Railway Capacity Utilisation 2. Emissions reductions achieved through biogas or methane recovery
5.	Wastewater treatment- enhancement of collection and treatment.	1. Proportion of domestic and industrial wastewater flows safely treated. 2. Emissions resulting from wastewater treatment with methane recovery or avoidance
6.	Energy Recovery in wastewater treatment	1. Number of wastewater Plants with Methane recovery and utilization for captive energy requirements
7.	Energy Efficiency in wastewater treatment	1. Energy Consumption per m3 of sewage or freshwater treated. 2. Percent reduction in GHG intensity. i.e. Reduction in tCO2e per m3 of water produced or wastewater treated .
8.	Renewable energy in water and wastewater treatment	1. Emission reductions resulting from displacing fossil fuels in water supply or wastewater treatment

3.1.3 Data inputs for each indicator, and their respective data sources/data collection methods

The data inputs for each indicator identified were then listed exhaustively for the two sectors, and their respective data collection methods listed or explained. This information was based on the Consultant's experience, and review of the most efficient data collection practices in the field of transportation studies and most common sources of data for estimation of emissions from the waste sector.

For some data inputs for the transport sector, specific government entities were listed as the custodians of the data. This was based on the consultation meetings which were held between the Consultant and the different stakeholders, as well as different reports and publications which they release periodically. In other instances, the entities were listed as proposed data collectors and custodians.

The information provided will subsequently updated for both sectors as more information is gathered from the various stakeholders.

3.1.4 Analysis of the data collected to calculate the indicators.

The identification of data collection methods was then followed by identification of the datasets which are currently being collected for the transport sector, and those which are not being collected at the national or regional level.

3.1.5 Analysis of data availability

The feasibility of collecting the different datasets proposed will be analysed at the project validation stage of the project, based on stakeholders' inputs on the available resources.

Data collection templates for activity data to track the identified NDC actions in the Transport and Waste sectors

The general structure of the data collection templates for activity data to track the identified NDC actions in the Transport and Waste sectors included data collector and compiler information, any specific assumptions and notes on the methodology, date of data collection and reporting period, measurement units, and columns for the different data required to estimate or quantify the specific performance indicator.

Separate data collection templates were developed for each performance indicator, to increase the relevance of different templates for the different stakeholders and their specialised data outputs and requirements. The performance indicators for which templates were developed were selected based on several factors including:

i. Feedback from the Client to reduce the number of indicators,

ii. The guidance of the 'SMART' indicator framework, and

iii. Feasibility of data collection.

Following the project validation stage, and the piloting of the data collection templates, Excel formulae will be incorporated into the data collection templates to ease the process of data entry, data handling, and improve the accuracy level of calculating the values of the indicators from the raw data by reducing the probability of human error in calculations.

3.1.6 Transport Sector

The data collection templates for activity data to track the identified NDC actions in the Transport sector were further classified into the different modes of transportation, to increase relevance for different stakeholders.

Data collection templates were developed for the following indicators:

i. Rate of adoption of fuel-efficient vehicles
ii. Improvement in national fleet average fuel economy
iii. Integration of fuel efficiency into national transport policy
iv. Number of vehicles over 20 years retired annually.
v. Volume of alternative fuels consumed.
vi. Alternative fuel vehicle adoption rate
vii. Alternative fuel infrastructure development
viii. Total length of NMT infrastructure (e.g., cycle lanes, walking lanes) completed annually.
ix. Integration of NMT in national road design standards
x. MGR railway rehabilitation progress
xi. Fuel economy of MGR locomotives
xii. Public bus fleet expansion
xiii. Public transport infrastructure development
xiv. Transportation system modernisation
xv. Transit-oriented development (TOD) planning
xvi. BRT network expansion
xvii. Metro rail network development
xviii. LRT network expansion
xix. SGR network.
xx. Adoption of electric vehicles.
xxi. Increase in water transport capacity and usage.
xxii. Length of paved national roads.
xxiii. Domestic passenger ferries.
xxiv. Ferry crossings.
xxv. Resilient bridges constructed.

xxvi. Length of permanent railway lines.

xxvii. Revised transport regulations and design codes.

3.1.7 Waste Sector

The data collection templates for activity data to track the identified NDC actions in the Waste sector were classified into the IPCC waste sub-categories of solid waste, and wastewater.

Data collection templates were developed for the following indicators:

i. Infrastructure improved or constructed for solid waste and wastewater management in cities (solid waste and wastewater)

ii. Methane Emissions or reductions from disposal of landfills or managed waste disposal sites

iii. Total amount of solid waste handled at solid waste management facilities.

iv. Length of sewer line or number of wastewater management systems constructed in the new cities.

v. Proportion of wastewater generated that is collected for treatment including to decentralized sanitation facilities.

vi. GHG emission reduction from methane avoidance or recovery from improved wastewater treatment or methane recovery

vii. Emission reductions achieved from the use of Biogas from biodigesters constructed under the schools bio latrine - NAMA.

viii. Operational Biogas digesters constructed under the school's bio-latrine NAMA.

ix. Emissions avoided by diversion of solid waste for energy production.

x. Amount of sugarcane solid waste diverted for energy generation.

xi. Number of people benefitting from improved organic waste management

xii. Amount of electricity generated from biogas recovery and utilisation for energy generation.

xiii. Achieved direct GHG emission reductions by pilot biogas energy plants and biogas utilisation.

xiv. Proportion of domestic and industrial wastewater flows safely treated.

xv. Emissions resulting from wastewater treatment.

xvi. Number of wastewater plants with methane recovery and utilisation for captive energy requirements

xvii. Energy consumption per cubic metre of sewage or freshwater treated.

xviii. Percent reduction in GHG intensity (Reduction in tco2e/m3 of water produced or wastewater treated).

xix. Baseline fossil fuel displaced with introduction of renewable energy sources in wastewater treatment or management.

xx. Emissions reductions from displacement of fossil fuels with renewable energy sources in

wastewater treatment or management.

xxi. Population with access to basic sanitation.

xxii. Population using safely managed sanitation services, including a hand-washing facility with soap and water.

xxiii. Amount of Water and Sanitation-related Overseas Development Assistance (ODA) that is part of a government coordinated plan.

xxiv. Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management.

xxv. Sewerage service coverage.

xxvi. Total kilometres of Sewerage network coverage.

xxvii. Number of new sewerage connections achieved annually.

xxviii. Efficiency of solid waste collection.

xxix. Number of municipalities/ cities with sustainable waste management facilities.

xxx. Length of drainage channels constructed/ improved in Greater Kampala Metropolitan Area (GKMA).

4 References

The comprehensive reference lists for all the resources used to develop the NDC Tracking and Monitoring Framework for the Transport and Waste sector Polices and Measures are provided in the Excel files for both the transport and waste sectors attached to this report.